

Climate Change Expert Group

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Insights for designing mitigation elements in the next round of Nationally Determined Contributions (NDCs)

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Abstract

The Paris Agreement is underpinned by nationally determined contributions (NDCs) in which Parties set out how they plan to support the Agreement's long-term temperature goal. Parties are to submit their next NDCs by early 2025, informed by the first global stocktake (GST1). The GST1 sets out key signals and a series of mitigation focused calls in line with 1.5°C pathways that can guide the next generation of NDCs. This paper explores how Parties can prepare enhanced NDCs that take forward GST1 outcomes on mitigation and relevant provisions on NDCs, building on lessons learned from successive NDCs and available follow-up opportunities to support this process. Insights from experiences highlight the interlinkages between enhancing NDC ambition and implementation. Ambitious NDCs underpinned by robust implementation plans and accompanying investment plans can ensure NDCs are action oriented, implementation ready and investable. At the same time, adopting whole-of-government, whole-of-society approaches to NDCs can foster a sense of national ownership and increase social acceptance, leading to more ambitious NDCs and support subsequent implementation. The paper also explores potential guidance that could be relevant for negotiations on NDC features in 2024. While recognising the nationally determined character of NDCs, Parties could use these negotiations to provide clarity on new issues that have emerged since the Paris Agreement was adopted and on existing elements that could benefit from clarification. When addressing negotiations on NDC features, Parties may also want to consider a longer-term perspective beyond the next NDCs and links with other relevant negotiation processes on reporting and transparency.

JEL Classifications: Q56, Q58, F53, Q54

Keywords: Climate change, UNFCCC, Paris Agreement, Global stocktake, NDCs

Résumé

L'Accord de Paris repose sur les contributions déterminées au niveau national (CDN) dans lesquelles les Parties exposent la manière dont elles prévoient de contribuer à l'objectif de température à long terme fixé par l'Accord. Les Parties sont tenues de présenter leur prochaine CDN début 2025 au plus tard, sur la base des résultats du premier bilan mondial. Ce dernier a envoyé des signaux forts et propose un ensemble de mesures d'atténuation de nature à limiter le réchauffement à 1.5 °C pour orienter les prochaines CDN. L'objet du présent rapport est d'analyser comment les Parties peuvent établir des CDN renforcées qui prennent en compte les résultats du premier bilan mondial concernant l'atténuation et les dispositions relatives aux CDN, en mettant à profit les enseignements tirés de la conception des CDN précédentes et les opportunités que représentent les processus existants de suivi du premier bilan mondial. Les expériences passées mettent en lumière un lien d'interdépendance entre le degré d'ambition des CDN et la mise en œuvre de celles-ci. L'adoption de CDN ambitieuses à des plans de mise en œuvre robustes accompagnés de plans d'investissement visant à la mobilisation des financements contribue à garantir des CDN orientées vers l'action, prêtes à être mise en œuvre et susceptibles de donner lieu à des investissements. Dans le même temps, considérer les CDN du point de vue de l'ensemble du gouvernement et de la société devrait permettre de favoriser le sentiment d'appropriation nationale et d'accroître l'acceptabilité sociale et, ainsi, d'aboutir à des CDN plus ambitieuses et faciliter ensuite leur mise en œuvre. Le présent document explore également de possibles orientations en vue des négociations sur les caractéristiques des CDN prévues en 2024. Tout en reconnaissant le principe de détermination au niveau national des CDN, les Parties pourraient mettre à profit ces négociations pour clarifier les nouvelles questions survenues depuis l'adoption de l'Accord de Paris ainsi que les éléments méritant des précisions. Dans le contexte des négociations sur les caractéristiques des CDN, les Parties pourraient également juger utile de considérer la situation à plus long terme, au-delà de la prochaine série de CDN, et de s'intéresser aux liens existant avec d'autres processus de négociation relatifs aux rapports et à la transparence.

Classification JEL : Q56, Q58, F53, Q54

Mots clés: Changement climatique, CCNUCC, Accord de Paris, Bilan mondial, CDN

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List of Acronyms

AFOLU	Agriculture, Forestry and Other Land Use
APA	Ad Hoc Working Group on the Paris Agreement
BTR	Biennial Transparency Report
CAEP	Climate Action Enhancement Package
CAT	Climate Action Tracker
CCXG	Climate Change Expert Group
CERC	Climate Equity Reference Calculator
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
ETF	Enhanced Transparency Framework
EU	European Union
FMCP	Facilitative Multilateral Consideration of Progress
GHG	Greenhouse gas
GST	Global Stocktake
GST1	First Global Stocktake
GWP	Global Warming Potential
ICTU	Information to facilitate Clarity, Transparency and Understanding
IEA	International Energy Agency
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
JTWP	Just Transition Work Programme
LDCs	Least Developed Countries
LT-LEDS	Long-term Low Greenhouse Gas Emissions Development Strategy
MPG	Modalities, Procedures and Guidelines

MWP	Mitigation Work Programme
NCQG	New Collective Quantified Goal on climate finance
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-Operation and Development
PCCB	Paris Committee on Capacity-building
SB	Meeting of the UNFCCC Subsidiary Bodies
SBSTA	Subsidiary Body for Scientific and Technological Advice
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
TER	Technical Expert reviews
TW	Terawatt
UNFCCC	United Nations Framework Convention on Climate Change
UNSG	United Nations Secretary General

Executive summary

The 2015 Paris Agreement established a bottom-up system of nationally determined contributions (NDCs) to support the global response to climate change. It also set up multilateral processes to assess collective progress towards its goals, to track the implementation and achievement of NDCs, and to progressively strengthen the ambition of efforts over time. Almost eight years since the Paris Agreement entered into force, collective efforts are not on track towards the long-term goals of the Agreement, with significant gaps in both the ambition and implementation of current efforts. The first global stocktake (GST1) of the Paris Agreement recognised the urgent need to address these persisting gaps and set out key signals to inform efforts going forward. Parties are to submit their next NDCs by early 2025 informed by the outcomes of GST1. This next generation of NDCs are expected to represent a progression beyond current efforts and reflect highest possible ambition, considering common but differentiated responsibilities and respective capabilities in light of different national circumstances.

As Parties prepare their next NDCs they have the benefit of many years of experience in designing and implementing successive NDCs to build on. Yet, they also face numerous challenges including how to design ambitious, implementation ready and investable NDCs that respond to the GST1 outcomes and reflect other provisions on NDCs. Moreover, the NDC preparation process is taking place in a charged context that includes geo-political tensions, economic uncertainties, and national elections in many countries. While preparing ambitious new NDCs to drive action to 2035, Parties also need to implement their current NDCs to deliver enhanced efforts in this critical decade. Navigating these challenges will not be easy but will be critical to deliver the course correction needed to keep the 1.5°C goal within reach. This paper explores how to prepare enhanced new NDCs that take forward GST1 mitigation outcomes and other relevant provisions on NDCs, building on lessons learned from the design and implementation of current NDCs. The paper also explores potential guidance that could be relevant for negotiations on NDC features in 2024.

The GST1 reiterates existing provisions in the Paris Agreement on NDCs and sets out new goalposts and signals to inform the next round of NDCs. On mitigation, the GST1 encourages all Parties to put forward economy-wide emission reduction targets that cover all greenhouse gases (GHGs), sectors and categories in their next NDCs and to align their NDCs with their long-term low GHG emission development strategies (LT-LEDS). The GST1 also calls on Parties to contribute, in a nationally determined manner, to a series of global mitigation focused calls in line with 1.5°C pathways. The new goalposts for NDCs and the mitigation focused calls in the GST1 represent a notable step forward from previous provisions. The GST1 decision also provides markers to guide follow-through at both the technical and the political level. However, translating the global signals in the GST1 into domestic NDC processes is not straightforward. A key question is how to make best use of available opportunities and build on experiences to implement the course correction set out in the GST1.

Experiences in developing successive NDCs, implementing domestic mitigation measures, insights from the GST1 process, and on-going preparations of biennial transparency reports (BTRs), provide a solid foundation which can be built on in approaching the design and development of the next generation of NDCs. Some useful insights from experiences include:

- *Interlinkages between enhancing NDC ambition and implementation:* More ambitious NDCs need to be considered alongside national implementation capacities and frameworks to ensure NDCs are action oriented, implementable, and nationally owned. NDCs underpinned by robust implementation and investment plans can support the delivery of national climate commitments.
- *Means of implementation, in particular finance and investment, can enable NDC implementation and facilitate NDC ambition:* Preparations of new NDCs need to move forward in parallel to ongoing discussions on means of implementation and finance. A robust decision on the new collective quantified goal (NCQG) on climate finance at COP29 alongside wider efforts to mobilise domestic and international finance and investment can create an enabling environment for enhanced NDCs.
- *Strengthening NDC processes, information and transparency can help to increase ambition and implementation:* Adopting whole-of-government, whole-of-society approaches to the preparation and implementation of NDCs can foster a sense of ownership, increase buy-in and social acceptance, leading to more ambitious NDCs and supporting subsequent implementation. Continued provision of capacity building support for NDCs as envisaged in the GST1 decision can help to strengthen domestic NDC processes and improve information to inform more ambitious NDCs, enhance transparency and help to track implementation.
- *Role of peer exchange and mutual learning:* New spaces for dialogue envisaged in the GST1 and discussions under relevant existing UNFCCC activities, such as the mitigation work programme and the just transition work programme, can provide opportunities for peer exchange to inform NDC preparations. For example, discussions could explore how to prepare more ambitious emission reduction targets, how to align NDCs with 1.5°C, how to translate global calls from the GST to the national level, taking into account different starting points and national circumstances.
- *Co-ordinated political advocacy efforts to maintain momentum:* The troika of COP28-COP29-COP30 Presidencies could play a key role in maintaining political pressure on taking forward GST1 outcomes in enhanced NDCs. These efforts could be co-ordinated with other actors and discussions in relevant international fora, such as the G20 and G7, to keep the spotlight on NDCs.
- *Role of actors outside the UNFCCC process:* The UN High-level Climate Champions, non-Party stakeholders and international organisations can support the translation of GST1 outcomes in domestic NDC processes, track progress towards global calls in the GST1, and support delivery on the ground.

In parallel to preparing their next NDCs, Parties are also expected to resume negotiations on NDC features in 2024. Any potential further guidance on features of NDCs would need to recognise the nationally determined character of NDCs which remains at the heart of the Paris Agreement. With this consideration in mind and building on insights from GST1, Parties need to reflect on how/where further guidance on NDC features would provide added value. It could be helpful for Parties to start by elaborating a common understanding of what constitutes “features” of NDCs, while respecting national circumstances. Additionally, the purpose of any guidance can benefit from discussion as the current timeline could limit its application in the next round of NDCs in 2025. The negotiations also need to consider potential overlaps and links with relevant negotiation processes on reporting and transparency.

While recognising the nationally determined character of NDCs, Parties could take the opportunity of negotiations on NDC features to provide clarity on new issues that have emerged since the Paris Agreement was adopted and on existing elements that could benefit from clarification. For instance, further guidance could encourage Parties to put forward NDCs aligned with net-zero aligned LT-LEDS. Further guidance could encourage Parties to clarify how emission removals contribute to achieving their NDC target to improve transparency and facilitate assessments of expected residual emissions. Further guidance could encourage certain Parties that have not yet done so to adopt absolute reduction targets in their next NDCs, and further practical guidance could be provided on how to transition to economy-wide targets covering all GHGs, sectors and categories, aligned with limiting global warming to 1.5°C.

1. Introduction

The Paris Agreement is underpinned by nationally determined contributions (NDCs) in which Parties set out how they plan to support the Agreement's long-term temperature goal. The Paris Agreement includes provisions to assess progress towards its goals at the collective level through a periodic global stocktake (GST) process, and at the individual level through regular reporting by Parties under the Enhanced Transparency Framework (ETF). Efforts are to be ratcheted-up over time with more ambitious NDCs put forward every five years informed by the outcomes of the GST. The next round of NDCs are to be submitted by early 2025. These NDCs are among others expected to represent a progression beyond current efforts and reflect each Party's highest possible ambition, considering its common but differentiated responsibilities and respective capabilities, in light of different national circumstances (UNFCCC, 2016^[1]).

The 28th Conference of the Parties (COP28) in December 2023 marked the conclusion of the Paris Agreement's first GST (GST1), following almost two years of information collection and technical discussions under the United Nations Framework Convention on Climate Change (UNFCCC). The GST1 recognises that despite progress, Parties are collectively not on track to achieving the purpose and goals of the Paris Agreement. Decision 1/CMA.5 (hereafter referred to as the GST1 decision) recognises the urgent need for action to address persisting gaps and sets out key signals to inform the way forward, including the next round of NDCs (UNFCCC, 2023^[2]).

As Parties prepare their next NDCs they have the benefit of many years of experience in designing and implementing successive NDCs to build on. However, they also face numerous challenges including how to design ambitious, implementation ready NDCs that respond to the various calls in the GST1 as well as other provisions and guidance on NDCs. Furthermore, the NDC preparation process is taking place in a charged context including high geo-political tensions, economic uncertainties, on-going conflicts, and a historic number of elections taking place across the world in 2024. Navigating these challenges will not be easy, but doing so will be critical to implement the course correction the GST1 sets out to keep the goals of the Paris Agreement within reach.

This paper explores how to prepare enhanced NDCs that take forward the GST1 outcomes on mitigation, building on lessons learned from the design and implementation of current NDCs. The paper also explores potential guidance that could be relevant for negotiations on NDC features in 2024. This paper is structured as follows: section 2. provides a brief background on current guidance and provisions on NDCs, unpacks the mitigation focused calls in the GST1 and related follow-up processes to support the preparation of enhanced NDCs by early 2025. Section 3. explores insights for preparing enhanced NDCs aligned with the mitigation calls in GST1, including insights from 1.5°C compatible global emission pathways and for preparing ambitious, implementation ready NDCs drawing on country experiences. Section 4. focuses on the negotiations on NDC features in 2024 and sets out potential elements that could be relevant for the discussions. Finally, section 5. provides a synthesis of key findings and conclusions from the analysis in this paper.

2. Context

This section sets out a brief background on NDCs, including current guidance on the design and implementation of NDCs as set out in the Paris Agreement, subsequent guidance adopted by Parties, and goalposts outlined in the GST1 decision. This section also unpacks the mitigation focused calls in the GST1 decision and follow-up processes in the UNFCCC and beyond that can support preparations of the next round of NDCs.

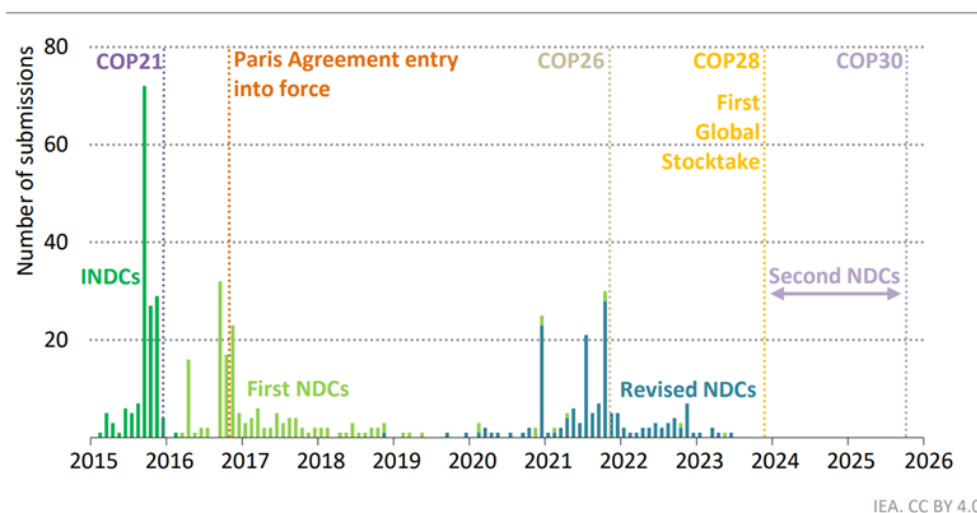
2.1. Overview of current provisions on NDCs

The Paris Agreement and subsequent CMA decisions provide some guidance on key characteristics related to the design and implementation of NDCs – see Annex A for a non-exhaustive overview. The Paris Agreement includes provisions to progressively strengthen efforts over time, with successive NDCs expected to be more ambitious than previous NDCs, for instance:

- Article 3 of the Paris Agreement states that “efforts of all Parties will represent a progression over time, while recognising the need to support developing country Parties for the effective implementation of this Agreement”,
- Article 4.3 of the Paris Agreement further articulates that successive NDCs “will represent a progression” beyond a Party’s current NDC and “reflect [the Party’s] highest possible ambition”, considering common but differentiated responsibilities and respective capabilities in light of different national circumstances; and
- Article 4.5 of the Paris Agreement notes “support shall be provided” to developing country Parties to implement these provisions relating to NDCs and enable increased ambition in their actions (UNFCCC, 2016^[1]).

To achieve its long-term temperature goal, the Paris Agreement requests Parties to communicate new NDCs of increasing ambition every five years (Article 4.9), informed by the GST outcomes. Article 4.11 also provides flexibility for Parties to adjust “at any time” their NDCs to enhance its level of ambition. Under this five-year cycle, Parties are to submit new, enhanced NDCs “at least 9 to 12 months in advance” of the next relevant COP (paragraph 25) (UNFCCC, 2016^[1]). This five-year cycle is designed to balance the need to provide countries with sufficient time to develop and implement their NDCs with the need to progressively strengthen efforts to effectively respond to the climate challenge. COP26 and COP27 called on countries to strengthen their NDCs ahead of the next milestone in the five-year ambition cycle, namely the outcome of GST1 in 2023. However, the response to these calls was underwhelming - see Figure 2.1.

Figure 2.1. Timeline of NDC submissions, 2015-2026



Source: (IEA, 2023^[3]).

In communicating their next NDCs in 2025, Parties are expected to provide information to facilitate clarity, transparency and understanding (ICTU), with different elements to be applied only if applicable to the Party's NDC (UNFCCC, 2023^[2]). Taking available ICTU guidance into account in the NDC preparation process has multiple benefits. For example, at the international level taking available guidance on NDCs into account could help increase understanding of national goals in the international context, facilitate aggregation of individual efforts to better assess collective progress under the GST, and help increase transparency and accountability. At the national level, taking available guidance on NDC accounting and reporting into consideration when preparing new NDCs can facilitate subsequent efforts to track and report on implementation and achievement of NDCs consistent with the modalities, procedures and guidelines (MPGs) of the ETF (Aragon, Alcobé and Idriss, 2021^[4]). The provision of ICTU could support assessments of NDC ambition and implementation, however, given their bottom-up nature a diversity of approaches are taken in NDCs and their reporting, which together with varying capacities to provide ICTU, makes it challenging to compare and aggregate progress at a collective level (European Capacity Building Initiative, 2020^[5]).

The Paris Agreement provides some guidance on the type of emission reduction targets in NDCs, differentiating between developed and developing country Parties. Article 4.4 of the Paris Agreement mandates that “developed Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets”, whereas developing countries are provided with more flexibility by being “encouraged to move over time towards economy-wide emission reduction or limitation targets” taking into account different national circumstances (UNFCCC, 2016^[1]).

The GST1 decision reiterates provisions in the Paris Agreement on NDCs and sets out new goalposts to inform the next NDCs. For instance, paragraph 4 of the GST1 decision encourages Parties – without differentiating between developed and developing countries – to adopt in their next NDCs “ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5°C, as informed by the latest science, in the light of different national circumstances” (UNFCCC, 2023^[2]). The explicit call in the GST1 decision encouraging Parties to expand the scope of NDCs represents an important step forward given that only 44% of Parties currently have economy-wide targets encompassing all GHGs, sectors and categories (UNFCCC, 2023^[6]). This underscores the need for Parties to strengthen the comprehensiveness of their NDCs to effectively address the full range of GHG emissions. Paragraph 37 of the GST1 decision also requests Parties that have not

yet done so “to revisit and strengthen the 2030 targets in their NDCs as necessary to align with the Paris Agreement’s temperature goal by the end of 2024, taking into account different national circumstances” (UNFCCC, 2023^[2]).

The Paris Agreement includes provisions for the formulation of long-term low greenhouse gas emission development strategies (LT-LEDS), noting “all Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies” taking into account different national circumstances (Article 4.19, (UNFCCC, 2016^[1]). The GST1 decision goes beyond this provision by inviting all Parties to communicate or revise their LT-LEDS by COP29 “towards just transitions to net zero emissions by or around mid-century” (paragraph 42) and encouraging Parties to “align their next nationally determined contributions with long-term low GHG emission development strategies” (paragraph 39-40, (UNFCCC, 2023^[2]) This explicit call in the GST1 decision to align NDCs and LT-LEDS is a significant step forward – see section 3.

2.2. Overview of GST1 outcomes on mitigation

The GST is a periodic exercise to assess collective progress under the Paris Agreement with the intention of informing national climate efforts going forward, including the next round of NDCs. The section on mitigation in the GST1 decision (Section II.A) recognises that despite progress, global GHG emissions trajectories are not in line with the Paris Agreement’s temperature goal and resolves to take urgent action to address this persistent gap. The GST1 decision reiterates the latest findings of the Intergovernmental Panel on Climate Change (IPCC), that keeping global warming to 1.5°C requires reductions in global GHG emissions of 43% by 2030 and 60% by 2035, relative to 2019 to reach net-zero CO₂ emissions by 2050, while recognising that full implementation of current NDCs would reduce global GHG emissions by just 2% by 2030, compared with 2019 levels (IPCC, 2023^[7]) (UNFCCC, 2023^[6]).

The GST1 decision calls on Parties to contribute, in a nationally determined manner, to a series of global mitigation focused efforts in line with 1.5°C pathways – see Box 2.1. The level of detail of each call varies from relatively specific (e.g. on renewables and energy efficiency), to general signals of the overall direction of travel (e.g. reducing emissions from road transport), and a reiteration of calls from previous COPs (e.g. on unabated coal and fossil fuel subsidies). The timeline of each call varies from efforts as soon as possible (e.g. for phasing out inefficient fossil fuel subsidies), to near-term (e.g. 2030 and in this critical decade), to mid-century and some calls with no specified timeline. The GST1 decision also emphasises the importance of wider efforts for achieving the Paris Agreement’s temperature goal, including ocean-based mitigation action and transitioning towards sustainable lifestyles (UNFCCC, 2023^[2]).

The reference point, including the base year, for the global mitigation focuses calls is not specified in the GST1 decision. However, as the calls in paragraph 28 are listed under a chapeau that recognises the need to align with 1.5°C pathways, baselines could be inferred (see section 3.4.2). For example, in the International Energy Agency’s (IEA) net-zero pathway, tripling renewable energy from 2022 levels of 3,6 Terawatt (TW) to reach 11TW in 2030 and doubling annual energy efficiency improvements from 2% in 2022 to reach 4% in 2030, would account for almost three-quarters (72%) of total CO₂ emission reductions needed by 2030 to reach 1.5°C (IEA, 2023^[8]). Analysis by Climate Analytics (2024^[9]) shows that to align with the 1.5°C goal, global renewable capacity needs to increase 3.2–3.4 times relative to 2022 levels (depending on capacity data used in 2022), thus the call to triple renewables could “be seen as a floor, not a ceiling” (Climate Analytics, 2024^[9]).

Box 2.1. Selected mitigation focused calls in the GST1 outcome

Paragraph 28 of the GST1 decision recognises the need for GHG reductions in line with 1.5°C pathways and calls on Parties to contribute to the following global efforts in a nationally determined manner (emphasis added):

“(a) **Tripling renewable energy capacity** globally and **doubling the global average annual rate of energy efficiency improvements by 2030**;

(b) Accelerating efforts towards the **phase-down of unabated coal power**;

(c) Accelerating efforts globally towards **net zero emission energy systems**, utilising zero- and low-carbon fuels, well before or by around mid-century;

(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;

(e) Accelerating **zero- and low-emission technologies**, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilisation and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production;

(f) Accelerating the **substantial reduction of non-carbon-dioxide emissions** globally, in particular methane emissions by 2030;

(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;

(h) **Phasing out inefficient fossil fuel subsidies** that do not address energy poverty or just transitions, as soon as possible”.

Paragraph 33 of the GST1 decision reiterates the importance of conserving, protecting and restoring nature and ecosystems to meet the temperature goal of the Paris Agreement, including (emphasis added):

- Enhanced efforts towards **halting and reversing deforestation and forest degradation by 2030**,
- Through other **terrestrial and marine ecosystems acting as sinks and reservoirs** of GHGs,
- By **conserving biodiversity** in line with the Kunming-Montreal Global Biodiversity Framework.

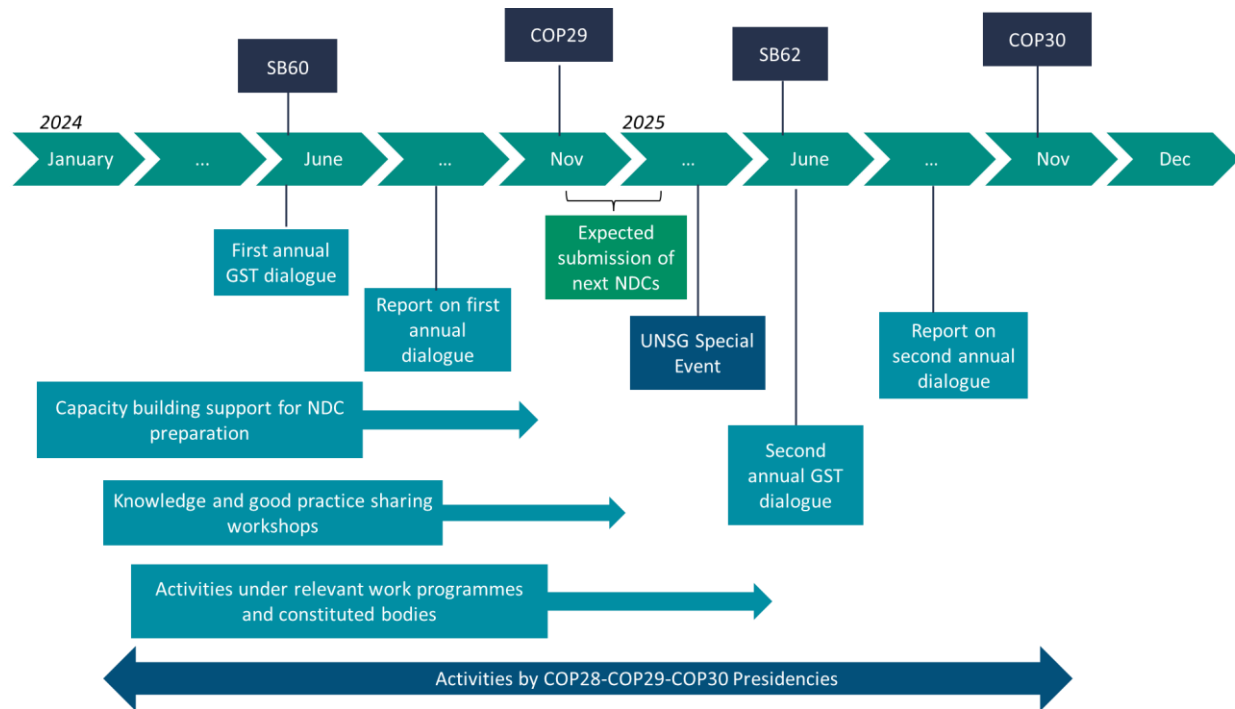
Source: (UNFCCC, 2023^[2]).

2.3. Overview of follow-up from GST1 to inform the next round of NDCs

2.3.1. Follow-up provisions in the GST1 decision

The GST1 decision includes a section on guidance and the way forward that sets out a series of follow-up provisions – see Figure 2.2. The arc of implementation spanning the next two years and culminating in the submission of new NDCs by early 2025 will be a test of the success of the GST1 process (Jeudy-Hugo and Charles, 2023^[10]).

Figure 2.2. Follow-up provisions in the GST1 decision to support NDC preparations in 2024-2025



Notes: This figure provides a preliminary mapping of follow-up provisions in the GST1 decision at the technical and political level focused on informing the next round of NDCs, including activities by actors within the UNFCCC process (i.e. UNFCCC Secretariat, SB Chairs, constituted bodies, operating entities of the Financial Mechanism, COP28-29-30 Presidencies) and beyond (i.e. relevant stakeholders and organisations). The GST1 decision includes follow-up provisions in other areas which are not directly linked to NDC preparations and thus not included here. The timing and modalities of certain follow-up provisions are still to be confirmed.
Source: Authors based on provisions in the GST1 decision (UNFCCC, 2023^[2]).

To inform preparations of the next NDCs, the GST1 decision establishes new spaces to exchange experiences on preparing NDCs including an annual dialogue¹ on how GST1 outcomes are informing NDC preparations starting at the 60th meeting of the UNFCCC Subsidiary Bodies (SB60) as well as workshops to facilitate knowledge and good practice sharing. These spaces could provide a useful forum for peer exchange and mutual learning at a technical level, allowing Parties to share experiences on how they are responding to the calls in the GST1 in their NDC preparations, challenges faced, and help to identify opportunities for collaboration.

The GST1 decision also invites relevant work programmes and constituted bodies to integrate GST1 outcomes when planning their future work. Some work programmes including the Mitigation Work Programme (MWP) and the Just Transition Work Programme (JTWP) include an explicit link to the GST in their mandates and could provide additional spaces for discussions on how to take forward GST outcomes to inform enhanced NDCs. For example, discussions under the JTWP on “Just Transition pathways to achieving the goals of the Paris Agreement through NDCs, NAPs and LT-LEDs” (UNFCCC, 2024^[11]) could provide insights on how to integrate just transition considerations in the next NDCs drawing on experiences including with inclusive, multi-stakeholder engagement processes in the preparation and

¹ Paragraph 97-98 of the GST1 decision (UNFCCC, 2023^[2]) also envisages a new dialogue on implementing the GST outcomes, expected to run from CMA6 (November 2024) to CMA10 (2028). This annual dialogue could provide a space to assess implementation of wider GST outcomes (e.g. progress on closing knowledge gaps identified in the GST1; how relevant work programmes and constituted bodies are considering GST1 outcomes in their activities; how non-Party stakeholders are considering GST1 outcomes in their activities, preparations for the second GST).

implementation of NDCs. Some Parties also see a role for the MWP in taking forward GST1 mitigation outcomes in this critical decade, e.g. through discussions on the NDC-investment nexus at MWP investment-focused events (Government of Australia, 2024^[12]), by supporting implementation of mitigation calls in paragraphs 28 and 33 of the GST1 decision (Alliance of Small Island States (AOSIS), 2024^[13]) and enhancing the contribution of cities in NDCs (European Union and its Member States, 2024^[14]). Discussions in relevant thematic dialogues (e.g. on oceans, mountains, children) and high-level ministerial roundtables (e.g. on pre-2030 ambition, just transition) could also provide relevant insights for Parties to consider when preparing and implementing their NDCs.

In parallel to preparing their next NDCs, Parties need to strengthen implementation of their current NDCs and the GST1 decision invites all Parties to intensify existing arrangements for preparing and implementing their successive NDCs. The GST1 decision includes calls for the continued provision of capacity building support for preparing, communicating, and implementing NDCs through existing channels under the UNFCCC (i.e. operating entities of the Financial Mechanism, Paris Committee on Capacity-building (PCCB), the UNFCCC Secretariat including through regional collaboration centres) and by other relevant organisations (paragraph 188-189, (UNFCCC, 2023^[2])).

The GST1 decision also includes important elements for maintaining political attention on the GST1 after COP28 with a proposed “Roadmap to Mission 1.5°C under the guidance of current/incoming Presidencies of COP28-COP29-COP30. Activities under this Roadmap are to “significantly enhance international co-operation and the international enabling environment to stimulate ambition in the next round of nationally determined contributions, with a view to enhancing action and implementation over this critical decade and keeping 1.5°C within reach” (paragraph 191, (UNFCCC, 2023^[2])). This collaboration between a troika of COP Presidencies is an innovation in the UNFCCC process that could play an important role in maintaining political pressure to take forward the GST1 outcomes as highlighted in previous CCXG analysis (Jeudy-Hugo and Charles, 2023^[10]). Coordinated activities under the troika could help to maintain the spotlight on domestic processes of preparing new NDCs and encourage Parties to put forward NDCs that reflect their highest possible ambition. The GST1 decision reiterates the provision in Decision 19/CMA.1 for a special event by the UNSG where Parties are invited to present their new NDCs. This provides an important political milestone in the GST1 follow-up process and an opportunity for Parties that have prepared new NDCs in line with GST1 outcomes to be recognised.

2.3.2. Other follow-up opportunities in the UNFCCC process and beyond

Beyond provisions set out in the GST1 decision, there are potential opportunities to follow-up the GST1 outcomes through other processes under the UNFCCC including provisions under the ETF. Preparations of biennial transparency reports (BTRs) could highlight lessons learned on the design, information requirements, structure, and implementation experiences of current NDCs which could provide insights to inform the next round of NDCs. In their next NDC, Parties are to provide information on how the preparation of their NDC has been informed by the outcomes of the GST (Annex I, paragraph 4(c) (UNFCCC, 2019^[15])). A review of this information, for example as part of the review of a Party’s implementation and achievement of their NDC through the technical expert review (TER) and the facilitative multilateral consideration of progress (FMCP) exercise, or through other processes, could provide insights for subsequent GST cycles.

There are also provisions, processes and activities planned outside the UNFCCC process to follow-up on the outcomes of the GST including at the national level. For example, in their NDCs some Parties including Brazil, Republic of Kazakhstan and South Africa, note their intention to reflect the outcomes of GST1 in their next NDC. Some Parties have also established specific mechanisms to take forward the GST outcomes in their domestic processes for preparing new NDCs and climate targets as discussed in previous CCXG analysis (Jeudy-Hugo and Charles, 2022^[16]). For example, in the European Union (EU), the European Climate Law includes explicit provisions linking the process of setting new climate mitigation

targets to the GST outcome. In Fiji, the Climate Change Bill requires the government to communicate new NDCs informed by the GST every five years – see Box 2.2.

Events and activities within and outside the UNFCCC can also contribute to the implementation of the GST1 outcome as recognised in Decision 19/CMA.1 (UNFCCC, 2018^[17]). For example, actions under the 2030 Climate Solutions Implementation Roadmap by the High-Level Climate Champions, the Marrakech Partnership and their network of partners and initiatives could support implementation of the GST1 outcomes (High-Level Climate Champions, 2023^[18]). Non-party stakeholders can support Parties in preparing their NDCs and facilitate delivery on the ground. Attention on the GST1 at the regional level could be maintained through initiatives by non-Party stakeholders such as Regional Hub activities under the independent GST (iGST) (iGST, 2024^[19]). Various voluntary international initiatives, pledges and activities that Parties and non-Party stakeholders are engaged in could also help to raise the ambition and implementation of Parties mitigation efforts and support their NDCs (Jeudy-Hugo and Errendal, 2023^[20]).

Box 2.2. Selected national mechanisms and provisions linking the GST to domestic processes

In the **European Union (EU)**, the European Climate Law established a legally binding target of climate neutrality by 2050 and included a provision to establish a 2040 intermediate target within six months of the conclusion of GST1 that takes into account the outcomes of GST1 (European Commission, 2021^[21]). Building on this provision, in February 2024, the European Commission proposed an intermediate GHG reduction target of 90% by 2040 compared to 1990 levels. The proposed 2040 target is in line with advice of the European Scientific Advisory Board on Climate Change (ESABCC) (European Commission, 2024^[22]), and once agreed will serve as the basis for the EU's next NDC. While a legislative proposal and supporting policy framework are yet to be agreed, the Commission's proposal outlines potential options which reflect some of the mitigation calls in GST1. For example, in the energy sector, accelerating the deployment of renewable energy sources, promoting low- and zero-carbon solutions, phasing out coal, investing in grid infrastructure, and enhancing energy efficiency are expected to reduce fossil fuel consumption by 80% by 2040 compared to 2021 levels.

In **Fiji**, the 2021 Climate Change Bill incorporates legal provisions to account for the outcomes of the GST in its NDC. The bill outlines Fiji's commitment to communicate an increasingly ambitious NDC every five years, which will be informed by the outcomes of the GST (Government of Fiji, 2021^[23]).

Some Parties current NDCs indicate they will take GST outcomes into account in their next NDC. For example, the 2023 NDC of **Brazil** indicates that its NDC in 2025 will be informed by the GST (Government of Brazil, 2023^[24]). Similarly, the 2023 NDC of the **Republic of Kazakhstan** indicates that the outcomes of GST1 will be considered in the preparation of its second and subsequent NDCs (Republic of Kazakhstan, 2023^[25]). **South Africa's** latest NDC (2021) indicates it may update its 2030 target in its second NDC taking into account, among others, the GST1 outcome (Government of South Africa, 2021^[26]).

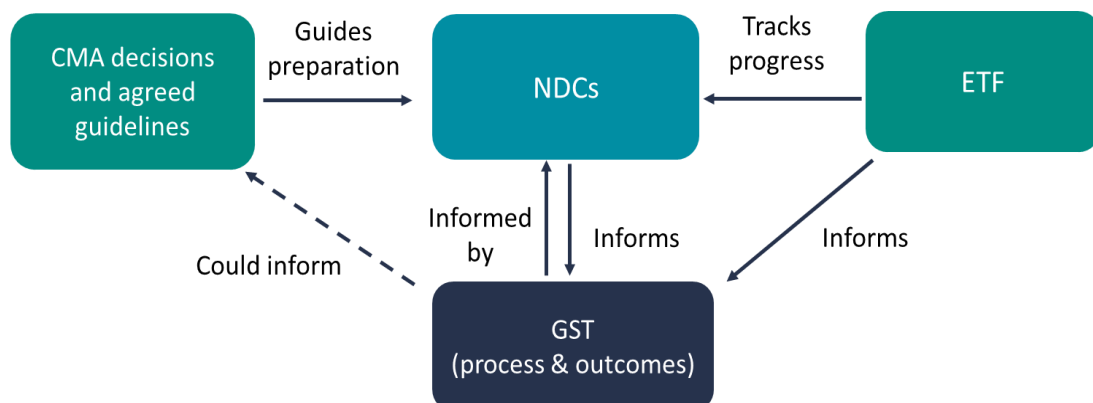
3. Preparing enhanced NDCs informed by GST1 mitigation outcomes

This section explores how GST1 outcomes on mitigation can be taken forward by countries to inform the preparation of enhanced NDCs. Through a synthesis of recent research, experiences and case studies, this section explores potential ways forward for aligning national mitigation commitments with the global signals set out in the GST1 outcome.

3.1. Considerations for enhancing NDCs

NDC enhancement captures the idea of a progression in successive NDCs as set out in section 2. The rationale to enhance the next round of NDCs is made clear in the GST1 decision given persisting gaps in progress towards the long-term temperature goal of the Paris Agreement (UNFCCC, 2023^[21]). In approaching the process of enhancing NDCs, it is useful to consider inter-linkages with other provisions in the Paris Agreement in particular the ETF and GST. As set out in Figure 3.1, provisions in the Paris Agreement, subsequent CMA decisions and guidance on ICTU of NDCs have an important role in guiding and informing the preparation of NDCs. Under the ETF, BTRs will include information to track progress on implementing and achieving NDCs and will be subject to subsequent technical and peer reviews. NDCs are both information inputs to future GST processes and are to be informed by the outcome of the GST. The outcomes of the GST could potentially inform future CMA decisions and potential revisions of guidelines for NDCs. Considering the Paris Agreement's provisions on NDCs (Article 4), the GST (Article 14) and the ETF (Article 13) together as part and parcel of the multilateral climate regime can support more ambitious and effective climate efforts (Winkler, Mantlana and Letete, 2017^[27]).

Figure 3.1. Understanding interlinkages between NDCs and other provisions in the Paris Agreement



Notes: The dashed line indicates a potential interlinkage between GST outcomes and subsequent CMA decisions and guidelines.
Source: Authors.

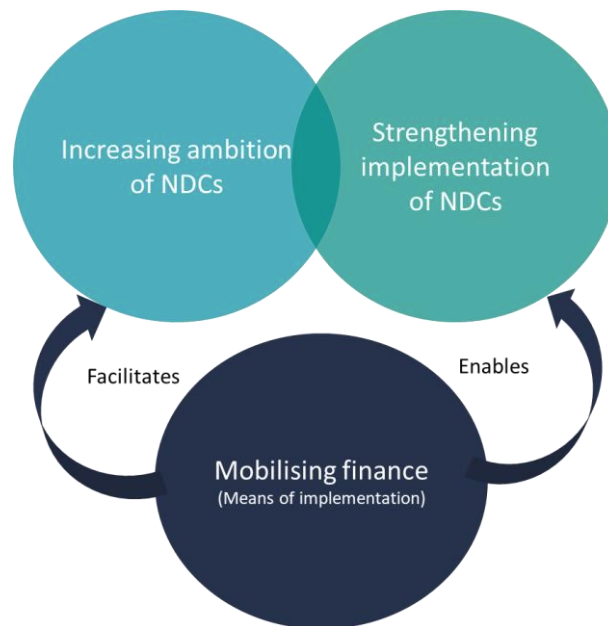
NDC progression will look different in different countries depending on various factors and national circumstances. For example, in current NDCs some Parties note efforts to increase emission reduction targets, advance peaking dates, enhance domestic efforts, adopt long-term targets, improve monitoring and tracking arrangements, expand stakeholder consultation processes and develop sector-based actions as reflecting a progression from previous efforts (UNFCCC, 2023^[6]). Good practices for designing, preparing, implementing and reporting on more ambitious NDCs discussed in the GST1 technical dialogues include for example, strengthened mitigation targets, elaboration of sectoral implementation plans, provision of information on domestic mitigation measures, inclusive processes of stakeholder engagement in developing NDCs, etc. (UNFCCC, 2023^[28]) (UNFCCC, 2022^[29]).

In considering how to enhance the next round of NDCs, it is useful to distinguish between different elements relating to the design, development and implementation of NDCs as set out below (Fransen et al., 2019^[30]) (NDC Partnership, 2022^[31]). These different elements of NDC enhancement are not mutually exclusive and some are closely interlinked as discussed further below:

- **Enhancing NDC ambition:** e.g. strengthened economy-wide GHG reduction targets, expanded coverage of sectors, gases and categories, introduction of a timeframe for peaking emissions, alignment with LTS and/or net-zero goals and/or 1.5°C pathways.
- **Enhancing NDC implementation:** e.g. implementation plans setting out policies and actions with defined roles and responsibilities for different actors, sector-specific transition plans, an investment plan to identify funding needs, potential sources of finance (public and private) and a strategy to unlock domestic and international finance and investment to deliver the NDC.
- **Enhancing NDC information and transparency:** e.g. improved modelling tools, analysis, and data collection to inform more detailed NDC targets, provision of information in line with ICTU guidelines, developing/strengthening a monitoring, reporting and verification framework to track NDC implementation and feed into BTRs.
- **Enhancing NDC processes:** e.g. inclusive whole-of-government processes that support co-ordination among different ministries and whole-of society, inclusive approaches that engage relevant stakeholders in the preparation and implementation of NDCs; identification of institutional arrangements to lead/co-ordinate NDC preparation and implementation; communication and awareness raising activities to support NDC implementation.

Experiences with successive NDCs highlight the interlinkages between NDC ambition and implementation and the critical enabling role of finance and investment on both – see Figure 3.2. Preparations for the next round of NDCs need to move forward in parallel to efforts to implement current NDCs and alongside ongoing discussions on scaling up means of implementation, finance and investment. Means of implementation, in particular finance and investment, is a critical enabler underpinning the implementation of NDCs and can also facilitate enhanced ambition. Agreeing a robust decision on the new collective quantified goal (NCQG) on climate finance can help to “create the best possible conditions for enhanced ambition and implementation of the next round of NDCs” (C2ES, 2024^[32]), alongside concerted efforts across the board, e.g. to address barriers to mobilising private finance for climate action (OECD, 2023^[33]), to designing a fit for purpose financial system.

Figure 3.2. Synergies between ambition, implementation, and finance in enhancing NDCs



Note: Means of implementation including technology transfer, capacity building and finance are critical for supporting enhanced ambition and implementation of NDCs.

Source: Authors.

Various resources are available to support countries in the NDC enhancement process. This includes knowledge products, such as voluntary toolkits and guidance on how to design enhanced NDCs as well as the provision of finance and technical support to help countries throughout the NDC development and implementation process - see for example Box 3.1. Several organisations are engaged in activities to support the preparation and implementation of NDCs. Some support activities have a global reach (e.g. NDC Partnership, UNDP Climate Promise, UNEP NDC Action Project, World Bank NDC Support Facility, Global Green Growth Institute, etc.). Some support activities have a more regional focus (e.g. UNFCCC Regional Collaboration Centres, Africa NDC Hub, Pacific NDC Hub, NDC Advance in the Asia Pacific region, NDC Invest in the Latin America and Caribbean region, etc.).

Existing experiences in supporting countries throughout the NDC process, insights gathered through the GST1 technical dialogue process, as well as on-going preparations of BTRs, provide a rich knowledge base which can be built on in approaching the design and development of the next round of NDCs. The GST1 decision included calls to identify current activities and provide capacity building support for the preparation and communication of the next NDCs (paragraph 117, 188, 189, (UNFCCC, 2023^[2])). Discussions to improve co-operation and co-ordination among various support activities to prepare and implement NDCs are underway following an inter-agency meeting with development and implementation organisations in March 2024 organised by the UNFCCC. Following a call from the troika of COP Presidencies (COP28-COP29-COP30 Presidencies, 2024^[34]); the UNDP's Climate Promise 2025 was launched in April 2024 bringing together efforts under the UN system to provide a coordinated platform of UN support to developing countries to prepare NDCs aligned with 1.5°C (UNDP, 2024^[35]). Such efforts to improve coherence and co-ordination in support for the next NDCs can help to avoid duplication of efforts, create synergies among actors engaged in this space and the provision of more effective support to countries to deliver enhanced NDCs informed by GST1 outcomes.

Box 3.1. Supporting NDC enhancement – Experience of the NDC Partnership

The NDC Partnership brings together more than 200 members, including over 120 countries, and more than 80 institutions to create and deliver on ambitious climate action that helps to achieve the Paris Agreement and the Sustainable Development Goals (SDGs).

Between 2019-2022, the NDC Partnership co-ordinated the delivery of targeted support through the Climate Action Enhancement Package (CAEP) to 55 countries to support the enhancement of their NDCs. Support provided across different elements of NDC ambition, quality and process included:

- Studies, analysis, modelling, and data collection that supported enhanced emission reduction targets in 33 countries' NDCs.
- Sectoral plans and national strategies that supported the expanded coverage of sectors and gases in 29 countries' NDCs.
- Studies, analysis, and stakeholder engagement support for NDC implementation in 55 countries.
- Analysis to cost targets, development of long-term finance plans, and identification of funding sources that supported planning for NDC financing in 49 countries.
- Support for stakeholder engagement, consultations and capacity development that increased transparency of NDCs in 43 countries and inclusiveness of NDC processes in 54 countries.

To support preparations of the next round of NDCs, the NDC Partnership has launched a thematic call on LT-LEDs and NDC Alignment, Update, and Enhancement. As of March 2024, over 40 countries have requested support under the call. NDC Partnership members will be mobilised to respond to the requests until COP30 in 2025.

Source: Authors based on (NDC Partnership, 2022^[31]) and Personal communication (March 2024).

In communicating their next NDC in 2025, Parties need to show how their NDC has been informed by the outcomes of the GST1. How the signals in the GST1 are interpreted and translated into subsequent policies and programs at the domestic level will depend on various factors including:

- **Domestic enabling factors** such as domestic institutional set-up/capacities, national political dynamics, economic circumstances, inclusive, multi-stakeholder engagement processes, access to financial support and capacity building etc. Such domestic enabling factors play an important role in determining the progression of NDCs given the bottom-up nature of NDCs and the freedom national policy makers are afforded to determine their own national contributions to global commitments (Peterson et al., 2023^[36]). Dedicated support to developing countries, e.g. to strengthen human capacities and institutional frameworks, address gaps in available data, could strengthen the domestic enabling environment for more ambitious climate action (Jeudy-Hugo and Charles, 2022^[16]). Continued provision of capacity building support to prepare and implement NDCs, as called for in the GST1 decision, can help to strengthen the domestic enabling environment and facilitate the preparation of enhanced NDCs.
- **External enabling factors**, such as global political advocacy efforts, geo-political considerations, and the engagement of international institutions, for example, the World Bank, International Monetary Fund (IMF), IEA and OECD, could also play a role in supporting the take-up of the signals from the GST1. Focused political advocacy efforts by the troika of COP28-COP29-COP30 Presidencies could encourage Parties to carry forward the GST1 outcomes in their domestic processes preparing their next NDCs. Global political advocacy has been successfully used in the

past, for example co-ordinated efforts by the United Nations Secretary General (UNSG) and the COP26 President and their teams were among the factors influencing the submission of new or updated NDCs ahead of COP26 (Jeudy-Hugo and Charles, 2022^[16]). Co-ordinated global political advocacy by the troika of COP28-COP29-COP30 Presidencies together with relevant actors, such as the UNSG, and other international fora (e.g. G7, G20, African Union) could help maintain political attention on taking forward the GST1 outcomes in domestic NDC processes.

3.2. Insights from Paris-consistent global emissions pathways for enhanced NDCs

3.2.1. Global CO₂ and GHG benchmarks in line with GST1 outcomes

Paragraph 27 of the GST1 decision recognises “that limiting global warming to 1.5°C with no or limited overshoot requires deep, rapid and sustained reductions in global greenhouse gas emissions of 43 per cent by 2030 and 60 per cent by 2035 relative to the 2019 level and reaching net zero carbon dioxide emissions by 2050” (UNFCCC, 2023^[2]). The benchmarks for emission reductions in the GST1 decision are informed by the latest science and can be linked to the current state-of-the-art climate change mitigation scenarios assessed by the IPCC AR6 WG3 (Riahi, 2022^[37]; UNFCCC, 2023^[28]). Current available scenarios databases, such as the IPCC AR6 pathways, contain several global emissions pathways, but only a subset of these is consistent with the Paris Agreement’s goals of stabilising long-term temperature and reaching global net zero GHG emissions this century (see Annex B).

Table 3.1 provides complementary information to what is included in the GST1 on global GHG and CO₂ benchmarks to the GST1 based on a range of Paris-consistent global climate change mitigation scenarios (Annex B). Several key insights can be drawn from these global benchmarks to inform the preparation of the next round of NDCs as set out below:

- **Near-term GHG emissions reductions** by 2030 are crucial as they largely determine the level of peak warming reached this century (Pouille et al., 2023^[38]). The next NDCs need to significantly increase ambition by 2030 and 2035 and set out trajectories for continued emission reductions thereafter.
- Global benchmarks indicate **NDCs need to be economy-wide and cover all GHGs** as called for in the GST1. Reaching global net zero CO₂ emissions around mid-century is required to stabilise global temperatures at 1.5°C and reaching global net zero GHG emissions in the 2070s is needed to avoid long-term climate impacts, especially in terms of sea-level rise (Pouille et al., 2023^[38]). In 2023, 80% of Parties had economy-wide emissions targets, but only 44% of Parties stated these targets covered all GHG emissions and only 66% cover all sectors (UNFCCC, 2023^[6]).
- Global benchmarks indicate global emissions **need to peak as soon as possible, and by 2025 at the latest**. This highlights the importance of providing information on timeframes for anticipated peaking of emissions in addition to target-year levels. In 2023, only 4% of Parties specified a timeframe in which emissions are expected to peak in their NDCs (UNFCCC, 2023^[6]).

Table 3.1. Global economy-wide emission reductions consistent with Paris ambition and GST1 outcomes

	Global emission reductions <i>economy-wide, relative to 2019 levels</i>				Year of global net zero emissions
	2030	2035	2040	2050	
Aggregate GHG	43% (35 – 60%)	59% (50% - 80%)	69% (60 – 92%)	86% (74 – 100%)	2076 (2051 – 2100)
Carbon dioxide (CO ₂)	45% (37 – 70%)	64% (49% - 96%)	80% (60– 114%)	100% (76 – 120%)	2051 (2038 – 2067)

Note: The table shows economy-wide emissions reductions consistent with paragraph 27 of GST1 outcomes. GHG emissions are measured using IPCC AR6-estimated Global Warming Potentials over 100 years (GWP₁₀₀). Median values are given on the first line and 5th – 95th percentiles values on the second line in parentheses.

Source: Authors using data from the IPCC AR6 scenarios database (Byers, 2021^[39]).

3.2.2. Paris-consistent global/sectoral benchmarks supporting other mitigation related calls in the GST1

The mitigation focused calls under paragraphs 28 and 33 of the GST1 decision (see Box 2.1 in section 2.) are framed in the context of aligning with 1.5°C pathways, while reiterating the nationally determined nature of efforts under the Paris Agreement. Paris-consistent pathways provide benchmarks on the timing of some of the calls, for example in relation to the phase down of coal, the transition of energy systems away from fossil fuels to reach net zero emissions, and the speed of emission reductions needed in the road transport sector. Based on a range of Paris-consistent global climate change mitigation scenarios from the IPCC 6th Assessment Report (see Annex B), Table 3.2 provides information on global benchmarks in line with calls in the GST1 decision and additional timeframes relevant for preparing the next round of NDCs. These are broadly aligned with benchmarks from other emission pathways including those from the IEA's Net Zero Emissions by 2050 scenario (IEA, 2023^[8]).

Table 3.2. Quantified global benchmarks to support selected mitigation related calls in the GST1

Para. 28 (a) Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030;					
					2030
Change in electricity generation capacity from 2020 to 2030: renewables (incl. biomass)					x3.7 (x1.7 - x4.8)
Average annual rate of energy efficiency improvements compared with 2020					3.9% (2.6% - 5.9%)
Para 28. (b) Accelerating efforts towards the phase-down of unabated coal power;					
		2030	2035	2040	2050
Share of unabated coal in power generation		4.7% (0.1% - 10.8%)	2.4% (0.0% - 7.15%)	0.0% (0.0% - 3.5%)	0.0% (0.0% - 0.6%)
Change in unabated coal power generation compared with 2020		-82% (-65% to -100%)	-91% (-75% to -100%)	-100% (-85% to -100%)	-100% (-97% to -100%)
Year of phase out of unabated coal in power generation					2040 (2030-2050)
Para 28. (c) Accelerating efforts globally towards net zero emission energy systems, utilizing zero- and low-carbon fuels well before or by around mid-century;					
Year of net zero CO ₂ emissions in the energy supply sector					2040 (2031-2057)
Year of net zero GHG emissions in the energy supply sector					2042 (2037-2058)
Para 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;					
		2030	2035	2040	2050
Share of primary energy production	Total fossil	68% (55% - 72%)	57% (43% - 65%)	46% (31% - 58%)	31% (15% - 50%)
	Coal	10% (5% - 16%)	7% (3% - 14%)	5% (0% - 12%)	4% (0% - 10%)
	Oil	35% (27% - 39%)	30% (20% - 35%)	25% (13% - 32%)	14% (4% - 22%)
	Gas	23% (14% - 27%)	20% (10% - 28%)	16% (6% - 29%)	13% (4% - 33%)
Change in primary energy production compared with 2020	Total fossil	-27% (-17% to -53%)	-38% (-28% to -61%)	-48% (-38% to -68%)	-59% (-41% to -83%)
	Coal	-69% (-51% to -84%)	-75% (-59% to -91%)	-81% (-67% to -98%)	-89% (-68% to -99%)
	Oil	-8% (+6% to -42%)	-19% (-1% to -56%)	-31% (-7% to -71%)	-57% (-28% to -89%)
	Gas	-9% (+17% to -42%)	-25% (+18% to -56%)	-42% (+19% to -71%)	-43% (+22% to -71%)

	-55%)	to -67%)	to -78%)	to -86%)
Para 28. (e) Accelerating the substantial reduction of non-carbon-dioxide emissions globally, in particular methane emissions by 2030;				
	2030	2035	2040	2050
Global emissions reductions in methane (CH ₄), compared to 2019	33% (21% – 59%)	39% (28% – 62%)	44% (35% – 64%)	52% (40% – 70%)
Global emissions reductions in nitrous dioxide (N ₂ O), compared to 2019	16% (1% – 36%)	20% (2% – 42%)	24% (2% – 48%)	26% (-2% – 60%)
Global emissions reductions in F-Gases, compared to 2019	76% (-10% – 87%)	81% (-6% – 88%)	85% (-1% – 89%)	88% (23% – 90%)
Para 28. (f) 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;				
	2030	2035	2040	2050
Change in CO ₂ emissions from road transport, compared with 2020	-13% (3% to -15%)	-36% (-13% to -38%)	-59% (-28% to -62%)	-87% (-66% to -98%)
Para. 33. 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				
	2030	2035	2040	2050
Forest land cover, compared with 2020	+4% (-1% to 8%)	+5% (-1 to 11%)	+6% (-2% to 13%)	+8% (-2% to 18%)
Carbon sequestration from land use, compared with 2020	x4 (x2 – x41)	x8 (x2 – x63)	x12 (x2 – x84)	x15 (x2 – x95)

Note: Median values are given on the first line and 5th – 95th percentiles values on the second line in parentheses. 2035 values are interpolated from 2030 and 2040 values. As available scenarios do not consistently present comprehensive information on land use and land use change, they cannot be used to provide more detailed benchmarks corresponding to paragraph 33 of the GST1 decision and further tailored analysis on land use change is required.

Source: Authors using data from the IPCC AR6 scenarios database (Byers, 2021^[39]).

Table 3.2 provides information that can help countries take forward some of the calls in paragraph 28 and 33 of the GST1 decision in their NDCs. A few examples include:

- To align with the Paris Agreement's goals, the call to accelerate “efforts towards the phase-down of unabated coal power” implies a global **full phase-out of unabated coal power by 2040**.
- To align with the Paris Agreement's goals, the call to accelerate “efforts globally towards net zero emission energy systems” implies a global transition to **emission-free energy systems by around 2040**.
- Significant **reductions are needed across all types of GHGs** to achieve the Paris Agreement's temperature goal, including significant reductions of non-CO₂ emissions, in particular methane emissions which need to be cut by 33% globally by 2030 (see Table 3.2). For other GHGs, there are larger uncertainty ranges in the reductions needed in Paris-consistent pathways, but significant reductions of F-gases and nitrous dioxide remain crucial. All current NDCs cover CO₂ emissions, 91% cover methane, 89% cover nitrous oxide and less than 50% cover one or several F-gases (UNFCCC, 2023^[6]). There are significant gaps in coverage from a global emissions perspective, for example in current NDCs, 15% of Parties, accounting for 46% of total global methane emissions in 2020, communicate corresponding measures for reducing methane emissions from fossil fuel operations (UNFCCC, 2023^[6]).

3.2.3. Other Paris-consistent global and sectoral benchmarks

Additional information from 1.5°C scenarios that are not explicitly addressed in the GST1 decision could be useful for informing the next round of NDCs. Information on specific sectors may be relevant for improving the sectoral specificity of NDCs. Annex C provides selected quantified benchmarks for sectoral action at the global level, across industry, transport, agriculture and land use, and buildings sectors, that would keep the Paris Agreement's temperature goal within reach. Some highlights based on information in Annex C include:

- Pathways consistent with the Paris Agreement's goals see **significant reductions in CO₂ and methane emissions from industry by 2030** – 34% and 21% reductions compared to 2020 levels respectively.
- CO₂ emissions from **transport need to be reduced by approximately 15% globally by 2030**, compared to 2020 levels, in line with Paris-consistent pathways. Reductions in transport emissions largely depend on lowering the use of fossil fuels and in particular oil through the electrification of transport modes, which need to reach close to 30% by 2030 and over 50% by 2050.
- Paris-consistent pathways in the AFOLU sector rely on tackling non-CO₂ emissions (-11% for methane and -8% for nitrous oxide by 2030) and on CO₂ emissions from **AFOLU becoming negative by 2030**. To that end, carbon sequestration from land use, mainly through afforestation/reforestation, needs to be increased four-fold by 2030.

3.2.4. Challenges and opportunities in using global and sectoral benchmarks and pathways to inform NDCs

A key challenge in using global emissions pathways to inform NDCs is how to translate global benchmarks to the national level. While global benchmarks can help to inform the overall ambition, direction, and coverage of an NDC, they cannot be used to directly inform emission levels at the national level. The expectation that a global framework could identify “appropriate” levels of emission reductions required from individual governments goes against the bottom-up, nationally determined character of NDCs. Moreover, scenarios analyse trade-offs and trends at the global level and not at the level of individual actors, and thus the information produced at low geographical resolutions is not fit-for-purpose to directly inform emission levels at the national level.

Parties can undertake bottom-up modelling approaches and analyses to develop national mitigation pathways that respond to the global calls in the GST1 based on national reduction potential, feasibility, benefits and costs. The mitigation focused calls in the GST1 and complementary benchmarks informed by Paris-consistent emission pathways can help to inform the development of quantitative targets in NDCs through bottom-up modelling approaches and analyses. Continued in-country modelling support to develop national mitigation pathways that reflect global benchmarks also provide opportunities for countries to align their NDCs with their LT-LEDS as called for in the GST1.

Global benchmarks for sectoral action in line with Paris-consistent pathways can support improved sectoral coverage, more specific information on how different sectors will contribute to achieving the economy-wide emission reduction target in an NDC and the elaboration of sectoral transition plans (see section 3.4). At the same time, emission pathways informed by global/sectoral benchmarks rely on models which have a number of limitations and blind spots, e.g. over-reliance on certain technologies, lack of consideration of demand-side measures, limited specificity for some mitigation measures and sectors (Gambhir et al., 2019^[40]). Thus, countries could use the results of such models critically, and complement them with an identification of the most relevant sectoral mitigation options at the national level.

Global benchmarks can be adapted at the national level to consider equity and fairness through a hybrid approach that combines national bottom-up assessments and modelling approaches with “fair share” top-down approaches. Such a hybrid approach mirrors the hybrid bottom-up / top-down architecture of the

Paris Agreement (Winkler et al., 2017^[41]). Various tools and top-down approaches are available that seek to integrate equity considerations in global pathways and inform NDCs. These tools assess national “fair shares” of global carbon budgets and equitable and mitigation efforts at the national level downscaled from Paris-consistent global mitigation pathways - see Box 3.2. Some of these tools have been used to inform certain countries’ NDCs, for example the “fair share” range of efforts in South Africa’s updated NDC (see Box 3.3). Quantified “fair share” tools can help countries to articulate equity principles in their NDCs, explain their mitigation targets in terms of the proportion of the global carbon budget or of a 1.5°C global pathway (Hales and Mackey, 2017^[42])

Parties are expected to explain how their NDC is considered fair and ambitious in light of their national circumstances (UNFCCC, 2019^[15]). Providing clearer information on fairness in NDCs can help to operationalise equity in relation to mitigation efforts (UNFCCC, 2023^[28]). While there is no single agreed definition of equity, different tools, frameworks and criteria for assessing fairness and ambition can help Parties provide further information in their NDCs on fairness considerations, including reflecting on equity in line with ICTU guidelines (Winkler et al., 2017^[41]). None of the available tools, frameworks and criteria for assessing fairness have universal support (UNFCCC, 2023^[28]) and there remain many different interpretations of how to operationalise equity.

Box 3.2. Examples of tools for national “fair share” assessments

This box provides an overview of some available approaches and tools for assessing “fair shares”. Each tool proposes one or several definitions of equity in the context of emission sharing across countries, however these definitions are not agreed or recognised by all Parties and do not have universal support

Climate Equity Reference Calculator

The Climate Equity Reference Calculator (CERC), developed by the Stockholm Environment Institute and EcoEquity, allows users to choose among a set of explicit equity approaches (capability, responsibility and right to promote sustainable development), aligned with the UNFCCC’s core equity principles, and quantitatively assess national “fair share” emission pathways in line with a global 1.5°C pathways.

Carbon Budget Explorer

The Carbon Budget Explorer, developed through the ELEVATE project, calculates national emission pathways in line with different global emissions pathways based on a range of equity-sharing principles. The tool can be used to navigate the implications of different views on fairness for countries’ mitigation targets. The tool is being developed to include more direct comparisons with current policy and national scenarios to explore feasibility dimensions.

Climate Action Tracker

The Climate Action Tracker (CAT) was developed by Climate Analytics, the New Climate Institute, and the Potsdam Institute for Climate Impact Research. It combines the results of multiple mitigation effort-sharing studies and principles to assess the implications of global 1.5°C and 2°C global pathways at the national level.

Source: . (Holz, Kartha and Athanasiou, 2017^[43]; Holz et al., 2019^[44]; Dekker, 2023^[45]; Climate Action Tracker, 2024^[46])

3.3. Insights for increasing ambition in NDCs aligned with GST1 mitigation outcomes

3.3.1. Aligning NDCs with 1.5°C pathways and long-term strategies

As set out in section 2. , the GST1 decision reiterates existing provisions and guidance on NDCs and outlines some new goalposts for preparing the next round of NDCs. In particular, the GST1 decision encourages *all* Parties to come forward with ambitious, economy-wide emission reduction targets, that cover all GHGs, sectors and categories, and are aligned with limiting global warming to 1.5°C (paragraph 39, (UNFCCC, 2023^[21])). In terms of where things stand on aligning NDCs with 1.5°C pathways, of the 168 latest NDCs, 52% state their alignment with the Paris Agreement’s goals or with mitigation pathways limiting global warming to well below 2°C or 1.5°C (UNFCCC, 2023^[6]). Current experiences provide insights on how some countries are already working to align their NDCs with the 1.5°C global temperature goal drawing on recommendations from independent scientific advice, national modelling assessments and support from international technical assistance (see Box 3.3). For example, in New Zealand, recommendations from the Climate Change Commission have been used by the government to improve the alignment of their NDC with the 1.5°C temperature goal. In Costa Rica the 2020 NDC update was informed by climate modelling and 1.5°C aligned decarbonisation trajectories from the country’s long-term strategy. In South Africa, a “fair share” assessment of NDC target ranges for GHG emission reductions

helped inform adjustments in its updated NDC. Exchanges of such experiences and collective discussions on 1.5°C aligned NDCs, including through the GST dialogues and other relevant spaces, could provide useful insights to inform Parties' preparations of their next NDCs.

Box 3.3. Insights from selected examples of aligning NDCs with the 1.5°C temperature goal

Costa Rica

Costa Rica's long-term strategy, known as the National Decarbonisation Plan aims to achieve net zero GHG emissions by 2050 and is viewed by the Government as being aligned with the 1.5°C temperature goal (Government of Costa Rica, 2019^[47]). In developing the National Decarbonisation Plan, stakeholders and representatives of various sectors were consulted, and modelling analysis conducted to generate sectoral GHG emissions pathways towards the 2050 target. Once a 2050 GHG emission reduction target was set for each sector, a back casting approach was used to define mid-term (2023-2030) sectoral emission reduction targets and decarbonisation trajectories which were in turn used to outline mid- and long-term policy options to reach the targets (Groves et al., 2020^[48]). This work alongside scenario workshops with stakeholders to define actions towards the 2030 (and 2050) targets in each sector informed the development of Costa Rica's 2020 NDC update. In the Government's view, the 2020 NDC update is aligned with the 1.5°C goal as it builds on the 1.5°C aligned decarbonisation trajectories in the NDP (Government of Costa Rica, 2020^[49]) (Dirección de Cambio Climático, 2020^[50]).

New Zealand

New Zealand's Climate Change Commission (He Pou a Rangi) provides independent advice to the Government on its climate plans and policies, including its NDC (Climate Change Commission, 2023^[51]). A 2021 report by the Climate Change Commission found New Zealand's 2020 NDC target incompatible with the 1.5°C goal based on analysis to convert global GHG emissions reductions in line with the IPCC's 1.5°C pathways to GHG emissions reductions at the national level. The Climate Change Commission recommended revising the NDC target to reduce emissions by more than 36% by 2030 below 2005 levels, however, this does not account for effort sharing and other factors (Climate Change Commission, 2021^[52]). In November 2021, the Government submitted an updated NDC with a 2030 emission reduction target of 50% compared to 2005 levels, which, it notes, is more compatible with 1.5°C. The 2021 NDC also outlined a 2050 net-zero target for all gasses except biogenic methane, which is covered by separate reduction targets of 10% by 2030 and 24-47% by 2050, compared to 2017 levels (Government of New Zealand, 2021^[53]). The Climate Change Commission's advice to inform the preparation of New Zealand's next NDC aligned with the global 1.5°C temperature goal is expected to be provided by 31 December 2024 (Climate Change Commission, 2023^[51]).

South Africa

In the process of updating its first NDC, South Africa assessed if its target ranges for GHG emissions in 2025 and 2030 constitute a "fair share" to efforts to limit global warming to well below 2°C and achieve 1.5°C. Drawing on CERC and CAT, the analysis generated 2025 and 2030 "fair share" ranges for South Africa lower than previously anticipated. Thus, for South Africa's NDC to be consistent with agreed global temperature limits, the analysis recommended a decrease in the original target ranges (UCT, 2021^[54]) (UCT, 2021^[55]). These recommendations were incorporated in South Africa's updated NDC with adjustments to target ranges in both 2025 and 2030 (Republic of South Africa, 2021^[56]).

The GST1 decision encourages Parties to align their next NDCs with their LT-LEDS (paragraph 40, (UNFCCC, 2023^[2])). This call goes beyond previous provisions and represents a significant step forward. There is currently limited alignment between NDCs and LT-LEDS – while 48% of Parties provided quantifiable information on their long-term mitigation visions, strategies or targets up to and beyond 2050

in their latest NDCs, only 33% of Parties, identified domestic mitigation measures in the context of longer-term measures and targets in their LT-LEDS and/or other national long-term strategies (UNFCCC, 2023^[6]). Aligning NDCs and LT-LEDS can help ensure actions outlined in the NDC are consistent with a long-term decarbonisation pathway; while NDC targets could serve as interim milestones towards achieving LT-LEDS objectives. To enhance alignment between NDCs and LTS and optimise use of resources, co-ordination in institutional arrangements, linking monitoring systems and synchronising review and revision cycles could be considered (Falduto and Rocha, 2020^[57]). As set out in Box 3.4, experiences of some countries such as Canada and Tonga to align their NDC with their long-term net-zero targets and/or LT-LEDS could provide useful insights for others.

Box 3.4. Selected examples of aligning NDCs and long-term strategies and targets

Canada

Canada's Net-Zero Emissions Accountability Act (2021) mandates the Government to set national emission reduction targets every five years between 2030-2050, aligned with the NDC cycle, as milestones towards its 2050 net-zero target. The Act also requires the Government to formulate emission reduction plans for each target, setting out specific actions the Government will take to meet the target and explain how each plan contributes to the 2050 target (Government of Canada, 2021^[58]). Progress under the emission reduction plans is regularly reviewed and together with subsequent developments, including the introduction of new technologies and further climate efforts, will be used by the Government to regularly update projections for 2030 and 2050 and inform the interim target setting process every five years (Government of Canada, 2022^[59]).

Tonga

Tonga's second NDC (2020) and its LT-LEDS (2021) were developed in unison (Government of Tonga, 2022^[60]). Stakeholder dialogues played a key role in shaping Tonga's long-term vision, helping to identify priority interventions in each sector as well as short- (2025), medium- (2030) and long-term (2050) actions. These stakeholder discussions on the LT-LEDS informed the preparation of the 2020 NDC. Likewise, recommendations and targets from the NDC were integrated in the development of long-term sectoral pathways as stakeholders engaged in the 2015 and 2020 NDC processes were actively involved in developing the LT-LEDS. To further enhance the link between the NDC and the LT-LEDS, an explicit link to the NDC is made in most short-, medium- and long-term sectoral targets in the LT-LEDS. To ensure alignment with its long-term vision, the Government plans to monitor, measure and evaluate implementation of short-term actions and the NDC to inform and revise its LT-LEDS. Going forward, Tonga aims to update both the LT-LEDS and subsequent NDCs in a co-ordinated manner, in line with the five-year NDC cycle, to align near-term policy planning and targets with long-term sectoral pathways (Government of Tonga, 2021^[61]).

3.3.2. Enhancing mitigation targets in NDCs to take forward GST1 outcomes

As set out in section 2. , the GST1 decision reiterates provisions in the Paris Agreement on NDCs and sets out new goalposts to inform the next round of NDCs. In particular, the GST1 decision encourages Parties – without differentiating between developed and developing countries – to come forward with **ambitious, economy-wide emission reduction targets, that cover all GHGs, sectors and categories**. Responding to this call would represent a progression beyond current efforts for several Parties given that only 44% of Parties currently have economy-wide targets encompassing all GHGs, while only 66% of NDCs cover all sectors from the IPCC 2006 guidelines (UNFCCC, 2023^[6]). This underscores the need for Parties to

strengthen the comprehensiveness of their NDCs to address the full range of GHG emissions and cover all sectors and categories.

Sectoral analyses underpinning the preparation of NDCs can support the inclusion of more sectoral specificity on how different sectors contribute to delivering the overall economy-wide emission reduction target, reflecting costs and capabilities of mitigation options at the national level. For example, the preparation of Australia's next NDC and new Net-Zero Plan is underpinned by six sectoral decarbonisation plans setting out opportunities in the electricity and energy, transport, industry, agriculture and land, resources and built environment sectors (Government of Australia, 2024^[12]). More sectoral specificity could inform the development of accompanying sectoral transition plans, sector-specific policy roadmaps and investment plans, helping to shape expectations among relevant actors and facilitate implementation on the ground as discussed in section 3.1.

While the next round of NDCs is expected to have an end date of 2035, there remains a need to strengthen 2030 targets as reiterated in recent CMA decisions. Paragraph 37 of the GST1 decision reiterates the call on Parties that have not yet done so **“to revisit and strengthen the 2030 targets in their NDCs** as necessary to align with the Paris Agreement's temperature goal by the end of 2024, taking into account different national circumstances” (UNFCCC, 2023^[2]). This call reiterates the challenge of improving implementation of current NDC targets to deliver enhanced action in this critical decade while simultaneously preparing ambitious new NDCs to drive efforts to 2035.

In addition to the calls in the GST1 decision, Article 4.4 of the Paris Agreement mandates developed Parties to take the lead and undertake **economy-wide absolute emission reduction targets**, while developing countries are encouraged to move towards economy-wide emission reduction or limitation targets over time (UNFCCC, 2016^[1]). As of September 2023, while 80% of current NDCs include economy-wide emission reduction targets, only 37% set absolute emission reduction targets, while 46% of NDCs use baseline scenario targets (UNFCCC, 2023^[6]). To date, baseline scenario targets have mostly been set by countries with low to medium income per capita, countries with higher income per capita have mostly adopted absolute emission reduction targets, while several higher income countries have either not elaborated NDCs at all or have adopted intensity or baseline NDCs (see Figure 4.1 and (IEA, 2023^[3]). Experiences of some countries in adopting absolute emission reduction targets could provide insights for others. For instance, the UK's 2020 NDC established an economy-wide absolute emission reduction target of 68% by 2030 compared to 1990 levels (Government of the United Kingdom, 2023^[62]). This target was informed by the work of the Climate Change Committee (CCC) which among others recommended a 2030 economy-wide absolute emissions-reduction target aligned with the goals of the Paris Agreement based on detailed pathways to reaching net zero by 2050 (Climate Change Committee, 2020^[63]).

The mitigation focused calls in the GST1 decision are framed at the global level and not the national level. Thus, there is a need for national and regional roadmaps to translate these global calls into the pace and scale of action needed on the ground. For example, the **call in the GST1 decision to triple global renewable energy capacity by 2030** is likely to have different implications for different countries and regions depending on different starting points and national circumstances. For example, the African Leaders Declaration on Climate Change targets a fivefold increase in Africa's renewable generation capacity alongside increased financing support (African Union, 2023^[64]). Different regions are expected to scale up renewables at different rates relative to current capacities. For example, around 8,000 GW is estimated to be added in China and other advanced economies by 2030, while just below 3,000 GW is projected for other emerging market and developing economies (IEA, 2023^[3]). Another regional breakdown of 1.5°C compatible renewables deployment shows regional growth in Asia 3.6 times relative to 2022 levels driven primarily by growth in China and India; 3.1 times in OECD due to lower growth in electricity demand and higher level of existing installed renewable energy capacity in 2022, and 6.6 times in Sub-Saharan Africa due to low levels of existing renewable capacity and high energy access needs, alongside significant mobilisation of investments in renewables and grid expansion (Climate Analytics, 2024^[9]).

The call to triple global renewable energy capacity by 2030 does not mean every country needs to achieve a tripling in its domestic renewable energy capacity. For instance, countries starting from a low/zero baseline have room to go beyond tripling, whereas for some countries tripling renewable energy capacity may not be realistic/achievable or needed domestically given efforts already undertaken (Jones, 2023^[65]). While it will not be necessary for every country to triple their renewable energy capacity, in current NDCs, 6% of Parties indicated targets consistent with or beyond 1.5°C pathways in the IEA's 2023 updated Net Zero Roadmap of tripling total installed renewable capacity by 2030 (UNFCCC, 2023^[6]). For example, Saudi Arabia, India, Indonesia, the Philippines, Ireland, Israel, Czechia, Hungary, Lithuania and Estonia have current targets that aim for a tripling (or more) of their renewable energy capacity in 2022, while South Africa's current capacity target reflects an increase of 2.9 times the 2022 level (Altieri et al., 2023^[66]). Some countries are also reflecting the tripling call in their LT-LEDS. For example, the LTS of the United Arab Emirates (UAE) sets a goal of tripling the share of renewable energy by 2030 from 2022 levels as part of its updated 2050 Energy Strategy (UAE, 2024^[67]) (UAE Ministry of Energy & Infrastructure, 2023^[68]). These efforts to scale up renewable energy capacities are motivated by different factors including economic concerns. However, given different national starting points and circumstances, the inclusion of national goals or plans to triple renewable energy capacity at the national level is not sufficient to assess the ambition of efforts (Altieri et al., 2023^[66]).

While tripling renewable energy capacity globally by 2030 is technically feasible, achieving this goal will require immediate additional efforts with potentials varying across countries depending on different starting points and national circumstances. Moreover, key challenges relating to infrastructure expansion, grid integration, storage technologies, social acceptance, and issues relating to financing, including high costs of capital in developing countries will need to be overcome. A significant mobilisation of investments in renewables and grid expansion is needed particularly in developing countries. The average annual investment in renewables from 2017-2022 was USD 466-486 billion. To triple renewables globally by 2030, the annual average investment needs are estimated to be between USD 1080-1300 billion (IEA, 2023^[3]) (COP28, IRENA and GRA, 2023^[69]).

The call in the GST1 decision to double the global average annual rate of energy efficiency improvements by 2030 can be translated into a sustained annual improvement in energy efficiency of 4% until 2030 from 2022 levels of 2% (IEA, 2023^[70]). While achieving a continuous doubling of efficiency rates will be challenging, there are best practices to build on that combine regulation, information and incentives with robust implementation and enforcement mechanisms. Many countries include energy efficiency measures in their current NDCs across different sectors, especially the building and energy sectors (UNFCCC, 2023^[6]). Some countries have also set quantified, timebound and economy-wide energy efficiency targets in other national policy documents. For example, Thailand's energy efficiency development plan includes a target to reduce energy intensity by 30% in 2036 compared to 2010 (Ministry of Energy, 2015^[71]). The US aims to double its energy productivity from 2010 levels by 2030 (U.S. Department of Energy, 15^[72]), while Argentina aims to reduce energy demand by 8.8% in 2030, compared to 2019 levels (Undersecretariat of Renewable Energy & Energy Efficiency, 2019^[73]).

The type of actions to support energy efficiency improvements is expected to vary across regions and countries. In advanced economies, behavioural changes and improved energy and material efficiency are expected to drive energy efficiency improvements in 2030 by reducing demand for electricity (6%), natural gas (15%) and internal combustion engine cars (14%). In emerging markets and developing economies, a shift towards more efficient fuels, particularly through universal access to clean cooking, is projected to reduce residential fuel demand by nearly 60% by 2030. These regions are also projected to have high appliance sales in 2030, with expected technical efficiency improvements of 50% compared to 2022 levels for appliances like air conditioning (IEA, 2023^[3]). Investment needs to double energy efficiency by 2030 are estimated to amount to approximately USD 1.8 trillion from 2023-2030 with the majority of energy efficiency related investments projected in advanced economies, followed by emerging markets, developing economies and China (IEA, 2023^[3]).

3.4. Insights for preparing implementation ready NDCs to support GST1 outcomes

As noted in section 3.1, it is important to consider efforts to increase NDC ambition alongside implementation to support delivery on the ground. Key enablers for translating NDCs into action are discussed in the sections below and include granular implementation and investment plans to unlock needed domestic and international finance as well as whole-of-government, whole-of-society approaches to preparing and implementing NDCs.

3.4.1. NDC implementation plans

An NDC implementation plan can provide clarity on how NDC targets are translated into concrete actions, including at the sector-level, identifying relevant roles, responsibilities, multilateral stakeholder engagement processes and resource needs to deliver the NDC. NDC implementation plans could also highlight how engagement in relevant voluntary international collaboration initiatives, pledges and activities will help to deliver the NDC.

Engaging with relevant stakeholders, including government ministries, subnational governments, private sector entities, civil society organisations and international partners, can support elaboration of feasible NDC implementation plans, help integrate NDCs in relevant national and sectoral policy portfolios and legislative decisions, and support alignment between local and national climate goals (WRI, 2024^[74]). Some countries have already developed implementation plans to accompany their NDCs, for example:

- In **Malawi**, the process to revise its 2021 NDC included the development of an implementation plan for 2021-2025. The implementation plan covers 10 sectors and related sub-sectors outlining key targets, timelines, milestones, indicators, responsible government entities for implementation, monitoring and evaluation, etc (NDC Partnership and Government of Malawi, 2022^[75]). The plan and Malawi's NDC also outline the cost of conditional and unconditional measures and identifies resource mobilisation actions such as international market mechanisms (Republic of Malawi, 2021^[76]).
- In **Papua New Guinea**, in parallel to enhancing its 2020 NDC, an NDC implementation plan was developed together with sectoral roadmaps for electricity and agriculture, forestry, and other land use (AFOLU). The NDC implementation plan provides a concise framework outlining actions to be implemented from 2021-2030, indicators used to track progress, lead and supporting government agencies, timeframes for delivery, and budget estimates for each activity (NDC Partnership and Climate Change and Development Authority Papua New Guinea, 2021^[77]).

3.4.2. NDC investment plans

Additional finance and investment will be required to implement NDCs. Ambitious targets in NDCs can help to catalyse investment in countries by sending strong market signals and providing investment certainty. NDC investment plans can also support governments in identifying financial requirements and help to mobilise needed finance and investment to implement their NDCs. Costing specific actions needed to achieve NDC targets – to assess the scale and type of finance (e.g. debt, equity, grants) needed to realise the NDC implementation plan and the NDC overall (Riva et al., 2020^[78]) – can increase understanding of associated resource requirements and inform the development of accompanying NDC investment plans. A costing assessment could also include the identification of NDC elements that will be covered by domestic finance, and which NDC elements require additional international finance to be implemented. An NDC investment plan can also help identify and develop investment proposals and a project pipeline to implement NDC actions through programmatic approaches. Credible investment and financing strategies underpinning NDCs can help bring together relevant public and private actors to support the translation of

NDC commitments into action on the ground (WRI, 2024^[74]). At the same time, efforts to strengthen institutional capacities within relevant sectoral/planning/finance ministries can further support efforts to attract investment and finance (NDC Partnership, 2022^[31]). Some countries have already developed investment plans to accompany their NDCs, for example:

- In **Belize**, an NDC implementation plan and a climate finance strategy were developed with support from CAEP under the NDC Partnership. The strategy specifies the overall climate finance needs and funding gaps of implementing Belize's NDC and provides the overall guidance and framework for Belize to organise and implement climate finance related actions. The strategy is an indicative plan and requires additional details on sub-activities and responsibilities (Commonwealth Secretariat, 2021^[79]).
- In **Ghana** a financing strategy was developed in 2021 outlining how each of the actions in its 2019 NDC implementation plan could be operationalised. The strategy includes how unconditional actions will be financed (e.g. existing budgets, on-going donor support), as well as how conditional actions could be financed (e.g. private investments, blended finance) (Cook, 2021^[80]).
- In **Rwanda**, an NDC investment plan was integrated in the NDC implementation plan outlining estimated costs and funding sources of NDC activities (NDC Partnership, 2023^[81]). The Ministry of Finance and Economic Planning, the Ministry of Environment, and the Rwandan Green Fund, led the NDC investment planning process which included estimating NDC costs, coordinating stakeholder engagement and identifying key interventions in each sector to support NDC targets (NDC Partnership, 2022^[82]). Additional stakeholders were engaged to help mobilise funding (e.g. World Bank, European Investment Bank, International Finance Corporation (EIB, 2023^[83]) (NDC Partnership, 2023^[84])).
- The **Asian Development Bank's** NDC Advance programme assists countries in translating their NDC's into climate investment plans and the identification of priority projects. The programme also helps countries to develop monitoring and reporting mechanisms and mobilise finance for the implementation of their NDCs (ADB, 2022^[85]).
- The **Inter-American Development Bank's** NDC Invest programme provides support to help countries turn their NDC commitments into investment plans by developing technically and financially feasible projects, providing grants and market development services as well as mobilising funding to reduce project risks (Riva et al., 2020^[78]).

3.4.3. Whole-of-government approaches to NDC preparation and implementation

To effectively implement NDCs, strong domestic institutions and frameworks are needed to co-ordinate a whole-of-government approach, integrate NDC priorities in sectoral programs, train government staff, engage relevant stakeholders, revise regulatory frameworks, etc. (Bakhtiari, Hinostroza and Puig, 2018^[86]). Such an approach can support national ownership and buy-in behind an NDC so it becomes more than a box ticking exercise under the UNFCCC process, but one that is fully integrated in national development plans and processes. Some countries experiences in strengthening domestic institutions and adopting whole-of-government approaches to their NDCs include for example:

- In **Kenya**, climate action and implementation is under the leadership of the President and overseen by various ministries with input from subnational authorities.
- In **Peru**, a NDC multisectoral working group (GTM-NDC) was established that integrated 14 government entities responsible for, among others, co-ordinating the development of sectoral action plans and informing the design and implementation of prioritised measures (Riva et al., 2020^[78]).

3.4.4. Whole-of-society, inclusive approaches to NDC preparation and implementation

The importance of inclusive, multi-stakeholder engagement in the preparation and implementation of NDCs is increasingly recognised. In current NDCs, 79% of Parties refer to formal arrangements for domestic stakeholder consultation, of which 93% indicated they conducted consultations and engagement in an inclusive and participatory manner and 81% of those reference gender-sensitive consultations, representing an increase from previous NDCs (UNFCCC, 2023^[6]). Comprehensive, transparent, and inclusive stakeholder engagement processes to develop and implement NDCs can promote buy-in and drive NDC enhancement (Peterson et al., 2023^[36]).

Engaging affected stakeholder groups in the preparation of economy-wide NDCs helps to ensure diverse perspectives are considered, leading to more comprehensive and ambitious outcomes, fostering a sense of ownership, strengthening social acceptance and supporting subsequent implementation of the NDC (NDC Partnership, 2019^[87]). In the year of elections in 2024, robust whole-of-society approaches to preparing and implementing NDCs can help to ensure commitment prevails despite changing domestic political circumstances. Experiences in strengthening inclusive multi-stakeholder engagement in the NDC preparation and implementation process include for example:

- In **Colombia**, an inclusive NDC update process was carried out with a significant stakeholder engagement plan that included technical workshops with various stakeholders, as well as awareness raising workshops. These engagement efforts led to increased interest from national development banks and financial institutions concerning NDC related financing opportunities (NDC Partnership, 2022^[31]).
- In **Liberia**, an updated and more ambitious NDC was developed through robust, inclusive stakeholder engagement processes based on a whole-of-government, whole of society participatory approach. In addition, a gender responsive NDC financing strategy was developed which included gender disaggregated data (UNDP, 2022^[88]).
- In **Nepal**, the preparation of NDC implementation plans for the energy and agriculture sectors were developed under the guidance of relevant national sectoral ministries through a participatory, inclusive process involving representatives from national and provincial governments, the private sector, youth, women's groups, and academia (UNDP, 2022^[88]).

4. Potential guidance on NDC features

This section provides an overview of issues related to negotiations around NDC features, which will resume in 2024 at CMA6 during COP29. Building on the overview in section 2. on current guidance on NDC design and implementation in the Paris Agreement and other relevant decisions, this section outlines the mandate to continue consideration of further guidance on NDC features. It also sets out some non-exhaustive examples of why and where further potential guidance on NDC features could be helpful.

While many characteristics for NDC design and implementation are included in the Paris Agreement and its accompanying decision (see section 2.1 and Annex A), Paragraph 26 of decision 1/CP.21 requested the Ad Hoc Working Group on the Paris Agreement (APA) to “develop further guidance on features of” NDCs for consideration and adoption by the CMA at its first session. The APA held six informal consultations in 2016 but could not reach consensus. As a result, paragraph 20 of decision 4/CMA.1 provided for Parties to continue consideration of further guidance on “features of NDCs” in 2024 (UNFCCC, 2019_[15]).²

While respecting the nationally determined character of NDCs, developing further guidance on features of NDCs nearly a decade after the adoption of the Paris Agreement could be valuable in several ways. Such guidance could provide clarity on issues that have emerged since the start of implementing the Paris Agreement, such as alignment of NDCs and LT-LEDS. Moreover, further guidance could help Parties elaborate NDCs in a way that enhances clarity, transparency, and comparability of their contributions to facilitate aggregation of information, support assessments under future GST cycles, and provide a more comprehensive picture of collective efforts.

Any potential further guidance on features of NDCs would need to recognise the nationally determined character of NDCs, which is and will remain at the heart of the Paris Agreement and the NDCs process itself. With this consideration in mind and building on the GST1 outcomes (see section 2.2), Parties need to reflect on how/where further guidance on NDC features could provide added value. For this purpose, there are a few open questions as set out below:

- **Common understanding of “features” of NDCs:** Providing clarity on what Parties understand as “features” of NDCs is important, as this term does not have an official definition in any CMA decision. The APA informal consultations indicated Parties used the term to refer to “characteristics of NDCs” (APA, 2016_[89]). The APA informal consultations also highlighted that many Parties stressed any guidance on features of NDCs must “respect the nationally determined character of NDCs and take into consideration the diversity of NDCs as well as different national circumstances and capacities”, and that any guidance needs to be flexible and not represent any additional burden, in particular to developing countries. It would thus be helpful for Parties to start by

² Paragraph 20 of decision 4/CMA.1 (UNFCCC, 2019_[15]) refers to the “seventh session” of the CMA, taking place in 2025 because of the gap year in UNFCCC negotiations in 2020 due to the COVID-19 pandemic. However, the same paragraph contains a reference to “2024” in parenthesis. The outcomes of the meeting of the Bureau on 25 February 2021 provided that one criteria to maximise progress and minimise delay following the COVID-19 pandemic is to hold events “in the year that they were scheduled to be held” (UNFCCC, 2021_[98]). The Bureau's prioritisation of the originally scheduled year over session number implies negotiations on NDC features will resume in 2024 at CMA6.

elaborating a common understanding of what constitutes “features” of NDCs before discussing potential guidance on features of NDCs.

- **Purpose of further guidance, and its impact on future NDC cycles:** While the purpose of further guidance on NDC features remains undefined, one potential outcome could be providing Parties with a framework for designing their NDCs in 2025 and beyond. This framework could offer common aspects or elements of NDCs for Parties to consider when designing their next NDCs. However, if any further guidance on features of NDCs is adopted at CMA6 in November 2024, this would leave limited time for its application in the next round of NDCs which are expected between December 2024 and February 2025 (9-12 months ahead of COP30). Considering this time constraint, when addressing negotiations on further guidance on features of NDCs, Parties may want to consider a longer-term perspective beyond the immediate next round of NDCs.
- **Relationship with other relevant negotiation processes:** Paragraph 18 of Decision 3/CMA.1 (UNFCCC, 2019^[90]) mandates a review and potential update of ICTU by 2027, with a potential decision targeted for 2028. Similarly, the modalities, procedures, and guidelines (MPGs) for reporting and review will be reviewed in 2028 with the potential for updates. Some suggestions relating to opportunities to provide additional clarity and detail on NDCs ex-ante or ex-post, such as encouraging or requesting further clarity on Article 6 co-operation, are informational. Such information-related issues are better considered in scheduled negotiations on ICTU (ex-ante) or MPG (ex-post), rather than under the negotiations on features of NDCs. In some instances, there could be linkages/complementarities between discussions, for example where specific issues identified under negotiations on NDC features are subsequently elaborated through revised ICTU or MPG guidelines (see discussion below).
- **How to structure potential additional guidance and which elements it could address:** As outlined above, while the Paris Agreement provides a good framework for designing and implementing NDCs, there are some new issues that have emerged since the start of implementing the Paris Agreement, as well as several existing elements that could be improved or clarified.

Given the limited time available for negotiations on this item at COP29, a focused approach could be adopted that addresses key priority issues that have emerged since the Paris Agreement was adopted and/or specific areas where further clarification is needed to complement existing guidance. Issues identified under the negotiations on features could be subsequently elaborated through updated ICTU or MPG guidelines in 2027-2028. Some non-exhaustive examples are included in (Table 4.1) and discussed below.

Table 4.1. Some examples of potential further guidance on new issues or on existing elements that could be improved or clarified

Theme	Existing elements or new issues*	Potential further guidance on features of NDCs, ICTU, MPGs
Alignment of NDCs with LT-LEDS and the 1.5°C goal	New	Parties could be encouraged to align their NDCs with net-zero aligned LT-LEDS and the 1.5°C temperature goal. This call could be supported through future ICTU guidance requesting Parties to explain how their NDC aligns with their LT-LEDS (where they have one) and how their NDC aligns with the 1.5°C temperature goal.
Contribution of removals towards NDC target	New	Through future ICTU or MPG guidance, Parties could be encouraged to clarify how emission removals in specific sectors contribute to achieving their NDC target.
Response to specific calls in the GST	Existing	Encourage Parties to elaborate how they intend to respond to specific calls from GST1 building on existing ICTU guidance. This call could be supported through future guidance requesting Parties to provide information on progress in their contribution to specific calls from GST1.
Form of NDC targets	Existing	High-emitting and high-income Parties that have not yet done so could be encouraged to adopt absolute emission reduction targets.
	Existing	Future guidance could be elaborated for Parties on preparing economy-wide emission reduction targets covering all GHGs, sectors and categories, aligned with limiting global warming to 1.5°C.

Note: (*) Since the adoption of the Paris Agreement.

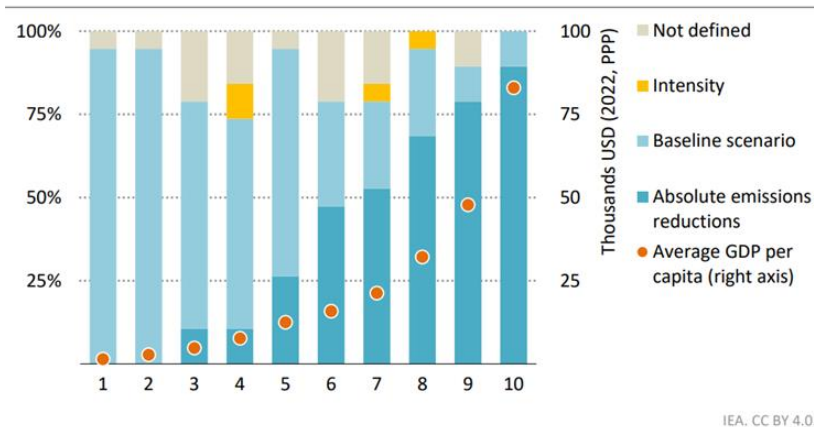
Source: Authors.

Building on the GST1 outcome that encourages Parties to align their next NDCs with their LT-LEDS, further guidance could encourage Parties to align their NDC with net-zero aligned LT-LEDS and the 1.5°C temperature goal. Moreover, future ICTU or MPG guidance could take this a step further by requesting Parties to explain how their NDC aligns with their LT-LEDS (where they have one) and how their NDC aligns with the 1.5°C temperature goal. Under the Paris Agreement, Parties are to implement domestic mitigation measures to achieve their NDCs, however as highlighted in the GST1 decision, there are significant gaps in the ambition and implementation of current efforts (UNFCCC, 2016^[11]). IEA analysis suggests that planned energy policies in emerging market and developing economies are already more ambitious in aggregate than their NDCs indicate, particularly in the case of conditional NDCs (IEA, 2023^[3]). The picture is reversed in advanced economies, where emissions in 2030 are nearly 0.7 Gt higher in stated policies than in revised NDCs, implying that policies currently in place are inadequate to meet stated NDCs, let alone longer-term net-zero targets.

Further guidance could be considered for existing elements of NDCs that might need improvement or clarification. For instance, further guidance could encourage certain Parties to adopt absolute emission reduction targets. As of September 2023, 37% of Parties have set an absolute emission reduction target, 46% of NDCs use baseline scenario targets (which mitigate emissions against a forward-looking counterfactual business-as-usual baseline); 16% of NDCs use emission intensity targets (which are relative to an economic or operational variable such as GDP) or other policies and measures such as peaking emissions (UNFCCC, 2023^[6]). IEA analysis shows that countries with low to medium income per capita have mostly set baseline scenario targets, whereas countries with higher income per capita have mostly adopted absolute emission reduction targets (IEA, 2023^[3]). However, several higher income countries have either not elaborated NDCs at all or have adopted intensity or baseline NDCs (Figure 4.1). Baseline scenario or emission intensity targets do not directly translate to absolute emission reductions, and often the accuracy of these targets depend on underlying assumptions. Moreover, in both cases absolute emissions could increase. While this reflects provisions in the Paris Agreement, further guidance could be provided to encourage high-emitting and high-income Parties that have not yet done so to adopt absolute reduction targets in their next NDC (IEA, 2023^[3]). Moreover, further practical guidance (or capacity building support) could be provided to Parties to support the transition to economy-wide targets

covering all GHGs, sectors and categories as envisaged in the GST1 decision. This could be done outside the negotiating space.

Figure 4.1. Mitigation target types of NDCs by country development level.



IEA. CC BY 4.0.

Note: Analysis of NDCs as of September 2023. The y axis represents the percentage of NDCs in a specific category. The x axis represents countries and groups them by deciles of GDP, with the highest income countries to the right of the graph.

Source: (IEA, 2023_[33]).

Another aspect that Parties might want to reflect upon is how to enhance clarity and transparency on emission removals in their NDCs. If Parties implemented ICTU guidance fully, there would be a sufficient degree of transparency, including in relation to the contribution of emission removals to the NDC. This could be brought a step forward and made more explicit in further ICTU guidance or in the negotiations on features of NDCs, for example by encouraging Parties to clarify in their NDC how emission removals in specific sectors contribute to achieving their NDC target. This clarification would help to enhance transparency, facilitate assessments of expected residual emissions and enhance comparability in expectations on residual emissions across countries.

Parties are to account for anthropogenic emissions and removals in their NDCs as requested by Article 4.14 of the Paris Agreement (UNFCCC, 2016_[11]). The Paris Agreement does not, however, require Parties to explicitly separate emission reduction and removal targets in their NDCs which has led to a lack of clarity and inconsistent approaches in the design, implementation, and accounting of NDCs. This ambiguity hinders the ability to accurately assess a Party's effective emission mitigation efforts and further transparency in this regard could be beneficial. Some countries, such as Indonesia (Government of the Republic of Indonesia, 2022_[91]), already indicate the expected emissions contribution of the LULUCF sector³ in their latest NDC. Other countries such as Switzerland (Federal Council of Switzerland, 2021_[92]) include separate targets in their LT-LEDS. These efforts to enhance transparency on removals could be taken a step further with a call encouraging Parties to consider separating emission reduction and removal targets in their NDCs. Such an approach could be considered through future negotiations on NDC features, with a longer-term perspective beyond the next round of NDCs in 2025. Such an approach would avoid diverting attention from the urgent need to reduce emissions in the short-term and reduce the risk that Parties rely on higher levels of removals in the future ((Jeffery et al., 2020_[93]); (Carbon Market Watch et al., 2024_[94])). Separating reduction and removal targets could also enhance transparency, help to incentivise the scale-up of removal technologies, and enhance certainty for project developers ((Deprez, 2023_[95]), (Budinis and Lo Re, 2023_[96]), (Carbon Market Watch et al., 2024_[94])).

³ The emissions contribution of the LULUCF sector can be positive or negative depending on accounting methods

5. Conclusions

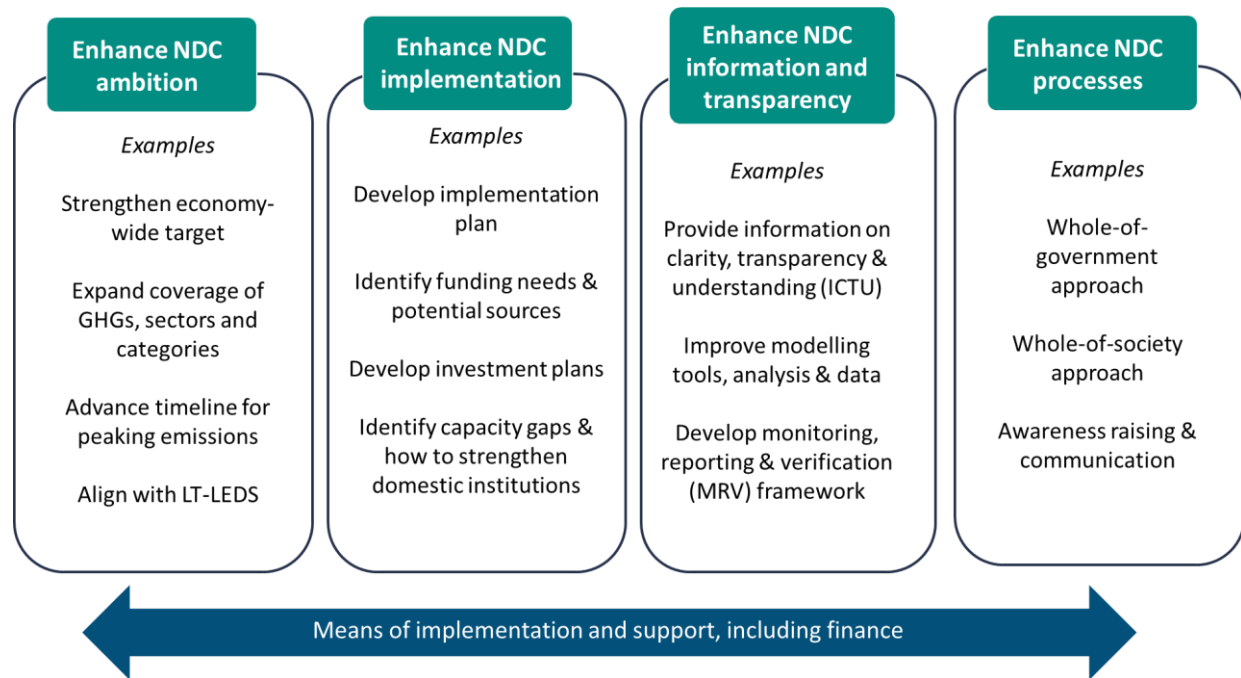
The Paris Agreement includes an in-built ratchet mechanism to progressively strengthen the global response to climate change. Parties' successive nationally determined contributions (NDCs) are expected to be more ambitious than their previous efforts, considering national circumstances. The next round of NDCs are expected in 2025. The need to enhance the next NDCs is made clear in the first global stocktake (GST1) which recognised that collective efforts are not on track to meet the Paris Agreement's goals and the urgent need to address persisting gaps.

Almost eight years since the entry into force of the Paris Agreement, Parties are much better placed to prepare their next NDCs as they can build on experiences with successive NDCs, draw on insights from the preparation of their first biennial transparency reports (BTRs) under the Enhanced Transparency Framework (ETF), and discussions during the GST1 process. Preparations for the next round of NDCs need to move forward in parallel to efforts to implement current NDCs to deliver enhanced efforts in this critical decade, and alongside on-going discussions on scaling up finance and investment.

The NDC formulation and enhancement process will look different in different countries depending on various contextual factors and enabling conditions. The outcome of efforts to update/revise/prepare new NDCs to date has varied widely, from expansions in the scope and coverage of NDCs to changes in target type and revisions to headline numbers among others. This diversity reflects the bottom-up, nationally determined nature of NDCs. There are nonetheless certain elements that could be helpful in framing the process of enhancing NDCs that relate to the design, development and implementation of NDCs - see Figure 5.1. These elements are not mutually exclusive, and some countries could consider enhancing their NDC across more than one element.

Experiences with successive NDCs highlight the interlinkages between NDC ambition and implementation and the critical enabling role of finance and investment on both. Considering NDC implementation alongside or shortly after the NDC preparation process, e.g. with the development of implementation plans and accompanying investment plans, can ensure an NDC is action oriented, implementation ready and investable. Means of implementation, in particular finance and investment, is a critical enabler underpinning NDC implementation and can facilitate enhanced ambition. Agreeing a robust decision on the new collective quantified goal (NCQG) on climate finance at the 29th Conference of the Parties (COP29) alongside wider efforts (e.g. to address barriers to mobilising private finance, design a fit for purpose international financial system, reform the multilateral financial architecture) can help create an enabling environment for enhanced NDCs in 2025. At the same time, improved information and strengthened processes to prepare and implement NDCs through whole-of-government, whole-of-society approaches can foster a sense of national ownership, increase buy-in and social acceptance, leading to more comprehensive, ambitious NDCs and can support their subsequent implementation.

Figure 5.1. Potential elements of NDC enhancement



Note: Potential non-exclusive elements that could be considered when formulating enhanced NDCs.

Source: Authors.

The Paris Agreement and subsequent CMA decisions provide some guidance on characteristics related to the design and implementation of NDCs. This includes provisions relating to progression, highest possible ambition, and the five-year cycle for communicating new NDCs informed by GST outcomes. The Paris Agreement and subsequent CMA decisions also provide some guidance on the type of emission reduction targets in NDCs, differentiating between developed and developing country Parties, and common metrics to be used in NDCs and GHG inventories. The GST1 reiterates existing provisions and sets out new goalposts to inform the next round of NDCs. In communicating their next NDCs, Parties are expected to provide information to facilitate clarity, transparency and understanding (ICTU) of their NDCs, including how their NDC has been informed by the GST1 outcomes. Taking this guidance into account in the NDC preparation process could support future assessments of collective progress under the GST and subsequent efforts at the national level to track and report on NDC implementation and achievement.

The GST1 sets key signals to inform enhanced efforts going forward and markers to guide follow-up. Responding to the calls in the GST1 would represent a progression beyond current efforts for several Parties given limited inclusion of economy-wide targets covering all GHGs, sectors and categories in current NDCs and the limited alignment of current NDCs with LT-LEDS. However, as discussed in previous CCXG analysis⁴, translating the global calls in the GST1 into domestic processes to prepare NDCs is not straightforward and will depend on various contextual factors and enablers. Parties also face multiple headwinds and challenges in 2024-25 that further complicate this exercise. Follow-up will be key and the GST1 decision includes several provisions to support NDC preparations at both the technical and political level – see Table 5.1. A key question is how to make best use of these available opportunities to deliver ambitious, implementation ready and investable NDCs that respond to the GST1 outcomes and reflect other provisions on NDCs. For example, how can capacity building support for NDC preparation and

⁴ Judy-Hugo, S. and L. Charles (2022), "Translating outputs to outcomes under the global stocktake of the Paris Agreement", OECD/IEA Climate Change Expert Group Papers, No. 2022/01, OECD Publishing, Paris, <https://doi.org/10.1787/e06c61f0-en>

implementation be delivered in a co-ordinated, coherent way to implement the calls in GST1? How to use insights from experiences to change the way NDCs are designed to be more ambitious, nationally owned tools that are implementable and investable? How can political momentum be galvanised to deliver ambitious NDCs through effective co-ordination among the troika of COP Presidencies, other relevant actors, and international fora? Addressing these and other questions can help deliver enhanced national climate efforts to implement the course correction set out in GST1.

Table 5.1. Follow-up provisions in the GST1 decision to support the next round of NDCs

Focus	Provision	Key actors
Knowledge sharing and mutual learning	Annual GST dialogue on how GST outcomes informs NDC preparations	SB Chairs
	Report on annual GST dialogue	UNFCCC Secretariat
	Knowledge and good practice sharing on NDC preparation and implementation, incl. through workshops	UNFCCC Secretariat
	Integrate GST1 outcomes in future activities of relevant work programmes and constituted bodies	Relevant work programmes (e.g. mitigation work programme, just transition work programme) Constituted bodies UNFCCC Secretariat Actors engaged in relevant thematic dialogues and high-level ministerial roundtables
Capacity building support	Identify current activities to enhance capacities of developing countries to prepare and implement NDCs	Paris Committee on Capacity-building (PCCB) Parties Other constituted bodies Relevant stakeholders
	Capacity building support for preparation and communication of next NDCs	Operating entities of the Financial Mechanism Constituted bodies UNFCCC Secretariat including through regional collaboration centres
	Capacity building support for preparation of next NDCs	Relevant organisations
Maintaining political momentum	Invitation to present NDCs at UNSG Special Event	Parties UNSG COP28-29-30 Presidencies
	Activities under "Roadmap to Mission 1.5°C to support ambitious NDCs	Troika of COP28-29-30 Presidencies

Notes: This table provides an overview of follow-up provisions set out in the GST1 decision focused on informing the next round of NDCs. The GST1 decision includes follow-up provisions in other areas which are not included here.

Source: Authors based on (UNFCCC, 2023^[2]).

As set out in Table 5.1, the GST1 decision establishes new spaces to exchange experiences on preparing and implementing NDCs, including the annual GST dialogue. Such spaces can provide useful opportunities for peer exchange and mutual learning among Parties at the technical level on how to take forward GST1 outcomes in the preparation and implementation of NDCs. Activities under relevant work programmes and constituted bodies, such as the Mitigation Work Programme (MWP) and the Just Transition Work Programme (JTWP), as well as discussions under relevant thematic dialogues (e.g. on oceans, mountains, children) and high-level ministerial roundtables (e.g. on pre-2030 ambition, just transition) could also provide insights for Parties to consider when preparing and implementing their NDCs.

Calls for the continued provision of capacity building support for preparing, communicating, and implementing NDCs through existing channels under the UNFCCC and by relevant organisations will be important. For example, continued in-country modelling support to develop national mitigation pathways that reflect global benchmarks provide an opportunity for countries to align their NDCs with their long-term

low emission development strategies (LT-LEDS) as called for in the GST1. Continued and strengthened capacity building support can strengthen the domestic enabling environment for preparing and delivering more ambitious NDCs that are nationally owned and implementation ready.

To complement planned follow-up at the technical level, the GST1 decision includes provisions for continued engagement at the political level. Activities by the troika of COP28-COP29-COP30 Presidencies is an innovation in the UNFCCC process that could play an important role in maintaining political pressure on implementing GST1 outcomes as discussed in previous CCXG analysis⁵. Co-ordinated activities under the troika could help maintain the spotlight and encourage Parties to put forward NDCs that reflect their highest possible ambition. There are also other channels within the UNFCCC (e.g. under the Enhanced Transparency Framework (ETF), on-going activities (e.g. under the just transition work programme (JTWP) and the mitigation work programme (MWP)), and beyond (e.g. national mechanisms to take forward GST1 outcomes in domestic processes, activities by High-level Champions, non-Party stakeholders, international organisations) that can support take-up of GST1 outcomes in processes to enhance NDCs.

As Parties prepare their next NDC, a key question is how to build on current experiences and capacity building support activities to formulate more ambitious, implementation ready NDCs in 2025. Various resources are available to support countries throughout the NDC process including financial and technical support provided through organisations at the global, regional, and national levels. Improving co-ordination among various existing support activities to prepare and implement NDCs can help to avoid duplication of efforts, create synergies among actors engaged in this space and the provision of more effective support to countries to deliver enhanced NDCs informed by GST1 outcomes.

Another key question concerns how the next round of NDCs can be designed to reflect the latest science and available mitigation opportunities. Global climate change mitigation scenarios consistently show several measures are necessary at the global level for rapid and deep emissions reductions in line with the goals of the Paris Agreement, including transitioning away from fossil fuels and towards renewable energy. Global emission pathways aligned with 1.5°C provide indications at the global level of the timing of calls set out in the GST1 and can help to inform Parties' preparations of their next NDCs, including strengthening the sectoral specificity and coverage of their NDCs. However, due to their global focus and low geographical resolutions, global pathways cannot directly inform national emission levels and bottom-up, nationally determined approaches remain critical.

In preparing their next NDCs, Parties can undertake bottom-up modelling approaches and analyses to develop national mitigation pathways that reflect global benchmarks. Equity, both between countries and within countries, is a key consideration in translating global goals to the national level and enhancing NDCs. Parties are to explain how their NDC is considered fair and ambitious in light of their national circumstances under ICTU guidelines. Different tools, frameworks and criteria for assessing fairness and ambition are available that can help Parties provide further information in their NDCs on fairness considerations, including reflecting on equity. Some of these tools have been used to inform certain countries' NDCs, for example the "fair share" range of efforts in South Africa's updated NDC. However, none of the available tools, frameworks and criteria for assessing fairness have universal support and there remain many different interpretations of how to operationalise equity.

In communicating their next NDC in 2025, Parties need to show how it has been informed by the outcomes of the GST1. This includes calls in the GST1 to adopt economy-wide emission reduction targets covering all GHGs, sectors and categories, aligned with 1.5°C and to align NDCs with LT-LEDS. Experiences with preparing and implementing successive NDCs could provide useful insights and opportunities for mutual learning:

⁵ Jeudy-Hugo, S. and L. Charles (2023), "Towards a successful outcome of the first global stocktake of the Paris Agreement", OECD/IEA Climate Change Expert Group Papers, No. 2023/01, OECD Publishing, Paris, <https://doi.org/10.1787/beb9c43f-en>.

- Some Parties are already trying to align their NDCs with 1.5°C. For example, in New Zealand, the Government has been working to improve the alignment of its NDC with the 1.5°C temperature goal based on recommendations from its Climate Change Commission; while in Costa Rica the 2020 NDC update was informed by climate modelling and 1.5°C aligned decarbonisation trajectories from its long-term strategy.
- Some Parties have established processes to facilitate alignment of their NDC with their LT-LEDS. For example, in Canada the Government sets national emission reduction targets every five years aligned with its NDC cycle as milestones towards its 2050 net-zero target. In Tonga, the Government developed its second NDC and its LT-LEDS in unison and aims to update its LT-LEDS and subsequent NDCs in a co-ordinated manner to align near-term policy planning and targets with long-term sectoral pathways.
- The GST1 decision encourages Parties – without differentiating between developed and developing countries – to come forward with economy-wide emission reduction targets, that cover all GHGs, sectors and categories. Responding to this call would represent a progression beyond current efforts for several Parties. More sectoral specificity on how specific sectors contribute to the NDC target and the development of accompanying sectoral transition plans and investment plans can in turn help to shape expectations among relevant actors and facilitate implementation.
- The Paris Agreement mandates developed countries to take the lead and adopt economy-wide emission reduction targets, while developing countries are encouraged to move towards economy-wide emission reduction or limitation targets. Experiences of some countries such as the UK in adopting economy-wide absolute emission reduction targets could provide insights to others.
- Some Parties have taken steps to develop implementation ready NDCs that are accompanied by robust implementation and investment plans. For example, in preparing their current NDCs, Malawi and Papua New Guinea developed accompanying implementation plans including sector-specific transition plans outlining key actions, indicators, and responsible government entities for implementation. Some Parties, including Belize, Ghana, and Rwanda, prepared NDC investment plans which others cost NDC targets and set out plans to unlock finance and investment.
- Adopting inclusive whole-of-society and whole-of-government approaches to prepare and implement NDCs can support national ownership and buy-in, leading to more comprehensive, ambitious outcomes and supporting subsequent implementation. In the year of elections in 2024, robust whole-of-society approaches to NDCs can help to ensure commitment prevails despite changing domestic political circumstances. There are several experiences of efforts to strengthen inclusive multi-stakeholder engagement in the NDC process including for example in Colombia, Liberia and Nepal. Enhancing NDC processes can help re-envisage NDCs so they are more than a box ticking exercise under the UNFCCC, but fully integrated in national development plans and processes.

The mitigation focused calls in the GST1 are framed at the global level, thus, there is a need for national and regional roadmaps to translate these calls into the pace and scale of action needed on the ground. Some considerations for translating GST1 calls on renewables and energy efficiency include:

- Several countries are already working to strengthen their efforts on renewable energy and energy efficiency motivated by various factors, including economic concerns. These existing experiences provide a good baseline to build on and insights which could be useful to others.
- The call to triple global renewable energy capacity by 2030 does not mean every country needs to achieve a tripling in its domestic capacity. Some countries starting from a low baseline have room to go beyond tripling, whereas for others tripling may not be realistic or needed domestically given efforts already undertaken.
- The call to double energy efficiency improvements is likely to have different implications for different regions/countries with reliance on different sectoral measures. For example, in advanced

economies, behavioural changes and improved energy and material efficiency are expected to play an important role alongside electrification. In emerging markets and developing economies, universal access to clean cooking is expected to play an important role alongside technical efficiency improvements in appliances including air conditioning.

- Meeting the global call to triple global renewable energy capacity will require a significant mobilisation of investments in renewables and grid expansion, particularly in developing countries. Projected investment needs to meet the call to double global average energy efficiency improvements are also significant. Unlocking investments, including in supporting infrastructure and technologies, is critical for implementing more ambitious renewables and energy efficiency measures and can be facilitated by strategic engagement with the private sector, investors, and relevant international organisations.
- Securing social acceptance and buy-in through strong and inclusive consultation processes that engage all relevant actors are important enablers for scaling up renewable energy and energy efficiency measures.
- Co-ordinated global political advocacy by the troika of COP28-COP29-COP30 Presidencies and the UNSG with other international fora (e.g. G20, African Union) could help maintain political attention on taking forward GST1 outcomes in domestic NDC processes.
- Engagement of relevant international organisations (e.g. IEA, IRENA, OECD) and other experts could support the translation of global mitigation calls in the GST1 decision (e.g. by helping to clarify/define what specific global calls in GST1 mean at different levels) and support efforts to monitor and track progress towards the global calls in GST1 going forward.

In parallel to preparing their next NDCs, Parties are also set to resume negotiations on further guidance for NDC features in 2024. While recognising and respecting the nationally determined nature of NDCs, these negotiations present an opportunity for Parties to refine the framework for developing NDCs to reflect the evolving context since the Paris Agreement was adopted, lessons learned with successive NDCs, and insights from the first assessment of collective progress under the GST. Any potential outcome of the negotiations on features in 2024 is unlikely to have a significant impact on the next NDCs due by early 2025 but could be approached with a longer-term perspective.

Any potential further guidance on features of NDCs would need to recognise the nationally determined character of NDCs which is and will remain at the heart of the Paris Agreement and the NDCs process itself. With this consideration in mind, and building on the insights from the GST1 outcomes, Parties need to reflect on how/where further guidance on NDC features could provide added value. Considering the limited time available at COP29 and the technical and political nature of these negotiations, it would be helpful for Parties to focus on selected priority topics, with a view to adopting a potential decision at COP29. Based on potentially agreed principles and topics, Parties could then consider requesting the Subsidiary Body for Scientific and Technological Advice (SBSTA) (taking advantage of its more frequent meetings compared to the CMA) to bring forward technical aspects of those agreed NDC features for consideration and potential adoption at the next CMA meeting.

Negotiations on further guidance on NDC features will intersect with other negotiation items, including reporting and transparency issues and related guidelines under ICTU and MPGs. Understanding these interlinkages/connections with other items will be important as negotiations on further guidance on NDC features get underway. Some suggestions raised in the context of discussions on features of NDCs relate to opportunities to provide additional clarity and detail on NDCs ex-ante or ex-post, such as encouraging or requesting further clarity on Article 6 co-operation. Such information-related issues are better considered in scheduled negotiations on ICTU (ex-ante) or MPG (ex-post), rather than under the negotiations on features of NDCs. In some instances, there could be some linkages/complementarities between discussions, for example where specific issues identified under the negotiations on NDC features are subsequently elaborated through revised ICTU or MPG guidelines.

Further guidance on NDC features could prioritise areas that have emerged since the adoption of the Paris Agreement and/or on specific NDC elements where further clarification is needed to complement existing guidance. For instance:

- Building on the GST1 outcome, further guidance could encourage Parties to align their NDCs with net-zero aligned LT-LEDS and the 1.5oC temperature goal. This call could be supported through future ICTU guidance requesting Parties to explain how their NDC aligns with their LT-LEDS (where they have one) and how their NDC aligns with the 1.5oC temperature goal.
- Further guidance could encourage Parties to clarify in their NDC how emission removals in specific sectors contribute to achieving their NDC target. This clarification could also be requested through future ICTU guidance, and would help to enhance transparency, facilitate assessments of expected residual emissions and enhance comparability in expectations on residual emissions across countries.
- Building on existing ICTU guidance, Parties could be encouraged to elaborate how they intend to respond to specific calls from GST1 building on existing ICTU guidance. This call could be supported through future guidance requesting Parties to provide information on progress in their contribution to specific calls from GST1.
- Further guidance could encourage certain Parties that have not yet done so to adopt absolute reduction targets in their next NDC. Further practical guidance could also be provided to Parties on preparing economy-wide emission reduction targets covering all GHGs, sectors and categories, aligned with limiting global warming to 1.5°C.

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Annex A. Non-exhaustive list of provisions related to characteristics of NDCs

Table A.1. Selected provisions in CMA decisions related to characteristics of NDCs

Decision	Article / Para.	Description	Topic
Paris Agreement	3	"As nationally determined contributions to the global response to climate change, all Parties are to undertake and communicate ambitious efforts as defined in Articles 4, 7, 9, 10, 11 and 13 with the view to achieving the purpose of this Agreement as set out in Article 2. The efforts of all Parties will represent a progression over time , while recognising the need to support developing country Parties for the effective implementation of this Agreement"	Ambition raising
	4.2	"Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures , with the aim of achieving the objectives of such contributions"	NDC design and implementation
	4.3	"Each Party's successive nationally determined contribution will represent a progression beyond the Party's then current nationally determined contribution and reflect its highest possible ambition , reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances"	Ambition raising
	4.4	" Developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets . Developing country Parties should continue enhancing their mitigation efforts and are encouraged to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances."	NDC design - targets
	4.6	" The least developed countries and small island developing States may prepare and communicate strategies, plans and actions for low greenhouse gas emissions development reflecting their special circumstances ."	Special circumstances
	4.7	" Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans can contribute to mitigation outcomes under this Article"	NDC design and implementation
	4.9	"Each Party shall communicate a nationally determined contribution every five years in accordance with decision 1/CP.21 and any relevant decisions of the Conference of the Parties serving as the meeting of the Parties to this Agreement and be informed by the outcomes of the global stocktake referred to in Article 14."	NDC update process
	4.10	"The Conference of the Parties serving as the meeting of the Parties to this Agreement shall consider common time frames for nationally determined contributions at its first session"	NDC design – time frames
	4.11	" A Party may at any time adjust its existing nationally determined contribution with a view to enhancing its level of ambition , in accordance with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement."	Ambition raising / NDC update process
	4.14	"In the context of their nationally determined contributions, when recognising and implementing mitigation actions with respect to anthropogenic emissions and removals , Parties should take into account, as appropriate, existing methods and guidance under the Convention , in the light of the provisions of paragraph 13 of this Article."	NDC implementation – reductions and removals
6.1	"Parties recognise that some Parties choose to pursue voluntary cooperation in the implementation of their nationally determined contributions to allow for higher ambition in their mitigation and adaptation actions and to promote sustainable development and environmental integrity"	NDC implementation - voluntary cooperation	
Decision 1/CP.21	23	"Requests those Parties whose intended nationally determined contribution pursuant to decision 1/CP.20 contains a time frame up to 2025 to communicate by 2020 a new nationally determined contribution and to do so every five years thereafter pursuant to Article 4, paragraph 9, of the Agreement"	NDC design – time frames
	24	"Also requests those Parties whose intended nationally determined contribution pursuant to decision 1/CP.20 contains a time frame up to 2030 to communicate or update by 2020"	NDC design – time frames

Decision	Article / Para.	Description	Topic
		these contributions and to do so every five years thereafter pursuant to Article 4, paragraph 9, of the Agreement”	
	25	“Decides that Parties shall submit to the secretariat their nationally determined contributions referred to in Article 4 of the Agreement at least 9 to 12 months in advance of the relevant session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement with a view to facilitating the clarity, transparency and understanding of these contributions, including through a synthesis report prepared by the secretariat”	NDC update process
	26	“Requests the Ad Hoc Working Group on the Paris Agreement to develop further guidance on features of the nationally determined contributions for consideration and adoption by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its first session”	NDC features guidance
	27	Agrees that the information to be provided by Parties communicating their nationally determined contributions, in order to facilitate clarity, transparency and understanding, may include, as appropriate, inter alia, quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals , and how the Party considers that its nationally determined contribution is fair and ambitious, in the light of its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2.	NDC design
Decision 4/CMA.1	19	“Notes that features of nationally determined contributions are outlined in the relevant provisions of the Paris Agreement ”	NDC features
	20	“Decides to continue consideration of further guidance on features of nationally determined contributions at its seventh session (2024) ”	NDC features
Decision 6/CMA.3	2	“Encourages Parties to communicate in 2025 a nationally determined contribution with an end date of 2035, in 2030 a nationally determined contribution with an end date of 2040, and so forth every five years thereafter ”	NDC design – time frames
	37	“Recalls Article 3 and Article 4, paragraphs 3, 4, 5 and 11, of the Paris Agreement and requests Parties that have not yet done so to revisit and strengthen the 2030 targets in their nationally determined contributions as necessary to align with the Paris Agreement temperature goal by the end of 2024 , taking into account different national circumstances”	NDC update process
	39	“Reaffirms the nationally determined nature of nationally determined contributions and Article 4, paragraph 4, of the Paris Agreement and encourages Parties to come forward in their next nationally determined contributions with ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances ”	NDC design - targets
Decision 1/CMA.5 (GST1 decision)	40	“Notes the importance of aligning nationally determined contributions with long-term low greenhouse gas emission development strategies and encourages Parties to align their next nationally determined contributions with long-term low greenhouse gas emission development strategies.”	NDC design and implementation
	171	“ Invites all Parties to put in place new or intensify existing domestic arrangements for preparing and implementing their successive nationally determined contributions”	NDC design and implementation
	177	“ Encourages Parties to take into account the good practices and opportunities identified during the technical dialogue of the first global stocktake in enhancing their actions and support”	NDC design and implementation
	190	“Also invites Parties to present their next nationally determined contributions at a special event to be held under the auspices of the United Nations Secretary-General”	NDC update process
	191	“ Decides to launch , under the guidance of the Presidencies of the fifth, sixth and seventh sessions of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement, a set of activities (“Road map to Mission 1.5”) to significantly enhance international cooperation and the international enabling environment to stimulate ambition in the next round of nationally determined contributions , with a view to enhancing action and implementation over this critical decade and keeping 1.5 °C within reach”	NDC update process

Source: (UNFCCC, 2016^[1]), (UNFCCC, 2019^[15]), (UNFCCC, 2022^[97]), (UNFCCC, 2023^[2]).

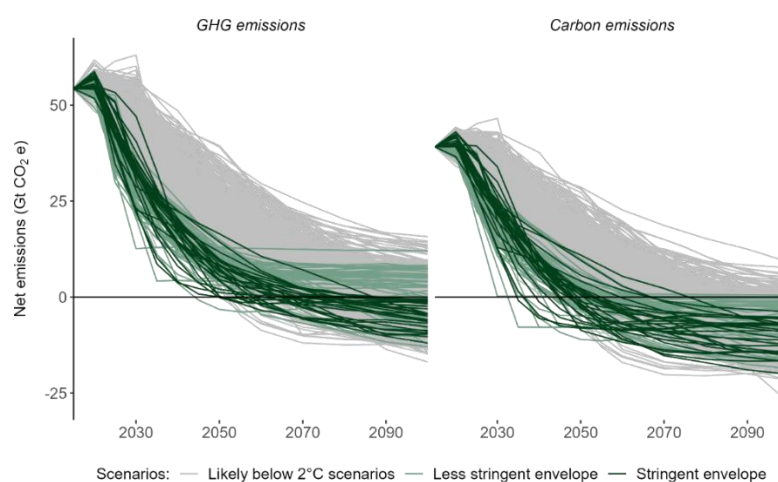
Annex B. Paris-consistent global emission pathways

Global climate change mitigation or emission pathways seek to reconcile temperature and emission targets, including those in the Paris Agreement, with potential future developments of technologies and the socio-economic system. Such global scenarios serve as the backbone for scientific and global policy research on climate mitigation, including in the IPCC AR6 WG3. IPCC AR6 mitigation findings rely on over 2,000 global scenarios (Byers, 2021^[39]), underpinned by a broad set of assumptions resulting in different potential emissions futures and associated temperature outcomes (Riahi, 2022^[37]).

Only a small subset of currently published scenarios have the potential to deliver the Paris Agreement's goals. (Pouille et al., 2023^[38]) identified a set of criteria for selecting emission pathways that align with the Paris Agreement's temperature and mitigation objectives. These criteria were applied to the IPCC AR6 scenarios to select a set of Paris-consistent scenarios that can be used to draw insights on changes in emitting sectors and resulting global GHG emissions required. These criteria require that scenarios:

- Ensure temperature rise is limited to 1.5°C by the end of the century with at least 50% probability;
- Ensure limited overshoot of 1.5°C during the century, with peak temperature at or below 1.6°C at the 50% probability level;
- Keep very likely chances of never reaching the 2°C limit (90% probability);
- Reach net zero CO₂ and net zero GHG emissions this century; and
- Ensure an early peaking of global emissions

Figure B.1 Reference envelopes of scenarios in Paris-consistency criteria



Note: Pathways in green correspond to scenarios that fulfil Criteria 1, 2, 3, 4 and 5. Pathways in dark green satisfy the more stringent interpretation for each of the criteria, while pathways in light green satisfy the less stringent level of interpretation of the criteria. The other pathways (in grey) correspond to all other scenarios that remain below 2°C with a 67% chance throughout the century.

Source: (Pouille et al., 2023^[38]).

Annex C. Sectoral benchmarks from 1.5°C global emissions pathways

Table C.1. Complementary global sectoral benchmarks for industry, transport, AFOLU and buildings to achieve the Paris Agreement's goals

	2030	2050
Industry		
CO ₂ emissions reductions (compared to 2020)	-34%	-80%
CH ₄ emissions reductions (compared to 2020)	-21%	-58%
Change in carbon intensity (compared to 2020)	-25%	-82%
Share of electricity in industry energy demand	28%	55%
Share of hydrogen	0,4%	5,1%
CCS in industry (Mt CO ₂ /year)	449	729
Transport		
CO ₂ emissions reductions (compared to 2020)	-15%	-61%
Share of electricity	5%	23%
Share of biofuels	4%	16%
Share of oil	88%	51%
Agriculture, Forestry and Other Land Use (AFOLU)		
CO ₂ emissions reductions (compared to 2020)	-101%	-162%
CH ₄ emissions reductions (compared to 2020)	-11%	-26%
N ₂ O emissions reductions (compared to 2020)	-7%	-11%
Carbon Sequestration from land use (Mt CO ₂ /year)	548,7	2667,2
compared to 2020	x7	x34
Land Cover - energy crops (million ha)	40,8	226,6
compared to 2020	x5,7	x32
Land Cover - Forest (million ha)	4146,2	4264,9
compared to 2020	+4%	+7%
Buildings		
CO ₂ emissions reductions (compared to 2020)	-13%	-76%
CH ₄ emissions reductions (compared to 2020)	-33%	-70%
Change in carbon intensity (compared to 2020)	-12%	-77%
Share of electricity	47%	82%
Share of gases	19%	5%

Source: Authors using data from the IPCC AR6 scenarios database (Byers, 2021^[39]).

www.oecd.org/environment/cc/ccxg.htm
www.iea.org



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