GGGI

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Closer to 1.5˚C: Driving Ambitions to Deliver on the Paris Agreement

Lessons and Recommendatoins from GGGI's Provision of Support to Member and Partner Countries in 2020-2021 for NDC Enhancement

May 2023

Technical report series

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27. Green Growth Index 2022: Measuring Performance in Achieving SDG Targets, Lilibeth Acosta, Innocent Nzimenyera, et al., December 2022.
28. Closer to 1.5°C: Driving Ambitions to Deliver on the Paris Agreement: Lessons and Recommendations from GGGI's Provision of Support to Member and Partner Countries in 2020-2021 for NDC Enhancement, Ingvild Solvang, Siddhartha Nauduri, et al., May 2023

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CONTENTS

Executive Summary

At a time when record-breaking climate events are observed with higher frequency and more intensity around the world, the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report of 2021 pointed to increasing evidence that climate change is widespread, rapid, intensifying and undeniably linked to human emissions of greenhouse gases (GHGs) into the atmosphere. The opportunity to limit global warming to 1.5°C compared to pre-industrial levels—as set in the Paris Agreement—still depends on future emissions, which leaves a narrow and rapidly closing window for ambitious climate action to avoid the most devastating impacts of the climate crisis.

The nationally determined contributions (NDCs) are, in essence, governments' plans to cut emissions and adapt to the climate crisis. Ahead of the 26th United Nations Climate Change Conference of the Parties (COP26), countries were expected to submit renewed targets, and by November 2021, 151 countries had submitted their revised NDCs. However, this process of NDC revision and update has been overshadowed by the continued gap between ambitions expressed in the NDCs and the actions required to achieve the goal of the Paris Agreement. Currently, NDCs set the world on path to a disastrous 2.7°C warming. The focus ahead must, therefore, be on NDC implementation, and ensuring a robust process for the Global Stocktake under Article 14, which is a periodical review of the collective progress on NDC implementation. At the same time, preparations for the next rounds of NDC update due in 2025 has begun, and the process must bring climate commitments back on track to meet Paris Agreement targets.

About This Report

The objective of this report is to provide recommendations for the NDC revision process in 2025, based on lessons learned from the 2020-2021 NDC revision process, in which the Global Green Growth Institute (GGGI) supported 30 of its Member States and partner countries on various aspects of NDC enhancements. Detailed analysis of the NDCs and their sectoral coverage in Member and partner countries provided lessons on the process of enhancing mitigation and adaptation targets, integrating gender equality and social inclusion considerations into NDCs to enhance ambition and effectiveness of climate action, strengthening financial planning, and promoting international cooperation under Article 6 readiness. Furthermore, the report highlights barriers to NDC implementation facing developing and emerging countries, particularly those linked to access to climate finance, and brings to attention key priorities for GGGI's support to climate action.

Lessons and Recommendations for Enhanced NDCs

Enhancing Mitigation Targets in NDCs

Enhancing the mitigation ambition of the NDCs is of paramount importance as several analyses, including the 2021 synthesis reports from the United Nations Framework Convention on Climate Change (UNFCCC), indicate. Countries have, to varying degrees, expanded coverage of economic sectors and GHGs, and made mitigation targets time bound. Importantly, countries have increased transparency by providing more information on their mitigation targets and methodological approaches to estimating GHG emissions in line with the reporting requirements of the modalities, procedures, and guidelines (MPG) of the enhanced transparency framework (ETF).

Enhancing ambition means: having comprehensive data and information systems in place to feed decision-making, an ability to understand the results of actions implemented, the identification of trends and opportunities to reduce emissions, the prioritization of actions based on opportunities and resources available to implement these actions, and finally, decide between market and non market approaches to finance them. Conducting these activities with inputs from a broad range of stakeholders, including private sector, civil society groups, youth, academia and indigenous communities is needed to ensure inclusion and reflection of realistic implementation mechanisms. With the first reports under the ETF due at the end of 2024 and the next cycle of NDCs to be submitted by 2025, countries should prioritize building these systems and capacities. Raising ambition also requires urgent mobilization of international finance as reiterated at several COPs, high-level political forums and international agreements.

Key findings and lessons from sector-specific analyses include the following:

- **Energy** — There are critical actions that can be implemented within the energy sector in developing countries, including urgently moving away from fossil fuels, and improving demand- and supply-side energy efficiencies. In the latest updated NDCs, the assessed countries have either added renewable energy targets as a percentage of quantified installed capacities or as quantums, included measures on energy efficiency, and various means of decoupling transport systems from fossil fuels through the use of biofuels.

- **Agriculture, Forestry and Other Land Use (AFOLU)** — For most developing countries, especially in Least Developed Countries (LDCs), the AFOLU sector is one of the principal sinks, but emissions from the sector are increasing. Agriculture experienced the most salient progress in terms of the number and scope of interventions, with few countries adding new measures in livestock management, energy-efficient agricultural technologies, and other related areas. While mitigation is a priority, adaptation actions are of equal importance in the AFOLU sector, due to its importance to food security and employment in most of the assessed countries.

- **Waste** — In the waste sector, the main limiting factor has been availability of data. Despite this, several countries have adopted long-term waste management strategies and added mitigation actions and are implementing integrated waste management practices to reduce their emissions in this sector.

- **Industrial Processes and Product Use (IPPU)** — The IPPU sector also faces data challenges and is one of the least assessed sectors in GHG inventories in the analyzed countries. Recognizing that emissions from this sector will only increase in future in line with the growing demands from its contributing underlying economic sectors (such as cement) and high-GHG-potent gases (such as hydrofluorocarbons), countries have increased the use of alternative additives in the cement mix and in the iron and steel industries to reduce emissions, and are exploring energy efficiency measures.

A few of the assessed countries have submitted their long-term low emission development strategies (LT-LEDS), but the number of developing countries with such long-term plans remains low. Without such long-term plans, countries run the risk of developing relatively short-to-medium-term NDCs with lower ambition actions, leaving the successive NDCs to sharply increase their ambition to achieve the targets of the Paris Agreement. An LT-LEDS or net-zero targets will help countries make systematic and controlled progress toward 2°C and 1.5°C temperature goals.

Recommendations for NDC enhancement in mitigation from the transparency perspective

1. Establish or strengthen measurement, reporting and verification (MRV) systems for meeting obligations under the ETF, as per the modalities, procedures and guidelines referred to in Article 13 of the Paris Agreement, and be ready with first biennial transparency reports by 2024.

2. Prepare LT-LEDS and related targets in place to analyze how the NDCs can help reach these targets.

3. Create the necessary frameworks under which implementation of NDC actions can be continually monitored, and via which data and information needed for NDC revision will be readily available.

4. Develop systems to provide the information needed to facilitate the clarity, transparency and understanding of mitigation and adaptation actions in the next NDC revisions by 2025, i.e., actions should have more accurate information on aspects such as GHGs targeted, sectors covered, methodologies for assessing results, commensurate assessments of steps for implementing these actions and resources required.

5. Build the capacity of primary data providers to better understand the data and information they must provide to improve overall data quality.

6. Continue submitting GHG inventories and other communications to fulfil reporting obligations as part of the UNFCCC process, and enable the creation of consistent datasets that support the country in informed decision-making.

7. Expand coverage of GHGes and sectors in GHG inventory to identify additional opportunities for mitigation.

Recommendations for NDC enhancement in adaptation

1. Link NDCs to NAPs.
2. Articulate commitments to improving the availability of data to guide climate vulnerability assessments and the development of adaptation targets and measures.
3. Establish clear and measurable adaptation targets.
4. Establish clear linkages between climate risks and the country's adaptation targets and measures.
5. Enhance synergies between adaptation and mitigation, and enhance the focus on adaptation through articulating adaptation co-benefits of mitigation, and vice versa.
6. Emphasize the alignment of adaptation with the Sustainable Development Goals (SDGs).
7. Show alignment between adaptation communications and the Sendai Framework.
8. Estimate the costs for unconditional and conditional adaptation measures to help highlight governments' domestic capacity and commitment gaps.

Enhancing Adaptation Targets in NDCs

Compared with first NDCs, countries have strengthened adaptation components by emphasizing adaptation as a priority, elaborating processes to identify and prioritize adaptation actions, and enhancing target-setting and articulation of measures. There is also enhanced focus on articulating adaptation co-benefits of mitigation, and on the status of the process to formulate and implement national adaptation plans (NAPs). This is indicative of a growing momentum for the NAP as the primary national instrument for adaptation and a main source of information for the NDCs.

Countries have improved the technical rigor of the adaptation component by increasing clarity of the adaptation targets and aligning country-specific climate vulnerability with relevant adaptation measures. Challenges to adaptation planning and target setting remain, largely due to the limited availability of data and technical capacity to articulate linkages between vulnerability to climate change and specific sectoral targets and actions. Overcoming these challenges is key to mobilizing climate finance and fostering political support for climate change response policies and interventions.

Enhancing linkages between adaptation actions and disaster risk management emerges as an important building block for subsequent discussions regarding loss and damage as well as the Sendai Framework's aim to mitigate the loss of lives, livelihoods and health, and protect the assets of individuals and countries from disasters.

Integrating Gender Equality and Social Inclusion

In partial alignment with the Enhanced Lima Work Programme on Gender and its Gender Action Plan, 85% of second and updated NDCs referred to gender in contrast to only 29% in previous NDCs. However, the quality of gender integration varies, and 42% of NDCs lack specificity on how gender effectively interlinks with climate measures, leaving great room for improvements. To achieve inclusive outcomes, inclusion should be considered at all levels, i.e., planning processes, climate policy frameworks and NDC governance structures. Inclusive planning processes are characterized by broad engagement in the NDC formulation process, including ministries and civil society with mandates for gender equality, youth engagement and social development.

Integrated climate policies need to go beyond statements for gender and social inclusion mainstreaming in the NDC to explicitly articulate targets for women's empowerment, gender equality and social inclusion in sector-specific gender action plans, and apply sex-disaggregated indicators for monitoring. It is good practice to base the NDC enhancement process on sector-specific gender and social assessments. Analysis of the NDCs shows that they have, to varying degrees, addressed women's participation and leadership in climate action; access to jobs, services, technology and finance; and gender relevance to climate vulnerability, disaster risk and recovery. In addition to applying gender equity lens in NDCs, long-term strategies offer unique opportunities to address underlying barriers to an inclusive and gender-responsive labor market and decision-making process.

Effective inclusive governance mechanisms ensure the engagement of ministries for gender and social inclusion in supporting NDC implementation. Best practices include gender-responsive budgeting processes to underpin NDC implementation and establishing systems that are capable of monitoring and evaluating gender-responsive and inclusive outcomes.

Recommendations for NDC enhancement in gender and social inclusion

1. Ensure multi-stakeholder engagement to embed the NDC enhancement process in the wider framework for gender equality, women's empowerment and social inclusion.
2. Articulate a wider objective for gender-responsive just transitions toward resilient and low-emission development to identify ambition and direction for climate action in different sectors that contribute to the achievement of gender equality.
3. Collect sex-disaggregated data for climate action-related sectors to strengthen the integration of gender into sector assessments and co-benefits assessments (e.g., employment potential), and design gender targets in specific measures.
4. Strengthen the capacity for gender mainstreaming in future NDCs and NDC implementation. This includes strengthening the capacity of ministries in charge of gender equality and social development in climate change, and strengthening the capacity of sector-specific ministries in gender equality and women's empowerment.
5. Use sector-specific gender assessments and gender action plans to ensure gender is effectively integrated into NDCs, including into sector-specific NDC measures, to avoid it being side-lined.
6. Establish, as best practice for NDC enhancement, gender targets for both mitigation and adaptation measures.
7. Articulate a governance structure for accountability toward the implementation and monitoring of gender outcomes in NDC implementation.
8. Link gender outcomes in climate action with gender-responsive budgeting mechanisms, and secure resources to implement measures for inclusive access to the co-benefits of climate action.

Financial Planning

NDC targets are necessary, though in isolation not sufficient to deliver ambitious climate action. Governments need to progress by adopting appropriate policies incentivizing climate-conforming investments and consumption patterns in their countries, and by addressing barriers preventing the scaling up of access to available funds.

The NDCs can serve as investment menus for governments to mobilize the available public and private funding needed to ensure full and effective NDC implementation. Governments can also use the NDCs to communicate their needs for financial support. Several countries provided in-depth analysis of the estimated costs of implementing proposed mitigation actions. Further detailing NDC targets with roadmaps and investment strategies is an important step in further incentivizing finance flows into countries for their mitigation and adaptation actions.

Recommendations for NDC enhancement in financial planning

1. Identify the existing in- and out-flows of climate finance in the country.
2. Where specific actions have been identified for NDC targets, quantify the financial costs of implementation, including human and technical resource costs and the cost of creating an enabling environment.
3. For those NDC targets that do not have specific actions, evaluate the potential choices, and then quantify the financial costs of implementation.
4. Evaluate internal revenue methods and means to finance actions, and use this information to prioritize the actions.
5. Assess the availability of external public and private finance means to support the actions that cannot be supported through internal means.
6. Evaluate the potential of carbon finance routes to generate the revenue for implementation, including risk-balanced financial instruments such as feed-in tariffs, taxes and carbon markets.

Leveraging Carbon Markets and Article 6 Mechanisms

Carbon markets under Article 6 of the Paris Agreement are expected to open the deadlocks on the path to moving from the billions of dollars initially pledged to the trillions needed to tackle the climate crisis. Most of the countries assessed in this report have in their NDCs declared a willingness to explore the opportunities for international cooperation under Article 6, but the level of details provided varies. This may partly be because the Article 6 Rulebook was not yet finalized at the time when submissions were due. Looking ahead, we may expect more countries to express their intention to engage in voluntary cooperation.

Participation in cooperative approaches requires the establishment of complex institutional and technical frameworks and requires capacity building and support toward readiness. A review of a country's readiness to pursue cooperative approaches under Article 6 will include: 1) articulation of a strategic vision and alignment of cooperation based on Article 6 with national development priorities; 2) existence of a relevant institutional framework able to facilitate identification, approval and recording internationally transferred mitigation outcomes (ITMOs); and 3) existence of technical and legislative frameworks for measuring GHG emissions at the installation level following an internally-approved methodology for sharing the data with the international community.

Many countries have highlighted commitment to key attributes of the emerging carbon market such as transparency, preservation of environmental integrity, prevention of double counting and verified emissions reductions. The functionality of carbon pricing instruments depends strongly on the trust of market participants, which is typically underpinned by the robustness and accuracy of the data delivered by an MRV framework. A robust and reliable MRV framework and system is more important than ever, not only for leveraging the opportunities of carbon markets and Article 6 mechanisms, but also for meeting obligations of the ETF under Article 13, and for submission of regular GHG inventories, NDCs and biennial transparency reports that will be subjected to international verification processes and the global stocktake. Inadequate MRV framework and systems will be a major challenge to mobilize climate and carbon finance.

Recommendations for for NDC enhancement in Article 6 readiness

1. Review existing institutional frameworks for fiscal policy, foreign direct investment policy and environmental policy.
2. Enhance the reviewed policy and governance frameworks by embedding functionalities related to Article 6 in them.
3. Align strategic national development objectives with emerging carbon markets.
4. Continuously phase in investment incentives to channel new foreign direct investments into actions with mitigation benefits, and develop strategies to sell the mitigation outcomes achieved on carbon markets.
5. Develop broad strategies for the use of revenue from sales of mitigation outcomes.
6. Prepare or update a list of capacity gaps, which will provide the basis for the design of capacity building activities.
7. Establish institutional links across the governance of fiscal policy, foreign direct investment policy and environmental policy.
8. Build on existing frameworks (e.g., activities developed under the Kyoto Protocol) rather than developing frameworks from scratch.
9. Develop a comprehensive MRV strategy, linking national statistical frameworks with reporting of GHG emissions.

Promoting International Cooperation under Article 6

COP26 delivered the Rulebook for Article 6, and while the details of its implementation are in infancy, GGGI is supporting Member and partner governments on their planning and readiness for carbon transactions through international cooperation under Article 6.2. Effective carbon markets are expected to contribute to closing the finance gap for climate action but will require significant policy reform, strategies and emissions reduction projects at scale.

Since 2020, GGGI has engaged in developing a number of initiatives to support some of its Member countries with an interest in selling their excess emission reductions as ITMOs, through cooperative approaches with countries interested in buying such ITMOs.

These pilot initiatives include supporting the host countries in creating the governance frameworks needed, preparing the administrative documentation for the transaction and meeting the technical requirements of Article 6. Countries need capacity to enter the market and manage trading, and bring in private sector policies that will incentivize small and medium business to engage in cooperative approaches or linking carbon trades with domestic and foreign environmental policy instruments. The policy framework for carbon markets is most effective when aligned with other long-term development strategies, and furthermore, Article 6 readiness requires broad engagements across line ministries, private sector and countries' investment agencies.

The Climate Finance Gap in Developing Countries

Critical to NDC implementation is the capacity of developing countries to mobilize climate finance. Additionally, developed countries' commitments to financing climate action in developing countries is central to the UNFCCC negotiations. The collective goal of developed countries from COP15 to mobilize USD100 billion annually by 2020 was not met. At COP26, developed countries committed to raising USD500 billion by 2025. While the developed countries' pledges are important both politically and practically, they are still far short of the estimated USD32 trillion required by 2030 to transition to sustainable economies. Achieving climate targets therefore hinges on countries' ability to design market-ready climate action, leverage public funds to attract investments and engage the private sector. This capacity varies greatly between countries based on several characteristics.

Figure 1 shows that developing and emerging economies with low- to mid-levels of climate vulnerabilities (Category A) tend to attract higher volumes of climate finance compared to mid- and highly-vulnerable LDCs (Category B) and Small Island Developing States (SIDS) (Category C), despite their vulnerabilities and requirements for adaptation and development. Emerging economies' efforts to mobilize climate is backed by higher levels of financial innovations and more sophisticated policies, including green banking guidelines, adopted climate and sustainable finance strategies, and established governance structures under which market-led sustainable finance principles can be implemented effectively. The relative larger scale of the economy, robust policy frameworks and institutional capacity of these countries are key to attracting funding. In contrast, more vulnerable LDCs struggle to mobilize finance due to economic and political instability, higher regulatory uncertainties, and generally a lower risk-reward ratio than what is required by investors. SIDS have low volumes of finance due to their remoteness and small-scale economies, making them highly dependent on small undiversified economies. SIDS also face high levels of debt, and reliance on overseas remittances and official development assistance. Both LDCs and SIDS struggle with a critical lack of bankable project ideas to attract finance and finance at scale.

By tailoring its support to different countries' needs, GGGI has supported the mobilization of USD7 billion for its Member and partner countries. This includes support to the issuance of the Government of Peru's first sovereign sustainable bond at USD4 billion. When excluding this large amount as an outlier among successful projects, 48% of the funds were mobilized to developing and emerging economies, 43% to LDCs and 9% to SIDS. Most of the funds went to solar projects (31%) and sustainable landscapes investments, i.e., forestry and irrigation (19%). However, less than 4% of all funds were tagged to adaptation. GGGI's investment portfolio mirrors the global distribution of climate finance and indicates the added focus required on adaptation finance.

The Adaptation Finance Gap

For the first time, at COP26, a global goal on adaptation finance was agreed; that is, the commitment to double adaptation finance from the 2019 level by 2025, thus increasing overall adaptation investment to USD40 billion per year. Furthermore, the consensus reached at COP27 to establish a Loss and Damage Fund will lead to diversification of resources available to developing

countries. Annual adaptation finance needs in developing countries are expected to reach the upper end of the ranges of USD140 billion-USD300 billion by 2030 and USD280 billion-USD500 billion by 2050,[1] which show the great need for scalable adaptation solutions, and the urgency to leverage domestic and private sector investments.

A major challenge for adaptation financing is that adaptation projects are perceived as not being market ready. While the private sector is increasingly crowding out public investment in mitigation sectors such as renewable energy and waste processing in some countries, adaptation measures, such as coastal protection or the provision of basic services that reduce vulnerability, are typically funded through grants or domestic resources. A main reason for this is that many adaptation projects are seen as being for the public good, with few opportunities to "privatize" benefits for the market.

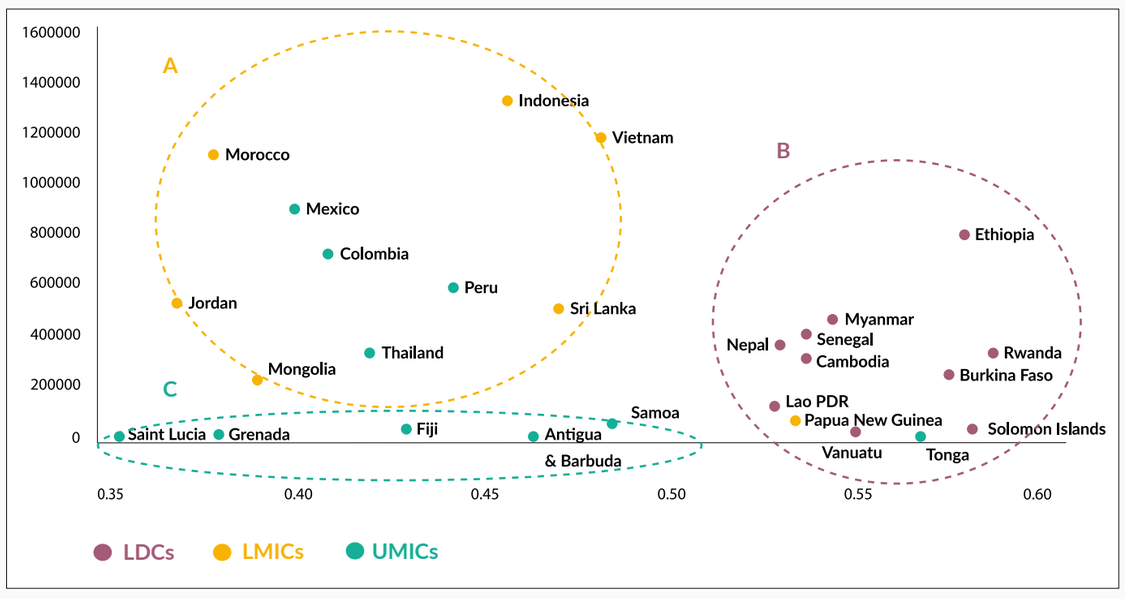
1 United Nations Environment Programme, *Adaptation Gap Report 2021* (Nairobi, 2021).

Another barrier to adaptation financing is that many of the countries that are the most in need of finance are already heavily in debt—there is a strong correlation between a country's need for adaptation and a high government gross debt to gross domestic product (GDP) ratio. Countries with the greatest need for protection of and support for livelihoods are the least able to borrow to reduce vulnerability.[2] GGGI's support of green investment plans under the Green Climate Fund (GCF) Readiness Programme and its work on NDC enhancement help to plug the adaptation finance gap by providing assistance in preparing an enabling environment through which scarce resources can be channeled into adaptation and resilience projects.

GGGI supports the development of enabling financial environments through the application of its analytical tools, such as the Green Growth Index, whereby governments are supported in developing measurable adaptation scenarios that can be used to conceptualize bankable projects that might attract investments.

2 United Nations Conference on Trade and Development, *COP26: Least developed countries need more funds to adapt to climate change*, November 1, 2021.

Figure 1. Flows of climate finance to countries over country vulnerability rankings, 2010–2020



Sources: Organisation for Economic Co-operation and Development, Tracking climate finance and Notre Dame Global Adaptation Initiative, Country Index.

Priorities to Accelerate NDC Implementation

GGGI has identified activities that will build the capacity of developing countries to set ambitious targets, create an enabling policy environment for climate action, develop pipelines of climate projects, and mobilize climate finance with the engagement of the public and private sectors. Through a value chain approach, GGGI offers tailor-made solutions and services to its Members and partners in five areas essential to the implementation of the Paris Agreement and achievement of the SDGs (Figure 2).

Supporting Climate Strategies for More Ambitious 2030 and 2050 Targets

Countries are required to further enhance their NDCs in the upcoming revision cycle to come in alignment with the IPCC recommendations and ensure that the goals of the Paris Agreement are met. Meanwhile, countries must work on the enabling environment for NDC implementation and transformational shifts in climate-related sectors. Particularly for countries that have not set 2050 net-zero targets, GGGI is supporting the development of LT-LEDS. These longer-term pathways are essential to enhance ambition for the shorter-term NDCs. Further work on roadmaps, sector-specific strategies and finance plans for implementation are needed to accelerate NDC implementation, as well as capacity building and support on transparency frameworks to meet the requirements for access to green and climate finance, including carbon finance under Article 6.

While attention is on high-emitting countries to reduce their emission, it is important to focus on developing countries, LDCs and SIDS that are currently not among the largest emitters. Getting countries off on a low-emission development pathway early will avoid future emissions, particularly in countries with high populations and large economies.

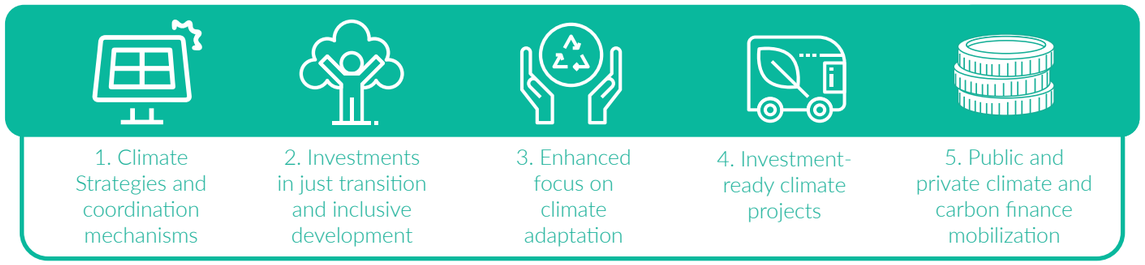
Sectors to focus on in GGGI Member and partner countries will vary, but it is clear that a focus on phasing out of coal power is key, as well as focus on climate-smart agriculture, forest conservation and nature-based solutions to accelerate the green transition.

Mobilizing Investments Dedicated to Gender Responsive Just Transitions

In the transition to low-emission development pathway we need an understanding of how the shift will impact different segments of the population. Not only is this a matter of fairness and justice, but it is also a prerequisite for political will and public support of ambitious climate action. A major issue is the transitioning of the workforce toward the new demands of green industries, while ensuring equal opportunities for women and youth to quality, decent jobs and livelihoods, both as wage employment and entrepreneurship. Gender-responsive just transition frameworks can support strategies to address underlying inequalities in the economy, such as access to care services that can enable the active participation of women in the labor market, as well as access to productive and financial assets.

A challenge to tackle is how to effectively integrate strategies for just transition, gender quality and social inclusion into the implementation of large-scale climate action, which would mean both government and private sector actors taking measures to remove barriers for more inclusive labor markets and leadership. Such frameworks can be integrated with the LT-LEDS and NDC revision processes to include programs for women and youth's access to green jobs and implement gender-responsive budgeting processes, following the example of the LT-LEDS in Burkina Faso and Ethiopia. Other opportunities are found in the development of gender lens investment criteria and establishment of thematic bonds, either exclusive gender bonds or sustainability bonds with clear social and gender criteria where the first sovereign sustainable bond of Peru of USD4 billion serves as an example.

Figure 2. Areas of GGGI's provision of support to Members and partners for NDC implementation



Enhancing the Focus on Climate Adaptation

GGGI's enhancement support for adaptation extends across NDC, NAP and LT-LEDS tools, addressing the need for different temporalities and institutional entry-points for climate action. While NDC enhancement in GGGI countries such as Ethiopia or Fiji have provided overarching frameworks for action around adaption, NAPs provide the opportunity for embedding and mainstreaming these orientations, as well as for the identification of specific projects.

LDCs and SIDS, through their development of NAPs creates a menu of investment options that support the mobilization of climate and green finance. Support to develop and structure investment opportunities in nature-based solutions and climate-smart agriculture are priority interventions for multi-sectoral impacts, and there are large opportunities for these types of interventions in GGGI Member and partner countries across all regions. Such enhancement also identifies opportunities to integrate adaptation and resilience objectives with bankable mitigation opportunities, such as solar irrigation renewable energy. In the Burkina Faso and Ethiopia LT-LEDS, GGGI supported an approach that focuses on long-term planning for climate risks. These risks were modeled for energy and agriculture to identify the level of adaptation ambition required for a 20-50-year horizon. This suite of approaches is essential for mobilizing investment into resilient energy and agriculture systems, and promote policy and public investment to reduce vulnerability.

Building Institutional Capacity and Readiness for Bankable Projects

The lack of bankable investment opportunities is critical in developing countries, particularly in LDCs and SIDS. This creates a large demand for technical support and capacity building for government and private sector partners to realize the investment opportunities outlined in NDCs and other green climate strategies. Different actors require funding, financial skills and technical expertise, and it is important to note that the preparation of investments may take several years, from project identification to actual implementation. This is particularly the case for large-scale infrastructure projects, which are also the most transformational in terms of the green transitions and achievement of NDC and LT-LEDS targets.

While GGGI supports the development of bankable projects through concept, design and finance stages, the focus is deliberately on the early stages of project preparations, which makes GGGI a strong partner for GCF, multilateral development banks and other large green and climate funds in need of bankable project pipelines. Through the GGGI-Korea Trust Fund, GGGI has access to project preparation funds that are often lacking. Figure 3 shows the niche of GGGI among various institutions, providing support to different types of projects from fully-funded grant initiatives to the left, commercial investments on the right, and high-risk/low-return projects in the middle that require specific support to become bankable and attract concessional funding or blended finance mechanisms.

Figure 3. Overview of the ecosystem for green investment services

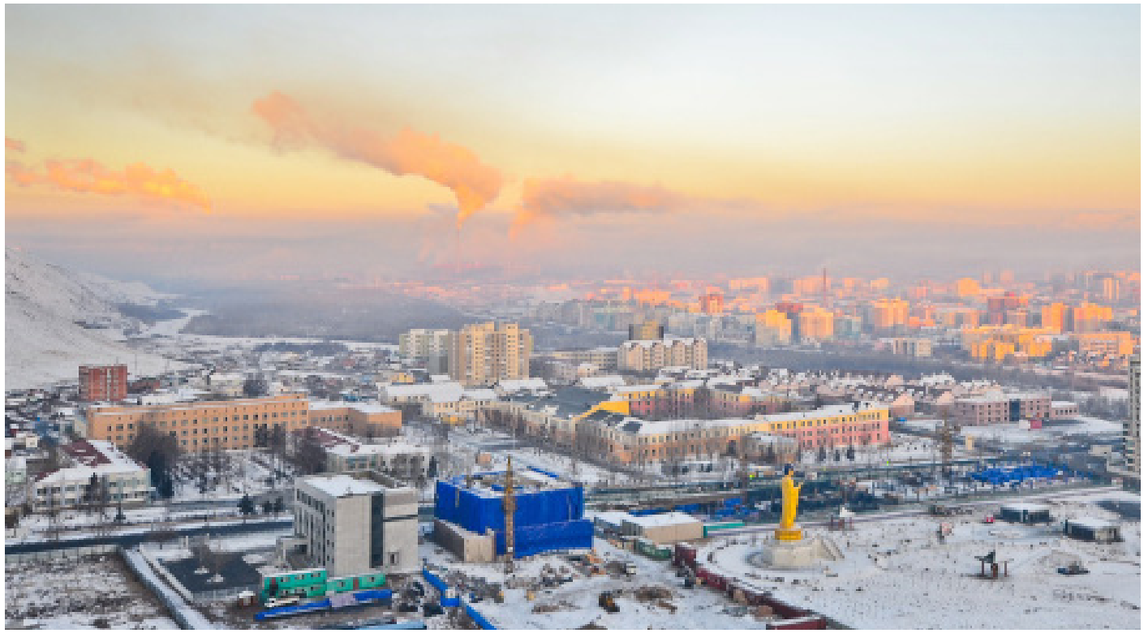
Unlocking the Public and Private Finance Needed for NDC Implementation

Bankability is essential to the engagement of commercial capital, and developing countries are seeking support for project origination and upstream structuring of private sector projects that meet the return-on-investment expectations and risk tolerance of investors. Concessional and blended finance mechanisms are key to crowding in commercial capital, de-risk and turn opportunities into market-ready projects. GGGI has more than 60 projects with the GCF, which has successfully leveraged public and private investments in Member and partner countries.

Work with central banks and financial institutions has led to climate investment strategies and taxonomies. Such efforts contribute to the greening of national financial systems through integration of environmental, social and governance requirements into investment eligibility criteria and due diligence processes. Capacity building in these areas is critical to access funding from the GCF, Adaptation Fund and Global Environment Facility. In recent years, the growth of the bond markets has opened up formidable opportunities to increase volumes of climate finance, shown by example from GGGI's work with Mexico, Peru and Viet Nam.

Priorities for GGGI

The focus ahead for GGGI is on supporting the implementation of NDCs, especially for the 30 countries where GGGI provided support in their NDC enhancement, the work continues and shifts from planning to implementation. Countries that made net-zero pledges now need roadmaps, implementation plans and financing strategies to turn these pledges into reality. At the same time, GGGI will continue to support Member and partner countries in creating enabling environments for further increasing ambition to a level that can realize 2030 and mid-century targets to limit global warming to 1.5°C, as well as strengthen resilience and adaptive capacity. GGGI, embedded within governments and with rich experience and lessons to draw from, is in a favorable position to understand and meet the varying and complex needs of countries to achieve Paris Agreement and SDG targets.



Introduction

Maintaining Momentum for Climate Action in a World in Crisis

Climate Change has in the 2020s gained increasing acceptance as the major crisis facing humanity in the 21st century. The perceivable surge in frequent extreme weather events, droughts, floods, and wildfires threatening both rich and poor countries and communities has brought climate change into the public consciousness. The heightened awareness is supported by an unprecedented amount of scientific evidence that global warming is widespread, rapid, intensifying, and undeniably linked to human emissions of GHGs into the atmosphere. The findings published by the Inter-governmental Panel on Climate Change (IPCC) in the Sixth Assessment Report[3] in 2021 signalled a 'code red' for humanity and helped build a momentum ahead of COP26 in Glasgow in 2021. Postponed one year due to the COVID19 Pandemic, countries were expected to submit updated Nationally Determined Contributions (NDCs) at COP26, and efforts were mobilized to support governments come closer to collectively meeting the goal of the Paris Agreement of limiting global warming to 2 degrees and closer to 1.5°C. Despite the moment, COP26 was lukewarm and deemed "nor success nor failure" however credited for keeping the goal of 1.5 °C global warming compared with pre-industrial levels alive, though just barely. A synthesis report by UNFCCC[4] ahead of COP26 found the NDCs to be short of the ambition required to reach the 2°C s target.

COP27 took place in Egypt in November 2022, and with the world still reeling from the shocks of the pandemic, the political backdrop had dramatically intensified with the Russian invasion of Ukraine in February 2022. While the climate events continue to break records, the war has dramatically worsened the environment for global cooperation. Not only has the war threatened the lives of millions and caused a refugee crisis across Europe. International ODA finance is under strain hampering sustainable development efforts particularly in the least developed countries. The blocking of Ukrainian food exports is expected to exacerbate droughts and cause famines across the Sahel. And sanctions on Russian oil and gas have caused an energy crisis fueling increased living costs around the world.

3 IPCC, 2021. Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [MassonDelmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

4 *Nationally determined contributions under the Paris Agreement. Synthesis report by the secretariat*, October 2022.

Climate action must remain on the agenda. The IPCC concluded in 2021 that global warming above 1.5°C s still depend on future emissions. This gives a theoretical possibility of keeping close to 1.5°C; however the window is rapidly closing. Without ambitious and immediate climate action, we are steering towards a human made cliff. IPCC further reported on Impacts, Adaptation and Vulnerability in 2022[5] with increasing confidence that climate change is increasingly affecting marine, freshwater and terrestrial ecosystems and ecosystem services, water and food security, settlements and infrastructure, health and well-being, and economies and culture. The most devastating impacts will be felt by Least Development Countries (LDCs) and Small Island Development States (SIDS).

The commitments expressed in the NDCs are important indicators of global levels of ambitions, and 151 counties submitted updated NDCs ahead of COP27. GGGI provided support to 30 of its Members and partner countries on revisions, aiming to improve the quality and ambition of NDCs both in terms of higher targets for mitigation, particularly in high emitting countries, but also in terms of qualitative improvements such as more rigorous analytics backing up mitigation and adaptation targets and measures, strengthened focus on gender and social inclusion, and enhanced focus on MRV.

Despite efforts, The Nationally Determined Contributions under the Paris Agreement synthesis report[6] prepared by the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) shows that even when taking into account the implementation of the revised NDCs, the global GHG emissions in 2030 are expected to exceed their levels from 2010 by 15.9%. That would lead the world towards a path of average warming by 2.7°C above pre-industrial levels. In contrast, to be consistent with a global emission pathway that has no or limited overshoot of the 1.5°C goal, global net anthropogenic GHG emissions need to decline by about 45% from the 2010 level by 2030 and reach net zero around 2050. To limit global warming to below 2°C, CO_2 emissions need to decrease by about 25% from the 2010 level by 2030 and reach net zero around 2070. Overall ambitions articulated in the NDCs are still far from what is required to halve GHG emissions by 2030 in order to achieve the 1.5°C goal.

In other words, NDCs are in their current form falling short. However, some hope is provided by the increasing number of Parties to the UNFCCC that adopted net zero targets to be reached at around mid-century. Although at the end of 2021 aggregation of such longer-term goals would place the world on path to 1.8°C warming,[7] for the firsttime showing signs of falling below the 2°C goal, the latest synthesis report by UNFCCC[8] downsized that ambition to below 2 °C (with over 67 per cent likelihood). Yet, implementing the pledged net zero targets continues to be the key priority, and it is crucial that countries back up these mid-century pledges with concrete shorter-term targets, to be achieved by implementing realistic, reliable action strategies.

Objective of this Report

The next opportunity to revise NDCs and ensure their alignment with 2050 net zero targets will come in 2025, and in light of the upcoming process, the Chapter 2 of this report aims to generate the lessons learned from the 2020-2022 NDC revision process and highlight, based on GGGI's experience, how Member and partner countries effectively enhanced their NDCs quantitatively in terms or targets and or qualitatively for example through added clarity, transparency, focus on gender, social inclusion and socio-economic co-benefits. Chapter 3 follows the flows of climate finance to accelerate climate action in GGGI's developing country Member and partner countries and highlights some of the challenges provided by a large financing gap. Chapter 4 highlights some of GGGI's key priorities ahead to ensuring larger than NDC ambitions that can accelerate the achievement of the 1.5°C goal of the Paris Agreement.

GGGI Support to Members NDC Revision Cycles

Party's "contributions" to address climate change are "nationally determined" and expected to closely follow their

5 IPCC, 2022. *Climate Change 2022: Impacts ,Adaptation and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 37–118, doi:10.1017/9781009325844.002.

6 UNFCCC. 2021. *Nationally Determined Contributions under the Paris Agreement. Synthesis report by the secretariat*, Document FCCC/PA/CMA/2021/8. Bonn: UNFCCC.

7 Birol, F. 2021. *COP26 climate pledges could help limit global warming to 1.8 °C, but implementing them will be the key*. Commentary, November 4, 2021. Paris: International Energy Agency.

8 *Long-term low-emission development strategies. Synthesis report by the secretariat*, October 2022.

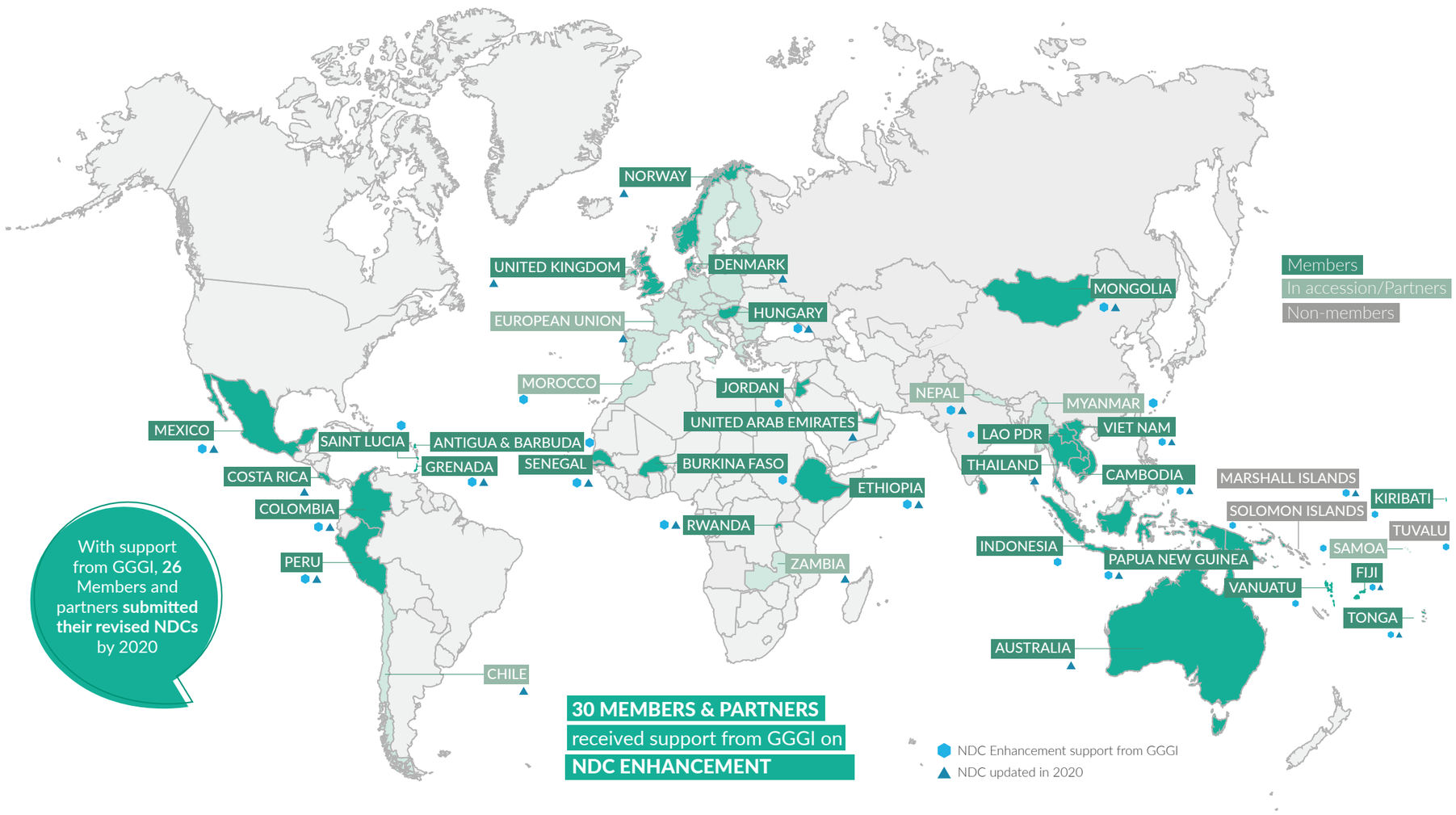
national circumstances and priorities. Hence the NDCs have become the central element of the Paris Agreements. This approach as taken up by the Paris Agreement emphasises the "bottom-up" (i.e., nationally determined) nature of the contributions that countries make to the global effort to address climate change.

Paris Agreement calls Parties to prepare, communicate[9] and maintain successive and ambitious NDC representing a progression beyond countries' current NDC, reflecting their common, but differentiated responsibilities and respective capabilities. NDCs are subject to regular revision following a five-year cycle. The first revision process was due in 2020, however as COVID pandemic led to the postponement of COP26, Parties submitted their initial NDCs throughout 2020 and 2021. Ahead of COP26 in November 2021, GGGI supported 30 Member and Partner countries in preparation of their NDCs. As a result of this cooperation, the following submissions were made:

- 1 country submitted its first NDC
- 24 countries updated their first NDC
- 5 countries submitted their second NDC

9 See the Article 4, paragraph 9.

Figure 4. Global distribution of the 30 GGGI Member and Partner countries that were recipients of the NDC related support in 2020–2021.



Box 1. GGGI Value Chain: Turning NDCs into vehicles of action

GGGI is a treaty-based inter-governmental organization dedicated to support Members and Partner government transition to inclusive, green low emission development pathways. GGGI is responding to this challenge by following a value chain approach that begins on the left, with the introduction of green growth and climate action into national planning, and then moves to the right, toward project preparation and financing. Specifically, this means that GGGI works on developing the enabling environment for green and low-emission transitions through policies and a portfolio of investment opportunities that includes (i) projects taken to bankability, (ii) capital market and risk mitigation instruments, and (iii) NFVs.

Specific details on GGGI's support to Members on the NDC Revisions

GGGI support differs across its Member Countries and closely reflects their specific needs. Overall GGGI has delivered specialised expertise in strategic policy design supporting the host governments in design, implementation, and financing sectoral strategies. More technical interventions include designs of MRV frameworks and support in developing infrastructure for national GHG emission inventories. More recently the work on government administrative frameworks for Article 6 and transaction support has been initiated. The range of services provided by GGGI, and the specific area of expertise in some more detail is summarized in Table 1.[10]

10 This work was carried out primarily in partnership with the NDC Partnership via its Climate Action Enhancement Package (CAEP), the Regional Pacific NDC Hub, the Africa NDC Hub, the Swedish International Development Cooperation Agency, the Green Climate Fund (GCF), the Norwegian Ministry of Climate and Environment, and the Swedish Energy Agency.

Table 1. GGGI's NDC enhancement support of Members and partners in 2020–2021.

	Support provided	Countries
Enhanced ambition and NDC revision	• Sector-level planning and target setting • NDC revision support • Stakeholder engagement plans	Antigua and Barbuda, Colombia, Lao PDR, Nepal, Papua New Guinea, Cambodia, Tonga, Samoa, St. Lucia, Burkina Faso, Senegal, Mongolia, Morocco, Myanmar
Acceleration of the NDC implementation	• NDC implementation plans and roadmaps • NDC financial plans and budget tracking tools • Community engagement	Antigua and Barbuda, Indonesia, Kiribati, Fiji, Samoa, Tuvalu, Tonga, St. Lucia, Jordan, Republic of Marshall Islands, Mexico
MRV and transparency	• GHG inventory and database management and peer reviews • MRV frameworks: - National, subnational MRV systems - Sectoral and project level MRV system development - NDC MRV systems - MRV and reporting under Article 6 - NC and BTR support	Antigua and Barbuda, Grenada, Peru, Republic of Marshall Islands Solomon Island, Tonga, Fiji, Papua New Guinea, Vanuatu, Colombia, Burkina Faso, Ethiopia, Myanmar
Article 6 readiness and transaction design	• Carbon pricing and transaction scoping and readiness • Design of policy approaches and project interventions under the Article 6 of the Paris Agreement	Indonesia, Morocco, Senegal, Nepal, Cambodia
Adaptation to climate change	• National Adaptation Planning (NAP) • Design of adaptation targets • Adaptation solutions and projects	Antigua and Barbuda, Bahrain, Myanmar, Rwanda, Sri Lanka Tonga
Design and analysis of countries' long-term emission reduction strategies	• Stakeholder engagement and institutional arrangements • Vision building • Baseline assessments • Development of low mission development scenarios prioritization of actions • Implementation finance and monitoring plan s	Burkina Faso, Cambodia, Ethiopia, Hungary, Tonga, Vanuatu
Assessment of the socio-economic co-benefits of the climate policy interventions.	• Assessment of employment potential under NDC targets • SDG alignment • Gender equality and social inclusion NDC support	Antigua and Barbuda, Burkina Faso, Indonesia, Mexico, Rwanda, Mongolia

Box 2. GGGI engagement with the NDC Partnership

GGGI as a member of the NDC Partnership, with the support of the climate action enhancement package (CAEP) funding, GGGI contributed to NDC revision in 11 countries. Multiple areas of GGGI support include enhancing the depth and breadth of the countries' NDCs, design of the implementation road maps, the enhancement of MRV frameworks for NDC mitigation and adaptation actions, climate finance tagging, development of a social inclusion strategy, and the organization of large public awareness campaigns for NDCs at the national and sub-national levels.

1. Lessons for the NDC Revision Process

Defining Enhanced Quality of NDCs

The term NDC enhancement captures the idea of NDC progression, that is inherent in the Paris Agreement, starting with the invitation to communicate new or updated NDCs in 2020 (Fransen et al. 2017). In this paper we review the following dimensions of NDC enhancement — mitigation (mitigation enhancements can increase ambition and/or facilitate enhanced implementation), adaptation, and communication—considering that the objectives and requirements under the Paris Agreement vary across these components (See Figure 2). Ideally, the NDC enhancement process will bring NDCs more closely into alignment with the goals of the Paris Agreement, maximize the benefits of the NDC for development and resilience, incorporate relevant opportunities to strengthen implementation, and improve transparency.

Another perspective of the enhanced NDCs is an increased recognition of sub-national commitments, risks, and responses. The review focused on the following key elements of NDC:

Adopting and sharing quantified information on countries' mitigation targets, specific reference points e.g., for defining emission reduction targets, and/or 'business as usual scenarios are commonly understood to lead to higher-quality NDCs. Overall, the quality of NDCs of countries subject to the review has improved on several fronts, yet the emission reduction targets submitted still remain far from the level of ambition required to meet the purpose and goals of the Paris Agreement.[11] On the contrary, currently adopted emission reduction targets added up to a significant increase in global GHG emissions in 2030 by about 16% compared with the 2010 levels.[12] Clearly, this goas back to the complexity of the decision-making. Governments trying to balance between free riding incentives implied by the public good character of the environmental protection. Given the economic diversity across the countries an adoption of stringent climate policies might have serious implications on countries' competitiveness on the international markets. Transforming countries' economies towards xxx also requires a strong

11 UNFCCC NDC synthesis report.

12 UNFCCC NDC synthesis report.

political capital, not readily available with each government.

Large part of the ambition gap originates from technical factors inherent in the designs of the countries NDCs. For example, uncertainties pertaining in the actual design of 'business as usual' (BAU) scenarios. Many countries still remain reluctant to use a fixed base year with known emissions and continue using BaU scenario as a baseline. Business as usual scenarios typically project a rapid increase of countries' GHG emissions often without disclosure of the relevant assumptions and driving factors. As a result, any reduction achieved against such a base line scenario leads to a de facto increase in emissions measured against a fixed base year.

Adaptation targets

Countries improved the technical rigor of design of their adaptation action by making increasing clarity of the adaptation targets, aligning country specific climate change vulnerabilities with adaptation measures, and enhancing synergies between adaptation and mitigation actions.

Gender and social Inclusion

Countries enhanced their focus on gender and social inclusion, most effectively, linking explicit gender targets with sectoral and climate measures, gender budgeting, and aligning climate action with existing sustainable development plans and disaster risk reduction strategies.

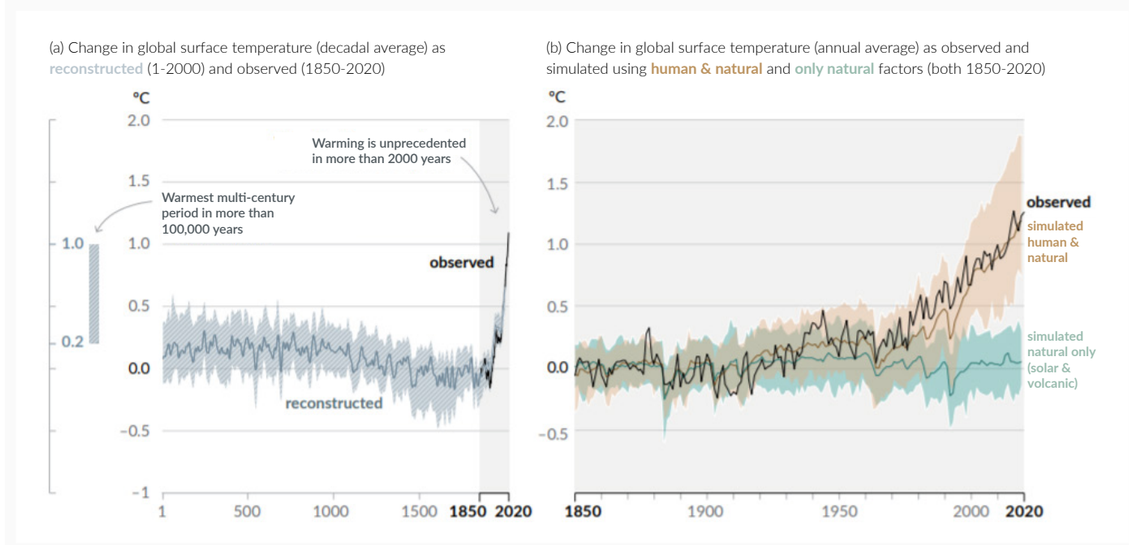
SDG Alignment

Half of the countries under review made a specific reference to their SDGs. A few, expanded on linkages between each climate action and specific SDGs, clearly demonstrating the unified approach being taken to address the diverse environmental challenges under the United Nations Rio Conventions. Countries also expanded on how their SDG targets are integrated into their key development strategies, and described steps in implementing the SDGs, with at least a reference made to the actions identified as contributing to the achievement of SDG 13 (climate action).

Mechanisms to accelerate NDC implementation

Many NDCs include climate change measures that are backed up by NDC roadmaps and financial plans enhancing readiness for climate finance mobilization, including considerations for Paris Agreement Article 6 carbon market mechanisms. Countries also improved their NDCs by expanding on implementation mechanisms, such as institutional arrangements, to demonstrate strong commitment to their NDCs, or by showcasing how their NDC and actions therein align with national development strategies.

Figure 2. Changes in Global Surface Temperature Relative to 1850-1900



Source: IPCC 2021 6th Assessment Report, Summary for Policy Makers

2. Reflections on the elements of NDC Revisions

2.1. Mitigation

Countries enhanced their NDCs by expanding their mitigation targets, coverage of the greenhouse gases, economic sectors, increasing stringency and making the mitigation targets time-bound. Importantly, many countries increased transparency by providing more information on their mitigation targets. Some countries improved the technical aspects of their NDCs such as e.g., design of baseline and reference scenarios, the approach to estimate their GHG emissions, or improved in their application of the relevant methodologies. A few countries submitted their long-term low-emission development strategies (LT-LEDS) in 2020 or 2021, as encouraged by the CMA[13]. A detailed analysis of the NDCs, their sectoral coverages, GHGes included and changes from first submissions to the latest are presented in the Annex to this report. Extracts from this analysis are presented in the next page.

Assessment of the enhancements found significant variations in BaU projections and base years. While percentage targets ostensibly increased, a relative percentage comparison often did not reflect the updates made in emission level projections.

In many cases the new absolute targets proved to be a reduction in ambition. To better account for these contingencies and provide a more accurate assessment of whether ambition was increased, the analysis only includes figures for countries that reported information on the absolute targets required to develop GHG scenarios. To provide more clarity, countries acknowledged the contextual nature of these changes in their NDC targets, such changes in mitigation ambitions and any other details also reflect progress in developing national methodologies and accessing information needed for transparently calculating estimates.

Quantifiable GHG emission reduction targets were adopted by the Lao People's Democratic Republic, Papua New Guinea, Rwanda, Samoa, and Tonga. Several countries added both 2025 and 2030 targets, reporting both relative and absolute targets with reference to baseline scenario emissions. Most countries have included periods of implementation, with a few providing this information

13 1/CMA.3, Paragraph 32.

for specific actions and others providing it for the NDC as a whole. The Lao People's Democratic Republic, Rwanda, Samoa, and Tonga established specific GHG targets for their NDCs. In contrary some countries, such as Antigua and Barbuda and Nepal, committed to enhancing renewable energy and clean energy targets rather than emission reduction targets. Another group of countries such as Fiji, Grenada, Mexico, and Thailand, retained their percentage targets and/or reduced absolute targets.

Most of the countries reviewed presented plans how they can contribute to the global energy transformation (see Annex I). Renewable energy enhancement mechanisms included increasing the installed capacities, clarifying the relevant national strategies for the energy sector, and intention to adopt new technologies. Overall, 20 countries of the 28 that submitted updated NDCs, provided national, subnational, or regional quantitative renewable energy targets and/or corresponding measures. Most of the LDCs and SIDS covered by this assessment reported quantitative targets or outlined their interventions in a more granular form[14]. Still some countries such as e.g., Grenada, Mexico, Mongolia, Peru, Saint Lucia, Thailand, and Viet Nam, have not articulated any quantifiable renewable energy targets due to limitations in financing, technical resources, and transmission line capacity. To mobilize the deployment of renewables international support will be critical.

Figure 4 illustrates the increase in ambition between the first and the updated or second NDCs submitted by countries in both absolute and relative terms for those that had set quantified GHG targets. All the LDCs (e.g., Lao People's Democratic Republic or Samoa) raised their ambitions substantially compared with their first NDCs, while other developing countries (e.g., Cambodia, Colombia, Viet Nam) have raised their emission reduction targets. Annex I summarizes both unconditional and conditional mitigation targets included in the NDCs of the 30 countries covered in this study.

14 Ethiopia is an exception providing more granular insights only for adaptation.

Figure 3. Differences in ambition from GGGI member countries' updated NDC submissions

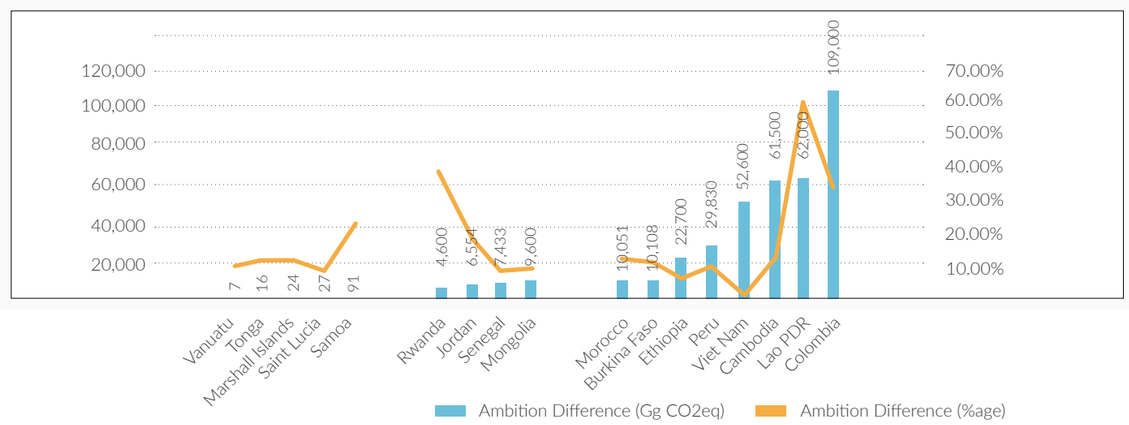
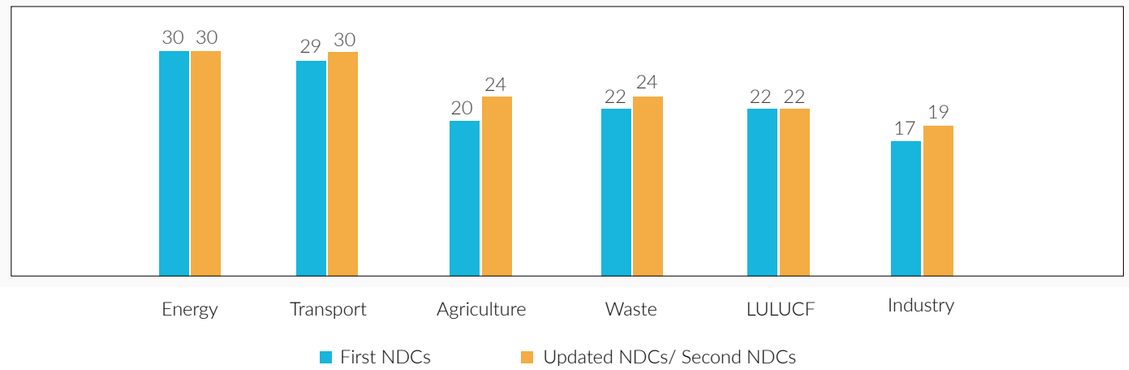


Figure 4. Sectoral coverage expansion between first NDCs and updated NDCs / Second NDCs



2.1.1. Sectoral coverage

In terms of the sectoral coverage, the standard approach for all countries have been to include the same sectors that were covered in their first NDCs also in updated submission or second NDCs. Some countries have also expanded their sectoral coverage (Figure 5).

Energy and transport

Energy sector contributes with the highest share to countries' GHG emissions, though in some countries, particularly LDCs, FOLU takes the highest share. Hence, all countries have included some interventions in their energy and transport[15] sector in their NDCs, though emission reduction targets for the energy sector were not always directly associated with specific mitigation actions.

Main concerns, particularly in developing countries and LDCs, was the skyrocketing energy demand, mostly satisfied by the coal fired energy production. As a result, the business-as-usual scenarios expect almost doubling countries' emissions by 2030. Therefore, high relative emission reduction targets indicate increase in emissions relative to 2016.

Table 2 outlines the mitigation targets included in the updated NDCs. The emphasis is targets on renewable energy sources.

Renewable energy targets featured in almost all updated submissions. References to specific technologies associated with planned installed capacities were identified, illustrating some progress countries achieved in implementation of their targets. Some countries limited their commitment to reaching specific shares of the renewable energy on the overall primary energy mix. A few countries converted their renewable energy targets into GHG equivalents. Measures included the promotion of energy efficiency, electrification of existing systems, and decoupling of transport systems from fossil fuels through, for example, the use of biofuels.

Agriculture

Agriculture is covered by most of the updated and second NDCs, either as an independent sector or as part of the agriculture, forestry, and other land use (AFOLU). Agriculture also arises as a sector in need of enhanced capacity to adapt to climate change, particularly due to its importance to food security and employment in many developing countries (e.g., Fiji, Kiribati). Emission reduction targets for agriculture largely remain expressed in qualitative terms without, with a few exceptions. These include percentage reductions relative to the BAU scenario emissions (e.g., Ethiopia) and quantification of savings in emissions or reduction in removals (e.g., Lao People's Democratic Republic).

Agriculture experienced a most salient progress in terms of a number and scope of different interventions. For examples countries such as Cambodia, Rwanda, Samoa, and Solomon Islands included new measures in livestock management, energy-efficient agricultural technologies, and other related areas.

Coverage of LULUCF remained effectively unchanged. Rwanda excluded LULUCF in its updated NDC while Samoa included it. Such variations in coverage can be attributed to changes in subsectoral measures as countries continuously re-evaluate their strategic priorities. Some countries developed subsectoral targets to identify areas for further mitigation action. Mexico raised its ambition to cover all five carbon sinks (above-ground biomass, below-ground biomass, litter, deadwood, and soil organic matter) which were not previously explicitly identified.

Some countries did not adopt any emission reduction targets for agriculture but added more details on implementation of the proposed interventions (e.g., Papua New Guinea).

LULUCF remains a challenging sector, particularly for the SIDS. Some countries that have not included LULUCF targets pursue a REDD+ program, that covers LULUCF.[16]

Waste

Waste sector was covered by updated or second NDCs in 24 countries. For the first time waste sector found its way into the NDCs also in Cambodia, Lao PDR, and Samoa. All countries developed their BaU scenarios and assessed the impacts of the proposed interventions using the methodologies provided in the 2006 IPCC Guidelines[17]

Several countries have adopted specific long-term waste management strategies (e.g., Jordan, National Municipal Solid Waste Management Strategy 2015–2034, Lao People's Democratic Republic, Sustainable Solid Waste Management Strategy and Action Plan for Vientiane 2020–2030).

15 Transport is a subsector of energy according to the sectoral classification in the 2006 IPCC Guidelines.

16 Reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks. See *https://redd.unfccc.int/* for more information.

17 IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Eggleston, S., L. Buendia, K. Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies.

Mitigation actions for the waste sector in the NDCs included implementation of specific waste management practices, such as integrated waste management (e.g., Myanmar), improving sanitation facilities (e.g., Mongolia), and using wastewater treatment facilities to reduce methane emissions and generate a renewable electricity (e.g., Saint Lucia).

The sector has benefited from quantified emission reductions, with most countries having set specific targets alongside identifying measures to implement in order to achieve those targets. However, limited availability of data remains one of the biggest challenges for the sector.

Industrial Processes and Product Use (IPPU)

IPPU is the least covered sector, with only 21 countries having included it in their NDCs. Few countries refer to the effective lack of data that limits formulation of any quantitative target for the sector. Some countries have adopted quantified targets for IPPU sector such as e.g., Burkina Faso, Viet Nam, and recognized that this sector is considerable expected emissions and thus high potential emission reduction opportunities (e.g., Ethiopia). Iron and steel production is another prominent sub-sector, with large emission reduction opportunities (such as the use of steel slag, which already occurs e.g., in Jordan).

2.1.2. Coverage of different GHGs

Eleven countries[18] enhanced their coverage of specific greenhouse gases and pollutants in their NDCs. This was achieved by four different paths:

i) adding more of the greenhouse gases included in the 2006 IPCC Guidelines,[19]
ii) adding precursors and other gases included in the 2006 IPCC Guidelines,[20]
iii) expanding gas coverage to new sectors,
iv) increasing transparency through the disclosure of gas coverage.

For example, Grenada and Lao People's Democratic Republic expanded their gas coverage in the IPPU sector, the Lao People's Democratic Republic, Samoa, and Vanuatu expanded their gas coverage in the waste sector, and Myanmar strengthened transparency by disclosing its sectoral gas coverage.

All GGGI Members Countries expanded their GHG coverage, with four countries[21] adding methane (CH_4) and nitrous oxide (N_2O) emissions, another four countries[22] adding hydrofluorocarbon (HFC) emissions, and three countries[23] adding carbon dioxide (CO_2) emissions. Other countries maintained their existing coverage, or in some cases, enhanced coverage by including precursors and other gases.[24] Only one country[25] has continued with its coverage of nitrogen trifluoride (NF_3). In most cases, expansion in the coverage of greenhouse gases followed expansion of the sectors. This enabled a wider recognition of GHG emissions and possible mitigation actions.

18 Fiji, Lao People's Democratic Republic, Mongolia, Morocco, Myanmar, Nepal, Peru, Rwanda, Samoa, Tonga, and Vanuatu.

19 The 2006 IPCC Guidelines cover carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydro-fluoro-carbons (HFCs), per-fluoro-carbons (PFCs), solfur hexafluoride (SF_6), nitrogen trifluoride (NF_3), trifluoromethyl sulfur pentafluoride, and halogenated ethers and other halocarbons not covered by the Montreal Protocol on Substances that Deplete the Ozone Layer.

20 Nitrogen oxides, ammonia, non-methane volatile organic compounds, carbon monoxide and sulfur dioxide.

21 Fiji, Lao People's Democratic Republic, Nepal, and Samoa.

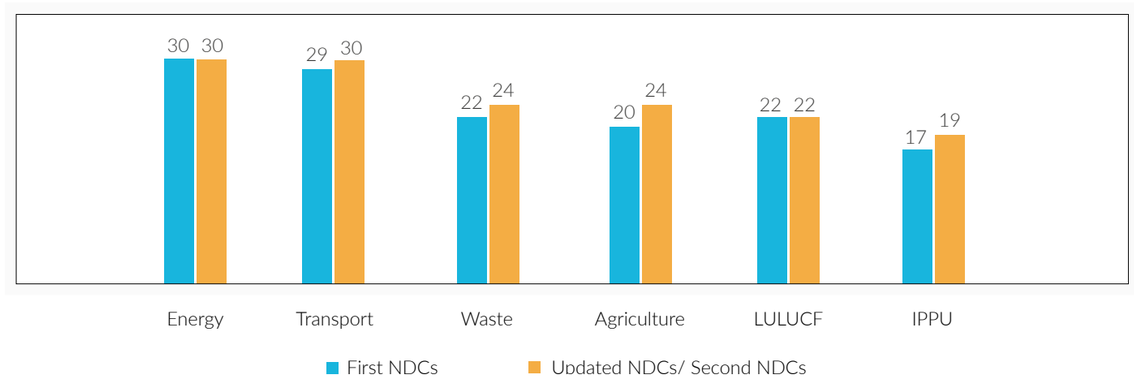
22 Mongolia, Morocco, Peru, and Rwanda.

23 Lao People's Democratic Republic, Myanmar, and Nepal.

24 Morocco, Samoa, Tonga, and Vanuatu.

25 Hungary.

Figure 5. Number of NDCs and updated / second NDCs with sectoral coverages



Three countries reduced their greenhouse gas coverage, namely, Antigua and Barbuda (HFCs), Jordan (perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6), and Viet Nam (PFCs and SF_6). Despite these five exclusions, 18 additions were made (or 31, including miscellaneous gases) in the enhanced NDCs of the GGGI Members' NDCs. Eight GGGI Member Countries improved upon their sectoral scopes as part of their enhanced roadmaps.

2.1.3. Information to Facilitate Clarity, Transparency, and Understanding of NDCs

Decision 4/CMA.1, including its Annex I, of the CMA calls for countries to provide information to facilitate clarity, transparency and understanding when communicating their NDCs and the actions included therein. The decision requires this information to be included in second and subsequent NDCs, countries have been encouraged to provide it in their submissions since 2020. They have answered the call by actively gathering data and information with which to update their NDCs.

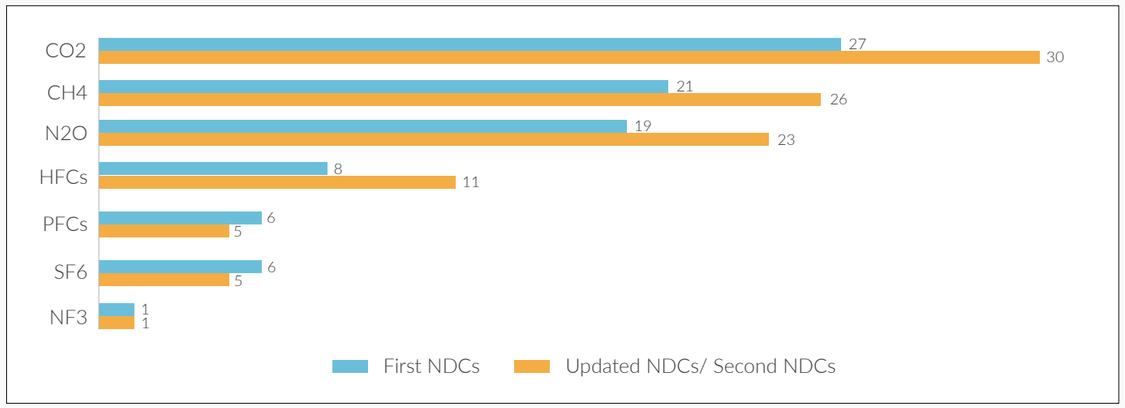
At COP 26, the work program that had been initiated upon adoption of the Paris Agreement was completed. Parties have reached a common understanding of the type of data and information that must be continually monitored as part of the NDC process and reported in the biennial transparency reports (BTR) to be submitted to the UNFCCC secretariat. This was not the case when countries embarked on updates or revisions of their NDCs; however, they had an indication of the types of data and information to be included to facilitate clarity, transparency and understanding of NDCs from decision 4/CMA.1.[26] More than half of the countries covered by the analysis provided the required information, while the others made some attempt to include it in a distributed manner rather than in a specific tabular format.

Countries have enhanced their first NDCs by, for example, improving their baseline GHG emissions, implementation strategies and roadmaps for specific mitigation actions, and including more detail in their description of assumptions and methodological approaches. A few countries expressed in their NDCs the intention to prepare an LT-LEDS or included information on how it was implemented (e.g., Fiji). Some countries added a description of their baseline modelling tools highlighted challenges related to addressing the existing data gaps.

Parties to the Paris Agreement have reporting obligations, which start with the submission of first BTRs by 2024. A few countries (e.g., Fiji, Grenada, Indonesia, Viet Nam) mentioned the BTR in their NDCs, including planning processes in this regard, and indicated that updates on progress of the NDC would be reported in the first BTR.

26 Available at https://unfccc.int/documents/193407.

Figure 6. Number of first and updated / second NDCs and the greenhouse gases covered



2.1.4. Establishing time-bound mitigation targets

All NDCs reviewed included an implementation period, with 29 out of 30 countries setting their actions to cover the period up to 2030. A few countries also included emission reduction targets for 2025. Given the Glasgow decision on NDC time periods indicates that they are to have 10year implementation timescales, these countries are well prepared. For the compliance with the Paris -Agreement, it is important to articulate long-term, mid-century pathways to serve as guidance for setting the shorter term NDC targets.

Table 3. Examples of enhancements made by countries regarding information to facilitate clarity, transparency and understanding of the NDC

Country	Enhancement
Antigua and Barbuda	• Indicative actions supporting implementation of the mitigation targets in the energy, electricity, transport, waste, and AFOLU sectors • Indicative information on the actions necessary to implement the adaptation targets, as well as targets that support social inclusion and gender and reduce transitional risks, including how the country could engage in the region and in other enabling environments • A table with reference years, indicators, targets, sources of data, and other information, such as time frames for implementation
Burkina Faso	• Evaluation of the mitigation potential of sectoral emissions using quantitative tools referred by the 2006 IPCC Guidelines (EX-ACT, GACMO) • Enhanced estimates of costs of mitigation actions covering the energy, transport, waste, and AFOLU sectors for both the conditional and the unconditional targets
Cambodia	• Modelling tools used for projecting the baseline (PROSPECTS+ and EX-ACT) • MRV system and planning systems needed for the ETF
Colombia	• Change of target from reduction against BAU to absolute • Seven new emission categories, enabled by improved information availability: - Other energy industries: combustion of fuel for coal production, mining, and quarrying - Pipeline transport - Forest land (fuelwood consumption) - Land converted to forest land - Wetlands
Ethiopia	• Clear projections of GHG emission and emission reduction targets made by using an improved methodology and revised emission factors, and improving consistency with the 2006 IPCC Guidelines • Enhanced ability to track progress in mitigation with improved MRV and monitoring and evaluation systems • Clear demarcation of unconditional and conditional mitigation interventions
Hungary	• Reflection of European Union provisions and the country-specific provision of a 7% reduction target for sectors outside the European Union Emissions Trading System and 43% for sectors covered by it.
Fiji	• Includes oceans as a separate sector, recognizing them as a carbon sink of importance • Reflects on the LT-LEDS developed and submitted in 2018 and on its implementation • Uses assessment tools NEXSTEP and LEAP
Grenada	• Intention to develop an LT-LEDS • Use of IPCC methodologies
Indonesia	• Lowered BAU projection with targets marginally changed • Enhanced clarity through (i) adopting the Paris Agreement rulebook (Katowice Package) and (ii) sectoral BAU and emission reduction target allocation • Intention to formulate a long-term low GHG emission development strategy

Jordan	• First NDC mentions an action plan to develop the National Green Growth Plan by 2016. In the updated NDC, Jordan has developed the National Green Growth Plan in 2017. • Development of an LT-LEDS • Development of the National Gender Mainstreaming in Climate Change policy, a framework for addressing gender inequality • Development of a framework for integrating vulnerable groups (children, refugees, unemployed, disabled)
Lao People's Democratic Republic	• Increased transparency and improved evaluation of quantitative targets • Added description of methodologies used
Mexico	• While absolute targets have decreased (from 244.2 to 210.0 Mt CO_2 eq) because BAU projections have changed, the BAU change shows an improved BAU methodology (using INEGyCEI for estimates) and an increase in transparency • Intention to develop a monitoring and follow-up system to ensure the effectiveness of sectoral mitigation actions and to comply with commitments under the ETF
Mongolia	• Increased number of livestock • Additional policy plans in the industrial processing sector • Change in methodology for BAU projection
Morocco	• Nine new mitigation actions
Myanmar	• Enhanced transparency through better quantification of sectoral targets
Papua New Guinea	• Compliance with ETF requirements • Commitment to enhance ambition in how data are collected and managed • Establishment of a framework for fossil fuel emission offsetting: the country remains committed to an energy transition but recognizes that a full transition will take time given the country's complex geography, dispersed population, and growing economy. As such, a framework for offsetting emissions from fossil fuels will be introduced to support economic incentives for the transition while also helping to finance domestic nature-based solutions, in particular, reduced emissions and enhanced removals from the forest sector.
Saint Lucia	• Moved from a BaU approach to a base-year approach • Included plans to develop a long-term strategy
Thailand	• The country is formulating its LT-LEDS, which will guide it toward climate-resilient and low GHG emissions development and serve as the basis for enhancing subsequent NDCs
Tonga	• Recognition of Tonga's need to establish a forest inventory in order to improve clarity and transparency for the AFOLU sector and provide the basis for calculating GHG emissions and carbon sequestration from forests and other woody biomass • Recognition of Tonga's need to expand the country's formal waste collection system to improve transparency and clarity regarding the assumptions and methodologies used to calculate GHG emissions from waste • Regarding non-GHG components, the aim to improve clarity and transparency, which will enable the country to report anthropogenic emissions or removals from the AFOLU and waste sectors • The setting of a clear and transparent target for reducing GHG emissions, as well as clear and transparent non-emission targets for the AFOLU and waste sectors • Improvement in clarity and transparency by explaining why the IPPU sector does not have targets, namely: (i) GHG emissions from the sector represent a small fraction of total emissions and (ii) the paucity of data on emissions from the sector prevents target formulation

Viet Nam	• Addition of detailed sector-specific targets • Update of the base year with the latest national GHG inventory • Development of the ETF to monitor and evaluate the activities in and results from the implementation of the updated NDC, including the establishment of MRV systems for mitigation actions at the national and sectoral level • Novelty and comprehensiveness: -Updated and adjusted contributions to climate change f and mitigation to bring them in line with current status and latest forecasts for national socioeconomic development to 2030 -Added a section on the impact assessment of the implementation of mitigation measures on socioeconomic development -Added a national framework for the MRV system for mitigation activities -Significantly increased the mitigation contribution in terms of both amount and percentage compared with the BAU level. - The unconditional GHG reduction targets are 146.3 Mt CO_{2e}, or 15.8% reduction compared to BAU and the conditional targets are 257.4 Mt CO_{2e}, or 27.7% reduction compared to BAU with a total target of 403.7 Mt CO_{2e} or 43.5% reduction compared to BAU • New sectoral targets for industrial processes: -Implementing measures for grinding blast furnace slag, fly ash, pozzolana, and limestone to replace clinker in cement production -Reducing consumption of HFCs

Box 3. Recommendations for NDC enhancement in mitigation from the transparency perspective

1. Establish or develop MRV systems for meeting their obligations under the ETF, as per the modalities, procedures, and guidelines referred to in Article 13 of the Paris Agreement; be ready with first biennial transparency reports by 2024
2. Prepare LT-LEDS and related targets in place to analyze how their NDCs can eventually help them reach these targets.
3. Focus on creating the necessary frameworks under which implementation of NDC actions can be continually monitored, and via which information and data needed for NDC revision will be readily available;
4. Create the systems needed to provide information needed to facilitate the clarity, transparency and understanding of mitigation and adaptation actions in the next NDC revisions by 2025; i.e., actions should have more accurate information on issues such as GHGes targeted, sectors covered, methodologies for assessing results, commensurate assessments of steps for implementing these actions and resources required
5. Build the capacity of primary data providers to better understand the data and information they must provide in order to improve overall quality.
6. Continue submitting GHG inventories and other communications to fulfil reporting obligations as part of the UNFCCC process and to enable the creation of consistent datasets that support the country in informed decision-making.

2.2. Net Zero Targets

A growing focus of GGGI support to its Member and Partner countries is on 2050 net zero targets. More specifically GGGI supported the Governments in Burkina Faso, Cambodia,[27] Ethiopia, Solomon Islands, and Vanuatu in developing their LT-LEDS. GGGI developed a conceptual approach to systematically incorporate climate resilience in LT-LEDS[28], successfully applying it in the development of the LT LEDS in Ethiopia and Burkina Faso. A particular aim of this work was to ensure that these strategies meet the climate adaptation priorities of the LDCs and SIDS. Various analytical models and methods[29] have been developed and applied by GGGI to assess the macroeconomic and socioeconomic benefits of emission reduction achieved in these countries.

The Climate Action Tracker (CAT) has reviewed the performance of the 40 largest emitting countries against their NDC targets. The 2030 targets for all the countries included in this review that were rated by the CAT are insufficient. Notable exceptions were Ethiopia and Morocco, both rated as "almost sufficient" to achieve the goal of the Paris Agreement.

Most of these countries have declared or are currently discussing net zero or carbon neutrality targets according to the Net Zero Tracker.[30]

As shown in Table 4, 14 countries had by March 2022 made a net zero pledge, mostly in the form of a policy document (NDC or LT-LEDS), many of which were adopted in the lead-up to and during COP 26. Of the countries that received GGGI support in developing LT-LEDS and NDCs, only Hungary has passed its net zero targets into a legal document, marking a high level of government commitment.

Along with other large emerging economies such as China and India, Indonesia and Thailand have made later-than-2050 pledges, whereas a few of the LDCs and SIDS have pushed forward their target year for net zero (e.g., Nepal and Saint Lucia).

27 GGGI supported the Cambodia LT-LEDS in the waste sector only.

28 Shammugam, Shivenes & Oberholzer, Basil & Bassi, Andrea & Pallaske, Georg & Grafakos, Stelios. (2022). Integration of climate resilience and low emission pathways: Assessing the environmental and socio-economic impacts in the energy and agriculture sectors.

29 Green economy modelling, extended cost–benefit analysis, employment impact assessment, and GGGI's Green Growth Simulation Tool)

30 According to data available at the *Net Zero Tracker website*. Accessed March 30, 2022

GGGI provides demand-driven and country-led technical support to its Member and Partner countries throughout the process of developing their LT-LEDS. This support covers visioning, stakeholder engagement, policy assessment, scenario analysis and modelling, policy and project prioritization, document preparation, and identification of financing strategies. GGGI conducts technical work collaboratively with and under the guidance of government counterparts, as well as with sector-specific technical experts, public and private sector research institutions, and GGGI's international technical experts.

The Government of Hungary, with the support of GGGI, developed its long-term National Clean Development Strategy, which sets the basis for the country to reach climate neutrality by 2050. It was adopted into law in 2021. The Strategy is a result of extensive stakeholder consultations and robust modelling analysis of future socioeconomic and technological emission pathways. It provides a clear, forward-looking vision of the economic transformation required to meet the net zero emissions goal by 2050 while minimizing the risk of stranded assets and avoiding future lock-ins in high-emitting infrastructure. To achieve climate neutrality by 2050 under its early action scenario, Hungary will require significant investments in the coming decades. However, based on the GGGI technical analysis, the decarbonization of the Hungarian economy through greater investment, lower energy costs, and increased productivity will generate significant avoided costs and bring macroeconomic benefits that outweigh the investment costs and lead to a significant boost in gross domestic product (GDP). GDP is forecasted to be 21% higher under the early action scenario than under the BaU scenario by 2050. Higher GDP growth will result in higher government revenue and create around 183,000 additional 'green jobs' compared with the BaU scenario.

The Government of Tonga developed its LT-LEDS in 2021. The process of developing the LT-LEDS was designed to strengthen and enhance existing policy dialogue and governance processes. The LT-LEDS provides a vision and framework with which other sectoral and national plans can align over time. Developing the LT-LEDS and the NDC simultaneously ensured alignment between long-term vision and pathways and short-term planning and investments.

Table 4. Net zero targets and NDC 2030 targets for the 30 countries reviewed.

	Submission of LT-LEDS to UNFCCC Secretariat	Net Zero Target Year	Form of commitment	Type of Technology NDC 2030 target	Climate Action Tracker rating* for 2030 target
Antigua and Barbuda	No	2040	Policy document	Renewable energy and transport targets	Not rated
Burkina Faso	No	2050	Proposed / in discussion	11.6% vs BAU	Not rated
Cambodia	Yes	2050	Policy document	41.7% vs BAU	Not rated
Colombia	Yes	2050	Policy document	51% vs BAU	Highly insufficient
Ethiopia	No	2050	Proposed / in discussion	68.8% vs BAU	Almost sufficient
Fiji	Yes	2050	Policy document	30% vs BAU	Not rated
Grenada	No	2050	Proposed / in discussion	30% vs BAU (2025)	Not rated
Hungary	Yes	2050	In law	40% vs BAU	Not rated
Indonesia	Yes	2060	Policy document	29–41% vs BAU	Highly insufficient
Jordan	No	2030	Policy document	31% vs BAU	Not rated
Kiribati	No	2050	Proposed / in discussion	13.7% (2025) and 12.8% (2030) vs BAU	Not rated
Lao People's Democratic Republic	No	2050	Policy document	60% vs BAU	Not rated
Marshall Islands	Yes	2050	Policy document	32% vs BAU	Not rated
Mexico	Yes	2050	Proposed / in discussion	22% vs BAU	Highly insufficient
Mongolia	No	2030	NA	22.7% vs BAU	Not rated
Morocco	Yes	2030	Policy document	18.3% (unconditional) and 45.5% (conditional) vs BAU	Almost sufficient
Myanmar	No	2050	Proposed / in discussion	Sector-specific targets	Not rated
Nepal	Yes	2045	Policy document	Energy sector specific targets	Not rated
Papua New Guinea	No	2050	Proposed / in discussion	Sector-specific targets	Not rated
Peru	No	2050	Proposed / in discussion	Net emissions <208.8 Mt CO2 eq in 2030 (unconditional target)	Insufficient
Rwanda	No	2050	Proposed / in discussion	16% vs BAU (unconditional; an additional 22% conditional)	Not rated
Saint Lucia	No	2030	Policy document	16% vs BAU (2025)	Not rated
Samoa	No	2050	Proposed / in discussion	26% vs BAU	Not rated

Senegal	No	2050	Proposed / in discussion	4% (2025) and 5% (2030) vs BAU	Not rated
Solomon Islands	No	2050	Proposed / in discussion	27% vs BAU (2025)	Not rated
Thailand	Yes	2065	Policy document	20% vs BAU	Critically insufficient
Tonga	Yes	2050	Policy document	Energy and AFOLU sector specific targets	Not rated
Tuvalu	No	2050	Proposed / in discussion	60% vs BAU (2025)	Not rated
Vanuatu	No	2050	Proposed / in discussion	Sector-specific targets	Not rated
Viet Nam	No	2050	Political pledge	8% vs BAU	Critically insufficient

** Ratings are available at the Climate Action Tracker website: https://climateactiontracker.org/countries/. Accessed December 22, 2021.*

2.3. Adaptation

Most countries have chosen to incorporate adaptation interventions into their NDCs although on a voluntary basis.[31] LDCs and SIDS are disproportionately impacted by climate change, so incorporating adaptation into their NDCs reflects its importance in the domestic policy agenda. Decision 9/CMA.1[32] mandates adaptation communications and places adaptation higher up on the agenda. The decision also highlights the benefits of increasing the visibility and profile of adaptation interventions and the coherence of adaptation interventions with mitigation.

A more precise alignment of both adaptation and mitigation actions can also support countries meeting requirements for adaptation finance, particularly for the most vulnerable countries. Adaptation communications also serve as input to the global stocktake and enhance global learning and understanding of adaptation needs and actions.

Overall, Parties have strengthened the adaptation component of their NDCs by emphasizing adaptation as a priority, elaborating processes to identify and prioritize adaptation actions, and enhancing target-setting and articulation of measures for adaptation. There has also been an enhanced focus on articulating adaptation co-benefits of mitigation, and on the status of the process to formulate and implement national adaptation plans (NAPs). Although only 11 of the countries supported by GGGI in NDC enhancement had submitted a NAP as at the end of 2022,[33] a total of 80 countries globally are covered by either adaptation communications or NAPs, and 51 NAPs and adaptation communications as of 2022 in the lead-up to COP 27.[34] All this is indicative of growing momentum for the establishment of the NAP as the primary national instrument for adaptation and a key source of information for the NDCs.[35]

2.3.1. Adaptation Prioritization and Planning

Two major challenges to adaptation planning have been the availability of data and the technical capacity to articulate linkages between vulnerability to climate change and specific sectoral targets and actions. Overcoming these challenges is key to mobilizing climate finance and fostering political support for climate change response policies and interventions. Countries have taken varying approaches to adaptation prioritization.

For Tonga, the focus in its second NDC is adaptation in agroforestry and the marine sector was aimed at building on existing national development priorities. The availability of data for these sectors was also a motivating factor for placing a focus on them, as was the recognition that these areas, particularly fisheries, are important to livelihoods.[36]

Rwanda's updated NDC outlines a sophisticated adaptation prioritization process, which includes the stocktaking of the existing Green Growth and Climate Resilience strategy (2021) and associated sectoral working papers, the first NDC, and sector-level studies. Priority sectors were identified through the NDC Partnership Plan under the leadership of the Ministry of Environment. Adaptation interventions were selected using indicators, baselines, milestones, and targets at workshops and expert consultations, as well as through the application of a multi-criteria analysis methodology for prioritization. The aim of the process, as stated in the NDC, is to further support an integrated approach to global, national, and sub-national level Sector Strategic Plans and District Development Strategies.[37]

2.3.2. Adaptation Target Setting

A weakness identified in the review of Tonga's first NDCs[38] was the lack of specific, time-bound target-setting for adaptation, which remains a challenge for many countries owing to a lack of data and technical expertise. However, the UNFCCC NDC synthesis report notes that overall, NDCs have been enhanced significantly in this area.

Tonga

Tonga's second NDC is a good example of an NDC with an enhanced adaptation component. With the support of GGGI, the Government of Tonga conducted a comprehensive review of its first NDC (submitted in 2016). The review assessed achievements of the first NDC targets and options for enhancing the subsequent NDC in mitigation and adaptation. Recommendations included improving data collection, including specific, time-bound targets, and strengthening the linkages among the climate vulnerability assessment, targets, and the means to achieve the targets. The recommendations were applied to improve the second NDC, which was submitted in 2020.

While Tonga's first NDC highlighted the importance of interventions in the AFOLU sector as crucial to both mitigation and adaptation, it lacked sector-specific emission reduction targets. The recommendation of the review to establish a forest inventory by 2025 was incorporated into the second NDC, enabling a GHG emission target for the sector to be set. The review also recommended the creation of a non-GHG target for AFOLU; as a result, the action to plant one million trees by 2023 was incorporated into the second NDC's adaptation section as a means of achieving the target of 30% of land in Tonga being utilized for agroforestry or forestry by 2025.

For the marine sector, the NDC targets under adaptation are the prevention of loss of land to sea level rise and the maintenance of existing stocks of fish and other marine species, to be achieved through the use of a quantifiable target for the expansion of Marine Protected Areas and Special Management Areas. The NDC review questioned the linkages between area management bodies and NDC targets; as a result, the second NDC included requirements for area management zones to be clearly defined and enforced. The Government of Tonga is developing an implementation road map that articulates specific adaptation measures for the AFOLU and marine sectors, finance needs, and mitigation co-benefits. The road map will support NDC implementation.

The government improved the quality of Tonga's NDC targets significantly through becoming time-bound and largely quantifiable. Importantly, they are now focused on feasible national-level measures aimed at adapting to Tonga's specific vulnerabilities that are, with the highest possible degree of scientific certainty, direct manifestations of climate change, namely, rising sea level and increase in temperature. The targets do not focus on areas that require global solutions, for example ocean acidification. Furthermore, Tonga is moving toward a systematic assessment of priority options that interlock measures and targets.

The Government of Tonga developed its second NDC using the existing Joint National Action Plan 2 on Climate Change and Disaster Risk Management 2018–2028 as its basis. The Government aligned targets and integrated monitoring and evaluation systems through whole-of-government and whole-of-society approaches. Work to identify synergies, complementarities, and gaps across Tongan ministries and the country's policies and regulations were completed during the NDC enhancement process under the Regional Pacific NDC Hub.

Rwanda

Rwanda updated its NDC to include climate change adaptation and mitigation measures aimed at reducing emissions, by 2030, by 16% compared with the BAU baseline (unconditional measure) and 38% subject to external finance (conditional measure). The Government of Rwanda, through the Rwanda Environment Management Authority (which is Rwanda's national designated authority for the GCF), with support from GGGI as the delivery partner, is implementing the GCF NAP project Building Flood Resilience Capacities in Rwanda to achieve the NDC. Rwanda's Green Growth and Climate Resilience strategy significantly informed the updating of Rwanda's NDC, which, in turn, strengthened alignment between national

31 UNFCCC NDC synthesis report.

32 Available at *https://unfccc.int/documents/193407*.

33 Burkina Faso, Cambodia, Colombia, Ethiopia, Fiji, Kiribati, Nepal, Peru, Saint Lucia, and Tonga, Sri Lanka. The NAPs are available at *https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx*.

34 United Nations Climate Change, UN Climate Change Conference UK 2021 and UK Government. 2021. *COP26: The Glasgow Climate Pact*. Bonn: UNFCCC. For 2022 NAPs, *hyyps://napcentral.org/*.

35 UNFCCC NDC synthesis report.

36 Interview with Luisa Tuiafitu Malolo, Director of Director for Climate Change, Ministry of Lands, Environment, Climate Change and Natural Resources Kingdom of Tonga. November 8, 2021.

37 Republic of Rwanda. Updated Nationally Determined Contribution. May 2020.

38 Kingdom of Tonga. 2020. Tonga Nationally Determined Contributions Review Report. Review of the 2015 Intended Nationally Determined Contributions and Recommendations for the 2020 Nationally Determined Contributions. Department of Climate Change. Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change, and Communications (MEIDECC)

development priorities and the NDC. The flood resilience project is aligned with the country's adaptation priorities and is delivering on key interventions planned in the NDC for water, agriculture, and human settlements. For these sectors, the updated NDC contains elaborated targets with specific interventions and designated responsible entities. The specific actions that GGGI supports under Rwanda's NAP and NDC relate to sustainable land management, stormwater management, improved irrigation and water management, disaster risk management, and resource mobilization, as well as to the overall goal of achieving urban resilience.

Nepal

Nepal enhanced its NDC by including the sanitation sector, and though it is primarily framed in the context of mitigation, adaptation co-benefits are indicated as being significant. Untreated domestic wastewater and faecal sludge account for nearly 60% of GHG emissions from Nepal's waste sector through the production of CH_4 and nitrogen dioxide.[39]

2.3.3. Adaptation Co-benefits

The explicit focus on adaptation as a co-benefit of mitigation and mitigation as a co-benefit of adaptation is recognized as an NDC enhancement. For developing countries articulating their LT-LEDS, the coupling of mitigation and adaptation helps aligning climate action with the principal priorities, which are to reduce vulnerabilities and accelerate positive socioeconomic outcomes. Rwanda's updated NDC is an example of an NDC that includes both mitigation and adaptation co-benefits.

(i) Examples of mitigation co-benefits of adaptation include measures in the AFOLU sector associated with GHG emission reduction resulting from improved land and forestry management; improved water management linked to the availability of water sources for hydropower; and energy efficiency outcomes from enhancing the resilience of buildings and settlements.

(ii) Examples of adaptation co-benefits of mitigation include diversification in energy sources through renewable energy, reducing sole reliance on the grid and minimizing reliance on imported energy, which, in turn, is connected to overall resilience of the economy, industries, and communities; health as a co-benefit of improved air quality from e-mobility; and improved livelihoods and food security arising from mitigation efforts in the AFOLU sector.

39 According to the GHG inventory included in Nepal's third national communication under the UNFCCC, submitted in 2021. Available at *https://unfccc.int/non-annex-I-NCs*.

2.3.4. SDG Alignment

Reaching reductions of the greenhouse gas emissions emission reduction tareveral NDCs highlight the linkages between specific climate actions and the SDGs to emphasize the importance of a socioeconomic framework to fostering synergies with long-term national development priorities (e.g., Cambodia, Colombia, Ethiopia, Rwanda). Prominent linkages are to SDG 1 (on poverty eradication), SDG 2 (on food security), SDG 5 (on gender equality), and SDG 8 (on decent jobs to indicate the importance of just and equitable transition in line with the principle of leaving no one behind). Some countries have established SDGs and just transition toward long-term low-emission transitions toward 2050 as underlying principles, while explicitly integrating a focus on vulnerability reduction and resilience for the communities most impacted by climate change into adaptation measures (e.g., Indonesia).

2.3.5. Adaptation Links to Disaster Risk Management

Multiple GGGI members have made cross-references between adaptation actions to the Sendai Framework for Disaster Risk Reduction 2015–2030, which aims at mitigating the loss of lives, livelihoods and health, and the assets of individuals, businesses, communities, and countries from disasters. Enhancing coherence between the Paris Agreement, the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts, and the Sendai Framework is seen to be an important building block to the success of the new Glasgow Dialogue on loss and damage established at COP 26.

Antigua and Barbuda, as a SIDS with a negligible contribution to global GHG emissions, emphasizes in its updated NDC the adaptation and resilience co-benefits of its planned renewable energy transition. The country's vulnerability to climate change impacts—such as frequent and intense storms and hurricanes, droughts, floods, rising temperatures, decreased annual rainfall, sea level rise—diverts resources, including climate finance, from development sectors to climate change loss and damage, weighing on the nation's economic vulnerability. Linkages between mitigation and adaptation can be seen in non-GHG targets (see Box 5). This target for affordable and accessible renewable energy was informed by a household survey and consultations with vulnerable groups, and in turn informed the development of an Inclusive Renewable Energy Strategy under the NDC Partnership CAEP. Furthermore, linkages to the Sendai Framework can be seen in Antigua and Barbuda's target for disaster recovery (see Box 5).

Box 4. Recommendations for NDC enhancement in adaptation

1. Link NDCs to National Adaptation Plans
2. Articulate commitments to improving the availability of data to guide climate vulnerability assessments and the development of adaptation targets and measures.
3. Establish clear and measurable adaptation targets.
4. Establish clear linkages between climate risks and the country's adaptation targets and measures.
5. Enhance synergies between adaptation and mitigation and enhance the focus on adaptation through articulating adaptation co-benefits of mitigation, and vice versa.
6. Emphasize the alignment of adaptation with the SDGs.
7. Show alignment between adaptation communications and the Sendai Framework.
8. Estimate the costs for unconditional and conditional adaptation measures to help highlight to governments domestic capacity and commitment gaps.
9. Identify realistic project options as well as the partners needed to support their implementation.

2.4. Gender Equality and Social Inclusion

The UNFCCC NDC synthesis report shows that countries are increasingly integrating gender considerations into their NDCs as a means of enhancing the ambition and effectiveness of climate action. References to gender were made in 85% of updated and second NDCs, including all but one of the NDCs by Members and partner governments reviewed, in contrast to only 29% of previous NDCs. While the numbers are promising, the quality of integration varies. Nearly 42% of NDCs lack specificity in showing how gender effectively interlinks with climate action. Annex 2 shows how gender and social inclusion has been captured in the 30 NDCs included in this study.

Gender equality and women's empowerment is recognized as a crosscutting issue in 22% of updated NDCs.[40] This recognition alone is not sufficient to ensure that gender is firmly and explicitly into the concept of Just Transitions. Gender is often left out or made inexplicit in framework for just transitions (Anderson and Fisher, 2022[41]). Gender and social inclusion as strategic objectives, must, in alignment with national development priorities for poverty eradication, gender quality and women's empowerment, be linked to specific adaptation and mitigation targets. The strategic integration of gender equality and social inclusion should be based on the robust understanding of the dynamics that impact the roles men, women, and different segments of society not only as vulnerable to climate change but as active agents in climate action.

Gender and social inclusion must be integrated into all cycles of NDC planning and implementation, i.e. inclusive planning, integrated climate policy frameworks, and governance.

40 UNFCCC NDC synthesis report.

41 Anderson, S., Fisher, S., 2022. *Gender equality and informality in low-carbon transitions: a review of evidence to identify transformative outcomes*. IIED, London.

2.4.1. Inclusive planning

Gender and social assessments have been conducted in several countries as part of the process of developing the NDC and other climate instruments that help identify potential to integrate human development priorities into the transformational shift towards low-emission and resilient development pathways. The NDC should also establish a principle for gender in transfer of technology, access to training, access to climate finance and capacity building and education, and participation in decision making.

If the objective is to transform power dynamics for more inclusive and just access to the co-benefits of climate action, such as access to energy and other services, equal opportunities for jobs and leadership positions in green industries, and access to modern technologies, knowledge and information that ensure effective participation in decision making, climate policies must be informed by systematic and science based data and analysis that disaggregate access to opportunities by sex, age and other relevant demographic dimensions. This will in turn support the development of gender transformational just transition frameworks that can take advantage of the opportunities for human development created by the shift towards low-emission, resilient development pathways. Lastly, gender should also be incorporated into MRV systems to track gender responsive targets.

2.4.2. Developing Sector-specific Gender Action Plans

In preparation of the revised NDC, the Government of Burkina Faso conducted a sector-specific gender assessment and developed gender action plans (GAP) for the agriculture, energy, housing, livestock, water, sanitation, transport, and research, technology and innovation.

The outcomes articulated in the gender action plan for Burkina Faso's NDC are centred on the strengthening of mechanisms for gender mainstreaming in government policy. This includes three pillars:

1) **Production of knowledge and data on gender in sectors relevant to the implementation of the NDC**: Pointing to the lack of data to support gender-responsive analysis and target setting in all sectors, the GAP calls for production of data and knowledge, development of tools, and enhance information, education and communication around gender in NDC implementation.

2) **Capacity building**: Pointing to the knowledge gaps for climate in social ministries and lacking understanding of gender in technical sectors relevant to the implementation of the NDC, the GAP calls for gender strategies to be developed for all sectors, and for trainings to be conducted for policy makers and actors involved in the implementation of the NDC.

3) **Mainstreaming of gender in NDC sectors project and programs**: The GAP suggests the implementation of gender markers for climate action to ensure that gender is systematically addressed in NDC implementation. The GAP also suggests a main focus on economic empowerment for women and equal representation of men and women in decision making bodies to be the key strategic objectives for gender in NDC implementation.

The strategic focus of the GAP is not reflected in the sector specific plans for NDC implementation, including also lacking gender indicators and targets at sector level. There is not much reference to concrete actions to be undertaken in the implementation of measures outlined in the NDC to ensure that gender and social inclusion are actually addressed. However, Bukina Faso has established a network of gender focal points within ministries to accelerate gender in NDC implementation, which can mitigate the risk that gender concerns are sidelined.

Additionally, Burkina Faso's NDC has included gender in the NDC financial plan. USD 1.4 million for gender related measures is included under its conditional target, indicating that the implementation of the NDC GAP is dependent on international support. The budget constitute a modest 0.05% of the total conditional NDC budget and 0.03% of the total budget for implementation of both conditional and unconditional NDC targets. However, the NDC also acknowledges that additional investments in gender mainstreaming will be made during the implementation of specific NDC actions. Burkina Faso's gender focal points within technical departments are mandated to identify opportunities for gender equality and women's empowerment at the national, subnational, and sectoral level. These include opportunities for women to engage in and have an impact on agribusiness, the transition to improved cookstoves, and non-timber forest products.[42]

Owing to the lack of explicit gender targets expressed in the sector-specific gender action plans and alongside specific climate measures, there are no budget estimates for gender mainstreaming within the mitigation and adaptation NDC actions. Strengthened gender-responsive budgeting would yield a higher budget estimate for gender actions. It could also highlight the sex-disaggregated estimates of how co-benefits of climate action are distributed. Furthermore, it would show gender investments as part of the unconditional financial targets, showing a country's commitment to gender and social inclusion in NDC implementation.

2.4.3. Linking Gender to Specific Mitigation and Adaptation Actions

Antigua and Barbuda is showing the way in gender transformation approaches by integrating gender-responsive measures into its strategy to transition to renewable energy. The country links its transition to renewable energy to overall national resilience. To achieve its targets, it has developed the Inclusive Renewable Energy Strategy. The Strategy includes measures for affordable renewable energy and energy-efficient options with enhanced access to finance to allow people to meet their energy needs. The Social Inclusion and Investment Programme (under development) seeks to expand both small-scale and commercial investment opportunities in renewable energy in Antigua and Barbuda.

Box 5. Gender-responsive and socially inclusive targets in Antigua and Barbuda's NDC[43]

Across the climate change framework:

1. 100% female-headed households (20,000) having all barriers to accessing backup renewable energy generation and storage systems removed by 2030
2. 20% increase in the number of women-led businesses implementing renewable energy and adaptation interventions by 2030
3. Gender-responsive green business development program developed by 2025

Specific to adaptation:

1. Farmers and their families being provided with the support needed to recover from drought and hurricanes to prevent the accumulation of unsustainable debt and its corresponding increased risks by 2025
2. 50% reduction in the average annual hurricane preparation costs for single-parent households by 2030
3. 100% of community businesses and organizations supporting women in their post-extreme weather event recovery being identified and provided with support for their efforts to facilitate women's ability to resume work and livelihoods (and potentially return to their homes and communities) within seven days of such an event

2.4.4. Governance for Gender-responsive Climate Action

The Government of Burkina Faso has established a gender technical working group comprising gender focal points of relevant ministries and departments, which is responsible to ensure gender mainstreaming in government policy. The country's gender action plans include a stakeholder mapping, which identified the key political and technical stakeholders and positioned the Ministry of Women, National Solidarity, Family and Humanitarian Action and the National Council for the Promotion of Gender as key actors. These actors have been engaged in the capacity building of sector-level departments, including their gender

42 Interview with Yvonne P. Yameogo, Gender and Climate Change Focal Point, SP/CNDES, Government of Burkina Faso, on October 14, 2022.

43 Presentation by Ezra Christopher, Government of Antigua and Barbuda, at a COP26 side event cohosted by GGGI at the NDC Partnership Pavilion on November 9, 2021.

focal points, and are expected to play an instrumental role in the monitoring of gender in NDC implementation.

Cambodia has enhanced its NDC by placing a stronger focus on gender, and put forward a model for incorporating gender into both mitigation and adaptation actions. The updated NDC states that most of its actions include targets for women's participation of between 15 and 70%. It also emphasizes the importance of age- and gender-disaggregated data, which enable the measuring of gender targets in terms of women's participation, women's access to skills development and technology, and women's engagement in climate change related decision-making. The Ministry of Women's Affairs has been mandated with planning and facilitating gender mainstreaming in climate action, and the Gender and Climate Change Committee has been established to lead information gathering, research on the impact of climate change on women and children, and capacity building on climate change in the Ministry's departments. The Ministry has overseen the integration of climate change into the National Policy on Gender Equality and Women's Empowerment.

A designated section in Cambodia's NDC highlights the linkages between mitigation and adaptation at the sectoral and action level. Furthermore, alongside priority climate actions for mitigation and adaptation, the NDC identifies six actions on gender to improve the enabling environment for climate action (see Box 6). These enabling factors highlight important processes that help to break down the silos in which social and environmental or climate ministries are commonly found and processes that strengthen the capacity of the Ministry of Women's Affairs in climate change and sectoral ministries in gender and social inclusion.

In Ethiopia, the Ministry of Finance implements a gender-responsive budgeting mechanisms, and has acknowledged the importance of liking gender to climate budgeting processes.

Box 6. Gender actions to enable transformational climate action in Cambodia's NDC

1. Strengthen institutions at the national and subnational level to integrate gender-responsiveness into climate change adaptation policies, plans, programs, and budgeting processes (Ministry of Women's Affairs)
2. Establish coordination and accountability mechanisms to reduce the climate change vulnerabilities of the most vulnerable women and marginalized groups, including ethnic minorities, people with disabilities, youth, and the elderly (Ministry of Women's Affairs)
3. Enhance the monitoring and evaluation systems of sectoral ministries to enable them to track gender outcomes through the collection of sex-disaggregated data, gender indicators and budgeting, outcome-based reporting, and the dissemination and scaling up of the gender and climate change adaptation related knowledge generated
4. Build the capacity of Gender and Climate Change Committee members and sectoral ministries in gender analysis and gender-responsive budgeting, including its relevance to NDC implementation
5. Develop technical guidelines for gender mainstreaming in NDC processes
6. Establish a market supply chain of rural women entrepreneurs resilient to climate change (National Committee for Sub-National Democratic Development)

Box 7. Recommendations for NDC enhancement in gender

1. Ensure multi-stakeholder engagement to embed the NDC enhancement process being embedded in the wider framework for gender equality, women's empowerment, and social inclusion.
2. Articulate a wider objective for gender responsive Just Transitions towards resilient, low-emission development to identify ambition and direction of travel for climate action in different sectors that contribute to the achievement of gender equality.
3. Collect sex-disaggregated data for climate action related sectors to strengthen the integration of gender into sector assessments, co-benefits assessments (e.g., employment potential), and design of gender targets in specific measures.
4. Strengthen the capacity for gender mainstreaming in future NDCs and NDC implementation, including the capacity of ministries in charge of gender equality and social development in climate change, and of sector-specific ministries in gender equality and women's empowerment and its relevance to each sector.
5. Use sector-specific gender assessments and gender action plans to ensure gender is effectively integrated into NDCs, including into sector-specific NDC measures, to avoid it being side-lined.
6. Establish, as best practice for NDC enhancement, gender targets for both mitigation and adaptation measures.
7. Articulate a governance structure for accountability toward the implementaation and monitoring of gender outcomes of NDC implementation.
8. Link strategic outcome gender in climate action with gender-responsive budgeting mechanisms, and overall, secure resources to implement measures for inclusive access to co-benefits of climate action.

2.5. Financial Planning

NDC targets are necessary, though in isolation not sufficient to deliver ambitious climate action. Governments need to progress by adopting appropriate policies incentivizing climate-conforming investments and consumption patterns in their countries and by addressing barriers preventing the scaling up of access to available funds.

The UNFCCC NDC synthesis report found that almost all Parties provided information on finance as a means of NDC implementation. According to the International Finance Corporation, NDCs can be used as "investment menus" for governments to mobilize the available public and particularly the private funding needed to ensure full and effective NDC implementation. Governments use their NDCs to communicate their countries' needs for international financial support. Many countries provided in their NDCs in-depth analyses of the estimated costs of implementing the proposed mitigation actions. Linking NDC targets with road maps and investment strategies is an important step in further incentivizing finance flows into countries for their mitigation actions.

Rwanda's NDC shows an examples of costed climate actions and separation of targets. The country has an unconditional GHG reduction target of 1.9 Gg CO_2 eq and a conditional target of an additional 2.7 Gg CO_2 eq. The estimates for financing the conditional target (USD 3,667 million) and the unconditional target (USD 2,010 million) for the coming decade total about USD 5.7 billion. This costing covers the energy, IPPU, agriculture, and waste sectors, which have individual estimates of USD 2,655 million, USD 4 million, USD 2,645 million, and USD 372 million, respectively. The country's clear articulation and prioritization of sectors and subsectors is a strong enabler of NDC implementation. Rwanda's detailed adaptation targets come from its NAP and are a result of ongoing mainstreaming of climate adaptation in budgeting and national planning through the National Strategy for Climate Resilience (2017). The total costs cited in the NDC show a near balance in finance needs between adaptation and mitigation.

Ethiopia's updated NDC includes an unconditional target of 24.5 Mt CO_2 eq GHG emissions reduced and/or avoided by 2025, which increases to 56.2 Mt CO_2 eq by 2030. The conditional target expands to 129.9 Mt CO_2 eq and 277.7 Mt CO_2 eq by 2025 and 2030, respectively. The NDC clearly indicates the potential emission reductions from each sector against the 2020, 2025, and 2030 BAU scenarios. Ethiopia also included its finance needs for NDC implementation in the updated submission, and determined that 20% of the funding contribution would be needed for the unconditional component of the target. This unconditional contribution is expected to translate into about 6.32 billion per annum by 2030. The remaining 80%, amounting to USD 316 billion and to come from external sources, would be needed for implementing its conditional mitigation actions (USD 275.5 billion) and conditional adaptation actions (USD 40.5 billion). Demonstrating strong linkages to domestic planning systems, the NDC indicates how these estimates were derived from climate resilience plans and 10-year development plans.

The **Lao People's Democratic Republic** submitted a more focused updated NDC, with climate finance requirement assessments for specific technologies for its conditional measures. The conditional targets, requiring a total of USD 4,762 million in funding, are expected to contribute to GHG emission reductions of 45.791 Mt CO_2 eq over the 2020 and 2030 decades, covering the land-use change and forestry, energy, agriculture, and waste sectors. The unconditional target for the same time period is 3.975 Mt CO_2 eq, covering the land-use change and forestry and energy sectors, with the largest contribution to the emission reduction coming from 13 GW of hydropower capacity being added for both domestic use and export.

GGGI has supported five Pacific Island countries in developing NDC implementation road maps and investment plans and one country in developing sector-specific NDC implementation road maps. Details on these countries' plans and road maps follow.

Fiji's NDC investment plan presents 20 primary mitigation opportunities—11 in the transport sector and 9 in the energy efficiency sector—to be implemented from 2020 to the end of 2030. Information is also provided for 11 secondary mitigation opportunities. The consolidated temporal financing pathway for all of the primary opportunities leads to an estimated USD 1.98 billion total investment requirement. This includes USD 29 million for capacity building and technical assistance and USD 1.95 billion in capital investments.

Tuvalu's NDC implementation road map and investment plan (including a project pipeline) identifies 14 GHG mitigation opportunities: 5 in the land transport sector, 3 in the maritime transport sector, and 6 in the electricity energy efficiency sector. These have been separated into primary (the most promising) and secondary (less promising, but could be pursued if the necessary investment is found) opportunities. Tuvalu has eight primary opportunities. These opportunities have the potential to reduce GHG emissions by 10,689 t CO_2 eq by 2030, with an annual GHG mitigation potential of 2,055 t CO_2 eq once projects are implemented. Combined with planned renewable energy and storage projects, the primary GHG mitigation opportunities would reduce GHG emissions from the energy sector by 54% relative to Tuvalu's most recent GHG emissions profile (2014 for the electricity sector and 2002 for all other sectors). The opportunities are estimated to have an investment need of USD 23,472,000 by 2030.

Kiribati's NDC investment plan includes 15 primary mitigation opportunities—9 in the transport sector and 6 in the energy efficiency sector–to be implemented from 2020 to the end of 2030. The consolidated temporal financing pathway for all of the primary opportunities leads to an estimated USD 210.5 million total investment requirement. This includes USD 15.5 million for capacity building and technical assistance and USD 195 million in capital investments.

Tonga's NDC implementation road map and investment plan (including a project pipeline) identifies 15 mitigation and adaptation opportunities. Once implementation constraints are considered, projects in the pipeline have the potential to reduce GHG emissions by 2,167,244 t CO_2 eq by 2030, with an annual mitigation potential of 374,690 t CO_2 eq in 2030. Mitigation projects in the pipeline are estimated to have an indicative investment need of USD 30,037,000 by 2030, while adaptation projects are estimated to have an indicative investment need of USD 12,902,000 by 2030.

Samoa's NDC implementation road map and investment plan (including a project pipeline) identifies 21 GHG mitigation opportunities: 4 in the electricity sector; 5 in the land transport sector; 5 in the maritime transport sector; 1 each in the waste, tourism, and marine sectors; and 4 in the AFOLU sector. Once implementation constraints are considered, these opportunities have the potential to reduce GHG emissions by 802,124 t CO_2 eq by 2030, with an annual mitigation potential of 122,151 t CO_2 eq in 2030. The opportunities, which would reduce GHG emissions in Samoa in 2030 by 34% relative to the 2007 level, are estimated to have an indicative investment need of USD 135,414,000 by 2030.

Papua New Guinea's NDC implementation road map for the electricity sector identifies 37 projects as either planned or proposed and they are spread across the short term (2021–2023), medium term (2024–2026), and long term (2027–2030). The types of projects include solar, hydro, and biomass, with a total estimated installed capacity 417 MW. Of the 37 projects, 22 are proposed, with estimated installed capacity of 57 MW and estimated costs of 384 million kina (around USD 109 million). For the AFOLU sector, a separate implementation road map was developed; Papua New Guinea identified that a total of USD 500 million would be needed to implement the road map over the coming 10 years. Under this road map, 111,946 Gg of cumulative emission reductions against the 2015 level will be delivered between 2021 and 2030.

The preceding analysis largely covers the most vulnerable countries, that is, the LDCs, given they continue to receive

Box 8. Recommendations for NDC enhancement in financial planning

1. Identify the existing in and outflows of climate finance in the country.
2. Where specific actions have been identified for NDC targets, quantify the financial costs of implementation, including human and technical resource costs and the cost of creating an enabling environment.
3. For those NDC targets that do not have specific actions, evaluate the potential choices, and then quantify the financial costs of implementation.
4. Evaluate internal revenue methods and means to finance actions, and use this information to prioritize the actions.
5. Assess the availability of external public and private finance means to support the actions that cannot be supported through internal means.
6. Evaluate the potential of carbon finance routes to generate the revenue for implementation, including risk-balanced financial instruments such as feed-in tariffs, taxes, and carbon markets.

a relatively lower amount of climate finance (see section 3.1. below on flows of finance to vulnerable countries).

2.6. Carbon Markets and Article 6 Mechanisms

Carbon markets are expected to open the deadlock on the path to moving from the billions of dollars initially pledged to the trillions of dollars needed to finance the countries' economic transformation. Along with increasing the efficiency of global mitigation action, carbon markets provide investors with much-needed signals as to where to channel their investments to prevent old technology lock-ins and minimize mounting stranded assets. Carbon markets also attach value to many services previously offered as a public good and hence enhance their supply. Further, they generate much-needed revenue that can be used to increase the efficiency of a country's fiscal system and incentivize transformational change through investments and research and development activities. For that to happen, countries must be willing to cooperate in undertaking economic reforms and pursuing investment-friendly policies in which the Paris Agreement Article 6 mechanisms are embedded.

The UNFCCC NDC synthesis report found that most countries have declared a willingness to explore the opportunities for international cooperation under Article 6 of the Paris Agreement. However, countries differed widely in terms of the depth of information provided in their NDCs in this regard. In terms of accessing international finance, most of the LDCs and SIDS still focused their attention on climate finance provided by international funds rather than through emerging carbon markets. This observation might be related to the fact that at the time of submission of all of the updated or second NDCs reviewed, negotiations on the Article 6 rulebook had not been concluded—countries faced many uncertainties and lack of experience with the Article 6 regulatory framework, which had not been finalized. This could have prevented them from taking a more proactive attitude.[44]

Nevertheless, some countries did explicitly address the role of emerging global carbon markets in facilitating carbon mitigation and ultimately the inflow of carbon finance to sellers of the mitigation outcomes. Some countries limited references in their NDCs to the general use of mechanisms under Article 6, while others more specifically made mention of Article 6, paragraph 2 or paragraph 4, and the use of non-market approaches (paragraph 8). Some countries stated their intention to make use of the Clean Development Mechanism.[45] Nevertheless, the CDM in its original form will not continue being operational under the Paris Agreement. All eligible projects will have to be transformed to meet the criteria for cooperative approaches under Article 6. Following the rulebook for Article 6 being agreed upon at COP 26, it is expected that more countries will increasingly express their intention to participate in voluntary cooperation under Article 6. Many countries[46] have also highlighted the importance of the key attributes of the emerging carbon markets such as transparency, preservation of environmental integrity, prevention of double counting of emission reductions, and the ability to deliver real, permanent, and verified emission reductions. Some countries[47] have recognized the contribution of market-based instruments to safeguarding the cost-efficiency of mitigation actions.

Participation in cooperative approaches requires the establishment of complex institutional and technical frameworks. Such a task may easily reach beyond the existing capacity of many Parties to the UNFCCC. To facilitate progress, it has become standard practice to review and support countries' path to readiness[48] to pursue cooperative approaches under Article 6 of the Paris Agreement. Such reviews have usually been carried out along three key dimensions: (i) the articulation of a strategic vision and the alignment of cooperation based on Article 6 with other countries' development strategies and priorities, (ii) the existence of a relevant institutional framework able to facilitate internationally transferred mitigation outcomes (ITMOs), and (iii) the existence of technical and legislative frameworks for measuring GHG emissions at the installation level following an internationally approved methodology and for sharing these data with the international community.

2.6.1. Article 6 in the NDCs of Small Island Developing States

The review of the current NDCs reveals that not all SIDS are currently planning the use of Article 6 provisions in the same way. Samoa and Tonga, which are supported by GGGI, are examples of such countries. In its updated NDC, Tonga stated its intention to achieve its second NDC's mitigation objectives exclusively through domestic efforts. It does not envision the use of ITMOs as a buyer but might consider selling carbon credits to other countries; very much in line with most SIDS and countries with a negligible share of global GHG emissions.

Most of the SIDS covered by this study have declared an interest in exploring opportunities under the Article 6 mechanisms (e.g., Fiji, Papua New Guinea, Vanuatu). Countries expressed the following views on this in their NDCs:

- **Fiji** expressed its interest to explore the potential of bilateral, regional, and multilateral market-based cooperation, including in the context of Article 6. Such cooperation would support the achievement of its own NDC and generate ITMOs to support NDC attainment by other countries.
- Similarly, **Antigua and Barbuda** stated its intention to explore, upon finalization of the Article 6 rulebook, the potential for having a regional carbon market. A regional market could support the achievement of their own NDC as well as generate ITMOs to support NDC attainment by other countries.
- **Saint Lucia** indicated its intention to use market-based instruments such as cap-and-trade schemes to keep the costs of mitigation low. It did not define mitigation co-benefits from the forest sector because, at the time of NDC submission, negotiations on the Article 6 rulebook were ongoing and because it is articulating a national REDD+ program. Saint Lucia mentioned that uncertainties around double counting prevented the inclusion of forest sink capacity targets in its updated NDC.
- The **Solomon Islands**, among other countries, highlighted the need to strengthen existing capacities to regulate carbon trade and to design and implement carbon projects. In this regard, awareness-raising activities might be needed to develop countries' carbon trading legislation.

2.6.2. Article 6 in the NDCs of the Least Developed Countries

A few LDCs, including Nepal, Cambodia and Myanmar, explicitly shared some details of their intended use of Article 6 mechanisms in their NDCs. This may well be

44 See, for example, statements in the current NDC of Saint Lucia that explicitly indicate the country is holding off on its forest sink capacity targets until the uncertainties regarding Article 6 mechanisms are resolved.

45 For information, see *https://unfccc.int/process-and-meetings/the-kyoto-protocol/mechanisms-under-the-kyoto-protocol/the-clean-development-mechanism*.

46 For example, Antigua and Barbuda, Grenada, and Saint Lucia. These countries, which are part of the Alliance of Small Island States, reiterate in their NDCs their common position regarding environmental integrity and express concerns that less rigorous mechanisms will undermine ambitious climate actions by high-emitting countries.

47 For example, Antigua and Barbuda, Grenada, and Saint Lucia. These countries, which are part of the Alliance of Small Island States, reiterate in their NDCs their common position regarding environmental integrity and express concerns that less rigorous mechanisms will undermine ambitious climate actions by high-emitting countries.

48 *https://ercst.org/wp-content/uploads/2021/11/20211027-PCG-CF_Art6_Readiness-NDCs_27.10.21.pdf*

because they are the countries already embarking on Article 6 initiatives. That, however, by no means implies other countries are reluctant to participate. In fact, the number of countries referring to voluntary cooperation under Article 6 in their updated NDC has almost doubled compared with the previous submissions. Similarly, the increasing interest to explore opportunities for international cooperation on carbon mitigation is visible in a large number of pilot activities related to Article 6. In line with the position of the Least Developed Countries Expert Group under the UNFCCC, most of the LDCs reviewed have expressed an interest in exploring opportunities for cooperation and access to carbon finance under Article 6 mechanisms. They have urged robust Article 6 mechanisms, which ensure environmental integrity and enable investments in capacity building that enable the LDCs to benefit, to be finalized.

Nepal has expressed a general interest in exploring potential markets that allow higher mitigation ambitions while promoting sustainable development and environmental integrity. **Ethiopia** was more specific, expressing a strong interest in voluntary cooperation on emerging international carbon markets governed by Article 6. Ethiopia sees carbon markets as an instrument for increasing mitigation ambition, provided environmental integrity through robust accounting is taken into account in the additional promotion of sustainable development. This comes with an explicit invitation for Parties to explore opportunities for cooperation with Ethiopia. Further, Ethiopia outlined the steps it will take to enhance its readiness for Article 6 cooperation, which include identifying additional mitigation potential eligible for domestic and international carbon markets, undertaking institutional capacity building to meet the requirements of the Article 6 rulebook, establishing mechanisms to authorize ITMOs, and building adequate transparency framework. Ethiopia also mentioned the potential to engage with instruments for NDC implementation beyond the Paris Agreement, such as e.g., the Carbon Offsetting and Reduction Scheme for International Aviation of the International Civil Aviation Organization (CORSIA).

Senegal did not include any reference to Article 6 but hosts several pilot projects related to it. In cooperation with the World Bank and the Standing Committee on Finance under the UNFCCC, the Senegalese Rural Electrification Agency is implementing a rural electrification program aimed at replacing diesel-driven grids with photovoltaic (PV) systems. Switzerland's interventions are aimed at installing biogas sites on farms to reduce the use of firewood and charcoal.

Cambodia and **Myanmar** provided the most detail about their potential carbon trade while expressing a need for support to identify eligible mitigation projects, that could deliver mitigation outcome that qualifies for such trading. Myanmar explored opportunities to sell ITMOs from specific programs to the Republic of Korea as its carbon trading partner.

GGGI[49] along with several other international organizations has been developing and implementing pilot programs related to Article 6. Such programs aim to support the design of the relevant governance structures and supply ITMOs to the emerging global carbon markets. Some of these programs support host countries in developing the necessary technical capacities to enhance cooperation and increase consistency in the design of countries' NDCs with global practice,[50] establish baseline methodologies, comply with corresponding adjustments, develop systems and national registries to record evidence for BTRs, and adopt legislative frameworks for authorizing ITMOs.

2.6.3. Measurement, Reporting, and Verification Framework under the Paris Agreement

Safeguarding the integrity and credibility of carbon pricing instruments is crucial for their successful deployment and to meet the Paris Agreement's aims of ensuring environmental. The functionality of carbon pricing instruments strongly depends on the trust of market participants, which is typically underpinned by the robustness and accuracy of the data delivered by the underlying comprehensive MRV framework. In designing such a framework, and indeed at all stages of the MRV process, countries can greatly benefit from their experience with the Clean Development Mechanism and Joint Implementation.

MRV concepts, elaborated under the UNFCCC for developing countries, have been built upon and expanded to the ETF referred to in Article 13 of the Paris Agreement. Countries must submit regular GHG inventories, national communications, NDCs, and, now, BTRs. The modalities, procedures, and guidelines under Article 13 cover the contents of these reports. The reports are reviewed by the UNFCCC secretariat and the information contained in them will be subjected to an international verification process and, eventually, the global stocktake. Inadequate MRV frameworks will be a key challenge to mobilizing climate finance, as well as to enhancing and implementing NDCs.

49 With the support of key donors, namely the Governments of Norway and Sweden.

50 For example, by translating non-GHG metrics into the CO2 eq-based framework.

The agreed rulebook requires countries to set up an MRV system that fulfills all BTR reporting requirements. Given the flexibility of design of cooperative approaches under Article 6, the MRV systems should allow the tracking of mitigation outcomes down from the intervention. Ultimately, for countries participating in ITMO transactions, robust MRV systems are required at both the seller and the buyer end. With the emphasis on accounting and corresponding adjustments, a comprehensive MRV system will enable both donors and receivers to facilitate these transactions. Before implementation and during its design, an ITMO will take in data from existing MRV systems, such as the GHG inventory (for historical data), and any future projections in NDCs or LT-LEDs. Once operationalized, the ITMO will generate data for the BTRs of both countries, while the corresponding adjustments will result in altered NDC ambitions of the buyer. A well-designed MRV framework will also be pivotal in mitigating the risk of the carbon crediting mechanism.

Few countries reported in their updated or second NDCs on their progress in developing their national MRV systems. No specific information was provided on the MRV of Article 6 related activities. Cambodia reported the timeline for developing a comprehensive MRV framework before 2030; the framework will build on the country's existing institutional structures. Cambodia has thus far developed five MRV systems, for: (i) GHG emissions, (ii) actions under the Cambodia Climate Change Strategic Plan (both adaptation and mitigation), (iii) REDD+ activities, (iv) two planned nationally appropriate mitigation actions, and (v) 12 Clean Development Mechanism projects and six Joint Implementation projects. Importantly, and highly relevant for scaling up sectoral and policy approaches, Cambodia highlighted its need to integrate its MRV framework with local statistical frameworks. Similarly, Myanmar reported on ongoing work on its MRV framework, which is expected to collect data and information for preparing GHG inventories and BTRs and to track support (finance, technology, and capacity building) received.

Even with the firm guidance resulting from the conclusion of the Article 6 rulebook negotiations, countries will need support in developing their regulatory and legislative frameworks and institutions to enable, as well as imparting technical knowledge for designing and operationalizing their MRV systems. GGGI continues supporting its Member countries in developing comprehensive and transparent MRV systems. This support covers reporting under Article 6, and more specifically, MRV of the interventions under Article 6 designed in cooperation with GGGI. This capacity building and development and sharing of knowledge products places high importance on the coherent approach taken on the activities under Article 6 along with the development of methodologies and indicators to be used for the accounting of benefits and co-benefits of adaptation and mitigation actions, LT-LEDS, and economic diversification strategies.

Box 9. Recommendations for NDC enhancement in Article 6 readiness Strategic vision

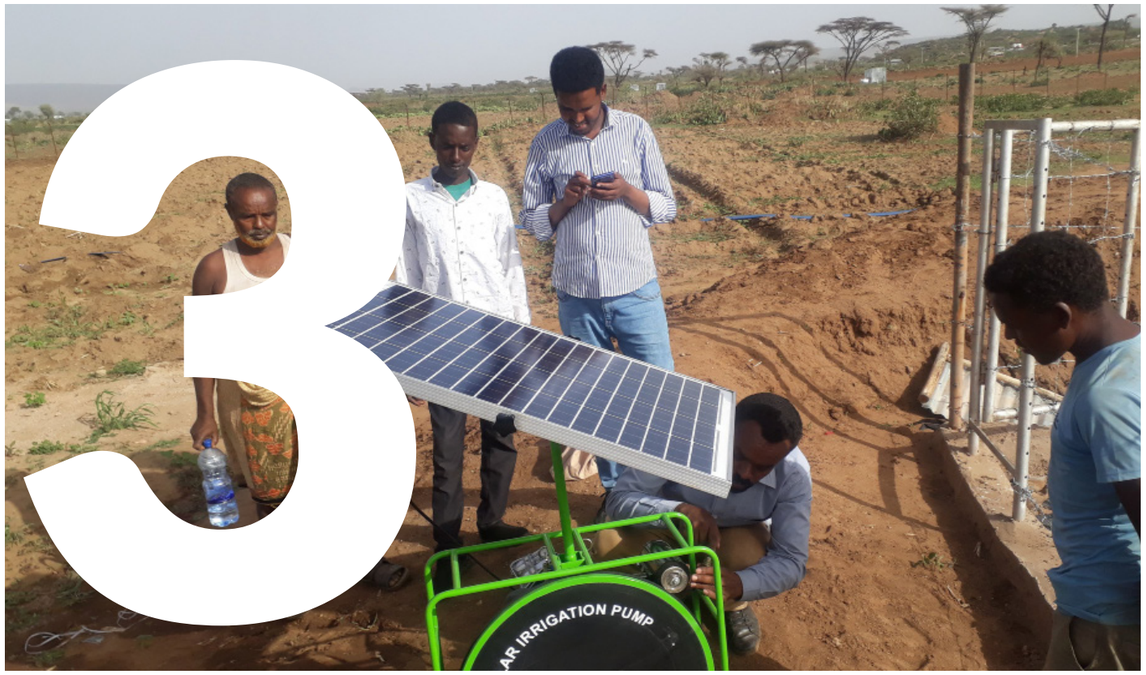
1. Review existing institutional frameworks for fiscal policy, foreign direct investment policy, and environmental policy.
2. Enhance the reviewed policy and governance frameworks by embedding functionalities related to Article 6 in them.
3. Align strategic national development objectives with emerging carbon markets.
4. Continuously phase in investment incentives to channel new foreign direct investments into actions with mitigation benefits and develop strategies to sell the mitigation outcomes achieved on carbon markets.
5. Develop broad strategies for the use of revenue from sales of mitigation outcomes.

Institutional framework

1. Prepare or update a list of capacity gaps, which will provide the basis for the design of capacity-building activities.
2. Establish institutional links across the governance of fiscal policy, foreign direct investment policy, and environmental policy.

MRV

1. Build on existing frameworks (e.g., activities developed under the Kyoto Protocol) rather than developing frameworks from scratch.
2. Develop a comprehensive MRV strategy, linking national statistical frameworks with reporting of GHG emissions.



3. The Climate Finance Gap in Developing Countries

Looking ahead to implementation of NDCs, the need to scale the available funding flows to developing countries is urgent. At COP 15 in 2009, developed countries committed to mobilizing USD 100 billion for climate action each year by 2020. In 2022, this commitment had not been met. At COP26, a target to raise USD 500 billion in 2021-2025 was agreed. Developing countries will continue to uphold their demand that rich countries meet these financial commitments, and that the share of finance for adaptation, which is the key priority for most developing countries, is increased.

The numerous financial pledges made are important politically and practically. However, the pledges are far off the actual cost of achieving the purpose and goals of the Paris Agreement along with SDGs. According to the Glasgow Financial Alliance for New Zero (GFANZ)[51], USD 125 trillion of investment is required by 2050 to transform the global economy and avoid the worst physical impacts of climate change. By 2030, USD 32 trillion will be required, according to GFANZ. Given public support and the right government policies being put in place, private sector actors could provide up to 70% of this financing globally.[52]

Closing the climate finance gap requires massive mobilization of public and private sector finance along with addressing the barriers to developing countries' readiness to attract financing and capacity to put finance into effective climate actions. GGGI Member and Partner countries are working to enhance their readiness through articulation of climate ambitions in NDCs and sector level policies, development of road maps and investment plans for implementation, development and structuring of investment-ready climate measures, and enhancement of transparency and MRV capacity. GGGI also supports countries in building strategic partnerships with development finance institutions, multilateral development banks (MDBs), and the private sector, and in establishing institutional arrangements for implementation.

51 https://www.gfanzero.com/netzerofinancing/ accessed March 1, 2022
52 Ibid.

3.1 Climate Finance Flows to Vulnerable Countries

The capacity to mobilize climate finance varies across countries. At the core of the challenge is the critical lack of investment-ready climate projects in developing countries.[53] The different capacities of countries renders them with different support needs. Not surprisingly, developing countries with larger, emerging economies and more advanced financial systems are able to access greater volumes of climate finance. The most vulnerable countries, which largely comprise the LDCs, access less climate finance despite their greater need in terms of adaptation and development.

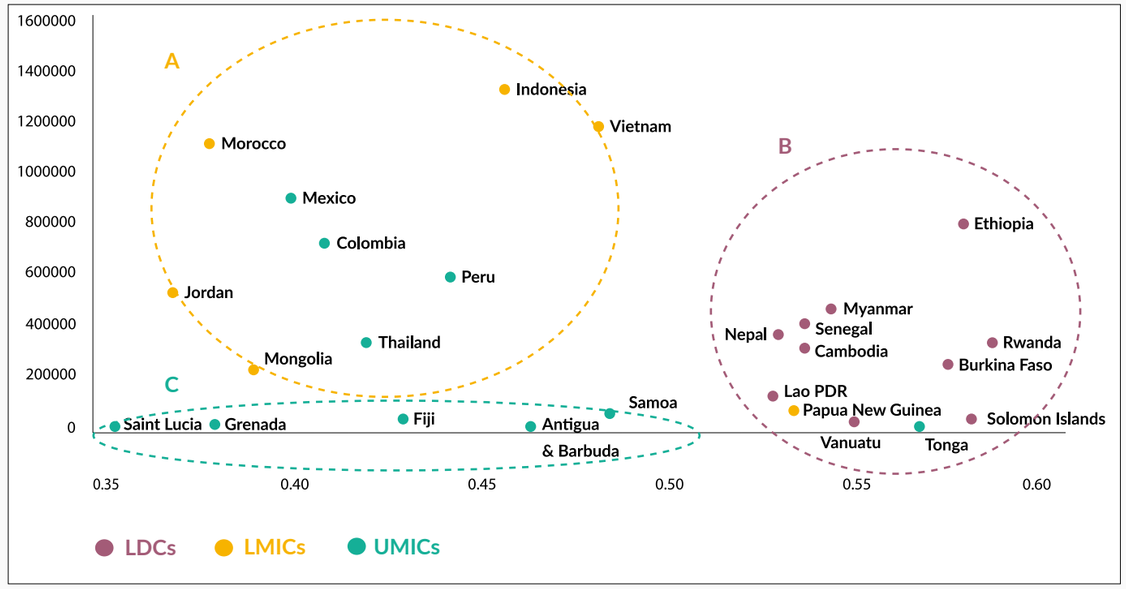
These trends can be illustrated by Organisation for Economic Co-operation and Development (OECD) data on climate finance[54] and by the Notre Dame Global Adaptation Initiative (ND-GAIN) Country Index (vulnerability rankings)[55] as shown in Figure 7 below.

53 GGGI. 2021. *Closing the Climate Financing Gap: Stocktaking of GGGI Green Investment Projects 2015–2020. GGGI Technical Report No. 20*. Seoul: GGGI.

54 *Climate Finance Provided and Mobilized by Developed Countries Aggregate trends updated with 2019 data* (OECD, 2021).

55 University of Notre Dame. 2021. *ND-GAIN Country Index*. Accessed [March 1, 2022]. For more information on the ND-GAIN methodology, see *https://gain.nd.edu/our-work/country-index/methodology/*.

Figure 1. Flows of climate finance to countries over country vulnerability rankings, 2010–2020



Source: Organisation for Economic Co-operation and Development, Tracking climate finance and Notre Dame Global Adaptation Initiative, Country Index. (vulnerability rankings).[56]

56 The ND-GAIN Country Index (vulnerability rankings) takes into account a country's degree of exposure to climate change and its sensitivity to impacts in specific negatively impacted sectors. It also considers a country's adaptive capacity. All of these factors vary over time; in figure above, an annual average over the previous decade was applied.

Relatively more vulnerable countries often receive less climate finance and is linked with the higher risks facing investors in these environments. Macroeconomic factors that links to political and economic instability play a role in some of the most vulnerable countries, often LDCs. Additionally regulatory environments and uncertainty will impact the flows of finance into countries with more sophisticated financial systems and developed risk guarantee mechanisms. Capacity also vary greatly in terms of capacity to generate and apply climate data and link effective bankable solutions and private sector engagement that meet the requirements of climate finance institutions. Based on these findings, we see some general trends across different categories of countries as show in Table 5 below.

Table 5. Categories of countries based of climate finance flows over climate vulnerability

Category A (yellow)	Countries with high funding and relatively low vulnerability - Examples: Indonesia, Morocco, and Viet Nam - Attract the most climate finance - Middle income countries - Advanced in terms of industrialization and have developed energy sectors and sophisticated financial systems
Category B (red)	Countries with low funding and relatively high vulnerability - LDCs such as Myanmar, Senegal, and Solomon Islands - Middle income countries such as Papua New Guinea and Tonga - The LDCs in this category have low capacity to invest in climate change: some of these countries are grappling with challenges such as political instability and war, which places climate change low on their list of priorities - The SIDS among these countries have small economies, small projects, and high transactional costs, which makes them less attractive to investors
Category C (green)	Countries with low funding and relatively low–medium vulnerability - SIDS such as Antigua and Barbuda, Fiji, and Saint Lucia - Upper-middle income countries with a relatively high degree of development - The challenge for SIDS is generating investment pipelines at scale that meet the requirements of large financial institutions and investors

Category A includes Colombia, Indonesia, Jordan, Mongolia, Morocco, Peru, Thailand, and Viet Nam. These countries have a higher ability to mobilize climate finance and increased levels of green finance innovation. Indonesia and Viet Nam are the most vulnerable countries that receive the largest amount of finance, while Colombia, Mexico, and Morocco, with lower vulnerability, are also comparatively well served in terms of climate financing. Measures that enhance readiness for climate finance undertaking by these countries includes developing green banking guidelines, developing climate and sustainable finance strategies, and establishing governance structures under which market-led sustainable finance principles can be implemented effectively. The relative larger size of economy and robust policy frameworks and institutional capacity of these countries are key to attracting funding, in particular for the administration of enhanced adaptation flows.

Table 6. Examples of green finance innovations for accelerating climate finance in well-funded countries

Colombia	In 2012, the Colombian Government and the representative association of Colombian banks (Asobancaria) signed the Green Protocol, a voluntary framework and guidelines.
Mongolia	The Mongolian Sustainable Finance Principles are a set of voluntary principles developed through a public–private dialogue among the Mongolian Bankers Association, the Mongolian Ministry of Environment, Green Development and Tourism, and the Bank of Mongolia, with international support from the Dutch development bank FMO and the International Finance Corporation through the Sustainable Banking Network.
Morocco	Morocco's Central Bank has committed to sustainable development as part of its formal strategy and is taking its first steps in the field of green finance. It has convened workshops with commercial banks to explore regulatory and voluntary standards options toward developing a road map for finance reform for a green economy. Some banks in the country have already introduced environmental, social, and governance (ESG) initiatives. The Central Bank has also set up a working group on green finance.

Category B countries are the most vulnerable countries that receive some of the lowest flows of climate finance. Among these countries are LDCs (e.g., Burkina Faso, Lao People's Democratic Republic, Uganda), which have significantly lower volumes of financing compared with the middle-income countries in category A. The LDCs in this category are the most vulnerable to climate change impacts, and their lack of financing is a significant challenge. However, as discussed in chapter 2 on adaptation above, in Rwanda, Tonga, and Nepal, for example, institutional changes are primed to encourage increased financing levels.

An outlier in this category is Ethiopia, which, compared with other LDCs in this review, has mobilized a greater amount of climate finance. There are several factors contributing to their effectiveness, as the fifth largest and fastest growing economy in Africa. Additionally, ambitious climate targets and strong commitment shown through the Climate Resilient and Green Economy Strategy launched in 2011.

Ethiopia	The Government of Ethiopia has maintained a focus on climate change as a priority for long-term development. The Climate Resilient Green Economy strategy launched in 2011 sets a climate-resilient growth path to middle-income country status by 2025. The Strategy sets out clear finance targets with federal budgetary commitments as the means to attract international public and private financing.

Category C countries are SIDS (i.e.., Saint Lucia, the Solomon Islands) that have low volumes of financing and moderate to high levels of vulnerability to climate shocks owing to their unique structural characteristics.[57] Their remoteness means limited connectivity with other countries and regions, as well as global markets, while their small, dispersed populations imply a small size of domestic markets and constrained capacities. These factors have led SIDS to depend on their small, undiversified economies, facing high levels of debt, reliance on overseas remittances, and official development assistance. This situation is exacerbated by frequent climate change-related weather events and shocks that divert public funds from development to emergency response.[58] Per capita, SIDS attract relatively large amounts of finance[59] compared to other developing countries. At the same time, SIDS have relatively higher costs of climate action in relation to emission reduction impact.

3.2. The Climate Finance Gap

A key challenge to finance flows is the lack of investment-ready projects in developing countries,[60] The reasons for this "project" gap are linked to complexities within the finance ecosystem, to country capacity, to external risk factors, and most of all limited enabling environment generating sufficient incentives for investors to develop such projects.[61]

It has proven challenging to (i) identify investment opportunities in developing countries that match investors' preferred risk–reward ratio, (ii) identify the large projects and investment opportunities at a scale that the major financial institutions, such as MDBs, seek, and (ii) fit financial instruments (e.g., bonds and national financial vehicles) to available projects. Countries also lack the institutional capacity to manage funds. Many developing countries, particularly the LDCs and most vulnerable countries, are riddled with political instability, which poses a risk to investors in both the short and the long term. Furthermore, changes in government and the policy environment can result in shifting support for climate

57 OECD. 2021. *COVID-19 pandemic: Towards a blue recovery in small island developing states*. OECD policy responses to coronavirus (COVID-19), 26 January 2021. Pairs: OECD.

58 Ibid.

59 That stems from the dis-economies of scale associated with providing development assistance to small countries – i.e., a small country bias.

60 GGGI. 2021. *Closing the Climate Financing Gap: Stocktaking of GGGI Green Investment Projects 2015–2020. GGGI Technical Report No. 20*. Seoul: GGGI.

61 Ibid.

action, which arguably is an international challenge to effective climate action. All of these challenges are interconnected and manifest themselves in different ways across different sectors and countries, and also across mitigation and adaptation efforts.

GGGI mobilized USD 7 over 2015–2021 for bankable green investment projects. This included support to the Government of Peru's first sovereign thematic bond of USD 4 billion, and it is predicted that thematic bonds will continue an increase in volume of green and climate finance ahead. Deducting the large bond in Peru, which as a single investment skews the average results, Figure 8 shows that around 48% of GGGI supported finance went to developed and emerging markets (Category A).

However, and increasing amount at 43% went to LDCs (Category B) and 9% to SIDS (Category C).

31% of GGGI supported investments flowed into solar energy projects, while 19% was mobilized for sustainable landscapes projects, i.e. REDD+ and forestry and irrigation. And the majority flowed into projects tagged for mitigation. Around USD 193 million was mobilized for the funding of adaptation and climate resilience projects. This constitutes less than 4% of the total funds, and therefore presents an opportunity for GGGI with its Members and partners to further expand its focus on adaptation initiatives, including highlighting adaptation and resilience as a co-benefit of specific mitigation actions.

Figure 8. GGGI finance mobilized for green investment projects, by country category, 2015–2021 (USD Millions)

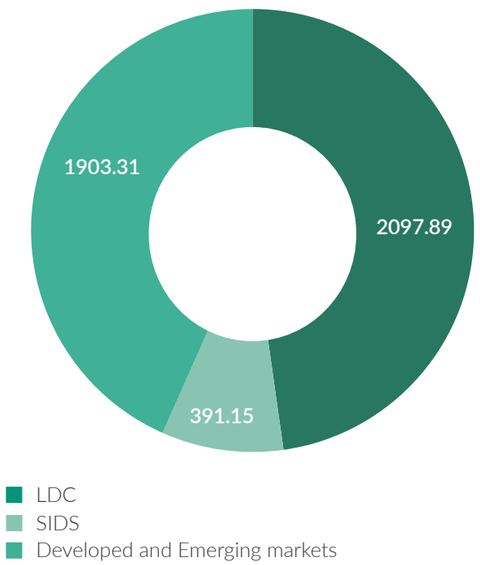
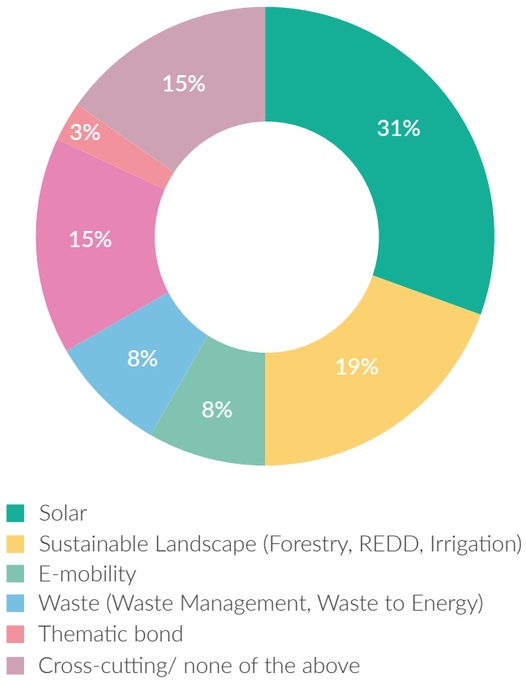


Figure 9. Proportion of investments mobilized across sectors



3.3. Adaptation Finance

Despite the call for more finance to be mobilized for climate adaptation measures, such measures have received only a marginally growing share of global climate finance. GGGI's investment portfolio mirrors the global distribution of climate finance by project type.

For the first time, at COP 26, a global goal on adaptation finance was agreed; that is, the commitment to double adaptation finance from the 2019 level by 2025, thus increasing overall adaptation investment to USD 40 billion per year. Furthermore the consensus reached at COP28 to establish a Loss and Damage Fund will lead to diversification of resources available to developing countries. Unfortunately, negotiated agreements fall far short of the costs of achieving the 1.5°C goal and covering the adaptation needs of developing countries. Achieving net zero ambitions is estimated to require USD 100–150 trillion cumulatively toward 2050. Annual adaptation finance needs in developing countries are expected to reach the upper end of the range USD 140–300 billion by 2030 and USD 280–500 billion by 2050.[62]

The major source of adaptation finance is public concessional finance provided by development agencies and MDBs. In 2020, MDBs committed USD 66 billion, USD 38 billion of which was allocated to low and middle income countries and USD 13.3 billion (around 30%) of which was allocated to adaptation.[63] Bilateral donors are the second largest source of climate finance for adaptation, but the largest volumes from this source are largely directed at mitigation (15–21% of funding between 2013 and 2017).

Domestic finance and private sector sources are difficult to mobilize. From a total of around USD 30 billion generated for adaptation in 2017–2018,[64] only USD 500 million, or 1.6%, was mobilized from the private sector. At COP 26, Parties urged banks to move on from their position of de-risking investments to providing direct support for adaptation projects and adapting financial products accordingly. The trend for increased support for adaptation is growing, with multilateral adaptation financing increasing from USD 3.1 billion in 2013 to USD 7.4 billion in 2017, even if the overall increase is small compared with mitigation financing.[65]

62 United Nations Environment Programme. 2021. *Adaptation Gap Report 2021*. Nairobi: UNEP.

63 European Bank for Reconstruction and Development. *2020. Joint Report on Multilateral Development Banks' Climate Finance*. London: EBRD.

64 World Bank. 2021. *Enabling Private Investment in Climate Adaptation and Resilience: Current Status, Barriers to Investment and Blueprint for Action 2021*. Washington, DC: World Bank.

65 OECD. 2019. Climate Finance Provided and Mobilised by Developed Countries in 2013–2017. Paris: OECD.

A major challenge for adaptation financing is that adaptation projects are perceived as not being market ready. While the private sector is increasingly crowding out public investment in mitigation sectors such as renewable energy and waste processing in some countries, adaptation measures, such as coastal protection or the provision of basic services that reduce vulnerability, are typically funded through grants or domestic resources. A key reason for this is that many adaptation projects are seen as being for the public good, with few opportunities to 'privatize' benefits for the market.

Another barrier to adaptation financing is that many of the countries that are the most in need of finance are already heavily in debt—there is a strong correlation between a country's need for adaptation and a high government gross debt to GDP ratio. Countries with the greatest need for protection of and support for livelihoods are the least able to borrow to reduce vulnerability.[66] GGGI's support of green investment plans under the GCF Readiness Programme and its work on NDC enhancement help to plug the adaptation finance gap as they help prepare an enabling environment through which scarce resources can be channelled into adaptation and resilience projects. An example of this is GGGI's work in Bahrain, which has focused on developing a national adaptation and investment plan for the country, under which a pipeline of specific projects was established and partners and funders for these projects were identified. In Rwanda, the project's sectoral focus on resilience building has led to the development of specific nature based solutions for enhancing urban resilience across urban areas of Rwanda.

The lack of enabling environments and data are key barriers to GGGI's support of NDC enhancement and NAP formulation. GGGI will be working to help to bridge this gap through the application of its analytical tools, such as the Green Growth Index and the Green Recovery Tools, whereby governments are supported in developing concrete, measurable adaptation scenarios that can be used to attract investment. The latter have recently be used to support G20 deliberations on post Covid recovery.

GGGI's support of LDCs for developing their LT-LEDS highlights its commitment to enhanced NAPs and NDCs that support its Members in accessing greater volumes of adaptation finance.

66 United Nations Conference on Trade and Development. 2021. *COP26: Least developed countries need more funds to adapt to climate change*. Website content dated November 1, 2021. Geneva: UNCTAD.

3.4. Alignment of Green Recovery with Climate Action

The socio-economic impacts of the COVID-19 pandemic disproportionally affected developing countries. The OECD indicated a finance gap of USD 1 trillion in economic emergency packages for developing countries and a substantial post-COVID increase in the financial gap to achieve their sustainable development reaching USD 3.7 trillion.[67] Governments released their short-term relief packages and to mitigate the long-term impacts to their economies they design medium- and long-term recovery strategies. Aligning those strategies to NDC implementation with the aim of incentivizing the decarbonization of their economies is crucial. Economic solutions that were viewed in isolation of the climate crisis are now being compounded to ensure a sustainable recovery. The premise of 'building back better' is based on better integrating NDC implementation in financial plans, along with implementing measures that promote social equality.

GGGI, in collaboration with Vivid Economics, assessed the 'greenness' of recovery measures in 21 GGGI Member and partner countries,[68] including the eight countries that belong to the Organisation of Eastern Caribbean States. Using the Greenness of Stimulus Index,[69] GGGI developed a Green Recovery Index based on the GGGI Green Growth Index[70] that offers enhanced focus on (i) the social inclusion dimension of green recovery measures, in addition to the climate and nature dimensions; (ii) short-term relief measures that are mostly for social and welfare support but provide an enabling environment for long-term recovery measures; (iii) differentiation between climate change mitigation and adaptation, where the latter considers not only supporting ecosystems but also building social resilience; and (iv) other sectors that are impacted by the pandemic, including health and tourism.

The findings of the assessment show that while most developing countries align green recovery with SDG achievement, most fail to prioritize green and climate change-related measures. For example, on average, 11% of the stimulus announced by the assessed countries supports green incentives (defined as climate and nature incentives beneficial to climate and environment) (Figure 10).

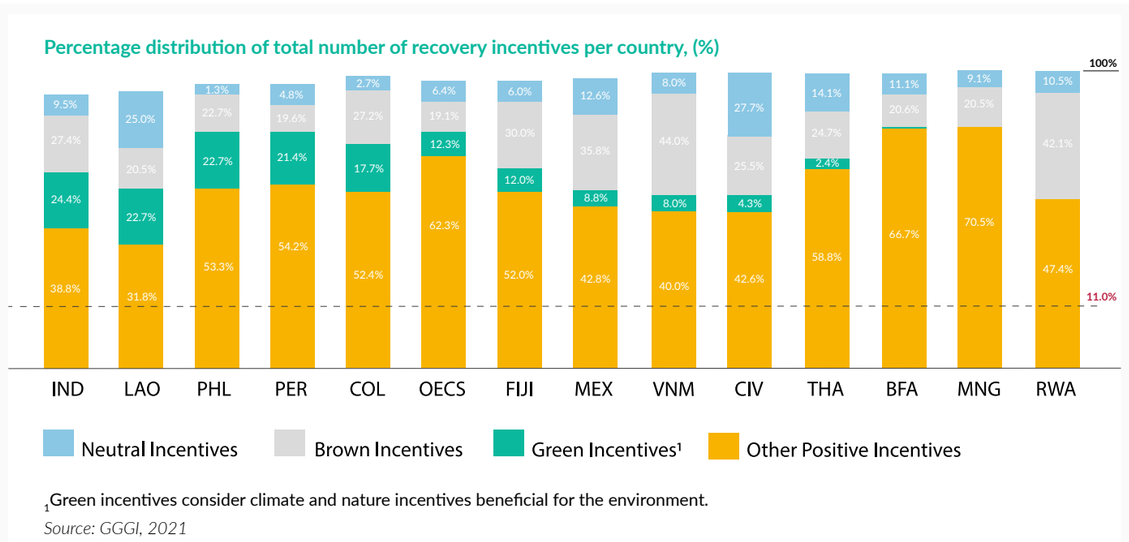
67 OECD. *Closing the SDG financing gap in the COVID-19 era*.

68 For example, Burkina Faso, Colombia, Côte d'Ivoire, Fiji, India, Lao People's Democratic Republic, Mexico, Mongolia, Peru, Philippines, Rwanda, Senegal, Thailand, and Viet Nam.

69 Vivid Economics and Finance for Biodiversity Initiative. 2021. *Greenness of Stimulus Index*. December 2021 release.

70 GGGI. 2021. *Green Growth Index 2021*.

Figure 10. Analysis of coronavirus disease 2019 pandemic recovery incentives in selected GGGI Member and partner countries



¹Green incentives consider climate and nature incentives beneficial for the environment.

Source: GGGI, 2021

Emerging economies (e.g., India, Indonesia, Mexico, Mongolia) had high-carbon incentives, which led to low climate index component scores. The LDCs scored low in the social index component for lacking social incentives that support a sustainable transition and develop long-term resilience.

Opportunities to protect nature and biodiversity through recovery incentives were neglected by most countries. SIDS placed an emphasis on climate adaptation and social resilience but were found to lack the financial resources required to implement the measures announced.

The assessed countries prioritized green productive investments and green fiscal and monetary incentives.

However, to ensure a green transition, countries should also add incentives that promote green skills, green planning, strategies and governance, gender and social inclusion", green regulation, greening the financial sector, and green behavioral change. The countries that performed best in terms of greenness of recovery measures have both a high economic dependence on natural capital and strong political support for sustainability (e.g., Philippines, Thailand, Viet Nam).

The study also found that compared with social stimulus measures, most climate change measures were long term (and could therefore provide opportunities for alignment with 2030 and mid-century targets.

Figure 11. Categorization of coronavirus disease 2019 pandemic recovery incentives in GGGI Member and partner countries

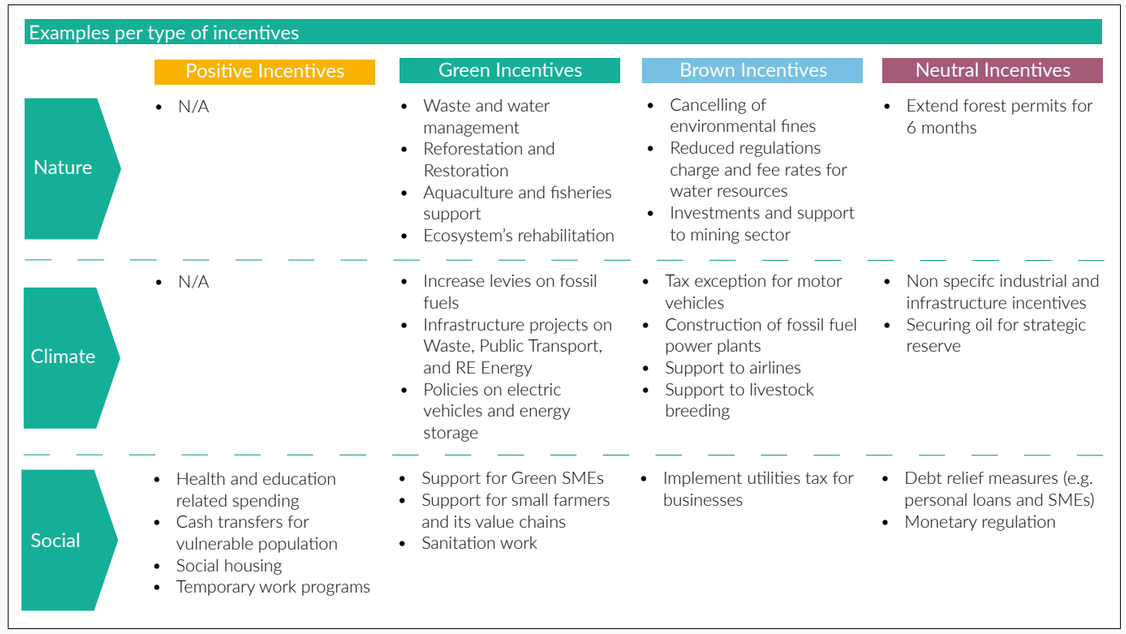
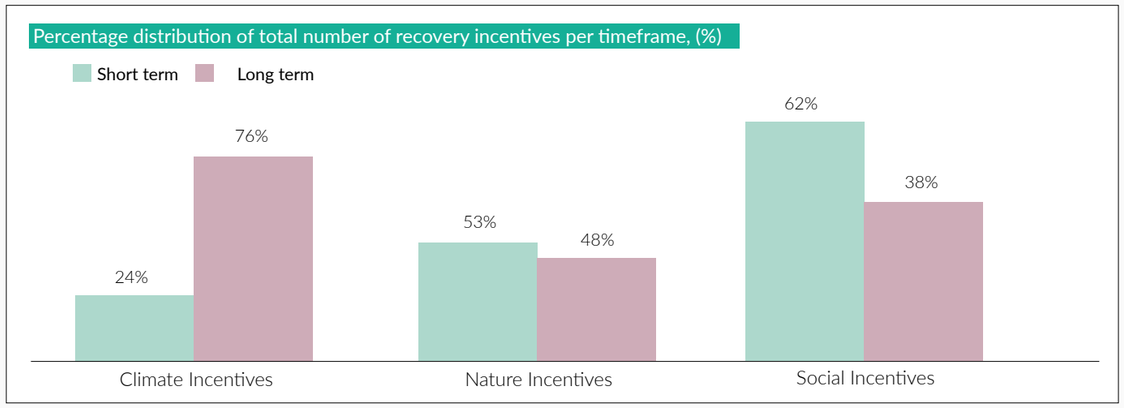


Figure 12. Short-term versus long-term coronavirus disease 2019 pandemic recovery incentives in GGGI Member and partner countries



The reason for the relatively low uptake of green stimulus measures, as concluded from the study, is that governments have prioritized more immediate needs to keep unemployment low. Limited financial resources is a barrier combined with levels of departments, which is characteristic in developing countries, particularly the LDCs and SIDS. To support 'building back better', countries, with the support of organizations like GGGI, need to focus on delivery against multiple social, economic, and sustainability priorities. There is evidence that investments in renewable energy, green buildings, climate-smart agriculture, and reforestation can generate a larger number of green jobs than fossil fuel alternatives.[71]

The study formulated recommendations for policies, financial measures, and capacity building activities that can enable NDC implementation and net zero ambition achievement (Table 7).

71 GGGI, 2021. *Green Recovery and Climate Action: Assessment Green Jobs from Renewable Energy and Forestry Investments for Developing and Emerging Economies*. GGGI Technical Report No. 19. September 2021.

Table 7. Recommendations for pathways toward coronavirus disease 2019 pandemic recovery and net zero emissions in developing countries

Moving from a green recovery to Net Zero Emissions in developing countries: The pathway towards NetZero needs to address unemployment, poverty, inequality, disparities of capacity, and economic hurdles that currently face the developing countries	
Policies	• Focus on skills development for future green jobs • Complement mitigation incentives with adaptation and resilience measures • Leverage green recover committees and technical groups to establish enforceability mechanisms for the new sustainable development commitments
Finance	• Invest in projects already considered for a viable pathway towards Net Zero • Leverage Carbon Finance – International Carbon Markets • Establish environmental, social, and governance (ESG) standards for investments
Capacity-building	• Long-term and consistent collaboration and engagement amongst different stakeholders with a clear common vision • Invest in data gathering and information development to inform decision-making and to track progress

Table 8. Examples of green recovery policies

Senegal	GGGI supported the Government of Senegal with the review of its national development strategy (the Emerging Senegal Plan) in the light of the COVID-19 pandemic and the revised NDC. A new action plan and the Green Emerging Senegal Plan were developed. The plans focus on self-sufficiency and reduced reliance on imports, particularly for rice, and incentivize private sector funded climate actions.
Indonesia	Indonesia's economic recovery is based on the SDG framework, with green energy transition a cornerstone. In line with the country's pledge to increase its solar power capacity to 5.7% of the country's total energy mix by 2025, the Government aims to scale up its rooftop solar capacity under the Solar Archipelago plan, which is one of a number of Government actions to rebuild the economy. Moreover, the Government aims to enhance its investment framework for renewables and implement reforms that will attract a higher level of private capital.
Peru	GGGI supported the design and issuance of the Government of Peru's first sovereign sustainability bond for SDG and NDC implementation. The bond includes 60 environmental and social indicators that align with national development priorities and the NDC. Social eligibility criteria include the development of alternative livelihoods through the support of micro, small, and medium-sized enterprises; targeting of the poor and vulnerable for public spending; and affordable housing programs.[72] The bond raised USD 4 billion, and was oversubscribed, indicating the growth potential for thematic bonds in the Latin America and Caribbean region, and elsewhere.
Antigua and Barbuda, Saint Lucia, Saint Vincent and the Grenadines	Debt for climate swaps offer debt relief to highly in debt countries while enabling the achievement of their climate goals and providing them with fiscal space to face the COVID-19 pandemic. Antigua and Barbuda, Saint Lucia, and Saint Vincent and the Grenadines are ready to initiate negotiations with creditors for such swaps.

72 Government of Peru. 2021. *Peru Sustainable Bond Framework*. Lima: Ministry of Economics and Finance.

4. Looking Ahead: Supporting NDC Implementation in Developing Countries

The focus ahead for GGGI is on supporting the implementation of NDCs. GGGI will also support Member and partner countries in creating enabling environments for further increasing ambition to a level that can realize 2030 and mid-century targets to limit global warming to 1.5°C, as well as strengthen resilience and adaptive capacity. GGGI, embedded within governments and with rich experience and lessons learned to draw from,[73] is in a good position to understand the different needs of countries.

GGGI has identified activities that will build the capacity of developing countries to set ambitious targets, create an enabling policy environment for climate action, develop pipelines of climate projects, and mobilize climate finance with the engagement of the public and private sectors.

Through the value chain approach, GGGI offers tailor-made solutions and services to its Members and partners in five areas important to the implementation of the Paris Agreement and achievement of the SDGs (Figure 2), namely:

1. **Climate strategies and coordination mechanisms**, which includes supporting countries in enhancing 2030 and mid-century targets through NDCs, NAPs, sectoral policies, and effective transparency frameworks and MRV systems.

2. **Investments in just transition and inclusive development**, which includes supporting countries in maximizing the socioeconomic co-benefits of climate action and their equitable distribution, enabling equal access to green jobs and sustainable services for all.

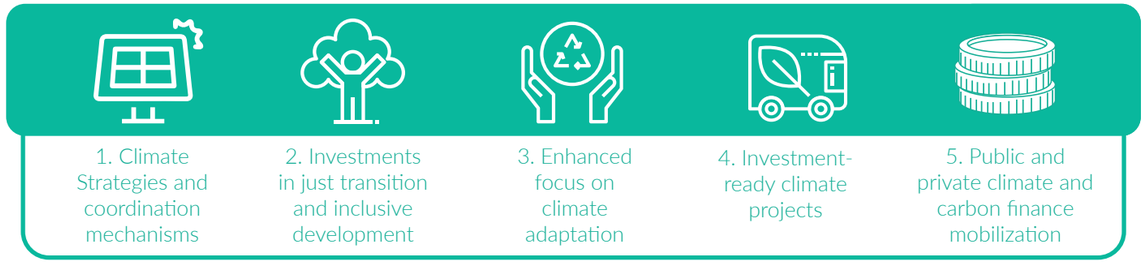
73 For example: GGGI. 2021. *Unlocking Climate Change Project Potential: Lessons Learned from the Call for Project Concept Notes of the GCF Readiness Programme*. GGGI Insight Brief No. 5. Seoul: GGGI.

3. **Enhanced focus on climate adaptation, which includes providing support to meet the adaptation** needs of the most vulnerable countries and communities, and to meet the global goal of adaptation.

4. **Investment-ready climate projects,** which includes supporting the efforts of governments, the private sector, and financial institutions to design market-ready climate measures.

5. **Public and private climate finance mobilization**, which includes supporting countries' capacity to mobilize climate finance from different sources, including from market mechanisms for carbon transactions under Article 6 of the Paris Agreement.

Figure 2. Areas of GGGI's provision of support to Members and partners for NDC implementation



4.1. Supporting Climate Strategies and Coordination Mechanisms for 2030 and 2050 Targets

As shown throughout this report, the updated and second NDCs were enhanced in various ways. However, the need to further enhance the 2030 targets for GHG emission reduction to match the ambition of decarbonization and to limit temperature increase is urgent. These targets are the most important indications at present of countries' commitment to set themselves on the right trajectory toward the milestones and ultimate achievement of carbon neutrality by 2050 and the 1.5°C goal. As long as these targets are not aligned with the IPCC recommendation of a 40–50% reduction in GHG emissions compared with the 1990 level by 2030, more support is required.

The potential exists for more countries to articulate 2050 net zero targets, which GGGI is supporting through its work on LT-LEDS. At the same time, the net zero pledges to have credibility need to be backed by ambitious and realistic shorter term NDC targets aligned with the IPCC recommendations. Road maps and action plans are needed to outline in detail the way forward to achievement of the pledged decarbonization. The road maps and action plans should include concrete policies, actions, and projects, as well as projections of the funding required to implement them.

GGGI will continue to support Members and partners in NDC implementation and measures additional to the NDCs to push higher ambitions ahead of the next NDC revision cycle due in 2025. Defining clear targets is the starting point for developing effective climate measures, NDC implementation road maps, financial plans, and transparency frameworks that meet the requirements of climate finance providers such as the GCF while also forming the foundation for countries' engagement with the Paris Agreement Article 6 market mechanisms.

While attention is on high-emitting countries to take immediate action to reduce their GHG emissions, it is also important to focus on developing countries. It is argued that the failure to urgently identify low-emission development pathways that allow continued but sustainable economic growth also nd achievement of the SDGs could lead to a "carbon tsunami" in the future from currently emerging countries with large populations, high economic growth rates, and a heavy reliance on coal for energy.[74] Such countries include GGGI Members and partners (e.g., Ethiopia, India, Indonesia, Pakistan, the Philippines, Thailand, Uganda, and Viet Nam). There is also concern for countries with high petroleum consumption (e.g., Mexico). These countries must move away from the old paradigm of 'develop now—clean up later' applied in the past by developed countries (e.g., the United States of America and European countries), as well as China.

74 Sims Gallagher, K. 2022. *The coming carbon tsunami*. Foreign Affairs January/February 2022.

While no other emerging economy is likely to match China's emissions since 2000, a World Resources Institute analysis of how China could meet 2030 and 2050 targets aligned with IPCC recommendations provides lessons that are nevertheless applicable to other countries.[75] The study found that China can peak its carbon emissions as early as 2026 while generating nearly USD 1 trillion in net economic and social benefits in 2050. It recommended that China focus on the following six priorities to accelerate its green transition:[76]

1. Transitioning faster to cleaner sources of electricity;
2. Improving industrial energy efficiency;
3. Electrifying the transportation sector;
4. Accelerating the removal of CO_2 from the atmosphere using carbon capture methods;
5. Scaling up plans to curb non-CO_2 GHGs, such as CH_4; and
6. Phasing out coal power.

These six means of green transition are among the pathways considered in GGGI's work with countries on LT-LEDS and sector-level strategies. GGGI analytical tools support governments in projecting baselines and BAU scenarios while factoring in economic growth estimates when assessing future energy needs. These pathways run parallel to ambitious reduction scenario pathways aligned with the Paris Agreement goals, and they guide sector-specific development pathways. As further development remains a priority for all countries, GGGI's approaches also focus on projecting socioeconomic co-benefits of climate action, such as green jobs and, more broadly, SDG alignment. Highlighting co-benefits is essential to securing political will and public demand for ambitious climate action.

75 World Resources Institute. 2020. *Accelerating the Net-Zero Transition: Strategic Action for China's 14th Five-Year Plan*. Washington, DC: WRI.

76 Ibid.

Box 10. Enhancing ambition through emphasizing socioeconomic co-benefits: Employment assessment for energy and forestry NDC targets.

A study by GGGI (2021)[77] assessed the employment co-benefits of implementing targets related to renewable energy and forestry set by GGGI Members that are developing and emerging economies in their NDCs. The study used employment factors to estimate the number of direct job-years generated as a result of investments in renewable energy and forestry to achieve NDC targets.

The study concluded that for the 27 GGGI Member emerging and developing economies that had quantifiable renewable energy targets in their NDCs, implementation of these targets would lead to more than 10 million job-years for the 11-year period until 2030. The majority of these employment co-benefits, over 4 million job-years, were situated in just three emerging economies with large energy sectors and ambitious NDC targets: Indonesia, Mexico, and Viet Nam.

For the 14 GGGI Member emerging and developing economies that had quantifiable forest-related targets in their NDCs, the study concluded that implementation of these targets would lead to some 30–40 million job-years over the 11-year period until 2030. About half of these forest-related employment co-benefits accrued in Indonesia, while a significant number of the LDCs also had a high potential for forest-related employment (e.g., Burkina Faso, Cambodia, the Lao People's Democratic Republic, Myanmar, Nepal, and Senegal), where potential job-years were approximately 0.5–1 million per country. The forest sector provides employment opportunities for a climate-vulnerable rural population and is relevant for both mitigation and adaptation.

Both renewable energy and forestry offer significant opportunities for green job creation in developing and emerging economies. Forest-related investments can generate 300–600 direct job-years per million United States dollars invested, while renewable energy investments can generate 10–50 direct job-years per million United States dollars. Forest-related investments are more labor-intensive; however, renewable energy could generate two to three times more indirect and induced jobs. In addition, renewable energy investments produce more jobs than their fossil-fuel alternatives for every million United States dollars invested.

77 GGGI, 2021. *Green Recovery and Climate Action: Assessment Green Jobs from Renewable Energy and Forestry Investments for Developing and Emerging Economies*. GGGI Technical Report No. 19. September 2021.

GGGI supports the strengthening of institutional arrangements and coordination mechanisms of governments and other stakeholders, in line with a whole-of-government and whole-of-society approach to NDC implementation; for example, part of the GCF Readiness Program, for which GGGI is a main implementing partner. Consolidation of climate data and information across different agencies, ministries, and public institutions is key to planning climate measures and monitoring their effectiveness, as well as to modelling climate change impacts. Enhanced information flows are required to raise awareness across the public and private sectors on the availability of climate funding opportunities beyond public finance.[78]

4.2. Mobilizing Investment Dedicated to Just Transitions, Gender Equality, and Inclusive Development

With growing inequality spurred further by the COVID-19 pandemic, it is more important than ever to ensure that just transition and inclusive development outcomes are at the centre of climate policy. This requires an understanding of how people and communities are impacted differently by climate change and environmental degradation, but how the shift toward a sustainable, low-emission development pathways men, women, socioeconomic groups, and communities differently.

Just transition measures focused on the transitioning of the workforce towards new demands of green industries, while also ensuring equal opportunities for women and youth to quality, decent jobs, and livelihoods, both as wage employment and entrepreneurship. Green solutions and technologies should also offer pathways out of poverty for communities, and green transitions should be centered diverse leadership opportunities. Additionally, it is pivotal to address energy costs and impacts on households and consumers, especially for energy-poor countries and communities, while also ensuring access to sustainable services within priority sectors for climate action.

GGGI is working with Members and partners to address gender equality, women's empowerment, and poverty eradication through its program. Targets 75% of its programs to effectively address gender and/or poverty. More can be done to enhance the ambition for how aspects of equality and justice are addressed, and through the development of a Framework for Gender Just Transition as the first chair of the Gender Expert Group on the Green Growth Knowledge Platform (GGKP), GGGI is playing a lead role in identifying opportunities to integrate gender and social inclusion in green policy and investments.

Creation of green jobs is a key area of priority for GGGI Members and partner government. In principle, all jobs can be jobs for women also in sectors where women traditionally are under-represented in the labor market overall[79], but also specifically in sectors such as energy and transport. Women are more likely than men to be engaged in informal, unpaid, and vulnerable jobs across different sectors. Programs for Women in Green Jobs that tackle the underlying barriers to women in the labor market and participation in decision making, which will support countries acceleration of women empowerment. Growing evidence has shown gender equality as an accelerator of SDGs.[80]

Measures for just transition and inclusive development must be integrated into national climate and sustainable development policies. This will include readiness and remobilization of the workforce to meet the demand for new technologies within the renewable energy, energy efficiency, transport, waste, and other sectors. This integration will require strong public sector support, dedicated funding streams, and partnerships with the private sector, civil society groups, and labor unions. GGGI supports the development of just transition projections, strategies, and funding mechanisms for countries transitioning to low emission economies.

Although large climate funds like the GCF have incorporated gender and social inclusion into their governance structures, it is proving challenging to move beyond 'entry level' to significant gender equality and social inclusion impacts. A focus on green entrepreneurship and micro, small, and medium-sized enterprises, particularly those led by women and youth, can significantly contribute to jobs creation and equitable distribution of socioeconomic co-benefits of climate action. Similar impacts can be achieved by focusing on climate-smart agriculture and enhanced access of smallholder farmers to financial services, knowledge, technology, and other inputs along value chains. Research has also shown that transitions in the waste sector, which tends to have a high level of informality, has better and more sustainable results when informal sector actors, such as waste pickers associations, are recognized and engaged with meaningfully as key stakeholders. Doing so could also have significant impacts on labor conditions in the sector.

78 For example: GGGI. 2021. *Unlocking Climate Change Project Potential: Lessons Learned from the Call for Project Concept Notes of the GCF Readiness Programme*. GGGI Insight Brief No. 5. Seoul: GGGI.

79 World Economic Forum. (2021) Global Gender Gap Report.

80 UNDP. 2019. Gender Equality as an Accelerator for Achieving the Sustainable Development Goals. A discussion Paper.

At the project level, experience shows that large transition opportunities tend to attract the most climate finance but often lack a dedicated focus on just transition. In contrast, smaller, localized initiatives with a more explicit focus on just transition, gender equality, and social inclusion are more challenging to finance.[81] Hence, GGGI will support countries in their establishment of dedicated finance streams for just transition and inclusive development through blended finance options and innovative social impact finance (e.g., sustainability bonds and climate insurance).

81 TRIP South Africa research. 2021.

Box 11. Just transition and pricing policies supported by GGGI

GGGI provided support to Colombia for channelling revenues from coal into green employment through offset or other financing mechanisms for investments in forestry-based sectors and by doing so, establishing economic activity in green sectors as an alternative to coal as the industry is phased out. This transition benefits workers in Colombian regions that have 40–50% of their economies tied up with the coal industry. Forestry based livelihoods also offer opportunities for women, as women play significant roles forestry and natural resource management.

A study in Saint Lucia supported by GGGI explored different ways of phasing out fossil fuel subsidies. The study highlighted that the gradual phaseout of fossil fuel subsidies in combination with the reallocation of increased revenues into compensating affected households and reinvesting in energy efficiency and renewable energy could reduce the country's dependence on fossil fuel imports, improve the public budget, and improve the economic performance of the country, all while reducing air pollution and GHG emissions.

Ethiopia and Burkina Faso LT-LEDS, includes proposed Women and Youth in Green Jobs programs that aim to address structural barriers to women and youth's participation in the workforce, and access to high paying, quality jobs and leadership roles in green industries. These barriers include focus on encouraging women and girls to pursue STEM related professions and fund programs to support women's entry and retention in traditionally male dominated sectors. The Proposed program also focused on the access of women to assets and financial services.

4.3. Enhancing the Focus on Climate Adaptation

To reach the most vulnerable countries currently receiving the lowest volume of climate finance, GGGI supports Members in aligning their NDC and LT-LEDS targets with their adaptation objectives, and is working on strengthening a pipeline of adaptation projects to promote investments in climate-smart agriculture, climate-resilient infrastructure, and livelihoods-focused adaptation approaches. These projects will be underpinned by GGGI's continued support for the development of enabling environments that build in the planning tools, capacity, and legal frameworks required for facilitating adaptation investments. One of the organization's strengths lies in its strong portfolio of mitigation investment projects. GGGI will apply its expertise in green investment to enhance its financing of adaptation projects through its existing portfolio of work, but also as an expanded effort to fill the significant adaptation gaps.

GGGI supported the mobilization of USD 193 million for funding adaptation and climate resilience projects in the 2015–2020 period. This work will intensify in the coming years as adaptation finance has climbed higher on the agenda following the COP 26 commitment to double it by 2025. GGGI continues to add LDCs to the group of countries it supports. It receives increasing requests from its key donors to support the formulation of NAPs and the development of regional and national programs. A major growth area is in programs for enhancing adaptation and resilience to climate change in African, Central American, and Pacific Island countries.

GGGI will continue to support the development of NAPs and investment plans to implement them, and will work with key partners with strategic investors, financial institutions, and adaptation platforms (e.g., in the Lao People's Democratic Republic, Nicaragua, and Paraguay). There is a strong demand for this support.

Furthermore, looking to enhance direct access to locally led adaptation initiatives, GGGI will work to develop innovative financial instruments aligned with its experience in the development of national financial vehicles for mobilizing private investments, and it will collaborate with MDBs and development finance institutions to mobilize concessional and commercial finance at scale. For blended financial vehicles to work, there is a need for pipelines of investment-ready projects, and GGGI will capitalize on its experience and strong partnerships within ministries of environment and finance to align demand, international policy, and project bankability with national development planning.

Climate diplomacy underpins the fragile process of bringing policy and successful funding projects to fruition. GGGI continues to support the LDCs in climate negotiations and provides direct support, through its climate diplomacy program, to the Chair of the Least Developed Countries Expert Group under the UNFCCC, who is from a GGGI Member country, Senegal. This support helps strengthen the call for enhanced financial, knowledge, and technology support for developing countries, and the LDCs in particular.

4.4. Supporting Institutional Capacity and Readiness for Bankable Projects

As mentioned above, the lack of bankable investment opportunities in critical in developing countries, particularly in LDCs and SIDS, and there is a large demand for technical support and capacity building for government and private sector partners to realize the investment opportunities outlined in NDCs and other green, climate strategies. In 2015-2022, GGGI supported the mobilization of USD7 billion, and its project pipeline is valued at USD9 billion.

Different actors require funding, financial skills and technical expertise, and also important to note, the preparation of investments may take several years, from project identification to actual implementation. This is particularly the case for large sale infrastructure projects, which are also the most transformational in terms of the green transitions and achievement of NDC and LT-LEDS targets. GGGI support the development of bankable projects through three phases – the Concept, Design and Financing Phases. This includes the pre-feasibility and feasibility studies required, but also securing of investor commitments that in most cases build on strong evidence of project financial viability and environmental, climate, and social outcomes. GGGI's focus is deliberately on the early stages of project preparations, and work in that regard as a partner to the GCF, ADB and other MDBs to generate pipelines of projects. The focus of GGGI is to overcome the barriers to green investments and climate projects, especially in the conceptual and preparatory phases. Figure 14 below shows the niche of GGGI among various institutions, providing support to different types of projects from fully grand funded initiatives to the left, commercial investments on the right, and high-risk/low return projects in the middle that require specific support to become bankable and attract concessional funding or blended finance mechanisms to attract commercial finance.

Figure 3. Overview of the ecosystem for green investment services

4.5. Unlocking the Public and Private Finance Needed for NDC Implementation

GGGI continues raising awareness among its partner governments about different financing opportunities to enhance deployment of green climate technologies. Net zero financing road maps are helpful in guiding policymakers and investors to green their investments. GGGI will continue to provide capacity building and government awareness raising, as well as technical and economic feasibility assessments. Public sector projects should be designed and structured in such a way that green innovation in the form of new technologies and existing technology improvements is well integrated into project design. GGGI will select technologies that are seen as priorities by governments and that are investible and feasible given available public budgets and international funds.

Bankability will be essential to engage commercial capital. GGGI's value-add will be to help origination and upstream structuring of private sector projects so that they can meet the return-on-investment expectations and risk tolerance of investors. Matching of investors and projects will be key. GGGI will identify concessional finance instruments that can crowd in the commercial capital, including local financial institutions, by strengthening the commercial viability of green projects and utilizing de-risking strategies. In this way, GGGI will support the development of business models that attract investors and help build pipelines of investible green climate projects.

There is general agreement that blended finance will be required for green climate investment at scale. Concessional finance can help de-risk projects, improve project returns (by lowering the cost of capital and/ or providing subsidy support), or both. It will be key to unlocking commercial finance in need of viable investment opportunities. GGGI has mobilized concessional finance from global climate funds such as the GCF that have leveraged investments from public and private sources of finance.

Upscaling, aggregation, and programmatic approaches will continue to be important models and mechanisms for increasing finance flows for the green transformation of GGGI Member countries. GGGI will continue developing commercially viable business models that can bundle and scale proven, market-tested technologies into larger portfolios. The bundling of smaller projects, with the aim of reducing transaction costs and increasing overall ticket size, can attract investors looking for larger-scale assets. Larger investors are unable to invest in small projects, and smaller investors may also decide not to because of issues attributable to deal size limitations.

GGGI supports governments, central banks, and financial institutions of its Member and Partner countries in developing their NDC-related investment strategies and green and sustainable taxonomies. Such efforts contribute to the greening of national financial systems through integration of environmental, social, and governance (ESG) requirements into investment eligibility criteria and due diligence processes. These efforts also form an important part of the readiness process for the GCF Direct Access Entity accreditation process, which is expected to help increase the volume of climate finance flowing to local, subnational, and national initiatives.

GGGI supports governments in developing thematic bonds focused on NDC and SDG implementation. These bonds allow governments to increase the flow of private, institutional, and commercial funds into the implementation of climate action and they have potential, and potentially significant, social co-benefits where social criteria are embedded in the bond framework. In 2021, GGGI supported the issuance of Peru's first sovereign sustainability bond and was instrumental in the issuance of Mexico's USD 345 million sustainability bond. GGGI is also supporting the Government of Viet Nam through the Viet Nam Green Bond Readiness Program and exploring bond opportunities with the Governments of the Dominican Republic, Saint Lucia and other countries. On the other hand, GGGI highlights the importance to handle bond financing with care as increases the issuing countries' indebtedness. High levels of debt in turn limit the government's fiscal and regulatory space to implement necessary reforms.

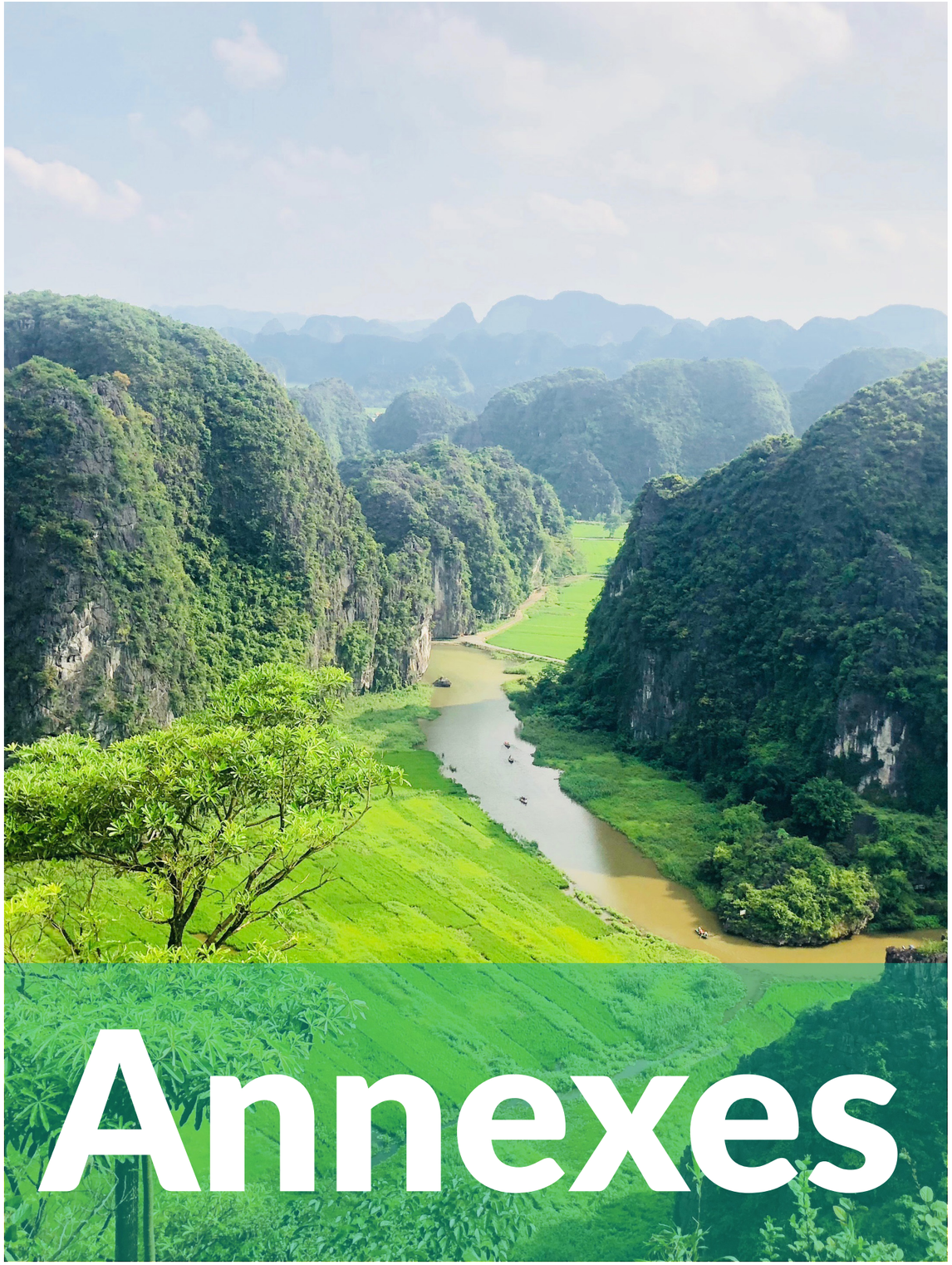
4.6 Supporting implementation of carbon pricing

Pricing carbon emissions is a key to incentivizing greenhouse gas emission reduction around the world. Implementation of carbon pricing requires extensive technical skills and experiences, that might be limited - specifically in developing countries. At the international level, the recently adopted Article 6 of the Paris Agreement lays down the basis for the emerging global carbon markets, that can ultimately inter-link the emerging national carbon pricing frameworks. The purpose of Article 6 however reaches beyond carbon pricing policies.. The main focus of Article 6 is to provide a framework for any potential cooperative approaches between different Parties to the Paris Agreement, that can be developed in order to jointly reduce greenhouse gas emissions in an economically efficient way with the associated transfers of mitigation outcomes and carbon finance.

Since 2020, GGGI has engaged in developing a number of initiatives to support some of its Member Countries with an interest in selling their excess emission reductions as ITMOs, through cooperative approaches with countries interested in buying such ITMOs. These pilot initiatives include supporting the host countries in creating the governance frameworks needed, preparing the administrative documentation for the transaction and meeting the technical requirements of Article 6. The programs deliver detailed technical assistance through a series of decision support initiatives that support the countries to establish their governance frameworks, along with associated capacity-building events, discussing in some more detail the different features and requirements of Article 6 and the administration of ITMO transactions. For the mitigation activities the programs focus on specific projects and policy approaches selected by the host countries. The intention is to facilitate access to carbon finance for activities that are additional to domestic commitments made under the NDCs and thus are beyond business as usual, through the sale of the achieved additional mitigation outcome as ITMOs. Note these mitigation outcomes can be achieved not only through decreet project activities but also through the national implementation of mitigation policies. This latter approach is designed to build upon the project level activities that were traded under the Kyoto Protocol's Clean Development Mechanism, scaling up to more transformational change that can support the meeting of the climate goals.

Most recently GGGI has expanded its work in 2022 on Article 6 readiness under the SPAR6C program. Different goals of this project include delivery of support to the host countries to tie in longer-term strategic planning and further incorporation of the private sector along with the more familiar support for design of the governance frameworks and development of mitigation activities. Delivery of capacity building activities for operationalization of Article 6 based international carbon markets is currently high on the international climate policy agenda. Aligned with this international priority, the GGGI Council approved the establishment of the GGGI Carbon Transaction Platform (CTP) in October 2022. Based on two pillars the CTP will support readiness activities through Knowledge Exchange and Capacity Building activities enabling potential sellers to sit with buyers on an equitable basis to agree trading approaches. The second pillar will operate trust fund activities to help accelerate trade between countries.

Many efforts along with the piloting programs under Article 6 at this early stage in the development of international carbon markets focus on building up countries' capacities to enter the market and manage trading. More conceptual aspects of carbon markets including policy design incentivizing small and medium size businesses to engage in cooperative approaches or linking carbon trades with domestic and foreign environmental policy instruments will require further attention. Moreover, practitioners will need to leave their comfort zones working almost exclusively with Ministries of Environment and engage with a wider set of stakeholders across multiple line ministries, the private sector and countries' investment agencies to green the much-needed FDI flows or treasuries to adjust the fiscal policy frameworks. More attention needs to be paid to countries' paths to implement relevant policy reforms and carbon pricing mechanisms as part of their long-term development strategies. The GGGI programs are starting to look at these areas through policy approaches and connection of carbon trading to long term planning for green growth. This is needed in order to accelerate from bilateral project level carbon transactions towards larger scale interventions that can help meet the overall goal set by the Paris Agreement.



I. Summary of mitigation ambition enhancements to the NDCs in updated NDC/ Second NDC Submission

Country	Mitigation ambition in the updated / Second NDCs	Renewable Energy Enhancements
Antigua and Barbuda	First NDC • Efficiency standards for importation of vehicles by 2020 Updated NDC *Conditional targets* • Targets additional to those included in the first NDC • 100% all new vehicles to be electric by 2030 • Explore potential emission reductions in waste sector • Explore potential emission reductions in AFOLU sector	First NDC • Conditional: Energy matrix with 50MW of electricity from renewable sources both on and off-grid in the public and private sectors by 2030. Updated NDC • Conditional target of 86% renewable enrgy generation from local resources in the electricity sector by 2030. • Actions to be taken by 2030 in Electricity generation: 1. 100 MW of renewable energy generation capacity available to the grid. 2. 50 MW renewable energy owned by farmers who can sell electricity to off-takers. 3. 20 MW wind-powered energy. 4. 100 MW renewable energy generation capacity owned by social investment entities. 5. 100% renewable energy generation for all government operations.
Burkina Faso	• 2025 unconditional: reduce GHG emissions by 9965,96 Gg CO2eq or 10.77% of BAU projections • 2025 conditional: reduce GHG emissions by 5062,55 Gg CO2eq or 5.47% of BAU projections • 2025 total: reduce GHG emissions by 15,028.51 Gg CO2eq or 16.25% of BAU emissions • 2030 Unconditional: reduce GHG emissions by 21,074.94 Gg CO2eq or 19.60% of BAU • 2030 Conditional: reduce GHG emissions by 10,557.91 Gg CO2eq or 9.82% of BAU • 2030 Total: reduce GHG emissions by 31,682.3 Gg CO2eq or 29.42% of BAU	First NDC • Double share of renewable energy in the world energy mix by 2030 (SE4ALL). • Promote renewable energy projects (solar, hydro) and eliminate fossil fuels. Updated NDC • Solar energy actions/projects with mitigation component in annex. • Unconditional - Several concentrated solar power projects with a cumulative installed capacity of about 65 MW • Conditional - Several CSP with about a cumulative installed capacity of 380 MW - A biomass power project of 10 MW capacity in Ouagadougou - Several LED light distribution projects

Cambodia	• Reduce 50% of historical emissions by 2030. Estimated emissions reduction including FOLU sector under NDC scenario will be 64.6 MtCO2e/year. This is equivalent to a 41.7% reduction compared to BAU, of which 59.1% is from the FOLU. • Halving the deforestation rate by 2030, in line with REDD+ strategy.	**First NDC** • Grid connected RE generation (solar energy, hydropower, biomass and biogas); off-grid electricity; energy efficiency promotion by end users. Combined equivalent to 1,800 GgCO2eq (16%) emissions reduction. • Promote RE and adopt energy efficiency standards (?), targets (?)for garment sector, rice mills, and brick kilns. Equivalent to 727 GgCO2eq (7%) emissions reduction. • Use RE for irrigation and solar lamps. **Updated NDC** • 25% renewable energy share in energy mix (solar, wind, hydro, biomass) by 2030
Colombia	• Reduce deforestation rate to 50,000 ha/year by 2030 • Emit a maximum of 169.44 mtCO2eq in 2030, equivalent to a 51% reduction in emissions compared to the projected emissions in 2030 in the reference scenario, initiating a decrease in emissions between 2027 and 2030 tending towards carbon neutrality in the middle of the century. • Establish carbon budgets for the period 2020-2030 no later than 2023. • Reduce black carbon emissions by 40% compared to 2014 level	**First NDC** **N/A** **Updated NDC** • Diversify energy matrix and seek renewable energy sources with a potential to reduce 4.74 – 7.99 MtCO2eq in electricity generation • Quantitative RE components in business-led measures (solar, wind, biomass, eco-efficienct stoves).
Ethiopia	• 2030 Unconditional: 14% reductions compared to BAU • 2030 Conditional: 54.8% reductions compared to BAU • The combined mitigation target (unconditional and conditional elements) corresponds to a reduction of 68.8% compared to the BAU projection by 2030.	**First NDC** • Will expand electricity generation from renewables. • Implemented investment in improved transportation systems that utilize clean and renewable energy. **Updated NDC** • To reduce residential biomass use in LUCF, shift from unsustainable biomass energy demand to electric stoves, renewable biofules (e.g. residues). • Increasing share of electric vehicles • Significant RE measures in adaptation section
Hungary	• The EU and its Member States, acting jointly, are committed to a binding target of a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990. • Reduce road transport emissions	Updated NDC • Increase renewable energy in final energy consumption at least 32% by 2030, which doubles 2021 levels

Fiji	**Updated NDC** • 2030 Unconditional: 10% absolute reductions from energy sector compared to BAU CO2 emissions • 2030 Conditional: 20% absolute reductions from energy sector compared to BAU CO2 emissions • 2030 total: 30% absolute emission reductions from energy sector compared to BAU CO2 emissions • Reduce domestic maritime shipping emissions by 40% Oceans sector/blue economy	**First NDC** • 100% renewable energy share in electricity generation by 2030. Equivalent to BAU emissions reduction by 20%. **Updated NDC** • 100% renewable energy power generation by 2030, equivalent to 20% reduction of emissions BAU.
Grenada	**Second NDC** • Grenada commits to reducing its GHG emissions by 40% of the 2010 emissions levels by 2030, and is completely conditional.	**First NDC** • 30% emissions reduction by 2025 with 10% from renewables and 20% from energy efficiency measures. 1. 10MW solar 2. 15MW geothermal 3. 2MW wind **Second NDC** • While the second NDC calls for rapid expansion of renewable energy, it doesn't include specific actions.
Indonesia	**Updated NDC** • 2030 Unconditional: 31.92% reduction of emissions against the BAU scenario of 2,869M tCO2e in 2030, which would be a reduction of 916 M tCO2e • 2030 Conditional: 43.2% reduction of emissions against the BAU scenario of 2,869 Mt CO2e in 2030, which would be 1,632 M tCO2e • Forestry sector: target in peat lands restoration of 2 million ha and rehabilitation of degraded land of 12 million ha by 2030.	**First NDC** • At least 23% share from new and renewable energy by 2025 in energy use **Updated NDC** • New and renewable energy at least 23% in 2025, at least 31% in 2050
Jordan	**Updated NDC** • 2030 Unconditional: 5% reductions compared to BAU, resulting in 1,817.58 Gg CO2eq. • 2030 Conditional: Additional 26% reductions compared to BAU, resulting in 9,451.42 Gg CO2eq. • 2030 total: 31% reductions compared to BAU, quantified to be 11,269 Gg CO2eq	**First NDC** • 11% renewable energy share in the total energy mix by 2025 • Activating the Renewable Energy and Energy Efficiency Fund (JREEEF). • Implement 3000 renewable energy powered Zero Emissiosn Electric Vehicle (ZEV) charging stations. • Improving energy use efficiency in water utilities, and implementing projects on renewable sources (hydropower, solar, wind) and biogas in the water sector. **Updated NDC** • Electricity generated from renewables to have a share of more than 35% by 2030. Implementation through measures listed in the national strategy action plan. Equivalent to 4,528 GgCO2eq reduction. • Improving efficient energy consumption in all sectors by 9%. • Introduction of concentrated solar power (CSP) of 100MW and CSP 300MW.

Lao People's Democratic Republic	First NDC: • Achieved First NDC goal of 90% households electrified. Updated NDC • 2030 unconditional: 60% emission reductions compared to baseline scenario, or around 62,000 ktCO2e in absolute terms. • New target of 10% reduction of final energy consumption compared to BAU scenario in energy efficiency sector, about 280 ktCO2e/y reduction between 2020-30 • New conditional target in agriculture; development of 50,000 hectares adjusted water management practices in lowland rice cultivation. • New conditional target in waste; implementation of a 500 tons MSW/day sustainable municipal solid waste management capacity.	First NDC • 30% renewable energy share by 2025 • 10% share of biofuels for transport fuels by 2025 Updated NDC • 1GW solar and wind power • 300MW biomass power • 10% share of biofuels for transport fuels by 2030 • Combined reduction of approximately 184 ktCO2e/y between 2020-2030 Achieved First NDC goal of hydro expansion to 5,500 MW by 2020 (13,000 ktCO2e/y emission reduced in sector, equivalent to 26% of total emissions of 50,742ktCo2e in 2000).
Marshall Islands	• Commits to economy-wide reduction target by at least 32% below 2010 levels by 2025 and at least 45% below 2010 levels by 2030. • Communicates an indictive reduction target by at least 58% below 2010 levels by 2035.	First NDC • Recognizes need for uptake of renewable, in particular solar and biofuels, to attain GHG targets. Second NDC • 100% renewable energy by 2050. • Quantified actions for project implementation in wind power, soloar photovoltaics, biomass.
Mexico	Updated NDC: • 2030 unconditional: reduce GHG emissions by 22% and 51% of its black carbon emissions by 2030, compared to BAU scenario • 2030 conditional: reduce GHG emissions up to 36% and 70% of its black carbon emissions	FIRST NDC N/A Updated NDC N/A
Mongolia	Updated NDC: 2030 unconditional: reduce GHG emissions by 22.7% compared to BAU scenario 2030 conditional: reduce total national GHG emissions by 27.2% compared to BAU scenario Actions to remove GHG by forest would set total mitigation target as 44.9% by 2030.	First NDC • 20% renewable share in total electricity generation by 2020; 30% renewable share in total electricity generation by 2030. 1. 675MW large hydro power facilities. 2. 354MW wind power facilities. 3. 145MW solar PV power facilities. Updated NDC Use of hydro power, wind power, solar power, heat pumps for heating utilities, and energy efficiency; equivalent to 8,340.5 GgCO2eq emissions reduction.
Morocco	Updated NDC: • 2030 unconditional: reduce GHG emissions by 26,119.2 Gg CO2e (18.3%) compared to NAC scenario • 2030 conditional: reduce GHG emissions by 64,771.5 Gg CO2e (45.5%) compared to NAC scenario Unconditional targets increased from 17% to 18.3%, but different BAU.	First NDC National Energy Strategy targets: 42% of installed electrical power from renewable sources (14% solar energy, 14% wind energy, 14% hydraulic energy) by 2020. Updated NDC 52% of installed electrical power from renewables (20% solar energy, 20% wind energy, 12% hydraulic energy) by 2030.
Myanmar	Updated NDC • 2030 unconditional target for FOLU sector: reduce net emissions by 25% • Conditional target for agriculture sector: <10% tree cover class per hectare • Conditional target for FOLU sector: net emission reduction of 50% by 2030 • LPG unconditional target: emission reductions of 14.94 million tCO2e	First NDC Energy sector: • Rurual electrification through use of at least 30% renewable sources as to generate electricity supplies. Increase share of hydroelectric generation within lits of technical hydroelectric potential; indicative goal of 9.4 GW by 2030 Updated NDC • 11% (2000MW) renewable energy share by 2030 (conditional). • 17% (3070MW) renewable energy share by 2030 (unconditional). • Unconditional target for new renewable energy of 11% (2000 MW) by 2030 • Conditional target for new renewable energy: increase by 53.5% from BAU (2000 MW) • 19,567 MW additional hydropower • Rural Electrification unconditional target: emissions reduction of 0.155 million tCO2e by 2030 • 2030 Conditional: GHG emissions would be avoided by 0.874 MtCO2e • Rural Electrification conditional target: emissions reduction of 0.310 million tCO2e by 2030 • 2030 conditional target to increase renewable energy access to mini-grid development.
Nepal	• New quantified sectoral targets Transport: • Sales of electric vehicles in 2025 will be 25% of all private passenger vehicles sales. Leading to decrease in fossil fuel dependency by 9% and reduce emissions from a projected BAU by 8%. • By 2030, increase sleas of e-vehicles to cover 90% of all private passenger vehicle sales, leading to a decrease in fossil fuel dependency by 28% and reducing emissions from BAU projection by 28%. Residential cooking and biogas • By 2030 ensure 25% of households use electric stoves. • By 2025, install 500,000 improved cookstoves in rural areas. For energy sector, 23% emissions reduction combining energy generation, transport, and residential cooking and biogas. AFOLU: • By 2030 maintain 45% of total area of country under forest cover.	First NDC • 20% renewable share in energy mix by 2020. • 80% electrification through renewable energy sources by 2050. Clean energy measures: 1. 4,000MW of hydroelectricity by 2020, 12,000MW by 2030 2. 2,100MW of solar energy by 2030 3. Additional 220MW of electricity from bio-energy by 2030 4. Additional 50MW of electricity from small and micro hydropower plants 5. Increase share of biogas up to 10% as energy for cooking in rural areas Second NDC • By 2030, expand clean energy generation from approximately 1,400 MW to 15,000 MW, of which 5-10 % will be generated from mini and micro-hydro power, solar, wind and bioenergy. Of this, 5,000 MW is an unconditional target. The remainder is dependent upon the provision of funding by the international community. • By 2030, ensure 15% of the total energy demand is supplied from clean energy sources.

Papua New Guinea	Updated NDC: LULUCF sub-sector: • 2030: Reduce emissions from deforestation and forest degradation by 10,000 GgCO2eq compared to 2015 level moving the LULUCF sub-sector from net GHG source 1,176 Gg CO2e to net GHG sink -8,284 Gg CO2eq • 25% reduction in annual deforestation and annual degradation against 2015 levels (equating to reduction of 8,300 ha of annual deforestation and 43,300ha of degradation) and ian increase in areas of forest planted.	First NDC 100% renewable energy by 2030 Second NDC Renewable energy share from 30% in 2015 to 78% in 2030 Decrease from original target due to: - Enhanced information on projects and the time lag to oeprationalize larger generation projects. - Expansion of LNG sector in electricity generation
Peru	Updated NDC • 2030 Unconditional: Net GHG emissions do not exceed 208.8 MtCO2eq in 2030 2030 Conditional: To limit net GHG emissions to 179.0 MtCO2eq	First NDC N/A Peru has been implementing different initiatives that are enabling the transformation of the national energy consumption and generation matrixes through switching fules to natural gas, and promoting renewable energy sources which have given place to the connection of wind farms, solar, and biomass power plants to the national grid. Updated NDC N/A
Rwanda	Updated NDC • 2030 unconditional: 1.9 Mt CO2eq reduced in that year, which is 16% relative to a BAU scenario • 2030 conditional: an reduction of 2.7 Mt CO2eq reduced that year, which is 22% relative to BAU	First NDC • RE in mitigation actions: -Establishment of new grid connected renewable electricity generation capacity in the form of large-scale hydro power plants and solar PV power Updated NDC • Conditional: 56.75MW large hydropower capacity by 2030 24.5MW small and mini hydro projects by2030 75MW regional projects by 2030 Unconditional: 68MWp solar mini-grids in off-grid rural areas by 2030
Saint Lucia	Updated NDC 2030 target: reduce 7% GHG emissions in the energy sector relative to 2010	First NDC 35% renewable energy by 2025 50% renewable energy by 2030 Updated NDC NAMA: renewable energy in school sites. The NAMA's targets include 20% reduction in energy consumption and 16% reduction of GHG emissions [aligned with First NDC target of 16% by 2025, 23% by 2030] both to be achieved by 2025. Such efforts will increase access to adequate resilient educational infrastructure, including sustainable energy. N/A
Samoa	Updated NDC • 2030 target: 26% reduction in GHG emissions compared to 2007 emission levels, which amounts to 53 Gg CO2eq in Energy, 1.2 Gg CO2eq in Waste and 35.2 Gg CO2e in AFOLU • Expands area under agroforestry to 5% of agricultural land by 2030 relative to 2018. • Changed target year from 2025 to 2030.	First NDC 100% renewable energy by 2025 Second NDC 100% renewable energy by 2025 Achieved 50% renewable energy generation by 2021, showing increase in renewable energy share by 24%, from 26% in 2014.
Senegal	Updated NDC: • 2025 Unconditional: reduce 5% GHG emissions compared to BAU • 2025 Conditional: reduce 23.7% GHG emissions compared to BAU • 2030 Unconditional: reduce 7% GHG emissions compared to BAU • 2030 Conditional goal: reduce 29.5% GHG emissions compared to BAU	First NDC Sub-sector unconditional measures in electricity: • Solar PV: power stations of a total cumulative power of 160MWp. • Wind: plants with a total combined capacity of 150MW. • Hydraulics: plants with a cumulative total power of 144MW. Updated NDC Sub-sector unconditional measures in electricity by 2030: • Cumulative installed solar capacity of 235MW. • Wind power of 150MW. • Hydroelectricity capacity of 314MW. • Injection of a total power of 699MW in renewable energies in 2030.
Solomon Islands	Updated NDC • 2025 unconditional target: reduce GHG emissions by 14% below 2015 levels BAU projections • 2025 conditional target: reduce GHG emissions by 27% below 2015 levels BAU projections • 2030 unconditional target: reduce GHG emissions by 33% below 2015 levels BAU projections • 2030 conditional target: reduce 45% GHG emissions by 2030, compared to BaU projection. • With appropriate international assistance, Solomon Islands can achieve net zero emissions by 2050.	First NDC • Conditional and unconditional quantifiable actions in hydropower and solar energy. Updated NDC • Has the potential to increase electricity access and use through renewable energy and technologies to 100% by 2050 • 100% renewable energy by 2030. • Quantified unconditional and conditional projects in solar PV and hydropower with GHG reduction potentials provided.
Thailand	• 2030 unconditional target: Reduce 20% GHG emissions compared to projected BAU levels 2030 conditional target: Reduce 25% GHG emissions compared to projected BAU levels	First NDC • Power Development Plan (PDP) aims to achieve 20% renewable energy share in power generation in 2036. • Alternative Energy Development Plan (AEDP) aims to achieve 30% share of renewable energy in total final energy consumption in 2036. Updated NDC (qualitative) • Ambitious energy targets are put forward in the Power Development Plan (PDP), Alternative Energy Development Plan (AEDP), and Energy Efficiency Plan (EEP). • Recognizes need for support in development of energy efficiency and renewable energy technologies.

Tonga	Updated NDC • New non-emission targets for • AFOLU: identify emission target by 2025 and plant one million trees by 2023 Waste: expand formal waste collection sytem, identify emission target by 2025	First NDC • 70% renewable share in electricity generation by 2030. • 50% renewable share in electricity generation by 2020 (27 GgCO2eq). • Reduction of electricity line losses to 9% by 2020. Updated NDC • 70% renewable electricity (16 GgCO2eq). • Achieved FIRST NDC target of reduction of line losses below 9% of electricity generated since 2018. From 2015-19, line losses were below 9%. • Energy: 13% (16 Gg) reduction in GHG emissions by 2030 compared to 2006.
Vanuatu	Updated NDC: • 2030 target: Reduce GHG emissions by 30.977 Gg CO2eq in livestock sector compared to BAU projections and 29.335 Gg CO2eq, which is 56% compared to BAU projections. • Sectoral coverage increased to include Agriculture, FOLU and Waste sectors. • Electric vehicles by 2030: 10% total public buses, 10% Government fleet and 1000 electric two/three wheelers. • 13% electricity sector end-use efficiency. • 14% improve biomass end use efficiency. • Increased energy efficiency in commercial and residential sectors • Livestock: enhanced capacities for livestock farming and pasture management; converting pastures to silvo-pastural systems and improved livestock efficiency through international support – all expected to result in 30.977 Gg CO2e reductions by 2030 • Forestry: sustainable logging practices for commercial logging under REDD+ • Waste: implement waste to energy plant for Port Villa, Luganille and Lenakel; introduce composting of MSW; implement collect, sort and export recyclable material; develop and implement national plastics strategy; implement centralized wastewater collection and treatment of wastewater and improve public and communal toilet facilities, including bio-toilets – all expected to reduce 29.335 Gg CO2e by 2030	First NDC • 100% renewable energy by 2030 in electricity sector. • Substituting and/or replacement of fossil fuels with coconut oil based electricity generation. -Doubling wind installed capacity to 5.5 MW by 2025 • Installing 10MW grid connected solar PV by 2025. • Commissioning proposed first stage 4 MW Geothermal plant by 2025. • Adding 10MW grid connected solar PV by 2030 • Commissioning the second stage 4 MW Geothermal plant by 2030. • Planned intervention of: off grid renewable energy projects under Scaling Up Renewable Energy in Low Income Countries Program (US $34.2 million). Updated NDC • 100% renewable energy by 2030 in energy sector. • By 2030, Renewable Energy Capacity Addition and substituting of fossil fuels with Coconut oil based electricity generation. • Tranposrt sector: 20% bio-diesel (bio-fuel) blending in diesel by 2030. • 100% off-grid connectivity by 2030 and public institutions, both on and off-grid. • 1000 biogas plants for commercial and residential use • Commerical, Institutional, Residential sectors: 65% renewable electricity use by rural tourism bungalows.
Viet Nam	Updated NDC • 2025 unconditional target: Reduce a total of 91 MtCO2e, which is 12.5% lower compared to the BAU scenario projections • 2030 unconditional target: Reduce a total of 146.3 MtCO2e, which is 15.77% lower compared to the BAU scenario projections • 2025 conditional target: additional reduction of 114.8 MtCO2e, which is 15.81% lower compared to BAU projections. • 2030 conditional target: additional reduction of 257.4 MtCO2e, which is 27.74% compared to BAU projections.	First NDC • Apply energy savings and efficiency, and renewable energy applications in the residential sector, trade and services. • Change the energy structure in industry and transportation towards a reduced share of fossil fuel, encouraging the exploitation and use of renewable and low GHG emissions energy sources. • Develop and implement financial and technical mechanisms and policies to support research and application of renewable energy sources, both on-grid and off-grid. • Develop a renewable energy technology market, domestic industries and local service providers. Updated NDC • Developed Renewable Energy Development Strategy to 2030, with a vision to 2050 (2015). • Domestic mitigation measure of promoting efficient exploitation of renewable energy sources and increasing their proportion in energy production and consumption. • Improve policy framework related to climate change response in general, and energy efficiency and renewable energy development in particular, to mobilise domestic and foreign enterprises to invest in climate change and green growth.

II. Gender and Social Inclusion in Updated and Second NDCs

Country	Gender and social inclusion in updated and second NDCs
Antigua and Barbuda	• Inclusive programs proposed to address financial exclusion among vulnerable groups Gender • Gender equality and equity stated as national priorities • Baseline gender assessments conducted by the Government to identify multiple cases of vulnerability to climate change, with state governments to ensure planning is gender-responsive, going beyond gender sensitivity • Inclusive revision process conducted with stakeholder consultations in public, private, and civil society through key informant interviews, meetings, workshops, public awareness campaigns, household surveys, etc. • 20% increase in women-led businesses in renewable energy by 2030 • 100% (i.e. 20,000 homes) having all barriers to accessing backup renewable energy generation and storage systems removed by 2030 • Mainstreaming of gender in energy planning through the Inclusive Renewable Energy Strategy—the Strategy will recognize gender norms, inequalities prevalent in the energy sector, and women's and men's differentiated access to energy Children and youth • Pursue development of the National Youth Policy and Youth Engagement Strategy and Action Plan to engage children and youth and vulnerable groups in mitigation and adaptation initiatives • Expand training and skills development programs for youth employment and decent work
Burkina Faso	• Pursuit of gender-responsive development • To ensure monitoring and implementation of NDC projects, the Government to coordinate with the Ministry of Women, National Solidarity, Family and Humanitarian Action • Acknowledgement that consideration of gender in some projects remains weak • Potential socioeconomic benefits of NDC action implementation stated: increased agricultural productivity and income for women and youth, and increased income for women beneficiaries of projects • Development of gender-sensitive sector plans and the use of gender analysis in priority sectors • Consideration of gender and nature-based solutions • Estimates made of finance needs for the implementation of gender-specific actions (crosscutting): USD 1,379,891 • Identification of gender as an adaptation support sector; social inclusion and gender mainstreaming must guide the implementation of NDC actions • Data collection as part of the progress monitoring framework, taking into account, as best as possible, the gender dimension through sex and age disaggregation
Cambodia	• Addresses gender equality (crosscutting) as a priority—gender has been effectively mainstreamed across planning and budgeting • References supplementary programs (Ministry of Women's Affairs and other ministries) to align measures • Pays particular attention to gender-responsive approaches and vulnerable groups as part of NDC improvement • Sets quantifiable measures in adaptation and mitigation for girls (i.e., increase percentage of girls for enrollment and promotion rate) • Includes gender indicators, gender-responsive targets, and gender analysis for all measures • Conducts stakeholder consultations with women, the disabled, the elderly, indigenous peoples, and ethnic minorities • In NDC implementation, particularly mitigation measures in forestry and other land use, Government to promote the rights (concerning land ownership) of indigenous peoples • Youth engagement tends to be lower in mitigation; in adaptation, there is involvement in volunteering activities in education, training, outreach, etc. Mitigation • Adds gender and youth components in mitigation measures • Uses gender-disaggregated data and identifies quantitative and qualitative gender diversity targets, employment targets, and the role of women in specific sectoral labor • All sectors encouraged equal gendered involvement, but the waste and energy sectors show higher tendency to maintain a gender balance and to encourage women's participation Adaptation • Adds gender and youth components in adaptation measures • Adds quantitative targets for ensuring women's participation in stakeholder consultations • Adds actions to enhance training and workshops • Identifies gaps in gender-disaggregated data collection
Colombia	• Integrates considerations of the Paris Agreement as transversal to climate action, such as human rights, intergenerational equity, just transition of the workforce, gender equality, and women's empowerment • Recognizes the gender-differentiated impact of climate change and the central role women play in aspects such as agricultural production • Commits to directing the mainstreaming of gender in public policy. This includes the National Public Policy for Gender Equality. • Held ten dialogues with institutions of Afro-descendant groups, peasants, indigenous people, youth organizations, and women to foster inclusive participation in decision-making • Collects sex-disaggregated data on national circumstances Adaptation • Recognizes gaps in sex-disaggregated data collection and commits to strengthening the data collection process • Develops adaptation measures to promote just transition and gender approaches in climate change policies, instruments, and training
Ethiopia	• Considers gender equality and the inclusion of vulnerable groups and communities as essential for design and implementation to move toward equitable outcomes • Conducted detailed gender and institutional capacity gap analyses to inform NDC updating Adaptation • Gender-responsive approach will be adopted in all activities, and vulnerable groups will be considered to ensure equity in diversifying adaptive livelihood alternatives • Gender-disaggregated data and indicators for the agriculture intervention of strengthening drought and crop insurance mechanisms Mitigation • Gender-disaggregated data use in policy interventions for the land-use change and forestry, livestock, and energy sectors

Hungary	• **The EU and its Member States, acting jointly, are committed to a binding target of a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990.** • **Reduce road transport emissions**
Fiji	• Gender-responsive planning process that considers gender issues in all adaptation and mitigation approaches, considers gender balance in decision-making processes, promotes gender-equitable benefits, and achieves outcomes that ensure gender is a key consideration in programming finance and capacity building Adaptation • Steps to protect social infrastructure against climate change and prioritization of gender, disability, and the needs of children and the elderly in disaster management and climate action
Grenada	• Links NDC implementation to the national policy framework in the Gender Equality Policy and Action Plan • Development and implementation of the 2013–2017 Structural Adjustment Program included inputs from stakeholders in gender and youth organizations • References gender and youth considerations and gender sensitivity
Indonesia	• NDC promotes and considers obligations relating to the right of Adat communities, migrants, children, youth, elders, persons with different abilities, gender equality, women's empowerment, and people in vulnerable situations • Enhancing the role of women in development and strengthening women's capacity and leadership in climate change as a part of NDC implementation and Indonesia's long-term development strategy • Conducted preliminary assessment on capacity-building needs to develop programs that address just transition, gender needs, and vulnerable groups in mitigation and adaptation • Promotion of the inclusive participation of local and Adat communities and women in the planning and implementation stages of the land-use sector (sustainable forest management)
Jordan	• The National Climate Change Policy (2013–2030), the NAP, and the third national communication under the UNFCCC pledged to address gender inequalities through mainstreaming a gender perspective in adaptation and mitigation policies • NDC references women as particularly disadvantaged in constrained access to information and knowledge • Jordan, acknowledging the different impact of climate change on women, men, girls, and boys, is pursuing gender mainstreaming by developing the National Gender Mainstreaming in Climate Change Policy to address gender inequality • Acknowledges and considers rights of children, refugees, unemployed, people living with disabilities • NDC implementation will ensure essential crosscutting themes such as gender equality, women's empowerment, and youth inclusion are considered with mitigation and adaptation objectives. For instance, agriculture adaptation targets that promote the use of non-conventional water resources will secure positive impacts on the income of rural communities and women workers. • As part of the planning process, stakeholder consultations were conducted in a gender-responsive manner Adaptation • NDC references the elderly and abused women and children, among other vulnerable groups, as components of key adaptation intervention areas. • Use of farmers' indigenous knowledge and traditions as a measure to enhance the adaptive capacity of the water and agriculture sectors during drought
Lao People's Democratic Republic	Adaptation • The 2010 National Strategy on Climate Change is being revised to emphasize gender-responsive climate action and enhanced adaptation efforts of vulnerable sectors • In the public health sector, the Scaling Up Water Supply, Sanitation and Hygiene project will improve water sources in rural areas with specific targets to ensure gender equality
Marshall Islands	• Commits to a gender-responsive and human rights based approach in all NDC-related planning, programming, and implementation "Tile Til Eo" 2050 Climate Strategy (2018) • Acknowledges and references the prosperity of women and youth as part of its GHG statement • Reliable data on gender issues is a major deficiency—the Strategy aims to increase gender-differentiated and -disaggregated data collection and to identify gaps, needs and opportunities for women, men, youth, and marginalized and vulnerable groups in order to address gender inequities, particularly in remote rural communities • Recognizes the need to increase the engagement of women and youth, as well as gender and human rights experts, in advocacy, engagement, and capacity building, and for enhancing sector-specific gender considerations • Includes a gender and human rights section with recommendations to, inter alia, mainstream and safeguard gender and human rights; improve disaggregated data collection, monitoring, evaluation; eliminate gender-based violence; and strengthen capacity across stakeholders. • The Government adopted the National Gender Mainstreaming Policy in 2015, which prioritizes policies that integrate gender equality into national programs and services and improve women's economic empowerment in decision-making. The Strategy identifies vulnerable groups of women living in the outer islands and those with disabilities.
Mexico	• The NDC is based on gender-responsive approaches, prioritizing the needs of vulnerable groups, and promoting the inclusion and recognition of science and traditional knowledge of native indigenous communities • The NDC includes supplementary objectives from the Lima Work programme on gender under the UNFCCC and the Gender Action Plan of the United Nations Convention to Combat Desertification • As part of the NDC's update process, Mexico conducted consultations with human rights, gender perspective, and youth association Adaptation • The NDC identifies indigenous and Afro-Mexican communities as particularly vulnerable to climate change impacts
Mongolia	Adaptation • Targets in livelihood and social safeguards to identify social groups vulnerable to climate change and build their resilience, reduce vulnerability by improving economic activities and livelihoods, and ensure equality for vulnerable groups and increase employment
Morocco	• Acknowledges human rights and gender equality as part of the NDC update process
Myanmar	• As per means of implementation, Myanmar will ensure gender equality in all technical and financial capacity-building programs Mitigation • Targets in the agriculture sector: establish capacity for a monitoring and reporting system of agroforestry systems adoption and production adaptation co-benefits related to gendered socioeconomic outcomes; capacity development for farmers at the local level to support development of gender-inclusive production systems Adaptation • The Government has expressed the need for international support for plans to engage with women's groups, youth groups, and ethnic groups during the enhancement process of adaptation actions of each priority sector

Nepal	• NDC developed through consultations at the national and provincial level with women, indigenous peoples, and youth Mitigation • By 2030, develop a crosscutting action plan for integrating gender equality and social inclusion into achieving NDC targets, which will include: 1. Developing programs with dedicated resources to ensure participation of women, children, youth, indigenous peoples, and marginalized groups in climate change related policy development and monitoring and implementation processes at the local, provincial, and national level 2. Promoting leadership, participation, and the negotiation capacity of women, indigenous peoples, and youth in climate change forums 3. Ensuring gender-disaggregated data are collected when reporting on progress and achievement • AFOLU sector 1. Committees that manage community-based forests to have 50% women representation and proportional representation of Dalits and indigenous peoples in key posts 2. Institutional capacity to be developed to ensure forest tenure and access to finance and technology for local communities, women, and indigenous peoples by 2030 3. Fair and equitable benefits from sustainable forest management for women and indigenous peoples to be endured Adaptation • By 2030, all 753 local governments will implement climate-resilient and gender-responsive adaptation plans that prioritize women, people with disabilities, children, senior citizens, youth, and indigenous peoples • By 2025, a strategy and action plan on gender-responsive climate-smart technologies and practices will be implemented
Papua New Guinea	• Commits to ensuring a gender-responsive and human rights based approach in planning, programming, and implementation. This includes participation of men, women, youths, and vulnerable groups. • NDC includes a dedicated section for gender and youths in means of implementation, which includes identifying potential approaches to promote socially inclusive climate-friendly agriculture; promoting women's access to resources, information, and climate-smart technologies; enhancing the role of women and youth in agricultural value chains; and promoting inclusive forest rehabilitation and timber management
Peru	• Recognizes in the implementation process crosscutting gender, intercultural, and intergenerational approaches. Ensured involvement of non-state actors, such as indigenous peoples and youth.
Rwanda	• Gender mainstreaming is a priority at all levels of policy and implementation and the NDC MRV will ensure gender-disaggregated data are captured and reported as well as engage the private sector in supporting national NDC MRV processes • Promote and encourage mainstreaming of gender considerations in climate change issues through capacity-building provisions Adaptation • Adaptation metrics, including indicators and targets, were generated as measures to guide the collection of gender-disaggregated data in mainstreaming climate adaptation in sector priorities
Saint Lucia	Gender • Mainstream gender in national strategic planning and programming across government and within climate change considerations, including nationally appropriate mitigation actions and NAP initiatives • Gender Relations Department is developing a national gender equality policy and strategic plan • To ensure stakeholder participation, address gender considerations in project design, consultation, implementation, and monitoring stages of projects. In 2019, launched EnGenDER, a regional project benefitting Caribbean countries, including Saint Lucia. It will facilitate gender integration in climate change and catalyze initiatives. - Identifies gap in lack of data on differential needs and disaggregated data. To strengthen gender-disaggregated information use, Saint Lucia, through the EnGenDER project, will undertake sectoral gender assessments and develop guidelines for gender-responsive sectoral adaptation strategies and action plans. Children and youth • Recognizes the importance of children and youth, including those with disabilities, participating in decision-making • Integrated children and youth into climate resilience through gardening programs and community groups that enhance food security
Samoa	• With GGGI, engaged a consulting firm to prepare the second NDC and develop an NDC implementation road map and investment plan. This road map and plan includes gender-responsive considerations in the form of guidelines for promoting gender and social inclusion.
Senegal	• References gender mainstreaming in formulating NDCs. • Senegal is planning to implement a national strategy for gender equity and equality, which will promote gender equity and equality in all sectors. The Government has made a commitment to integrate gender issues into all public policies.
Solomon Islands	Mitigation • The Government will integrate gender analysis and gender considerations in planning and implementation of mitigation actions Adaptation • The Government will undertake gender analysis and integrate gender considerations as part of vulnerability and disaster risk assessments as well as adaptation actions. Inclusive participation of women and youth should be actively encouraged at all levels in order to build the capacity of vulnerable groups.
Thailand	• Recognizes the need for support to improve the assessment of mitigation potential and gender sensitivity
Tonga	• Tonga puts a strong emphasis on ensuring the consideration of aspects such as gender, income, and age when developing its NDCs
Vanuatu	• As part of the NDC planning and enhancement process, the Government included stakeholder participation from the Department of Women's Affairs and references gender policy. • Gender equality and other vulnerable group inclusion was integral to the NDC enhancement process; a gender expert with the DoCC team reviewed gender-responsive considerations. The NDC complies with the requirements of gender-sensitive design in Gender Analysis and Nationally Determined Contributions guidance. • None of the enhanced NDC actions impacts negatively on gender equality and women's rights, or limits access or influence on women's access to and control over natural resources.
Viet Nam	• Recognizes increased risk from climate change for women, children, and the elderly

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