Partnership on Transparency
in the Paris Agreement

NDC Progress Indicators:
a guidance for practitioners

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Imprint

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1. Introduction

1.1. The importance of tracking progress towards climate targets

Tracking progress towards a climate target is an essential task for ensuring its achievement. We can never know exactly what the future holds. Therefore, we need to keep checking whether things go as planned or whether we need to finetune our approach, e.g., the strategy and/or measures developed to help achieve a climate target. Climate-related targets generally have additional benefits, e.g., related to health, job creation, livelihoods, food security or energy security. For some countries, these benefits can be just as or even more important than the climate target itself. Tracking progress thus also helps ensuring such benefits can be reaped.

Where countries have committed to climate targets at an international level, reporting progress to the targets internationally will help create an atmosphere of trust. This is achieved as countries see each other's progress. Reporting

on progress also supports countries in sharing lessons learned and benefitting from each other's good practices.

Under the Paris Agreement[1], countries have set climate targets related to mitigation and in many cases also to adaptation. Countries communicate those targets in the form of Nationally Determined Contributions (NDCs). As the name suggest, the type of targets and level of ambition are decided by the countries. For this reason, targets in the NDCs vary considerably. For example, mitigation targets might be related to specific sectors, specify a reduction of greenhouse gas (GHG) emissions or aim to reduce GHG intensity (e.g., GHG emissions per unit of gross domestic product – GDP). These targets may be set relative to a target year, known as an absolute target, or to the GHG emission level in a Business-As-Usual scenario (BAU). Adaptation targets are even more diverse, depending on each country's national circumstances.

Figure 1: The policy cycle for climate targets.

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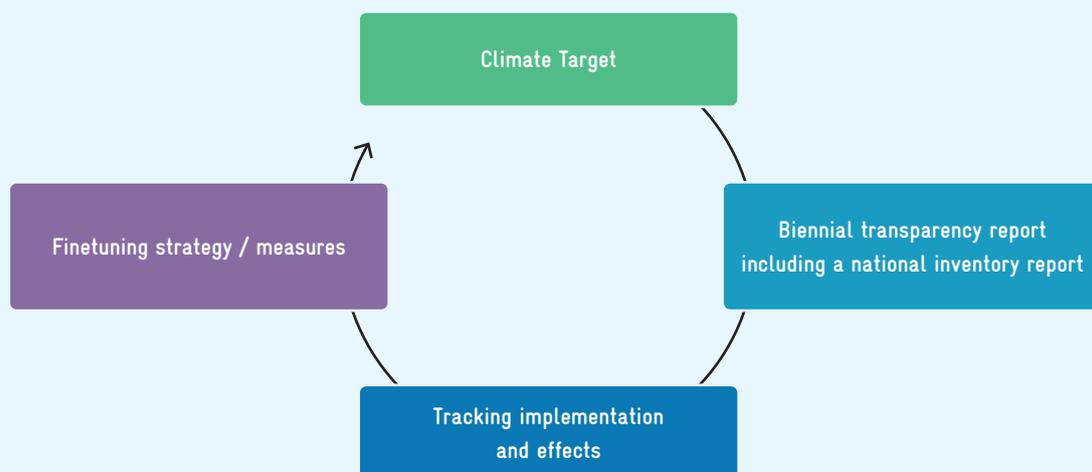
1   Paris Agreement, https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

1.2. Reporting requirements related to NDC tracking

Under the Paris Agreement's Enhanced Transparency Framework (ETF)[2], all Parties are required to report information related to climate action and support as part of their Biennial Transparency Reports (BTR) by December 2024 at the latest and then every two years onwards[3]. Specific information to be covered by BTRs is presented in Figure 2. While the reporting framework is common to all Parties, some differences exist in reporting requirements, based, inter alia, on the insight that some countries have more reporting experience than others. In general, developed countries have more experience in reporting on climate-related topics under the United Nations Framework Convention in Climate Change (UNFCCC) than

developing countries because requirements for developed countries under the UNFCCC are more rigorous than those for developing countries. Figure 2 presents the reporting requirements under the Paris Agreement. Some contents are mandatory ("shall" requirements), others are voluntary ("should" requirements). Additionally, the Modalities, Procedures and Guidelines (MPGs) provide flexibility options with the aim of reducing the reporting burden for developing countries with limited capacities. This is achieved by allowing these countries to enhance their capacities over time, for example, by allowing to report fewer or less detailed information while capacity limitations prevail.[4]

Figure 2: Key elements of the Biennial Transparency Report (BTR).

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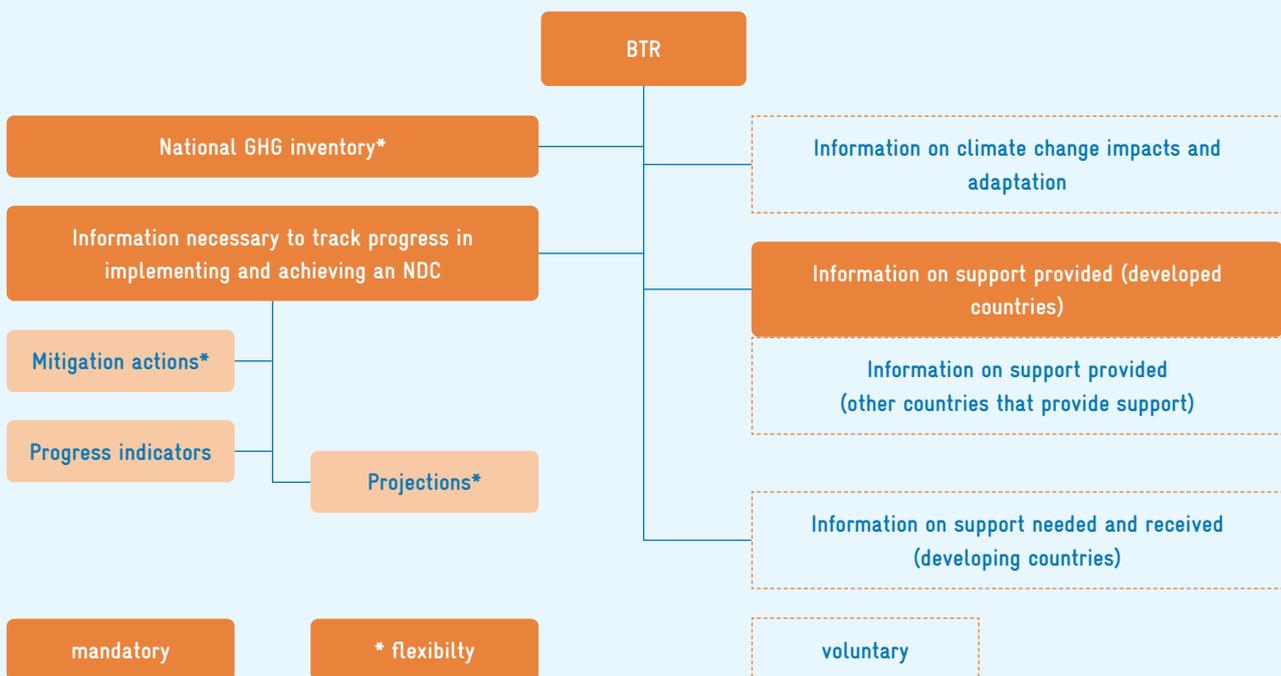
2   See Art. 13 of the Paris Agreement, https://unfccc.int/sites/default/files/english_paris_agreement.pdf. The ETF is operationalised by the modalities procedures and guidelines (MPGs) in decision 18/CMA.1, https://unfccc.int/documents/193408
3   Least Developed Countries and Small Island Developing States may report BTRs at their discretion.
4   Where countries choose to use a flexibility option, they must provide self-determined estimated time frames for improvements in relation to the relevant capacity limitations.

More information on the BTR reporting provisions can be found, e.g., in the guidance document "Climate Action and Transparency under the Paris Agreement".[5] Likewise, the document "Proposed indicators for domestic MRV purposes and tracking progress of NDCs[6]" covers the reporting requirements under the Paris Agreement with a focus on indicators used to track progress of NDCs in greater detail, which can provide additional orientation.

The MPGs require that all countries report on relevant indicators to track progress towards implementation of their NDC. Reporting such indicators falls under "information necessary to track progress made in implementing and achieving the NDC", which is a "shall" mandatory requirement. However, what "relevant" means for each specific target is not defined.

According to the MPGs, indicators for tracking progress towards a country's NDC shall be relevant to that NDC and can be qualitative or quantitative. The MPGs mention a number of illustrative examples, namely "net GHG emissions and removals, percentage reduction of GHG intensity, relevant qualitative indicators for a specific policy or measure, mitigation co-benefits of adaptation actions and/or economic diversification plans or other (e.g., hectares of reforestation, percentage of renewable energy use or production, carbon neutrality, share of non-fossil fuel in primary energy consumption and non-GHG related indicators)"[7].

Indicators are to be reported for each year of reporting during the implementation of the NDC. In addition, information on reference point(s), level(s), baseline(s), base year(s) or starting point(s) is to be provided. The MPGs do not further define reference point(s), level(s), baseline(s), base year(s) or starting point(s). For the purpose of this paper, these terminologies are different but relating to a similar concept, i.e., where an NDC target is defined in comparison to historical data (e.g., 1990 GHG emissions) or a counterfactual future development (e.g., the BAU scenario up to 2030).

Where GHG inventory data is used, the information reported is to be updated where recalculations of the GHG inventory take place. In cases where GHG inventory data is used as an indicator or as input to an indicator, the information reported is to be updated when recalculations have taken place since the communication of the latest NDC or submission of the previous BTR. The MPGs also require countries to report additional information, including, how indicators are related to their NDC as well as methodologies and/or accounting approaches. GHG projection data will not be used to assess progress towards the mitigation targets unless the Party has identified a reported projection as its baseline (this is typically the case for BAU-related targets).

The specific reporting formats to be used for reporting under the MPGs, including for progress tracking, were agreed upon at the Conference of the Parties (COP) 26 in November 2021.

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5   GIZ, 2023, Climate Action and Transparency under the Paris Agreement, https://transparency-partnership.net/publications-tools/climate-action-and-transparency-under-paris-agreement

6   ICAT, 2021, Proposed indicators for domestic MRV purposes and tracking progress of NDCs, https://climateactiontransparency.org/wp-content/uploads/2021/06/Indicators-report-ISPRA.pdf

7   See Decision 18/CMA.1, paragraph 66, https://unfccc.int/documents/193408

Reporting on indicators in BTRs – mitigation

The outline for BTRs and Common Tabular Formats (CTF) for reporting information on climate progress are laid out in the 'Guidance for operationalizing the modalities, procedures, and guidelines for the ETF, referred to in Article 13 of the Paris Agreement'[8] ('transparency guidance' in short). In BTRs and the accompanying CTF, the following information on indicators must be reported:

• Description of selected indicators (CTF table 1 in Annex II to the transparency guidance).

• Definitions needed to understand each indicator (CTF table 2 in Annex II to the transparency guidance).

• Methodology or accounting approach used to generate the information for each indicator (CTF table 3 in Annex II to the transparency guidance).

• Indicator values in the base year and in each year of the NDC period (CTF table 4 in Annex II to the transparency guidance).

• Projections of key indicators (CTF table 10 in Annex II to the transparency guidance).

Appendix 1 provides filled-in examples for these CTF tables using common indicators such as GHG emissions and removals or total area of forest.

The information to be provided in the CTF tables is partly quantitative and partly narrative. Additional narrative information can be provided in the BTR. The outline for BTRs was defined in Annex IV to the transparency guidance. The relevant chapter for providing such information is Chapter II – 'Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement'.

Reporting on indicators in BTRs – adaptation

According to the MPGs, indicators relating to adaptation should be reported in BTRs. Specifically, paragraph 113 of the MPGs specifies that 'each Party should provide the following information, as appropriate, related to monitoring and evaluation: […] Assessment of and indicators for:

(i) How adaptation increased resilience and reduced impacts.

(ii) When adaptation is not sufficient to avert impacts.

(iii) How effective implemented adaptation measures are.

According to paragraph 117 of the MPGs, 'each Party may provide, as appropriate, any other information related to climate change impacts and adaptation under Article 7'. Hence, other information on indicators for adaptation may also be reported in the BTR. The relevant chapter in the BTR outline for reporting such information is Chapter III – 'Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement'.

For developing countries, reporting on progress tracking towards climate targets is a new reporting requirement. It is important to note that using indicators to track NDC progress will also benefit the country, as it supports informed policy-decision making[9]. While countries might choose to report a small, selected number of indicators focussing on the NDC targets as part of their BTR, they might choose to assess a larger indicator set domestically, to better understand how their mitigation and adaptation actions lead to progress towards the overall NDC targets and where adjustments to such actions might be required where progress is slower than expected.

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8   Decision 5/CMA.3, https://unfccc.int/documents/460951

9   For examples of these benefits see GIZ, 2018, National benefits of climate reporting, https://transparency-partnership.net/publications-tools/national-benefits-climate-reporting

1.3. Aim and structure of this paper

This paper aims to support developing country staff preparing for BTR reporting by providing guidance on the selection and reporting of NDC-related indicators. The paper introduces the concept of indicators, presents potential indicators for frequently used NDC targets for mitigation as well as adaptation, and suggests a step-by-step approach for identifying and compiling relevant indicators. Further, this paper provides guidance in filling common tabular formats (CTF) for tracking progress towards NDCs in the annexes by providing examples of filled-in CTF tables, and examples of indicators which Rwanda, Ghana, and Uruguay have selected for tracking actions under their NDC[10].

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10 An extensive list with examples of proposed indicators for monitoring climate action can be found in the publication by ICAT Proposed indicators for domestic MRV purposes and tracking progress of NDCs, https://climateactiontransparency.org/wp-content/uploads/2021/06/Indicators-report-ISPRA.pdf

2. What are indicators?

Indicators convey information about the current state of a particular situation of interest, as such they are a means to demonstrate achievement of an objective. As they serve to track progress towards an objective, they can help planning actions necessary to reach the objective. To allow doing so, indicators must be clearly related to the objective.

Indicators can be quantitative or qualitative. As a general rule, a quantitative indicator consists of a unit of measurement and the value (e.g., 50 MW), whereas qualitative indicators are descriptive and non-numerical (e.g., 'implementation phase of the mitigation action Wind Power Generation Park A').

To make sense, indicators are usually compared to two elements:

1) A reference or a baseline value (if quantitative) or an initial situation (if qualitative). The baseline or initial situation can also be counterfactual looking at what happens if a climate-related measure is not taken.

2) An objective or target, i.e., the value (if quantitative) or the situation one strives to achieve.

Not all indicators use a baseline value, e.g., where an absolute target value / situation has been set. The baseline is of particular relevance where the objective is defined in relation to the baseline, e.g., reducing GHG emissions by 25% below the BAU, i.e., baseline, value.

Figure 3: Examples of targets and associated indicators
a) Mitigation example with statement of achievement.
b) Adaptation example with statement of progress.

a)

Target

50,000 additional insulated households until 2023

240.000 insulated households in 2023 – 40,000 are additional.

Indicator

200.000 insulated households in 2020

Measured value and unit

Baseline

80% of the target was achieved in target year

b)

Target

Increase irrigated cropland to 3.14 Mha by 2030

2.5 Mha of irrigated cropland in 2025

Indicator

Measured value and unit

Progress towards target 80%

To allow meaningful tracking of progress towards an objective, both the target and the indicator need to be SMART (see Figure 4), i.e., they need to be specific, measurable, ambitious, relevant and time bound. Usually the term "achievable" is associated with the letter A, but in this report, the term "ambitious" is used. This is because in the context of responding to climate change, picking targets which seem achievable from the current perspective may discourage the planning of ambitious actions which are needed to achieve the goals of the Paris Agreement. Hence, this report suggests that targets need to be ambitious.

Figure 4: The SMART concept

S	M	A	R	T
Specific	**Measurable**	**Ambitious**	**Relevant**	**Time-bound**
The indicator is clearly defined, so there cannot be different interpretations on what it is about or whether a target has been achieved or not.	The indicator value can be measured either quantitatively or qualitatively.	Achieving the target requires ambitious action.	The indicator relates to a relevant impact of a climate action.	The indicator relates to a point in time or timeframe when or during which the target value must be reached.

2.1. Identifying relevant indicators with the Intervention Logic Framework

Where NDC targets are quantitative and fully SMART it is often easy to identify a suitable progress indicator. With qualitative targets, e.g., related to adaptation or where the NDC target is a set of mitigation and/or adaptation actions, suitable indicators can be more difficult to identify. Development interventions use an approach called the Intervention Logic Framework to identify how a specific intervention leads to change over time at different levels. The assessment performed under this framework can help identify relevant indicators.

The intervention logic is a tool which helps to explain the different steps and actors involved in the intervention, and their dependencies – thus presenting the expected "cause and effect" relationships. It can be used as a communication tool – to facilitate discussion with different parties, to identify differences in understanding or to clarify details. And as an analytical tool – to identify relationships and dependencies and to track performance.

Outlining the logic framework can provide a narrative of how the intervention ("action") is expected to work. This will enable the identification of anticipated outputs resulting from the action taken. Outputs are under the direct control of the action. The outputs are in turn considered to lead to further change referred to as outcomes. They are considered to result from an intervention but are not under its direct control. In the long-term these outcomes will then lead to specific impacts (see Figure 5).

Figure 5: Intervention Logic Chain

Action		Output		Outcome		Impact
A policy, programme or investment to be implemented by National Government	→	Occurs as a result of the action and is under the direct control of the project	→	Change generated by the output, but not under the direct control of the project	→	Long-term change resulting from the outcomes
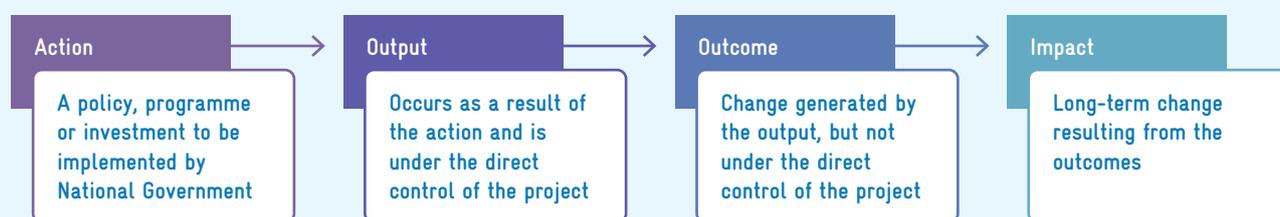
Source: Authors

Table 1 below presents examples of simplified intervention logic for several mitigation and adaptation actions.

Table 1: Illustrative intervention logic for several mitigation and adaptation actions

Sector	Action	Output	Outcome	Impact
Transport	Electrification of the bus fleet	Increased number of electric buses	Reduced pollutant and noise emissions in the city	Improvements for public health
Waste	Construction of a sanitary landfill with gas capture	Increased tonnages of waste disposed to sanitary landfill	Reduced open dumping of waste and waste burning	Improvements for public health
Energy	Installation of rooftop solar photovoltaics (PV)	Increased electricity generation from solar PV	Reduced consumption of fossil fuels and/or fuelwood	Improvements for public health, reduced deforestation
Transport	Improvements to walking and cycling infrastructure and subsidies for cycle equipment	Increased numbers of bicycles in use	Reduced congestion	Improved travel times
Energy/Industry	Energy efficiency program for local industries	Reduced consumption of fossil fuels	Energy savings for businesses	Improved profitability
Water	Conversion of recreational and open spaces to water squares and parks	Additional water retention area	Reduction of floods due to rainfall	Reduced exposure to flooding
Coastal management	Install flood gates	Floodgates installed	Reduced storm surge flooding	Reduced exposure to flooding
Health	Increase shade in public areas	Shading structures installed	Moderated temperatures	Reduced exposure to heatwave
Water	Rainwater Harvesting	Rainwater collection system installed	Increased water availability	Reduced vulnerability to drought
Forest	Implement preventive forestry management	Controlled burns	Reduced wildfire events	Reduced vulnerability to wildfires

Once the intervention logic has been mapped out, indicators can then be identified to track changes at the different levels, i.e., the outputs, outcomes and impact. In the example of an electrification of the bus fleet, potential indicators may include the number of electric buses in the fleet, which may be available from the transport authority or bus operators, data on ambient air quality, which may be collected by the city's environmental team, and data on improvements in public health. In this example, these indicators in isolation may not tell the full story; however, by collecting data on all aspects, correlations can be made between the change in the type of buses being used, reductions in pollutant concentrations, and changes in public health metrics.

Figure 6: Illustrative mitigation example of the intervention logic chain in relation to public transport
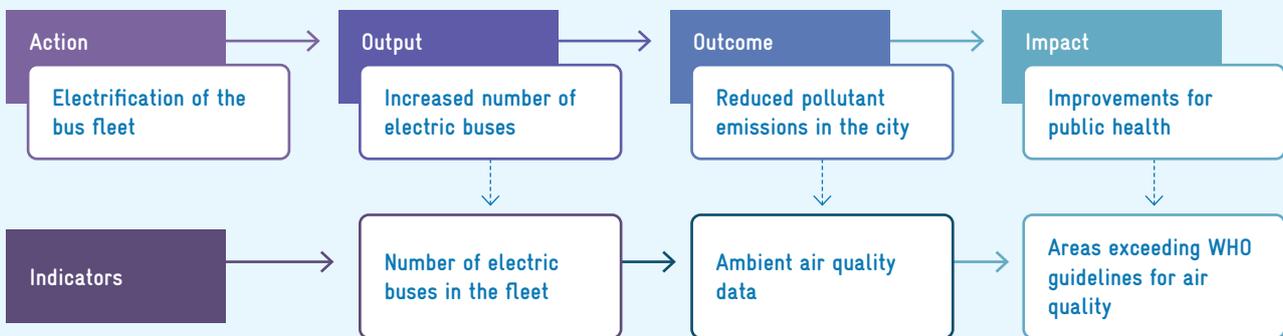
Source: Authors

The NDC Transport Tracker

The transport sector accounts for 24% of the global energy-related CO_2 emissions (IEA 2020). Rapid economic growth combined with an ongoing urbanisation trend and increasing motorisation lead to a further increase in traffic amount globally. Therefore, the transition to a decarbonisation path for the transport sector is essential to achieve the goals of the Paris Agreement. To achieve this, reported information and used indicators need to match with those contained in the NDCs. The NDC Transport Tracker offers a clear picture of ambitions, targets and policies in NDCs and Long-Term Strategies to support sustainable transport.

The tracker examines NDC information related to the transport sector in a systematic way. It identifies GHG and non-GHG objectives and can help choose suitable indicators for tracking these goals. While this landing page provides an overview of transport in NDCs and LTS, the expert mode allows for more in-depth analysis by practitioners and researchers.

Find more information here:
https://changing-transport.org/tracker/

3. Mitigation and adaptation targets in the NDCs

As the progress indicators aim to show progress on the NDC targets, it is worthwhile first considering the mitigation and adaptation targets or efforts included in the NDCs submitted.

Countries have included a wide variety of mitigation and adaptation targets in their NDCs. Mitigation targets fall into one of several categories, presented in Table 2 below.

Generally, mitigation targets can be differentiated by whether they include a GHG-related element or not. Several countries have combined GHG and non-GHG targets, e.g., a GHG intensity target and a renewable energy target.

Table 2: NDC mitigation target types and country examples[11]

NDC target type	Description	Country Examples
GHG-related targets		
Absolute emission reduction or limitation target relative to a base year	Mitigation target that aims to reduce, or control the increase of, emissions relative to an emissions level in a historical base year.	Brazil NDC commits 'to reduce its greenhouse gas emissions in 2025 by 37%, compared with 2005. Additionally, Brazil commits to reduce its emissions in 2030 by 50%, compared with 2005'.
Emission reduction target below a BAU level	Mitigation target relative to a reference scenario that represents future events or conditions most likely to occur in the absence of activities taken to meet the mitigation target. This can cover an economy wide or sectoral coverage.	Morocco's NDC reduction target, '45.5% below BAU emissions by 2030. 2010 is the start year for the BAU scenario.' 18.3% of the reduction are unconditional.
Fixed-level target	Mitigation target that aims to reduce, or limit the increase of, emissions to an absolute emissions level in a target year.	Argentina's 's fixed-level target, will not exceed net emissions of 359 Mt CO_2 eq by 2030., Indicatively net emissions in 2025 are expected to be 372 $MtCO_2$ eq
Trajectory target	Mitigation target to reduce, or control the increase of, emissions to specified quantities in multiple target years or periods over a long timeframe. This can include 'peaking targets' which specify that emissions remain constant for a period after peaking and then decline.	China's target is to peak CO_2 emissions before 2030 and achieve carbon neutrality before 2060.
Intensity target[12]	Mitigation target that aims to reduce emissions intensity (emissions per unit of another variable, typically GDP) by a specified quantity relative to a historical base year.	India's target is to reduce the emissions intensity of its GDP by 45% by 2030 compared to the 2005 level.

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11 Adapted from Briner, G. and S. Moarif (2017), Enhancing transparency of climate change mitigation under the Paris Agreement: Lessons from experience, OECD/IEA Climate Change Expert Group Papers, No. 2016/4, OECD Publishing, Paris, http://dx.doi.org/10.1787/a634dc1f-en.

12 It is important to note that intensity targets, due to including additional factors (e.g., GDP) might potentially be achieved with limited climate action based on strong growth of the additional factor, e.g., strong GDP growth.

Non-GHG targets		
Sectoral non-greenhouse gas targets	These are targets framed in terms of factors which are relevant for national GHG trends, for example energy efficiency, renewable energy, or forest cover	China has pledged to 'increase the share of non-fossil fuels in primary energy consumption to around 25%'. China also pledged 'to increase the forest stock volume by 6 billion cubic meters'. Both targets are set for 2030 and compared to 2005 levels.
Mitigation actions	Targets can also include one or a series of specific mitigation actions (e.g., policies, programmes, projects).	Cape Verde committed to shift progressively to low carbon public transport.

Adaptation efforts/targets communicated in the NDCs vary greatly due to the variety in national circumstances. They are often guided by goals and visions and sometimes expressed as overall policy objectives, such as: integrating adaptation into development planning and implementation, including 'climate proofing' key development sectors and integrating adaptation into the national budget; strengthening institutional capacity; enforcing behavioural change; ensuring various types of resilience (economic, social, and environmental); and preventing and resolving conflict. Goals and visions are generally closely intertwined with development objectives such as poverty eradication, economic development or improvement of living standards, environmental sustainability, security, gender, and human rights. Hence, they often overlap with one or several Sustainable Development Goals.

Adaptation measures and actions constitute the main element of the adaptation efforts targets presented by Parties in their NDCs. Most Parties derived the measures or actions presented in their adaptation component from their existing national strategies, plans or programmes, such as their national adaptation plans (NAPs). Most of the adaptation components identify priority areas or sectors and a set of associated specific actions. The most relevant priority areas / sectors are food production and nutrition security, freshwater resources, terrestrial ecosystems, human health, infrastructure, and energy. The "Tool for Assessing Adaptation in the NDCs" (TAAN)[13] is an interactive knowledge platform that aims to provide an overview of and detailed information on adaptation in NDCs.

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13 Tool for Assessing Adaptation in the NDCs (TAAN), https://taan-adaptationdata.org/

Figure 7: Priority areas and sectors for adaptation actions identified in the adaptation component of the communicated Nationally Determined Contributions (percentage of Parties who mentioned the area/sector)
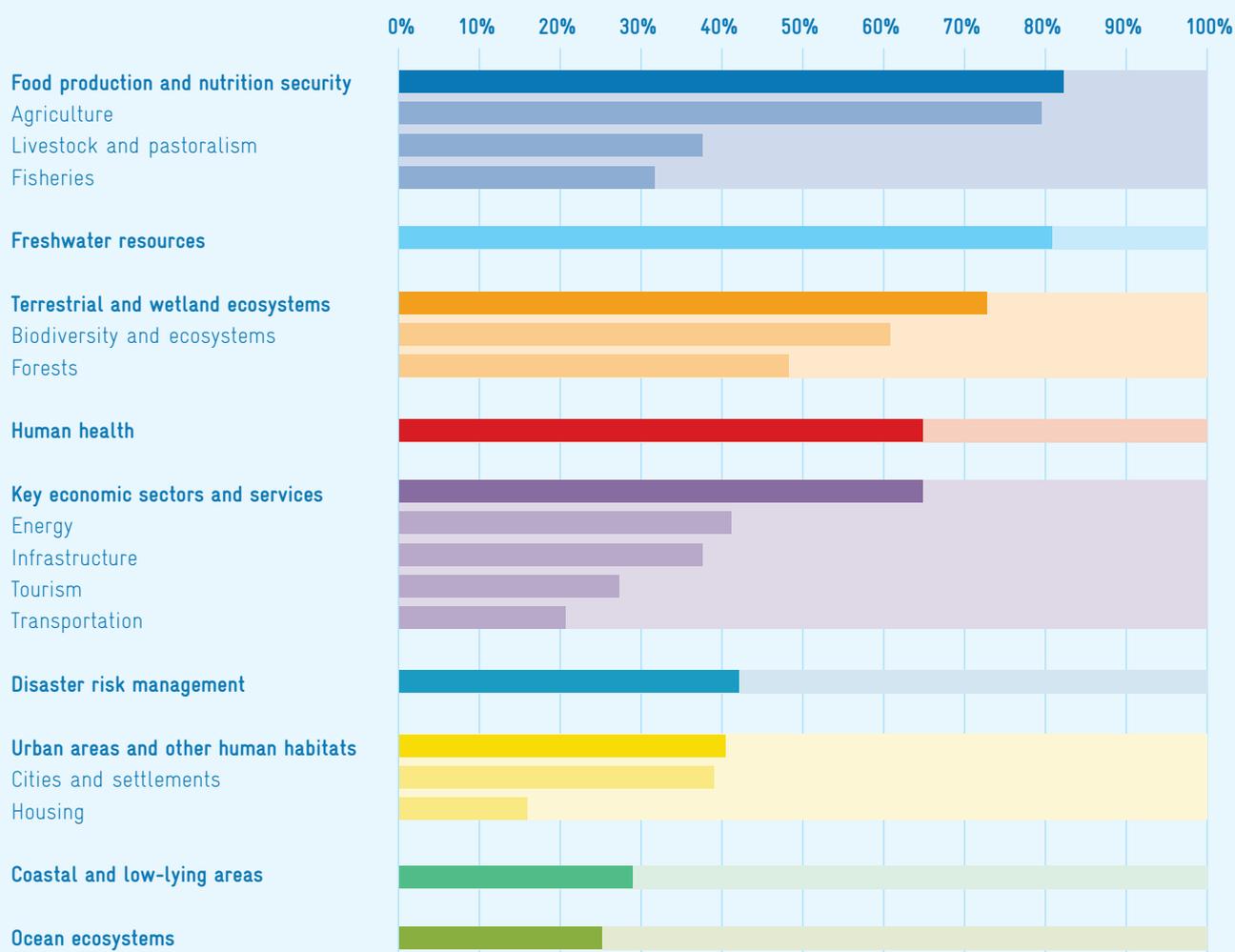
Source: UNFCCC[14]

Some countries also included quantitative adaptation targets, presented in Table 3.

14   UNFCCC, 2021, Nationally determined contributions under the Paris Agreement. Synthesis report by the secretariat. Addendum. Additional information from adaptation components of nationally determined contributions, https://unfccc.int/documents/306870

Table 3: Illustrative quantitative adaptation targets and national examples[15]

Sector	National Examples
Water	Ensure full access to drinking water by 2025 Increase water storage capacity from 596 m^3 to 3,997 m^3 Increase desalination capacity by 50% from 2015 by 2025
Agriculture	Convert 1 million ha grain fields to fruit plantations to protect against erosion Increase the amount of irrigated land to 3.14 million ha
Ecosystems and biodiversity	Protect 20% of marine environments by 2020 Establish 150,000 ha marine protected areas
Forestry	Regenerate 40% of degraded forests and rangelands Increase forest coverage to 20% by 2025 Maintain 27% forest coverage Achieve 0% deforestation rate by 2030
Disaster Risk	Ensure that all buildings are prepared for extreme events by 2030 Reduce the number of the most vulnerable municipalities by at least 50%
Energy	Ensure that hydropower generation remains at the same level regardless of climate change impacts

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15 Updated NDC Assessment Report by the UNFCCC Secretariat https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs/ndc-synthesis-report

4. Identifying and compiling NDC indicators – Step by step approach

This section provides guidance for countries to follow when identifying and compiling indicators for their NDC targets and the key considerations for countries on their indicator journey. Figure 8 provides a step-by-step approach to implement when identifying NDC indicators.

Figure 8: Step by step process – Identifying and compiling progress indicators for NDC targets

Step 1
Identify and assess NDC targets

Step 2
Make targets SMART

Step 3
Identify type of indicator suitable to track the target

Step 4
Identify data and methodology required

Step 5
Compile, report, document, archive

Source: Authors

4.1. Step 1: Identify and assess NDC targets

What to do

As a starting point, identify all mitigation and adaptation targets included in the most recent NDC. List them in a tabular format, including:

- The target or effort.
- The target value (if quantitative) or description (if qualitative).
- The scope of the target or effort (e.g., sectors, gases).
- The unit of the target value (if quantitative).
- The target timeframe.
- The baseline value (if available).

Table 4 shows the application of Step 1 to specific country examples for the mitigation target types. In some cases, it already becomes apparent that the target itself or its scope require further definition.

Table 4: Step 1 – Illustrative examples for mitigation and adaptation target categories

NDC target type	Country Examples	Scope	Target value	Target unit	Target timeframe	Value in reference / Base period / BAU
GHG related targets						
Absolute emission reduction or limitation target relative to a base year	Brazil's NDC commits 'to reduce its greenhouse gas emissions in 2025 by 37%, compared with 2005'[16].	CO_2, CH_4, N_2O, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and SF_6	37	%	2025	Base year emission estimation in the fourth BUR is around 2.4 Mio. kt of CO_2 eq. May be updated according to the latest inventory.
Emission reduction target below a BAU level	Morocco's NDC unconditional reduction target, "18.3% below BAU emissions by 2030"[17].	CO_2, CH_4, N_2O and HFCs	18.3	%	2030	The BAU scenario is projected approx. 1.4 Mio. kt CO_2 eq in 2030
Fixed-level target	Argentina's 's fixed-level target, will not exceed net emissions of 359 Mt CO_2 eq by 2030 to 369 Mt CO_2 eq for 2030[18].	CO_2, CH_4, N_2O, HFCs and PFCs	359	Mt CO_2 eq	2030	No reference value is used. But in its NDC submission Argentina compares the level of ambition to its 2016 emissions, which were around 364 Mt CO_2 eq.
Trajectory target	China's target is to peak CO_2 emissions before 2030 and achieve carbon neutrality before 2060[19].	CO_2	NDC does not indicate at which emission level peaking will occur	kt CO_2 eq (comparing emission levels of the unspecified peaking year with the levels of later years)	Year of peaking to be compared with all following years	N/A

16 Brazil First NDC – Second Update (2022), https://unfccc.int/sites/default/files/NDC/2022-06/Updated%20-%20First%20NDC%20-%20%20FINAL%20-%20PDF.pdf

17 Morocco First NDC (Updated Submission) (2021), https://unfccc.int/sites/default/files/NDC/2022-06/Moroccan%20updated%20NDC%202021%20_Fr.pdf

18 Argentina Second NDC (Updated Submission) (2021) https://unfccc.int/sites/default/files/NDC/2022-05/Actualizacio%CC%81n%20meta%20de%20emisiones%202030.pdf

19 China First NDC (Updated Submission) (2021), https://unfccc.int/sites/default/files/NDC/2022-06/%E4%B8%AD%E5%9B%BD%E8%90%BD%E5%AE%9E%E5%9B%BD%E5%AE%B6%E8%87%AA%E4%B8%BB%E8%B4%A1%E7%8C%AE%E6%88%90%E6%95%88%E5%92%8C%E6%96%B0%E7%9B%AE%E6%A0%87%E6%96%B0%E4%B8%BE%E6%8E%AA.pdf

Intensity target	India's target is to reduce the emissions intensity of its GDP by 45% by 2030 compared to the 2005 level[20].	CO_2	45	t CO_2 eq per unit of GDP	2030	2005 emissions/2005 GDP
Non-GHG targets						
Sectoral non-green-house gas targets	China has pledged to 'increase the share of non-fossil fuels in primary energy consumption to around 25%.	N/A	25	%	2030	N/A
Mitigation actions	Cape Verde set goals for the share of electric vehicles that will be acquired for different vehicle categories. The example here is the goal for public transport buses.	N/A	50	%	2025	N/A

Table 5 shows illustrative examples for adaptation target categories, taken from National Adaptation Plans.

Table 5: Step 1 – Illustrative examples for adaptation target categories

	Country Examples	Target value / Qualitative description	Target unit	Target timeframe
Water Quality	Expand the scope of Brazil's National Drinking Water Quality Surveillance Program (VIGIAGUA) to reach 85% of Brazilian municipalities, by 2019.[21]	Engagement with 85% of Brazilian municipalities	%	2019
Human Settlement	Fiji to promote the enforcement of appropriate national building codes and infrastructure design on critical facilities and public assets.[22]	Enforcement of national building codes to support compliance of disaster resilient infrastructure	N/A	2030
Agriculture	Kenya to up-scale and promote drought tolerant traditional high value crops; water harvesting for crop production; index-based weather insurance; conservation agriculture; agro-forestry; and Integrated soil fertility management.[23]	Implementation of disaster resilient agricultural techniques and management	N/A	2030

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20 India Updated First NDC (2022), https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf
21 Brazil's NAP 2016 https://www4.unfccc.int/sites/NAPC/Documents/Parties/Brazil%20NAP%20English.pdf
22 Fiji's NAP 2018 https://www4.unfccc.int/sites/NAPC/Documents/Parties/National%20Adaptation%20Plan_Fiji.pdf
23 Kenya's NAP 2016 https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Kenya_NAP_Final.pdf

Health	Kuwait aims to increase public awareness of climate changes effects and impacts on general health.[24]	Increase public awareness on health implications from climate change	N/A	2030
Ecosystems and biodiversity	Sri Lanka have established a comprehensive pro-gramme to monitor climate change impacts on key natural ecosystems and biodiversity.[25]	Monitoring the impacts of climate change on vulnerable ecosystems and species	N/A	2025

4.2. Step 2: Make targets SMART

What to do

Assess and, if necessary, clarify the scope covered by the target. Where necessary, clarify also other elements, e.g., units, reference / baseline levels. This is a relevant prerequisite to constructing relevant indicators in the following step. Targets defined in a more general manner usually require more work. In doing so, involve the stakeholders who will be responsible for implementing the measures necessary to achieve the targets.

Examples and considerations

The structured presentation of indicators undertaken under step 1 might reveal that some targets are not fully smart, and thus require further definition of the scope. For example, achieving a share of 28% of renewable power by 2030 is not a fully SMART target yet. What should the 28% refer to – e.g., power generation (including or excluding imports and exports?) or capacities installed? Which technologies should be counted as renewable power technologies?

Together with the relevant stakeholders for achieving the NDC target (in the above example this could be the Ministry of Energy), define the indicator's scope so that it becomes unambiguous under which conditions the target has and has not been achieved. For quantitative indicators this will be considerably easier than for qualitative indicators.

Regarding qualitative adaptation targets it is equally important to clarify all components of a target. For instance, "to increase public awareness of climate changes effects and impacts on general health" can lead to misinterpretation on whether or not the indicator has been achieved – e.g., what types of climate change impacts will be addressed? What mechanism will be used to engage with the public? Under which conditions will public awareness be considered as increased? What are the current levels of public awareness, have these been defined? Finally, has a timeframe been established for when the target must be reached?

The below tables present illustrative examples of issues that might require addressing, when making mitigation and adaptation targets smart.

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24 Kuwait's NAP 2021 https://www4.unfccc.int/sites/NAPC/Documents/Parties/Kuwait%20National%20Adaptation%20Plan%202019-2030.pdf
25 Sri Lanka's NAP 2016 https://www4.unfccc.int/sites/NAPC/Documents%20NAP/National%20Reports/National%20Adaptation%20Plan%20of%20Sri%20Lanka.pdf

Table 6: Potential issues related to the definition of scope and other characteristics of mitigation targets

Type of mitigation target	Elements to consider for a SMART target	Unit
GHG related targets		
Absolute emission reduction or limitation target relative to a base year	• Base year clearly agreed? • Gases included agreed? • Sectors / GHG inventory categories agreed • Target year agreed?	kt CO_2 eq
Emission reduction target below a BAU level	• As for absolute emission reduction target • BAU level clearly defined? Data and methods available?	%
Peaking Target	• GHG emissions (t CO_2 eq) in all years leading to the current year, with or without land use, land use change and forestry (LULUCF)	kt CO_2 eq
Intensity target	• As for absolute emission reduction target • Intensity-relevant factor and source / methodology to be used clearly defined, e.g., GDP, population?	kt CO_2 eq / capita or GDP / etc. % (if compared to BAU or base period)
Non-GHG related targets		
Renewable Energy	• Definition of "renewable" to be used – e.g., which sources, which technologies? • What does it relate to – share in total power / power + heat generated, GWh electricity generated, renewable generation capacities installed / operational?	• % • GWh • MW

Energy Efficiency	• Definition of "energy efficiency" to be used
	• What does the target relate to, e.g.
	  – energy efficiency improvement compared to a base year or BAU
	  – Energy efficiency target level?
		• GWh
		• TJ / unit of GDP

Forest cover	• Is there a national forest definition? • Methodology to determine forest cover agreed? • Reference level / baseline data and methodology available?	• Hectares or km^2 • % of national territory • % increase compared to reference / baseline
Implementation of qualitative policies and measures	• Is the scope and are the activities under the scope of the measure clearly defined? • Is there agreement, under which conditions the measure would be considered as implemented?	Likely a qualitative indicator

Table 7: Potential issues related to the definition of adaptation targets

Adaptation Target Areas	Elements to consider to make target SMART	Unit (where applicable)
Water	• Is there a waste water efficiency definition? • Methodology to determine water use and water efficiency? • Water use by sector (commercial vs residential) • Reference level / baseline data and methodology available?	• Volume of water (m^3)
Ecosystems and biodiversity	• Definitions and categories of country specific, invasive, alien flora and fauna species • Number of species per type (primary producers, invertebrates, vertebrates) by environments (terrestrial, freshwater etc)	• Number of species per type
Human settlements and environmental health	• Access to up-to-date resident population statistics? • Target reference period?	• Number of healthcare centres • Number of health care centres per 100 000 inhabitants
Agriculture and forestry	• Is there a sustainable forest/agriculture management definition? • Land Cover Classification determined? • Methodology to determine forest cover agreed? • Geographical boundaries / National territory defined? • Reference level / baseline data and methodology available?	• Index of sustainable forest management • % of land

4.3. Step 3: Identify type of indicator suitable to track the target

What to do

Once the NDC targets have been made SMART, identify indicators which allow understanding whether these targets have been met or not. With quantitative targets, once they are made SMART, the most relevant indicator can be identified from the target itself. With qualitative targets the intervention logic framework (Logframe) provides a helpful approach to identifying suitable progress indicators (cf. section 2.1).

Further indicators, e.g., related to implementation, could of course be chosen to support the understanding of progress, e.g., afforested surface area, area for which forest management plans have been improved, etc. The MPGs leave the choice of indicators to the Parties, as long as the indicators are relevant to their NDC. The use of such implementation-related progress indicators can surely be considered beneficial at the national level. Parties might however decide not to include such information in their BTRs.

It is vital that the identification and agreement of the NDC progress indicators involves all relevant stakeholders to ensure their credibility and legitimacy.

Examples and considerations

Where a forest cover of 23% of the country's surface area is to be achieved by 2030, the indicator that represents progress towards the target best, will be the share of the country's surface area that is forested – based on a commonly agreed forest definition. Identifying indicators for qualitative targets related to adaptation can often prove difficult. Intervention logic frameworks can help to identify specific indicators and how each indicator can track

different levels of performance. This framework outlines the narrative of an action by mapping out the relationships and dependencies of a target. For the example of a qualitative adaptation target of introducing new water management tools for sustainable agriculture, the figure below presents the Logframe approach to identify suitable indicators.

Figure 9: Example of Logframe approach used in relation to a qualitative adaptation target
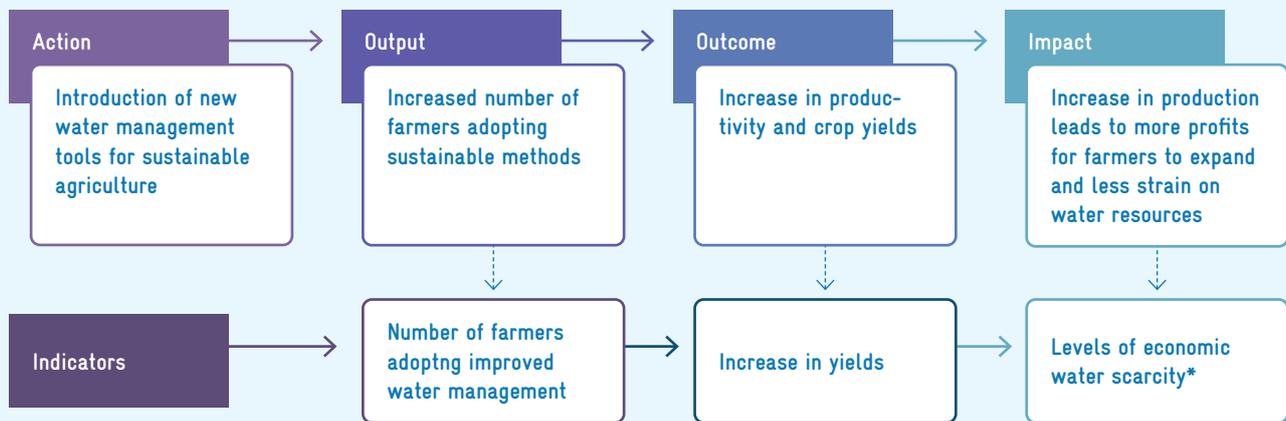
Source: Authors

* economic water scarcity is a result of poor management of the sufficient available water resources.[26]

Table 8 presents illustrative examples of indicators relevant to the mitigation target categories, Table 9 for adaptation target categories.

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26   https://www.sciencedaily.com/terms/water_scarcity.htm

Table 8: Illustrative examples of mitigation targets and relevant mitigation indicators for tracking progress

Type of mitigation target	Relevant indicators	Unit
GHG-related targets		
Absolute emission reduction or limitation target relative to a base year	GHG emissions • as reported in the national GHG inventory adapted to the specific scope of the target (e.g., gases and sectors covered), • including use of market-based mechanisms, and • adapted to the specific timeframe of the target (e.g., where a multi-year target-period applies).	kt CO_2 eq
Emission reduction target below a BAU level	Relationship (e.g., difference in %) between • GHG emissions in the BAU target year/ period (updated, where applicable) and • GHG emissions as reported in the national GHG inventory adapted to the specific scope of the target (e.g., gases and sectors covered), including use of market-based mechanisms, and adapted to the specific timeframe of the target (e.g., where a multi-year target-period applies)	%
Peaking Target	GHG emissions in all years leading to the current year, • as reported in the national GHG inventory adapted to the specific scope of the target (e.g., gases and sectors covered), • including use of market-based mechanisms	kt CO_2 eq

Intensity target	• GHG emissions
	  – as reported in the national GHG inventory adapted to the specific scope of the target (e.g., gases and sectors covered),
	  – including use of market-based mechanisms, and
	  – adapted to the specific timeframe of the target (e.g., where a multi-year target-period applies)
	• divided by the relevant factor the target relates to, i.e., GDP, population, energy consumption, etc.
		kt CO_2 eq / capita / GDP / etc.
		% (if compared to BAU or base period)

Non-GHG related targets		
Renewable Energy	Depending on specific definition of target, relevant indicators include • % of electricity generated by source • Total generation by source • Installed capacity by source	 • % • GWh • MW
Energy Efficiency	Depending on specific definition of target, relevant indicators include • Total energy demand or consumption • Energy intensity of the economy	 • GWh • TJ / unit of GDP
Forest cover	Depending on specific definition of target, relevant indicators include • Share of land covered by forest • Area covered by forest • Area restored or reforested • Forest stock • CO_2 sequestered per year	 • % • ha • ha • m^3 • t CO_2 eq

| Implementation of qualitative policies and measures | • Indicators helping to understand whether implementation takes place and at what status it is, e.g., specific documentation
• Planning of the development and implementation of measures, including milestones and timelines
• Administrative acts approving, requiring, supporting for the implementation of measures, e.g., building standards, legal requirements on the fuel efficiency of cars, allocation of responsibilities to a Ministry / agency, etc.
• Indicators showing change which can clearly be related to the measure, e.g., number of EV-cars supported by an economic incentive scheme | |

Table 9: Illustrative examples of adaptation indicators for the adaptation target areas[27]

Adaptation Target Areas	Relevant indicators	Unit
Water	• Level of water stress: freshwater withdrawal as a proportion of available freshwater resources • Change in water use efficiency over time • Progress in deployment of water resources management projects and instruments	• % of freshwater withdrawn • % of water resources with a defined water quality • % of economic water scarcity
Ecosystems and biodiversity	• Cumulative number of alien species	• Number of species per type
Agriculture and forestry	• Progress towards sustainable forest management • Proportion of agricultural area under productive and sustainable agriculture	• Index of sustainable forest management • % of land

4.4. Step 4: Identify data and methodology required

What to do

Once indicators have been defined, identify the data and methodology required to compile the indicator.

For each indicator, a data collection plan needs to be developed. This will provide a complete overview for each indicator of what is being measured, the baseline, the targets, data sources and methods. It also specifies who will be collecting data, with what frequency and to whom it will be reported. In the case of NDC indicators, much relevant information or sometimes even the indicator data itself is likely to be already available from data collection for the compilation of other sections of the BTR (see Table 11 below for details).

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27 The UNECE initial of set climate change indicators: the issue of dual measurement https://seea.un.org/sites/seea.un.org/files/unceea_2018_background_paper_on_dual_cc_indicators_submitted_0.pdf

Examples and consideration

In considering the data and potential methodology required, the following questions might be helpful:

- What information is required for the indicator?

- Where can that information be found – has it already been compiled for other purposes, e.g., national statistics, SDG reporting?

- For which years is the information available?

- Does the information available have the necessary quality, e.g., is the approach to data collection / calculation consistent over time, is the data sufficiently accurate?

- Is the information already available with the correct scope and in the correct units? Or are adjustments to scope / units necessary?

- Is a calculation necessary to compile the indicator (e.g., GHG emissions, GHG emission reductions or removals?) If so, is there an internationally accepted practice that should be used, e.g.,

  - the 2006 IPCC Guidelines[28] for National GHG Inventories
  - The World Resource Institute Policy and Action Standard[29]
  - Progress indicators for mitigation and/or adaptation actions as agreed for reporting to donors.

Table 10 presents the sections of the BTR and information with potential relevance for the compilation of NDC progress indicators. Table 11 presents types of information relevant for the compilation of indicators for the mitigation targets categories and Table 12 for the compilation of indicators for the adaptation categories.

Table 10: Data likely collected for other sections of the BTR

BTR sections	Relevant progress tracking data
National inventory report	GHG estimates of different scopes, e.g., national totals (including and excluding land use, land-use change and forestry (LULUCF categories)), sectoral scopes, scopes for different sets of gases (e.g., CO_2, CH_4, N_2O where a Party has not included HFCs, PFCs, SF6 and NF3 in their most recent NDC). Furthermore, activity data collected for the national GHG inventory estimation can be relevant for non-GHG-related targets, e.g., forested area
Mitigation policies and measures, actions, and plans	Information on the implementation of mitigation actions and relevant changes achieved, e.g., MW renewable capacity operational
Progress on implementation of adaptation	Information on the implementation of adaptation actions and achievements through these actions, e.g., regarding improved access to drinking water and/or electricity.
Information necessary to track progress made in implementing and achieving the NDC (BAU data)	According to paragraph 67 of the MPGs, "each Party shall provide the information for each selected indicator for the reference point(s), level(s), baseline(s), base year(s) or starting point(s) and shall update the information in accordance with any recalculation of the GHG inventory, as appropriate". In the case of an emission reduction target compared to BAU, the baseline data includes total GHG emissions in the BAU scenario.In case the BAU scenario has not been updated over time, this information can either be taken from the NDC itself or from assessments conducted in order to develop the NDC. Where the BAU is updated over time, information might be taken from the projection chapter of the BTR (if applicable) in the form of a Without Measures Scenario (WOM). Generally, where a Party has an NDC target related to a BAU and it intends updating the BAU over time, integrating this process with the preparation and reporting of projections in the BTR is a valuable consideration.

28 Eggelston.S, et al, 2006, IPPC Guidelines, https://www.ipcc-nggip.iges.or.jp/public/2006gl/.
29 Rich.D et al, 2014, World Resource Institute Policy and Action Standard, https://files.wri.org/d8/s3fs-public/Policy_and_Action_Standard.pdf

Table 11: Data sources for Mitigation target categories

Mitigation target categories	Relevant data sources
GHG-related targets	
Absolute emission reduction or limitation target relative to a base year	• National GHG inventory data from the BTR under preparation
Emission reduction target below a BAU level	• National GHG inventory data from the BTR under preparation • BAU projections from the most recent NDC or from the BTR under preparation in case the BAU projections are updated over time
Peaking target	• National GHG inventory data from the BTR under preparation
Intensity target	• National GHG inventory data from the BTR under preparation • Depending on specific target: GDP, population typically available from the national statistical offices
Non-GHG targets	
Renewable Energy	Depending on specific target: • % of electricity generated by source and/or total generation by source from the national energy balance (if available), likely collected for the mitigation chapter of the BTR under preparation • Installed capacity by source: Potentially collected for the mitigation chapter of the BTR under preparation, alternatively to be collected from the Ministry responsible for power and heat generation
Energy Efficiency	• Total energy demand or consumption: from the national energy balance (if available), potentially collected for the mitigation chapter of the BTR under preparation • Energy intensity of the economy: Potentially available from the national statistical services.

Forest cover	• Depending on type of target information like:
	  – % of land covered by forest
	  – Hectares of land covered by forest
	  – Hectares of land restored or reforested
	  – Volume of forest stock
	  – Tonnes of CO_2 stored/sequestered per year
	Has likely been collected for the preparation of the LULUCF categories of the national GHG inventory and potentially for the mitigation and/or adaptation chapters.

Implementation of qualitative policies and measures	• Information likely available from the mitigation chapter of the BTR under preparation.

If certain data is not readily available at national level, it is worth checking whether they may have been collected by other institutions for reporting to international organisations, such as the Food and Agriculture Organization (FAO), the International Energy Agency (IEA) or the Latin American Energy Organization (OLADE).

Table 12: Data sources for Adaptation target areas

Adaptation target areas	Relevant data sources
Water	Depending on specific target: • Volume of water (m³) can be derived from sector analysis this may have been collected as part of the NAP and/or national water provider
Ecosystems and biodiversity	Depending on specific target: • National totals of species can be potentially sourced from Ministries of Environment, Environmental Protection Agencies and National Biodiversity Statistics
Extreme events and disasters	Depending on specific target: • National Statistical Offices and/ or Disaster Management Agencies • Severe Weather Database • National Hydrometeorological Institutes
Human settlements and environmental health	Depending on specific target: • Health Statistics • Ministry of Health • International: WHO Mortality database
Agriculture and forestry	Depending on specific target: • Data on agricultural production can be collected through agricultural surveys organized by the national statistical agencies • Geospatial data/remote sensing from the ministry or agency responsible for agriculture

Source: Authors

4.5. Step 5: Compiling, reporting, documenting, archiving

What to do

The assessment of available data sources in the previous step will show that many progress indicators can be compiled with data already available from BTRs and National Communications (NCs). Relevant data sources should be entered in the data collection plan for each indicator. The timing – when such data, e.g., national GHG inventory estimates, information on adaptation actions, becomes available – will be important to consider for the overall BTR compilation process.

Where additional data needs to be collected, assess whether such data collection can be integrated into existing data collection processes or can be built up together with data collection processes which need to be established for BTR reporting.

Not all relevant data might be available from the start and/or data might not be available at the quality desired. This is a very normal situation which can be remedied by long-term planning for relevant improvements. These can include performing assessments (e.g., studies), introducing relevant processes to regularly collect relevant data, introduce more sophisticated calculation methodologies where appropriate, etc. Figure 10 illustrates the process of data collection and improvement over time.

In collecting data, compiling, and reporting indicators, use quality control and quality assurance processes as you do for your national GHG inventory compilation, BUR/NC and BTR compilation. The Biennial Transparency Report Guidance and Roadmap Tool [30] can help in this

30 PATPA, 2021, Biennial Transparency Report Guidance and Roadmap Tool https://transparency-partnership.net/publications-tools/btr-guidance-and-roadmap-tool

process by guiding developing countries in planning the preparation process of their first BTR as well as preparing a roadmap for implementing it.

The reporting of indicators needs to be consistent over time with regards to the data sources used and the calculation methodology applied. Where any of these change, the whole time series needs to be recalculated and the recalculated values reported. Information on the recalculations and the reasons for it should be reported as well.[31] A typical case is the recalculation of national GHG inventory estimates which would impact GHG-related NDC targets. Another likely case is the regular updating of a BAU scenario, which would impact GHG-related NDC targets relative to such a scenario.

The NDC progress indicators are the most tangible information reported on the progress towards your NDC targets. Considering further information in the BTR, e.g., on national circumstances, mitigation, and adaptation actions, the national GHG inventory trends and GHG projections (if applicable), these indicators can tell a more comprehensive story about the progress, the success stories and good practices behind it, remaining challenges and need for support. Understanding this

story is also key for successful policy decision-making at the national level. Sharing the story in the BTR will help showcasing successes and obtaining suitable support, where needed.

Once the NDC indicator data has been reported, document all relevant information, e.g., data sources, input data, methodologies, assumptions, calculation sheets and the compiled indicator data. This will help future compilation of NDC progress indicators to be conducted more efficiently as well as consistently over time. While this seems an easy step, experience shows it is at present often not followed to the extent necessary or not followed at all. This impedes future updating and reporting processes. Archive all these materials safely together with the remaining BTR material, using a clear folder structure and document nomenclature, which makes it easy to find relevant information. Where available, consider the documentation and archiving processes in place for your national GHG inventory compilation. National statistical offices typically also have relevant experience with these steps.

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31 Volume 1, Chapter 5 of the IPCC 2006 Guidelines for national greenhouse gas inventories presents considerations on time series consistency, see https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_5_Ch5_Timeseries.pdf. While these considerations target national GHG inventory estimates, the general principles described apply to any kind of indicator data.

Figure 10: Illustrative example of step-by-step data collection process

Build on existing data / structures → Prioritise and select data accordingly → Collect data → Fill data gaps → Improve data quality over

Source: Authors

Examples and considerations

Table 13 below presents approaches for dealing with data gaps and for reporting transparently on the approaches taken.

Table 13: Dealing with data gaps – what to do and what to report

Type of data gap	What to do	What to report in the BTR
Relevant input data not available at all	Identify • activities enabling the collection of relevant data (e.g., research, studies, new statistics) • entities responsible for these activities • necessary preconditions, e.g., budget / staff, legal framework, MoUs, etc.	Report • the fact that the indicator data is currently not available and why that is the case • action taken to make the indicator data available in the future • When you expect to be able to report on the indicator • What international support is required to do so (if applicable)
Relevant input data not available for all years, all sectors, all regions, etc	• Where possible, use gap-filling approaches (e.g., overlap, surrogate data, interpolation, and trend extrapolation)[32] to estimate the indicator value for the full scope / all relevant years • Use approaches suggested under "relevant input data not available at all" to collect missing data in the future	Report • what information was not available / for which years? • What gap filling approaches have been deployed? • actions taken to make indicator data available in the future • When would you expect to be able to report the indicator? • What international support is required to do so (if applicable)?
Data is not available as a relevant mitigation or adaptation action has not started yet	• Put data collection and compilation processes in place before the action starts	Report • The fact that the implementation has not yet started and • When is it planned to start?

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32   Volume 1, Chapter 5 of the IPCC 2006 Guidelines for national greenhouse gas inventories presents relevant gap filling approaches, see https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_5_Ch5_Timeseries.pdf.

5. Summary

Under the Paris Agreement, countries have put forward mitigation and adaptation targets. Tracking progress towards targets is necessary to ensure targets are met, especially because it allows for finetuning and adjustments of efforts when necessary. For example, unexpected delays may occur, or new developments may facilitate efforts. This also helps attain additional benefits connected to the climate targets, e.g., related to health, jobs, energy security or food security. At an international level, reporting on progress towards climate targets ensures transparency and creates trust.

While developing countries have experience with reporting on climate-related issues under the UNFCCC, reporting progress towards climate targets is a new requirement for them. The Paris Agreement's Enhanced Transparency Framework and its Modalities, Procedures and Guidelines include the requirements for such reporting, which starts by December 2024 in the form of Biennial Transparency Reports (BTRs). Just as the NDC targets are nationally determined, so will the NDC progress indicators, with the sole requirement that they shall be relevant to the NDC.

As a general approach, where indicators are SMART (specific, measurable, ambitious, relevant, time-bound) they will be easier to track. The Intervention Logframe approach, commonly used for development interventions, can help identify suitable indicators.

This paper suggests a 5-step process for identifying and reporting indicators, presented in Figure 11.

Figure 11: Step by step process – Identifying and compiling progress indicators for NDC targets

Step 1
Identify and assess NDC targets

Step 2
Make targets SMART

Step 3
Identify type of indicator suitable to track the target

Step 4
Identify data and methodology required

Step 5
Compile, report, document, archive

Source: Authors

Appendices

Appendix 1 Example tables for reporting on indicators in biennial transparency reports

As explained in Chapter 1.2, Parties shall report information on indicators in their biennial transparency reports. The common tabular format (CTF) tables for the reporting of this information have been defined in the 'transparency guidance'[33].

In the following, filled-in example tables are provided. The actual information to be reported by each Party will differ, depending on the type of NDC, the target and the chosen indicator(s).

Table 14: Description of selected indicators

The example text is shown in bold font

Indicator(s) selected to track progress	Description
Net GHG emissions and removals in CO$_2$eq	
Information for the reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate	**The reference level in the base year (1990) is 12,345 kt CO$_2$eq.**
Updates in accordance with any recalculation of the GHG inventory, as appropriate	**The reference level has been recalculated from 12,321 kt CO2eq in the previous national inventory to 12,345 kt CO$_2$eq in the national inventory which is submitted together with this BTR.**
Relation to NDC	**The indicator is defined in the same metric and unit as the target of the NDC.**
Total area of forest in hectares	
Information for the reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate	**The reference level in the base year (2020) is 123,456 hectares.**
Updates in accordance with any recalculation of the GHG inventory, as appropriate	**No updates have been made.**
Relation to NDC	**The indicator is defined in the same metric and unit as the forestry-related target of the NDC.**
Reduction of GHG emissions compared to the business-as-usual scenario	
Information for the reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate	**The baseline corresponds to total net GHG emissions and removals in a business-as-usual scenario. The baseline value in the base year (2020) is 12,345 kt CO$_2$eq. The baseline value in the target year (2030) is 16,789 kt CO$_2$eq. Baseline values for all years from 2020 to 2030 are provided in chapter 2 of the BTR**
Updates in accordance with any recalculation of the GHG inventory, as appropriate	**The baseline value in 2020 has been recalculated from 12321 kt CO$_2$eq to 12,345 kt CO$_2$eq. The baseline value in 2030 has been recalculated from 16,890 kt CO$_2$eq to 16,789 kt CO$_2$eq.**
Relation to NDC	**The percentage reduction (as communicated in the NDC) is determined by comparing total net GHG emissions from the GHG inventory (in kt CO$_2$eq) to the baseline level (in kt CO$_2$eq).**

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33 Decision 5/CMA.3, Annex II, https://unfccc.int/documents/460951

Table 15: Definitions needed to understand each indicator

The example text is shown in bold font

Definitions[a]	
Definition needed to understand each indicator:	**Indicator 'Net GHG emissions and removals':** **Net GHG emissions and removals correspond to the annual totals reported in CO_2 equivalents in the latest national GHG inventory. The totals comprise all sectors and gases listed in the CTF table entitled 'Reporting format for the description of a Party's nationally determined contribution under Article 4 of the Paris Agreement, including updates'.**
	Indicator 'Total area of forest in hectares': **Area with woody vegetation consistent with the thresholds used to define Forest Land in the national inventory document.**
	Indicator 'Reduction of GHG emissions compared to the business-as-usual scenario': **The reduction of GHG emissions in percent is determined by comparing total net GHG emissions from the GHG inventory (in kt CO_2eq) to the baseline level (in kt CO_2eq).**
Any sector or category defined differently than in the national inventory report:	**{Sector} Not applicable**
	{Category} Not applicable
Definition needed to understand mitigation co- benefits of adaptation actions and/or economic diversification plans:	**{Mitigation co-benefit(s)} Not applicable**
Any other relevant definitions:	**{…} Not applicable**

Table 16: Methodology or accounting approach used

The example text is shown in bold font

Reporting requirement	Description or reference to the relevant section of the BTR
If the methodology or accounting approach used for the indicator(s) in table 1 differ from those used to assess the implementation and achievement the target, describe each methodology or accounting approach used to generate the information generated for each indicator in table 4 (para. 74(c) of the MPGs)	**Not applicable. The methodology/accounting approach used for the indicators in table 1 is the same as the methodology/accounting approach used to assess the implementation and achievement the target.**

Table 17: Indicator values in the base year and in each year of the NDC period

EXAMPLE 1:

NET GHG EMISSIONS AND REMOVALS; PERCENTAGE REDUCTION OF GHG INTENSITY; TOTAL AREA OF FOREST; RENEWABLE ENERGY PRODUCTION.

Please note that these indicators are not necessarily related. Parties with only one NDC target may decide to report only one indicator.

	Unit, as applicable	Reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate (paras. 67 and 77(a)(i) of the MPGs)	Implementation period of the NDC covering information for previous reporting years, as applicable, and the most recent year, including the end year or end of period (paras. 68 and 77(a)(ii–iii) of the MPGs)					Progress made towards the NDC, as determined by comparing the most recent information for each selected indicator, including for the end year or end of period, with the reference point(s), level(s), baseline(s), base year(s) or starting point(s) (paras. 69–70 of the MPGs)
				Year 1 2021	Year 2 2022	End year	Target level	Target year or period	
Indicator(s) selected to track progress of the NDC or portion of NDC under Article 4 of the Paris Agreement (paras. 65 and 77(a) of the MPGs):									
Net GHG emissions and removals	kt CO_2eq	12,345		12,000	11,500		7,000	2030	The most recent level of the indicator is 9% below the base year level.
Percentage reduction in GHG intensity	percent	0%		20%	22%		40%	2030	The most recent reduction amounts to 22%.
Total area of forest	hectares	123,456		130,000	135,000		150,000	2030	The most recent level of the indicator is 9% above the base year level.
Renewable energy production	Terajoules	123		150	160		200	2030	The most recent level of the indicator is 30% above the base year level.
Where applicable, total GHG emissions and removals consistent with the coverage of the NDC (para. 77(b) of the MPGs)	kt CO_2eq	12,345		12,000	11,500		7,000	2030	
Contribution from the LULUCF sector for each year of the target period or target year, if not included in the inventory time series of total net GHG emissions and removals, as applicable (para. 77(c) of the MPGs)	NA	NA		NA	NA		NA	NA	
[Information to be filled in by Parties participating in cooperative approaches][34]									
[Assessment of the achievement of the NDC – this part of the table is to be provided after the end of the NDC period only]									

34 Filled-in example tables for Parties participating in cooperative approaches can be found in the guidance document ‚Accounting for National Determined Contributions, Second Edition', https://transparency-partnership.net/publications-tools/second-edition-accounting-national-determined-contributions

EXAMPLE 2:

QUALITATIVE INDICATOR FOR A SPECIFIC POLICY OR MEASURE; MITIGATION CO-BENEFITS OF ADAPTATION ACTIONS; MITIGATION CO-BENEFITS OF ECONOMIC DIVERSIFICATION; EMISSION REDUCTION COMPARED TO A BUSINESS-AS-USUAL SCENARIO.

Please note that these indicators are not necessarily related. A Party may report several indicators if it has several mitigation actions in its NDC. Typically, a Party will report one of the indicator types shown in this example, but not a combination.

		Reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate (paras. 67 and 77(a)(i) of the MPGs)	Implementation period of the NDC covering information for previous reporting years, as applicable, and the most recent year, including the end year or end of period (paras. 68 and 77(a)(ii–iii) of the MPGs)					Progress made towards the NDC, as determined by comparing the most recent information for each selected indicator, including for the end year or end of period, with the reference point(s), level(s), baseline(s), base year(s) or starting point(s) (paras. 69–70 of the MPGs)
	Unit, as applicable		Year 1 2021	Year 2 2022	End year	Target level	Target year or period	
Indicator(s) selected to track progress of the NDC or portion of NDC under Article 4 of the Paris Agreement (paras. 65 and 77(a) of the MPGs):								
Implementation phase of the measure 'Shutdown of coal power plant X and replacement by renewable energy'	NA	Phase 0	Phase 1	Phase 2		Phase 5	2030	The implementation of the measure has reached phase 2. For more information, please see chapter 2 in the BTR.
Removal of CO2 as a co-benefit of adaptation actions	kt CO2eq	0	10	15		100	2030	The most recent removal of CO_2 amounts to 15 kt CO_2eq.
Reduction of GHG emissions as a co-benefit of economic diversification	kt CO2eq	100	200	300		1,000	2030	The most recent reduction of GHG emissions amounts to 300 kt CO_2eq.
Reduction of GHG emissions compared to a business-as-usual scenario	percent	0%	10%	15%		50%	2030	The most recent reduction of GHG emissions amounts to 15% compared to the business-as-usual scenario.
Where applicable, total GHG emissions and removals consistent with the coverage of the NDC (para. 77(b) of the MPGs)	kt CO2eq	12,345	12,000	11,500		10,000	2030	
Contribution from the LULUCF sector for each year of the target period or target year, if not included in the inventory time series of total net GHG emissions and removals, as applicable (para. 77(c) of the MPGs)	NA	NA	NA	NA		NA	NA	
[Information to be filled in by Parties participating in cooperative approaches][35]								
[Assessment of the achievement of the NDC – this part of the table is to be provided after the end of the NDC period only]								

35 Filled-in example tables for Parties participating in cooperative approaches can be found in the guidance document ‚Accounting for National Determined Contributions, Second Edition', https://transparency-partnership.net/publications-tools/second-edition-accounting-national-determined-contributions

Table 18: Projections of key indicators

Key indicator(s)[c]	Unit, as applicable	Most recent year in the Party's national inventory report, or the most recent year for which data are available	Projections of key indicators		
		2022	2025	2030	2035
Annual total GHG emissions and removals	kt CO_2eq	11,500	10,000	8,000	7,000
Percentage reduction in GHG intensity	Percent	22%	25%	35%	40%
Total area of forest	hectares	135,000	140,000	145,000	15,000
Renewable energy production	Terajoules	123	13,000	14,000	15,000
Removal of CO_2 as a co-benefit of adaptation actions	kt CO_2eq	15	40	90	110
Reduction of GHG emissions as a co-benefit of economic diversification	kt CO_2eq	300	500	800	1,200
Reduction of GHG emissions compared to the business-as-usual scenario	percent	15%	20%	40%	50%

Appendix 2 – Good Practice Examples of indicators for tracking actions under the NDC

Rwanda

Rwanda has developed a comprehensive MRV system; this framework was developed within their revised NDC[36]. The proposed framework is consistent with the stringent Enhanced Transparency Framework and UNFCCC reporting requirements. It encapsulates progress indicators; this allows the country to track progress of actions and meet reporting requirements. For both mitigation and adaptation, Rwanda has identified the responsible actors for each specific indicator. This includes the line ministry, lead agency and several key stakeholders who are either crucial in providing data or accountable for the data process and analysing results. The MRV system also captures non-GHG impacts on environmental, social, and economic impacts of the NDC actions, and their performance in achieving national sustainable development goals.

Regarding climate change mitigation actions, Rwanda have developed a set of indicators for each of the key emitting sectors. The selection of indicators has been derived from existing international frameworks, thus aligned with UNFCCC requirements for MRV systems. Rwanda's mitigation indicators are structured under the four main IPCC reporting sectors Energy; IPPU; AFOLU; and Waste (noting that AFOLU only includes the agriculture sector). Each sector includes headline indicators relating to emissions and mitigation activity. These headline indicators

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36   Rwanda's First NDC (updated submission), https://unfccc.int/sites/default/files/NDC/2022-06/Rwanda_Updated_NDC_May_2020.pdf

are underpinned by a set of more detailed supporting indicators which track performance of the implementation of mitigation measures. Additionally, Rwanda have outlined several external drivers such as GDP and population growth. Rwanda have included these factors as part of their monitoring framework in order track their influence in driving emissions. Table 19 provides examples of Rwanda's mitigation indicators. This selection of indicators helps Rwanda to monitor GHG emissions as well as the effectiveness of mitigation measures within each sector. As illustrated in Table 19 these indicators are related both to GHG emissions and to non-GHG impacts linked to key emitting sectors.

Table 19: Examples of Rwanda's mitigation indicators

Sector	Headline Indicator	Supporting Indicator	Other Factors
Energy (Electricity generation)	Share of renewables in total electricity supply (%)	Generation of electricity (GWh and % of total)	Rural Energy Strategy development (progress towards milestones)
Energy	Current fossil fuel use (% of total energy use)	Number of Electric Vehicles	Availability and cost of new and low carbon energy technologies and practices
IPPU	Current GHG emissions (Mt CO_2eq)	F-gas substitution (%)	Substitution of F-gases and progress towards targets under Kigali amendment to Montreal Protocol
AFOLU (agriculture)	Crop production (t of total crop biomass)	Crop rotation (ha)	Climatic and other key factors influencing yields and agricultural practices
Waste	Current total waste disposal (t)	Waste to energy generation (MW)	Waste recycling progress (e.g., policies and practices; plastic, metals and paper recycling rates)

In preparation of developing Rwanda's adaptation indicators, several principles were put in place. Firstly, the integration of robust analytics to build a reliable database on adaptation metrics. Secondly, Rwanda had identified significant gaps in how adaptation change actions are prioritised for financing, thereby, it was crucial for Rwanda to create synergies between adaptation and climate financing decisions. Thirdly, local and sector context has been considered throughout the makeup of each indicator. This has been carried out by drawing on climate resilience assessments. See Table 20 for illustrative examples of adaptation indicators.

Table 20: Examples of Rwanda's adaptation indicators

Adaptation Indicator	Data source
Percentage change in national climate change vulnerability index (%)	Vulnerability Index study report
Water storage per capita & number of households and institutions with a rainwater harvesting system installed (m³ per capita)	Integrated Water Resources Management & Water Monitoring and Development Unit
Proportion of land surface covered by forest (ha)	Rwanda Water and Forestry Authority & Forestry department-GIS Report
Percentage of extreme weather events for which advance warning was provided at least 30 min in advance (%)	Rwanda Meteo, Quarterly high impact weather report

Rwanda has a robust institutional arrangement; coordinated by the Ministry of Finance and Economic Planning (MINECOFIN) through sector working groups (SWGs) that track implementation of sector objectives. The Natural Resources SWG has the responsibility to monitor and evaluate the implementation of the NDC through regular stakeholder engagement. The SWG is chaired by the Ministry of Environment (MoE). The implementation of sub-sector priorities is monitored and evaluated by Thematic Working Groups (TWG) who also sit under the MoE. The TWG host a national technical working committee responsible to coordinate national institutions implementing NDC actions. The TWG is a key platform for guiding the analytical framework, reporting, updating, and implementing both national mitigation and adaptation priorities. Furthermore, the MoE chairs the results-based monitoring and evaluation (RBME) system for info and data monitoring. The Rwanda Environment Management Authority (REMA) is accountable for compiling the GHG inventory and is the coordinating body for climate change reporting on mitigation and adaptation projects. See Figure 12 for an organogram of Rwanda's institutional arrangements.

Figure 12: Rwanda's Institutional Arrangement
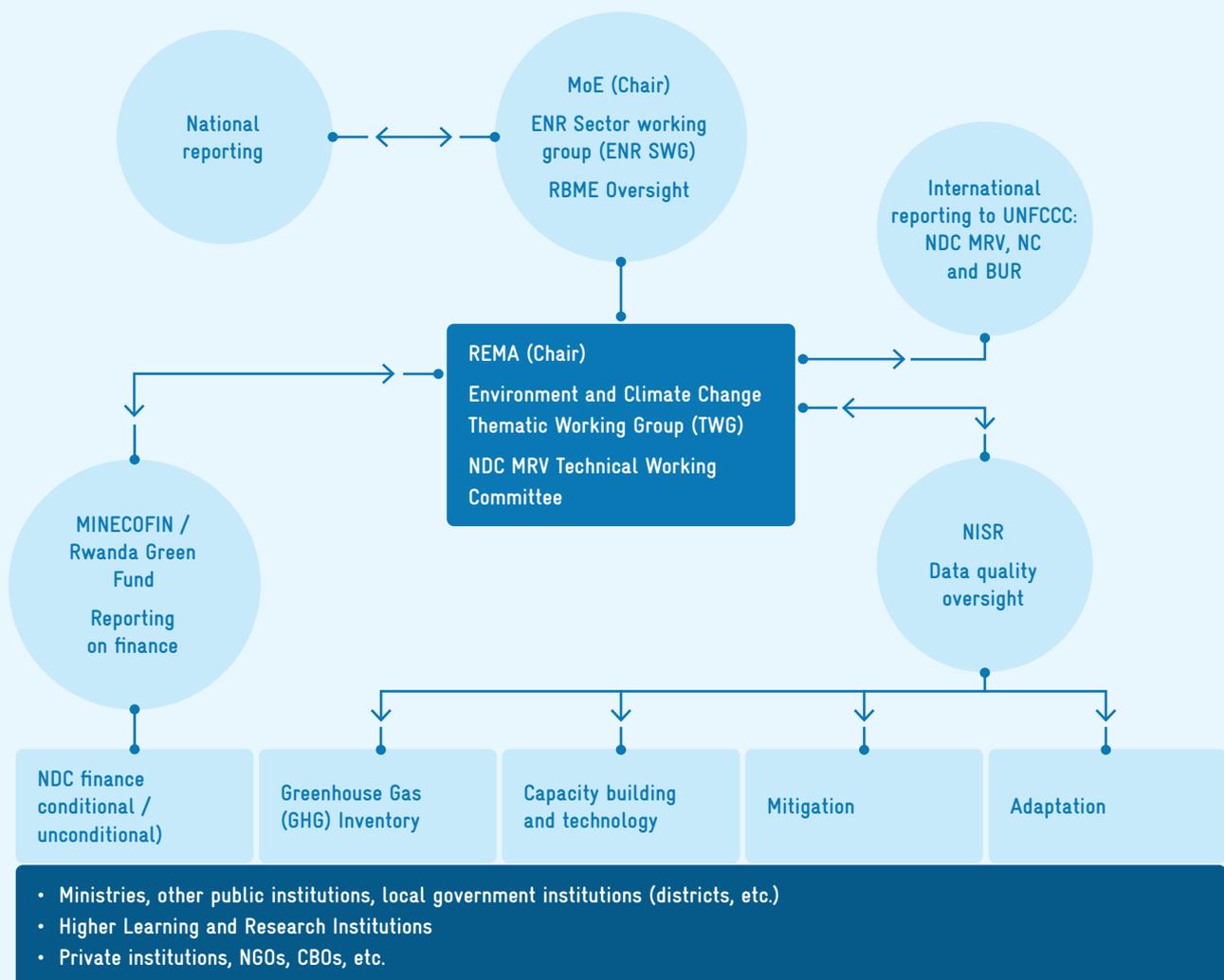
Source: Rwanda's First NDC (updated submission)[37]

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37   Rwanda's First NDC (updated submission), https://unfccc.int/sites/default/files/NDC/2022-06/Rwanda_Updated_NDC_May_2020.pdf

Rwanda's MRV framework demands periodic and timely data collection, analysis, and overall management to ensure efficient reporting. In conjunction to the technical working groups the National Institute of Statistics Rwanda (NISR) provides insight to environmental statistics at a national level. The NISR develop surveys including vulnerability to climate change analysis and validates data and information for internal and external use. A key responsibility is to directly populate data portals to provide interactive access which is paramount to Rwanda's MRV framework. In addition, primary data is generated by central government through the technical working committee.

Ghana

In 2013, Ghana launched a Climate Ambitious Reporting Program (GCARP) as its domestic MRV system. The MRV system is deployed to track the country's progress towards achieving its NDC at the national and sectoral levels.[38] Ghana's MRV system builds on existing national monitoring and evaluation structures. By integrating the country's Annual Progress Report (APR) system this has enabled Ghana to enhance institutional structures and data collection processes. Not only does the MRV system build on these existing national M&E structures, the G-CARP is also aligned with the national GHG inventory system. This integrated approach enables Ghana to compile, collate and report GHG emission reduction data at a national and sectoral level. The National GHG inventory methodologies, which are aligned with IPCC 2006 Guidelines, are used as the basis to estimate GHG emission reductions for each mitigation action.[39]

The GCARP comprises four components: (a) institutions (b) data management (c) methods and tools and (d) training. This cohesive system includes data related to GHG inventories, mitigation actions, GHG impacts and climate change support, i.e., financing and capacity building. Furthermore, GCARP grants a comprehensive assessment of impacts and provides useful information, allowing for better coordination in planning of mitigation, adaptation, and development actions. A key focus for Ghana is to transparently report and mainstream GCARP's operations with ministries, departments, and agencies, industry, businesses and NGOs.[40]

Data collection on the impact of mitigation actions is carried out via regular surveys and also systematically through the sectoral APR system, where sectors are able to develop indicators and report through the sector APR.[41]

Ghana's domestic MRV systems have seen major achievements in recent years. The country's arrangement has been revised from an original ad-hoc arrangement to a decentralized structure where line ministries are primarily responsible in compiling sector GHG inventories. The Environmental Protection Agency (EPA) is the lead agency under the Ministry of Environment, Science, Technology, and Innovation (MESTI). The EPA cooperates with inventory stakeholders to manage a host of data protocols such as activity data and emission factors, quality control/quality assurance, and preparation of the reports. This improved institutional structure involves thirty experts from sixteen different public and private institutions. The roles and responsibilities of each institution and their reporting lines are organised to reflect the levels of vertical and horizontal integration.[42]

During the design and implementation stage of the G-CARP system, several stakeholders identified existing national and international sources of data. These data streams included sources such as national budgets, agricultural census and national communications, as well as sector-specific project reports.[43] Thereby, these data streams assist the collection of data to monitoring indicators and to track the performance of actions in Ghana. By utilizing Ghana's existing data sources this has increased the system's overall effectiveness, both at a city and national level. In addition to building on existing data sources, the data collection process also draws on sourcing information on mitigation actions via interviews with key stakeholders. This information collected includes the scope and type of

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38   Ghana's Third Biennial Update Report, https://unfccc.int/documents/299589

39   Analysis of MRV and Accounting Systems of Annex I and Non-Annex I Countries: Good Practices and Lessons Learned, https://www.transparency-partnership.net/system/files/document/Good%20Practices%20print%20Published_0.pdf

40   Ghana Climate Ambitious Reporting Program, https://www.transparency-partnership.net/system/files/document/Good%20Practice-Ghana-Climate%20Ambitious%20Reporting%20Program.pdf

41   https://www.transparency-partnership.net/system/files/document/Good%20Practice-Ghana-Climate%20Ambitious%20Reporting%20Program.pdf

42   https://www.transparency-partnership.net/system/files/document/Good%20Practice-Ghana-Climate%20Ambitious%20Reporting%20Program.pdf

43   Ghana's Second Biennial Update Report, https://unfccc.int/sites/default/files/resource/gh_bur2_rev-2.pdf

mitigation, sub-actions taken or envisaged to be taken, achievements and challenges.

In recent years, the National Development Planning Commission and the EPA developed indicators to track the progress of NDC at the national and sectoral levels.[44]

An NDC indicator tracking template was used that the line ministries use for data collection and reporting progress. A snapshot of the template, which was published as an annex to Ghana's Third Biennial Update Report, is provided in Table 21.

Table 21: Snapshot of Ghana's NDC indicator tracking template

Programme of Action	Threshold Target by 2030	Sub-units	Indicators	Lead Institutions
Increase small-medium hydro installed capacity up to 150–300MW	300	MW	Mini-hydro installed capacity	Ministry of Energy
Attain utility-scale wind power capacity up to 50–150MW	150	MW	Grid-connected wind power installed capacity	Ministry of Energy
Attain utility-scale solar electricity installed capacity up to 150–250 MW	250	MW	Grid-connected solar installed capacity	Ministry of Energy
200,000 solar systems for lightning in residential and non-residential buildings	200,000	500W	Number of installed solar home systems	Ministry of Energy
Establish 55 mini-grids with an average capacity of 40kW.	55	40kW	Number of 40kW mini-grids installed	Ministry of Energy
Increase solar lanterns penetration in rural non-electri-fied households to 2 million	2,000	1000 lamps	Number of LED lamps distributed	Ministry of Energy
Scale-up adoption of LPG in at least 50% of households	134	1000 LPG stoves	Number of LPG stoves adopted, % of house-hold using LPG for cooking	Energy Commission
Scale-up access and adoption of 2 million efficient stoves	2,000	1000 efficient stoves	Number of efficient stoves distributed	Energy Commission
Fuel switch from heavy fuel oil to natural gas in existing electric power plants	50	100 TJ fuel use/year	Quantity of natural gas per thermal electricity generated	Volta River Authority, IPPs
Improve the efficiency of the thermal power plants by converting the single-cycle power plants to combined cycle	3.3	100 MW increase	Amount of capacity added due to single cycle to combined cycle conversion	Independent Power Producers
and utilisation of associated gas from Jubilee and Tein oil fields	120	1 MMSCF/day	Amount of gas recovered from oil field	Ghana National Gas Company
Promote Efficient lighting with LED bulbs	20,000	1000 bulbs	Number of LED bulbs distributed	Energy Commission

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44   Ghana's Third Biennial Update Report, https://unfccc.int/documents/299589

Scale up adoption of Efficient Refrigeration	2,000	1000 refrigerators	Number of efficient refrigerators distributed	Energy Commission
Scaling up the installation of power factor correction devices in 1,000 commercial and industrial facilities (capacitor banks).	1,000	1 facility	Number of industrial and commercial facilities that have installed capacitors	Energy Commission
Ghana Cocoa REDD+ Programme	270	Avoided deforestation 1000 ha	Avoided deforested area (ha)	Forestry Commission
Wildfire management in the transition and savannah drylands in Ghana				Forestry Commission
National Forest Plantation Development Programme	660	Reforestation of 1000 ha	Areas reforested (ha)	Forestry Commission
Enrichment Planting				
Reduction in the RAC sector (scale-up market share of climate-friendly and energy-efficient air-condition)	70%	Market share of green and energy-efficient air conditioners	% of market share of green and EE air conditioners	Environmental Protection Agency
Expansion of intracity transportation modes (Bus Rapid Transit)	200	1 km BRT line	Length of BRT km	Ministry of Transport
Expansion of inter and intra city transportation modes (Railway Transit System)	TBD	TBD	TBD	Ministry of Railways
Improve the effectiveness of urban solid waste collection up to 70-90% and the construction of engineered landfills for methane recovery	14	200 t/day plant	Quantity of gas recovered from engineered landfills	Ministry of Sanitation and Water Resources
Increase the current waste-to-compost capacity of 200 t/day to 500 t/day	0.5	1000 t/day plant	Waste-to-compost processing installed capacity	Ministry of Sanitation and Water Resources
Scale-up 200 biogas facilities	1	1000 t/year plant	Quantity of biogas produced	Ministry of Sanitation and Water Resources, Ministry of Environment, Science, Technology and Innovation
Adoption of modified community-based conservation agriculture/climate-smart agriculture in 54 districts	54	Number of districts	Number of districts practising conservation agriculture/CSA	Ministry of Food and Agriculture
Scale-up penetration of climate-smart technologies to increase fisheries and livestock productivity by 10%	10	% Fisheries/ Livestock Production	% Increase in fisheries/livestock production	Ministry of Food and Agriculture, Ministry of Fisheries and Aquaculture

Source: Ghana's Third Biennial Update Report[45]

45   Ghana's Third Biennial Update Report, https://unfccc.int/documents/299589

The tracking of NDC progress is supported by an NDC accounting tool, which helps all stakeholders at the national, local, and sectoral level in the reporting of GHG inventory results as well as in the evaluation of the effects of actions under the NDC.

Uruguay

Uruguay's MRV system monitors the country's NDC targets and is used as an instrument to report to the UNFCCC[46]. Uruguay's second NDC[47], submitted in December 2022, contains several qualitative adaptation targets and quantitative mitigation targets. Uruguay's GHG inventory system and the MRV framework are interlinked. Although each party works in parallel, strong synergies have been developed to ensure open lines of communication to strengthen both the national GHG inventory and MRV system.

It is recommended to build on existing structures, some countries may already have the required mechanisms to monitoring climate interventions. Uruguay is a prime country

example whereby; the country has sought after existing arrangements. Uruguay has made significant efforts towards strengthening institutional capacity through revising public policies and instruments. The National Policy on Climate Change in 2017 was formed, alongside this the National System of Response to Change was created (SNRCC by its Spanish acronym) to coordinate policies, plans and national reports on climate change.[48] The SNRCC also coordinates the MRV system, providing a strong framework to enable the design of the NDC. The PMRV (Programming, Monitoring, Reporting and Verification) group coordinates closely with the working groups involved in the GHG inventory system to obtain the information regarding sectoral emissions required for the monitoring indicators.

Uruguay's MRV framework aims to track the progress towards targets continually throughout the implementation of the NDC, and an online tool is available for the visualisation of this progress[49]. Table 22 lists examples of the indicators used for tracking progress towards the various NDC targets.

Table 22: Examples of NDC targets and selected indicators

NDC target	Selected indicator
Reduce the intensity of CO_2 emissions by 24% per unit of GDP	Percentage reduction of CO_2 emissions per unit of GDP in real terms compared to 1990
Maintain 100% of the native forest area in 2012 (849,960 ha).	Percentage of the native forest area with respect to the base year (2012).
At least maintain 100% of the amount of effective area in forest plantation management from the year 2015 (763,070 ha)	Percentage of effective area in forest plantation management with respect to the base year (2015).
Avoided CO_2 emissions from soil organic carbon in 10% of pasture area (1,000,000 ha)	Grassland area where CO_2 emissions are avoided soil organic carbon in the year t.

46 Uruguay's Greenhouse gas inventory evolution as a component of the MRV for the country's NDC, https://www.transparency-partnership.net/system/files/document/200114_GPD_Uruguay_GHG_inventory_RZ.pdf

47 República Oriental de Uruguay, Segunda Determinada a nivel Nacional al Acuerdo de París, https://unfccc.int/sites/default/files/NDC/2022-12/Uruguay%20Segunda%20CDN.pdf

48 Uruguay, Cuarto Informe Bienal de Actualización, https://unfccc.int/documents/419773

49 Visualizador de avances de la Contribución Determinada a nivel Nacional y otros indicadores vinculados, https://visualizador.gobiernoabierto.gub.uy/visualizador/api/repos/%3Apublic%3Aorganismos%3Aambiente%3Avisualizador_cdn.wcdf/generatedContent

The visualization tool presents the progress towards each NDC target (Figure 13). The anticipated impacts from the selected indicators are quantified in relation to a reduction in GHG emission using the country's GHG inventory data. In addition, technical specification templates are available on the website which define and document targets and measures. These templates include indicators, methodologies, data sources and geographical scope. Alongside each indicator methodology, responsible entities have been mapped for the respective indicator, this includes governmental and non-governmental agencies.

Figure 13: Visualisation of the progress towards Uruguay's NDC targets

Energy | IPPU

CO$_2$ / GDP

24% reduction in CO$_2$ emissions intensity per real GDP unit, from base year 1990

Target Year 2025 **24%**
Last available value **23% (Year 2019)**
Progress **96%**

Energy | IPPU | AFOLU | Waste

CH$_4$ / GDP

57% reduction in CH$_4$ emissions intensity per real GDP unit, from base year 1990

Target Year 2025 **57%**
Last available value 50% **(Year 2018)**
Progress **88%**
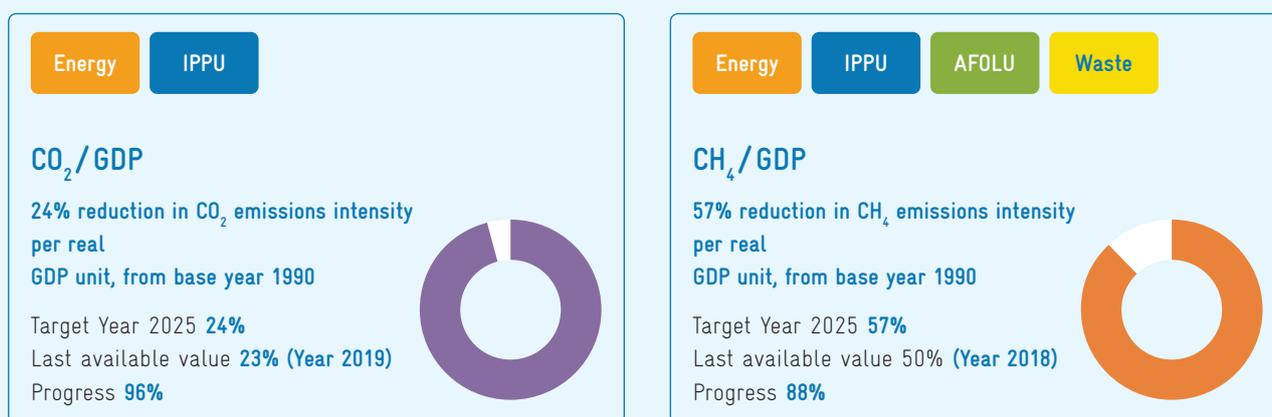
Source: SNRCC viewer for progress towards the NDC and other related indicators[50]

The same website provides information on the progress of the country's NDC measures, which can be further sorted by: measure sub-group, sector, state of progress, reference institution and gender sensitivity (see Figure 14). This online system mandates all technical specification templates are amended continuously.[51]

50 Ministry of Environment, SNRCC Greenhouse gas emissions and removals viewer, https://visualizador.gobiernoabierto.gub.uy/visualizador/api/repos/%3Apublic%3Aorganismos%3Aambiente%3Avisualizador_cdn.wcdf/generatedContent
51 UNPD, Best practices on MRV The case of Uruguay, https://www.un-gsp.org/sites/default/files/documents/best_practices_on_mrv-_monitoring_ndc_in_uruguay.pdf

Figure 14: Visualisation of the progress of Uruguay's NDC measures

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| Seleccione… ⌄ |

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| En Programación | En Implementación | Meta Alcanzada |

Medidas por sección de la CDN

| Mitigación – Incondicional | Adaptación | Mitigación – Condicional |
| | | Capacidades y Generaciór |

Source: SNRCC viewer for progress towards the NDC and other related indicators[52]

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52 Ministry of Environment, SNRCC Greenhouse gas emissions and removals viewer, https://visualizador.gobiernoabierto.gub.uy/visualizador/api/repos/%3Apublic%3Aorganismos%3Aambiente%3Avisualizador_cdn.wcdf/generatedContent