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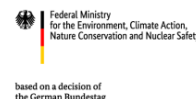


NDC Tracking – Projections

Sabino Del Vento (Ricardo)

19/03/2026, Windhoek

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What are GHG projections and why are they important?

An outlook or forecast of future GHG emissions and removals, as well as key indicators used for tracking progress, based on an underlying assumptions, parameters, and policy choices

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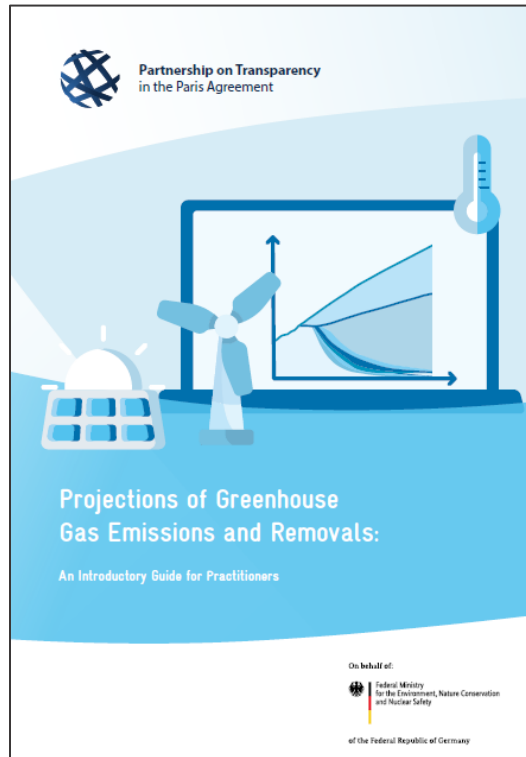


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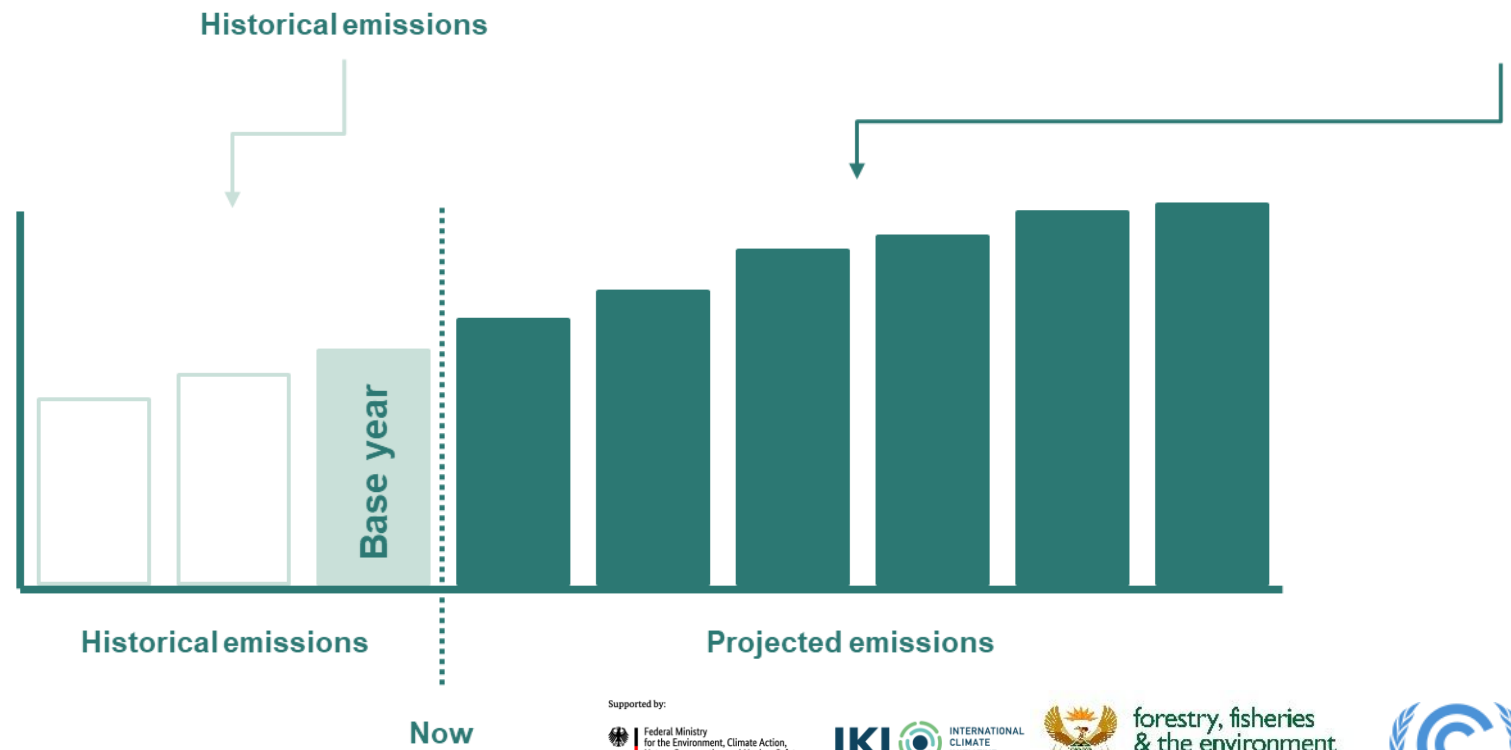


PATPA Publication on Projections



- 1) The importance of developing projections
- 2) Basic approach to developing GHG projections
- 3) Quality Assurance and Quality Control
- 4) Refining the projection's approach over time

<https://transparency-partnership.net/publications-tools/projections-greenhouse-gas-emissions-and-removals-introductory-guide>





Reporting requirements

- **Decision 18/CMA.1** (MPGs)

- Annex, chapter III.F. – Projections of greenhouse gas emissions and removals, as applicable, paragraphs 92–102

- **Decision 5/CMA.3** (CTF tables)

- Annex II: Common tabular formats for the electronic reporting of information on projections of greenhouse gas emissions and removals



CTF tables

- Annex II to decision 5/CMA.3 contains CTF tables for the electronic reporting of the information on:
- **projections**, the structured summary; mitigation policies and measures, actions and plans; summary of GHG emissions and removals; domestic policies and measures implemented to address the social and economic consequences of response measures; and the description of Party's NDC.



CTF tables for reporting projections of GHG emissions and removals

- Annex II to decision 5/CMA.3 – Which tables are relevant to projections?

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CTF tables for reporting projections of GHG emissions and removals

- Annex II to decision 5/CMA.3 – Which tables are relevant to projections?
- Projections under a WEM, WOM, and WAM scenarios
- Projections of key indicators
- Key underlying assumptions and parameters used for projections

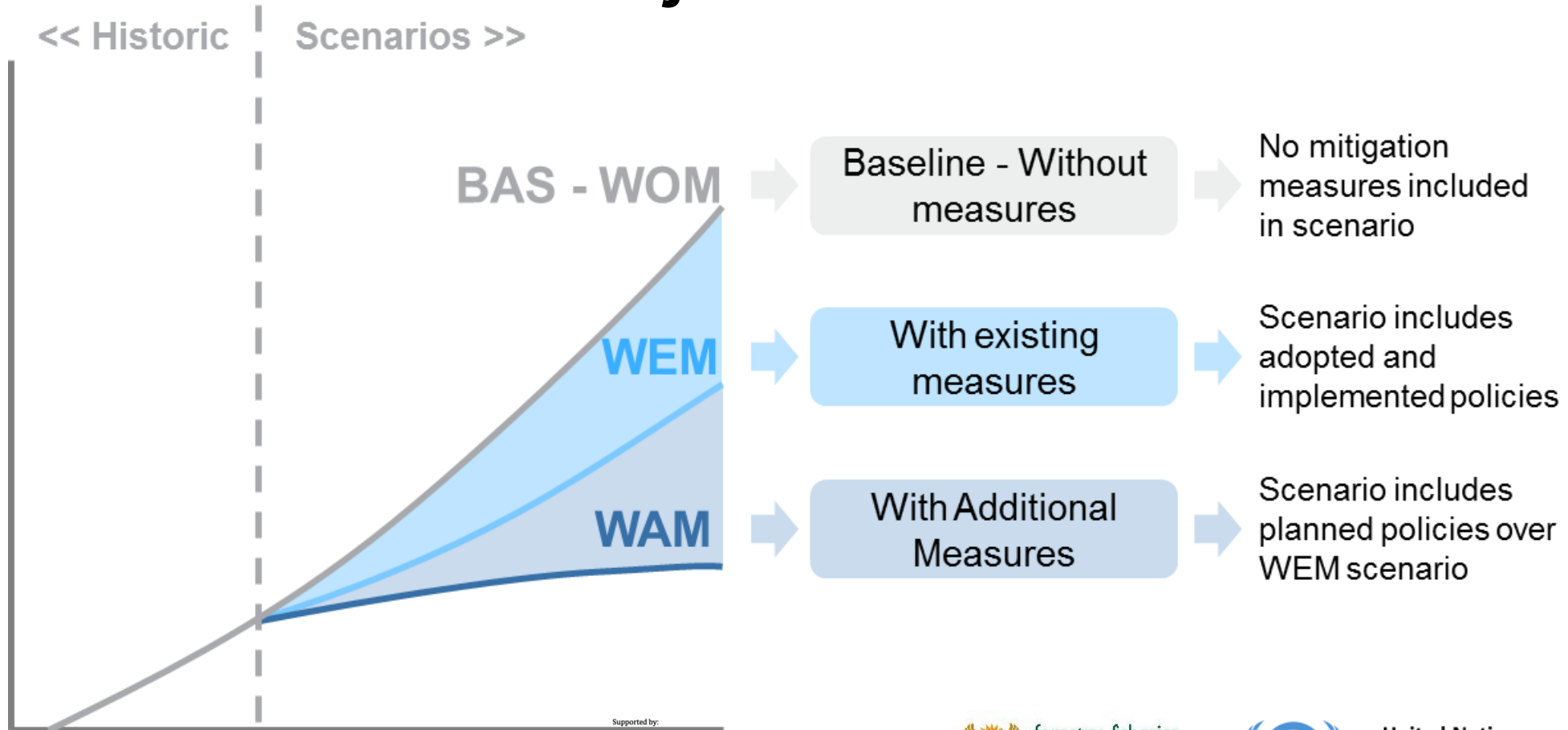


Understanding Key Terms and Abbreviations

- A **‘with (existing) measures’ (WEM/WM)** scenario encompasses currently implemented and adopted policies and measures.
- A **‘with additional measures’ (WAM)** scenario encompasses implemented, adopted and planned policies and measures.
- A **‘without measures’ (WOM)** projection excludes all policies and measures implemented, adopted and planned after the year chosen as the starting points for the projection.



Projections





Understanding Key Terms and Abbreviations

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Understanding Key Terms and Abbreviations

- **Baseline Scenario** projection: hypothetical case that represents future events or conditions most likely to occur in the absence of activities taken to meet a mitigation target
- **Business-as-usual (BAU)** scenario could include some implemented and/or adopted policies and measures and, as such, is not identical to a WOM scenario

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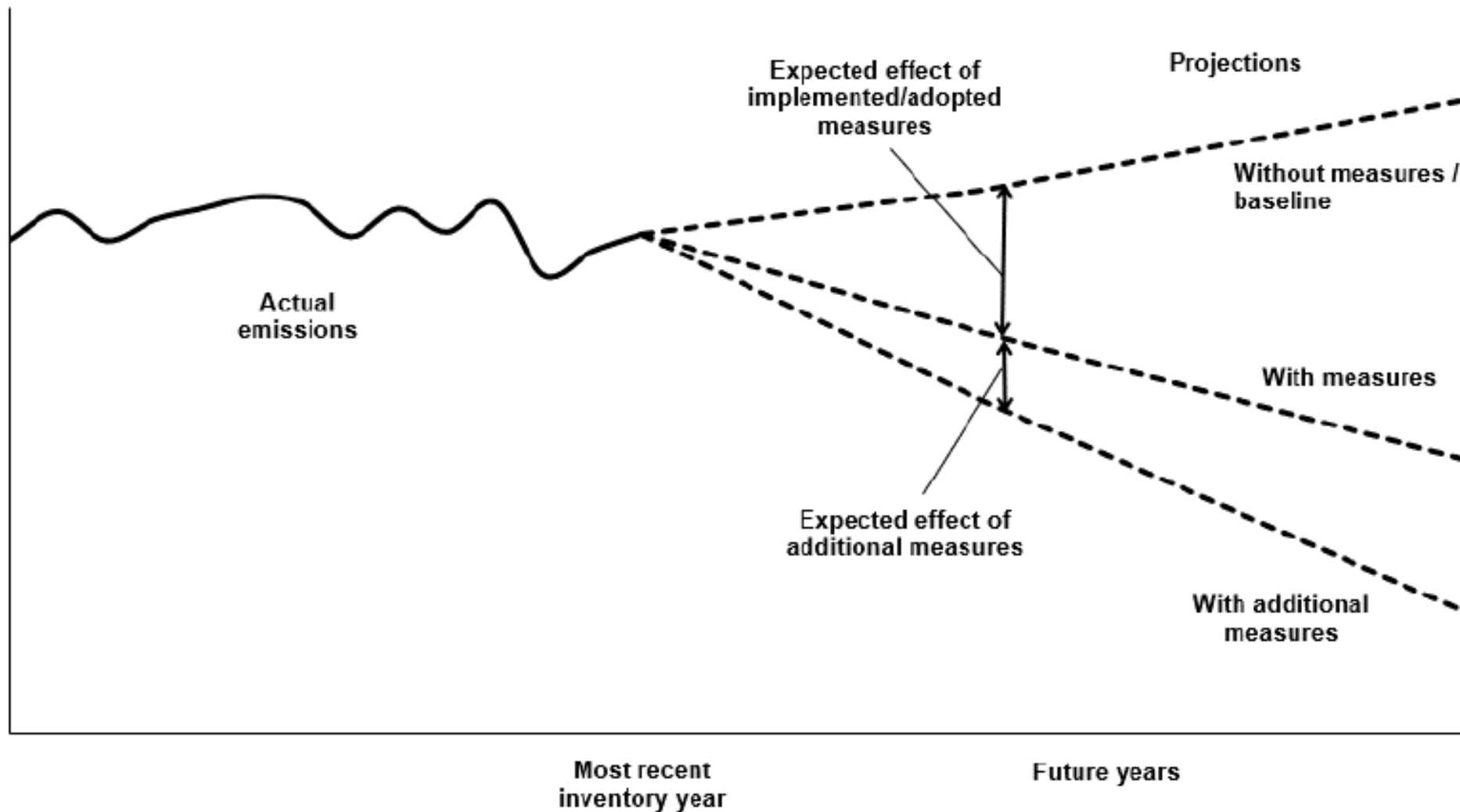
Understanding Key Terms and Abbreviations

- **Unconditional** NDCs – Commitments that a Party will implement using its own domestic resources, without requiring additional international support

- **Conditional** NDCs – Commitments that a Party will implement only if additional support is provided



Projections





Quiz

- Which paragraph in the MPGs defines the three scenarios associated with projections of GHG emissions and removals?
- Which scenarios are mandatory ('shall requirement') and which are non-mandatory ('may requirement')?



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Scenarios for GHG projections

Scenarios for projections of greenhouse gas emissions and removals

With measures

Encompasses currently implemented and adopted policies and measures ("shall requirement")

With additional measures

Encompasses implemented, adopted and planned policies and measures ("may requirement")

Without measures

If provided, it excludes all policies and measures implemented, adopted and planned after the year chosen as the starting points for the projections ("may requirement")

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Reporting projections under the ETF

Para MPGs	Type	Requirement
92	Shall / Encouraged	Report projections with flexibility for developing countries
93	Shall	Indicative of the impact of PaMs, not for progress assessment unless specified
94	Shall / May	Report ' with measures ' projection and optionally others
95	Shall	Projections to start from most recent year and extend at least 15 years , with flexibility for developing countries
96	Should	Methodology description including models, changes, assumptions, and sensitivity analysis
97	Shall	Provide projections of key indicators for NDC progress
98	Shall	Include sectoral , by gas and national total projections using a consistent metric
99	Shall	Present projections relative to actual inventory data
100	Shall	Provide emission projections with and without LULUCF
101	Shall	Present projections in graphical and tabular formats

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Reporting projections under the ETF

“102. Those developing country Parties that need flexibility in the light of their capacities with respect to paragraphs 93–101 above can instead report using a less detailed methodology or coverage.”

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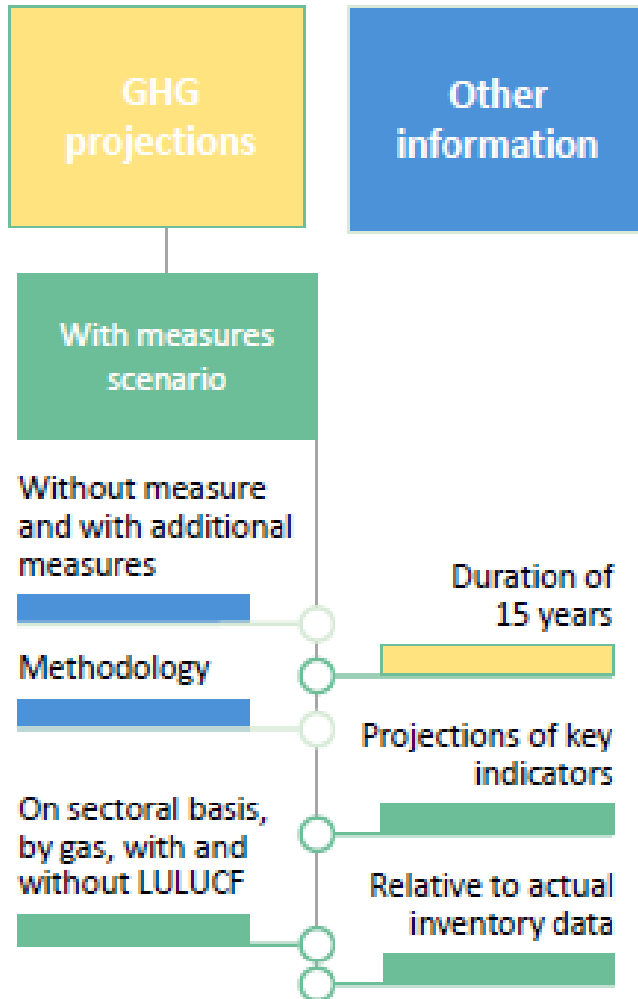


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Tracking progress: Overview of reporting requirements



Flexibility provisions

Table 5.1: Summary of flexibilities applied

MPD flexibility provision (18/CMA.1)	Description of the flexibility application	Clarification of capacity limitation	Deadline for capacity improvement	Progress made to address areas for improvement
Para 92, 95 and 102	Projections of GHG gas emissions and removals	Lack of capacity to report projections	2028, Subject to the availability of adequate support	NA

■ Mandatory "shall"
 ■ Non-mandatory "should"/"may"
 ■ Flexibility



Flexibility for developing country Parties

REFERENCE IN THE MPGS (ANNEX TO DECISION 18/CMA.1)	PROVISION IN THE MPGS	FLEXIBILITY PROVISION FOR THOSE DEVELOPING COUNTRY PARTIES THAT NEED IT IN THE LIGHT OF THEIR CAPACITIES
Paragraph 92 GHG emission and removals projections	Each Party shall report projections	Those Parties that need flexibility are instead encouraged to report these projections.
Paragraph 95 Projections extension	Projections shall begin from the most recent year in the Party's national inventory report and extend at least 15 years beyond the next year ending in zero or five	Those Parties that need flexibility have the flexibility to instead extend their projections at least to the end point of their NDC under Article 4 of the Paris Agreement.
Paragraph 102 Projections methodology or coverage	See paragraphs 93 through 101 of the annex to decision 18/CMA.1	Those Parties that need flexibility can instead report using a less detailed methodology or coverage .



Developing projections

Inputs:

1. Historical Data

1. **Historical Emissions:** Activity data including energy and industrial activities, and respective emissions factors.
2. **Historical Drivers:** Economic indicators (like GDP), demographic data, energy usage trends, and changes in land use.
3. **Non-emissions Data:** Additional environmental data (e.g., deforestation rates) and socio-economic data.

2. Projected Data

1. **Drivers:** Predictions on economic growth, demographic changes, and energy price fluctuations.
2. **Policies:** Forthcoming government policies and industry standards regarding emissions reductions.

3. Tracking Data

1. **Assumptions:** Economic and technological predictions for the future.
2. **Definition of Indicators:** Criteria to gauge progress, such as GHG emissions reduction and energy efficiency improvement.

Outputs:

- **GHG Results:** Forecasts of total and sector-specific GHG emissions and trend analysis.
- **Non-GHG Results:** Evaluations of other environmental impacts and socio-economic outcomes.
- **Policy Evaluation:** Analysis of the potential impact of proposed policies on GHG emissions and suggestions for policy modifications or new strategies.



Methods to estimate GHG projections

- Contrary to the case for estimating emissions for national GHG inventories, there are no prescribed methodologies for the preparation of projections
- **Parties may use any models and approaches at their disposal**, and as deemed relevant to their needs and national circumstances, to project future GHG emissions and removals
- All projections of GHG emissions and removals are modelled in some way

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Methods to estimate GHG projections

- Economy-wide macroeconomic models (e.g. computable general equilibrium (CGE), dynamic stochastic general equilibrium (DSGE));
- Sectoral models to project emissions from the energy sector (e.g. Price-induced Market Equilibrium System (PRIMES), Market Allocation (MARKAL), Integrated Market Allocation-Energy Flow Optimization Model System (TIMES), Model for Energy Supply Strategy Alternatives and their General Environmental Impact (MESSAGE), Low Emissions Analysis Platform LEAP);
- Sectoral models to project non-energy related GHG emissions (e.g. Common Agricultural Policy Regional Impact (CAPRI) for agriculture);
- Sectoral models to project GHG emissions and removals from land use, use change and forestry (e.g. CLUE, GEONAMICA, IMAGE, LANDSHIFT, PLM, SITE).

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Overview of options to present information

Narrative

- Suited to provide context
- Enables more detailed explanations
- Allows the description of connections and interactions

Tabular – CTF tables

- Enables comparability across Parties
- Provides comprehensive information (with flexibility)

Graphic

- Makes information and data easier to understand
- Enables direct visual understanding of trends or relationships

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Examples from BTR1

- South Africa
- Ghana
- Rwanda
- Namibia

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South Africa

- [CTFs for NDC Tracking Chapter of First BTR of South Africa](#)

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Sector ^d	Most recent year in the Party's national inventory report		Projections of GHG emissions and removals	
	(kt CO ₂ eq) ^c		(kt CO ₂ eq) ^c	
	2022		2025	2030
Energy		FX	FX	FX
Transport		FX	FX	FX
Industrial processes and product use		FX	FX	FX
Agriculture		FX	FX	FX
Forestry/LULUCF		FX	FX	FX
Waste management/waste		FX	FX	FX
Other (specify)		FX	FX	FX
Gas		FX	FX	FX
CO ₂ emissions including net CO ₂ from LULUCF		FX	FX	FX
CO ₂ emissions excluding net CO ₂ from LULUCF		FX	FX	FX
CH ₄ emissions including CH ₄ from LULUCF		FX	FX	FX
CH ₄ emissions excluding CH ₄ from LULUCF		FX	FX	FX
N ₂ O emissions including N ₂ O from LULUCF		FX	FX	FX
N ₂ O emissions excluding N ₂ O from LULUCF		FX	FX	FX
HFCs		FX	FX	FX
PFCs		FX	FX	FX
SF ₆		FX	FX	FX
NF ₃		FX	FX	FX
Other (specify)		FX	FX	FX
Total with LULUCF			433.14 ⁽¹⁾	394.28
Total without LULUCF			476.59	437.71

South Africa – Table 7

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South Africa – Table 10&11

- "Flexibility: Applied to the GHG emissions projection for the “with measures” scenario, which extends to 2030 (the end point of South Africa’s most recent NDC). The in-house model which was used to develop the projection currently only produced results up to 2030 which match SA’s requirements. The model’s capabilities will be extended to produce projections 15 years beyond the next year ending in zero or five by 2028. Flexibility: Applied to the GHG emissions projection for the “with measures” scenario, for which only aggregate national emissions projections are reported (without any disaggregation), and for which a less detailed methodology is reported, and to the projection of key indicators, which is not reported. As above, the current in-house modelling framework does not report comprehensive disaggregated GHG emissions by gas, sector and source, and so these were not reported. The methodology and assumptions for the model are still being documented. The indicator used to track progress was not projected due to limitations in data, and a currently inadequate understanding of the key drivers for natural disturbances. Data challenges are reported in Annex VII of the NID. Application and capacity constraint: Applied to the GHG emissions projection for the “with measures” scenario, for which only aggregate national emissions projections are reported (without any disaggregation), and for which a less detailed methodology is reported, and to the projection of key indicators, which is not reported. As above, the current in-house modelling framework does not report comprehensive disaggregated GHG emissions by gas, sector and source, and so these were not reported. The methodology and assumptions for the model are still being documented. The indicator used to track progress was not projected due to limitations in data, and a currently inadequate understanding of the key drivers for natural disturbances. Data challenges are reported in Annex VII of the NID. Self-determined timeframe for improvement: 2028"



Ghana

- [GHA-CTF-NDC-2024-V0.2](#)

- Is the information reported in the CTF table consistent with the reporting requirements?
- Completeness and transparency (MPGs and annex II to decision 5/CMA.3)





Projections of PV electricity generation

- Develop projections of photovoltaic (PV) electricity generation using a bottom-up, technology-specific modelling approach. This method combines projected PV capacity additions with scenario-dependent performance parameters to estimate annual electricity generation from the latest inventory year ($t_0=2024$) through 2050.
- The modelling framework consists of two sequential steps:
- **Projection of installed PV capacity** for each scenario using a compound annual growth formula based on policy assumptions and expected technology deployment.
- **Calculation of annual electricity generation** using capacity values combined with scenario-specific capacity factors and a PV degradation function.

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Projections of PV electricity generation

- Two policy scenarios:
- **With Existing Measures – WEM:** relies solely on already implemented measures and committed projects.
- **With Additional Measures – WAM:** reflects the implementation of announced policies consistent with the NDC.

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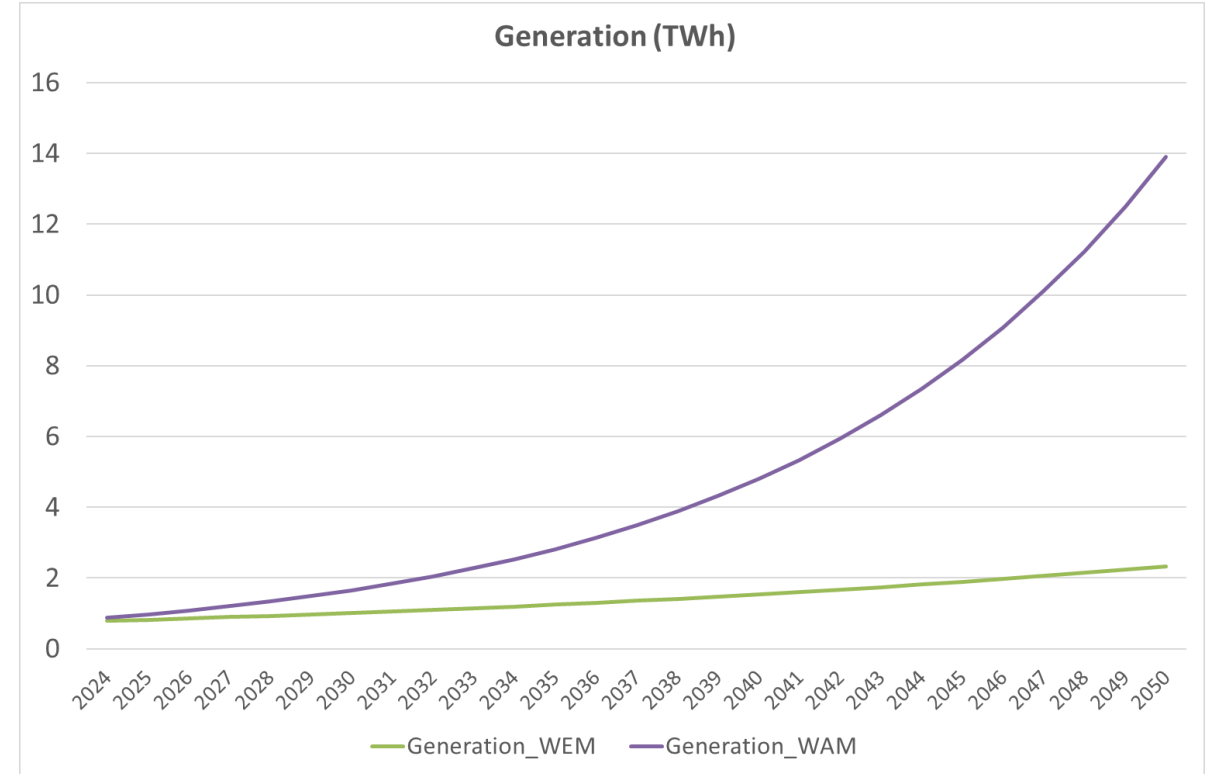
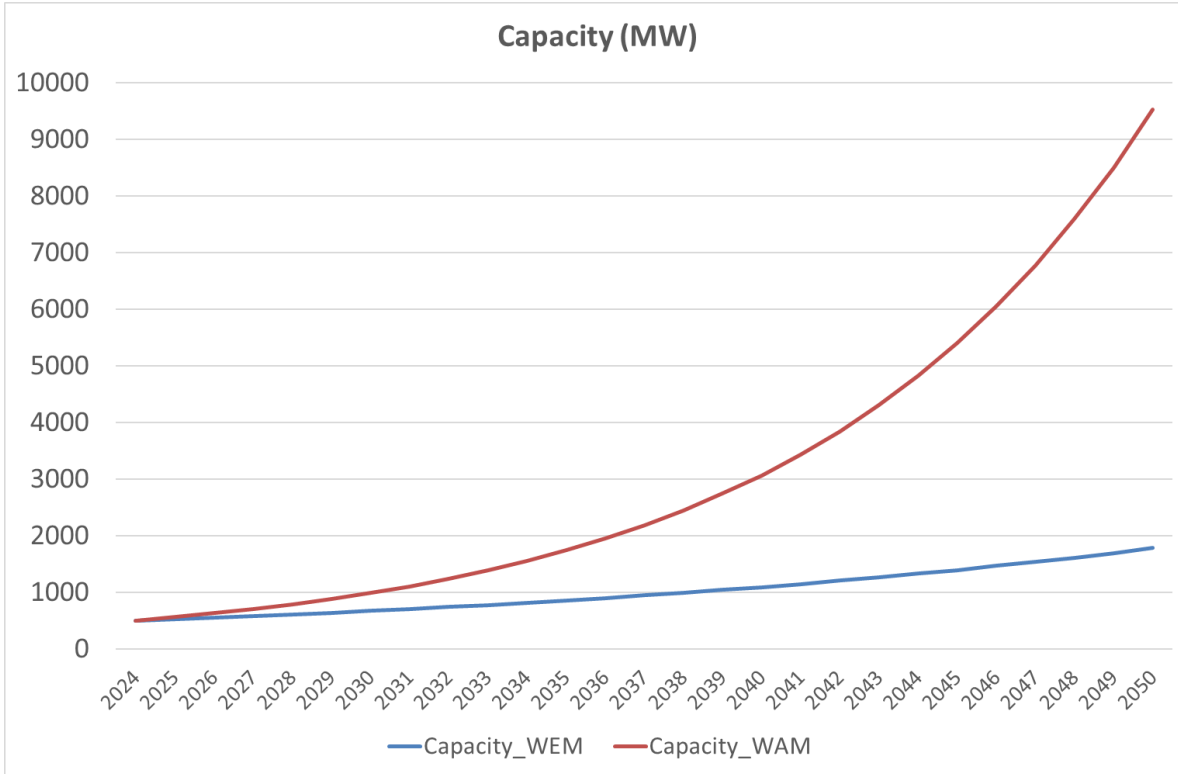
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Projections of PV electricity generation

- Projections extension (no flexibility provisions applied)
- What information needs to be reported in the CTF tables?

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	Most recent year in the Party's national inventory report	Projections of GHG emissions and removals			
	(kt CO ₂ eq) ^c	(kt CO ₂ eq) ^c			
		2025	2030	2035	2040
Sector^d					
Energy					
Transport					
Industrial processes and product use					
Agriculture					
Forestry/LULUCF					
Waste management/waste					
Other (specify)					
Gas					
CO ₂ emissions including net CO ₂ from LULUCF					
CO ₂ emissions excluding net CO ₂ from LULUCF					
CH ₄ emissions including CH ₄ from LULUCF					
CH ₄ emissions excluding CH ₄ from LULUCF					
N ₂ O emissions including N ₂ O from LULUCF					
N ₂ O emissions excluding N ₂ O from LULUCF					
HFCs					
PFCs					
SF ₆					
NF ₃					
Other (specify)					
Total with LULUCF					
Total without LULUCF					



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Sabino.delvento@ricardo.com

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