Validation Workshop Report: NDC Tracking Templates

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Validation Workshop Report: NDC Tracking Templates

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1 Introduction

1.1 Background

The validation of NDC tracking templates is a critical step in operationalizing Namibia's Measurement, Reporting, and Verification (MRV) and Enhanced Transparency Framework (ETF) commitments under the Paris Agreement. Namibia's updated NDC (2023) emphasizes a 7.669 $MtCO_2e$ emission reduction potential by 2030, with energy and AFOLU sectors contributing over 95% of mitigation efforts. To ensure that these targets are credibly tracked, a structured and stakeholder-validated system of data templates has been developed.

The validation workshop brought together representatives from MEFT, MIME, NamPower, ECB, NSA and regional authorities. The purpose was to ensure that data collection templates for key performance indicators are practical, comprehensive, and aligned with international reporting requirements (BTR1/NC5, ETF).

The final day of the Validation Workshop was devoted to the presentation, testing, and validation of Namibia's newly developed NDC tracking templates. These Excel-based templates have been designed to track the implementation of NDC mitigation actions in the energy and transport sectors, ensuring alignment with Namibia's Measurement, Reporting, and Verification (MRV) system and the Enhanced Transparency Framework (ETF) under the Paris Agreement.

The session was built on the work of the previous two days, which had addressed the new energy scenario and the adaptation of the ICAT methodology. By this point, participants had developed a clear understanding of the importance of robust data systems. Day 3 therefore provided the practical component: tools that would operationalize Namibia's reporting commitments.

1.2 Objectives of the Validation Workshop

The main objectives were:

- To **present draft NDC tracking templates** for energy-sector indicators (e.g., installed renewable energy capacity, GHG reductions, fossil fuel substitution).
- To **gather feedback from stakeholders** on usability, feasibility, and alignment with institutional data systems.
- To ensure that templates are **SMART** (Specific, Measurable, Achievable, Relevant, Time-bound).

- To define **QA/QC procedures** and assign institutional roles for data provision, validation, and compilation.

The key purpose of Day 3 was to validate the draft templates and confirm their technical soundness, usability, and relevance to Namibia's context. Participants were expected to review the indicators and formulas, test the templates with real or sample data, and suggest improvements. Another important objective was to define how the templates would fit into Namibia's institutional data flows, identifying who would collect, compile, validate, and approve information before it was uploaded into the national Climate Data Management System (CDMS).

The facilitator emphasized that the templates should not be seen as static tools, but rather as living instruments that can evolve over time. As such, stakeholder feedback during this validation exercise would be vital to refine the templates and build a sense of shared ownership among institutions responsible for climate reporting.

2 Methodology of Validation

The validation process followed a structured approach:

1. **Presentation of Indicator Templates**: Each indicator template was introduced, with details on units, assumptions, data sources, and formulas.
2. **Stakeholder Breakout Sessions**: Participants worked in groups (Energy, AFOLU, Waste, IPPU) to test the templates with sample data from ongoing projects (e.g., Omburu PV, Baynes Hydro, BEV roll-out).
3. **Plenary Discussion**: Consolidated group feedback was recorded, focusing on relevance, feasibility, and consistency with existing reporting systems.
4. **Revision Agreement**: Areas for refinement (e.g., unit harmonization, activity data clarity, inclusion of cost indicators) were documented for integration into the final templates.

2.1 Presentation of the Templates

The consultants began by walking participants through the structure of the Excel workbooks. Each template was organized into indicator-specific sheets, supported by a centralized "Config" sheet where Namibia-specific default parameters—such as grid emission factors, fuel efficiency values, and vehicle occupancy rates—were stored. This approach was intended to standardize inputs, minimize errors, and ensure consistency across all calculations.

The energy sector template focused on key mitigation indicators such as annual greenhouse gas reductions from grid-connected renewable energy, installed renewable energy capacity (both annual and cumulative), the share of renewable energy in total electricity generation, grid emission factors derived from the national generation mix, and transmission and distribution (T&D) losses. The template also included off-grid renewable connections, the number of households with access to clean cooking solutions, and data on renewable energy curtailment events.

The **transport sector template** covered a broader range of indicators reflecting Namibia's evolving mobility transition. These included the deployment of electric vehicles compared with internal combustion engine (ICE) baselines, improvements in fleet fuel efficiency, passenger mode shifts from private cars to public transport, the blending of biofuels in liquid fuels, non-motorized transport initiatives, freight efficiency improvements, and vehicle scrappage programmes.

What impressed many participants was the automation embedded in the templates. For example, avoided emissions from renewable energy projects were automatically

calculated using the formula: *Avoided tCO_2e = MWh generated × grid emission factor*. Similarly, in the transport template, emissions from electric vehicles were computed as *EV emissions = VKT × kWh/km × Grid EF ÷ 1000*, while those from ICE vehicles used the formula *ICE emissions = VKT × (L/100km ÷ 100) × fuel emission factor*. This built-in automation was seen as a way to minimize human error while also saving time for data compilers.

2.2 Reactions to the Energy Sector Template

The energy sector discussions were particularly lively. Representatives from **NamPower** noted that the templates aligned well with the data they already collect for settlement and metering purposes. They highlighted that the ability to link project-level renewable generation data directly to emissions reductions would strengthen both internal reporting and national-level transparency.

Officials from the **Electricity Control Board (ECB)**, however, emphasized that the accuracy of avoided emissions calculations would depend heavily on regularly updated grid emission factors. They pointed out that Namibia's dependence on electricity imports from South Africa meant that the grid factor was subject to frequent fluctuations. If templates continued to rely on outdated or static values, reported emissions reductions might be overstated or understated. The ECB therefore recommended institutionalizing an annual update of the grid EF in the Config sheet, linked to NamPower's generation and import data.

Civil society participants welcomed the inclusion of indicators beyond conventional GHG metrics. For instance, the template's attention to clean cooking and off-grid electrification was seen as critical for ensuring that Namibia's NDC tracking also captured **socially relevant outcomes** such as energy access, public health improvements, and gender-responsive benefits. One participant noted: *"For rural households, the question is not just how much carbon is reduced but whether women and children have access to safer, cleaner cooking solutions. These templates give us a way to measure that."*

2.3 Reactions to the Transport Sector Template

The transport sector discussions revealed both enthusiasm and concern. Participants appreciated the comprehensiveness of the indicators, which covered everything from electric vehicle uptake to non-motorized transport. Officials from the Ministry of Works and Transport (MWT) praised the way the templates accounted for both technological transitions (EVs, efficiency gains) and behavioral shifts (mode change to public transport, walking, and cycling).

However, several challenges were noted. The most pressing concern was the availability of reliable data. Calculating emissions reductions from electric vehicles, for example, requires accurate records of vehicle-kilometres traveled (VKT), vehicle-specific energy consumption, and occupancy rates. MWT officials admitted that such data was not systematically captured at present. Municipal transport planners echoed this point, suggesting that integration with the national vehicle registry and city-level transport surveys would be essential to populate the templates meaningfully.

Another participant suggested piloting the transport templates in Windhoek and Walvis Bay, where more structured data on fleets and traffic patterns is available, before rolling them out nationwide. This phased approach, it was argued, would help identify gaps and refine methodologies without overwhelming institutions that currently lack the necessary capacity.

2.4 Institutional Roles and Data Flows

The day also included a group exercise to map out institutional responsibilities for data collection, compilation, validation, and approval. The consensus was that project operators and implementing agencies (such as renewable energy developers, utilities, and fleet managers) would be the primary data collectors. Sector leads namely the Ministry of Mines and Energy (MME) for energy and the Ministry of Works and Transport (MWT) for transport would then compile the data into the templates. Validation would be the responsibility of MEFT, supported by the ECB for energy data. Final approval of the datasets before integration into the CDMS would rest with Namibia's MRV Committee.

Participants appreciated this clarification of roles, but several warned that these arrangements needed to be formalized. Without clear mandates and reporting obligations, institutions might delay or neglect submissions. Some participants recommended that reporting requirements be incorporated into sectoral regulations or memoranda of understanding between ministries and agencies.

2.5 Key Findings

The following key findings emerged from the validation workshop:

2.5.1 Alignment

Templates are aligned with the **NDC indicators** identified in Namibia's Mitigation Actions Appendix. This ensures that each template is directly linked to a performance measure under the updated NDC framework. Indicators such as installed renewable capacity, avoided GHG emissions, and BEV adoption are clearly embedded in the templates.

Table 1: Alignment of Templates with NDC Indicators

Indicator	NDC Action	Source Document	Alignment Notes
Annual GHG reductions from RE	Grid-connected solar, wind, hydro	Mitigation Actions Appendix	Full alignment with projected emission reduction potential
Installed renewable capacity (MW)	RE expansion projects	NDC 2023 Update	Direct alignment with Namibia's 2030 RE targets
BEV adoption (No. of vehicles)	Conversion of ICEVs to BEVs	Mitigation Appendix	Consistent with sectoral transport targets

2.5.2 Feasibility

Most data sources confirmed **availability of activity data**. NamPower, IPPs, and NSA provide reliable data for grid-connected RE, while the Ministry of Transport and NATIS maintain vehicle registration databases. However, data gaps persist in **off-grid solar PV adoption and bioenergy**. Stakeholders highlighted the need to strengthen collaboration with local municipalities and off-grid suppliers.

Table 2: Feasibility Assessment of Data Sources

Indicator	Primary Data Source	Availability	Identified Gaps	Suggested Action
Installed renewable capacity	NamPower, IPPs	High	Limited coverage of off-grid systems	Collaborate with municipalities and RE associations
Annual GHG reductions	NamPower, IPPs, ECB	High	Inconsistent reporting of load factors	Standardize reporting formats

BEV adoption	NATIS, Ministry of Transport	High	Data not yet disaggregated (light vs heavy vehicles)	Modify registration database fields
Bioenergy adoption	Ministry of Mines & Energy	Medium	Poor coverage of biomass-to-energy data	Establish centralized biomass registry

2.5.3 QA/QC Needs

Stakeholders emphasized the importance of **quality assurance and quality control (QA/QC)** features in templates. Recommended measures include:

- Drop-down menus for units of measurement.
- Automated error flags for missing or inconsistent data.
- Built-in validation formulas (e.g., cross-checking MWh generation against installed capacity).

Table 3: QA/QC Features Proposed

QA/QC Feature	Application	Benefit
Drop-down menus	Units, categories	Prevents inconsistent unit reporting
Error flags	Missing/incorrect values	Alerts users immediately to data entry errors
Cross-check formulas	Installed capacity vs. generation	Improves data consistency
Automated totals	Sectoral aggregation	Reduces manual calculation errors

2.5.4 Stakeholder Roles

Clear designation of roles was agreed upon during the workshop:

- **Data Providers**: Entities generating activity data (e.g., NamPower, IPPs, municipalities, NATIS).
- **Data Compilers**: Institutions responsible for consolidating data (NSA, MEFT).
- **Validators**: Institutions providing QA/QC oversight (ECB, QA/QC officers).

Table 4: Institutional Roles in NDC Tracking

Role	Institutions	Responsibilities
Data Providers	NamPower, IPPs, Municipalities, NATIS	Submit raw activity data
Data Compilers	NSA, MEFT	Consolidate, standardize, and prepare national datasets
Validators	ECB, MEFT QA/QC Officers	Verify consistency, ensure accuracy before submission

3 Outcomes of the Day

By the end of Day 3, participants had validated both the energy and transport templates, subject to minor refinements. There was broad agreement on the importance of localizing Namibia-specific parameters in the Config sheets, particularly for grid emission factors, vehicle fuel efficiency values, and occupancy rates. Stakeholders also committed to conducting a pilot test of the templates using data from the 2023–2024 reporting cycle, after which the templates would be integrated into the CDMS.

Another important outcome was the identification of capacity-building needs. Participants recognized that while the templates were technically sound, many institutions particularly municipalities and regional offices—lacked the expertise to use them effectively. Training programmes would therefore be required to build the necessary skills in data entry, validation, and analysis.

3.1 Lessons Learned

The validation discussions highlighted several important lessons. First, templates must remain as simple and automated as possible. If they become too complex, line ministries may struggle to adopt them. Second, the inclusion of evidence fields requiring each data entry to be linked to supporting documents or sources was recognized as essential for credibility and transparency. Third, while the templates represent a strong step forward, they will not solve Namibia's persistent data availability challenges, especially in the transport sector. Addressing these gaps will require institutional reforms and new data collection mechanisms. Finally, for long-term sustainability, the templates must be anchored in formal reporting mandates backed by law or regulation.

3.2 Conclusion

The Validation Workshop successfully achieved its goal of testing and validating Namibia's NDC tracking templates. The interactive process allowed stakeholders to see the templates in action, identify both strengths and weaknesses, and agree on practical steps for improvement. Participants left with a shared sense of ownership and responsibility for ensuring that the templates become operational tools rather than academic exercises.

The validation workshop confirmed that Namibia's NDC tracking templates are fit for purpose, aligned with national mitigation actions, and feasible for integration into institutional data flows. The revised templates will strengthen Namibia's ability to transparently track progress towards its NDC targets, enhance compliance with ETF requirements, and support evidence-based climate policy.

In conclusion, the workshop marked a critical milestone in Namibia's journey toward strengthening its MRV systems. By finalizing and institutionalizing these templates, Namibia will be able to report more transparently and accurately on its NDC progress, while also generating data that informs policy decisions and highlights the broader social and economic co-benefits of climate action.

3.3 Next Steps

1. **Integration of Feedback**: Revise draft templates to incorporate workshop recommendations.
2. **Pilot Testing**: Apply templates to at least two real projects per sector (e.g., Baynes Hydro, EV roll-out, composting plants).
3. **Institutionalization**: Embed validated templates within Namibia's ETF and NDC reporting system, ensuring consistency with Biennial Transparency Reports (BTR1/NC5).
4. **Capacity Building**: Conduct training for data providers, compilers, and validators on template use, QA/QC processes, and reporting procedures.

Annexes

Annexure: Summary of Energy and Transport NDC Tracking Indicators

This annexure provides an overview of the indicators presented during validation exercise, along with their definitions, potential data sources, and calculation methods.

A. Energy Sector Indicators

1. **Annual GHG Reduction from Grid-Connected Renewable Energy (tCO_2e/year)**
    - **Definition:** Measures avoided emissions from renewable electricity generation compared to fossil-based grid electricity.
    - **Data Sources:** NamPower settlement data; IPP generation reports; ECB annual statistics.
    - **Formula:** Avoided Emissions = *MWh generated × Grid Emission Factor (tCO_2/MWh)*.
    - **Notes:** Requires regular update of grid EF; must account for curtailment and T&D losses.
2. **Installed Renewable Energy Capacity (MW)**
    - **Definition:** Total installed generation capacity from renewable sources, disaggregated by annual additions and cumulative totals.
    - **Data Sources:** ECB licensing data; NamPower annual reports; IPP registries.
    - **Formula:** *Cumulative = Σ Installed MW by year*.
3. **Share of Renewable Energy in Total Electricity Generation (%)**
    - **Definition:** Proportion of renewable electricity generation in the overall mix.
    - **Data Sources:** NamPower generation and imports data; ECB statistics.

- **Formula:** *Renewable Generation ÷ Total Generation × 100*.

4. **Grid Emission Factor (tCO_2/MWh)**
   - **Definition:** Weighted average of emissions per unit of electricity supplied to the grid.
   - **Data Sources:** National generation mix; import statistics; IPCC emission factors.
   - **Formula:** *Σ(Generation × EF) ÷ Σ(Generation)*.
5. **Transmission and Distribution (T&D) Losses (%)**
   - **Definition:** Percentage of generated electricity lost before reaching end-users.
   - **Data Sources:** NamPower operational reports; regional distribution company data.
   - **Formula:** *Losses ÷ Injected Electricity × 100*.
6. **Off-Grid Renewable Energy Access (Households/People Served)**
   - **Definition:** Number of households or individuals connected to stand-alone solar, mini-grids, or other off-grid systems.
   - **Data Sources:** Regional energy offices; rural electrification programme reports; NGO/CSO data.
7. **Clean Cooking Access (Households/People)**
   - **Definition:** Number of households shifting from biomass/paraffin to electricity, LPG, or renewable-based cooking technologies.
   - **Data Sources:** Ministry of Mines and Energy surveys; household energy assessments.

B. Transport Sector Indicators

1. **EV Deployment versus ICE Baseline (tCO_2e reduction)**
   - **Definition:** Compares emissions from EVs to equivalent ICE vehicles.
   - **Data Sources:** Vehicle registry; EV operator data; fuel sales records.
   - **Formula:**
     - EV emissions = *VKT × kWh/km × Grid EF ÷ 1000*

- ICE emissions = *VKT × (L/100km ÷ 100) × Fuel EF*
- Reductions = *ICE − EV*.

2. **Fleet Fuel Efficiency Improvements (L/100km)**
    - **Definition:** Reduction in average fuel consumption per km across national fleet.
    - **Data Sources:** National vehicle registry; MWT fleet efficiency programmes; fuel import statistics.
    - **Formula:** *Baseline L/100km − Current L/100km × VKT × EF_fuel*.
3. **Passenger Mode Shift to Public Transport (tCO_2e reduction)**
    - **Definition:** Avoided emissions from passengers switching from cars to buses or mass transit.
    - **Data Sources:** Municipal transport surveys; operator ridership data.
    - **Formula:** *Passenger-km × (Car EF − PT EF)*.
4. **Biofuel Blending (tCO_2e reduction)**
    - **Definition:** Emission reductions from substituting conventional fuel with biofuels.
    - **Data Sources:** Ministry of Mines and Energy fuel blending data; import/export records.
    - **Formula:** *Liters blended × (EF_fossil − EF_biofuel)*.
5. **Non-Motorized Transport (tCO_2e reduction)**
    - **Definition:** Avoided emissions due to walking and cycling infrastructure reducing VKT by vehicles.
    - **Data Sources:** Municipal NMT programme reports; urban mobility surveys.
    - **Formula:** *Reduced VKT × EF per km*.
6. **Freight Efficiency (tCO_2e reduction)**
    - **Definition:** Reduced emissions from improving fuel efficiency in freight transport.
    - **Data Sources:** TransNamib; fleet operator reports; port logistics statistics.

- **Formula:** *(Baseline L/100 tkm − Current L/100 tkm) × Tonne-km × EF_fuel*.

7. **Vehicle Scrappage (tCO_2e reduction)**
    - **Definition:** Emission reductions achieved by retiring inefficient vehicles.
    - **Data Sources:** Vehicle registry; scrappage programme data.
    - **Formula:** *Vehicles × Average km × Fuel consumption × EF_fuel*.

C. Cross-Cutting Features

Both energy and transport templates include:

- **QA/QC Tools**: dropdowns for unit checks, conditional formatting for missing or outlier values.
- **Evidence Fields**: requirement to link each data entry to a document, database, or URL.
- **Automation**: built-in formulas for totals, averages, and per-unit calculations to reduce manual errors.
- **Config Sheet**: centralized storage of Namibia-specific parameters (emission factors, occupancy rates, grid EF).

Final Note on Annexure

The annexure is intended as a quick reference guide for users of the templates. It outlines what each indicator measures, where data can be sourced, and how results are calculated. During the workshop, participants found this kind of structured guidance helpful, especially those from regional offices and municipalities who may not be directly involved in MRV systems but are responsible for data provision.