Methodology Employed for Carbon Market Opportunity Quantification

# Objective

The methodology employed in this analysis aims to quantify the carbon market opportunity derived from each country's mitigation measures as submitted to the United Nations Framework Convention on Climate Change (UNFCCC) within their Nationally Determined Contributions (NDCs).

**Note:***We have planned a comprehensive bottom-up assessment to be conducted in the near future. This assessment will aim to quantify the actual carbon market opportunities within each country more thoroughly. It will encompass a broader scope of potential mitigation activities and market mechanisms, extending beyond the currently identified mitigation measures. This approach will involve a more granular analysis of local conditions, existing infrastructure capabilities, and other socio-economic factors that can influence the realisation of these opportunities.*

# Framework

Our analytical framework involves a multi-step process:

1. Data Collection: Collection of mitigation measures from each country's NDC submissions to the UNFCCC.
2. Categorization: Classification of measures into sectors and identification of relevant Clean Development Mechanism (CDM) methodologies, Verified Carbon Standard (VCS) methodologies, and Greenhouse Gas (GHG) mitigation potentials.
3. Market Price Assessment: Application of the latest carbon credit price information from Ecosystem Marketplace to estimate the potential revenue from carbon credits.
4. Quantification of Mitigation Potential: Calculation of the potential GHG emission reductions in metric tonnes of CO2 equivalent (MtCO2e).
5. Estimation of Carbon Revenue: Multiplication of GHG mitigation potential by a normalization factor and the latest carbon credit price to estimate potential revenue.

# Data Sources

* NDC submissions to the UNFCCC
* Ecosystem Marketplace's survey data for voluntary carbon credit prices
* Relevant CDM and VCS methodologies for standardized quantification approaches

# Assumptions

* The carbon credit prices remain stable at the latest recorded value from the Ecosystem Marketplace survey.
* Each mitigation measure can be adequately represented by existing CDM, Gold Standard or VCS methodologies.
* It is infeasible for a country’s entire GHG mitigation potential to be harnessed in form of carbon revenue. Considering these factors, a complete offset of all emissions through carbon credits is unlikely.

# Calculation Process

1. **Mitigation Potential:** For each mitigation measure, we apply the most relevant CDM or VCS methodology to estimate the GHG mitigation potential if not already provided in the NDC implementation documentation.

Example: For "low carbon electricity generation", the AMS-I.D methodology would provide a procedure for quantifying the reduced emissions.

1. **Carbon Revenue Estimation:** Each sector's mitigation potential is multiplied by the sector-specific current price per carbon credit to estimate the potential revenue.

**Potential Carbon Credit Revenue = GHG Mitigation Potential (MtCO2e) × Current Price per Carbon Credit (USD)**

However, since it is infeasible for a country’s entire GHG mitigation potential to be harnessed in form of carbon credits, it is necessary to apply a normalization factor to give more realistic and achievable emission mitigation estimations that are 1.5 C compatible.

**Normalisation factors**

According to [Climate Analytics’ National 1.5°C compatible emissions pathways for Africa](https://ca1-clm.edcdn.com/assets/1-5_npe_africa_1.pdf?v=1679478496):

**1.Ghana**

As of December 2021, Ghana has not articulated a long-term or net zero strategy. Long-term 1.5°C compatible pathways indicate that Ghana would need to reduce its GHG emissions to 15-21 MtCO2e/yr by 2050, which is equivalent to a **30-50%** reduction in emissions compared to 2015, excluding LULUCF emissions. On the road towards net zero, Ghana will need to balance its remaining emissions through the development of carbon dioxide removal approaches. Given the high level of LULUCF emissions in Ghana, this will mean reducing its land sector emissions to further contribute to negative emissions.

**2. Nigeria**

1.5°C compatible pathways show GHG emissions reductions of 42% (**33-54%**) by 2050 below 2015 levels or 186 (147-215) MtCO2e (excl. LULUCF) by 2050.q While there is high uncertainty on the level of LULUCF emissions, strong efforts to reduce LULUCF emissions will be needed for the country to reach net zero GHG emissions and balance its remaining emissions with the land sector. CO2 emissions reductions will be enabled largely by the rapid decarbonisation of the power sector, which is also a catalyst for decarbonisation of other sectors. Reductions in the transport and industry sectors would then be the next priority, as they are significant contributors to Nigeria’s emissions.

**3.Rwanda**

Rwanda has committed to net zero CO2 emissions by 2050, but has not yet articulated a long-term strategy or pathway to achieve this goal. 1.5°C compatible pathways indicate that Rwanda would need to reduce its GHG emissions to 5-6 MtCO2e/yr by 2050, which is equivalent to a **45-50%** reduction in emissions compared to 2015, excluding LULUCF emissions.

Therefore, we picked the low end of each country feasible reduction potential as the normalization factor:

**Potential Carbon Credit Revenue = GHG Mitigation Potential (MtCO2e) × Normalisation factor × Current Price per Carbon Credit (USD)**

# Validity and Reliability

The robustness of our estimates depends on the validity of NDC data, currentness of the Ecosystem Marketplace carbon credit prices, and the applicability of the CDM and VCS methodologies to the mitigation measures described.

# Limitations

* The methodology does not account for potential future price fluctuations, changes in policy, or actual implementation rates of the NDCs.
* **Permanence:** Absorbed carbon needs to be stored permanently. Forests are vulnerable to disturbances, and some technological solutions are unproven in long-term stability.
* **Leakage:** Avoiding emissions in one area might displace them elsewhere, like stopping deforestation but increasing logging activities in another region.

# Review Process

Our data and estimates undergo a peer review process by experts in carbon finance and policy analysis to ensure accuracy and credibility.

Additionally, we have planned a comprehensive bottom-up assessment to be conducted in the near future. This assessment will aim to quantify the actual carbon market opportunities within each country more thoroughly. It will encompass a broader scope of potential mitigation activities and market mechanisms, extending beyond the currently identified mitigation measures. This approach will involve a more granular analysis of local conditions, existing infrastructure capabilities, and other socio-economic factors that can influence the realization of these opportunities.

The review process, combined with the upcoming detailed assessment, underscores our commitment to providing stakeholders with a dynamic and accurate representation of carbon market potential, reflecting the evolving landscape of carbon finance and climate action initiatives.

# Updates and Revisions

The methodology and resulting estimates are subject to periodic review and updates in line with new data releases from the UNFCCC and Ecosystem Marketplace.

References

Climate Analytics (2022). National 1.5°C compatible emissions pathways and consistent power sector benchmarks in Africa.

Forest Trends’ Ecosystem Marketplace. 2024. State of the Voluntary Carbon Market 2024. Washington DC: Forest Trends Association.