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Gold Standard for the Global Goals
New Methodology Concept Submission

Version 1.0

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This template is for submission of new methodology concept as well as methodology revisions. The methodology developer shall submit the concept note electronically to Gold standard at help@goldstandard.org

Submitted by	
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Organization:	The Africa Carbon Markets Initiative
Project participant: (Yes/No)	
Responsible person/ entity: (Yes/No)	Yes
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To be completed by the GS Secretariat	
Decision: (Methodology concept approval (Yes/No):	Yes
Additional Action required:	*See below*
Date of Decision:	11/09/2023

For development of a full methodology, TAC have sought clarification on:

- Is the applicability restricted to just African nations?
- Methodology permitting the suppressed demand scenario
- TAC further provided inputs for consideration on:
    - Integration of battery systems
    - Preventive measures in place to avoid leakage of gensets if used in different installation settings
    - Potential inclusion of greenfield installations

1. Date of Submission:
(dd/mm/yyyy)

2. Title of the proposed methodology:
Phasing out fossil fuel gensets via distributed renewable energy projects (DRE)

3. New/revised methodology:

Yes/No

If the proposed methodology is not a new one, provide reference(s) to the methodology that the proposal seeks to revise/amend. Also provide a brief statement on the proposed change.

The proposed methodology is a new methodology. Related methodologies include: **AMS I.F., AMS I.L., AMS I.A.**

4. Description of the proposed methodology concept:

The methodology will apply to project activities that avoid GHG emissions by phasing out certifiably active fossil fuel gensets by replacement with distributed renewable energy (DRE) projects. The phase out will be monitored to support both integrity and energy security, and a range of distributed renewable energy technologies will be included.[1] The methodology will be globally applicable.

- There are multiple barriers to moving away from fossil fuel gensets including the upfront capital cost of the DRE system, and non-financial barriers especially in areas where DRE systems are not widespread
- Additionally, people should be compensated for early phase out based on the Net Present Value (NPV) of the genset over the remaining lifetime
- The compensation from carbon credits could be utilized to partially cover the investment cost of the DRE system or to compensate for the lost NPV value of the phased out genset

By allowing the use of simplified additionality tools, and direct monitoring for monitoring, reporting, and verification (MRV), the methodology facilitates channeling high integrity carbon credit revenues towards DRE units, incentivising a cleaner energy system. Additionally by incorporating simplified additionality tools, the methodology facilitates easy scale-up of supply.

Preliminary estimations suggest that retiring diesel gensets may deliver potential of 50Mt CO2/annum in Africa alone by 2030, with 18Mt/annum or 35% of this potential within Nigeria where additional potential could be derived from retiring smaller petrol gensets.[2] In

[1] Including solar photovoltaic, hydro, wind and renewable biomass
[2] ACMI Roadmap Report (2022); . Assumes retirement of gensets to exceed Nigeria's climate strategy targets (i.e., 20% reduction of emissions in 2030)

developing countries globally, back-up generators release ~100MtCO2 of emissions annually, which could be avoided through replacement with DRE.[3] Uptake through current methodologies is low with ~0.15MtCO$_2$ of credits issued in Africa under phasing out fossil fuel generators. Current methodologies do not incentivize or consider phasing out fossil assets before end-of-life, meaning that they do not consider leakage risks from the baseline technology or offer the possibility for project developers to distinguish their projects focusing on fossil-fuel phase-out, missing out on potential price premia.

5. Typical Project activity:

Describe in the typical project activity that would apply the proposed methodology. Also, briefly discuss the typical baseline situation and expected emission reductions (tCO$_2$ eq/year) and/or other primary SDG contributions.

Project activities would include avoided GHG emissions by phasing out multiple fossil fuel gensets of ~1KW and replacing with DRE systems smaller than 15MW, <1MW in most applications. This includes fossil fuel gensets used as a primary power source and/or gensets used for back-up power due to insufficient grid capacity or unreliability. Project activities aim to avoid the ~100MtCO2 released from backup generators, and any emissions from using fossil fuel gensets as a primary power source.[4]

The DRE alternatives encompass both off-grid battery linked systems as well as grid connected modular DRE systems e.g. household solar PV systems that allow the selling of excess power to the grid.

The baseline relates to GHG emissions that are generated through the use of fossil fuel gensets until the end of their lifetime. These GHG emissions will be avoided through the implementation of the project activity. The baseline will be calculated through the technical lifetime remaining on the genset and the estimated emissions factor of the fossil fuel genset. Conservative options for accounting for the baseline beyond the remaining lifetime of the genset will be considered in line with previous methodologies.[5]

A significant population is affected by local air quality issues which could benefit from increased energy access and improved air quality from phasing out of fossil fuel gensets. This would target SDGs:

- **SDG3: Good health and well-being** particularly target 3.9 on reducing the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- **SDG7: Affordable and clean energy** particularly **7.1** aiming for universal access to affordable, reliable and modern energy services, **7.2** aiming for a substantial increase in the share of renewables in the energy mix, and **7.b** on expanding infrastructure and upgrading technology for supplying sustainable energy services for all in developing countries

[3] IFC: The Dirty Footprint of the Broken Grid - The Impacts of Fossil Fuel Back-up Generators in Developing Countries
[4] Ibid.
[5] E.g., AMS I.L.

- **SDG8: Decent work and economic growth** particularly **8.5** which aims to achieve full and productive employment and decent work for all
- **SDG9: Industry, innovation and infrastructure** especially **9.1** aiming to develop quality, reliable, sustainable and resilient infrastructure to support economic development with a focus on affordable and equitable access for all, **9.4** aiming to upgrade infrastructure and retrofit industries to make them sustainable, and **9.a** aiming to facilitate sustainable and resilient infrastructure development in developing countries
- **SDG11: Sustainable cities and communities** specifically **11.6** aiming to reduce the adverse per capita impact of cities including air quality
- **SDG13: Climate action** particularly 13.a on mobilising finance for climate mitigation

6. Demonstration of Additionally:

Explain how additionality will be demonstrated in line with GS4GG requirements. If other approaches are proposed, describe accordingly.

There is no substantive precedent for DRE-related carbon credit revenues in Africa. This is largely driven by a lack of clarity on pathways to certifying DRE projects including compensation of genset phase out for carbon credit generation. Additionally, finance is required at scale beyond carbon credit revenues for the deployment of DRE systems. Phasing out fossil fuel gensets before the end of technical lifetime is unlikely to have occurred without carbon finance. Specifically, the integrity of the project will be determined by a demonstration of the following:

Fossil fuel genset phase-out:

- That the genset remains commercially competitive under the prevailing market conditions, faces no operational challenges that might affect its normal operation and is expected to continue to operate for its remaining life-time.
- That the genset's phase-out and its replacement with a new DRE unit face barriers and need additional support to overcome the barriers. To demonstrate the financial additionality UNFCCC approved CDM Tools may be used.[6] Further options will be explored during the full methodology development

DRE system:

- The DRE system may or may not be additional. A solar PV home system can show 60-65% cost savings for backup power generation in a case study from Lagos.[7] However, when considering the lost NPV of the phased out genset, additionality rises significantly, and there are often non-financial barriers prohibiting the uptake of DRE systems.
- In case the returns from the DRE system are below the benchmark return and the DRE system qualifies as per the additionality test, additional revenue can be sought

[6] E.g. TOOL21 Demonstration of additionality of small-scale project activities

[7] Babajide, A. and Brito, M.C. (2021) 'Solar PV systems to eliminate or reduce the use of diesel generators at no additional cost: A case study of Lagos, Nigeria', Renewable Energy, 172, pp. 209–218. doi:10.1016/j.renene.2021.02.088.

to support it. To demonstrate the financial additionality UNFCCC approved CDM Tools may be used.[8] Further options will be explored during the full methodology development

Where possible, the methodology would rely on streamlined additionality tools such as positive lists and penetration tests to ensure project developers can implement the methodology quickly at scale.

7. Quantification of SDG contribution:

Explain broadly how the SDG contribution targeted under this methodology will be quantified. At this stage, detailed calculation methods are not required. In particular, mention how projects using this methodology will contribute to SDG 13.

SDG 13: Climate action, specifically the emissions impact of the project, will be measured through the difference between the baseline emissions of a fossil fuel generator and the new clean energy system, accounting for leakage emissions. As the project activity concerns DRE units, project emissions are assumed to be zero. Emissions reductions will be calculated as follows[9]:

$$EI_y = EG_{DRE,y} \cdot EF_{DG,y} - LE_y$$

Where;
EI_y = Emissions impact in year y
$EG_{DRE,y}$ = Net electricity generation delivered by the DRE system in year y
$EF_{DG,y}$ = Emission factor of power generation of the fossil fuel generator
LE_y = Leakage emissions in year y

$$EF_{DG,y} = \frac{D_y \cdot NCV_D \cdot EF_D}{EG_{DG,y}}$$

D_y = Quantity of fossil fuel used in year y i.e., either diesel or petrol
NCV_D = Average net calorific value of said fossil fuel
EF_D = Average CO2 emission factor for the selected fossil fuel. This shall be derived from a national database or default IPCC values

$$LE_y = EG_{DG,y} \cdot EF_{DG,y}$$

$EG_{DRE,y}$ = Net electricity generation delivered by the retired genset system in year y

This is a high-level approach to quantification that will be further refined based on approached outlined in the detailed methodology. In case monitoring option 2 is used (see section 8), emissions are calculated as above except that leakage emissions are assumed to be zero as evidenced by decommissioned fossil fuel gensets.

[8] E.g. TOOL21 Demonstration of additionality of small-scale project activities
[9] Amended based on AMS-I.A. v.19.0

In addition to measuring the emissions impact of the project, SDG13.a on mobilising climate finance can be tracked by showing the flow of carbon finance by multiplying the emissions impact by a market average carbon credit price.[10]

SDG 3, 7, 9 and 11 will be measured through the proxy of the number of fossil fuel generators phased out. With each phased out generator, it should be possible to infer that a household has access to clean energy, higher air quality, improved infrastructure and a contribution to better air quality in the surrounding area. SDG9 can be estimated further by calculating the reduced share of CO_2 emissions per unit of value added in project areas. Further contribution to SDG 8 can be estimated by assessing jobs created in maintenance per DRE system.

8. Monitoring approach:

Provide brief information on how the SDG contribution will be monitored

Monitoring will be in accordance with the methodology and similar to that of existing associated methodologies. There are two potential routes for monitoring that ensure tracking the use of the baseline technology.

1. Leaving the phased-out fossil fuel genset within the project boundaries, monitoring the use of both systems with smart meters, or
2. Buying the fossil fuel genset for decommissioning, producing evidence of the purchase and decommissioning

Monitoring would cover the energy use, or evidence of decommissioning from the phased out genset, checking that new generators have not been purchased – to ensure no reversal – and the ongoing energy generation from the new clean energy source.

Key parameters that need to be fixed ex-ante are

- Power generation capacity of the fossil fuel gensets to be phased out (MW)
- Historical power generation of the fossil fuel genset (MWh)
- Historical quantity of fuel combusted in the fossil fuel genset in mass or volume unit
- Remaining lifetime of the genset
- Historical fuel efficiency of the fossil fuel genset

The above parameters shall be based on at least a year of operational data from the fossil fuel gensets.

Option 1: Fossil fuel genset remains within the project boundary

In this case, the project design would allow the phased-out fossil fuel genset to be left within the project area, where both the location of the genset, and the electricity created with it will be closely monitored to account for leakage.

The key parameters to be monitored are

- Net electricity delivered by the DRE system
- Power generation by the retired fossil fuel genset
- Volume fuel combusted in the fossil fuel genset in mass or volume unit

[10] For example, \$20/tCO_2e in 2030 based on ACMI Roadmap Report (2022)

This will be measured using smart energy meters installed on both the DRE systems as well as the phased out fossil fuel genset. This allows the developer to monitor project leakage by taking into account the potential continued use of the fossil fuel genset being phased out, while not decreasing energy security. Monitoring would also ensure the fossil fuel genset has not been sold to create power elsewhere. In areas with technical constraints e.g., limited network coverage, alternative monitoring methods can be explored.

Option 2: Fossil fuel genset is bought to decommission by the project developer

In this case, the project developer could use the carbon credit revenues or another financial mechanism to buy the fossil fuel gensets to decommission them.

The key parameters to be monitored are

- Net electricity delivered by the DRE system
- Evidence of the purchase and decommissioning of fossil fuel gensets

The project developer can opt to use either monitoring approach depending on the project design.

9. Other:

Add other relevant information that may be useful to assess the eligibility under GS4GG