VELDA METHODOLOGY

https://github.com/dreampiper/velda

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1. SOURCES

The following has informed the development of this methodology:

- VM0038 Methodology for Electric Vehicle Charging Systems v1.0

2. SUMMARY DESCRIPTION OF THE METHODOLOGY

This methodology aims to spur a reduction in the carbon intensity of water consumption in emerging markets using low-tech modular concentrated solar power (MCSP) systems.

This methodology applies to projects using MCSP systems on soil that has active soil degradation or stagnant carbon density, to provide alternative renewable energy to communities, offsetting unnecessary GHG emissions from single household water boreholes, that run using electricity from gasoline-powered generators.

This methodology applies to projects operating in sun-belts regions with an average high temperature of at least 35 degrees Celsius.

3. DEFINITIONS

Modular Concentrated Solar Power (MCSP)

Modular Concentrated Solar Power (MCSP) refers to a type of CSP system that is made up of smaller, modular components that can be combined and scaled up or down as needed to meet the energy demand of a particular application or location. MCSP systems should consist of several small, independent power blocks that are each made up of a solar field, a thermal energy storage system, and a power block that converts the stored thermal

energy into electricity.
The modular approach allows for greater flexibility and customisation in designing and deploying CSP systems, as well as easier maintenance and repair. It also allows for more efficient use of land and resources, as the system can be sized and optimised for the specific energy demand of a particular location.

Single Household Water Boreholes

A single-household water borehole refers to a small-scale water well that is typically used to supply water to a single household or a small group of households. In areas where access to clean water is limited or unreliable, such boreholes are often drilled to provide a reliable and consistent water source for domestic use.
It is possible that in communities where access to clean water is limited, there could be a large number of single-household water boreholes in use. Each of these boreholes may require a gasoline-powered generator to pump water to households, which could contribute to greenhouse gas emissions.

4. APPLICABILITY CONDITIONS

By meeting these applicability conditions listed herein, applicable projects can generate carbon credits that could be sold in carbon markets, providing a source of revenue to support the project's implementation and ongoing maintenance.

Projects must comply with all applicability conditions set out below:

1) The project must be located in sun-belts regions with an average high temperature of at least 35 degrees Celsius with limited or unreliable access to clean water, leading to the significant reliance on single household water boreholes.
2) The project must use MCSP systems to provide a reliable and sustainable source of energy to power water pumps for single household water boreholes.
3) Each project must be modular and be located on land that:
    a) Has active soil degradation or stagnant carbon density to ensure that the MCSP project is helping to address environmental issues in the area. Situating the project on degraded land can help to restore the soil and potentially sequester carbon, which can add net benefits beyond just generating renewable energy.
    b) Should be no more than 1/10 of the community it serves, to ensure that the MCSP project is designed and implemented in a way that meets the specific needs of the community it serves. This should help to promote community engagement and ownership of the project, which is important for long-term success and sustainability.
4) Projects should engage with the local community to build trust and transparency. This can involve providing regular updates on project progress, addressing community concerns, and involving the community in decision-making processes.
5) To ensure that double counting of emission reduction will not occur, project proponents must demonstrate that their systems can correct any issues that could lead to double counting or other problems and must use tamper-proof sensors that regular audits of project operations and systems can get reliable data from.

6) Project proponents must maintain an inventory of the MCSP systems that should consist of several small, independent power blocks that are each made up of a solar field, a thermal energy storage system, and a power block that converts the stored thermal energy into electricity. Other notable infrastructure systems must be referenced and described in the project's inventory.

5. PROJECT BOUNDARY

The project boundary would be the geographic location of the community where the project is implemented:

1) The specific areas where the boreholes that the project supplies electricity to are.
2) The geographic location where the MCSP system is located.

The GHG sources relevant to a project and its baseline:

1) Project sources:
    a) Construction and installation.
    b) Operation and maintenance.
    c) End-of-life disposal of the system's components.
2) Baseline sources:
    a) Diesel generator operation.
    b) Fuel transportation to the community, to power the generator.
    c) Regular maintenance and repairs when transporting technicians and replacement parts.

6. BASELINE SCENARIO

The baseline scenario is the operation of similar single-household boreholes, that would have used non-renewable energy to pump water.

7. ADDITIONALITY

Project proponents applying this methodology must determine additionality using the procedure described below:

Step 1: Regulatory Surplus

Project proponents must demonstrate that their projects go beyond the requirements of existing laws and regulations to ensure that the emission reductions claimed are additional and not already mandated by law. This is to prevent double-counting and ensure that the project is truly contributing to reducing emissions.

Step 2: Project Methods

Project proponents need to provide evidence of the financial, technological, or other barriers that they faced in developing and implementing the project without carbon finance. This can include demonstrating that the project is not financially feasible without carbon revenue, or that it is difficult to obtain financing due to perceived technology or performance risks

8. QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

8.1. Baseline Emissions

To calculate the baseline emissions for a borehole using fossil fuel generators, we need to know the amount of fossil fuel consumed by the generators and the carbon intensity of the fossil fuel. We can then calculate the baseline emissions by multiplying the fossil fuel consumed by its carbon intensity, this must be calculated as follows:

$$BE = EF_{ffg} \times FC_{ffg}$$

$$[(EF_{ffg} \times FC_{ffg}) + (EF_{p} \times W_{p} \times 365)] \times (1 - ER)$$

Where:

EF_{ffg} = Emission factor for the fossil fuel used by the generators (tCO2e/litre or tCO2e/gallon)

FC_{ffg} = Fuel consumed by fossil fuel generators in litres or gallons per year

8.2. Project Emissions

Project emission can be calculated by multiplying the amount of electricity generated by its respective carbon intensity and must be calculated as follows:

$$PE = EF_{csp} \times EG_{csp}$$

Where:

EF_{csp} = Carbon intensity of the electricity generated by the CSP system (tCO2e/kWh)
EG_{csp} = Amount of electricity generated by the CSP system in kWh per year

8.3. Leakage

is not considered an issue under this methodology and is therefore set at zero.