Baseline and Additionality Assessment

The baseline and additionality assessment is a requirement for eligibility under the Puro Standard. The assessment is made by the CO2 Removal Supplier and verified by the independent 3rd party auditor. The assessment made in this document will be publicly available in the Puro Registry.

The Puro Standard only certifies durable carbon removals from the atmosphere that are net-negative and does not certify emissions reductions or avoidance. The CORCs (Carbon dioxide removal certificates), issued therefore represent a net carbon removal (1 tCO2eq. net) from the atmosphere to a durable storage of minimum 100 years, from which are subtracted any supply-chain emissions from the project, any re-emissions over the guaranteed storage time, and any baseline removals taking place in a baseline scenario.

The CO2 Removal Supplier must in this assessment:

- **Define** and quantify all reasonable **baseline alternatives** to the proposed project activity to remove carbon with carbon financing. A baseline is a scenario that reasonably represents the natural and anthropogenic carbon removals to a permanent storage (storage durability over 100 years) in the absence of the carbon removal activity proposed by the CO2 Removal Supplier. Although anthropogenic emissions may take place in the baseline scenarios, these emissions do not constitute a reference point for the quantification of CORCs (only the baseline removals do).
- Demonstrate **carbon additionality to the baseline**, meaning that the project must convincingly demonstrate that it is resulting in higher volumes of carbon removals than the likely baseline alternatives (question A1.).
- Demonstrate **regulatory additionality,** meaning that the project is not required by existing laws, regulations, or other binding obligations (question A2.).
- Demonstrate **financial additionality**, meaning that the CO2 removals achieved are a result of carbon finance and that the project activity would not be economically viable without the carbon finance. The project activity can have substantial other non-carbon income sources, if the carbon finance through CORCs is significant for the economic viability of the project. To demonstrate financial additionality, CO2 removal Supplier must provide the responses in this form and must be able to provide full project financials for verification.

Reference documents: Puro Standard general Rules v3.0, rule 2.1.3 and Additionality Assessment requirements

Baseline: *Transitioning to CNG/LPG based drying facility*	The existing corn Cob drying facility uses a gasifier that uses corn cob waste shanks to produce syngas and utilize it for drying corn cobs, biochar produced in this process as a byproduct was transported to a captive cogeneration plant owned by the company sugar mill division for generating additional electricity under the net metering scheme by the government of India. In the year 2020 the company installed captive solar power plants at multiple facilities, thus causing them to reduce the net output to the grid through the captive power plant that utilized Biochar as additional fuel. The entire setup with the gasification unit was proving to be uneconomical and operationally heavy for the company to operate compared to other alternatives thus initiating a shift towards CNG/LPG based facility. The CNG transportation infrastructure has been improved and become very efficient in India for industrial uses within the past few years. All the seed processing facilities in the region are utilizing CNG to operate the Seed dryers because no additional set up is required to generate fuel and supplying energy, directly usable natural gas is supplied through efficient connections and meters to any facility and directly generate energy for any end use. Because of the high operations and maintenance expenditures and no economical end use of biochar, Climate finance is the only option for the company to keep the facility afloat as the market for Biochar as a fertilizer/soil amendment is practically non-existent in India at present.	None	None

Project activity: *Utilizing Biochar as a Soil Amendment: A Cost-free Solution for Farmers*	The company has built a pulverization set up for this project which would be utilized to process the biochar produced in the last production cycle into a form suitable to get mixed with the soil and have co benefits for the soil health. A robust MRV tool is built to monitor and validate the process end to end and collect relevant evidence.	1069 Tonnes of Removal	None

A1. Does the project lead to higher volumes of carbon removal than the baseline?	**Yes / No**

This project will have major co benefits for the farmers as the soil is acidic in the region and would be able to substantially optimize the pH level and improve the water/nutrient holding capacity of soil. Apart from removing more than 1000 tonnes of CO_2 from the atmosphere the project would also be avoiding additional 4000 tonnes of CO_2 that would have otherwise gotten generated because of decomposition or decomposition of Biomass.	Yes

A2. Is the project required by existing laws, regulations, or other binding obligations ?	**Yes / No**

No it's not required by the laws, regulations or other binding obligations. In Fact on the other hand most of the corn seed processing facilities in the region have transitioned to CNG based drying facilities due to the incentives and subsidies provided by the government for the same. Operating a gasifier based facility would require additional income in the form of climate finance to keep afloat.

No

A3. Is the project first-of-its-kind?	**Yes / No**
The project utilizes corn shank biowaste for the gasification process, which effectively dries the wet maize cob by harnessing the energy produced. By preventing complete burning, this method converts the bio waste into valuable biochar, minimizing waste and maximizing resource utilization, the biochar produced is then pulverized and sent to small holder and marginal farmers free of cost while the entire process is getting traced end to end using Varaha's DMRV tech stack. In business-as-usual scenarios these seed processing plants utilize other sources of energy like CNG and LPG to process the corn cobs while the amount of shank waste generated is either left to decompose or sold to other boiler based industries where it effectively goes out into the atmosphere as methane or CO_2	Yes

A4. Is the project dependent on carbon finance?	**Yes / No**

Yes, India is making massive strides in energy infrastructure upgradation since the past decade. The government has built large pipeline networks through public and private enterprises to facilitate effective distribution of Compressed Natural Gas for industrial and domestic uses. This setup is quite convenient for the industries and becomes an ideal plug and play scenario where the CNG is getting supplied in a directly usable form to various industries and the industries are charged through timely bills generated through the metering devices. The gasifier in this project has been operational since 2011 until 2020 the biochar produced as a byproduct was getting supplied to one of the captive cogeneration power plants owned by the company in the sugar mill on a pilot basis to improve efficiency and generate electricity. In 2020 the company developed a captive solar power plant in the seeds plant to improve the share of renewable electricity in the company's portfolio, thus making the biochar redundant for energy application. Operating the Gasifier is maintenance and operations heavy, causing a lot of downtime and additional expenses for the company making it unsustainable to operate and instigating a transition to CNG operated dryers. Since the market for biochar is non existent in India as the small holder and marginal farmers don't have the awareness about the benefits of biochar nor the financial bandwidth to try out novel soil amendments, the company has to depend on climate finance to keep the facility running and also provide the biochar free of cost to some of these farmers and make them aware of the long term benefits of Biochar amendment to the soil.	Yes

A5. Does the project need a large investment to achieve carbon removal ?	**Yes / No**
No the facility is already operational, it just needs an additional sustainable source of revenue to keep this carbon removal facility running for the long term and instigate a similar shift to other maize seed processing companies as well.	No

	Yes / No
N/A	No

Some projects may demonstrate additionality through simple cost analysis: this is applicable for projects where ex-ante investment analysis is not applicable, because a large investment is not needed. Examples of such a project could be charcoal producers starting to produce biochar for soil applications using existing equipment with minor adaptations.

Financial Additionality – large investment is not needed (Answer to A5 is "no")	**Project response**

Please describe adaptations needed and the related cost items and include evidence in attachment.	Initiate vital adjustments to the production plant to pulverize the biochar and procure large amounts of farmyard compost to optimize pH levels and render biochar perfectly suitable for application as an organic fertilizer. Implement a packaging system to fill biochar into bags, facilitating distribution to farmers as high-quality fertilizers free of cost. Establish biochar bag distribution channels for effectively reaching and benefiting farmers. Development of DMRV tool to trace the entire process end to end.
Please summarise the simple cost analysis here and provide an additional calculation spreadsheet in attachment. All formulas used in the spreadsheet shall be readable to the verifier and all relevant cells shall be viewable and unprotected. Mark confidential when needed.	The simplified cost analysis is as follows: The environmental intervention scenario (scenario IV) employs syngas as the fuel for the dryer facility for the initial processing of the maize crop being brought to the NSL factory. The total expense in scenario IV, for the operation and maintenance of the gasifier facility which is used in the production of syngas along with biochar in 3:1 ratio by mass, through the gasification of the remaining biomass after initial processing of the maize crop, and the packaging and distribution of the biochar aggregate to the nearby farms for carbon removal as proposed in the study has been calculated to be INR 21,044,655 and the total expense involved in scenario II, which employs CNG as a fuel for the drying process, comes out to be INR 14,594,580 which is substantially reduced due to the revenue generated by the sale of the remaining biomass after initial processing, amounting to INR7,776,000 and hence the net expenditure for scenario II becomes INR 6,818,580. Thereby, the differences in expenses in scenario IV and scenario II amount to INR 14,226,075 which needs to be substantiated by the sale of the 1069 carbon credits being generated in scenario IV. That implies that the cost of each carbon credit is calculated as INR13,307.83 which is USD 159.70 considering the current exchange rate.

If large investment is needed, , CO_2 Removal Suppliers can be guided by the CDM Methodological Tool 27 of the UNFCCC Clean Development Mechanism "Investment Analysis" to demonstrate financial additionality.

Please show your calculations to determine the benchmark rate for either equity IRR or WACC, whichever you are using. Please include documentation of how the rate is suitable for the technology and region.	N/A
Please state how CORC revenues change the expected IRR or NPV of the project.	N/A
Please conduct a sensitivity analysis in relation to the investment analysis and summarize the results here.	N/A
Please provide a full calculation spreadsheet file as an attachment. All formulas used in the spreadsheet shall be readable to the verifier and all relevant cells shall be viewable and unprotected. Mark confidential when needed.	N/A

I hereby declare that all information provided is truthful and precise to the best of my knowledge.

Varaha ClimateAG Private Limited

Director / Authorized Signatory

Date, Place: Gurugram, 29/11/2023

Representative name: Madhur Jain

Title: DIrector and Co-Founder
Organisation: Varaha