Puro.earth Standard

Additionality Assessment Requirements

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1. Introduction

One of the key requirements for Puro.earth is to ensure that the CO2 Removal credited by Puro Standard is additional, meaning that it would not have occurred in the absence of the incentive provided by carbon credits. Additionality is essential for the integrity and credibility of the carbon crediting program, as it ensures that the credits represent real and additional CO2 Removal that contributes to mitigating climate change. Additionality comprises of three different aspects:

- Regulatory additionality, where a CO2 Removal Supplier must demonstrate that the project is not required by existing laws, regulations, or other binding obligations.
- Carbon additionality to the baseline, meaning that that the activity results in higher volumes of carbon removals than the likely baseline alternatives.
- Financial additionality, meaning that the project must convincingly show that the CO2 removals are a result of the incentive provided by carbon credits.

2. Additionality Audits and Baseline

2.1. Overview

2.1.1. The additionality requirements are audited in the first production facility audit, and at the renewal of the crediting period as described in this document.

2.1.2. Puro Standard General Rules 4.0 clause 2.2.3 requires a design validation to be completed within three (3) years of the Commitment Date. The Commitment Date is defined as the calendar date on which the CO_2 removal Supplier (the activity proponent) committed to implementing the CO_2 Removal activity (e.g., the date when contracts for the purchase or installation of equipment required for the mitigation activity were signed). In the case where a mitigation activity does not involve capital expenditure, it refers to the date when the first physical actions were taken to implement the mitigation activity.

2.1.3. To give more precise guidance on the application of the General Rules clause 2.2.3, following exceptions are noted:

a) A CO_2 Removal Supplier is transferring from another carbon crediting program to the Puro Standard. The rule does not apply if the CO_2 Removal Supplier has passed an audit by a carbon crediting program with requirements deemed equivalent by the Puro Standard.

b) A CO_2 Removal Supplier has installed the equipment, but it has remained unused, or has been used at less than 10% of its capacity.

c) The delay in validation is due to an emergency situation, such as a natural disaster, or pandemic.

2.1.4. Puro Standard Additionality Assessment Requirements shall be reviewed every two years, or earlier as needed in line with the Puro Standard Methodology Development Requirements.

2.2. Regulatory additionality

2.2.1. Regulatory additionality means that the Puro Standard only issues credits for projects that go beyond the minimum legal or regulatory requirements for carbon

removal or sequestration. This way, we avoid rewarding projects that would have happened anyway due to regulatory requirements.

2.2.2. The CO_2 Removal Supplier must report if the removals are required by existing laws, regulations, or other binding obligations in the jurisdiction where the Production Facility is operating. This will be confirmed by an auditor in a facility audit.

2.2.3. Regulatory additionality is audited at every production facility audit i.e., every five years unless there is a specific reason to conduct an earlier facility audit, or the methodology defines a different crediting period.

2.3. Carbon additionality to the baseline

2.3.1. The CO_2 Removal Supplier shall report the CO_2 removals to durable storage claimed against a baseline which represents a conservative scenario for what would likely have happened without carbon credits (the "counterfactual" baseline). This will be confirmed by an auditor in a facility audit.

2.3.2. The Puro Standard only credits carbon removals from the atmosphere and not emissions reductions or avoidance. Therefore, only the removals that are "additional" from baseline zero are credited.

2.3.3. The CO_2 Removal Supplier shall use the requirements in the relevant Puro Standard Methodology to determine the baseline of durable carbon removal. If the methodology has no such requirements, the CO_2 Removal Suppliers can be guided by the CDM Methodological Tool 02 "Combined tool to identify the baseline scenario and demonstrate additionality. Version 7.0"[1] to conduct the baseline determination.

2.3.4. The baseline shall be reassessed in a production facility audit at the renewal of the crediting period.

2.3.5. The project scenario must be aligned with net-zero transition. This means that the activity cannot a) directly lead to an increase in the extraction of fossil fuels, b) relate to coal-fired electricity generation, or c) involve other unabated fossil fuel-powered electricity generation, other than new gas-fired generation that is part of increased zero-emissions generation capacity in support of national low carbon energy transitions.

3.Financial Additionality

3.1. Overview

3.1.1. The CO_2 Removal Supplier must demonstrate that the CO_2 removals are a result of carbon finance. This means that the CO_2 Removal Supplier must show either that the carbon credits were needed to secure the investment or to overcome specific barriers to the investment.

3.1.2. For clarity, if carbon removal is an add-on to a facility (for example, carbon capture and storage to a bio-energy plant), there is no requirement for a CO_2 Removal Supplier to cross-subsidize the carbon removal activity from other revenue sources, such as

[1] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf)

energy sales or carbon capture and use. The financial additionality analysis is made purely based on the project economics of the add-on investment.

3.1.3. Puro Standard allows three different ways of demonstrating financial additionality. The CO_2 Removal Suppliers shall perform one of the following:

a) Simple cost analysis, if the CO_2 Removal Supplier complies with the criteria laid out below,

b) Investment analysis or

c) Barrier analysis.

3.1.4. In addition to the alternatives in 3.1.3, the methodologies in the Puro Standard may also define standardized approaches specific to certain removal pathways. In that case, the CO_2 Removal Supplier may opt to follow that approach instead of the approaches described in this document.

3.1.5. Financial additionality analysis is complemented with a common practice analysis. If the CO_2 Removal Supplier is applying a technology, which is already a 'common practice' in the region, there is a higher risk that the generated carbon removal is not additional. In Puro Standard, common practice analysis is used to ensure that non-additional projects are not credited. However, even with low market penetration rate, or first-of-its-kind status, a CO_2 Removal Supplier shall demonstrate financial additionality through one of the additionality tests listed in clause 3.1.3. The combination of requirements is shown in Figure 1.

3.1.6. The market data required to demonstrate financial additionality is less extensive if the project is in one of the least developed countries[2] where data availability problems may occur. Conversely, the level of market data required is more extensive for high income countries.

3.1.7. Financial additionality shall be assessed by an auditor in a production facility audit and reviewed by Puro.earth.

3.2. Common practice

3.2.1. Common practice or market penetration rate analysis evaluates the extent to which a type of removal activity or technology is already implemented in the specific area.

3.2.2. Common practice analysis is required from CO2 Removal Suppliers after the relevant methodology and/or technology has reached a technology readiness level (TRL) of 8 or 9 (proven in operational environment). The TRL levels estimated by IPCC are shown in Table 1. This rule is set because common practice analysis requires there to be statistics available of existing installations and the market share of the practice. Thus, conducting a common practice analysis requires a minimum level of maturity from the activity for it to be practical and useful.

Table 1. Technology readiness levels of Puro methodologies as defined by IPCC[3] if available. Otherwise estimation by Puro.earth, marked with an asterisk (*).

Methodology	Technology readiness level
DACCS	6
Enhanced weathering	3-4
BECCS	5-6
Biochar	6-7
Carbonated materials*	5-6
Terrestrial storage of biomass*	3-4

[2] https://unctad.org/topic/least-developed-countries/list
[3] IPCC AR6 WGIII. https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter12.pdf

3.2.3. The default geographic boundary shall be the host country, but the CO2 Removal Supplier may choose a smaller region if they can justify it based on trade or investment patterns.

3.2.4. The CO_2 Removal Supplier shall define market penetration appropriately in terms of recent uptake or stock installations in relation to a realistic target market size. The CO2 Removal Supplier can be guided by the instructions in Concept note CDM-MP88-A01[4] published by the UNFCCC Clean Development Mechanism that notes the following conditions and constraints: a) Product and technology constraints, b) Socioeconomic characteristics, Geographical, topographical and climate conditions, and d) Cultural, demographic, behavioral, and psychographic conditions.

3.2.5. For distributed technologies, such as enhanced rock weathering, if the market penetration rate is above 16%, the activity is considered common practice and thus non-additional in line with the CDM Concept Note CDM-MP88-A01[4].

3.2.6. For suppliers operating plants, CDM Methodological Tool 24 of the UNFCCC Clean Development Mechanism "Common Practice"[5] applies. In short, using the tool requires CO2 Removal Suppliers to identify similar projects based on the following criteria:

a) output range of +/- 50% of the project,

b) located in the same region,

c) applying the same measure,

d) produce comparable goods or services in terms of quality, properties, and applications,

e) started commercial operation before the proposed start date of the project, and

f) are not registered in a carbon crediting program.

The number of similar projects in N_{all}. Within similar projects, the CO2 Removal Supplier identifies those that apply technologies that are different to the project technology and notes their number, N_{diff}. The project is common practice if $1-N_{diff}/N_{all}$ is greater than 0.2 and $N_{all}-N_{diff}$ is greater than 3.

3.3. Simple cost analysis

3.3.1. In line with CDM Methodological Tool 01 of the UNFCCC Clean Development Mechanism "Tool for the demonstration and assessment of additionality"[6] some projects may use simple cost analysis to show financial additionality. This is applicable to

a) projects with no other income besides carbon credits or

b) projects with minor capital expenditure (capex) compared to operational expenditure (opex). This could include for example enhanced rock weathering projects. The CO_2 Removal Suppliers using other methodologies may demonstrate that the above option is applicable also in their case.

3.3.2. The CO_2 Removal Supplier shall document the costs and revenues associated with the carbon removal project activity and the alternatives identified and demonstrate

[4] CDM-MP88-A01: Concept note: Ensuring the consistency in definitions of market penetration metrics and thresholds for additionality demonstration. https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20220713215726950/MP88_EA01_CN_Market%20Penetration.pdf

[5] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf

[6] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

that there is at least one alternative which is more profitable than the project activity without carbon finance.

3.3.3. The CO_2 Removal Supplier shall report any public subsidies they receive. The CO_2 Removal Supplier shall explicitly provide calculations to demonstrate how the subsidies are not sufficient to incentivize the project.

3.3.4. The assumptions, data and conclusions in the simple cost analysis must be consistent with the information presented to the company's board of directors (or other decision-making bodies) and to any banks or equity holders financing the mitigation activity or company.

3.3.5. The CO_2 Removal Supplier may provide evidence also in a confidential appendix. This may include confidential information relevant to the analysis, such as financial data or sales agreements. Confidential information shall be provided to the auditor and Puro.earth in a separate document that is clearly marked as confidential. The CO_2 Removal Supplier shall provide a description of the evidence provided for the audit, which will be published in the Puro Registry.

3.4. Investment Analysis

3.4.1. When simple cost analysis is not sufficient, the CO_2 Removal Supplier can be guided by the CDM Methodological Tool 27 of the UNFCCC Clean Development Mechanism "Investment Analysis"[7] to present the claim and evidence of financial additionality of their projects. The purpose of undertaking an investment analysis is to determine whether the project activity would be financially feasible or the most attractive alternative without the incentive provided by carbon credits, and to demonstrate that the carbon credit revenues were decisive for the investment decision.

3.4.2. The CO_2 Removal Supplier shall document how the financial benchmark used in the investment analysis is suitable to the country and sector. CO_2 Removal methodologies vary in their technology readiness level and risks inherent in the business model which can and should be reflected in the benchmark rates. The CO_2 Removal Supplier can choose to use either net present value (NPV) or internal rate of return (IRR) calculation and provide either a benchmark for weighted average cost of capital or for cost of equity. If the CO_2 Removal Supplier made the investment decision based on another metric, such as the return on investment (ROI) or payback period, the CO_2 Removal Supplier may use the same metric to demonstrate financial additionality.

3.4.3. The CO_2 Removal Supplier shall report any public subsidies they receive. If the subsidies are substantial, the CO_2 Removal Supplier shall explicitly provide calculations to demonstrate how the subsidies are not sufficient to incentivize the project.

3.4.4. The assumptions, data and conclusions in the investment analysis shall be consistent with the information presented to the company's board of directors (or other decision-making bodies) and to any banks or equity holders financing the mitigation activity or company.

3.4.5. The period of assessment shall reflect the period of expected operation of the underlying mitigation activity taking into consideration the expected crediting period renewals. As a minimum, the investment analysis is conducted for at least 10 years and includes the fair value of the assets at the end of the assessment period and any decommissioning costs.

3.4.6. The assessment shall include a sensitivity analysis that shows whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The ultimate objective of the sensitivity analysis is to

[7] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf

determine the likelihood of the occurrence of a scenario other than the scenario presented, providing a cross-check on the suitability of the assumptions used in the investment analysis.

3.4.7. The CO_2 Removal Supplier shall provide spreadsheet versions of the investment analysis to the auditors and Puro.earth. All formulas used in this analysis shall be readable and all relevant cells shall be viewable and unprotected. The CO_2 Removal Supplier shall either publish the full investment analysis or prepare a summary of the analysis that demonstrates additionality, which will be published in the Puro Registry.

3.5. Barrier Analysis

3.5.1. The CO_2 Removal Supplier may demonstrate any of the following three types of barriers:

a) financial barriers (e.g., financing is not accessible for the type of activity in the country due to the risks; this can be evidenced with bank refusal letters shared with auditors or with statements from financiers[8] demonstrating that carbon finance was needed for approval; carbon removal may also attract financiers that would not finance a similar project otherwise),

b) institutional barriers (e.g., the investor not being the beneficiary of cost savings associated with the investment) or

c) information barriers (e.g., lack of awareness of the financial benefits of by-products).

3.5.2. The Puro Standard may identify and document other barriers that are specific to a carbon removal methodology and/or region where the activity is implemented.

3.5.3. The CO_2 Removal Supplier shall provide verifiable evidence to demonstrate the existence of each identified barrier and that the carbon credit revenues are the decisive element in overcoming each identified barrier. The barriers shall be specific and, where possible, quantified. However, if the barrier can be considered as an additional cost, it should be considered in the framework of investment analysis rather than barrier analysis.

3.5.4. The CO_2 Removal Supplier shall demonstrate that the identified barriers commonly apply to similar activities in the sector and jurisdiction and not only to the specific project under consideration.

3.5.5. The CO_2 Removal Supplier shall demonstrate that at least one other alternative to the mitigation activity does not face any significant barriers, including the barriers faced by the mitigation activity.

3.5.6. The evidence used shall be applied conservatively. In case of uncertainty in the level of the identified barrier, the evidence or the value shall be interpreted to assure there is a very low likelihood that the effect of the barrier is overestimated. Such evidence may include independent studies, publicly available surveys, relevant market data, or data from national or international statistics.

3.5.7. The CO_2 Removal Supplier shall report any public subsidies they receive. If the subsidies are substantial, the CO_2 Removal Supplier shall demonstrate how the subsidies are not sufficient to overcome the barrier.

3.5.8. The CO_2 Removal Supplier may provide evidence also in a confidential appendix. This may include any confidential information that is relevant to the barrier analysis, such as financial data, financing agreements, market conditions, or technical specifications. Confidential information shall be provided to the auditor and Puro.earth

[8] Financiers can include buyers prepaying for carbon credits.

in a separate document that is clearly marked as confidential. The CO_2 Removal Supplier shall provide a high-level description of the evidence provided for the audit, which will be published in the Puro Registry.

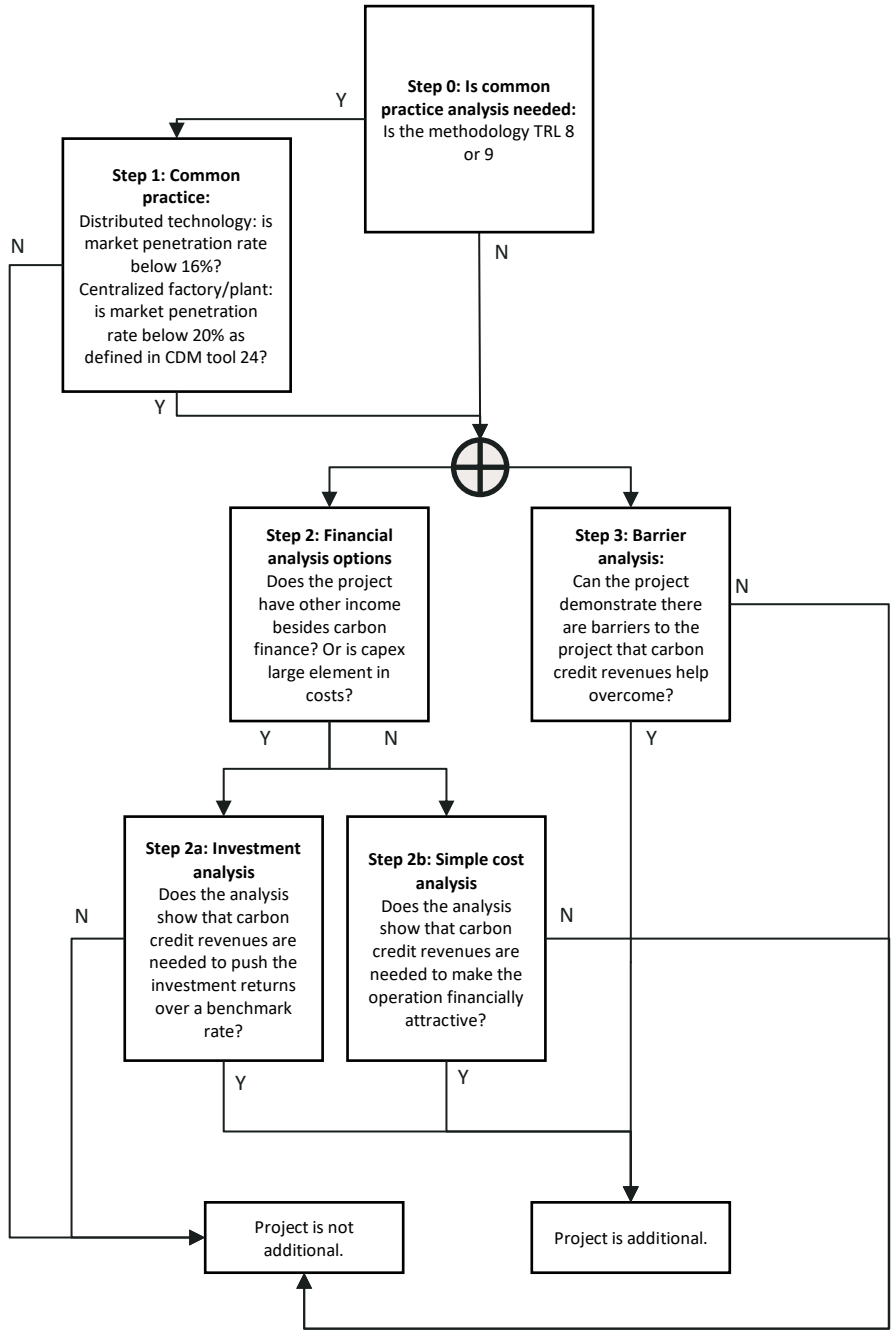

Figure 1. Obligatory steps and options to demonstrate additionality according to the Puro Standard.

4. Document History

Version	Issue Date	Comment
1.0	1 December 2022	Initial version published
2.0	7 June 2024	Rules rewritten to align with Puro Standard General Rules 4.0. New additions include • Clause numbers • Interpretation of the timing of design validation (clause 2.2.3 in General Rules 4.0) • Common Practice Analysis • Simple Cost Analysis • Barrier Analysis • More detailed disclosure requirements

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Puro.earth is the world's leading market infrastructure provider for engineered carbon dioxide removal (CDR). We provide the certification frameworks, scientific standards, and digital systems that allow engineered CDR to scale as an investment-grade market.

At the core of this infrastructure is the Puro Standard - the world's first dedicated standard built for the needs of an engineered CDR market. We certify suppliers under the Puro Standard that durably store carbon dioxide for at least 100 years, and in many cases over 1,000 years. To date, we have certified over 100 engineered CDR projects, resulting in the issuance of over 1.5 million CO_2 Removal Certificates (CORCs) in the Puro Registry as verified, traceable, investable assets. Our infrastructure is trusted by over 700 companies worldwide to procure carbon removals with confidence.

Nasdaq has owned a majority stake in Puro.earth since 2021. This brings 50+ years of expertise in building and operating the world's most trusted markets, strengthening Puro.earth's ability to deliver the transparency, rigor, and operational capacity needed to make CDR an institutional-grade asset class.

Puro.earth is an ICVCM Eligible Carbon Crediting Programme.