Calyx Global

CARBON CREDIT RATINGS EXPLAINER

The Calyx Global Approach to GHG Ratings



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VERSION 3

Introduction

Calyx Global's GHG integrity assessments

This document lays out the Calyx Global approach to rating carbon credits for their greenhouse gas (GHG) integrity. In addition to rating credits for their GHG integrity, Calyx Global also rates credits for their claimed contributions to Sustainable Development Goals (SDGs) and screens projects for environmental and social risk. An overview of our approach is provided in our Calyx Global Ratings Explained. This document is focused on providing additional details on how the Calyx GHG Ratings are generated.

Calyx Global's 3-level approach

Calyx Global's approach for the assessment of the quality of carbon credits occurs at three levels:

1. Carbon crediting program screening

This is the first step in our approach to rate carbon credits. We assess carbon crediting programs (e.g., Verra, Climate Action Reserve, Gold Standard, etc.) because we believe that there are certain characteristics of such programs that are important for credit quality. This includes issues related to governance, the rules and procedures in place for developing and updating the standard's documentation, carrying out stakeholder consultations, ensuring transparency, requiring validation and verification and maintaining a credible registry.

More information on our program level screening can be found in our explainer.

2. Methodology assessments

We also conduct a "deep dive" into methodologies (sometimes called "protocols") that are used as a basis for emission reduction or removal claims for various project types. These methodology-level assessments allow Calyx Global to focus project level analysis on methodological "gaps" or areas where we can expect high variability in GHG integrity.

We have done assessments for a large array of "project type + methodology" combinations. For example, avoided unplanned deforestation using VM0007, large-scale grid connected hydropower using ACM0002, landfill gas with utilization using ACM0001 and cookstove and biodigester projects applying GS TPDDTEC.

Our assessments inform our carbon credit ratings but are not themselves ratings. More information on the role of methodologies in our ratings can be found in our Calyx Global Ratings Explained.

3. Project level credit ratings

While our approach is informed by our review of the program and methodologies, it is a project level evaluation that results in our ratings of carbon credits. This document describes our project level credit ratings.

Calyx Global develops Project-level Assessment Frameworks (PAFs) for "project type + methodology" combinations. Calyx Global PAFs are used to generate project-specific ratings. They are focused on project areas where we found gaps or weaknesses in the methodologies that can cause GHG integrity risk (i.e., the "pain points" of methodologies) and areas where we expect to see variability among projects using the same methodology.

Project-level Assessment Frameworks use a systematic approach to ensure comparability across our ratings. PAFs are based on the same GHG integrity framework used to assess methodologies, but with more granular guidance for the specific project activity to address the unique qualities of different activity types. This results in consistency in our ratings, as well as comparability across ratings for different activities (e.g., cookstoves, renewable energy and forestry).

Examples to illustrate how Calyx Global Project Assessment Frameworks drive consistency through answering similar questions at a more granular level

Example #1: At the methodology level, we ask the question: "If baseline determination involves sampling, does the methodology have provisions in place to avoid bias in the sampling results?" However, at the project level, for afforestation/reforestation, this question would become: "Does the project employ a sampling regime (random or stratified) that avoids bias? And, does the project adequately sample all designated strata and either treat the strata separately or appropriately weight the values?"

Example #2: At the methodology level, we ask the question: "Are all of the relevant, material project emission sources (e.g., equivalent to >5% of baseline emissions) included in the methodology?" However, at the project level, for cookstove projects, this question would become: "Does the project monitor stove stacking (i.e., the practice of using more than one type of stove for cooking) and discount emission reductions to account for it?"

Ratings are based on project documents available on the carbon registries and other public sources of information. Preliminary ratings of credits that are not yet verified may also be based on draft project documents (non-public) being prepared for the carbon registries. Our GHG rating approach does not involve site visits as we intentionally avoid duplicating the activities of third party validation and verification bodies and creating additional work for developers.

The ratings process

1. Development of the Project Assessment Framework

Calyx Global PAFs are developed by, or in partnership with, subject matter experts. We work with leading experts in specific fields – renewable energy, cookstoves, forestry – to develop the PAFs. We recognize the challenge of deeply understanding each project type and, beyond this, also understanding the greenhouse gas accounting methodologies used to estimate emission reductions (or removals) from the mitigation activities of the project type. This requires expertise that few people in the world currently possess. That is also why Calyx Global works through partnerships and engages in outreach and collaboration, including with academic institutions, to find leading experts from around the world to support the development of all Calyx Global frameworks.

Each PAF is reviewed by our independent GHG integrity panel, composed of carbon methodology experts with a wide range of expertise in carbon markets and across both technology-based and nature-based mitigation activities. Our panel reviews the PAFs with an eye for consistency among the PAFs to ensure that the application of the PAFs will lead to comparable ratings.

2. Carbon project credit ratings

Calyx Global analysts answer each question within the PAFs. This often requires a range of investigations using various pieces of information gleaned from multiple public sources. The analysis is peer reviewed and reviewed by an expert on the specific project activity.

Project Assessment Framework (PAFs)

To assess credits from each project, we answer multiple questions, using a range of information sources

Registry documentation has information about the project claims of emission reductions and co-benefits.

Other data can be used to assess project claims. Our team of analysts researches a range of issues that affect our ratings, for example:

- Satellite data is used to assess forest carbon project claims (e.g., deforestation rates)
- Penetration rate of specific technologies in specific places (e.g., wind power in India)
- Common practice for specific activities (e.g., how common improved cookstoves are in Malawi)
- Regulations that may impact the project (e.g., landfill gas flaring in the USA)

Once our analysts investigate and respond to each question in the PAFs, the answers are used to "score" a project for each risk element: Additionality, over-crediting (including baselines, project emissions and leakage), Permanence and overlapping claims. These scores are then aggregated into an overall rating for GHG integrity. Calyx GHG Ratings are risk-based (i.e., they express the level of confidence we have in whether credits represent a unique, permanent metric tonne of CO2 emission reduction or removal). For more information on our ratings scale and how we aggregate the risk elements into an overall rating from AAA to D, see our Calyx Global Ratings Explained.

Completed PAFs and the final ratings are peer-reviewed by other analysts. All ratings are reviewed by a Calyx Global Director and an expert in the specific field of the project activity (which may be Calyx Global senior staff with specific expertise or subject matter experts from our partner organizations).

Criteria for rating carbon credits

Additionality

Calyx Global defines the risk of additionality as whether the emission reductions (or removals) would have occurred without revenues from carbon credits. In other words, whether the possibility of benefitting from the sale of carbon credits played a decisive role in implementing the activity.

Additionality is one of the most challenging criteria to assess for carbon projects, while also being the most important. Carbon credits, particularly if used to compensate for greenhouse gas emissions (i.e. offsetting), should encourage new, additional mitigation.

But there is a challenge in identifying whether carbon revenues were decisive, or "make or break" for a decision to pursue an activity. There are many publications about additionality – as one states, "Evaluating whether GHG reductions are additional can be deceptively difficult." Such difficulties include how to set the requirements "tight enough" to filter out non-additional activities (i.e., false positives), while not so stringent that nothing can occur.

This is one reason why our inherent risk analysis is critical for our assessments. We combine an assessment of the inherent risks of non-additionality for the project type with information provided by the project that can mitigate the inherent risks. This combination provides greater confidence in whether the project is additional.

Inherent risks: Our team of experts analyzes whether or not the activity itself is likely to be financially attractive without carbon revenues. In addition, for each project type, we determine whether carbon revenues are typically decisive for implementation.

Examples of the inherent risk of non-additionality for different project types

Forest conservation inherently has lower additionality risk. Protecting forests typically does not generate revenues – quite the opposite, in fact, because conservation means losing an opportunity to use the land for productive purposes. Therefore, carbon revenues can be decisive in facilitating the activity.

Landfill gas projects in the United States inherently have medium additionality risk. While landfill gas projects are typically financially unattractive without carbon revenues, landfills in the United States may be subject to local or state regulations requiring the destruction of methane.

Large-scale grid connected hydropower, wind and solar projects inherently have higher risk. Such projects are often financially viable without additional finance, and carbon revenues are typically too small to have a material impact on an investment decision.

Project assessment: After analyzing the inherent risk, we take a close look at each individual project and the evidence provided with regard to demonstrating that the project activities are, indeed, additional. In all cases we also do our own research to determine if there is evidence to bolster the case of additionality.

The first issue we examine is whether a project has provided evidence that carbon revenues were considered prior to the start date of the project (referred to as "prior consideration"). The start date depends on the activity itself – in some cases it may coincide with the first year of crediting, especially if that is when activities to reduce emissions began. In other cases, it makes more sense to define the start date as the date

of the investment decision. Only a few standards require projects to demonstrate that carbon revenues were considered prior to the project's start date. We believe providing evidence that carbon revenues were considered prior to the start date is useful in demonstrating that carbon revenues were part of the decision making process to implement the project.

We also determine whether the project activity is required by a law, regulation or other legally binding mandate. Where the activity is not required, it is said to demonstrate "regulnterry surplus." We also consider whether any relevant requirement is widely enforced – as in many cases, legal provisions are not implemented in practice. In those cases, the activity can still be additional.

Next, we use information on whether the project activity is commonly practiced (common practice). This can offer an indication of whether the activity would have been implemented regardless of the carbon revenues incentive.

Calyx Global looks at whether the activity is financially attractive (or not) without carbon revenues. In this case, where relevant, it is helpful if the project has provided information on its internal rate of return (IRR). lf such information is commercially sensitive, we confirm whether such details were provided and confirmed by the auditor (i.e., often called the validation and verification body, or VVB). Then we confirm if carbon revenues were decisive. For example, a project could provide information on the IRR of the project with and without carbon revenues and demonstrate that such revenues make a material difference in the project's initiation.

Note: Projects that use a methodology with a positive list or performance benchmark approach may be assessed differently than using the five elements below, particularly if we assess the activity to have low inherent risk of non-additionality.

A summary of the elements we assess for additionality and examples for each are given in the following table. The more elements a project has in place, the higher confidence we assign to the project's additionality. We note that most methodologies do not require a project to provide all five elements – particularly if the project is using a positive list. However, we believe that the more evidence a project provides, the higher the confidence one can have in the project's additionality.

Elements for assessing additionality	Examples
Prior consideration	We look for evidence that a project considered carbon revenues prior to the project start date. For example: • For renewable energy and landfill gas, where projects do not provide clear documentation of prior consideration, the series of project events that lead up to the beginning of the crediting period become critical. Events such as when the stakeholder consultation meeting took place, when the investment decision was made, or when construction began are all integral to prior consideration. For example, if the first evidence we can find of carbon revenues consideration (this might be a first document in a registry or an MOU with a government that mentions carbon revenues) is well after the construction of the renewable energy plant or landfill gas installation, this presents risks that the project is not additional. • For REDD, we also look for evidence of the consideration of carbon revenues – a stakeholder meeting, an MOU signed with an investor, or any other information – prior to the start of the crediting period. For this project type, unlike an infrastructure project with a large, upfront capital expenditure (where the start date is the investment decision or major financial commitment), the start date can be less clear. REDD projects have year-on-year operational costs that may shift from grant to carbon revenues, so we use the start of the crediting period as the start date.
RegulInterry surplus	We look for evidence that the project activity is not required by a law, policy or other legal provision. For example: • For landfill gas projects, we check whether there is a legal requirement to flare or capture and use landfill gas. However, it is also important that such requirements are enforced. For example, regulations in China (GB16889-2008) require landfills over a certain size to install capture and destruction systems; however, our contacts in China confirm that this is not widely enforced due to a lack of resources at the local government level throughout the country. • For renewable energy projects, the installation must not be required by the government. For example, India has set aggressive targets to implement renewable energy, but there are no legal requirements to choose the construction of a renewable energy plant over a fossil fuel plant. Therefore this would pass our regulInterry surplus test.
Common practice	We look for evidence that project activities are not commonly practiced. For example: • For renewable energy, we consider the penetration rate of the technology type in the relevant grid. For example, if solar powered energy takes up a significant portion of the total grid, then the technology type can be considered common practice and therefore less additional. • For cookstove projects, we look for data about the technology penetration for the stove that is being deployed by the project. We consider where and when project activities are implemented to assess the risk of the cookstove technology being common practice when the project started.

Financial attractiveness	We look for evidence that the project is not financially attractive without carbon revenues. For example: • For renewable energy or landfill gas, we check whether the project conducted an investment analysis, taking into account all relevant incentives, that demonstrates that the IRR of the project without carbon revenues was significantly lower than the benchmark rate of return. • For afforestation/reforestation projects, it would be ideal if the project provided an investment analysis, but many do not; in such cases where information is missing, we look at the project activity and the expected revenues – and treat commercial plantations differently than, for example, small-scale, smallholder-based projects, where we assess that there are credible barriers to investment and that the project would not be financially attractive without external revenues.
Carbon revenues impact	We look for evidence that carbon revenues were decisive for the project. For example: • For large-scale infrastructure projects such as renewable energy or landfill gas projects, we look for evidence that carbon revenues resulted in a substantial increase in the project's IRR. If information is not provided, or the "delta IRR" is marginal, this element is not met. • For afforestation/reforestation or improved forest management projects, we look for evidence that carbon revenues make a critical contribution and act as a guarantee for financial sustainability of the project. Because a thorough investment analysis is often not publicly available, we also consider the existence of emission reduction purchase agreements, agreements with carbon investors, verified statements about how long it will take the project to recoup initial investments, and information on the timeline and adequacy of non-carbon sources of funding.

Over-crediting

Over-crediting entails the assessment of how well the baseline was set, how well project emissions (or removals) are estimated and whether material leakage was estimated and accounted for (e.g., deducted from emission reduction - or removal - estimations). Together, these elements are important to ensure that the per credit claim of avoiding or removing one tonne of CO2 is not overstated.

1. Baselines

In assessing project baselines, we determine the risk that the proposed baseline is not a conservative estimation of the emissions or removals that would occur without the project. Fundamentally, we ask: did the project demonstrate that the baseline is plausible, realistic and conservative?

Inherent risks: As with all criteria, we first assess the inherent risks associated with estimating baseline emissions or removals. This entails understanding the ease of identifying the baseline scenario and the uncertainty associated with estimating emissions (or removals) for that scenario. We also examine whether perverse incentives to increase baseline emissions exist.

Examples of the inherent risk of incorrectly setting baseline emissions

REDD projects have a high inherent risk of incorrectly setting baseline emissions because determining the counterfactual is extremely difficult. Projecting deforestation into the future using a model introduces high levels of uncertainty.

Landfill gas projects have a medium inherent risk of incorrectly setting baseline emissions because, in the baseline, oxidation of methane occurs in the top-soil layer of a solid waste disposal site (SWDS). In the project, this methane is captured by a landfill gas capture system and thus the highly variable and site-specific top-soil oxidation has to be estimated, which has high levels of uncertainty.

Project assessment: We consider a range of elements for each project to assess whether the baseline is likely to be overestimated. Not every element will be relevant for the project type, but we are systematic in considering the same set of elements for every project. We check that the baseline scenario is conservative and that all relevant, material emission sources (or sinks for removals) are included in the baseline. We also check to ensure that a conservative approach is taken to any baseline data and parameters. In other words, where uncertainty exists, the selected values or other methodological choices should err on the side of estimating lower emission reductions (e.g., using the lower bound of uncertainty for a particular parameter). If sampling is used, we check for bias. Where measurement equipment is used, we assess whether measurements will be reliable. We also check the frequency of monitoring and whether it is sufficient to capture changes for the activity type.

The baseline can be affected by existing or changing government policies or legal requirements. We ascertain whether changing policies and requirements are relevant for a specific project type and, if so, whether the project considered these changes when setting the baseline. Other circumstances may also change the baseline conditions, so we consider those circumstances as well to ensure that the baseline is conservative. If a performance benchmark or standardized baseline is used, we evaluate whether this is updated on a sufficient basis. The length of the crediting period can also be an important factor for estimating emission reductions. We assess whether the crediting period is appropriate to the activity type. And, where relevant, we also check if renewal (and possible revision) of the baseline is required when renewing the crediting period.

Finally, we consider whether there is documented evidence of overestimation of baseline emissions (or underestimation of baseline removals) in peer reviewed literature.

Examples that illustrate how we assess various baseline elements

On conservativeness: For landfill gas projects, we check to see if the destruction of methane was occurring before the project began (and if so whether it was appropriately accounted for in the baseline), as well as whether the project provided a reasonable justification for the selected oxidation factor.

On changing circumstances: For renewable energy projects, we look at how the grid emission factor (GEF) - i.e., the composition of the electrical grid that determines the emissions displacement caused by the project — changes over the course of the project's crediting period. If the region of the project is rapidly adding more renewable energy sources to the grid, the GEF would decrease and the project would risk overestimation of the baseline if their data is not updated annually (ex-post).

On crediting period and renewal: For REDD projects, we assess whether the choice of the crediting period increases the risk of an overestimated baseline, since reassessment of the baseline does not occur until the next crediting period.

2. Project emissions (or removals)

Here we look at the risk that the project emissions (or removals) are not a conservative estimate of performance.

Inherent risks: In order to assess the inherent risk of underestimating project emissions (or overestimating project removals), we first consider the ease with which project emissions (or removals) can be estimated. We also consider the "signal to noise" ratio, i.e., whether the project activity generates emission reductions (or removals) that are significantly greater than the uncertainty of the measurement of project emissions (or removals). Emission reductions also can be more accurately estimated where project emissions are a small percentage of baseline emissions. For some project types, project emissions are not applicable because the project activity is only avoiding emissions, not generating them.

Examples of the inherent risk of underestimating project emissions (or overestimating project removals)

Biochar projects are low risk because project emissions are measured directly at the facility. Furthermore, the project scenario generates removals where the baseline does not. As a result, the signal to noise ratio is strong, and removals are easily and robustly measured with simple approaches and metrics.

Grassland management projects are high risk because the signal to noise ratio is very low for soil carbon sequestration. The remedy — longer time intervals to observe the change or more intensive soil sampling — may or may not occur at the project level.

Project assessment: Similar to assessing baselines, Calyx Global examines how projects estimate emissions (or removals) and whether they are being conservative in doing so. To estimate emissions (or removals) requires, as a first step, assigning or estimating values for parameters where the value may be uncertain. We have found that many methodologies do not require estimates of uncertainty – even for data that has high

uncertainty. This should not be acceptable, per most standards, but somehow is not caught during the validation of methodologies used in the marketplace today.

We also check if all relevant, material emission sources are included in the estimate of project emissions. Similar to our baseline assessments, if sampling regimes are used to estimate emissions, we check their reliability. And if measurement equipment is used to directly monitor project performance, we assess if the measurements will be reliable. Finally, we assess the frequency of monitoring parameters that are used in the estimation of project emissions, i.e., whether we believe it is appropriate to capture project performance.

Examples that illustrate how we assess project emissions

On conservativeness: For REDD projects, we assess whether the project has estimated all material sources of uncertainty - even though the methodology may not require a project to do so.

On whether material sources of emission are included: For REDD projects, we also determine whether emissions from degradation are material and, if so, whether the project is taking them into account.

On measurement and monitoring: For cookstove projects, many carbon accounting methodologies require that project stoves have a minimum combustion efficiency. However, in real-world settings cookstoves can perform less well than they do in laboratory settings. Therefore we consider how stove and project performance is measured and how stove stacking is managed and monitored by the project.

3. Leakage

For leakage, we are not assessing whether the activity causes leakage, but rather the risk that emissions caused by the project activity, but outside the project boundary, are being accounted for. This means estimating such emissions and deducting them from claimed emission reductions.

Inherent risks: In order to assess the inherent risk of unaccounted leakage, we first look at whether the project activities tend to cause unintended secondary effects on emissions outside the project boundary and how such emissions compare to claimed emission reductions.

We include in our assessment different types of leakage based on relevance to the project type:

- **Activity-shifting:** Project activities shift emissions to locations not targeted, or emissions not monitored, by the project.
- **Market:** An impact on the supply or demand of an emissions-intensive product or service, creating an increase in emissions elsewhere.
- **Lifecycle:** The generation of emissions of a product created as part of the activities implemented for a project.
- **Ecological:** Emissions from hydrologically connected systems (e.g., wetlands).

Examples of the inherent risk of leakage from project activities

For cookstove projects, the inherent risk of leakage is low. There is currently a lack of evidence to suggest that energy efficient cookstove projects result in material emissions outside of the activity accounting boundary (i.e., unintended secondary effects). Evidence from carbon projects that do monitor leakage report no leakage as a result of the project activity, or a value that is less than 5% of emission reductions.

For improved forest management projects, the inherent risk of leakage is high. Most management activities limit the production of wood and that deficit in the market will be replaced by production elsewhere. We make an exception for projects with no demonstrated history of timber extraction that intend to convert a production forest to a protected forest – in which case the risk is low.

Project assessment: To assess the risk of unaccounted leakage, we look at three elements for each project. The first is whether material sources of leakage have been identified. Second is how well the project has quantified the leakage that has occurred, and finally is whether leakage is accounted for, i.e., deducted from estimated emission reductions (or removals).

Examples that illustrate how we assess leakage

On whether material sources of leakage have been identified: For afforestation/reforestation projects, we determine whether tree planting took place on land that was providing subsistence or livelihoods to the community. Even if the land is described by project developers as 'degraded,' it may be part of a system of shifting cultivation or low-intensity grazing. We assess evidence that these activities did not move elsewhere and/or that the calories and income were effectively replaced.

On how well leakage has been quantified: For REDD projects, we assess the plausibility of reported leakage and how well the project sets a baseline for the leakage belt (used to estimate activity-shifting leakage); for improved forest management, we use peer-reviewed literature to benchmark whether the (market-based) leakage claims are within reason.

Permanence

Carbon credits should represent long-term mitigation benefits. This is especially true if the credits are being used to compensate for fossil fuel emissions that have long-term implications for atmospheric concentrations of greenhouse gasses. Similar to leakage, the most important issue for permanence is not whether there is reversal risk, but if such risks are covered by compensation mechanisms – such that the credits sold represent, in the end, an emission reduction or removal (which could come from another project if there is a proper insurance mechanism in place).

Why did Calyx Global choose a 100-year benchmark for non-permanence risk?

Calyx Ratings for non-permanence assess the risk of uncompensated reversals within a 100-year timeframe. Many users of credits wish to make claims related to compensating for emissions from fossil fuels that will stay in the atmosphere for a long period of time – much longer, in fact, than 100 years.

While many argue that a 100-year timeframe is not practicable, we believe carbon crediting programs should strive to provide as much of a guarantee as possible. Considering a 100-year timeframe also prices in the "carrying cost" of such an assurance, creating closer fungibility among credits that may be temporary with those that have low or no non-permanence risk.

Using a longer benchmark also helps to differentiate credits from standards that have long-term monitoring and compensation systems (e.g., the Climate Action Reserve) from those that have less stringent requirements for permanence.

Inherent risks: Different emission reduction or removal claims have different reversal risks, meaning the credited emission reductions or removals are reversed and the atmosphere, in the end, no longer sees a net benefit. For many project types that we assess, non-permanence is not applicable and there is no reversal risk. For some, there is high inherent risk of reversals because both man-made and natural disturbances can occur. For others, it might be that only natural disturbances can occur. Or perhaps, for some project types, reversals are rare.

Examples of the inherent risk of non-permanence for...

Nature-based projects have a high inherent risk of reversals because, for example, the carbon stored in forests or soils is prone to loss both from natural (e.g. fire, wind erosion) and human (land clearing, tilling) disturbances.

By contrast, some technology-based removal projects have low inherent risk of reversals. For example, storing CO2 in concrete has low risk of being re-released to the atmosphere because the CO2 is chemically bound within the concrete to form limestone and would require high temperatures (as in cement kilns) to release the CO2.

For many project types that we assess, there is no risk of non-permanence because once the activity is undertaken, it cannot be undone. For example, this is the case for renewable energy, landfill gas and the destruction of industrial gasses.

Project assessment: In order to assess the risk of uncompensated reversals, we start by assessing the strength of the insurance mechanism used. Particularly where the risk of reversal is medium or high, the standards should provide a mechanism to monitor for reversals and to compensate for them, when they occur. Ideally this monitoring and compensation occurs over a long time horizon. We find lower risk for credit vintages that have longer monitoring periods after the emission reduction or removal has occurred.

We also assess other elements that may be built into the standard or methodology that discourage (man-made) reversals from happening. For example, some methodologies provide only a portion of the emission reductions or removals up front and then issue the remainder in later years of the project, which provides a strong incentive for the project to continue monitoring (in order to receive the remainder of credits). We also

look at the treatment of avoidable reversals (i.e., reversals caused by the negligence of the project owner) and whether there are legal obligations to compensate for such reversals (which are impossible to insure due to the moral hazard of doing so), or other penalties for the project owner.

Then we assess the strength of the insurance mechanism itself. This includes whether there are requirements for the project to design and implement measures to reduce the risks of reversals, whether there are procedures to review the strength of the insurance mechanism (e.g., the buffer reserve) and make adjustments if needed, and if there is a track record of compensating for reversals that have occurred.

We also then assess, for each project, elements that can lower the reversal risk. These are divided into two categories: (1) the environment in which the project is located and elements that can cause risks of reversals (e.g., high rates of natural disturbance, or indicators of man-made disturbances such as governance indicators of the host country or trends in such disturbances), and (2) project design, such as the track record of the project implementer, whether the project benefits communities, the financial sustainability of the project, or legal requirements for the continuation of the project activity. If we find both a supportive environment and sustainable project design, we lower the risk level of the rating on non-permanence.

Examples that illustrate how we assess the risk of non-permanence

Analysis of the standard's insurance mechanism: The Climate Action Reserve's requirements for forest projects in the United States are currently the strongest guarantee against reversal risk. CAR requires such projects to monitor and compensate for reversals for 100 years after each credit vintage. While the buffer mechanism compensates for natural disturbances, the project owner is legally liable for avoidable reversals. In the case of CAR's Mexico Forest Protocol, ejidos may choose a 30-year monitoring period; however, only partial credit is provided year-on-year depending on the commitment (e.g., 1% per year) and full credit for the carbon sequestered is only issued 100 years after the date it was initially sequestered, providing an incentive for projects to continuously extend their monitoring period.

Analysis of elements that can lower reversal risk: For forest carbon projects, we assess the trends in forest loss, governance indicators (which are associated with forest loss), and the likelihood of natural disturbance. We consider the extent to which project design includes activities that are likely to protect carbon stocks in the long term, such as firebreaks or treatment for pests. We also consider provisions such as non-carbon income generating activities, community benefit sharing or investments in community development that could enhance the sustainability of project activities.

Overlapping Claims

Finally, we assess the risk that more than one credit is issued for the same emission reduction (or removal) under the same or multiple carbon crediting programs, or whether an emission reduction (or removal) might be "double claimed", i.e., a credit is issued for an emission reduction claimed by another entity towards a greenhouse gas target, irrespective of whether another credit was issued. At this time, we do not apply this risk to claims by governments to emission reductions or removals under NDCs.

For this risk category, we first check whether the emission reductions or removals occur at sources/sinks that are covered by mandatory mitigation targets (such as cap-and-trade systems, renewable portfolio standards, or other quota-based mitigation schemes). Then we determine whether there are identified overlaps with the

accounting boundaries of other credited mitigation activities. And finally we note whether the standard requires project owners to legally attest to exclusive ownership of emission reductions.

Examples that illustrate how we assess overlapping claims

Renewable energy projects are checked for overlaps with national mitigation targets and with the renewable energy certificate (REC) market where the same energy can be counted towards multiple different schemes.

A REDD project may claim to protect the same biomass as a cookstove project if the projects are in close proximity, and the cookstove project focuses on changing fuelwood consumption.

Additional Issues

Calyx Global does not rate credits from projects whose mitigation activities are inconsistent with a transition to net zero. In other words, the activity may reduce greenhouse gas emissions, but also further technologies or practices recognized as inconsistent with a transition to carbon neutrality by mid-century. Decisions on which activities fall into this category are taken by our independent expert panel.

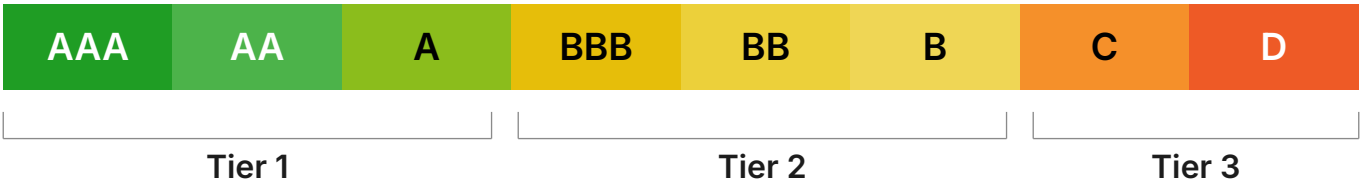
We also do not rate “ex-ante” credits, or credits that represent a future emission reduction or removal, as opposed to those that have occurred and have been verified. Similarly, we do not rate credits that we believe cause undue market distortions that can undermine the mitigation benefits (and therefore are a poor fit for carbon markets). We also have limits to how early the crediting start date can be – for example, if the start date is prior to the launch date of carbon crediting programs, we believe this represents a uniquely high additionality risk, since it would not have been possible for the project to have considered carbon revenue.

Calyx ratings do not assess alignment with the targets of the Paris Agreement or other international agreements.

GHG ratings

Scoring system

Once we have established the risk for each of the factors above, we combine these into an overall Calyx GHG rating for each project. The outcome is a letter grade from AAA to D that is an assessment of the risk that the carbon credits from the project are not achieving the emission reductions or removals that are claimed. AAA denotes a low GHG integrity risk, or high confidence in the claims. By contrast, a D denotes high GHG integrity risk, or low confidence, in the claims. In some public views, ratings are shown on a 3-step scale: Tier 1 corresponds to AAA-A, Tier 2 to BBB–B, and Tier 3 to C-D.



For each of the risk factors we assess (additionality, over-crediting, etc.), we assign a low to high risk rating in five steps: low risk, low-medium risk, medium risk, medium-high risk, and high risk. Each risk is assigned a number of demerits that factor into our scoring. The scale is not linear from low to high risk (i.e., a high risk results in considerably more demerits in our system). These demerits are additive – low risks in one area cannot balance out high risks in another. That means a project can have an D rating if it has high risks in just a couple of important categories. Each of the risk factors are also not treated equally, as we believe some characteristics have a stronger influence on the overall GHG integrity of projects' claims of emission reduction (or removal).

Additionality is a critical concept for carbon credits. Therefore, in the Calyx Global rating framework, a credit rating can never be better than its additionality assessment. For example, if the project is assessed to have a medium non-additionality risk, it cannot achieve a BBB rating or above. The additionality risk is therefore the starting point for the overall rating of the credit and has the greatest impact on the rating.

The next most important risk factor in our overall ratings are how well emission reductions (or removals) are estimated. This is followed by the risk of uncompensated reversals (i.e., non-permanence) and the risk of overlapping claims. If a project has high risk on any of these elements they receive a certain number of demerits that move them down the ratings scale. For example, if a project starts at medium risk of non-additionality, a high risk of over-crediting (i.e., the project may be substantially over-claiming the amount of emissions reduced) can push the rating down to the D level.

Preliminary ratings of credits that are not yet verified may cover all or only some of the four risk areas. To these we assign our low to high risk rating (in five steps as described above). We may, or may not, combine these into an overall letter grade rating.

GHG ratings apply to verified carbon credits for the year(s) stated in the rating. When a project verifies new credits, those receive a new rating. Each rating is valid, for the credits specified, as of the rating date noted beside the rating itself. GHG ratings are backward-looking, i.e. assigned after verification. Preliminary ratings of credits not yet verified are forward-looking.

We may update a past rating if new information is found to be available that will impact the rating and credits are still available. We monitor project documentation as well as any regional, national and international data

sources used in our ratings. If updated, a rating is flagged for visibility to users. We update preliminary ratings of credits not yet verified when those credits become verified.

This document describes Calyx Global's GHG carbon credit ratings approach. As new information arises our rating framework documents may be revised, according to our policies, with our independent expert panels.

Updating our approach

Our policy for revising our rating framework documents stipulates revisions when new science or other information is available that will increase the accuracy and/or comparability of our ratings. We conduct ongoing monitoring of peer-reviewed scientific research, carbon market standards and regulatory developments, and we receive inquiries from users and other stakeholders, in addition to the formal annual review conducted with our independent expert panel. Proposed revisions are assessed for impact and back-tested prior to deliberation by our independent expert panel and final decision. Material updates are noted in the change log of the framework documents and in this explainer.

Conclusion

Calyx Global seeks to arm buyers with the information they need to make decisions about which carbon credits to buy. Our ratings provide information on greenhouse gas emission reduction or removal claims and our level of confidence in such claims. With this, carbon credit buyers can manage their financial and reputational risk, while making an impact for people and the planet.

Our Ratings Are...

- **Comprehensive:** Calyx Ratings cover multiple project types across multiple standards.
- **Comparable:** Our systematic ratings approach enables the comparison of carbon credits.
- **Unbiased:** We don't buy or sell credits. We avoid conflicts of interest.

To learn more about the Calyx Global ratings process, find additional information at Calyxglobal.com/resources or request a demo at info@calyxglobal.com.

Calyx Global ratings and screenings, including GHG ratings, SDG ratings, ESR screenings and carbon crediting program screenings, are Calyx Global's own opinions based on the rating frameworks described here. They do not constitute any form of advice or recommendation with respect to any particular carbon project or class of projects. A Calyx Global rating does not indicate that any investment in a particular carbon project or class of projects is suitable for any person and does not provide any forecast whatsoever as to the development and performance of any such project or class of projects. Calyx Global does not accept any liability whatsoever for any loss, expense, cost or liability, howsoever arising from any person's decision to procure credits from, participate in, invest in or in any manner take financial exposure with respect to any carbon project. The information used to rate a carbon project has been developed from a range of sources which Calyx Global has limited opportunity to verify. Calyx Global accepts no liability to any person for any loss, expense, liability or claim that they may incur as a consequence of making any decision or taking any action in reliance on a Calyx Global rating. All rights including copyright and rights of authorship are vested in and reserved by Calyx Global. Calyx is a trademark subject to registration with the United States Patents and Trademark Office. The information provided here with respect to Calyx Global methodologies, including our assessment frameworks, are proprietary to Calyx Global and must not be used to rate, evaluate or assess a carbon project or imitate Calyx Global carbon project ratings without our prior written consent.

Appendix: version and change log

External document

Document name: Calyx Global GHG ratings explained
Owner: R&A Director of Operations
Version: 3.0
Issue date: 2023
Approved by: Donna Lee
Approval date: 28 October 2026
Effective date: Upon approval
Next scheduled review: October 2027
Classification: External

Material amendments to this document are recorded here. Each amendment increments the version number and is dated.

Version	Approval Date	Summary of change
3.0	28 October 2026	Added change log for this explainer and for project specific PAFs; added information on revision policy; Added information on preliminary ratings.
2.0	January 2025	Added new rating scale.
1.0	2023	Initial issue.

We also log any material amendments to each active project assessment framework (PAF) for reference in the table below. Each amendment increments the version number and is dated.

Version	Name of PAF	Approval Date	Summary of change
1.0	PAF urban forest conservation	4 September 2025	Initial issue.
3.0	PAF cookstoves	29 May 2026	Updated guidance on evidence for common practice.
1.0	PAF coal mine methane	1 October 2025	Initial issue.
1.0	PAF abandoned mine methane	26 August 2025	Initial issue.
2.0	PAF manure management	11 March 2023	Changed estimate of baseline retention time from 6 to 3 months.
1.0	PAF afforestation / reforestation	14 September 2022	Initial issue.
2.0	PAF ozone depleting substances	15 May 2024	Updated approach for determining emissions from substitutes for destroyed ODS.

Appendix: key assumptions

The following is a summary of key assumptions within our GHG ratings approach:

- **Additionality.** Our approach to additionality (see above) assumes that the GHG integrity of a credit can never be better than its additionality assessment. For example, if the project is assessed to have a medium non-additionality risk, it cannot achieve a BBB rating or above. The additionality risk is therefore the starting point for the overall integrity rating of the credit and has the greatest impact on the rating.
- **Over-crediting.** Our approach takes the perspective of what the atmosphere sees. This means if a key value (for example, a global warming potential value) is revised in the scientific literature midway through a project's operating lifetime, our approach will consider the latest, most accurate value rather than the value available to the project at its inception. (We recognize that updating such values may not be required by a carbon program or methodology.)
- **Permanence.** Our approach is based on a 100-year timeframe and using a sliding scale. We assume a more "durable" impact has higher value to the atmosphere (and thus, higher ratings). The longer the durability, the higher the rating, up to 100 years.
- **Overlapping claims.** Our approach assumes that a credit has higher integrity if it has lower likelihood to be "double claimed". This does not include claims by a government towards its Paris Agreement target.
- **Information risks.** Our ratings assume that projects should provide sufficient evidence to allow a user of the credits to be convinced that each credit represents one tonne of unique, permanent CO2e avoided, reduced or removed from the atmosphere.
- **Consistent with a net zero future.** We assume that credits that are not consistent with a net-zero future, such as those that extend the use of fossil fuels, should not be used as offsets and we currently do not rate them.
- **Market distortions.** We assume that mitigation activities that can create perverse incentives or distort markets for an underlying product should also not be sold as carbon offsets and we currently do not rate credits from projects where this is the case.