Addressing leakage in mechanism methodologies

BeZero Carbon Response to public call for input

BeZero

Executive Summary

- BeZero Carbon commends the Article 6.4 Supervisory Body (SBM) and Methodology Expert Panel (MEP) for its comprehensive guidance on addressing leakage in mechanism methodologies.
- Having rated the performance of over 500 carbon projects across multiple different sectors, we agree that leakage is an important risk factor that must be addressed by projects. Our team of over 180 climate scientists, geospatial experts, data scientists, financial analysts and policy specialists employs a top-down and bottom-up approach for assessing leakage risk in projects.
- We agree with the SBM and MEP's identification of the following three procedures: (1) identification of leakage, (2) avoidance or mitigation of leakage, and (3) calculation and adjustment for leakage as the three main fundamental points to a robust leakage assessment.
- **We see further opportunity for the SBM and MEP to enhance the document by providing additional clarifications and refinements on two main areas.**
    - Firstly, the **guidance on leakage identification** could be strengthened by identifying all key types of leakage and providing structured criteria for determining when deductions should or should not be applied. At BeZero Carbon, we assess activity shifting, market leakage and ecological leakage, with the first two being the most prevalent.
    - Secondly, further clarity should be given on **leakage calculations and adjustments**. The guidance could benefit from providing further instructions for how methodologies should approach leakage adjustments and utilise clear evidentiary standards that methodologies are required to use to quantify leakage or substantiate leakage mitigation.
- We would also recommend for the SBM and MEP to give greater consideration to **the role which the assessment of project-level performance risk could play in the design of the Paris Agreement Crediting Mechanism (PACM)**. Methodologies are limited in the extent to which they can control for project performance risk. Project level assessments and ratings can be employed to characterise and manage risk in a more nuanced and dynamic way.
- **We can provide the SBM and the MEP with access to our experts and platform to demonstrate the importance of project-level assessments and ratings to accurately identify and manage the performance risk underlying carbon projects.** Additionally, we would be happy to present to the SBM and MEP further details on the data and trends we have seen across carbon credit markets pertaining to leakage risk.

About BeZero Carbon

BeZero Carbon is a carbon ratings agency, equipping world-leading organisations with the knowledge, tools and confidence to make better climate decisions. We aim to scale investment in environmental markets that deliver a sustainable future.

Our offices are in London, New York, and Singapore. With a team of over 180 climate scientists, geospatial experts, data scientists, financial analysts, and policy specialists, and global partnerships with local experts and world-leading research institutions, our ratings and risk tools help businesses and institutions make risk-informed decisions on carbon projects of any type, at any stage, anywhere in the world.

We are committed to being the leading provider of independent ratings and risk analytics to carbon credit markets across the world. For all of the post-issuance projects we've assessed, our headline ratings are available for anyone to view, for free, on our platform. To guard our independence, we've signed up to the voluntary ICMA Code of Conduct and gone further than this by holding ourselves to 7 stringent pillars of independent carbon ratings.

Our ratings have helped to drive an increased correlation between price and credit quality in the voluntary carbon market. Our latest analysis suggests that the price premium for each incremental notch on the BeZero rating scale is, on average, around 40%.

About BeZero Carbon Ratings

Carbon Ratings assess the "performance risk" of carbon credits. This is best defined as the likelihood a given credit achieves a tonne of CO_2e avoided or removed for the time period committed to. Assessing this question on a like-for-like basis across all types of carbon credits requires a scale of outputs that captures the full range of risks.

The BeZero Carbon rating assesses the likelihood a credit achieves a tonne of CO_2e avoided or removed for the time period committed to on an eight-point scale from 'AAA' to 'D'.

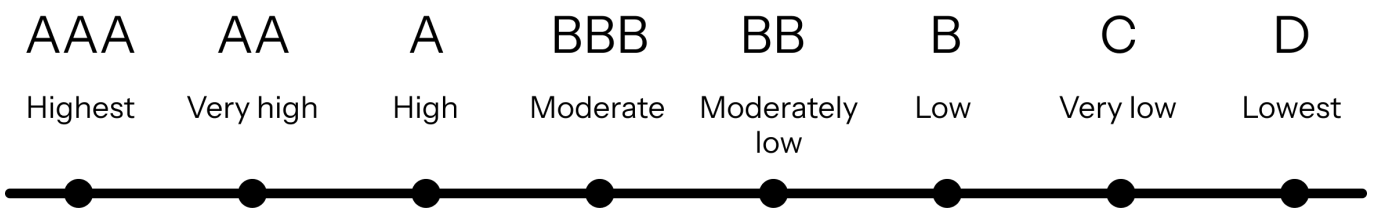


Figure 3. BeZero Carbon ratings scale, the assessment of the likelihood a carbon credit achieves a tonne of CO_2e avoided and/or removed.

This assessment incorporates three key risk factors that can be summarised as the extent to which the activity is real and would not have happened otherwise (additionality risk), the robustness of the calculations underlying the number of credits issued (carbon accounting risk), and the likelihood that the carbon outcome a credit commits to is achieved for the period committed to (permanence risk). The assessment relies on gathering information from a number of sources; therefore, the reliability of this information must also be factored into the score (information risk). Subject to materiality assessments, this information risk may drive risk factor and/or rating conclusions as appropriate.

Table 2. Risk factors in the BeZero Carbon Rating

Risk factor	Description
Additionality	The risk that a credit purchased and retired does not lead to a tonne of CO_2e avoided or removed that would not have otherwise happened.
Carbon accounting	The risk that the carbon accounting underlying a credit does not fully achieve a tonne of CO_2e avoided or removed. This includes assessment of leakage risk.
Permanence	The risk that the carbon avoided or removed by a project will not remain so for the time committed.

Call for input - response

BeZero welcomes the opportunity to provide feedback on the Addressing Leakage in Mechanism Methodologies v1.0 document. At BeZero Carbon, we assess leakage risk as part of our overall assessment of the project's carbon accounting. We define leakage risk as the risk that emissions avoided or removed by a project are pushed outside the project boundary. Typically, the sources of leakage risk can be categorised into market leakage and activity displacement.

The following response is structured into several sections -

- Our recommendations for improved clarity and requirements for leakage identification, calculation and adjustments.
- An overview of the importance of project-level assessment in understanding the performance risk of a carbon project.
- Our methodology for assessing leakage risk as part of our methodology for project ratings, insights into the impact of leakage risk across different sector groups and two case studies of our assessment of leakage risk in avoided deforestation and renewable energy.

Our recommendations

We recognize that the guidance outlines three key procedures, (1) identification of leakage, (2) avoidance or mitigation of leakage, and (3) calculation and adjustment for leakage. We agree that these are the three main fundamental points to a robust leakage assessment methodology. Based on our experience assessing over 500 projects, we see an opportunity to enhance the document with additional clarifications and refinements, which can be grouped into two main topics as outlined below.

Strengthening Guidance on Leakage Identification

While the guidance appropriately encourages project proponents to consider all potential sources of leakage, providing more detailed minimum requirements could further strengthen its clarity and effectiveness. At BeZero, we assess activity shifting, market leakage, and ecological leakage, with the first two being the most prevalent.

Our ex post assessment of the 115 NBS projects suggests that most projects may not apply leakage deductions, even when they likely should. Specifically, 54.4% of projects do not deduct for either

activity shifting or market leakage, 30.7% deduct for activity shifting but not market leakage, 9.6% deduct for market leakage but not activity shifting, and only 5.3% apply deductions for both.

Among the 54.4% of projects that made no leakage deductions, our analysis indicates that 45.2% should have accounted for either market leakage, activity displacement, or both. The remaining 54.8% were correctly justified in not making deductions, but within this group, 82% did not require deductions because the project activities were either a continuation of pre-project activities or had low effectiveness. The remaining 18% were mostly ARR projects, where pre-project activities were allowed to continue, meaning leakage was not expected.

In other words, when projects are effective and demonstrate high additionality, leakage is often likely to occur unless proper mitigation measures are in place, and it should be accounted for accordingly. This highlights the need for clearer guidance that explicitly calls out all key types of leakage and provides structured criteria for determining when deductions should or should not be applied.

Furthermore, while ecological leakage is often overlooked, it can have significant environmental implications, such as biodiversity loss and habitat fragmentation. We recommend that the guidance should consider addressing these potential impacts of leakage.

Enhancing Clarity in Leakage Calculation and Adjustments

We make three broad suggestions for how the guidance could yield methodologies and ultimately projects that reliably mitigate their leakage impacts. First, leakage quantification is notoriously difficult and in many cases the science remains far from settled regarding likely leakage rates, particularly with respect to market leakage. Therefore, any guidance should provide clear instructions for how methodologies should approach leakage adjustments in the face of considerable uncertainty, particularly around probable market leakage rates.

Second, projects in the VCM claim to avoid leakage via measures that do not hold up under scrutiny. For example, projects may claim that no leakage adjustment is necessary because the project land-base was “degraded” land prior to project initiation, without defining the term “degraded” or substantiating that the land was indeed unproductive. For another example, projects may claim to effectively mitigate all leakage via short-term plans to relocate productive activities outside the project area, but without credible long-term plans to ensure that the displaced production is sustained through the commitment period. Likewise, projects may make poorly substantiated choices regarding leakage monitoring. For example, in avoided deforestation projects the choice of a leakage belt can significantly impact the magnitude and accuracy of leakage deductions. Therefore, guidance should lay out clear evidentiary standards that methodologies must require in order to quantify leakage or substantiate leakage mitigation.

Third, it may be difficult or impossible for a methodology to provide high-integrity prescriptions for leakage quantification and mitigation across the wide array of project-specific contexts that we have encountered in the course of our assessment. Variations in local and regional labour and commodity markets, geographic variation in the climate impacts of comparable economic activity, and creative project-specific approaches to mitigating leakage may require project level diligence (rather than just methodology-level prescription-setting) to address in a confident, accurate, and authoritative manner.

Integrating project-level assessment

We recommend for the Article 6.4 Supervisory Body to take into account the role which project-level performance risk assessments could play in the design of the Paris Agreement Crediting Mechanism. Carbon markets of the past have been held back by an over-reliance on methodologies as the sole means of managing the risk that projects fail to deliver their stated carbon impacts. Ratings have emerged and been widely adopted in the voluntary carbon market (VCM) as a means of characterising and managing risk in a more nuanced and dynamic way. Our recent report "A new blueprint: How governments can design carbon credit markets for impact at scale" sets out in full our argument for why and how markets should integrate ratings into their design. This will be followed by a specific piece focusing on the integration of ratings in PACM in the following months.

The BeZero Carbon methodology for addressing leakage risks

Our carbon accounting assessment considers the risk that the carbon accounting underlying a credit does not achieve a tonne of CO_2e avoided or removed. Our analysis assesses the core building blocks of a carbon project's proposed credit issuance, interrogating how appropriate the calculations and assumptions are. This review includes an assessment of the leakage risks.

Leakage is the risk that emissions avoided or removed by a project are pushed outside the project boundary. The sources of such emissions vary from sector to sector, however, they can be broadly categorised into market leakage and activity displacement.

Market leakage occurs when a project's activities alter the supply and demand equilibrium, shifting market dynamics such that emissions avoided or removed by a project are offset by market activities elsewhere. Meanwhile, activity displacement refers to a specific emitting activity being displaced more locally.

Both market leakage and activity displacement are unintended consequences which can undermine the carbon benefits of a project.

Key factors when assessing leakage risk

To break down our assessment of leakage risk, we assess the two components of leakage (activity shifting and market effects) and leakage mitigatory safeguards employed by projects.

- Components of leakage

Projects can be exposed by both market leakage and activity displacement. Our consideration of market leakage includes upstream emissions, lifecycle emissions and product supply and demand dynamics. Meanwhile, our consideration of activity displacement includes specific analyses on the drivers and agents of project activities, carbon stocks of areas where activity may be moved to, baseline conservativeness and models applied.

In certain cases ecological leakage can occur, such as when a project's activities lead to a growth in carbon stocks beyond its boundaries. An example of this is when the management of sustainable woodlots leads to continued growth of carbon stocks outside of a project, acting to mitigate negative leakage.

There is variation in how projects account for leakage, if at all. If risks are deemed to be negligible, leakage emissions are often assumed to be zero.

In line with our ex ante and ex post rating framework, we consider risks arising from both a top-down and bottom-up perspective. For the former, this involves consideration of global and national data on parameters such as product supply and demand. The latter pertains to the interrogation of project-specific information on factors such as historic land-use in the area.

This hybrid approach ensures that as broad a range of sources of potential leakage risk as possible are considered and accounted for in the rating.

- Safeguards

Once potential leakage sources are identified, we interrogate any safeguards employed (or proposed to be employed) by the project.

Possible safeguards include measurement of emissions in leakage belts, the creation of leakage management areas and mitigatory activities (e.g. development of alternative livelihoods), and the application of leakage discount factors, among others. For each of these safeguards, our analysis considers their appropriateness and conservativeness and finally, actual application.

When assessing the suitability of the discount factor used, a range of techniques may be employed. This could include comparing the employed value to other estimates of leakage rates in a project's region.

For every sub-sector, the key components needed to be assessed for leakage can differ and therefore, the parameters we assess can vary. For example, the table below outlines the parameters which would be assessed for leakage for Avoided Deforestation.

Table 1. Sub-components of leakage assessed for Avoided Deforestation.

Leakage	Leakage	Activity displacement
		Market leakage
		Ecological leakage
		Acquisition of materials / infrastructure

In comparison, the parameters that would be assessed for Renewable Energy are illustrated in the table below.

Table 2. Sub-components of leakage assessed for Renewable Energy.

Risk factor	**Risk factor level 2**	**Risk factor level 3**
Leakage	Lifecycle emissions	Impacts of upstream activities
		Impacts of downstream activities
	Market leakage	

These two tables highlight how different parameters will need to be assessed depending on sub-sector type.

Leakage risk levels across sector groups

The below graphs represent the sector groups in which leakage risk can be a driving risk factor to project performance.

Figure 1. Leakage risk levels in the Energy Sector Group

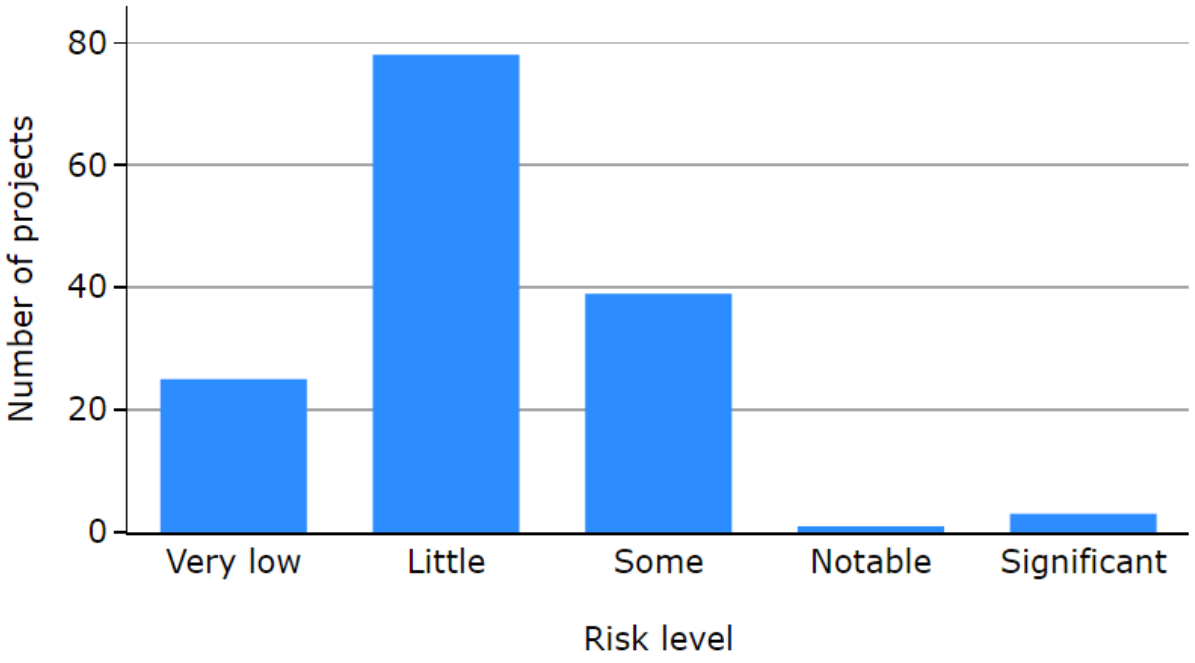


Figure 2. Leakage risk levels in Household Devices Sector Group

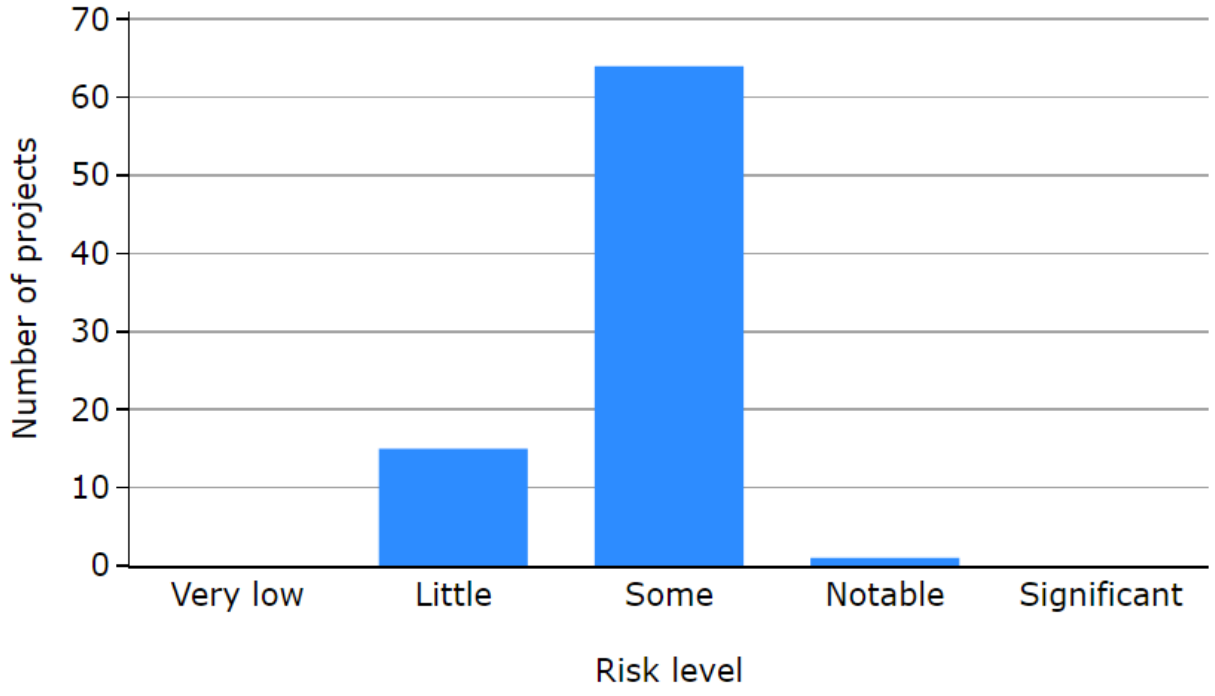


Figure 3. Leakage risk levels in Engineered Carbon Removals Sector Group

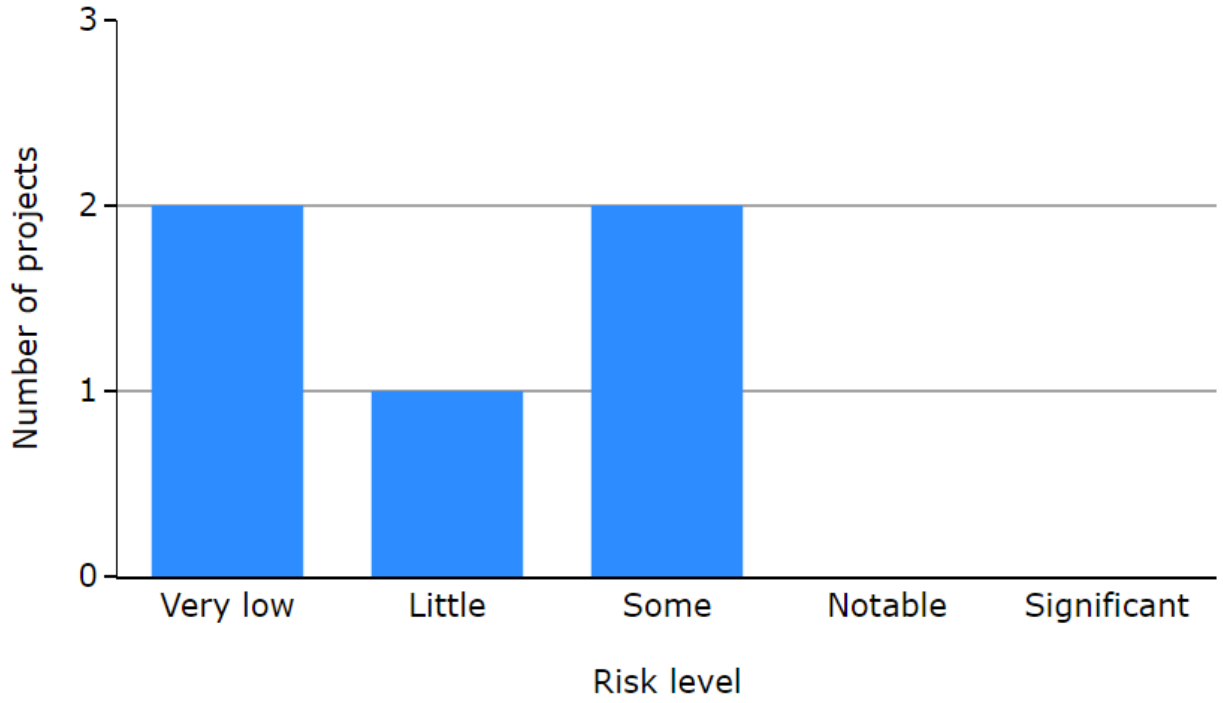


Figure 4. Leakage risk levels in Industrial Processes Sector Group.

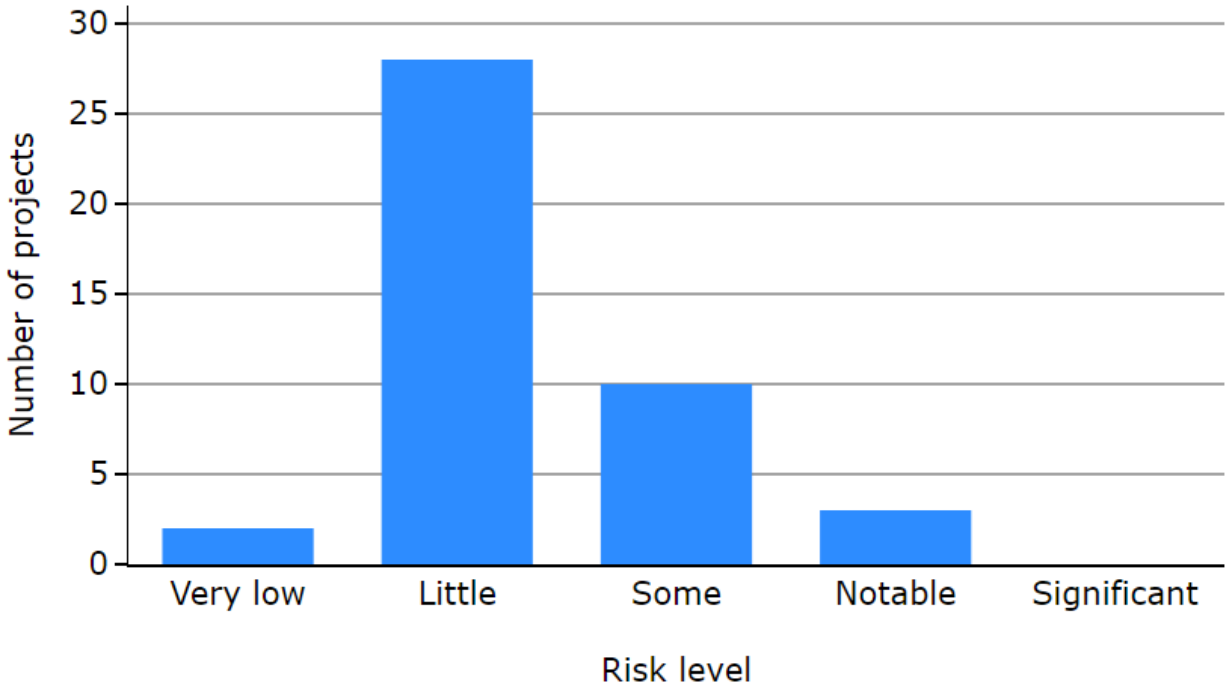


Figure 5. Leakage risk levels in Nature-Based Solutions Sector Group

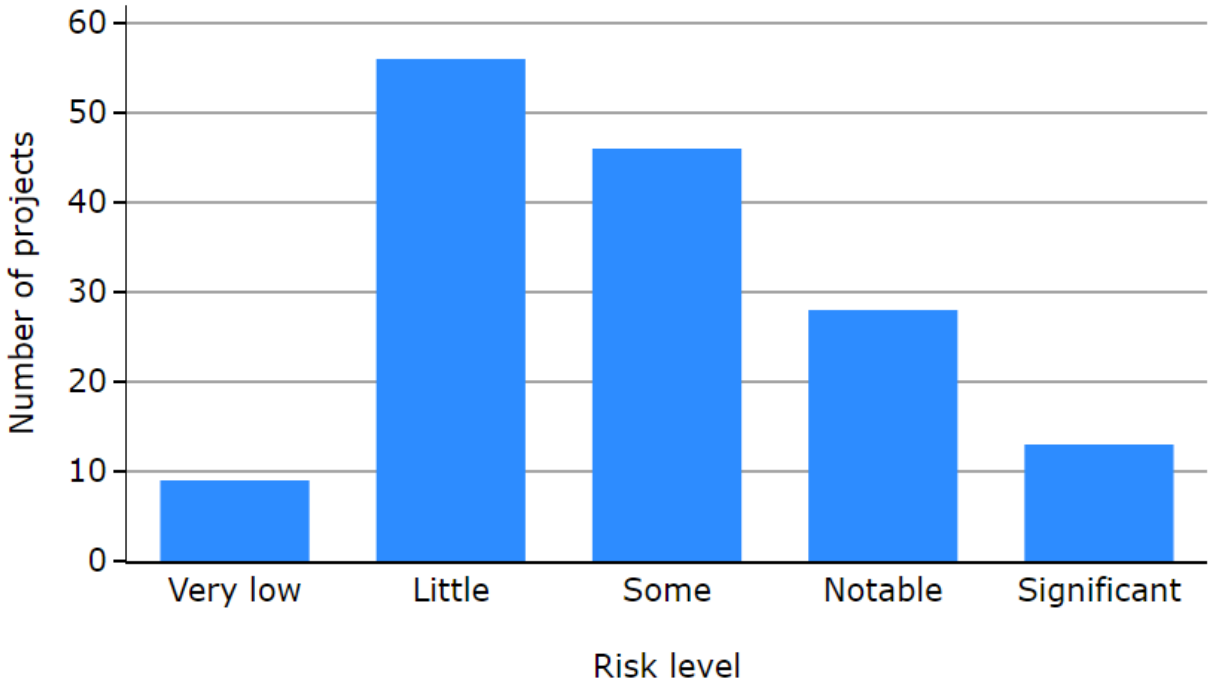
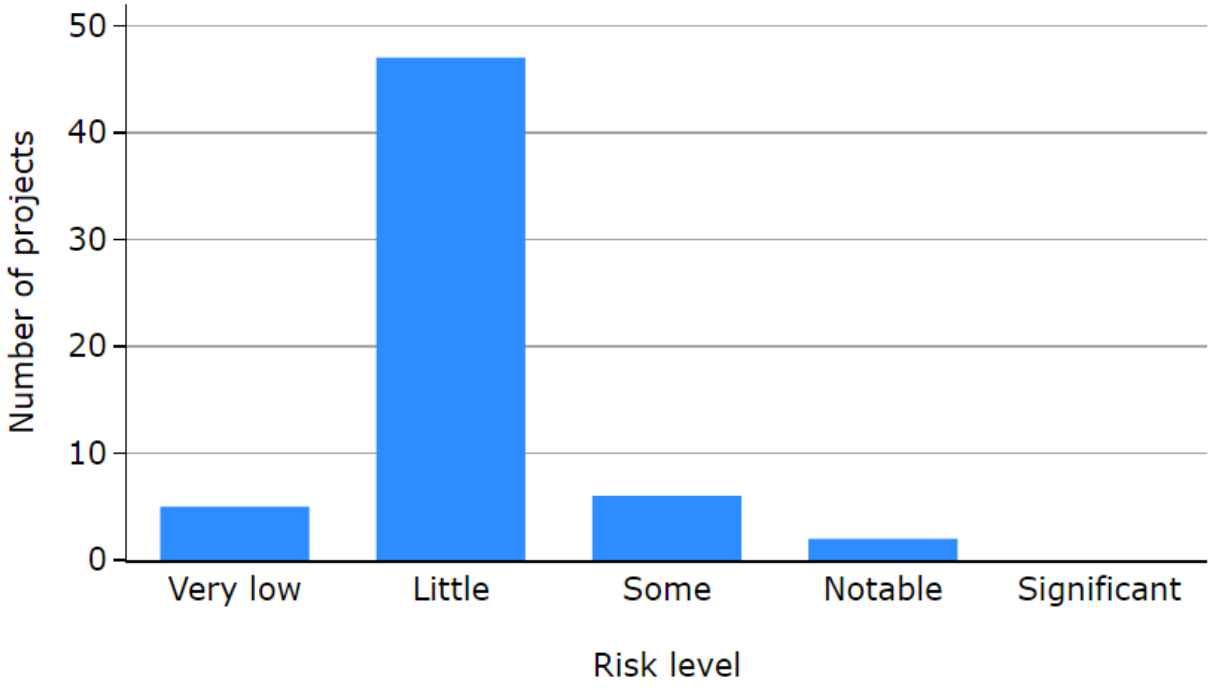


Figure 6. Leakage risk levels in Waste Sector Group



Examples of leakage risk assessments

The following two examples illustrate the BeZero Carbon approach to assessing leakage as part of the project-level assessment and rating.

Avoided Deforestation

VCS1650 Reduced Emissions from Deforestation and Degradation in Keo Seima Wildlife Sanctuary, Cambodia, BBB Rating

Summary

This REDD+ Avoided Deforestation project area covers 166,983 hectares of forest in Seima Protection Forest (SPF) in Cambodia. The site is part of the ancestral homeland of many ethnic Bunong people and is also a meeting place for two important eco-regions. The SPF is currently under threat from accelerating forest clearance for agriculture, together with unsustainable resource extraction. Before this project, conservation interventions have been on a fairly limited scale.

BeZero Carbon has reaffirmed the 'BBB' BeZero Carbon Rating assigned to credits issued by the Cambodia-based VCS 1650. This is based on the opinions and reasons expressed below, following our analysis of all available information. Carbon credits rated 'BBB' provide a moderate likelihood of avoiding or removing 1 tonne of CO_2e.

The 'BBB' rating continues to reflect the project's relatively strong additionality, driven by a high deforestation pressure and the project's relative effectiveness in containing this threat across the rated vintage. We also find limited over-crediting risk due to the adoption of a credible baseline rate of deforestation, while policy risk is tempered by limited funding and high levels of corruption. The rating is constrained by significant permanence risk, arising from increasing deforestation pressure and insecure land tenure, as well as notable leakage risk stemming from displacement of people and operations.

Leakage risk

- Notable leakage risk driven by the potential for displacement beyond the leakage belt.
- We believe VCS 1650 faces a notable leakage risk from unaccounted activity shifting within the defined leakage belt. There is a potential displacement of commercial interests and development opportunities beyond the project boundary that has not been assessed. Given the project's proximity to the Vietnamese border and a history of illegal logging routes, we also see a market leakage risk from the potential influence on timber trafficking routes.
- Leakage risk in avoided deforestation projects can stem from activity displacement caused by project implementation or market effects that disrupt supply-demand balance. VCS 1650 has defined an 84,774 hectares leakage belt to monitor deforestation and account for activity shifting, with the assumption that there will be no market leakage.
- We are of the view that VCS 1650 has likely caused activity shifting leakage that has not been sufficiently captured in project accounting. The project defines an 84,774 hectare leakage belt using a mobility analysis, creating a 4 km buffer around all settlements and roads within and bordering the project area. Leakage deductions are then calculated by comparing observed deforestation in the leakage belt to an assumed baseline. Across this vintage period, we find five years in which deforestation in the leakage belt exceeded what was predicted, leading to cumulative deductions of approximately 1.7 million credits. However, our geospatial analysis

confirms that there has been more forest loss in the leakage belt every year since the project began than what was observed in the ten years prior, with respective average deforestation rates of 2.1% compared to 0.2% for the same periods. Whilst this may be indicative of leakage, we are of the view that this increase in forest loss has primarily been driven by the granting of concessions and advancing frontier to the south west of the project area, rather than a direct consequence of project implementation. Nonetheless, given the limitations of project activities described in Additionality, the restrictions imposed on communities and the growing market for cash crops such as cassava and cashew, we do think it likely that agricultural expansion has occurred that would have otherwise encroached on the project area. As such, we are of the opinion that some level of primary leakage is likely to have occurred in all years since project implementation, meaning it may not have been sufficiently accounted for.

- There is a risk of displacement beyond the leakage belt that has not been accounted for, contributing to our assessment of notable leakage risk. In-migration to the project area is listed as a primary driver of deforestation and there is potential for these agents to be deterred by project activities and thus look to settle elsewhere. The project states that they will consider any prevention of this migration in their leakage assessment, extrapolating population growth in the participating villages from the previous ten years and assuming 100% leakage for any year this expectation is not met. Whilst this would be a conservative measure, there is no evidence that this has been acted upon since the project commenced, with no available data regarding population monitoring and no leakage deductions having been made. Moreover, by reducing their leakage assessment to participating villages and local communities only, the project does not account for the displacement of concessions or other developments that they may have prevented. For example, the suspension of recent mining concessions initially awarded within the project area and the granting of economic land concessions in close proximity to the project area may have been displaced as a result of financial incentives and protective measures stemming from VCS 1650. Considering the commercial value of such concessions and evidence of continuing top-down land allocation, it is entirely plausible, if not likely, that any planned or speculative developments within the project area will have been displaced elsewhere. For example, the value of rubber exports to Vietnam and increasing foreign investments in forestry further suggest that the suspension of rubber concessions within the project area could have led to displacement, adding to leakage risk.
- We consider there to be some risk of market leakage as a result of illegal timber operations, yet this is somewhat tempered by evidence of these activities having continued within the project area. As VCS 1650 identifies small-holder expansion as the primary driver of deforestation, it assumes there will be no market impact from project activities. However, it is estimated that as much as 90% of Cambodian timber production originates from forest conversion, meaning it is harvested illegally. Although it is likely that a sizable share of high valuable timber was extracted from the project area when it was under the occupation of the Samling logging concession, we find evidence that illegal extraction has continued across the project lifetime. Evidence of these activities occurring within the project area include patrol reports of confiscations and arrests, as well as the killing of two project rangers who reported an illegal logging camp on the Vietnam border. Although this more than highlights the necessity for project activities, supporting Additionality, it nonetheless demonstrates the potential for any reduction in logging from the project area to be displaced elsewhere and impact trans-national markets. For example, drawdowns in timber imports from Cambodia to Vietnam in 2016 were reported to be replaced by African imports, which increased by nearly 47%. As such, we are of the opinion that effectively avoiding deforestation in the project area is likely to have

repercussions beyond immediate stakeholders and has the potential to influence market dynamics, contributing to notable leakage risk.
- In conclusion, we believe that VCS 1650 faces notable leakage risk due to unaccounted deforestation within the leakage belt, the potential displacement of large-scale commercial activities and land concessions, and the risk of market leakage linked to illegal logging in the region.

Renewable Energy

VCS1716 Matebe Hydroelectric Plant, Democratic Republic of Congo, BBB Rating

Summary

This project involves setting up and operating a 13.26 MW hydroelectric plant in the Democratic Republic of Congo (DRC). The project will provide electricity to rural communities in the surrounding area through off-grid mini-grids. In addition, project activity will reduce greenhouse gas emissions by producing clean energy for the surrounding communities.

BeZero Carbon has reaffirmed the 'BBB' rating assigned to credits issued by the Democratic Republic of Congo-based VCS 1716. This is based on our opinions and reasons expressed below following our analysis of all available information. Carbon credits rated 'BBB' provide a moderate likelihood of achieving 1 tonne of CO_2e avoidance or removal.

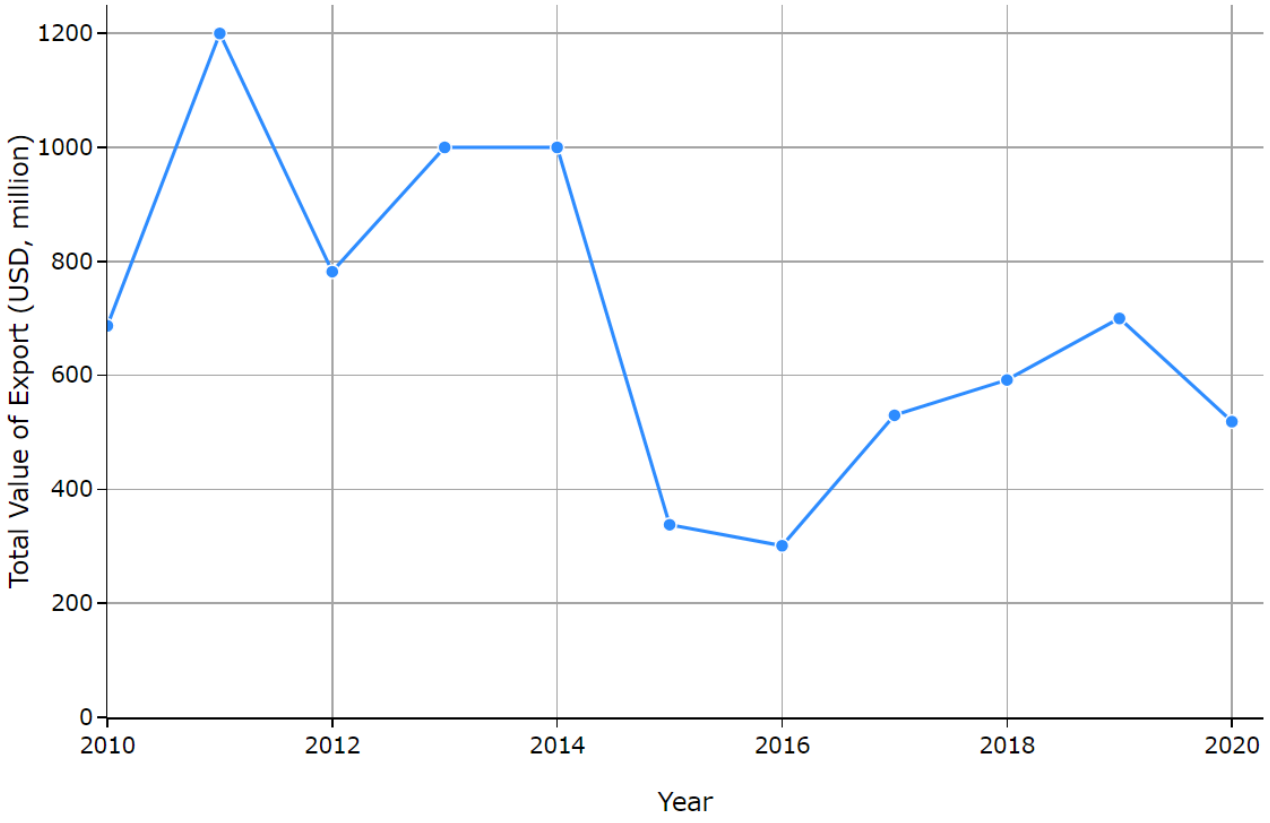
The 'BBB' rating continues to reflect our view of the project's limited additionality risk, driven by the DRC's low rates of rural electrification and its low policy risk due to minimal support for renewables. The rating is further supported by limited over-crediting and non-permanence risk, due to continuous monitoring and absence of reversal risks respectively. We find that the rating is constrained by some risk of leakage, driven by an increase in downstream emissions in the vicinity of the project area.

Leakage risk

- Some leakage risk due to small scale of activities tempered by increased downstream mining activities.
- Leakage risk refers to the risk that emissions avoided or removed by a project are pushed outside the project boundary. Leakage risk can emanate from two sources: displacement of other activities and market impacts. Like most renewable energy projects, VCS 1716 assumes zero leakage for the entirety of its crediting period and we find no project-specific evidence of leakage. Our assessment is therefore primarily driven by our sector-based analysis. In the case of VCS 1716 we find that as direct impacts from the project's construction activities are unlikely to be a material concern, indirect impacts of the project on local activities may be. This drives some level of risk in our view.
- For projects in the Energy sector, there is typically minimal risk of activity displacement and associated leakage emissions. We find upstream emissions associated with infrastructure acquisition and construction to be insignificant. For example, lifecycle emissions for run-of-the-river projects similar to VCS 1716 range between 18 and 74.9 gCO_2e per kWh, according to peer-reviewed literature and likely represent a fraction of the emission reductions from the project as a whole.
- Our analysis does however highlight some leakage risks related to local market impacts, specifically, mining activities in the Eastern region of the country. Mining activities in the country and region are dependent on access to power supplies. As discussed in the

additionality section, limited access to reliable power supplies may have previously limited the scope of such activities. However, the introduction of such energy projects may facilitate the development of mining activities, which are also noted to drive increases in forest loss in the region, particularly within Virunga National Park. Our spatial analysis of mining concessions from the DRC Mining Cadastre Map notes that there have been several permanent and research concessions granted within 15km of the project site since the project started in 2016. For example, mining concessions rose from one (in the 10 years preceding the project) to 11 in the year following the project start. Our project-specific analysis notes that mini-grids often function in isolation (15 km transmission range) and this creates some scope for downstream leakage risk by supporting increased mining activity.

- In summary, there is limited risk of leakage due to the small-scale, off-grid nature of activities. Some risk is introduced due to the increased potential for greenhouse gas intensive mining activities within the immediate vicinity of the project.
- Studies on the Renewables sub-sector indicate that leakage may be unavoidable due to market effects from fossil fuel re-allocation.
- We inform the degree of such risks by assessing fossil fuel trade flows. In the case of VCS 1716, despite the Democratic Republic of Congo (DRC) being the fastest-growing exporter of fossil fuels in the region of Sub-Saharan Africa between 2015 and 2020 with an average 14% growth per annum, the export of fossil fuels from DRC to all other countries accounts for less than 0.1% of the global total (equivalent to a total value of US $519 million in 2020).
- This small share in fossil fuel trade flows from a global market perspective suggests low leakage risks due to market effects.



Disclaimer

The BeZero Carbon Rating of voluntary carbon credits represents BeZero Carbon's current opinion on the likelihood that carbon credits issued by a project achieve a tonne of CO_2e avoided or removed. The BeZero Carbon Rating and other information made publicly available or available through the BeZero Carbon Markets platform ("Content") is made available for information purposes only. The Content and in particular the BeZero Carbon Rating sets out BeZero Carbon's opinion on a particular carbon credit or project based on publicly available information as at the date expressed and BeZero Carbon shall have no liability to anyone in respect of the Content, opinion and BeZero Carbon Rating. The Content is made available for information purposes only and you should not construe such Content as legal, tax, financial or investment advice. The Content is a statement of opinion as at the date expressed and does not constitute a solicitation, recommendation or endorsement by BeZero Carbon or any third party to invest, buy, hold or sell a carbon credit. The Content is not a statement of fact and should not be relied upon in isolation. The Content is one of many inputs used by stakeholders to understand the overall quality of any given carbon credit. BeZero Carbon shall have no liability to you for any decisions you make in respect of the Content. If you have any questions about BeZero Carbon, the BeZero Carbon Rating, the BeZero Carbon Rating methodology, qualifying criteria, rating process, any element of Content, the BeZero Carbon Markets platform or otherwise please contact us at: commercial@bezerocarbon.com.