

Our Carbon Credit Ratings Framework For Renewables Projects

Renewable Energy Sources (RES)

Solar

Geothermal

Hydroelectric

Wind

Incentivizing investment in real climate action

Introduction

Sylvera carbon credit ratings are the most reliable and trustworthy in the market.

Sylvera has developed a rigorous bottom-up approach in order to produce the most accurate ratings and analyses for carbon projects in the VCMs.

What sets Sylvera apart

- **Unparalleled depth & accuracy:** We build robust and bespoke ratings frameworks and production systems for each project type. Our ratings are not generated by algorithms alone, but by a team of experts analyzing a variety of quantitative and qualitative data, who then distill it into detailed reports.
[Read our white paper for more information.](#)
- **Technical and scientific expertise:** We have a large and growing team of experts who hold advanced degrees, working across our Multi-Scale Lidar, Geographic Information System (GIS), Commodities, Finance, Asset Valuation, Policy, Ratings and Machine Learning disciplines.
- **Independence:** We don't sell carbon credits and we never have. We also aren't paid by developers to rate carbon projects. This means we avoid conflicts of interest, and you can trust that our ratings and reports are unbiased.

Key Terms and Concepts

Renewable Energy Sources (RES) Project types

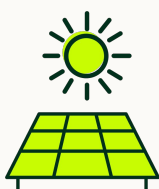
Solar	Solar energy involves converting the sun's radiation into electricity either directly using the photovoltaic effect or indirectly to heat water and drive steam turbines. This can be achieved with photovoltaic solar panels (solar PV) or by concentrating solar-thermal power (CSP), which enables solar-generated heat to be stored until energy is needed.
Hydroelectric	Hydroelectricity is produced by harnessing the gravitational force of flowing water. The technology is broadly classified into four categories: conventional (dams), pumped-storage, run-of-the-river, and offshore marine (tidal).
Wind	Wind energy involves using wind to produce electricity with the kinetic energy created by air flow. This is transformed into electrical energy using power turbines.
Geothermal	Geothermal energy uses natural heat energy generated by the earth's interior. This heat can be captured and used to produce geothermal energy by using steam that comes from the heated water pumping below the surface, which then rises to the top and can be used to operate a power turbine and generate electricity.

Key accounting variables and concepts

Emission factor	This refers to a carbon dioxide (CO ₂) emission factor (tCO ₂ /MWh) associated with each unit of electricity provided by an electricity system.
Load factor	The ratio of the electrical energy produced by a power plant for the period of time considered to the electrical energy that could have been produced at continuous full power operation during the same period, typically expressed as a percentage.
Megawatt hour (MWh)	A megawatt hour (MWh) is a measure of electric output and equals 1,000 kilowatts of electricity generated per hour.
Over crediting risk	This refers to the risk that the project has sold too many credits.
Operating margin	This represents the emission factor of existing power plants, measured in tCO ₂ /MWh.
Build margin	This represents the emission factor of planned future power plants, measured in tCO ₂ /MWh.
Baseline emission factor	This figure is the weighted average of the build margin and operating margin, measured in tCO ₂ /MWh. These emissions are what will be displaced by the renewable power generated from the carbon project.
Power	The rate of producing, transferring, or using energy. Power is measured in watts.
Project emissions	Emissions associated with ongoing operations of the carbon credit project.
Project net power generation	The net electricity output produced refers to the year that its associated credits were issued.
Vintage	This refers to the year, or timeframe, associated with an issued carbon credit.
Carbon credit	A tradable unit representing one metric ton of carbon dioxide (CO ₂), or an equivalent amount of another greenhouse gas (GHG), avoided or removed from Earth's atmosphere.

What are RES carbon credit projects?

RES projects avoid emissions associated with traditional energy sources. These projects displace emissions from fossil fuel power plants and supply electricity to a grid through renewable energy.



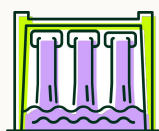
Solar

Pros

- Reliable source of energy
- Cost efficiency in construction and operation
- Limited impact on the environment during operation

Cons

- Non-continuous production
- Weak load factor
- Large environmental impact during construction
- Regular maintenance required (ie clean and repair)



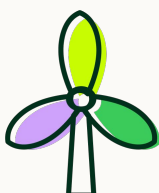
Hydroelectric

Pros

- Good load factor
- Reliable source of energy
- Low costs in construction and operation

Cons

- Environmental impact during construction
- Pumped-storage systems use fossil fuels to pump water
- Distance to distribution points



Wind

Pros

- Good load factor
- Limited impact on the environment during construction

Cons

- Non-continuous production and non-reliable energy source
- Ongoing operational environmental impact
- Distance to distribution points



Geothermal

Pros

- Good load factor
- Reliable source of energy
- Limited impact on the environment during operation

Cons

- High costs of construction and operation
- Vulnerability to climate disaster

What we look for in high quality RES projects

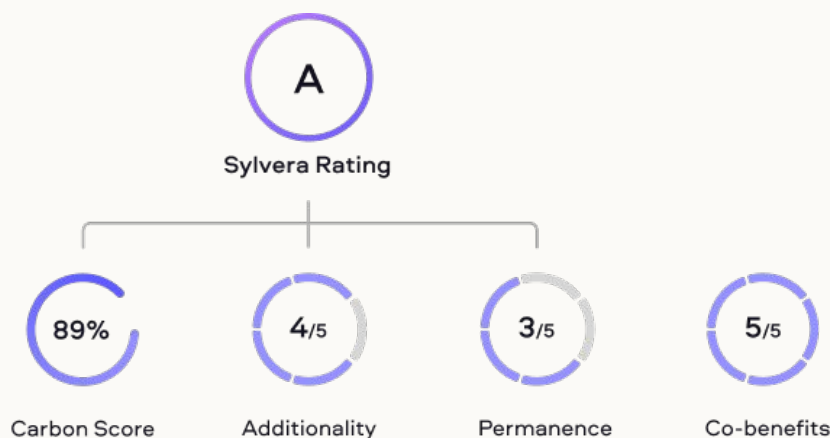
A reminder of our scoring pillars

We assess the quality of RES projects using defined processes and frameworks, as outlined in our [white paper](#).

Our top level Sylvera Ratings span from AAA-D and reflect whether each credit associated with the project is likely to avoid 1 metric ton of CO₂e emissions.

This rating is derived from a combination of scores that assess the **carbon performance**, **additionality** and **permanence** of the project. The scores in these three core pillars are combined in a series of matrices to ensure that underperformance in one key area does not get overshadowed by high performance in others.

Co-benefits are also assessed but they do not feed into the Sylvera Rating, as they do not have a direct bearing on the climate impact of carbon credits. Including them in the Sylvera Rating could lead to a high co-benefits score obscuring poor performance on carbon avoidance. Aspects of the project relating to co-benefits that could materially impact the project's ability to deliver its stated climate benefit are, however, reflected in the Sylvera Rating.



Carbon score

Sylvera's carbon score verifies whether the project has delivered on its carbon claims by comparing reported generation to third-party, independent generation data from grid operators, energy regulators, and offtakers.

Additionality score

Sylvera's additionality score assesses the likelihood the project activities would have been implemented in absence of the project. It also quantifies the likelihood and extent the project is inflating the business as usual (BAU) emissions or failing to report emissions, therefore issuing too many credits.

Permanence score

Sylvera's permanence score assesses whether the GHG emissions avoided by the project are likely to be maintained for an atmospherically significant period of time. **However, RES projects have no permanence risk because they do not store carbon.**

Co-benefits score

Sylvera's co-benefits score assesses the scope and relative impact of project activities on local biodiversity and communities - which are linked to UN Sustainable Development Goals (SDGs).

Carbon score

What is it?

Sylvera's carbon score verifies whether a project is accurately reporting on the emissions reductions achieved by the activity. If multiple vintages have been permitted, the carbon score is a vintage-weighted average score. Sylvera's models rebuild carbon accounting from the ground-up, utilizing third party grid data.

Note: The carbon score must be considered alongside the additionality score, which considers the overcrediting risk, to understand the climate impact of the project.

Why does it matter?

Accurate carbon accounting underpins the validity of a project's issuance and material under or over reporting of emissions will impact the number of credits that have been issued. This could either reduce the risk of overissuance or call into question whether too many credits were issued. If third party grid data shows the project produced less power than it reported, we think this is vital due diligence information to provide to our customers.

How do we calculate the carbon score?

Energy generated from renewable sources avoid emissions that would have otherwise been generated from more carbon-intensive power plants in the electricity grid. Sylvera audits the net power generation reported by the offset project by comparing reported generation with third-party, independent generation data from grid operators, energy regulators, and offtakers to verify whether the project is accurately reporting on emissions that are attributable to the project. The net power generation achieved by the renewable power plant determines its carbon score.

$$\text{Carbon Score} = \frac{\text{Sylvera Audited ERs}}{\text{Verified ERs}} = \frac{[(\text{Sylvera Audited project net power generation}) * \text{Baseline emission factor}] - \text{Reported project emissions} - \text{Project Leakage}}{\text{Verified ERs}}$$

	Sylvera ER	Permitted ER	Vintage Carbon Score	Weight	Weighted Score
Definition	Sylvera Audited emission reductions	Registry verified emission reductions	Comparison of sylvera audited and permitted ERs	Proportion of total permitted ER in vintage	Carbon score contribution by vintage
Formula			Sylvera audited ER/Permitted ER	Vintage permitted ER/total permitted ER	(Vintage carbon score) * weight
1st vintage	100	100	100%	0.83	83%
2nd vintage	10	20	50%	0.17	8.5%
All vintage	110	120	92%	1	92%

Carbon Score

Additionality score

What is it?

Sylvera's additionality score assesses whether (1) the projects' activities would only have taken place as a result of the carbon project revenue and (2) the project has sold too many credits due to baseline overestimation, not accounting for emissions related to the change in land use, or not being eligible to issues credits.

Why does it matter?

If the avoided emissions claimed by a project would have occurred without revenue from the sale of carbon credits then they are not additional. Additionality underpins the validity of credits issued by a project. If the project is not additional, then one credit purchased does not equate to 1 metric ton of carbon avoided and, therefore, yields no climate benefit above the business as usual (BAU) scenario. A measure of the likely additionality of carbon credits is essential to understand their climate impact.

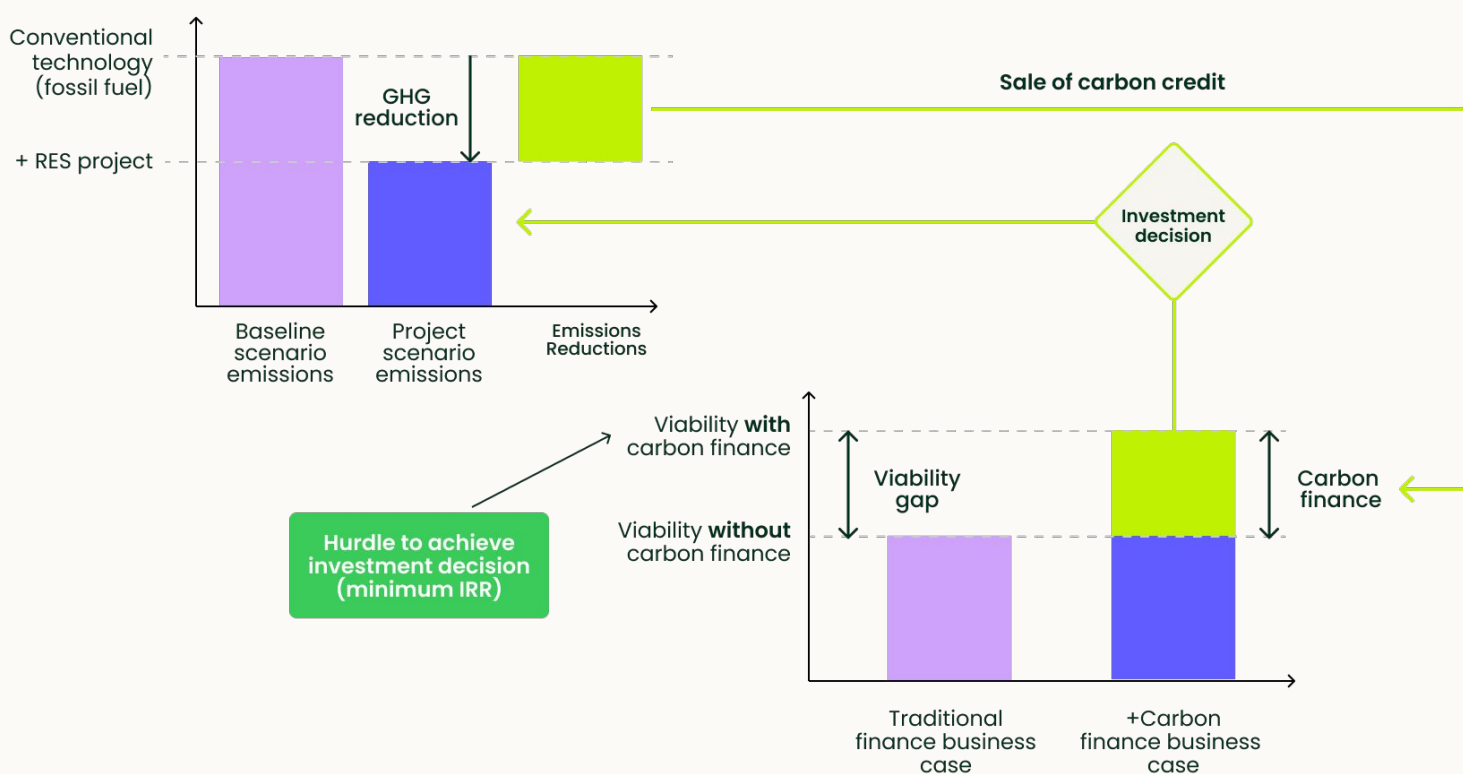
Additionality of activities	Financial additionality: We independently audit a project's reported investment analysis using Sylvera's proprietary financial model, which leverages country-level historical & forecasted prices, as well as average capacity and OpEx costs by technology type. These are used to determine if the project is sub-economic in the business as usual (BAU) scenario and if the carbon revenue bridges the economic viability gap of the project.
	Policy & regulatory barriers: We evaluate country or province subsidies or capital to renewable power plant owners, and incorporate the amount of the subsidy or capital into our financial model accordingly to determine the extent of impact on the project's financial additionality.
	Common practice analysis: We consider how widespread renewable projects with similar technology and installed capacity are in the country and region where the project is located. We also consider how many of these renewables projects have carbon revenues associated with them.
Over-crediting risk	Strength of baseline: We compare the baseline provided by the project to third party data. The operating margin should be reflective of the grid and the build margin should reflect annual supply additions to the grid.
	Land class emissions potential: We test for undisclosed presence of land classes that store carbon and potential emissions stemming from project development. If the land was storing carbon (e.g. forests), then the construction of the project and change in land class may release any stored carbon or disrupt existing carbon storage.
	Double counting: We identify projects concurrently registered on multiple registries. If the division of credits is not clearly defined and accounted for, then over-crediting risk can be present.
	Project ineligibility: We verify the successful construction of the power infrastructure as well as ensure the project developer has issuance rights for issued credits.

Spotlight on financial additionality

How does Sylvera assess financial additionality?

A project is financially additional if the carbon credit revenue bridges the economic viability gap, meaning that the avoided emissions provided by the renewable power plant would have not otherwise been realized without carbon financing. Sylvera's proprietary economic model assesses the business as usual (BAU) economics, or the project without carbon revenues, and the project's economic scenario, (in other words, the project with the carbon revenues). We independently assess the project economics within our own proprietary financial models. We test the reasonableness of the modelling assumptions with independent country-level cost and price models.

We have developed a database of country-level investment hurdle rates to test the reasonableness of the project's required minimum internal rate of return (IRR). The investment hurdle, or minimum rate of return, represents the return sufficient for a value-minded investor to proceed with a given investment. Our 1 to 5 scale represents how likely it is that the sale of the carbon credits led to the investment decision.



Financial additionality	<p>Financial inputs: Are the economics derived from the reported financial information consistent with the economics from Sylvera's proprietary economic model?</p>
	<p>Business as usual (BAU) scenario analysis: Is the Sylvera calculated BAU IRR less than the regional benchmark hurdle rate?</p>
	<p>Common practice analysis: If the BAU scenario is sub-economic, is the Sylvera calculated project scenario IRR more than the regional benchmark hurdle rate?</p>

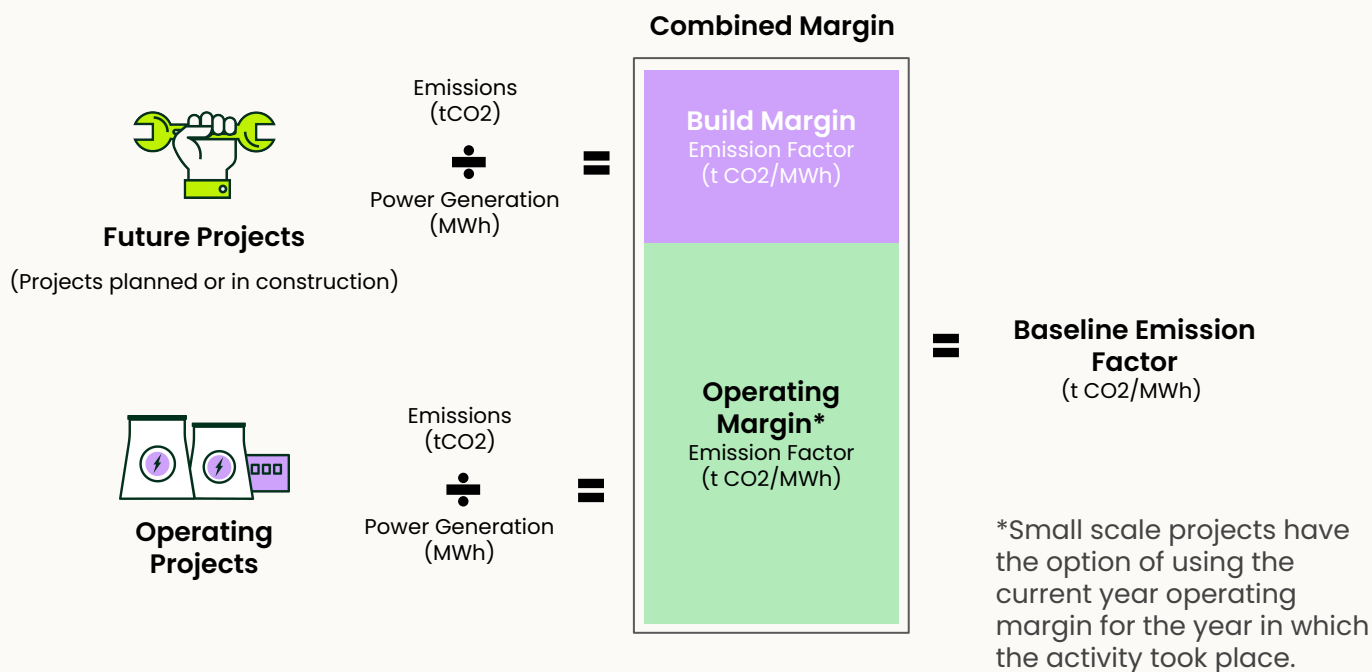
Additionality score (continued)

How does a project define the baseline emission factor?

The business as usual (BAU) baseline emission factor for the grid is established by combining the emission intensity of existing plants with the emission intensity of projected future projects, both of which would be displaced by the renewable power generated.

The Operating Margin represents existing plants and the Build Margin represents projected future projects. The weighted average of the Build Margin and the Operating Margin is the Combined Margin, which represents the baseline emission factor for the grid.

Some carbon credit assessments rely on comparing one project’s baseline against all the other offset projects’ baselines. This is a problematic approach, as other carbon projects all have the same incentive to inflate the grid emissions factor. Sylvera goes a step further by rebuilding the baseline from the bottom-up to give a robust view on potential over-crediting risk of the project.



Permanence score

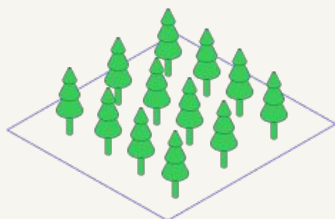
What is it?

Permanence refers to the risk that the avoided emissions will later be reversed and released back into the atmosphere. **Renewable projects have no permanence risk because carbon is not stored that may later be released.**

How do we calculate the permanence score?

There are no risks of reversal in RES projects. Therefore, all RES projects have a permanence rating of 5 out of 5. As there is no carbon stored in renewable projects, registries and methodologies do not require a non-permanence risk assessment and subsequent allocation of credits to a buffer pool.

PERMANENCE COMPARISON: NATURE-BASED SOLUTIONS VS RENEWABLES



In nature-based avoided emissions projects, such as REDD+, there is an inherent risk of reversal associated with an ecological life cycle. Carbon stored in natural systems is exposed to wildfire, drought, and long-term climatic changes that can result in complete loss or partial reduction in carbon storage capacity. For example, when a tree dies, it is no longer storing the carbon associated with the avoided emissions of the project.



In RES projects, there is no risk of reversal because none of the avoided emissions are stored. RES carbon projects do not store carbon, but rather result in avoiding the use of stored carbon.

Co-benefits rating

What is it?

Sylvera's co-benefits rating examines whether the project is implementing activities to support local biodiversity and communities, as well as the scale and likely impact of these activities.

How do we assess the co-benefits of RES credits?

Sylvera measures the impact RES project activities have on biodiversity. We leverage data provided by project developers, IUCN data, and IBAT data.

When assessing community impact, we utilize data disclosed by project developers and the Sustainable Development Goals (SDG) framework to triangulate a project's community impact. RES project activities inherently require a large cyclical workforce. To achieve a high score, projects must deliver community benefits beyond temporary employment opportunities. Projects that have a balanced gender workforce, and employ large numbers of people with long-term employment opportunities and fair wages will score higher.

BIODIVERSITY

THREATS

We determine whether commercial interests, local communities, and non-remoteness of the project area present material threats to the biodiversity in the project area.

BIODIVERSITY PROTECTION

We assess the extent to which the project has contributed to biodiversity loss.

COMMUNITIES

SUSTAINABLE DEVELOPMENT GOALS

We independently identify which UN SDGs the project is contributing towards by assessing the activities implemented by the project.

SCHEME

We determine whether the scheme is novel or ongoing, and if it goes beyond activities currently implemented in the region. We also assess whether the project makes a foundational contribution to activities that support SDGs.

IMPACT

We determine the relative impact of activities on local communities by scaling the SDG impact against country-level performance, the size of the population affected, and the emissions reductions achieved by the project.

How Sylvera compares to other ratings agencies

Existing data and assessments for RES credits are sparse, highly qualitative, and rely on poor proxies to measure carbon credit integrity criteria. Our RES framework goes beyond existing methodologies in three key ways to provide clients with independent, high-quality quantitatively driven assessments.

(i) To build our carbon score, we rebuild the constituent elements of a project's carbon accounting from the bottom-up by using third-party grid data. Current carbon credit assessments do not provide an overlay of data to verify that the net emissions reductions claimed by a project have truly materialized. The Sylvera approach to the carbon score enables buyers to identify projects that may have been over or under reporting power produced.

(ii) Our strength of baseline assessment rebuilds the baseline from the bottom-up using third-party grid data to give a robust view of the potential over-crediting risk of the project. Some currently available assessments of RES credits rely on comparing one project's baseline against all the other offset projects' baselines. This is a problematic approach; if we take the example of a renewables project, all have the same incentive to inflate the grid emissions factor. Relying on such a proxy does not go in-depth enough to sufficiently highlight the potential for over-crediting risk.

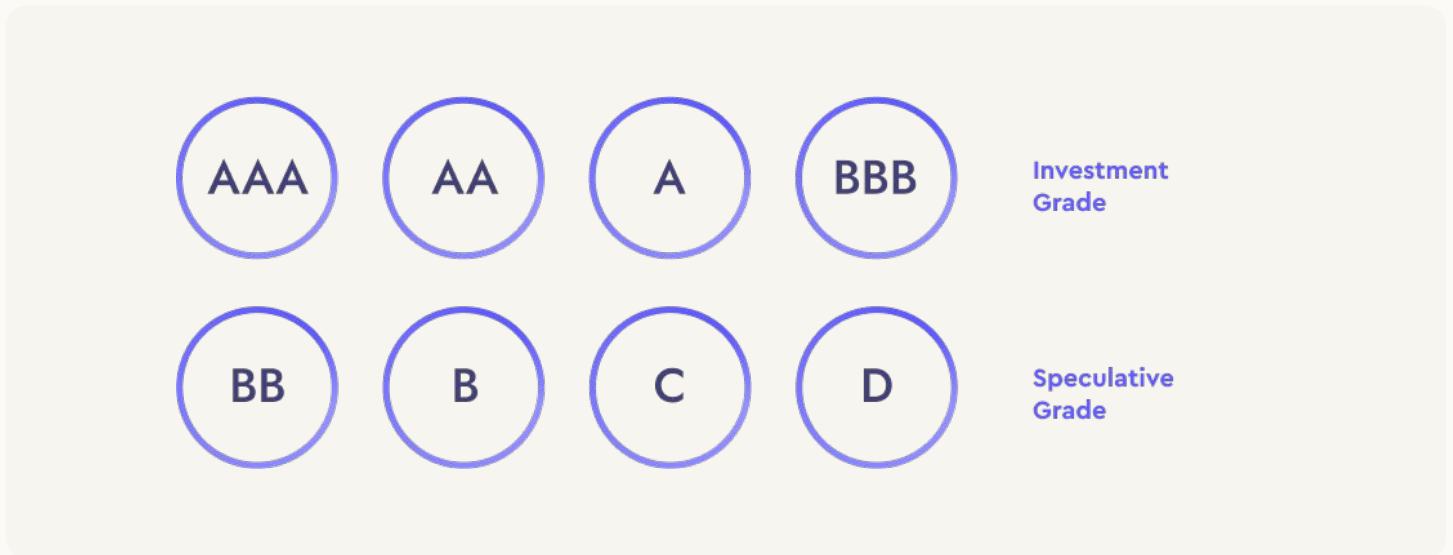
(iii) Financial additionality in RES projects is essential. We created our own proprietary economic model to scrutinize the reported economics. It would be easy to do a simple revenue analysis for financial additionality. In isolation, this says very little about the economic decision-making process at the heart of the additionality question. We believe you have to rebuild the project economics from the ground up. We replicate the internal rate of return within a full financial model to give a robust due diligence rating.

Sylvera has developed a reputation as nature-based solutions specialists, thanks to our world-class geospatial, earth observation, and machine learning experts. However, our mission to provide clarity in the VCMs doesn't stop at agriculture, forestry, and other land use (AFOLU) carbon credits. We have built an experienced team with project finance, natural resource economics, and commodities expertise to develop our non-AFOLU frameworks. Our RES framework and ratings provide robust and repeatable assessments of credit quality to enable buyers to mitigate risks and transact with confidence.

When it comes to RES credit due diligence, bottom-up is the only way to go.

Interpreting the Sylvera Rating

Our rating categories



The terms “investment grade” and “speculative grade” are market conventions and do not imply any recommendation or endorsement of a specific project for investment purposes.

Investment grade categories indicate relatively low risk, while ratings in the speculative categories signal either a lower level of potential impact, a relatively high risk to the project in the future or that an important negative event has already occurred.

Sylvera may also disclose issues relating to a project that means that it can not be rated. Such issues can be fundamental red flags (such as potential fraud) or the absence of the necessary data to produce a rating (such as high error shapefiles).

To arrive at our Sylvera rating (AAA-D) we first integrate additionality of activities and over-crediting risk to get an overall additionality score. Next, we use a matrix to generate our impact score by combining our carbon and additionality scores. Lastly, we integrate the impact and permanence scores via a matrix to arrive at our top level Sylvera Rating.

This same process is followed for the different types of projects, however, matrices are adjusted to each project type.

Interpreting the carbon score



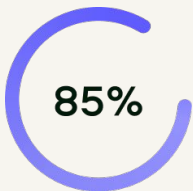
The project has delivered more emissions reductions relative to the baseline than verified.

Sylvera detects more avoided emissions than the project has reported.



The project has delivered the verified emissions reductions relative to the baseline.

Sylvera detects the same level of avoided emissions as the project.



The project has under delivered on verified emissions reductions relative to the baseline.

Sylvera detects less avoided emissions that are attributable to the project than the project reports.



The project has not delivered any emissions reductions and should not be issuing credits.

Sylvera detects significantly more emissions than the project reports.

Interpreting the additionality score



Indicates very high confidence that a project is additional.

Example: The project has a very low risk of over crediting. There is a significant difference in activities between the “business as usual (BAU)” and the “with project” scenario. The project activities implemented were a direct result of the revenue derived from the carbon project.



Indicates high confidence that the project is additional.



Indicates the project is likely additional.

Example: There is potential risk of over crediting. There is a difference in activities between the “business as usual (BAU)” and the “with project” scenario. The projects activities implemented may be a direct result of the carbon revenues.



Indicates uncertainty about the project's additionality claim.



Indicates we found a serious red flag questioning the project's claims of additionality.

Example: The project has a high likelihood of severe over crediting and/or the activities implemented to increase carbon stock or reduce emissions would have occurred in the absence of carbon revenues.

Interpreting the co-benefits rating



Indicates exceptional progression of targeted SDGs, as well as extraordinary protection biodiversity.

Example: The project implements a broad range of SDG activities with extensive reach in the community, and has strong biodiversity protection.



Indicates strong progression of targeted SDGs, as well as mitigates biodiversity risk.



Indicates average progression of targeted SDGs, as well as adequate activities protect biodiversity.

Example: The project implements SDG activities with moderate reach in the community and takes acceptable action to reduce pressures on biodiversity.



Indicates narrow progression of targeted SDGs, or low species richness and limited activities to protect biodiversity.



Indicates very limited progression of targeted SDGs, as well as deficient activities to protect biodiversity.

Example: The project implements limited SDG activities with limited reach in the community, while not taking meaningful action to protect biodiversity.

Disclaimer

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Ratings are, and will be construed solely as, a statement of opinion on the carbon impact of a project at a certain point in time, and not statements of current or historical fact, investment or financial advice, nor recommendations to take or not take a particular action by Sylvera or its directors, employees, contractors, agents or shareholders (collectively, the “Sylvera Parties”). Ratings are expressed in relative rank order, which is to say they are ordinal measures of the expected carbon impact and are not predictive of a specific outcome. Ratings do not address any other risk or assessment, including but not limited to market value risk or price volatility, and do not take account of any objectives or requirements of a user of the Rating and/or Content (a “User”). Ratings are the collective work product of Sylvera, and no individual, or group of individuals, is solely responsible for a rating. Ratings are not facts and, therefore, cannot be described as being “accurate” or “inaccurate.”

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Sylvera is the leading carbon credit ratings platform. We help corporate sustainability leaders, traders and exchanges confidently evaluate and invest in the best carbon credits. By creating the first carbon intelligence platform, Sylvera is raising the bar on project accounting and analysis, and introducing a much needed source of truth for carbon markets. We are backed by renowned investors like Index Ventures, Insight Partners, LocalGlobe and Salesforce Ventures.

To learn more about Sylvera, [contact us](#).

