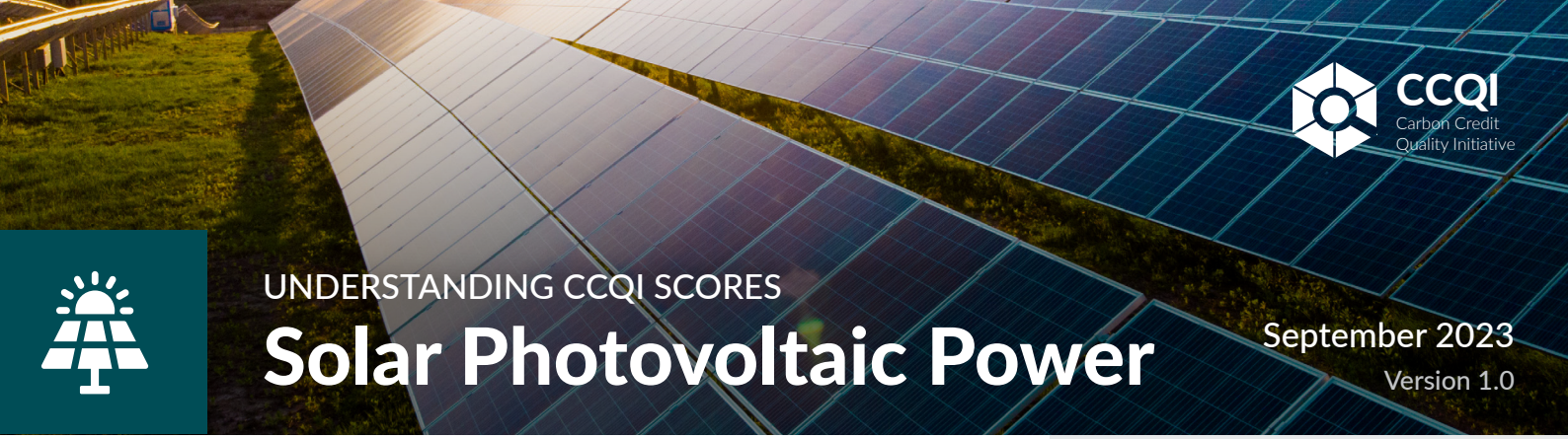


CCQI
Carbon Credit Quality Initiative

UNDERSTANDING CCQI SCORES

# Solar Photovoltaic Power

September 2023
Version 1.0

## Key CCQI findings

Solar photovoltaic projects have very high additionality risks. The technology is mature, and many countries support solar power with feed-in tariffs, renewable energy auctions, tax credits, or other policy instruments.

Quantification methodologies containing equations and permissible data sources for calculating and monitoring emission reductions for an solar photovoltaic project have shortcomings. We estimate that quantification methodologies likely overestimate emission reductions by about 10 to 30 percent.

The project type is a backbone for the global energy transition and indispensable for reaching net zero emissions. It also likely reinforces many Sustainable Development Goals.

## What is this project type about?

Installation of a new solar photovoltaic power plant. The electricity is fed into a national or regional electricity grid. The project type reduces emissions by displacing more greenhouse gas intensive electricity generation.

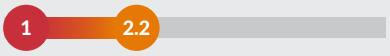
## Carbon market background

Next to wind and hydropower, solar power is one of the most popular renewable energy project types. Most carbon credits issued and sold today originate from a wave of projects that registered with the Clean Development Mechanism (CDM) between 2010-2013.

In 2019, the Verified Carbon Standard (VCS) and Gold Standard (GS) stopped accepting new solar photovoltaic projects for most countries. Exceptions exist for Least Developed Countries (GS, VCS), Small Island Developing States (GS), Landlocked Developing Countries (GS) as well as low and low-middle income countries where solar power is less than 5 percent of the total grid installed capacity (GS).

## CCQI score summary

Additionality/Vulnerability

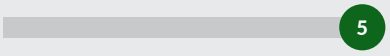



Quantification Methodologies

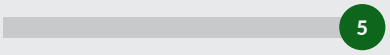

CDM ACM0002
Version 20.0

CDM AMS-I.D
Version 18.0

Non-permanence




Compatibility with net zero




SDG Impacts


### Why do I see a range of scores for some quality objectives?

In these cases, scores differ between carbon crediting programs, quantification methodologies, countries or other circumstances. The range represents the spectrum that applies for all possible combinations.

### CCQI resources

- CCQI Methodology & Definitions
- FAQ on our assessments
- Directory of assessment sheets

www.carboncreditquality.org

This factsheet was commissioned by Foundation Development and Climate Alliance.

FOUNDATION Development and Climate Alliance

# Main factors driving project type scores

## Additionality/Vulnerability

1 — 2.2

**Policy support drives the expansion of solar power**

Here we assess the likelihood that the mitigation activity typically would not have taken place in the absence of the added incentive created by the carbon credits (additionality).

In cases where the market for the type of carbon credit has collapsed (e.g., CDM for some project types), we assess whether the mitigation activity typically is at risk of discontinuing greenhouse gas abatement without ongoing revenues from carbon credits (vulnerability).

**How do other project types score?**


*Graph shows the range of scores for nine project types assessed by CCQI.*

There is a very low likelihood that emission reductions from solar photovoltaic power projects are additional. The impact of carbon revenues on improving the financial attractiveness of the project type is small. Other factors, in particular policy support and electricity sale revenues, are likely to drive their implementation.

In the case of CDM solar photovoltaic projects, the carbon credit market has collapsed. However, it is very likely that most projects registered with the CDM continue operation given that revenues from sources other than carbon credits (e.g., electricity sales) exceed operating expenditures.

You see a range of scores for this criterion because some carbon crediting programs have stricter provisions than others for project developers to demonstrate that they considered revenues from carbon credits when making their investment decision.

## Quantification Methodologies

CDM ACM0002 Version 20.0 — 2

CDM AMS-I.D Version 18.0 — 2

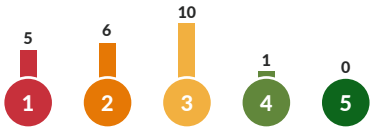
**Applying methodologies likely leads to overestimating emission reductions by about 10 to 30 percent**

Carbon crediting programs adopt methodologies for calculating the emission impact of a project. The methodologies prescribe, inter alia, equations, data sources and monitoring approaches. Here we assess whether quantification methodologies mitigate overestimation risks by applying conservative approaches for estimating emission reductions.

Most projects use CDM methodologies *ACM0002* (large-scale) or *AMS-I.D* (small-scale) to quantify their emission impact. We find that both methodologies likely overestimate emissions reductions by about 10 to 30 percent. While these results hold true for both wind power and solar photovoltaic power, the latter involves a higher risk of overestimation than wind power.

Shortcomings in the approaches for determining the grid emission factor are the main reason for this overestimation risk. Both methodologies allow fixing a single value for the

**How do methodologies for other project types score?**




*Graph shows the score distribution for all 23 quantification methodologies assessed by CCQI.*

full crediting period instead of updating it annually. This approach does not properly account for reductions in the grid emission factor that may occur over time due to an increasing share of renewables. The degree of overestimation depends on the energy strategy and trends of the country. In most countries, however, energy policies aim at increasing the share of renewables.

## Non-permanence

5

**The project type has no material non-permanence risk**

Non-permanence means that emission reductions or removals achieved by a project are later reversed e.g., due to a natural disaster or project mismanagement.

We assess whether the project type has significant non-permanence risks.

For project types that do have significant non-permanence risks we assess the robustness of carbon crediting program provisions to address these risks.

**How do other project types score?**


*Graph shows the range of scores for nine project types assessed by CCQI.*

There are no material risks that emission reductions achieved by the project type may be reversed.

## Compatibility with net zero

5

**Solar photovoltaic is indispensable for the global energy transition**

Here we assess whether the technology or practices applied by the project type facilitate the transition towards net zero emisisons.

In global net zero emission scenarios, solar photovoltaic, together with wind power, must become the leading source of electricity globally before 2030. The project type therefore

**How do other project types score?**


*Graph shows the range of scores for nine project types assessed by CCQI.*

is a backbone of the global energy transition. It rates highest among the project types assessed by the CCQI for this quality objective.

## SDG Impacts


**Positive contribution to some SDGs, but few local benefits**

Here we assess whether the project type contributes to the achievement of the Sustainable Development Goals (SDGs).

Note that projects implemented in Small Island Developing States (SIDS) and Least Developed Countries (LDCs) receive an upgrade to the score by one point due to the special circumstances of these countries.

**How do other project types score?**


*Graph shows the range of scores for nine project types assessed by CCQI.*

Solar photovoltaic power projects have mainly positive interactions with SDGs. Setting up grid-connected solar photovoltaic power plants increases the share of renewable energy. Solar photovoltaic power plants can also increase energy security in countries which (formerly) depend on fossil energy imports. Deployment of grid-connected solar photovoltaic supports the development of sustainable, reliable, and resilient infrastructure, sustainable industrialization, as well as the adoption of clean technologies. Reduced air and water pollution compared to fossil fuel power generation (especially coal) reduces the risk for related illnesses. The project type could reduce the access to land and resources for communities, as the projects require land areas.

While the project type clearly contributes to reducing GHG emissions and air pollutants, major local environmental and social benefits are not expected (such as SDGs 4, 5, 14 or 15).

## Starting points for further due diligence

This factsheet summarizes key risk factors for the quality of carbon credits from this project type, as identified in CCQI's detailed assessments. Individual projects might outperform any of our scores by making project-design choices that mitigate these risks. CCQI scores therefore do not apply to individual projects. They can however inform further due diligence when assessing the quality of individual projects. Questions to ask might include:

- Does the project face additionality risks because it is supported through policies, such as feed-in tariffs or renewable energy auctions?
- Is there a plausible case that solar power is not common practice in the country where the project is implemented, thus reducing additionality risks?
- Does the project update the value for the grid emission factor on an annual basis to account for expansion of renewable energy in the electricity grid during the project lifetime?

For assessments of specific projects, you may contact specialized rating agencies such as BeZero, Calyx Global or Sylvera.

CCQI
Carbon Credit
Quality Initiative

www.carboncreditquality.org

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## About CCQI

The Carbon Credit Quality Initiative (CCQI) was established to provide free, transparent information on the quality of different types of carbon credits, enabling users to understand what types of carbon credits are more likely to deliver actual emission reductions as well as social and environmental benefits.

CCQI was founded and is managed by Environmental Defense Fund (EDF), World Wildlife Fund (WWF-US) and Oeko-Institut, a leading European research and consultancy institution working for a sustainable future. Scores published by CCQI are derived from applying the CCQI assessment methodology. The assessment is led by Oeko-Institut, with support from experienced carbon market experts from Carbon Limits, Greenhouse Gas Management Institute (GHGMI), INFRAS and Stockholm Environment Institute (SEI). Draft results are reviewed by the full CCQI team before public release. All experts involved in CCQI have deep expertise in carbon markets and are not employed by project developers or carbon crediting programs.

*This factsheet was commissioned by*

FOUNDATION Development and Climate Alliance

www.allianz-entwicklung-klima.de

## How does CCQI assess quality?

CCQI assesses quality aspects of different types of carbon credits. The following main features define a type for our assessments:

- The type of project (e.g., landfill gas utilization)
- The carbon crediting program (e.g., Verified Carbon Standard)
- The quantification methodology used to estimate emission reductions for the project activity
- The country in which the activity takes place

We assess each type against several criteria, sub-criteria and indicators that are clustered around seven quality objectives.

Each assessment follows our publicly available methodology.

In this factsheet we present results for selected quality objectives, criteria and sub-criteria whose scores depend primarily on characteristics of the type of project.

To see how this project type scores against all our criteria, explore our scoring tool.

| Quality Objectives | |
|---|---|
| | 1 Robust Determination of the GHG Emissions Impact |
| 2 Avoiding Double Counting | 3 Addressing Non-permanence |
| 4 Facilitating a Transition Towards Net Zero Emissions | 5 Strong Institutional Arrangements |
| 6 Environmental and Social Impacts | 7 Host Country Ambition |

VISIT CCQI SCORING TOOL

*www.carboncreditquality.org/scores.html*

## How to interpret CCQI Scores?

Our scores use an interval scale from 1-5, with 5 representing the highest score.

Scores are risk-based and indicative of the confidence or likelihood that the assessment subject meets the quality objective.

We do not provide an aggregated score for types of carbon credits to provide users with a nuanced picture on different quality aspects.

### CCQI Score Scale

Level of confidence that the assessment subject meets the criterion or quality objective