



OECD Environment Working Papers No. 266

Guarantees and other risk
mitigation instruments
for clean energy:
Harnessing blended finance
to scale investments in
emerging markets and
developing economies

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<https://dx.doi.org/10.1787/93a6e05c-en>

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OECD Environment Working Papers are published on

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Abstract

This paper explores how guarantees and other risk mitigation instruments such as insurance, hedging products and Put and Call Option Agreements, have been used in emerging markets and developing economies (EMDEs) to mobilise capital for renewable power and energy efficiency projects. The paper presents the latest evidence and data, along with good practice examples of various instrument designs and implementation methods. A series of international case studies illustrates different types of guarantees and risk mitigation instruments applied in renewable energy and energy efficiency projects, and derives key learnings. The paper includes the results of a new OECD survey exploring the relevance of such instruments and identifies challenges and limitations of such financial instruments. Finally, the paper offers recommendations for different stakeholders, including donors, Development Finance Institutions (DFIs), Multilateral Development Banks (MDBs), EMDE governments and offtakers, financial regulators as well as financial institutions and insurance companies.

Acknowledgements

This Working paper is an output of the OECD Environment Policy Committee (EPOC) and its Working Party on Finance and Investment for Environmental Goals (WPFIEG). It was developed under the OECD Clean Energy Finance and Investment Mobilisation (CEFIM) Programme, with funding from the governments of Denmark and Canada.

The paper was co-authored by Valentina Bellesi, Benjamin Denis and Cornelia Schenk, under the supervision of and guidance from Geraldine Ang, Team Lead of the OECD CEFIM Programme, as well as Yuval Laster, Head of the Finance, Investment and Global Relations Division and Mathilde Mesnard, Deputy Director in the OECD Environment Directorate. Nour Ouljihate provided valuable research and data analysis support. Fatoumata Ngom contributed to the OECD data provision and analysis.

The authors gratefully acknowledge Ishwari Sawant from Convergence Blended Finance for the data-sharing collaboration.

The authors are grateful for the inputs and feedback received from the following OECD and IEA experts: Alwin Adityo, Joseph Cordonnier, Paul Horrocks, Ariola Mbistrova, Deger Saygin and Cécile Segueineaud, as well as Kristina Klimovich from the Energy Efficiency Hub of the International Energy Agency (IEA). The paper benefited from feedback, inputs and consultations with the following experts: Alexander Ablaza (Climargy), Christopher Bredholt (Green Guarantee Company), Federico Antonio Canu (UNEP Copenhagen Climate Centre, Global ESCO Network), Vukile Davidson (National Treasury of South Africa), Jessica Erickson Stiefler and Timothy James Histed (Multilateral Investment Guarantee Agency, MIGA), Chloé Jamain (Bpifrance), Max Jonsson (Swedish International Development Cooperation Agency, Sida), Jonathan Neo (GuarantCo, part of the Private Infrastructure Development Group (PIDG)), David Ochoa Lotero (Sura), Ishwari Sawant and Nicholas Zelenczuk (Convergence Blended Finance), Eric Tajchman (Dakar Académie du Développement Durable), Philipp Woelk and Hrvoje Jazvic (European Bank for Reconstruction and Development, EBRD).

The paper also benefited from feedback provided by WPFIEG delegates.

The authors express appreciation to the following organisations for supporting the dissemination of the survey conducted to inform this paper: the OECD Community of Practice on Private Finance for Sustainable Development, the OECD Development Centre's Emerging Markets Network (EMNet), the Institutional Investors Group on Climate Change (IIGCC), Glasgow Financial Alliance for Net Zero (GFANZ), Principles for Responsible Investment (PRI), Asia Investor Group on Climate Change (AIGCC), Global Renewables Alliance (GRA), United Nations Environment Programme Finance Initiative (UNEP FI) and the Mobilizing Investment for Clean Energy in Emerging Economies (MICEE) initiative of the World Economic Forum (WEF).

Finally, the authors thank Roberto Lonetti for his administrative support, as well as Beth Del Bourgo and Alyssa Perrott for their assistance with communications.

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Abbreviations and acronyms

ADB	Asian Development Bank
BEE	Bureau of Energy Efficiency
COP	Conference of the Parties
CPPA	Corporate Power Purchase Agreement
CGIF	Credit Guarantee & Investment Facility
CIO	Climate Investor One
DAC	Development Assistance Committee
DEA	Danish Energy Agency
DFI	Development Finance Institution
DRC	Democratic Republic of Congo Republic
EAIF	Emerging Africa Infrastructure Fund
EBB	Energy Bounce Back
EBRD	European Bank for Reconstruction and Development
ECA	Export Credit Agency
EDFI	European Development Finance Institutions
EFSD+	European Fund for Sustainable Development Plus
EE	Energy Efficiency
EEI	Energy Efficiency Insurance
EMDE	Emerging Market and Developing Economy
EPC	Engineering, Procurement, and Construction
EPG	Energy Performance Guarantee
EPOC	Environment Policy Committee
ESCO	Energy Service Company
ESG	Environmental, Social and Governance
ESI	Energy Saving Insurance
EU	European Union
FX	Foreign exchange
G20	Group of Twenty
GEF	Global Environment Facility
GW	Gigawatt
HSB	Hartford Steam Boiler Inspection and Insurance Company
HQLA	High-Quality Liquid Assets
IBRD	International Bank for Reconstruction and Development
ICC	International Chamber of Commerce
IDA	International Development Association
IDB	InterAmerican Development Bank
IEA	International Energy Agency
IFC	International Finance Corporation
IFU	Investment Fund for Developing Countries
IIGF	Indonesia Infrastructure Guarantee Fund
ILO	International Labour Organization
IMF	International Monetary Fund
INR	Indian Rupee

IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
kWh	Kilowatt hours
LCOE	Levelised Cost of Electricity
LDC	Least Developed Countries
LGD	Loss Given Default
LMIC	Lower middle income country
MDB	Multilateral Development Bank
MIGA	Multilateral Investment Guarantee Agency
MW	Megawatt
NHFO-SOE	Non-Honoring of Financial Obligations by State-Owned Enterprises
NOK	Norwegian Krone
NORAD	Norwegian Agency for Development Co-operation
ODA	Official Development Assistance
ODF	Official Development Finance
OECD	Organisation for Economic Co-operation and Development
PCG	Partial Credit Guarantee
PCOA	Put and Call Option Agreement
PD	Probability of Default
PIDG	Private Infrastructure Development Group
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PRI	Political Risk Insurance
PRG	Partial Risk Guarantee
PRSF	Partial Risk Sharing Facility
PV	Photovoltaic
RE	Renewable energy
SARB	South African Reserve Bank
SDGs	Sustainable Development Goals
SEA	Southeast Asia
Sida	Swedish International Development Cooperation Agency
SIDS	small island developing state
SME	Small and Medium-sized Enterprise
SNE	La Société Nationale d'Eau et d'Electricité du Tchad
SOE	State-Owned Enterprise
SPV	Special Purpose Vehicle
SSA	Sub-Saharan Africa
TCX	The Currency Exchange Fund
UAE	United Arab Emirates
UK	United Kingdom
UMIC	Upper middle income country
UNDP	United Nation Development Programme
US	United States
USD	United States Dollar
ZAR	South African rand

Executive Summary

Achieving the clean energy transition is indispensable to meeting climate and development goals and represents a USD 31.5 trillion investment opportunity by 2030. Meeting international climate goals and the Sustainable Development Goals requires mobilising private capital at scale to decarbonise the economy and facilitate the clean energy transition.

However, private capital for clean energy is not being mobilised at sufficient scale, especially in emerging markets and developing economies (EMDEs). Clean energy investment remains unevenly distributed: outside of a few large economies, EMDEs attract only a small share of global flows, due in part to high capital costs and persistent risk perceptions. It is estimated that annual clean energy investment in EMDEs will need to more than triple to USD 2.2-2.8 trillion per year by 2030.

This paper explores how risk mitigation instruments such as guarantees, insurance, hedging products and put and call option agreements (PCOAs), mobilise private capital for renewable power and energy efficiency in EMDEs. The paper finds that while these risk mitigation instruments can be effective in unlocking clean energy investment, they remain underutilised.

Key findings

The share of private finance mobilised for clean energy in EMDEs through guarantees declined from 51% in 2018 to 21% in 2023, with private finance mobilised averaging USD 2.5 billion over the same period. The limited utilisation of guarantees can be attributed to barriers such as product complexity, regulatory limitations, financiers' risk perceptions and lack of viable project pipelines in most EMDEs.

Results from a new OECD survey identify credit risk as the most significant barrier to clean energy finance in EMDEs, followed by regulatory and foreign exchange (FX) risks. Credit risk guarantees are viewed as the most relevant instrument, followed by portfolio guarantees.

To date, blended finance solutions for clean energy using guarantees and insurance are largely concentrated in large-scale transactions such as grid-scale renewable power. Energy efficiency projects are especially underserved, with guarantees backing less than USD 1 billion per year.

For renewable energy projects, the choice of risk mitigation instrument depends on several factors, including political risk, utilities' financial health, local financial system development and key project characteristics (e.g. size, duration, currency). In particular:

- Local currency partial credit guarantees (PCGs) help unlock domestic capital, especially when power purchase agreements (PPAs) are denominated in local currency. Hard currency PCGs support projects with foreign-denominated PPAs and debt. A PPA and debt structure that combine local and hard currency reduces overall FX risk of a renewable power project.

- First-loss guarantees can catalyse commercial or institutional capital for first-of-a-kind or merchant-risk projects but are capital-intensive and best suited for market creation.
- Portfolio guarantees allow for risk-sharing across multiple aggregated projects or borrowers, enabling capital mobilisation at a larger scale compared to guarantees provided to individual projects. Their success depends on strong donor co-ordination and tailored structuring.
- Partial risk guarantees are versatile instruments for addressing specific contractual risks, such as payment defaults under PPAs.
- Political risk insurance is important in fragile contexts, offering tailored coverage, though claims processes can be slow and eligibility is often limited to cross-border hard currency investments.
- Sovereign guarantees are still a dominant de-risking tool in many EMDEs, but fiscal constraints are driving interest in alternatives such as PCOAs, which replicate termination protection with lower contingent liabilities.
- Currency hedging is critical where project revenues and debt are in different currencies. Development finance institutions are instrumental in offering subsidised hedging solutions where commercial options are underdeveloped.

For energy efficiency projects, the choice of risk mitigation instrument depends on several factors, including political context and risk, investment scale, stage of market development and familiarity with risk mitigation products. In particular:

- While energy performance guarantees can reduce project risks, challenges like complex contracts, lack of standardisation and high-risk perception among financiers often hinder access to finance for energy service companies (ESCOs) and small clients. Combining these guarantees with additional instruments such as credit guarantees or insurance, as in the case of the energy savings insurance model, can enhance creditworthiness, improve loan terms and reduce financing costs.
- Partial credit guarantees – especially in local currency and structured as portfolio guarantees – showed success in unlocking domestic finance and aggregating small projects. Particularly in nascent energy efficiency markets, support measures including technical assistance and capacity building can help to improve uptake and effectiveness of guarantee instruments.
- Political risk insurance, although not broadly applied for energy efficiency projects, is particularly useful in EMDEs with unstable political contexts and can facilitate access to concessional capital.
- Insurance products like energy savings insurance are effective in overcoming barriers of access to finance and high upfront investment particularly for small- and medium-sized enterprises (SMEs) and projects.
- Commercial energy efficiency insurance products help reduce technical uncertainty for lenders and enhances creditworthiness.

Guarantees and other risk mitigation instruments cannot compensate for the absence of robust enabling environments in EMDEs. Risk mitigation instruments can help improve risk perception of clean energy projects, but they can only marginally change the underlying, standalone risk. They can facilitate transactions in EMDEs and new sectors, thus increasing familiarity. Yet, robust project pipelines and predictable policies and regulations ensuring long-term stability, transparent permitting processes and fair market access remain essential to build investor confidence.

Guarantees for innovative clean energy projects in EMDEs are often accompanied by other support measures. Financial instruments like grants or concessional loans help mobilise investment in high-risk or underdeveloped markets. Technical assistance helps build capacity for clean energy projects, while awareness-raising builds stakeholder confidence in innovative and unfamiliar initiatives.

The use of guarantees and other risk mitigation instruments continues to face systemic limitations:

- High transaction costs make smaller projects less viable, de facto creating minimum viable deal sizes, particularly for guarantees.
- Prudential regulations, such as Basel III, which are critical to preserve financial stability, may limit the use of guarantees for clean energy projects in EMDEs, as the capital relief provided by guarantees can vary significantly across jurisdictions, types of users and instruments.
- Investors and lenders often anchor pricing to prevailing market benchmarks, so credit enhancement might not fully translate into more favorable financing conditions.
- Some development banks tend to prioritise loans over guarantees, which can constrain both supply and institutional expertise.

Key recommendations

Risk mitigation instruments are most effective when targeting strategic clean energy segments with strong enabling environments and high market creation potential, where investment is hindered by risk perceptions (e.g. merchant renewable models, corporate PPAs, distributed renewables, and energy efficiency, particularly for SMEs). These instruments can be paired with complementary support measures to enhance impact.

On the supply side, donors and development banks could enhance the use and effectiveness of guarantees by developing internal capacity and harmonising due diligence and reporting. They could adjust institutional structures and incentives so that guarantees are treated as core instruments alongside loans, and use them proactively to enter underserved markets. Portfolio-level solutions can be effective to reduce costs and mobilise capital at scale. Expanding local currency guarantees and hedging support is essential to mitigate FX risk, support domestic capital markets and align PPAs and debt structures with local revenue bases. Greater transparency in performance (e.g. prices, call rates, mobilisation and development outcomes) would build confidence and inform policy making.

Financial regulators and supervisors could better assess and manage the unintended consequences of prudential regulations on cross-border financing for clean energy projects in EMDEs. Without changing such regulations, which are essential to financial stability, they could for instance adjust the treatment of risk mitigation instruments in the technical interpretation of such regulations, e.g. by recognising guarantees as eligible credit risk mitigants, updating the lists of eligible guarantors and clarifying definitions of timely payment.

2 Introduction

This chapter sets the context for the paper by outlining the urgent need for clean energy investment, especially in EMDEs. It presents the aim of the paper, as well as the target audience and scope. It also describes the methodology, which includes literature review, a new survey, case studies, and interviews. The chapter ends with an overview of the paper's structure and scope.

Context

Achieving international climate and energy goals – as well as broader energy security, access and affordability, economic resilience, just transition and sustainable development goals – requires mobilising capital from all sources, whether private, public or a blend of both. While public finance remains crucial, private finance must fill the bulk of the gap, given public budget constraints and sovereign debt sustainability issues, in developing countries and advanced economies alike. OECD data on climate finance provided and mobilised by developed countries for developing countries shows that after several years of stagnation, private finance mobilised increased significantly in both relative and absolute terms, reaching USD 21.9 billion in 2022 (OECD, 2024^[1]). The energy sector benefited most from this growth in private finance, representing nearly half of total private climate finance mobilised between 2016 and 2022.

While finance and investment are needed to decarbonise all sectors of the economy, the clean energy transition remains one of the most urgent priorities. Achieving the UAE Consensus goals by 2030 requires an estimated cumulative investment in clean energy of USD 31.5 trillion between 2024 and 2030 (IRENA, 2024^[2]). To meet rising energy needs in ways that align with international climate and energy goals, based on IEA scenarios, annual clean energy

investment in EMDEs from public and private sources will need to more than triple from USD 770 billion in 2022 to USD 2.2-2.8 trillion per year by the early 2030s, remaining around these levels to 2050. Considering EMDEs excluding China, the increase is even steeper (IEA/IFC, 2023^[3]). Yet despite record-high global investment in renewable energy capacity of USD 570 billion in 2023, it fell short of the USD 1.5 trillion needed each year to 2030. Average annual investments in energy efficiency alone must increase almost seven-fold by 2030. In 2023, around USD 323 billion was invested to improve energy efficiency in end-use sectors, but USD 2.2 trillion is needed each year for target achievement.

Despite the scale of the challenge, the global clean energy transition presents an unprecedented investment opportunity. Investing in clean energy can contribute to building resilient power systems, achieving energy security and driving a strong and sustainable recovery from the current crises (Denis and Roche, 2025^[4]; Tubiana, 2025^[5]). Investing in clean energy and energy efficiency increases productivity and innovation, balancing the economic impact of climate policy constraints on prices and consumption (OECD/UNDP, 2025^[6]). There is no shortage of global capital, but a disparity in allocation. OECD and G20 institutional investors alone hold more than USD 64 trillion of assets under management. However, they held only USD 314 billion in green infrastructure assets, most of it in OECD countries (OECD, 2020^[7]).

The investment opportunity to transition energy systems is particularly significant in EMDEs. Yet the clean energy investment gap is becoming increasingly apparent. This is not only due to the shortfall between current and required investment volumes to meet the UAE Consensus goals, but also because of the disproportionately low share directed to EMDEs. In 2023, EMDEs received 53% of energy transition-related investments. However, when excluding China, India and Brazil, the share falls to just 10% (IRENA, 2024^[8]). This share is likely to be even lower when it comes to energy efficiency investments (IEA, 2024^[9]), although precise estimates for EMDEs are lacking.

Strengthening domestic enabling conditions, developing local capital markets and addressing broader impediments in the international financial architecture remain critical for scaling clean energy in EMDEs. In addition, international development co-operation, and official development finance specifically, must embed private finance mobilisation at its core, supporting EMDE-led efforts to attract public and private investment. Domestic resources are estimated to account for much of the future clean energy investment in EMDEs, although external finance will also play a significant role.

Recent estimates suggest USD 1 trillion of external finance will be needed in EMDEs (excluding China) to meet the Paris Agreement's targets (G20 Independent High-Level Expert Group, 2024^[10]). In a context of scarce public and development finance resources, as well as sovereign debt sustainability issues and high cost of capital in many EMDEs (Montague, Raiser and Lee, 2024^[11]), blended finance – the strategic use of development finance for the mobilisation of additional finance towards sustainable development in developing countries (OECD, 2018^[12]) – is gaining increased attention. Blended finance models have demonstrated effective but remain underutilised. In 2023, official development finance interventions mobilised only USD 70 billion of private finance – and less than one-fifth of development finance providers' portfolio had private finance mobilisation as a core objective (OECD, 2025^[13]).

In recent years, there has been growing interest and momentum internationally regarding the use of guarantees¹ and other risk mitigation instruments such as insurance, to mobilise additional capital for clean energy and broader climate action in EMDEs (OECD, 2018^[12]).² Such instruments can attract new types of investors and financiers, allocate risks efficiently and contribute to credit enhancement. Different types of guarantees can target specific risks at different stages of a clean energy project life cycle. Yet, despite their potential, these instruments remain underutilised, and more evidence is needed to identify success and enabling factors as well as key bottlenecks to their use.

Aim, audience and scope

This paper explores how guarantees and other risk mitigation instruments such as insurance, hedging products and PCOAs, have been used in EMDEs to mobilise private capital for renewable power and energy efficiency projects. It does not delve into other de-risking, economic and financial incentives such as price protection through feed-in-tariffs or contracts for difference, volume protection through take-or-pay provisions, tax credits and renewable energy certificates.

This paper aims to inform policy makers in EMDEs' ministries – energy, finance as well as international co-operation and development ministries – as well as donors and development banks involved in developing such instruments. This paper can also be useful for policy makers in OECD member countries as both providers and users of risk mitigation instruments. While the focus of this paper is on EMDEs, risk mitigation instruments are also used in advanced economies, such as for new technologies or untested business models. The case studies presented in Annex A include several examples of guarantee programmes developed in advanced economies.

Methodology

This paper is developed by the OECD Secretariat, under the Clean Energy Finance and Investment Mobilisation (CEFIM) Programme³. This paper analyses success factors, challenges and insights with the use of guarantees and risk mitigation instruments for clean energy in EMDEs emerging from (i) a literature review, (ii) a new survey designed and administered by the Secretariat, (iii) analysis of key data sources, (iv) analysis of selected case studies internationally, as well as (v) bilateral interviews with key players (including MDBs, DFIs, specialised guarantee providers, developers, amongst others).

The Secretariat conducted a survey to gather practitioners' perspectives on the use and relevance of guarantees and insurance products to mitigate different types of risks for clean

¹ Chapter 2 provides definitions of different types of guarantees. Throughout the paper, the term “risk mitigation instruments” refers to guarantees, insurance, hedging products and put and call option agreements (PCOAs).

² Both guarantees and insurance qualify as blended finance instruments (OECD, 2018^[124]).

³ The [OECD Clean Energy Finance and Investment Mobilisation \(CEFIM\) Programme](#) aims to support selected emerging economies (Colombia, Egypt, India, Indonesia, the Philippines, South Africa, Thailand and Viet Nam) as well as a broader set of countries to mobilise private finance and investment in clean energy, in renewable energy, energy efficiency, clean hydrogen and industry decarbonisation.

energy projects. The survey aimed to gather insights from financial institutions (both public and private) and non-financial corporates, such as project developers, power utilities and Energy Service Companies (ESCOs).

This study also builds on tailored analysis of international case studies and country-specific needs assessment studies developed by OECD CEFIM Programme to support specific partner countries, including: work conducted in 2024-2025 for the Just Energy Transition Partnership (JETP) of Indonesia, with funding from Canada; as well as CEFIM support to India's Bureau of Energy Efficiency (BEE), Indonesia's Ministry of Energy and Mineral Resources (MEMR) and Indonesia Financial Services Authority (OJK) to develop needs assessment studies of energy savings insurance in India and Indonesia respectively (OECD, 2024^[14]) (OECD, 2025^[15]).

This work builds on OECD work on blended finance developed by the Environment and Development Co-operation Directorates under EPOC and the Development Assistance Committee (DAC), such as the *OECD DAC Blended Finance Principles* (OECD, 2018^[12]), the *OECD DAC Blended Finance Guidance* (OECD, 2021^[16]; OECD, 2025^[17]), *OECD Blended Finance Guidance for Clean Energy* (OECD, 2022^[18]), recent papers on guarantees (Garbacz, Vilalta and Moller, 2021^[19]) on scaling up the mobilisation of private finance for climate action (OECD, 2023^[20]; OECD, 2025^[13]), and country-specific Clean Energy Finance and Investment Roadmaps developed by the CEFIM Programme (OECD, 2024^[21]; OECD, 2024^[22]).

Outline

This remainder of this paper is structured as follows:

- Chapter 2 provides background on guarantees and risk mitigation instruments for clean energy in EMDEs, including definitions, evidence on the financial efficiency of guarantees, and an overview of key providers, latest trends and market developments.
- Chapter 3 examines the role of risk mitigation instruments for renewable power in EMDEs.
- Chapter 4 examines the role of risk mitigation instruments for energy efficiency in EMDEs.
- Chapter 5 discusses challenges and limitations of the use of such risk mitigation instruments.
- Chapter 6 summarises key takeaways and provides recommendations for policy makers, donors, DFIs, MDBs, regulators and financiers.

3

Unveiling the role of guarantees and other risk mitigation instruments for clean energy in EMDEs

This chapter offers an overview of different types of risk mitigation instruments in the clean energy sector, including definitions and main characteristics. It reviews main providers of guarantees for clean energy in EMDEs and analyses latest trends and market developments related to guarantees for clean energy, using OECD data on private finance mobilised by official development finance interventions, data from Convergence Blended Finance as well as the results of a new OECD survey.

A primer on guarantees and other risk mitigation instruments for clean energy: Definitions, purposes and key differences

Clean energy projects face significant risks and barriers to commercial investment, including regulatory challenges, long planning phases, counterparty and grid risks, exchange rate volatility, high perceived risks and high transaction costs for small projects, especially in EMDEs (OECD, 2022^[18]; OECD, 2023^[20]). For example, utility-scale renewable energy projects in EMDEs depend heavily on the financial health and creditworthiness of utilities and their ability to honour obligations set in Power Purchase Agreements (PPAs). Off-grid renewable energy

projects face uncertainty in their revenue streams, as they do not benefit from the stability of PPAs or other pricing structures, such as net-metering, and rely on direct sales to end-users, whose demand and ability to pay can be highly variable. For energy efficiency projects, typical barriers to commercial investment include limited collateral, credit track record and balance sheet limitations of project developers, including ESCOs and SMEs, particularly in EMDEs, the lack of performance data for energy efficient technologies, and high transaction costs due to the relatively small size and heterogenic nature of energy efficiency projects. In many markets, knowledge and awareness among financiers, businesses and policymakers about the potential and business model of energy efficiency improvements is limited.

Guarantees and insurance products can play a crucial role in mitigating some – though not all – of these risks and barriers associated with clean energy projects. By transferring specific risks to the guarantor or the insurer, and by enhancing credit quality, guarantees and other risk mitigation instruments can contribute to make transactions bankable and unlock private investment for clean energy. Table 1 below provides an overview of risk mitigation instruments commonly used for clean energy investments, their purposes, risk coverage, definitions and typical providers.

Types of risk mitigation instruments for clean energy

Guarantees are legally binding agreements under which the guarantor (or guarantee provider) agrees to pay part or all of an amount due on a loan, equity, or other instrument to the guaranteed entity (a lender or investor), in the event of non-payment by the borrower (or loss of value, in the case of an equity investment) (Garbacz, Vilalta and Moller, 2021^[19]).

Insurance and guarantees are risk mitigation instruments with different characteristics: Guarantees are often financial in nature, where a payment by the guarantor to a third party is triggered in the event of non-payment by a guaranteed entity. Insurance policies, on the other hand, may fulfil a similar role but often require specific conditions to be met before payment is issued. These conditions can often take the form of particular risks, situations, types of damage and contingent damages and losses.

Put and call option agreements (PCOAs) are commercial contracts that are used to replace (i) termination clauses in contracts such as power purchase agreements, when they create liabilities for the government, or to replace (ii) sovereign guarantees, without creating similar contingent liabilities. PCOAs function similarly to sovereign guarantees, with the government contractually committed to compensate the project owner in case of protracted payment default of the offtaker, or in case of other breach of contract events defined in the PCOA. Under such contracts and events, the project owner has the right to sell the whole project at a predefined price, usually covering its outstanding debt and its equity, and sometimes covering some of its expected return on investment.

Currency hedging is a risk mitigation instrument used by companies, investors, or governments to protect themselves against the risk of adverse movements in exchange rates. Depreciation of the local currency can significantly increase the cost of repaying foreign-denominated debt, potentially jeopardising the project's financial viability. The main types of currency hedging instruments include forwards, swaps, and options, each with distinct characteristics:

- A **forward contract** is a binding agreement to exchange a specific amount of currency at a predetermined rate on a future date.
- A **currency swap** involves exchanging principal and interest payments in different currencies between two parties, typically over a longer period.

- An **option** gives the buyer the right, but not the obligation, to exchange currency at a specified rate before or on a certain date.

The guarantee and insurance landscape is very diverse, as these instruments can be tailored to various risks and needs. The instruments most relevant to the clean energy space are discussed below.

Credit risk guarantees provide credit enhancement or tenure extension, by covering risks of non-payment or default by a borrower, regardless of the reason for the default, on a debt instrument. Credit risk guarantees do not deal with a specific project risk but rather enhance the financing conditions of projects or corporates. By improving the conditions and costs of financing for clean energy projects, they help to facilitate the viability and bankability of these projects. The most common form of credit risk guarantee is the **Partial Credit Guarantee (PCG)** instrument, which covers a portion of debt repayment for a single transaction in case of default. PCGs are applied to both renewable energy and energy efficiency projects, particularly to temporarily support energy efficiency improvements in low-price environments.

Another type of credit guarantees is **risk sharing facilities** or **portfolio guarantees**. These guarantees are often extended to a financial institution, to either derisk part of its existing assets and free up additional lending capacity, or to partially cover new loans in a specific sector or region. Portfolio guarantees can also be developed as a guarantee fund or facility, which issues multiple guarantees based on a unique budget allocation, diversifying risk and recycling capacity to issue new guarantees as older ones go extinct.

Partial Risk Guarantees (PRGs) protect private project companies or investors against specific project risks. These risks are often related to governments' contractual obligations towards a private project but can also be payment risks of a private offtaker under a corporate power purchase agreement (see Case Study 5 in Annex A). PRGs are flexible instruments, targeting risks that need to be allocated for a project to be bankable. In the clean energy space, they have in practice been mostly used to address payment risks under PPAs, e.g. to cover liquidity instruments such as letters of credit.

Political Risk Insurances (PRI) typically cover risks such as currency inconvertibility, breach of contract (e.g. PPAs), expropriation, political violence or non-honouring of financial obligations of sovereigns or state-owned enterprises (SOEs) – although some MDBs offer PRGs with similar risk coverages. PRI instruments can be designed to indemnify the insured entity up to an amount covering both outstanding debt and initial equity investment. They are used to cover the risk of final loss after an incident rather than liquidity risk. The Multilateral Investment Guarantee Agency (MIGA), a member of the World Bank Group, is a prominent provider of PRIs and focuses on Foreign Direct Investments (FDI).

Energy Performance Guarantees (EPGs) are commonly used as part of energy performance contracting (EPC) involving energy efficiency improvements and, to a lesser extent, renewable energy generation. An EPC with guaranteed savings commits the provider, typically an energy service company (ESCO) or technology provider, to install the necessary equipment and implement other energy efficiency measures and procedures, and guarantees the achievement of the contracted level of savings of energy (e.g. in kWh) and/or related energy costs (i.e. in monetary terms), but can also relate to a minimum energy delivery or supply (e.g. of cooling, heating, electricity, compressed air or lighting). It further establishes the terms of any upfront or ongoing payments between the beneficiary and the EPC provider. The EPC provider bears contractually agreed risks of technical implementation and operation.

An Energy Savings Insurance (ESI) addresses the barrier of high upfront investment for energy efficiency improvements that often compete with other investment priorities and

compensates for shortfalls in guaranteed savings as part of a project. The instrument consists of an insurance product typically combined with a package of complementary measures, including standardised EPC, independent third-party validation and financing (e.g. through credit lines from development banks, sometimes supported through grants). ESI compensates the entity which invested in the energy efficiency project (either the end-user/facility owner or a third-party investor such as an ESCO or energy efficiency project developer) in the event that the project is unable to deliver the minimum guaranteed energy savings as stipulated in the EPC. ESI is often based on a surety bond product, which acts as a guarantee that the insurance company assumes responsibility for compensating the client in the event that the debtor (i.e. ESCO) defaults and is unable to make payments. The ESI model has been developed through a public programme with support from multilateral financial institutions targeting energy efficiency improvements in SMEs in emerging and developing economies, and has since been piloted also in advanced economies in Europe.

Commercial insurance products related to energy efficient technologies exist in different forms from different providers. **Energy Efficiency Insurance (EEI)** addresses risks beyond energy savings performance and provides broader coverage, e.g. for equipment damage or breakdown, and revenue shortfalls in addition to energy savings underperformance. EEI products were developed by commercial providers in more mature markets and are recently also expanding to emerging economies such as India.

EPGs, ESI and EEI are instruments designed and used specifically for energy efficiency projects. Other instruments, such as PCGs, PRGs and PRIs, can be used for both renewable energy and energy efficiency projects to address the risks outlined above, as well as for other sectors. Chapters 3 and 4 delve into the role of guarantees for renewable power projects and energy efficiency projects, respectively.

Table 1. Overview of guarantees and other risk mitigation instruments commonly used for clean energy

Sectoral use	RE	EE	Both RE and EE			
Type of Guarantee and other risk mitigation instrument				Risks Coverage	Definition	Typical provider
Credit Guarantee	Risk	Partial Credit Guarantee (PCG)		Nonpayment by the borrower/ issuer. A PCG targets a single transaction, whereas a risk and loss sharing facility partially covers an entire portfolio.	Debt service default by the borrower, regardless of the cause of default, on the guaranteed portion of principal and interest. Enhance credit rating for debt instruments (loans and bonds).	Banks DFIs and MDBs Guarantee providers Foundations
		Risk and loss sharing facility				
Partial Risk Guarantee (PRG)				Non-honoring of financial obligations	Losses resulting from an entity (often sovereign or state-owned) defaulting on financial payment obligations.	DFIs and MDBs Governments
				Other risks	Coverage of residual risk (e.g. country risk, delay in permitting or in financial closure, change in regulations, or other).	
Political Risk Insurance (PRI)				Currency inconvertibility and transfer restriction	Losses arising from an investor's inability to convert local currency into hard currency due to government action.	ECAs DFIs and MDBs Governments
				Breach of contract	Losses arising from the utility's breach or repudiation of a contract (e.g. breach of a PPA).	
				Expropriation	Losses arising from government action including nationalisation or confiscation.	
				War, terrorism, and civil disturbance	Destruction of business due to political violence.	
Put and Call Option Agreement (PCOA)				Residual risks, often related to the country itself, that investors are unable or unwilling to take	Under a PCOA, the IPP has the right to sell the project at a pre-defined price if the off taker fails to pay. The PCOA replaces the termination clause.	Governments
Currency hedging				Foreign exchange risk	Hedging products protect against the risk of adverse movements in exchange rates.	DFIs Banks
Energy Performance Guarantees (EPGs)				Energy savings performance risk	If the project fails to meet the guaranteed savings, the ESCO compensates for the shortfall.	ESCOs
Energy Saving Insurance (ESI)				Energy savings performance and credit risk	If the project fails to meet the guaranteed savings and the ESCO is unable to compensate the client, the insurance compensates for the shortfall.	Insurers
Energy Efficiency Insurance (EEI)				Energy savings, material damage, loss of revenue and borrower credit risk	If the project fails to meet the guaranteed savings, if the equipment breaks down or if revenues are lost, the insurance policy compensates for the shortfall.	Insurers

Source: Author

The main attributes and benefits of guarantees and other risk mitigation instruments

Risk mitigation instruments differ in terms of the nature of the related financial transaction, coverage, reserve requirements, payments, currency, fees, loss coverage, and types of risk.

- **Nature of the financial transaction:** Guarantees can be applied to different financial transactions, both in the debt space (loans and bonds) as well as in equity (e.g. equity investments in funds or companies). Guarantees can be deployed to cover an *individual* investment, an entire *portfolio or fund*, or even an entire *balance sheet*. Other risk mitigation instruments can focus on a specific piece of equipment, or a specific risk, rather than on a financial transaction.
- **Coverage:** Risk mitigation instruments can be either *full* or *partial*, i.e. they can cover either the full value of an investment, transaction or portfolio, or only a part of that. Full coverage is rare, as partial coverage aligns interests of the lender and the guarantor (or the insurer), and as full coverage can create a risk of moral hazard with the guaranteed or insured entity. Nonetheless, guarantors typically try to recover, from the borrower, any amount they disbursed, and the market usually perceives the triggering of a guarantee as a credit negative event. Full coverage is offered in specific deals, often involving sophisticated investors such as pension funds, senior unsecured instruments and a recourse of the guarantor on the defaulting entity (Open Capital, 2025^[23]).
- **Risk types:** Risk mitigation instruments can cover a wide range of risks along a clean energy asset lifecycle, such as credit risk, political risks or performance risks, amongst others.
- **Reserve requirements:** *Funded* schemes require at least part of the guaranteed (or insured) amount to be kept in escrow for the lifetime of the guarantee to cover a potential default, in order to enhance the creditworthiness of the instrument. In *unfunded* guarantees, only the expected loss from guarantee contracts is kept in reserves.
- **Payments:** Guarantees can cover the principal and/or the interest payments. Insurance policies can cover the value of an investment and/or the loss of income in case of business interruption.
- **Currency:** Risk mitigation instruments can be applied to transactions either in hard currency, such as USD or EUR, or in EMDE domestic currency.
- **Fees:** Risk mitigation instrument fees depend on the risk level of the underlying transaction, project, or debtor. Fees can be subsidised by donor agencies, DFIs and MDBs in cases of high financial and development additionality.
- **Seniority:** Risk mitigation instruments can be provided on a *first loss basis* (covering initial defaults or losses up to a set limit), on a *second loss basis* (covering defaults once the first loss cover is exhausted), or *pari passu* (with cost-sharing between the guarantor and investor). A **first loss guarantee**⁴ makes the remaining portfolio appealing to investors as it not only reduces the loss given default – like *pari passu* guarantees do – but also reduces the probability of suffering a loss.

Risk mitigation instruments are flexible tools that can be used for a variety of purposes for clean energy investments. By mitigating, sharing or transferring risks, guarantees and other risk

⁴ First loss guarantees are different from first loss junior investments (e.g. in debt funds or companies), which entails a capital contribution (e.g. equity or subordinated debt) to be directly invested or provided. First loss guarantee is a contingent commitment by a third-party guarantor to cover early losses. The guarantor sets capital aside to cover potential losses but does not directly invest capital upfront.

mitigation instruments can have several benefits, including the mobilisation of private or commercial financial institutions into risky projects or risky markets, credit enhancement of a financial instrument (e.g. longer tenure or lower interest rates) and improved project viability. In the long run, this contributes to developing financial and/or clean energy markets and improving access to finance for underserved actors or countries.

Measuring and assessing the financial benefits of risk mitigation instruments

Methodological approaches

Assessing the financial benefits of risk mitigation instruments requires a nuanced approach that goes beyond simple cost-benefit analysis. Such assessment requires analysing both the *financial additionality* and *financial efficiency* of risk mitigation instruments.

Financial additionality materialises when finance is mobilised or an investment is made that would not have occurred otherwise. With this approach, risk mitigation instruments would need to generate savings that offset their own cost and unlock extra investment. The concept of mobilisation⁵ is thus central to the definition of financial additionality, which, however, also encompasses other dimensions, such as improved financing terms and conditions. Financial additionality refers to the extent to which a risk mitigation instrument achieves its intended financial objectives, such as enabling access to private capital (mobilisation) that would have otherwise not been mobilised, and/or reducing financing costs, or improving financing terms in a way which enables an investment that would otherwise not have materialised.

Financial efficiency, instead, focuses on how the instrument has financially performed, relative to its costs. There is a variety of possible methodological approaches to measuring the financial efficiency of risk mitigation instruments for clean energy projects:

- One approach is to compare the net present values (NPV) of a project's inflows and outflows with and without the risk mitigation instrument. An illustrative practical example of how this analysis can be conducted can be found in Annex C. Our example shows that the financial efficiency of guarantees like Partial Risk Guarantees (PRGs) depends on the risk profile of the off-taker, with guarantee efficiency decreasing with lower off-taker risk. A key limitation of this calculation is that it often overlooks non-financial transaction costs, such as delays and added negotiation burdens, which can distort the perceived value.
- Another way of assessing the financial efficiency of risk mitigation instruments is by using leverage ratios, which compare the volume of guarantees issued to the amount of public funding required or to the volume of private finance mobilised. Further details on methodologies to conduct such assessments as well as key limitations are provided in Annex C.

Financial additionality and efficiency need to be considered alongside *development additionality*, which captures the broader value of the guarantee in enabling projects that deliver positive social, environmental, or economic benefits that would not have occurred otherwise. Development additionality can be described as the development impacts that arise as a result of investment that otherwise would not have occurred, with development impacts defined as the

⁵ The term “mobilisation” refers to the ways in which instruments or mechanisms stimulate the allocation of additional financial resources (private finance in particular) to specific objectives; it requires a demonstrable causal link between finance made available for a specific project and the leveraging instrument used (OECD, 2023^[125]).

extent to which the intervention generates significant positive or negative, intended or unintended, higher-level effects, including potential systemic and institutional changes (Winckler Andersen, Hansen and Rand, 2021^[24]).

Evidence on the financial benefits of risk mitigation instruments

While methodologies for calculating financial benefits of risk mitigation instruments differ across institutions and available data is scarce – thus limiting comparability (Habbel et al., 2021^[25]) – available evidence suggests that guarantees and other risk mitigation instruments can be efficient and additional tools for mobilising private finance (Garbacz, Vilalta and Moller, 2021^[19]). There are two conditions for this. The first is that there is a market failure, in which projects with positive NPV are credit rationed or offered unsuitable financing. The second is that the risk mitigation scheme's design addresses market's needs. This includes targeting relevant projects and effectively mitigating risk without introducing prejudicial moral hazard. In this set-up, risk mitigation instruments can bring financial benefits and raise welfare (Arping, Lóránth and Morrison, 2010^[26]).

Where financial additionality is framed in terms of access to credit for underserved segments such as new clean energy technologies and SMEs, guarantee funds can be more efficient and cheaper than direct lending. In addition, risk mitigation instruments may be politically easier to defend since they are market-oriented tools – they can support local banks rather than compete with them – and involve relatively low upfront funding costs, as losses build up over time as defaults occur (Danida, 2020^[27]).

The experience of the Swedish International Development Cooperation Agency (Sida) with guarantees for sustainable development projects in EMDEs provides indicative ranges of leverage that these instruments can reach. The leverage ratio (in terms of ODA funds used vs. amount of guarantee issued) can reach approximately x28 over Sida's overall guarantee portfolio (Sida, 2024^[28]). Considering that Sida charges a risk-based and an administrative fee to the beneficiary of the guarantee (usually a financial institution), which can be subsidised by a grant if necessary, its high leverage ratio demonstrates that little public funding is used in guarantee funds, and that leveraging the sovereign credit rating of Sweden was in most cases enough to generate demand.

Another example is the Partial Risk Sharing Facility (PRSF) for energy efficiency in India, which had a leverage factor of 2.34 of the guarantee amount in terms of total energy efficiency investments. The technical assistance component of the PRSF supported the establishment of a green vertical⁶ of India's Small Industries Development Bank (SIDBI). Until 2024, SIDBI developed a portfolio of USD 2 billion in energy efficiency and renewable energy business, resulting in an indirect leverage of 46 times of the PRSF (see Case Study 8 in Annex A). This demonstrates the effectiveness of targeted technical assistance complementing the provision of guarantee.

It is worth noting that the leverage achieved depends on the risk profile of the underlying assets – all else equal, lower-risk assets typically allow for higher leverage against a guarantee, and vice versa.

⁶ SIDBI's Green Vertical is a dedicated unit specialised in green climate finance, including energy efficiency finance, which was created in 2021.

Growing international momentum devoted to guarantees and other risk mitigation instruments for clean energy

While some donors (e.g. Sweden and the United States) and development finance institutions (e.g. MIGA) have decade-long experience issuing guarantees for sustainable development purposes, guarantees and other risk mitigation instruments remain underutilised due to a wide range of limiting factors explored in Chapter 5. Before 2023, guarantees were not eligible to be reported as ODA (unless they were called), which disincentivised their deployment. In 2023, the Development Assistance Committee (DAC) agreed on reporting methodologies to measure and take into account donors' efforts in issuing guarantees and their ODA eligibility (OECD, 2023^[29]). This change is expected to incentivise the use of guarantees in coming years.

Recent years witnessed growing interest and international momentum on the use of guarantees and other risk mitigation instruments to mobilise private capital. Since 2020, several bilateral donors, including Denmark and Norway, have established new guarantee schemes, while other donors are exploring this option (e.g. Germany). In 2022, the Danish government launched the IFU Development Guarantee Facility of 2 billion Danish Krone (approximately EUR 268 million) with the aim to mobilise private capital for climate action in EMDEs (IFU, 2025^[30]). Capitalised by the Danish Ministry of Foreign Affairs, any potential loss from the guarantees is covered by a state reserve account. Similarly, in 2024, the Norwegian Agency for Development Co-operation (Norad) established a NOK 5 billion (approximately EUR 430 million) guarantee scheme as a 5-year pilot, aiming to mobilise NOK 15 billion (EUR 1.3 billion) of private investment for renewable energy projects in EMDEs (Norad, 2024^[31]).

A range of multilateral donors are increasing and streamlining the use of guarantees. For instance:

- The European Commission's expanded the use of guarantees through the European Fund for Sustainable Development Plus (EFSD+). The EFSD+ offers a variety of risk-sharing instruments, for up to EUR 40 billion with the aim to mobilise up to EUR 135 billion of public and private financing for the achievement of Sustainable Development Goals (SDGs) in EMDEs (European Commission, 2025^[32]). The EFSD+ guarantee is deployed via a range of eligible development finance institutions, with the European Investment Bank being the largest implementation partner.
- The World Bank Group (WBG) launched a new platform in 2024 to consolidate and streamline the guarantee product offer across WBG institutions. Housed at MIGA, the new platform aims to provide simplified access to all guarantee products of the WBG, concentrate guarantee experts across different WBG institutions under one umbrella platform and streamline due diligence and project evaluation. The platform aims to boost the WBG's annual guarantee issuance to USD 20 billion by 2030 and increase private finance mobilisation (World Bank Group, 2024^[33]).

The non-ODA eligibility of guarantees until 2023 led to the creation of specialised multi-donor guarantee providers such as GuarantCo which provides local currency guarantees for infrastructure projects in Africa and Asia (GuarantCo, 2025^[34]). New guarantee institutions and platforms have been set up in recent years, focusing particularly on climate change and clean energy. The Green Guarantee Company (a private entity operating on a commercial basis), for instance, was created in 2024 as the first solely climate-focused financial guarantor, specialising on backing hard currency green debt instruments (bonds, loans, sukuks, etc.) in ODA-eligible countries (excluding China) (Green Guarantee Company, 2025^[35]). New networks on developing guarantees have been established, e.g. the Green Guarantee Group (GGG), launched in 2023 at COP28 by Germany's Federal Foreign Office and Ministry of Economic

Affairs and Climate Action, which aims to increase knowledge and provide policy advice on the use of green guarantees to support climate investments (German Federal Foreign Office, 2024^[36]).

Collaboration on guarantees for climate investments has also increased in recent years, among both donors and MDBs/DFIs. The Innovative Finance Facility for Climate in Asia and the Pacific (IF-CAP), launched by the Asian Development Bank (ADB) in 2023, for example, is a multi-donor financing facility using guarantees from bilateral donors for parts of ADB's sovereign loan portfolios on a first loss basis to enable ADB to free up capital to increase lending for climate investments (ADB, 2024^[37]). IF-CAP was the first guarantee deal made by the Danish IFU under its recently established Development Guarantee Facility (IFU, 2025^[30]).

Latest trends and market developments

Data sources

Data on the use of guarantees and other risk mitigation instruments for clean energy is relatively scarce. Key databases are the OECD Creditor Reporting System, which provides data on private finance mobilised by official development finance interventions through guarantees (OECD, 2025^[38]), and the database of Convergence Blended Finance. Custom data from Convergence Blended Finance allows to gain granular insights into how guarantees and insurance have been used in blended finance deals. The two datasets are complementary as they capture different variables at different levels.

The OECD and Convergence Blended Finance define blended finance in slightly different ways and use different data collection methods, leading to differences in data methodologies and hindering direct data comparability. Annex B explains the methodologies used by the OECD and Convergence to source blended finance data.

Main trends

According to OECD data, in 2023 official development finance (ODF)⁷ to the energy sector amounted to USD 22 billion, representing 6% of total ODF (OECD, 2025^[38]). ODF for the energy sector was almost evenly split across three areas: (i) energy policy, (ii) renewable energy generation, and (iii) energy distribution, with just a small share (7%) directed towards energy generation from non-renewable sources. In the same year, over USD 8 billion of private finance was mobilised by ODF interventions for clean energy activities⁸, through a range of leveraging mechanisms, including guarantees⁹ (Figure 1).

OECD data shows that until 2018, guarantees were the financing instrument that mobilised the highest share of private finance for clean energy projects. Private finance

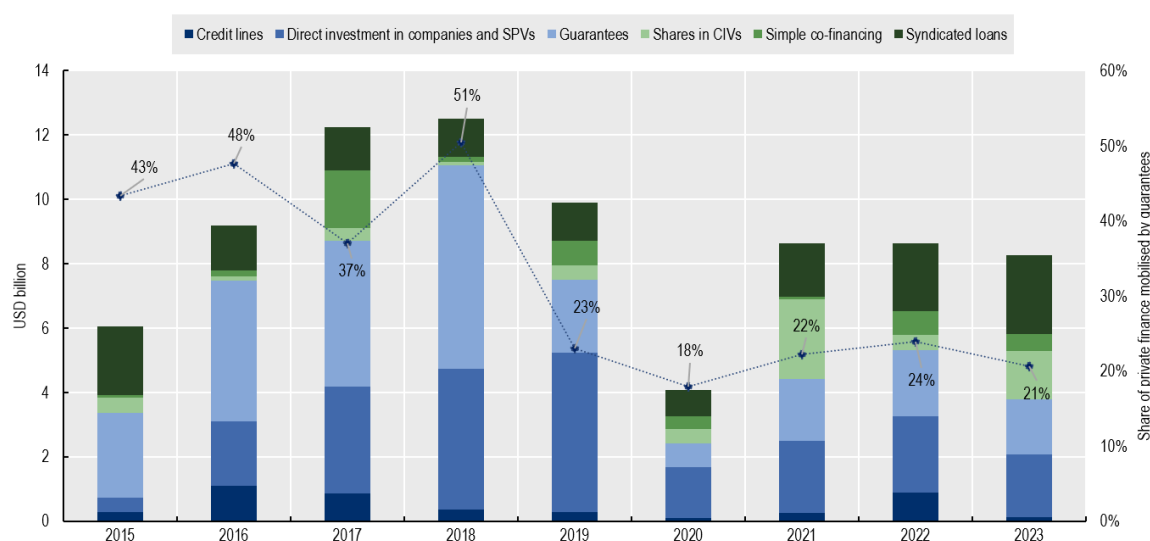
⁷ Official development finance refers to the sum of Official Development Assistance and Other Official Flows, as defined by the OECD (OECD, 2025^[126]).

⁸ The list of clean energy sub-sectors included in the OECD data on private finance mobilised by official development finance interventions can be found in the data methodology in Annex B.

⁹ The OECD data on private finance mobilised through guarantees focus strictly on guarantees and not other risk mitigation instruments (e.g. insurance).

mobilised through ODF interventions¹⁰ for clean energy through guarantees was on average USD 4.4 billion per year from 2015 until 2018, accounting for about 45% of total private finance mobilised. After a peak in 2018 at USD 6.3 billion, the trend has changed (see Figure 1): Guarantees were used significantly less to mobilise private finance for clean energy, whereas the use of direct investment in companies and syndicated loans increased. The peaks in 2017 and 2018 can be attributed, at least partially, to the significant mobilisation of private finance by a guarantee extended by the International Bank for Reconstruction and Development (IBRD) to the government of Argentina to backstop payment obligations as part of its RenovAr scheme, a large auction-based programme aimed to scale up private renewable energy capacity (see Chapter 3).

Figure 1. Private finance mobilised for clean energy by official development finance interventions



Source: Authors, using (OECD, 2025^[38]), OEDC DAC data on private finance mobilised through official development finance interventions, <https://data-explorer.oecd.org/s/34n>

Convergence data on blended finance deals for clean energy using guarantees shows a similar trend – an **increase in financing for clean energy through guarantees and insurance between 2015 and 2017 and a significant drop in 2020 during the COVID-19 pandemic** (Figure 2), due to the prominence of small-scale deals. 2024 data from Convergence shows a significant drop in terms of aggregate blended financing for clean energy through guarantees compared to 2023, although the number of deals using guarantees between 2022 and 2024 increased.

Attributing these trend changes to specific causes is challenging due to the aggregate nature of the data and the lack of information on individual projects. One possible factor behind the surge in private finance mobilised through guarantees between 2015 and 2018 is the increased global focus on climate finance. Conversely, the decline observed after 2019 aligns with the global economic downturn triggered by the COVID-19 pandemic, which broadly constrained the mobilisation of private finance (OECD, 2022^[39]). Another possible factor could

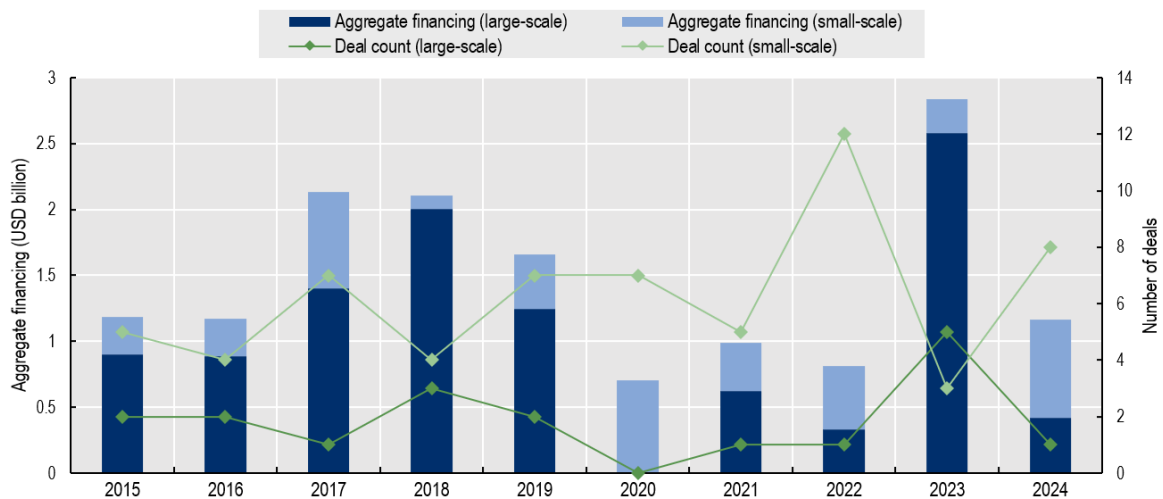
¹⁰ Throughout the following sections, the term “private finance mobilised” specifically refers to private finance mobilised *by official development finance interventions*, as reported in official OECD DAC data.

be that some large EMDEs now have more mature and self-sustaining clean energy subsectors such as grid scale solar and onshore wind benefitting from public utility PPAs, as well as more developed local banking systems and capital markets, where the need for blended finance might be decreasing (Convergence Blended Finance, 2024^[40]; IEA/IFC, 2023^[3]).

Regarding the deal size, **large-scale transactions (greater than USD 250 million) accounted for the majority of aggregate blended financing for clean energy through guarantees between 2015 and 2024**, with a notable peak in 2023 (Figure 2). Despite their dominance in total financing, large-scale deals were relatively few in number each year, typically ranging from one to four transactions annually. In contrast, medium to small-scale deals (USD 250 million or less) were more frequent, with annual counts consistently surpassing those of large-scale deals, yet contributing a much smaller share to overall financing volumes. This distribution underscores the sector's continued reliance on a limited number of large-scale transactions to drive aggregate investment, while small-scale deals remain important for broadening market participation and supporting project diversity. The pronounced spikes in large-scale financing highlight the impact that a handful of individual, high-volume transactions can have on annual investment trends in the clean energy sector.

Figure 2. Blended finance deals for clean energy using guarantees and insurance, by deal size

Annual financing (left axis), and deal count (right axis), over 2015-2024



Source: Authors, using proprietary data from Convergence Market Data, for exclusive use by the OECD.

Sectoral focus

OECD data on private finance mobilised through official development finance interventions in the energy sector – specifically via guarantees – indicates that renewable energy generation accounts for the largest share, representing 52% of the total. This is followed by energy generation from non-renewable sources (21%), oil and gas activities (13%), and energy distribution (11%), with the remainder spread across energy conservation and industry-related uses.

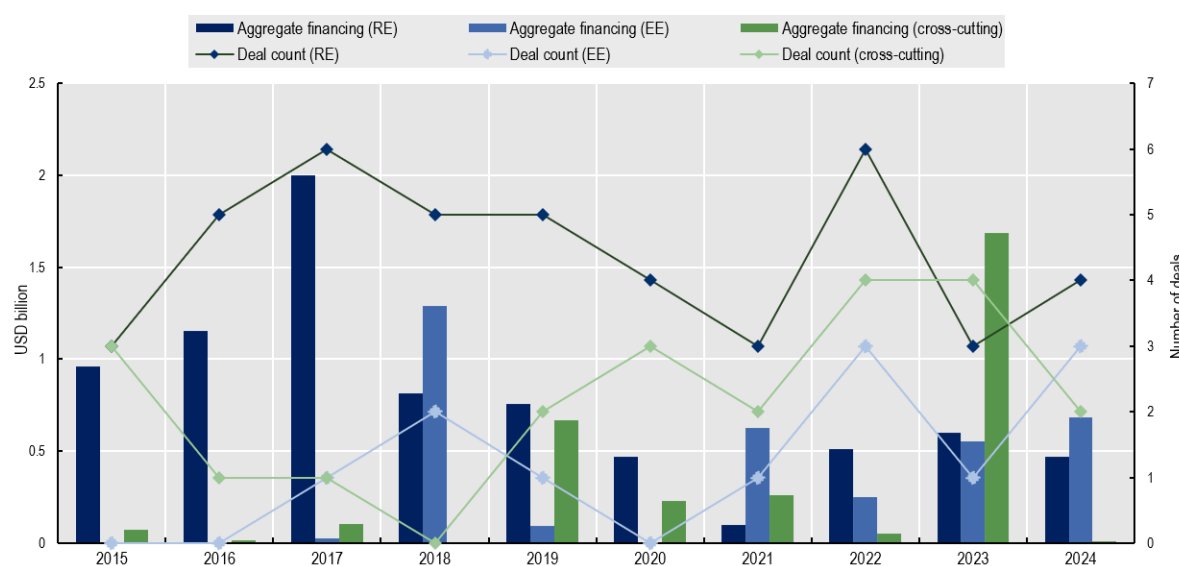
Convergence data shows that **renewable energy consistently attracted more blended finance than energy efficiency**. Renewables represent most of the clean energy deals using

guarantees between 2015 and 2024 (Figure 3). Energy efficiency deals remained comparatively modest in scale, only occasionally surpassing USD 1 billion in aggregate financing in select years such as 2018 and 2024.

Both renewable energy and energy efficiency exhibited year-on-year fluctuations in deal counts of blended finance using guarantees, with energy efficiency deals generally outnumbering renewable energy deals, particularly in 2022 and 2024. This pattern suggests that while renewable energy transactions tend to be larger in value but fewer in number, energy efficiency activity is characterised by a higher frequency of smaller-scale deals.

Figure 3. Blended finance deals using guarantees for clean energy

Aggregate financing (left axis), and number of deals (right axis), over 2015-2024



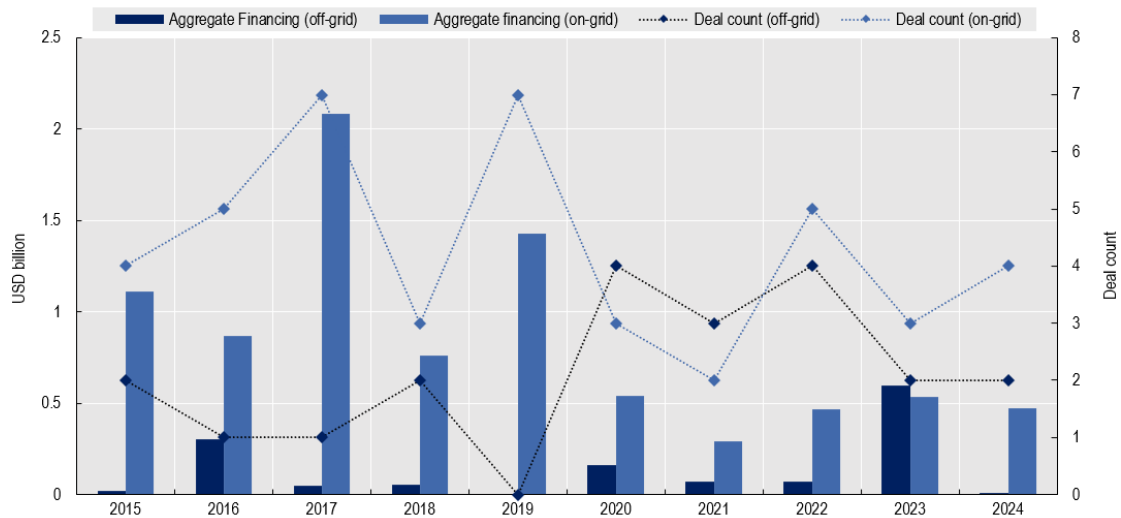
Note: The "cross-cutting" category includes clean energy activities that cannot be classified as either renewable energy or energy efficiency due to reporting limitations.

Source: Authors, using proprietary data from Convergence Market Data, for exclusive use by the OECD.

When looking at the breakdown between on-grid and off-grid clean energy blended finance deals using guarantees, between 2015 and 2024, **on-grid financing consistently accounted for the largest share of financing**. Annual aggregate financing for on-grid projects peaked at over USD 2 billion in 2017 and around USD 1.4 billion in 2019, before declining nearly threefold to USD 470 million by 2024 (Figure 4). Deal counts for on-grid projects followed a similar trajectory. In contrast, off-grid financing remained modest, with aggregate amounts exceeding USD 0.5 billion. In 2023, off-grid financing briefly surpassed on-grid in aggregate value, likely reflecting a growing focus on decentralised energy solutions.

Figure 4. Blended finance deals using guarantees for on-grid and off-grid renewables

Aggregate financing (left axis), and deal count (right axis), over 2015-2024



Source: Authors, using proprietary data from Convergence Market Data, for exclusive use by the OECD.

Main providers

Both public and private institutions issue guarantees for clean energy projects. Public international institutions include development co-operation agencies, bilateral and multilateral DFIs, MDBs, specialised guarantee providers and export credit agencies (ECAs). Public domestic institutions that issue guarantees in EMDEs include governments, national development banks or public guarantee providers. Private guarantee providers include private insurance companies, banks as well as foundations.

Guarantees extended by ECAs are outside the scope of this paper, as they are usually sector agnostic and aim to promote trade and support their domestic economies. In the energy sector, ECA activity in EMDEs used to focus on fossil fuels. While energy represents a low share of ECA activity overall, export credits for clean energy in EMDEs surpassed those for fossils for the first time in 2023 (IEA, 2025^[41]).

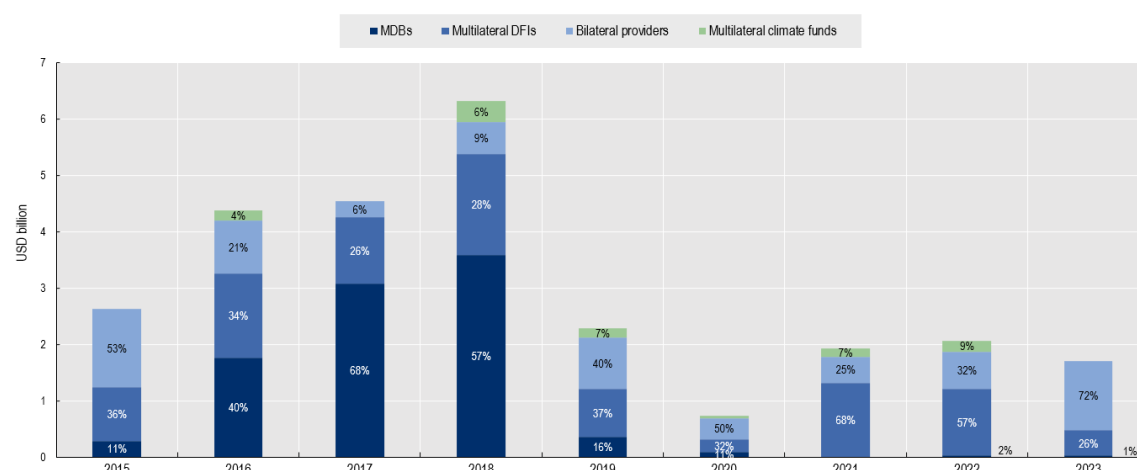
According to OECD data, between 2015 and 2018, MDBs mobilised the highest share of private finance through guarantees, whereas between 2019 and 2023, DFIs¹¹ played a much more significant role than MDBs¹² in a context of overall decline (Figure 5). While MDBs and multilateral DFIs on average mobilised the largest volumes of private finance for clean energy through guarantees, their operations remain largely centred on direct lending – except for specialised entities like MIGA. Clean energy does not consistently rank among the

¹¹ Including bilateral providers and multilateral DFIs. Multilateral DFIs include: Council of Europe Development Bank, IDB Invest, International Finance Corporation, Multilateral Investment Guarantee Agency, OPEC Fund for International Development and Private Infrastructure Development Group.

¹² MDBs includes: African Development Bank, Asian Development Bank, Development Bank of Latin America, European Bank for Reconstruction and Development, Inter-American Development Bank, International Bank for Reconstruction and Development and International Development Association.

top sectors receiving guarantee support: Renewable energy represented only 15% of MIGA's total exposures during the 2021–2024 period (MIGA, 2024^[42]).

Figure 5. Mobilisation of private finance for clean energy through guarantees, across types of providers

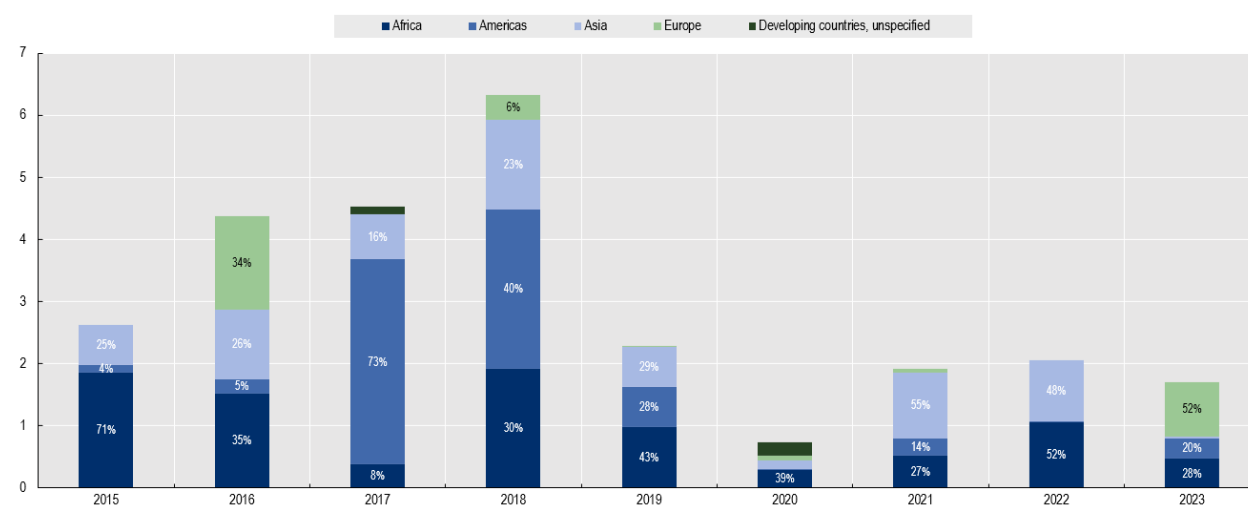


Source: Authors, using (OECD, 2025^[38]), OECD DAC data on private finance mobilised through official development finance interventions, <https://data-explorer.oecd.org/s/34n>

Main recipients

Africa and Asia were the primary recipients of private finance mobilised through guarantees for clean energy in the early years, with Africa's share peaking at 71% in 2015 (Figure 6). In recent years, Asia's share increased substantially in 2021 and 2022, with South Asia alone accounting for 40% of private finance mobilised through guarantees in the region over the 2015–2023 period, reflecting the region's growing investment opportunities and policy focus on clean energy.

Figure 6 Private finance mobilised for clean energy through guarantees, across regions



Source: Authors, using (OECD, 2025^[38]), OEDC DAC data on private finance mobilised through official development finance interventions, <https://data-explorer.oecd.org/s/34n>

A focus on individual countries illustrates how **a few large programmes contributed to a large part of global private finance mobilised for clean energy through guarantees**. Over the past decade, the landscape of top recipient countries has evolved significantly. Middle-income countries in Africa and Latin America and the Caribbean (LAC) were the predominant recipients from 2015 to 2018. This confirms an earlier finding of analysis of OECD data on climate finance provided and mobilised by developed countries, which showed that over 2016-2020 public climate finance providers mostly mobilised private climate finance for projects in countries with medium or relatively low-risk profiles (OECD, 2022^[43]). In recent years have seen a more diverse distribution. Notably, several large Asian economies (such as Bangladesh, Indonesia and Viet Nam) have emerged as key recipients.

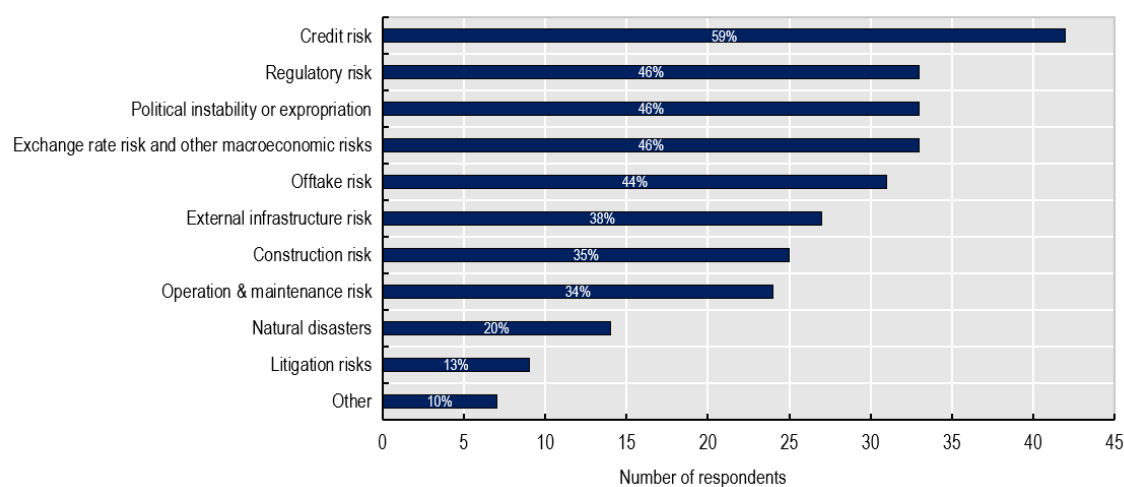
Survey results on most relevant risks and risk mitigation instruments for clean energy in EMDEs

In April-May 2025, the OECD conducted a survey on the role of guarantees and other risk mitigation instruments for clean energy in EMDEs to gather financial institutions' and non-financial corporates' perspectives. In total, 71 responses to the survey were received. Of these, 76% represented the financial sector (mainly MDBs and private banks), while 24% were from non-financial businesses such as Energy Service Companies (ESCOs) and other corporates. A significant proportion of respondents reported active engagement in clean energy lending, investment or operations in clean energy in EMDEs. Further details on the survey methodology and respondents' profiles (e.g. type of stakeholder, geography, etc) are provided in Annex B.

Main risks

Credit risks are the most prominent type of risks that clean energy projects face in EDMs, with 59% of respondents identifying them as the main risks. Regulatory and political risks, along with exchange rate and macroeconomic risks, were cited as the second most relevant (by 46% of respondents), followed by offtake risks. In contrast, risks related to natural disasters and litigation were considered least significant (Figure 7).

Figure 7. What are the main risks in financing clean energy projects in EMDEs?



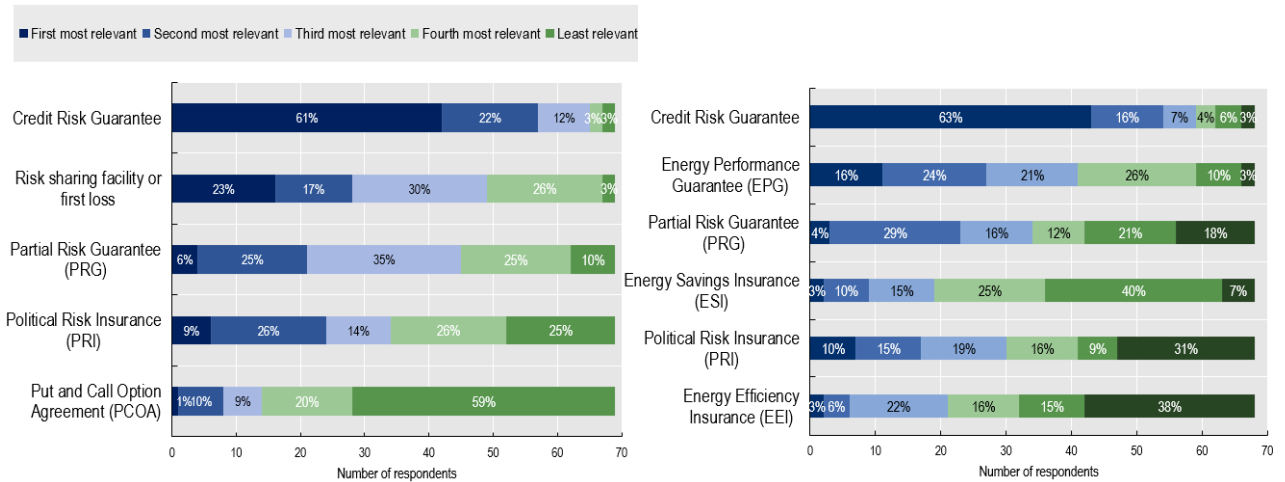
Source: 2025 OECD Survey on Guarantees and other risk mitigation instruments for clean energy in EMDEs

Most relevant guarantees and other risk mitigation instruments

Credit risk guarantees are viewed as the most relevant de-risking instrument, with over 60% of survey respondents ranking them as the top choice for both energy efficiency and renewable energy investments. For renewable energy investments specifically, risk sharing facilities are the second most relevant instrument. PRGs appear to be more relevant than PRI, potentially signaling that political risk coverage is no longer a pre-condition for investment in politically stable EMDEs. Conversely, instruments such as put and call option agreements are considered least relevant (Figure 8).

In the context of energy efficiency, energy performance guarantees (EPG) emerge as the second most valued instrument (after credit risk guarantees). Partial Risk Guarantees (PRGs) and Energy Saving Insurance (ESI) are also considered broadly useful, while Political Risk Insurance (PRI) and Energy Efficiency Insurance (EEI) are perceived as the least relevant instruments (see Figure 8).

Figure 8. Which types of guarantees or insurance would be most useful to de-risk renewable energy investments (left) and energy efficiency investments (right) in EMDEs?



Note: The white percentages represent the share of respondents that ranked that instrument, out of the total number of respondents.

Source: 2025 OECD Survey on Guarantees and other risk mitigation instruments for clean energy in EMDEs

The survey results overall underscore the critical importance of credit risk mitigation in financing clean energy projects and a preference for guarantees over specialised insurance products. This preference is potentially due to the broader risk coverage, greater familiarity with the instrument and stronger track record of guarantees than insurance in EMDEs. Apart from political risk insurance linked with blended finance, other insurance products are also often provided on a commercial basis and for specific sectors as is the case for energy efficiency insurance.

4 Guarantees and other risk mitigation instruments for renewable energy

This chapter analyses different types of risk mitigation instruments used in the renewable power sector, highlighting their success factors, enabling conditions, limitations and challenges. This chapter also discusses recent innovations and lessons learnt from practitioners' experiences. The instruments under the scope of this analysis and the selection of case studies are presented in Table 2 below. Annex A provides more details about the international case studies summarised in this chapter.

Table 2. List of analysed instruments and case studies

Type of instrument		Provider	Sector	Country	Guaranteed instrument	Case study # in Annex A
Partial credit guarantees (PCG)	Local currency PCG	GuarantCo	Solar rooftops	Pakistan	Loans	1
	Hard currency PCG	MIGA	Hydro and geothermal	Indonesia	Loans	2
	First loss guarantees	InvestEU (through EBRD)	Large-scale solar	Croatia	Loans	3
	Portfolio guarantees	Sida	Distributed renewables	Multiple	Debt fund	4
Partial risk guarantees (PRG)		Bpifrance	Large-scale solar PV and wind	France	Corporate Power Purchase Agreements	5

Political risk insurance (PRI)	MIGA	Cross-sector	Cross-country	Equity investments and loans	None
Sovereign guarantees	South African National Treasury	Small-scale solar	South Africa	Loans	6
Put and call option agreements	Governments in Sub-Saharan Africa	Large-scale solar power	Sub-Saharan Africa	Renewable power plants	7
Currency hedging	TCX	Cross-sector	Cross-country	Cross-border investments	None

Source: Authors.

Credit risk guarantees

Credit guarantees in local currency

Credit guarantees denominated in local currency are an effective de-risking tool that facilitate the mobilisation of local financing, improve financing conditions, help increase local financial institutions' familiarity with renewable energy projects and build local green financial markets. Partial Credit Guarantees (PCGs) denominated in local currency are provided by several guarantors, including MDBs, DFIs and specialised guarantee providers.

A notable example is GuarantCo's provision of local currency PCGs to a financial institution in Pakistan to support lending for solar rooftop installations (see Case Study 1 in Annex A). The guarantee enabled the bank to extend loans in local currency under more favourable conditions. Another example is the one of Proparco. Through its UNLOCK programme, Proparco (a subsidiary of the French Development Agency supporting private sector businesses and financial institutions) issued an unfunded guarantee to domestic financial institutions providing long-term local currency loans to clean energy and other infrastructure projects (Proparco, 2018^[44]). In Namibia, it provided a local currency-denominated guarantee to Standard Bank to backstop its local currency loan to a solar plant project, thus synthetically taking on FX risk – as Proparco's liabilities are in hard currency – and extending the tenor of the loan by seven years.

PCGs can also be useful to develop green bond markets and raise local currency financing for renewable energy projects. An example is the PCG provided by the Credit Guarantee & Investment Facility (CGIF) for a 15-year solar energy project bond in Viet Nam in local currency – the longest tenor since CGIF started its operations and the first renewable energy bond in the country (CGIF, 2021^[45]). In this case the PCG contributed to mobilise local currency investment by domestic banks, diversify financing sources for the project company, and build the local bond market.

Although PCGs help improve the credit profile of projects, the nature of underlying credit risk of the borrower or project remains the same for lenders as long as the guarantee covers only a portion of the debt exposure and repays lenders on a *pari passu* basis.¹³ The partial coverage implies that the commercial lender needs to conduct its own due diligence assessments as it still retains a portion of the borrower's credit risk. However, it can be argued that when a commercial lender takes the time to conduct its own due diligence, it is more likely to increase its familiarity to the sector, change its risk perception and potentially lend directly in the future without the need for guarantees.

¹³ The loss given default can be reduced by a partial *pari passu* guarantee, but not the probability of default (PD).

When a sector is nascent and perceived as risky by local financiers, guarantees are necessary but often not sufficient to kick start the sector and spur local lending. In such cases, guarantees need to be complemented by public financial incentives, technical assistance and training. For example, in Pakistan, the local bank that received GuarantCo's PCG also benefited from favourable financing conditions from the central bank, thanks to a programme dedicated to improving solar energy financing.

Moreover, grants and technical assistance can be useful to provide a holistic support to the sector, for example to increase women's participation in the clean energy job market. In the case of GuarantCo's PCG in Pakistan, the guarantee was coupled with a Private Infrastructure Development Group (PIDG) grant for technical assistance. This grant allowed the Pakistani bank to provide skills and knowledge on solar energy technologies to local female engineering students, by partnering with local universities. Such programmes can significantly contribute to empower women to pursue careers in the clean energy sector.

Credit guarantees in hard currency

Credit guarantees denominated in hard currency, such as the USD or EUR, can reduce the perceived credit risk for international investors and lenders. This mechanism not only enhances the bankability of renewable energy projects but can also help attract private capital at more favourable terms and longer tenure. This type of guarantees is particularly important because Independent Power Producers (IPPs) in the renewable energy sector often raise financing in hard currencies. They do this to match the currency of Power Purchase Agreements (PPAs) that are denominated in hard currency as well as to match the currency of imported equipment and services (e.g. solar panels or engineering procurement construction (EPC) contracts). Therefore, having guarantees in the same hard currency helps align the financial structure of the project, making it more bankable and appealing to private capital providers.

MIGA's non-honouring of financial obligations coverage, which functions similarly to a PCG, provides credit enhancement in transactions involving sovereign and sub-sovereign entities, as well as state-owned enterprises (SOEs) (MIGA, 2021^[46]). This coverage primarily benefits commercial banks' lending to public sector entities, e.g. for energy or other infrastructure investments. This instrument protects the lender against losses resulting from a failure to make a payment when due under an unconditional financial payment obligation or guarantee. Unlike some other forms of political risk insurance, this instrument does not require an arbitral award before a claim can be submitted to MIGA. A key advantage of this coverage is its compliance with the Basel Framework, which can provide capital relief to banks and encourage continued lending in MIGA member countries. MIGA's non-honouring of financial obligations cover is available for a tenor of up to 15 years (in some cases 20) and for up to 95% coverage.

However, MIGA's instrument also has some limitations, namely applicability only to public borrowers and debt or debt-like instruments, its coverage limited to non-payment risks, and its requirement for public entities for a minimum credit rating of BB-, a threshold many utilities in emerging markets may not meet (MIGA, 2023^[47]). Case Study 2 in Annex A provides an example of such MIGA cover, provided to commercial and development banks' lending to Indonesia's utility company PLN to finance working capital expenses in relation to USD denominated tariff payments under a PPA to buy electricity from the seven existing hydro and geothermal IPP projects.

Policy-based guarantees are a different form of credit guarantees, usually denominated in hard currency, backstopping sovereign commercial borrowing for budget support, rather than individual renewable power projects. Offered by MDB such as the World Bank or the Asian Development Bank, policy-based guarantees enhance the sovereign's credit

profile, facilitating access to capital markets or commercial financing, with lower interest rates and longer tenors than would be available solely based on the sovereign's own credit risk. These instruments can be instrumental in enhancing the bankability of public utilities and sovereign Put and Call Option Agreement (PCOAs), especially in countries with limited track records in international capital markets or those facing temporary economic challenges. The country asking for the guarantee usually needs to provide a sovereign counter-guarantee (MIGA, 2025^[48]). In Côte d'Ivoire, a policy-based guarantee by the World Bank recently secured a long-term loan with favourable terms, financing the retirement of existing costly short-term debt, reducing interest rates by over 30 basis points (Finance for Development Lab, 2025^[49]).

First loss credit risk guarantees

In the renewable energy space, first loss guarantees have mainly been used by governments and development co-operation agencies to provide catalytic support to mitigate the risks of renewable projects. Policy makers (such as the European Union) and development partners (such as Sida) are uniquely positioned to provide this kind of catalytic risk mitigation instruments, thanks to their strong risk appetite and development impact mandate.

The Encro Group's fully merchant solar projects in Croatia represent an innovative approach of MDB and commercial lending being mobilised thanks to a first loss guarantee provided by the InvestEU programme. By leveraging EU funds, InvestEU provides guarantees to de-risk projects and attract private investors. The EBRD and a Croatian bank extended loans worth EUR 10.6 million each to three special purpose vehicles (SPVs) incorporated by the Encro Group to construct and operate solar PV plants (see Case Study 3 in Annex A for further details).

This project introduces a novel market-based model that relies on the wholesale market. The electricity generated is sold directly on the market without subsidies, with the option for the SPVs to enter into corporate power purchase agreements (CPPAs) at a later stage. This innovative business model is an alternative to take-or-pay provisions set in PPAs and does not create the same long-term commitments for public power utilities. In this case, the IPP does not benefit from a secured revenue stream and is exposed to market risks, such as price volatility and demand fluctuations. The financing of such project is challenging, and the first loss guarantee unlocked access to debt. Specific risk mitigation instruments can help support the first projects of this type and demonstrate viability of market-based renewable energy models. Following this first transaction, EBRD financed other merchant risk IPPs in the region, and building on lessons learned it could improve financing terms such as the debt-to-equity ratio.

First loss guarantees also have several limitations. They are costly for guarantors, in terms of capital requirements – significant amounts must be set aside to cover potential losses. This is usually reflected in guarantee fees. First loss guarantees also require detailed legal and financial structuring, which can be time-consuming and costly to implement: they cannot rely on banks' due diligence as much as *pari passu* partial guarantees. Because of the capital intensity and risk concentration, guarantors' appetite to provide first loss guarantees is usually limited.

By providing a safety net for lenders and investors, first loss guarantee can have a significant risk mitigation effect. Given their limitations, they could be used to support first-of-a-kind projects, such as investment in new sectors or new, risky or untested business models. Once a sector or business model is developed, *pari passu* guarantees can be more efficient instruments to mitigate remaining risks.

Portfolio credit risk guarantees

Portfolio guarantees are increasingly being used as catalytic instruments to de-risk portfolio of investments in clean energy in EDMEs, made by financial institutions, fund managers or other financial intermediaries. The Swedish International Development Cooperation Agency (Sida) is a prominent provider of such guarantees, leveraging Sweden's high credit rating. Sida's fund guarantees enable the mobilisation of capital at a larger scale compared to guarantees provided to individual projects.

An example of Sida's portfolio guarantee for renewable energy is the one provided to the Mirova Gigaton Fund (MGF), a blended finance revolving debt fund that provides medium-to-long term debt financing to clean energy infrastructure projects and SMEs, predominately in Sub-Saharan Africa. The Case Study 4 in Annex A provides details of the fund and Sida's guarantee. Sida's guarantee differentiated risk-sharing approach – offering higher coverage for loans in Least Developed Countries (LDCs) and riskier segments – represents a promising approach to incentivise lending to underserved markets that would otherwise be commercially unattractive. The fund's multi-tranche structure enabled the attraction of a diverse range of investors, each with distinct risk, return and impact preferences.

The case study shows that donors, DFIs and MDBs and impact investors willing to take a subordinate position in blended finance funds are instrumental in unlocking more risk averse but often more scalable sources of institutional capital. Close and intensive collaboration between the fund manager and guarantee provider was key to align diverse stakeholder needs and priorities and to reconcile multiple development and financial objectives. In addition, the case study illustrates how co-operation between different donors (in this case, Sida and Norad) is key to provide a guarantee of the required size and scope within budget frameworks available.

Philanthropic foundations are playing a growing role in providing fund-level guarantees for renewable energy projects in EMDEs. A prominent example is the MacArthur Foundation, which provided a partial unfunded guarantee to the SDG Loan Fund – a blended finance fund investing in renewable energy and other SDG-related projects in EMDEs. The fund is among the few that managed to raise over USD 1 billion exclusively from institutional investors (Class A shares), benefitting from multiple layers of risk mitigation. These include a USD 111 million first-loss investment from FMO (Class B shares), which was credit-enhanced with a USD 25 million unfunded partial guarantee provided by the MacArthur Foundation (Convergence Blended Finance, 2022^[50]). The guarantee allowed FMO to take a junior position without bearing the risk of the whole loan portfolio on its balance sheet. The SDG Loan Fund capital is invested as participations in FMO-originated senior loans, thereby granting institutional investors access to FMO's investment pipeline. This case exemplifies how foundations can act as catalytic agents, using their balance sheets to absorb early risks and crowd in institutional capital that otherwise remain untapped.

Export Credit Agencies (ECAs) are emerging as unconventional yet increasingly relevant providers of fund-level guarantees for renewable energy investments in EMDEs. A notable example is the blended finance fund Climate Investor One (CIO), which benefited from a guarantee from Atradius (the Dutch ECA). This guarantee provided credit enhancement to the senior equity tranche of the fund and hence attracted pension funds and banks (Blended Finance Taskforce, 2023^[51]). While ECAs are generally less familiar with blended finance structures, the CIO fund's concessional first-loss coverage and limited currency risk profile provided the necessary assurance to the guarantor.

Despite their catalytic potential, several challenges continue to limit the full potential of portfolio guarantees in unlocking commercial capital at scale. At a broad sectoral level,

liquidity constraints, modest returns and persistently high-risk perceptions hinder the large-scale mobilisation of commercial capital in EMDEs with low sovereign credit ratings, even when underlying projects or companies have a strong credit profile. In addition, junior and concessional capital is increasingly limited, and there is a need for improved co-ordination among providers. Additionally, securitisation regulations in some jurisdictions can limit structures with loss-layer guarantees, as they sometimes trigger onerous legal and financial structuring and compliance requirements, making them unattractive to some investors. Finally, competition and state support rules in some jurisdictions can complicate the engagement of concessional finance providers with commercial investors.

Partial risk guarantees

A Partial risk guarantee (PRG) is a flexible and versatile family of instruments targeting specific needs of a project or programme. PRGs are meant to protect companies and investors against untransformed risks. These risks are often related to governments' contractual obligations in relation to a private project but can also be payment risks of a private offtaker, under CPPAs.

In the renewable energy space, PRGs (often referred to as payment guarantees) have in practice been mostly focusing on payment risks under PPAs, where they are designed to cover liquidity instruments such as letters of credit. In case of payment default by the offtaker, the IPP can draw the corresponding amount on a letter of credit, and this automatically generates a debt of the offtaker vis-à-vis the letter of credit issuing bank. If this debt is not repaid in time, the letter of credit issuing bank calls the PRG to repay outstanding principal and interest. The guarantor usually pursues the recovery of the disbursed amounts directly with the sovereign.

A notable example of a PRG backing governments' contractual obligations in a private renewable energy project is the International Bank for Reconstruction and Development (IBRD) PRG provided to the government of Argentina as part of its RenovAr scheme, a large auction-based renewable energy programme. This PRG covered government obligations to purchase the project if the put option (investor's right to sell the project) was exercised – covering power payment obligations as well as other risks. Initially, the World Bank approved a guarantee of USD 480 million in 2017 in support of auction rounds 1 and 1.5. In 2018, this envelope was expanded by USD 250 million for round 2. As investor confidence in Argentina's renewable energy market grew, the share of bidders requesting the guarantee declined over time – from 52% in round 1 to 19% in round 2. Since its launch, RenovAr awarded 147 projects totalling over 4.4 GW of renewable energy capacity and mobilised over USD 4 billion in private investment (IFC, 2019^[52]; World Bank, 2022^[53]). A PRG can be quite onerous as it usually requires a sovereign guarantee by ministries of finance.

Another illustrative and innovative case is the PRG programme developed by Bpifrance, the French state-owned investment bank, specifically designed for CPPAs (see Case Study 5 in Annex A). This programme aimed at providing IPPs with long-term visibility on revenue streams by mitigating the risks associated with corporate off-taker defaults. Bpifrance covers part of the IPP's revenue losses in case of CPPA termination. This case study shows that the involvement of credible guarantors such as national development/investment banks is pivotal in the success of PRGs for CPPAs. Their participation and knowledge of credit quality of local corporates enhances the confidence of investors and lenders. Such PRGs can support the development of renewables by IPPs in countries permitting open access to the power grid.

This case study also highlighted two main limitations of this scheme. First, this type of scheme adds a layer of complexity, as it usually requires three additional contracts (i) the tripartite letter of credit scheme with the offtaker, the bank and the IPP; (ii) the guarantee contract between the guarantor and the bank, and finally (iii) the counter indemnity agreement that allows the guarantors to claim repayment from the sovereign, the utility or the corporate offtaker. The second limitation concerns the regulatory environment. In some countries, regulatory frameworks do not allow the establishment of CPPAs due to concerns that they might undermine the profitability and financial sustainability of public utilities.

Political risk insurance

Political risk insurance (PRI) covers political risks related to expropriation, currency transfer restriction and inconvertibility, war and civil disturbance and breach of contract. The political risk cover is particularly important in countries with high political instability and ongoing conflicts or fragilities. PRIs can also be useful to free up country exposure limits for commercial lenders.

Coverage against these risks can be particularly relevant for the distributed energy market, which is characterised by small projects, often in rural or remote areas lacking access to the grid, requiring developers to engage with many different stakeholders, from ministries of finance, energy and environment to local agencies and villages. Moreover, distributed energy companies usually earn revenues in local currency, which then needs to be converted into hard currency and repatriated by investors.

A notable example of PRI's potential in the distributed energy field is the case of the Multilateral Investment Guarantee Agency (MIGA) PRI for solar mini grids in the Democratic Republic of Congo (DRC). The PRI helped catalyse private investment (equity and shareholder loans) in a challenging environment and ultimately provide more, cleaner, more affordable and reliable electricity to 23 000 households in the DRC through solar hybrid mini- and metro-grids (MIGA, 2024^[54]).

The PRI enabled the project company to attract the capital and investment that it would not have been able to access otherwise. However, in such contexts, PRI alone is often insufficient to attract purely commercial investment. It is more effective in mitigating risks for investors with a higher risk tolerance, such as MDBs, DFIs, impact investors, or foundations. This project also highlighted that significant donor support in the forms of grants, risk-sharing and investment is needed for renewable energy projects in fragile and conflict-affected countries, including at concessional terms.

One key political risk relates to expropriation. Standard expropriation coverage is triggered when expropriation results in financial unviability of an entire company. There are nonetheless challenges in claiming indemnities in the context of distributed energy companies, where expropriation cover applies to every single small-sized project that the company has. In the case of the DRC project, MIGA offered partial expropriation coverage, ensuring that if one mini-grid is expropriated, investors can receive compensation for that specific mini-grid even though the project company might remain financially viable, without affecting the coverage of other mini-grids. MIGA's novel approach demonstrated that flexibility and innovation are necessary to tailor standard products to the specific needs of distributed energy projects.

In the context of MIGA, one of the major public provider of insurance products, PRI has one notable disadvantage relative to other instruments, namely that claims are not paid out automatically (Center for Global Development, 2023^[55]). For example, in case a breach of

contract coverage is triggered, the parties need to go through an arbitration process, which can be lengthy and burdensome, leaving investors with no recourse in the interim. In addition, MIGA's products cover cross-border investments and thus often only apply to hard and freely convertible currency investments.

Bespoke guarantee products similar to PRIs have also been created specifically for transfer and convertibility risks of renewable power projects. The EDFI Transfer and Convertibility (T&C) Facility, launched in 2021 and managed with Proparco, provides EU-funded guarantees to protect investors in the renewable energy sector from losses caused by government-imposed restrictions converting local currency into hard currency or repatriating hard currency outside of the country. Covering up to 12 months of debt payments, it supports projects in 48 African countries by financing reserve accounts, helping mitigate FX-related risks and encouraging local currency financing in fragile markets (European Commission, 2021^[56]; OECD, 2025^[57]).

Sovereign guarantees

Sovereign guarantees are mostly used to attract investments in generation by independent power producers, especially in countries that are perceived as risky. They usually cover risks related to failure of governments or SOEs to meet their PPA obligations, unilateral changes in tax treatment, termination, currency inconvertibility and transfer restrictions (IRENA, 2020^[58]). When sovereigns backstop sub-sovereign and SOE commercial obligations, it creates contingent liabilities for them.

An innovative example of the use of sovereign guarantees for renewable energy projects is the South African Energy Bounce Back (EBB) Loan Guarantee Scheme (analysed in Case Study 6 in Annex A). The South African government launched the EBB Scheme in 2023 to address the challenges of load shedding and unreliable power supply by promoting small-scale solar rooftop investments by households, SMEs and ESCOs. The National Treasury provided a sovereign guarantee to the South African Reserve Bank (SARB), which then lends to participating banks. The guarantee covers 20% of losses from loans on a first loss basis, thereby reducing the perceived risk and increasing capital availability for rooftop solar investments. This scheme complemented tax incentives for solar installations. The EBB scheme was part of broader package of policy reforms to enhance energy security and promote a low-carbon transition.

The case study on the EBB scheme shows that sovereign guarantees can be more effective when combined with other public incentives, like tax rebates. Integrating such schemes into broader policy reforms aimed at energy security and low-carbon transitions can provide sustainable benefits.

Sovereign guarantees for renewable energy projects are usually issued by Ministries of Finance. The process of applying for and obtaining a sovereign guarantee can be lengthy. In Indonesia, as part of a government effort to accelerate the development of infrastructure projects, a government-owned agency was set up, Indonesia Infrastructure Guarantee Fund, to provide sovereign guarantees to PPP projects and conduct project preparation. Combining guarantee provision and project preparation under the same entity can improve project bankability and likelihood that the project materialises.

In recent years, sovereign guarantees became increasingly difficult to obtain, mainly due to their fiscal implications. The use of sovereign guarantees requires careful fiscal management and robust assessments to ensure efficient and strategic use of public funds, additionality and avoid windfall effects. Some countries have increasingly opted for lesser-

known alternative options, such as PCOAs, as discussed below. Donors, DFIs and MDBs can provide support to countries with limited fiscal space and constraints to increase contingent liabilities related to sovereign guarantees. For example, MDBs can provide loans to treasuries or guarantees to cover risks of non-honouring of sovereign financial obligations.

Put and call option agreement (PCOAs)

PCOAs are commercial contracts that provide financial security and risk mitigation to private investors in the energy sector. PCOAs grant investors the right to sell their power plants to the government at a predefined price in case of government protracted default on contractual obligations. This type of contract is used to replace PPA termination clauses and direct sovereign guarantees.¹⁴ PCOAs include a put option allowing shareholders to require the government to buy project assets in case of default and a call option enabling the government to require shareholders to sell the assets.

The PCOA is an innovative risk mitigation tool, used in major power projects in countries such as Nigeria and Ghana, which establishes direct contractual obligations between the host country and the project shareholders. This agreement provides a mechanism for investors and lenders to exit the project and recover their investments following a termination trigger event, without the government recording it as a liability on its balance sheet.

The government of Chad is currently considering a PCOA to support its first solar IPP, the Djermaya Solar project (see Case Study 7 in Annex A). This project secured senior lending pre-agreements as well as a PRG from DFIs, although it has not yet achieved financial close. The PCOA is a critical component of this project, since it provides confidence to investors and enables the government to provide security without incurring into contingent liabilities.

The project in Chad highlights the importance of innovative risk mitigation tools and strong government support, while also acknowledging the limitations of PCOAs, such as the complexity of their legal documentation and negotiation processes. In the case of this project, an additional liquidity instrument (here a PRG) has been requested, and a stable regulatory environment is needed for long-term success. These limitations suggest that PCOAs are more suitable for large-scale renewable energy projects in countries with high political risks, low renewable capacity, and no possibility of providing sovereign guarantees or Political Risk Insurance (PRIs).

Currency risk hedging

Currency hedging products play an important role in mitigating foreign exchange (FX) risk for renewable energy projects in EMDEs, where currency volatility can significantly undermine project viability. These projects often need to procure equipment that is denominated in hard currencies like USD or EUR – while power systems collect tariffs from users in local currencies. This currency mismatch exposes utilities, project developers and investors, to the risk that local currencies may depreciate over time, increasing the cost of,

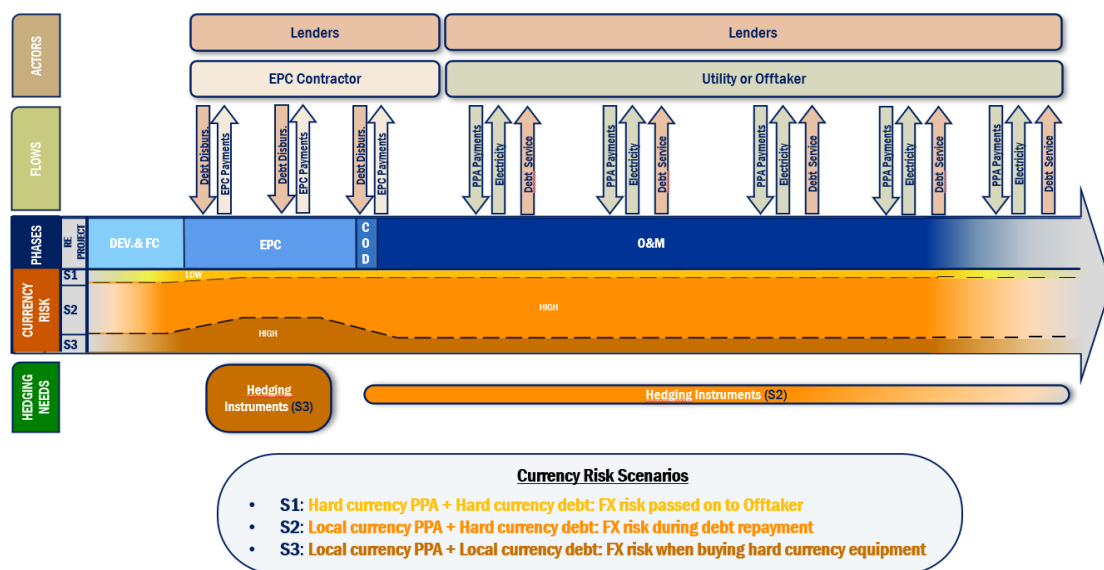
¹⁴ PPAs typically include termination clauses that allow investors to exit the agreement if the government fails to meet its obligations. However, these clauses can be complex and challenging to enforce. Direct sovereign guarantees, on the other hand, explicitly cover the financial obligations of the project, which can strain public finances.

respectively, paying foreign-denominated PPAs for utilities, or repaying foreign-denominated loans and reducing the value of repatriated returns for project owners.

The presence and severity of FX risk in a renewable energy project depend on several factors, namely the currency in which the PPA is denominated and the currencies of the project's liabilities and operational expenditures. Figure 9 below illustrates an IPP's exposure to FX risk under three scenarios:

- Scenario 1 (S1): both the PPA and IPP's debt are denominated in hard currency;
- Scenario 2 (S2): the PPA is denominated in local currency but the IPP's debt is in hard currency, often because relevant tenors and rates are not available in local currency;
- Scenario 3 (S3): both the PPA and IPP's debt are denominated in local currency.

Figure 9. FX currency risk throughout an IPP's renewable energy project lifecycle



Note: COD: Commercial Operation Date; DEV & FC: Development & Financial Close; DISBURS: Disbursement; EPC: Engineering, Procurement and Construction; IPP: Independent Power Producer; O&M: Operation and Maintenance; RE: Renewable Energy.

Source: Authors

In the scenario where both the PPAs and IPP's debt are in hard currency (S1), the IPP faces minimal residual risk, related to labour and maintenance, which are in most cases expenditures denominated in local currency. In this scenario, FX risk is mostly transferred to the offtaker – often a public power utility that collects revenues in local currency. Excessive FX risk for the offtaker can undermine the bankability of PPAs and the viability of IPPs relying on them. In addition, in many EMDEs, local currency PPAs are indexed to hard currency, which protects the IPP from local currency depreciation. This case is similar to the scenario S1, but with additional non-transfer and non-convertibility risks for the IPP. These refer to the inability to convert and repatriate revenues in foreign currency due to government-imposed restrictions or currency shortages, which can severely impact the IPP's ability to service debt or repatriate profits. Products such as PRI, as explained earlier, can help mitigate these risks.

For an IPP, the need for hedging – i.e. buying financial products to mitigate its FX risk – is particularly strong in S2 as its source of revenues (i.e. the PPA) and its primary long-term liability (i.e. debt repayments during the operation phase) are in different currencies.¹⁵ Hedging needs are also significant in S3, as the IPP must procure equipment in hard currency while it gets local currency from its lenders, although this FX risk spans over a shorter period of time (the procurement phase).

Currency hedging instruments, such as forwards, swaps, and options, help manage FX risk by locking in exchange rates or offsetting potential losses from currency fluctuations. However, in many EMDEs, local financial markets are underdeveloped, and long-term hedging products are either unavailable or prohibitively expensive. One solution is offered by actors like TCX, a development finance initiative that offers non-deliverable cross-currency swaps and forward contracts. These instruments convert hard currency development lending into local currency-denominated lending, focusing on markets where commercial hedging operations are either inadequate or absent. TCX enables local currency financing by absorbing FX risk, particularly in scenarios where PPAs are denominated in local currency and debt is in hard currency (S2) or in distributed renewable energy projects. As an example, TCX hedged Acumen's investment in Yellow Malawi, an off-grid solar company in Malawi (TCX, 2025^[59]). Acumen extended a blended-currency two-tranche loan, of which the first tranche was worth USD 1 million and was disbursed in USD to Yellow Malawi, who will repay in Malawian Kwacha, whereas the second tranche was disbursed and repaid in USD (Acumen, 2024^[60]). Acumen received a subsidy from the TCX EU Market Creation Facility to reduce hedging costs by 5% (TCX, 2025^[59]). This Facility enables TCX to reduce hedging costs for borrowers in the riskiest markets, thanks to guarantees from the European Fund for Sustainable Development Plus (EFSD+), implemented through KfW.

From a system-wide point of view, the scenario with a local currency PPA and local currency debt (S3) creates the least FX risk. In this case, the utility bears no FX risk, and the IPP's FX risk exposure is limited to the period between financial close and the procurement of equipment in hard currency. This risk can either be transferred to the EPC contractor through an EPC contract in local currency, or it can be hedged by the IPP using forward contracts based on expected payment dates for equipment, or it is sometimes taken by project's sponsors. While S3 is an optimal scenario as FX risk is minimised, a key challenge to its materialisation in many EMDEs remains: Long-term local currency financing for renewable power projects is often unavailable or expensive, due to limited depth of local financial and capital markets and risk-aversion of domestic investors. Only a very small share of clean energy projects is financed in local currency, with the majority financed in hard currency (OECD, 2024^[61]). Local currency PCGs (explored earlier) can be useful tools to develop domestic capital markets.

Overall, a PPA and debt structure that combines local and hard currency could reduce FX risk. Increasingly PPAs in EMDEs are structured with a mix of local and hard currency to better reflect the typical cost structure of IPPs: local currency for labour and maintenance, and hard currency for equipment.

¹⁵ In S2, hard currency loans can be swapped by the IPP or by the bank to lend in local currency, if the market offers such swaps.

5

Guarantees and other risk mitigation instruments for energy efficiency

This chapter analyses different guarantee and other risk mitigation instruments for energy efficiency projects based on a literature review, interviews with practitioners, a series of case studies and CEFIM's Needs Assessment studies for Energy Savings Insurance schemes in India (OECD, 2024^[62]) and Indonesia. The instruments under the scope of this analysis and selected case studies are presented in Table 3 below. Annex A provides more details about the selected international case studies.

Table 3. List of analysed instruments and case studies

Type of instrument	Case studies				
	Guarantee/insurance provider	Sector	Country	Guaranteed instrument / Insurance cover	Case study # in Annex A
Partial credit guarantees: Local currency, first loss portfolio guarantee	World Bank	Large-scale industries, MSMEs, municipalities, buildings	India	Loans	8
Political Risk Insurance	MIGA	Public lighting	St. Lucia	Equity investment and commercial loan	9
Energy Performance Guarantees	ESCOs	Industry, buildings, municipal services	Worldwide	Energy savings performance	Discussed as part of case study #10
Energy Savings Insurance	SURA	SMEs	Colombia	Energy savings performance	10

Energy Insurance	Efficiency	HSB/ Munich Re	Commercial Buildings	UK	Material damage, loss of revenue, energy savings performance	11
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Source: Authors.

Guarantees and other risk mitigation instruments used for financing energy efficiency projects may differ from their application for renewable energy projects. This is due to differences in project size, business and revenue models, risk perception and collateral value, amongst other factors. Compared to renewable energy projects, energy efficiency investments are also characterised by a higher level of complexity, often requiring the utilisation of multiple technologies and processes in the same project or facility, which makes scaling up more challenging, often higher upfront investment compared to less efficient technologies, and competing investment priorities particularly of smaller actors.

As the analysis of blended finance deals using guarantees and insurance for clean energy from the Convergence Market Data in Chapter 2 shows, these instruments remain relatively underutilised for energy efficiency. Out of 78 recorded deals between 2015 and 2024, only 12 were used for energy efficiency (15% of deals) with aggregate financing of USD 3.5 trillion (24%), compared to 22 clean energy deals¹⁶ (28%) of USD 3.1 trillion, and 44 renewable energy deals (56%) with aggregate financing of USD 7.8 trillion. Over 80% of aggregate financing for energy efficiency was mobilised through large-scale deals in four countries, demonstrating the significant impact of a limited number of large-scale transactions. This becomes even more apparent for clean energy projects combining renewables and energy efficiency, where only three deals accounted for two thirds of aggregate blended financing mobilised. Over the timeframe 2015-2024, 13 concessional guarantees were issued for energy efficiency, with 77% provided by development agencies or multi-donor funds, and 23% by DFIs/MDBs.

New initiatives hold promise to scale up energy efficiency financing and de-risking solutions. The new one-stop-shop guarantee platform to leverage commercial capital, for instance, which is housed by MIGA, includes credit guarantees, political risk insurance and trade finance guarantees. Nonetheless, while the World Bank has deployed guarantees to support energy efficiency in several markets, including Colombia, India and Vietnam, to date only the Partial Risk Sharing Facility (PRSF) in India was able to overcome perceived market risks (World Bank, 2025^[63]) and contribute to more sustainable local lending portfolios for energy efficiency projects.

Credit Risk Guarantees

Credit risk guarantees, often in the form of partial credit guarantees (PCGs), are often provided by international financial institutions (IFIs) or governments to local financial institutions to provide credit enhancement or tenure extension to energy efficiency projects. They are often backed by government or IFI resources and can be provided through public energy efficiency investment programmes to support nascent energy efficiency markets, strengthen skills and reduce risk perceptions of local financiers. To enhance the uptake and effectiveness of PCGs, they can be combined with financial and non-financial incentives such as grants and technical assistance, as well as capacity building and further support policies. Between 2015 and 2024, one third of blended finance energy efficiency deals that were recorded by Convergence included a combination of concessional guarantees and technical assistance funds.

Partial credit guarantees (PCGs) denominated in local currency have been used to de-risk and mobilise local financing with the aim to familiarise local financial institutions with energy efficiency projects and help develop the market. Here, the guarantor enters into credit guarantee agreements with participating local

¹⁶ Clean energy deals referring to both renewable energy and energy efficiency

FIs, determining eligibility criteria and guarantee coverage for a loan portfolio. Local FIs then provide credit lines for eligible energy efficiency projects.

The **Partial Risk Sharing Facility in India** (see Case Study 8 in Annex A) is an example of a first-loss local currency credit guarantee facility. The PRSF is focused on rupee-denominated loans provided by participating local financial institutions and offers first-loss coverage for up to 75% of the loan principal in case of borrower default. With funding from the Global Environment Facility (GEF) and the Clean Technology Fund (CTF), the portfolio risk sharing facility covers multiple energy efficiency projects across participating financial institutions, thereby helping them manage and mitigate credit risk associated with a portfolio of assets, while also providing technical assistance and capacity building to FIs and project developers. The first loss coverage mitigates the risk of local FIs associated with lending to ESCO-led energy efficiency projects by significantly reducing the loss in case of payment default and encouraging lending to energy efficiency projects. First loss guarantees can be costly for the guarantor in having to set aside sufficient capital to cover potential losses, often translating to higher guarantee fees. In the case of the PRSF, the annual guarantee fee amounts to only 0.5-1% depending on the guarantee loan amount or exposure, and on the grading of the ESCO.

Portfolio guarantees can be used to derisk clean energy investment portfolios of (local) financial institutions, funds or other financial intermediaries, thereby enabling access to financing for projects that would otherwise be perceived as too risky or not bankable. Particularly for smaller scale energy efficiency investments, this aggregation enables the mobilisation of capital at scale and can attract multiple investors while reducing transaction costs for individual projects. Similar to the PRSF in India, the China Utility-Based Energy Efficiency Finance (CHUEE) Programme provides a risk sharing facility where, in cases of default, IFC covers a portion of loans that participating local banks extend to sustainable energy projects, and also provides technical assistance (World Bank, 2024^[64]). Further examples include the IFC's portfolio risk sharing facility under the Sustainable Energy Finance Programme in Thailand. Sida's portfolio guarantee for the Mirova Gigaton Fund (MGF), which first addressed renewable energy projects and then also expanded to energy efficiency and electric mobility, is another example of a portfolio guarantee attracting multiple investors and mobilising capital at scale for a multitude of aggregated smaller-scale projects (see Case Study 4 in Annex A).

Credit risk guarantees can help to temporarily support energy efficiency improvements, including in low-price environments that typically provide little incentive for efficiency enhancement, if their cost is lower than the reduction in the lenders' risk margins that they trigger. In the long run, however, energy efficiency market development needs to rely on cost-reflective energy pricing and a supportive policy framework including regulatory measures like minimum energy performance standards with increasing stringency and coverage. Since the credit enhancement is implemented independently from a performance guarantee, credit guarantee schemes are often better suited for larger-scale projects or, as in the case of India, provided through a credit guarantee facility.

Political Risk Insurance

Political Risk Insurance (PRI) is an important risk mitigation instrument for new markets and particularly in countries with high political instability, on-going conflict or volatile regulatory frameworks. PRI products cover political risks related to breach of contract, currency inconvertibility and transfer restriction, expropriation, war and civil disturbance. The utilisation of PRIs for energy efficiency projects appears relatively limited compared to larger scale infrastructure and renewable energy projects. PRI providers can be private and profit-oriented, or public including national export credit agencies (ECAs) or multilateral agencies such as MIGA, several of which have special programmes for small and medium investors, companies and banks from developing countries.

MIGA is one of the major public providers of PRI products, with a green buildings and energy efficiency portfolio of about USD 1.38 billion over the 2021-2024 period. MIGA guarantees supported green buildings and green investments across the SME, building and public lighting sectors (World Bank, 2025^[63]). In 2021, MIGA provided a PRI for an equity investment and commercial loan for a nationwide streetlight modernisation programme in Saint Lucia covering the installation of over 24 600 LED public streetlights (see Case Study 9 in Annex A). As a small island developing state, Saint Lucia faced challenges in securing affordable capital for infrastructure upgrades due to perceived political and commercial risks, limiting its sovereign creditworthiness. The PRI helped reduce investor risks and unlocked capital for a transformative clean energy project in a relatively small market while alleviating the government fiscal burden.

While PRIs cover key political risks, further technical and project risks including low technical and institutional capacity in the host country, supply chain challenges or maintenance challenge might need to be addressed by further support measures to ensure successful project implementation. PRI providers may prioritise larger-scale projects which may not match typical energy efficiency project size.

Energy Performance Guarantees

Energy Performance Guarantees and insurance instruments are used to mitigate technical risks of energy efficiency projects, thereby enhancing the creditworthiness of the investor in energy efficient technology (e.g. an enterprise or public sector entity). Energy performance contracts (EPCs) are typically offered by energy service companies (ESCOs) or technology providers to their clients to fund energy efficiency upgrades through the achieved cost savings. Depending on the contracting modalities, EPCs can allow clients to implement energy efficiency improvements without upfront investment and shift liquidity requirements from the client to the ESCO. Nonetheless, access to finance remains one of the biggest barriers to ESCO market growth. The most used EPC models are either based on guaranteed savings or on shared savings in both private and public sector ESCO projects. Nonetheless, a diversity of contracting modalities exists in many markets, with a higher prevalence in private sector projects. Typical contract duration varies considerably between ESCO markets; in the majority of markets, the average duration of public sector projects is around 10 years. Private sector contracts tend to have a shorter duration, on average 6.7 years across surveyed markets, indicating a stronger focus on replacement of selected technologies like HVAC or lighting systems rather than comprehensive energy efficiency retrofits that would typically require longer payback periods (UNEP-CCC, 2025^[65]).

Under an EPC with guaranteed savings, the ESCO guarantees a certain level of energy savings over a defined period of time to the client and bears the performance risk. If actual savings fall short of the guaranteed level, the ESCO compensates the customer for the difference. While these contracts offer more predictability and lower performance risk for the client, the customer typically secures financing for the project, therefore bearing the credit risk while making repayments from the energy cost savings. This requires that the client is willing to spend accessible capital on energy efficiency rather than their core business, which can constitute a barrier. Under shared savings EPCs, the ESCO usually secures financing and shares the achieved cost savings with the client based on an agreed percentage, yet without a minimum savings guarantee. The ESCO therefore shares the risk with the client and is more incentivised to maximise savings, and often finances the project. Access to capital or financing for ESCOs can constitute a market barrier, as they do not own the facilities where an energy efficiency project is implemented, and therefore cannot fulfil requirements for collateral by financial institutions. In practice, EPCs may be a blend of both guaranteed and shared savings, with the ESCO or the client securing the investment. EPCs can also be combined with an ESI or EEI product.

Key barriers to financing ESCO projects and the wider adoption of EPCs include policy uncertainty, payment risk on the client's side, as well as limited understanding of ESCO business models and risk aversion among lending institutions that can restrict access to financing for ESCOs. Particularly in less

mature markets, this is often combined with a lack of trust in ESCOs, a lack of information on service offerings and performance, and often missing independence of the performance review of ESCOs and the implemented projects. Debt financing remains nonetheless the dominant financial instrument used for ESCO projects, whereas financial guarantees are underutilised across ESCO markets worldwide (UNEP-CCC, 2025^[65]).

While ESCO contracts with guaranteed savings mitigate the risks of energy efficiency projects, the complexity of the contracts (e.g. with regards to performance metrics, monitoring and verification protocols of energy savings) and the need for the client to obtain financing may discourage particularly smaller sized clients with limited in-house expertise and without strong credit rating or debt capacity. Strict public procurement and accounting rules and approval processes can constrain the use of EPCs in the public sector. Guaranteed savings contracts provide ESCOs an incentive to meet their savings guarantee, and can include penalties for underperformance or bonuses in the form of shared additional savings for overperformance. Such contracts work well for projects with quantifiable and predictable savings, e.g. through technology upgrades. Capturing the savings achieved through operational measures or behaviour change can be more difficult to achieve and verify.

Newer contracting models like As-a-Service (AaS) models also reduce risk for the client and address the financing barrier, as the client pays a recurring – typically monthly – subscription fee for the energy services received (e.g. lighting or cooling) instead of making an upfront investment. Such pay-as-you-go or pay-per-use models typically go beyond leasing or renting contracts by bundling services together with equipment. This allows the client to access state-of-the-art energy efficient technologies and solutions without upfront investment, and to better adapt the service offerings to their needs. This enables better scalability, particularly to small project sizes. The technology or service provider finances, owns, operates and maintains the equipment. For AaS contracts, the contracted energy performance can refer to the agreed delivery of energy services, such as lighting or cooling. Common models include lighting, energy management, heating/cooling or battery storage as-a-service, as well as combinations thereof. As-a-service contracts might, however, not be suitable for clients with strict and formalised procurement rules like in the public sector. Further limitations include potential long-term costs for the services obtained, limited control over energy systems and operations for instance in the case of energy management as-a-service, and higher dependency on the services provider. As-a-service contracts benefit from but also require a higher level of digitalisation than EPCs.

Energy Savings Insurance

The energy savings insurance (ESI) model aims to catalyse investments in energy efficient technologies and systems by small and medium-sized enterprises (SMEs) by creating trust and credibility among involved actors. SMEs constitute about 90% of businesses worldwide, which represents a significant opportunity for energy efficiency improvements. Nonetheless, SMEs are particularly affected by the often higher upfront costs of energy efficient technologies and systems, competing investment priorities, limited capacities and financial resources but also limited access to financing, as well as high risk perceptions which can create unrealistic risk-return expectations (Basel Agency for Sustainable Energy (BASE), 2024^[66]). While credit guarantees primarily mitigate financial risk for lenders by covering loan defaults or credit risks, ESI specifically lowers the upfront investment barrier and addresses performance risk by ensuring that the promised energy savings are achieved.

The ESI model was initially introduced in Latin America in 2015 by the Interamerican Development Bank (IDB) in collaboration with the BASE to support energy efficiency investments in SMEs and energy efficiency market development in emerging markets. It is now being replicated in several emerging and advanced markets in Europe, Asia and Africa. While conceptualised by development actors and initially

supported with concessional financing, ESI would need to become a commercially available product to ensure its sustainability in the long run.

The ESI model was successfully pioneered in Colombia to support energy efficiency investments in SMEs, initially in the health and hospitality sectors, then expanding to further sectors (see Case Study 10 in Annex A). By 2024, SURA successfully issued more than 600 ESI policies across the services, commercial and manufacturing sectors. The ESI programme was then expanded to Mexico and El Salvador, where it mobilised USD 21 million across 84 energy efficiency projects by 2023, and five other Latin American countries. Starting in 2018, the ESI model has been deployed in six countries in Europe, also targeting the SME sector, and since 2022 it has been introduced in Mongolia and Morocco (Basel Agency for Sustainable Energy (BASE), 2024^[66]). Further countries in Asia, including India and Indonesia are working with the OECD CEFIM Programme to assess market needs and implementation opportunities for an ESI model.

The ESI model comprises a package of financial and non-financial elements, which effectively address some of the prevalent market barriers for financing energy efficiency improvements. They include high risk perception related to the uncertainty of achieving the promised energy savings, lack of transparency and data on energy performance in the market, and limited access to financial resources. The elements of an ESI package include:

- An **energy savings insurance product** (typically a surety bond or a bank guarantee) at its core. ESI is often based on a surety bond, which acts as a guarantee that the insurance company assumes responsibility for compensating the client in the event that the debtor (i.e. ESCO) defaults on the guaranteed savings and is unable to make payments.
- Complementary elements, which include (i) a **standardised and simplified energy performance contract with guaranteed savings** establishing clear responsibilities and commitments between the beneficiary and the energy service/technology provider as well as measurement and verification procedures, (ii) an **independent technical validation** process to confirm the savings potential and proper installation and thereby enhance trust, (iii) **financing options** which may include credit lines from development banks or other FIs for green loans, other concessional loans or grants, and sometimes (iv) an **online platform** to track energy savings and facilitate the exchange of information and documents between involved parties. The standardised contract with guaranteed savings lowers transaction costs and passes performance risk to the technology provider. The ESI policy provides risk coverage for the enterprises in the event that the promised savings do not materialise.

The ESI was recognised by the Global Innovation Lab for Climate Finance in 2015 as promising instrument to mobilise private sector investment in energy efficiency (Climate Finance Lab, 2015^[67]). The Lab's analysis concluded that the instrument can absorb up to 80% of the underperformance risk. The ESI model is also comprised in the G20 Energy Efficiency Investment Toolkit, developed under Germany's G20 Presidency in 2017 (G20, 2017^[68]).

The ESI model has predominantly been applied to energy efficiency projects in the SME sector.

While there is no minimum or maximum project size for the application of the ESI model, typical project sizes in the SME sector range up to EUR 1 million, with representative ranges between EUR 100 000 and 400 000. The main costs related to the ESI model that need to be absorbed are (i) insurance fees, which typically range between 1.5-2% of the insured amount, and (ii) technical validation costs which depend on the specific market and service fee of the involved validation entities. Based on experiences from Europe, these can constitute around 2-5% of the investment considering the average investment size of EUR 1 million. In order to absorb these additional costs without inflating the total cost of an energy efficiency project, suggested minimum investment amounts range between EUR 20 000 for emerging markets like Colombia, Mexico and others in Latin America as well as Mongolia, or around EUR 50 000 in the European context (Basel Agency for Sustainable Energy (BASE), 2024^[66]).

Key learnings of the ESI model implementation across different markets include:

- The application of the ESI model across different markets and sectors demonstrates its adaptability and scalability.
- Existing surety bonds or similar established insurance products can be adapted towards an ESI product with little effort. In markets where surety insurance does not exist or is not used in practice, the involvement of reinsurance companies or international insurance brokers with local underwriters can support the initial uptake of the ESI. Bank guarantees can be provided as an alternative option, although with disadvantages for the balance sheet of the technology provider.
- The eligibility of technology providers or ESCOs needs to be verified based on a defined set of minimum qualification requirements during the underwriting process.
- Integrating the ESI product as a requirement for financing and the availability of green and concessional financing were important market drivers in some markets. Complementary support measures were, however, needed in several cases to ensure market uptake.
- Effective stakeholder co-ordination, awareness raising and the mobilisation of first adopters are important to ensure the uptake of ESI. The model requires tailoring to the specific local context and benefits from the provision of additional support measures including incentives.

Energy Efficiency Insurance

Commercial insurance products focusing on risk transfer for energy efficient technologies and systems exist in different forms from different providers, often developed for more mature markets such as the United States (US), the United Kingdom (UK) and selected European markets including Germany. **The Energy Efficiency Insurance (EEI)** is a commercial product offered by Hartford Steam Boiler Inspection and Insurance Company (HSB), a specialised engineering and technology insurance provider, which is part of reinsurer Munich Re. EEI can act as an instrument for credit risk enhancement, which removes the technical uncertainty for lenders/FIs and allows them to concentrate on the borrower credit risk. The insurance also aims to reduce financial exposure, resulting in improved creditworthiness of the borrower and often leading to lower interest rates and financing costs.

The EEI product addresses financing barriers related to technical uncertainties and protects loan repayments for financial institutions. Coverage extends beyond an energy savings insurance product, covering material damage to installed systems including equipment breakdown, business interruption and asset performance. Business interruption protects against the loss of gross revenue and increased costs of working in the event of equipment failure. Insurance for asset performance covers the annual shortfall in the energy savings achieved compared to the amount of savings insured by the policy. It covers a shortfall caused by deficiencies in the design or the implementation of energy savings measures, subject to a project audit. This instrument helps to improve confidence in the insurance-backed savings and can lead to reduced operating costs for the client through the achieved energy savings. Energy service providers can benefit from asset, revenue and performance protection as well as an improved creditworthiness, which often translates into lower cost of financing.

The EEI was designed by HSB for the UK and Ireland due to a reluctance of banks to finance energy efficiency projects and the requirement to secure loans against future cost savings following the installation of energy efficiency measures. The policy is designed for investors in energy efficiency measures, ESCOs and financiers of energy savings projects, and available for up to five years for commercial buildings. Its implementation in the UK shows that insurance coverage can improve access to financing for energy efficiency projects. The energy efficiency retrofit of a five-star hotel demonstrates how customised insurance products can unlock comprehensive energy efficiency retrofits in commercial buildings (see Case Study 11 in Annex A).

The availability of EEI products is very limited in terms of scope and markets, offering coverage for commercial buildings in the UK, Ireland and the US as well as India. As a commercial product, the EEI does not provide additional support in the form of technical assistance for project developers and/or financiers, which might be needed in less developed market.

6

Limitations to the use of guarantees and other risk mitigation instruments for clean energy

As discussed in chapter 2, guarantees and other risk mitigation instruments have not always lived up to expectations, especially in terms of amount of private finance redirected towards EMDEs. This chapter examines the main challenges, barriers and limitations related to the use and uptake of risk mitigation instruments for both renewable energy and energy efficiency in EMDEs. Evidence reveals that there are both weaknesses in existing risk mitigation products and issues with commercial financiers' expectations and risk perception, as discussed below.

Complexities associated with risk mitigation instruments

The transaction costs associated with deploying risk mitigation instruments are often substantial, which can deter stakeholders from using them and can limit the financial viability of small-scale projects. Transaction costs can include fees for legal services, due diligence, administrative expenses, and the time required to negotiate among the multiple parties involved in guarantees (see Annex C for more details on financial efficiency of guarantees).

The terms and conditions for claiming guarantees and insurances vary across providers, adding another layer of complexity. For example, the process of claiming guarantees provided by MDBs can be lengthy and opaque (depending on the contractual terms) (Citi, 2023^[69]).

Pricing guarantees and insurance products is an inherently complex exercise, exacerbated by lack of comprehensive data. In fragile contexts or for innovative technologies, guarantee fees might need to be subsidised. Guarantees and insurance products impose additional costs on borrowers. Where there is strong additionality and significant development impact, subsidising guarantee fees – by governments, donors, DFIs, or MDBs – may be justified.

Guarantees and other risk mitigation instruments often do not solve underlying, standalone credit risk issues or fix structural financial weaknesses. For instance, a PCG can only improve the borrower's financial health insofar as it gives access to financing and improves financial terms and conditions. A PRG covering PPA payment risk will only improve the offtaker's standalone risk profile insofar as it makes investment in new cost-competitive generation possible. Although guarantees do not directly change the underlying credit risk, they can contribute to change risk perceptions.

The guarantees' effect alone on market development can be limited and needs to be accompanied by complementary financial and non-financial support measures (such as grants, concessional loans and technical assistance), and an enabling regulatory environment. While guarantees can effectively catalyse and scale clean energy markets, sustained market development requires strategic policy interventions and co-ordinated support measures like technical assistance and capacity building.

Challenges related to unintended consequences of financial regulations

Elements of international financial regulatory frameworks may have unintentionally constrained cross-border investment flows for clean energy to EMDEs. While prudential rules developed after the 2008 Global Financial Crisis are crucial to preserve financial stability, increasing evidence suggests that capital, liquidity and solvency requirements set up as part of Basel III and Solvency II may have unintentionally limited long-term debt financing to capital-intensive infrastructure projects such as renewable power projects in EMDEs (Ang, Rottgers and Burli, 2017^[70]; Institute of International Finance, 2025^[71]; Risk Control, 2020^[72]; ICC, 2025^[73]). This is linked to three main issues: (i) the treatment of risk mitigation instruments in capital relief and liquidity standards; (ii) the differentiated treatment amongst jurisdictions; and (iii) the treatment of project finance exposures (OECD, 2025^[13]). The sections below aim to provide further information on these issues and propose enhancements in the regulations' implementations, and do not seek to analyse or question the relevance of existing financial regulations for financial stability.

Basel III sets out the framework regulating how banks can shift the risk weight assigned to a MDB guarantee-covered credit exposure from that of the original obligor to that of the guarantor (Basel Committee on Banking Supervision, 2020^[74]). However, **Basel III's eligibility criteria on guarantees do not fully match the conditions of guarantee products issued by development finance institutions.** A study by the Milken Institute and the OECD analysed a sample of guarantees extended by bilateral and multilateral providers and found that guarantees' conformity with the Basel III framework produced a weighted average score of 4.3 out of 5, suggesting overall high alignment with Basel's risk weighting standards (Lee, Betru and Horrocks, 2018^[75]). The study found that the area of non-conformity is primarily related to the 'unconditional' applicability of the guarantee as set out by Basel III, which does not allow the guarantor to cancel the guarantee for a reason other than for breach of contract. This can limit capital relief.

Requirements for a risk mitigation instrument to qualify as eligible credit protection include timely payout. If a default occurs, any provision in the guarantee contract which could prevent the protection provider from being obliged to pay out in a timely manner must allow for the direct control of the guarantee

beneficiary. Political risk insurance products often require an arbitral award before payment. Credit guarantees may have waiting periods before the guarantor pays out, to seek alternate solutions to the payment default scenario. There is no specific guidance as to what qualifies as timely payment, however many risk mitigation products used in the clean energy space may not qualify despite effectively mitigating risks.

Basel III does not explicitly recognise the treatment of guarantees issued by providers other than MDBs (e.g. foundations). The list of MDBs recognised under the Basel Framework excludes newer institutions with strong credit ratings and mandates aligned with climate finance, such as GuarantCo (rated AA by Fitch) and the Central American Bank for Economic Integration (rated AA by S&P) (ICC, 2025^[73]).

Furthermore, impacts of country risk must be considered under Basel III. **Banks must apply a country risk ceiling** (the maximum credit rating that any entity within a country can receive) and risk-weight floors (a minimum percentage risk weight that regulators require banks to apply) to corporates or projects in lower-rated jurisdictions (ICC, 2025^[73]). As a result, if a commercial bank wants to lend to a solar energy project to a country rated B-, the project would still entail at least a 100% capital charge due to the country's sovereign rating despite the project having risk mitigants such as being co-financed by a MDB, benefiting from a MIGA political risk insurance against currency inconvertibility and breach of contract, and a long-term power purchase agreement with a multilateral-backed utility.

Some **blended finance structures may also have further capital relief limitations** under certain regulations like the EU Securitisation Regulation¹⁷ (UNEP FI and PRI, 2021^[76]). If blended finance structures are classified as securitisations under this regulation, it could lead to substantial negative consequences for European Solvency II regulated investors. These can include increased capital charges and asset managers who would face retention rules and additional reporting obligations. Insurance companies face a regulatory 'cliff' that prevents them from investing in higher risk/sub-investment grade, less liquid assets under Solvency II (ODI, 2024^[77]).

The Basel III liquidity standards require banks to hold an amount of High-Quality Liquid Assets (HQLA) that fully covers expected cash outflows. SDG-aligned investments covered by guarantees do not currently always qualify as HQLA due to their lack of transferability and tradability (Garbacz, Vilalta and Moller, 2021^[19]). The guarantees evaluated in the 2018 study for example, do not allow a sale, transfer, or assignment without prior written consent other than, in some cases, to specific types of eligible entities (Lee, Betru and Horrocks, 2018^[75]). Moreover, many guarantees are structured to rely on the credit analysis capabilities and risk participation of the guaranteed party. Guarantee providers need to conduct due diligence on their guaranteed parties, limiting the liquidity of the instruments.

Countries that have adopted Basel III rules have followed different timelines for implementation, creating some uncertainty for financial institutions. Countries that have not adopted Basel III may have varying provisions to account for the implications of guarantees. Insights from interviews indicate that financial institutions, for instance in Africa, often face uncertainty regarding the criteria for regulatory relief associated with guarantees.

Current regulations do not fully capture the implications of partial risk guarantees (PRGs) and other risk mitigation instruments. As opposed to credit risk guarantees, which cover a portion or all of the risk of default and are accounted for through a credit substitution approach or modelling approach, PRGs only cover one specific risk (often the offtake risk). Capital relief could only be granted through a transaction credit rating, while it will not be fully reflected in a corporate credit rating. Furthermore, there is no commonly agreed methodology to calculate capital relief provided by such instruments – although they are

¹⁷ The 'EU Securitisation Regulation' refers to Regulation (EU) 2017/2402 laying down a general framework for securitisation and creating a specific framework for simple, transparent and standardised securitisation as amended by Regulation (EU) 2021/557 (UNEP FI and PRI, 2021^[76]).

designed to minimise the probability of a borrower defaulting (PD). More generally, Basel III currently does not recognise borrower-level mitigants in project finance transactions (ICC, 2025^[73]). FX hedging and power purchase agreements are not fully taken into account. Such exclusion could undermine the effect of risk mitigants and disincentivises the bank's participation.

Regulations such as Basel III do not recognise the double default effect. This refers to a positive effect of guarantees, which is not considered when calculating capital requirements. A truly risk sensitive model would recognise that default risk of the guarantor is only an issue when the original obligor is also in default. When defaults of the obligor and the guarantor are fully independent (i.e. no correlations between their respective credit risks – in the few cases in which this independence can be easily demonstrated), capital requirements could be based on a PD that equals PD of the obligor times PD of the guarantor. This value would in practice be considerably smaller than either of the PDs. The difference between these numbers is called the double default effect (BIS, 2025^[78]).

European state aid legislation may discourage European donors from providing concessional finance to European funds (Convergence Blended Finance, 2024^[40]). Such financing or guarantee provision may be considered unaligned with the regulations.

Some MDBs apply the same capital adequacy rules to guarantees as they do to loans, despite the differing levels of capital at risk for these two instruments. For example, the Inter-American Development Bank (IDB) and IDB Invest have capital rules that mandate allocating the same amount of capital for a guarantee as for an equivalent loan (Inter-American Development Bank, 2022^[79]). MDBs may be hesitant to alter such policies, as doing so could prompt a review of their credit ratings. Therefore, discussions with Credit Rating Agencies (CRAs) will be necessary to better understand the potential impact of these changes on MDBs' credit ratings.

Difficulties related to financiers' approaches

Commercial financiers' reliance on market benchmarks means that the pricing of financial products does not always fully account for the reduced risk provided by risk mitigation instruments. Institutional investors and banks often determine the pricing of their financial products by referring to market benchmarks – and not only considering the Probability of Default (PD) and Loss Given Default (LGD) to define risk margins. Market benchmarks can be standardised rates or indices that reflect the average cost of borrowing or lending in the market. However, this approach has limitations when it comes to incorporating the effects of guarantees and other risk mitigation instruments. This disconnect can lead to a situation where the benefits of such instruments are not fully passed on to the borrowers and the financial products may be priced higher despite reduced risk. This can limit the effectiveness of guarantees in making financing more affordable and accessible.

In transactions where credit enhancement improves credit rating, many actors still price a premium related to country risk in EMDEs, partly due to a lack of confidence in the legal system's efficiency to facilitate the recovery process in the event of non-payment. This perception can stem from concerns about the speed and fairness of legal proceedings, the enforceability of contracts, and the overall effectiveness of the judicial system in handling financial disputes. This means that for similar LGD, interest rates can remain higher in EMDEs than in developed economies, despite the credit enhancement.

In high-risk transactions, such as those rated CCC or B-, risk mitigation instruments can uplift credit profiles, but the resulting credit rating often remains in speculative grades. For such asset classes, investors expect high returns that are difficult to achieve in many sectors. Institutional investors also price in illiquidity and complexity premia, as well as premia for small-sized deals (typically under USD 300 million). Furthermore, international lenders and investors are not always familiar with EMDEs, nor with

blended finance and guarantees. This unfamiliarity may lead to overly conservative approaches, with investors not valuing geographical diversification enough.

Some MDBs and DFIs tend to prioritise loans over other financial instruments such as guarantees.

This focus often results in a limited number of expert staff who are knowledgeable about guarantees and insufficient incentives for staff to promote and extend guarantees (ADB, 2017^[80]; EBRD, 2020^[81]; Inter-American Development Bank, 2022^[79]). This situation can lead to underutilisation of guarantees and other risk mitigation instruments.

7

Key takeaways and recommendations

This chapter presents key conclusions and recommendations for different types of stakeholders on the use of guarantees and risk mitigation instruments for clean energy in EMDEs. It builds on analysis presented in the previous chapters (as well as supporting annexes).

Key takeaways

Risk mitigation instruments remain underutilised, despite clear signs of a growing interest. Several donors have shown signs of renewed interest in risk mitigation instruments to support the clean energy transition in EMDEs. This increased attention comes in a context of recently agreed ODA-eligibility of guarantees, international calls for increased private finance mobilisation and declining public financial resources allocated to international co-operation. Nonetheless, the share of private finance mobilised for clean energy in EMDEs through guarantees declined from 51% in 2018 to 21% in 2023, with private finance mobilised averaging USD 2.5 billion over the same period. The products' complexities compared to direct lending, limitations imposed by financial regulations and financiers' risk perception explain part of this underutilisation, while a lack of project pipeline is identified as a constraint by stakeholders in some regions.

Blended finance solutions for clean energy using guarantees and insurance are dominated by large scale transactions, while small-scale clean energy projects face financing bottlenecks. Very large-scale transactions (greater than USD 250 million) accounted for the majority of aggregate blended financing for clean energy through guarantees between 2015 and 2024. This high threshold tends to differentiate large hydropower and very large variable renewable power plants from smaller projects. Even with such a high threshold, the total investment from large transaction is consistently higher than the

aggregate investment in a larger number of small-scale projects. This results from the prevailing design of guarantees and other risk mitigation instruments with high levels of structuring and due diligence, which brings significant fixed costs. Such product design is not suited to smaller transactions, which are essential to the clean energy transitions – yet could provide an opportunity for governments to support the aggregation of smaller projects.

Guarantees for energy efficiency are particularly underutilised. Renewable energy consistently represents most blended finance clean energy deals using guarantees between 2015 and 2024. Energy efficiency deal numbers are significantly lower than renewables and aggregate annual financing backed by guarantees only once surpassed USD 1 billion over the same timeframe. This is linked to the often smaller size of energy efficiency projects, difficulties for lenders in valuing collateral and the prevailing design of guarantees, which is better suited for large-scale transactions. Over the past decade, more than 80% of recorded aggregate blended financing for energy efficiency using guarantees was mobilised through a handful of large-scale deals.

Credit risk guarantees are considered the most relevant tool for both renewable energy and energy efficiency investments by over 60% of respondents to a 2025 OECD survey. This reflects the diversity of sectors, technologies, risks and contexts of the clean energy transitions in EMDEs. Credit risk guarantees are broadly relevant in emerging markets as they cover all causes of default from a borrower, while, for instance, PRGs can address the main barrier to investment in markets where the offtaker or energy efficiency counterpart is too weak to be bankable, and ESI can address performance risks and financing for smaller energy efficiency investments.

Portfolio guarantees are a powerful, yet underutilised tool that can de-risk aggregated small transactions in underdeveloped sectors (e.g. in energy efficiency or distributed renewables). The leverage ratio, comparing public funding to the amount of guarantee issued, is often higher with portfolio guarantees than individual guarantees.

Risk mitigation instruments can be flexible and effective instruments to unlock financing for nascent/innovative clean energy sectors or underdeveloped markets. The case studies (see Annex A) and research show that guarantees and other risk mitigation instruments can be tailored to effectively support emerging solutions for the clean energy transition, such as distributed renewables, energy efficiency in SMEs, corporate PPAs and merchant business models for renewables.

Guarantees for innovative clean energy projects are often accompanied by complementary financial and non-financial support like grants, technical assistance and awareness raising, and embedded in a robust regulatory environment. Financial support mechanisms (such as grants, concessional loans or subsidies on guarantee fees) can be required in cases of high financial and development additionality and underdeveloped markets. Guarantees cannot substitute a strong policy environment ensuring long-term policy stability with minimum standards, transparent permitting processes, and fair market access, which are essential for investor confidence. Technical assistance is crucial for developing the skills and knowledge needed to finance, implement and maintain clean energy projects. Awareness-raising is particularly important when guarantees are employed to de-risk innovative projects that remain unfamiliar to ecosystem stakeholders.

For renewable energy projects, the choice of type of instrument depends on several factors: level of political risk, financial health of utilities, development of the local financial system and capital market and key project characteristics (e.g. size, duration, currency).

- **Local currency Partial Credit Guarantees (PCGs)** have proven effective in unlocking domestic capital by improving loan tenors and financing terms of projects, especially when PPAs are denominated in local currency. They can help to increase local financial institutions' familiarity with renewable power projects' risk profiles and to build domestic green capital markets.

- **Credit guarantees in hard currency** are important de-risking instruments for renewable energy projects, especially when PPAs and debt are denominated in hard currency.
- **First loss guarantees** are instrumental in attracting commercial or institutional capital for early-stage technologies or unproven business models. However, first loss guarantees typically have high capital requirements for guarantors and require complex legal and financial structuring.
- **Portfolio guarantees** allow for risk-sharing across multiple aggregated small- or mid-sized projects or borrowers, enabling capital mobilisation at a larger scale compared to guarantees for individual projects. Their success depends on strong co-ordination and tailored structuring.
- **Partial risk guarantees** are mainly used to cover payment risks under PPAs, e.g. for liquidity instruments such as letters of credit. However, they are flexible instruments that can be tailored to cover specific contractual risks and specific innovative projects (e.g. corporate PPAs).
- **Political risk insurance** is essential for mitigating political risks in politically unstable or fragile contexts, though claims processes can be slow and coverage is often limited to cross-border investments.
- **Sovereign guarantees** are still a dominant de-risking tool in many EMDEs. Their effectiveness increases when combined with tax incentives and policy reforms, but fiscal constraints are limiting their availability.
- **Put and Call Option Agreements** offer an alternative to sovereign guarantees by providing investors with a contractual exit mechanism in case of default on contractual obligations by the government. They are particularly suited for large-scale projects in high-risk environments, but they entail complex legal documentation and might require complementary liquidity instruments.
- **Currency hedging instruments** like swaps and forwards are essential tools to mitigate FX risk, especially when project revenues and debt are in different currencies. Development finance institutions play a key role in offering subsidised hedging solutions where commercial options are underdeveloped.

For **energy efficiency projects**, the choice of instruments depends on several factors including the level of political risk, scale of projects and sector, stage of energy efficiency market development and familiarity with existing risk mitigation products.

- While **energy performance guarantees** mitigate the risks of energy efficiency projects for the client, complex energy performance contracts, a lack of standardisation of contracts and M&V protocols and high-risk perception of financiers limit access to financing for ESCOs and smaller clients. Combinations with additional risk mitigation instruments like guarantees or insurance can improve the creditworthiness of clients and ESCOs, thereby leading to better access to finance, improved loan tenors and reduced financing costs.
- **Partial credit guarantees**, particularly in local currency and provided as portfolio guarantees, have proven effective in unlocking domestic financing, mobilising significant capital and sharing risks across multiple aggregated smaller scale projects. This allows local FIs to develop a lending portfolio for energy efficiency projects, and to gather experience and market data on the energy performance of energy efficient technologies and measures. Particularly in markets with weak policy and regulatory frameworks for energy efficiency, low ESCO activity and a low level of familiarity with energy efficiency overall, technical assistance and capacity building can significantly improve the effectiveness of guarantee instruments.
- **Political risk insurance** can help overcome government-related risks of energy efficiency projects in emerging markets with politically unstable contexts, as large upfront investments and long payback times bring about vulnerability to political and regulatory uncertainties. By safeguarding payments linked to long-term energy savings, they can facilitate access to concessional capital.

- Insurance products like **Energy Savings Insurance** can unlock substantial amounts of capital for energy efficiency improvements particularly for small to medium-scale projects and MSMEs. This is particularly the case in combination with other financial and non-financial elements like standardised contracts, independent validation and concessional financing instruments.
- Commercial products like **energy efficiency insurance** remove the technical uncertainty for lenders and financial institutions and can act as an instrument for credit enhancement. While mobilising private investment in energy efficiency, commercial products typically do not provide any supportive measures to help mature the energy efficiency market, and are often focused on specific sectors.

Guarantees and risk mitigation tools help to unlock financing and shift risk perceptions but do not fundamentally resolve structural credit risks. Guarantees and other risk mitigation instruments do not inherently reduce the risk of project or borrower non-performance; instead, they shift the financial responsibility for the risk that is covered to the guarantor.

Limitations and bottlenecks

While guarantees proved to be effective instruments to de-risk clean energy projects, several complexities and bottlenecks are preventing their scalability. Such limitations include the following:

- The transaction costs associated with deploying risk mitigation instruments are sometimes substantial, which can deter stakeholders from using them make them unsuited for small transaction sizes. Such costs must be significantly lower than the discount they generate on risk margins and other financing conditions.
- The current regulatory treatment of guarantees can pose limits to their use, as the capital relief provided by guarantees can vary significantly across jurisdictions, types of users and instruments.
- Commercial financiers' reliance on market benchmarks might result in higher pricing of financial products than what would correspond to the reduced risk provided by guarantees.
- With some exceptions, MDBs and DFIs tend to prioritise loans over other financial instruments due to misaligned incentives and expertise development.

Key recommendations

Cross-cutting recommendations

To maximise development impact and mobilise private capital at scale, guarantees and other risk mitigation instruments could be deployed in a targeted and strategic manner, by:

- **Ensuring financial and development additionality:** Guarantees can de-risk projects that would otherwise not proceed due to perceived or real risks.
- **Catalysing new markets and technologies:** Guarantees can be effective in unlocking financing for nascent markets or jump start new technologies or innovative business models.

Strategic use of public resources would ensure the availability and financial efficiency of guarantees and risk mitigation instruments. This includes:

- **Prioritising high-leverage interventions:** This implies focusing public support on instruments that mobilise significant private capital relative to the public funds committed, or have a transformative market potential.

- **Ensuring cost-effectiveness:** This can be achieved by designing instruments that minimise transaction costs, aligning all parties' requirements upfront and avoiding redundancy with other de-risking tools.
- **Building institutional and market capacity:** Capacity-building can be effective in developing local financial institutions' ability to structure and deploy guarantees effectively, supporting insurance providers in offering targeted products and strengthening capacities of project developers and ESCOs in developing bankable project proposals.
- **Strengthening policy frameworks for clean energy** to create a reliable investment climate and develop clean energy markets sustainably, including long-term targets and strategies, regulations, information and capacity building measures as well as incentives.

The targeted use of guarantee and other risk mitigation instruments, towards nascent, priority sectors of the clean energy transition, ensuring financial and developmental additionality, must be co-ordinated with policy support and capacity building. Guarantees alone are unlikely to yield large benefits in terms of development additionality, and they can even tend to weaken credit discipline of stakeholders when not correctly framed (IMF, 2019^[82]).

As publicly available data on risk mitigation instruments is particularly scarce, all stakeholders involved in guarantee provision could consider improving the tracking and disclosure of performance data, especially their call rates and prices, to build confidence and demonstrate success to stakeholders. While the case study analysis reveals positive effects of risk mitigation instruments in terms of enhanced access to finance and positive development outcomes, a quantitative assessment of their effectiveness is hindered by a lack of data and agreed methodologies across different instruments and actors. Updating the evidence base on the effectiveness and success factors of different risk mitigation instruments and seeking better alignment of methodological approaches between different providers to allow for more thorough analysis would help to improve the development and targeted deployment of these instruments.

Recommendations for donors, DFIs and MDBs

As key providers of guarantees and other risk mitigation instruments, donors, bilateral DFIs and MDBs could join forces to build coherent offers of support to EMDEs by considering the following:

- **Developing internal capacity.** Donors, DFIs and MDBs could establish dedicated risk mitigation teams and train their staff to increase skills and knowledge on risk mitigation instrument use.
- **Scaling up portfolio guarantees** for funds or structures that can aggregate clean energy projects, so as to create and de-risk a pool of assets that can be investable by commercial banks and institutional investors at scale.
- **Developing local currency instruments.** Donors, DFIs and MDBs could encourage local currency lending and guarantee provision to match the need of EMDE developers and investors.
- **Aligning with national strategies and developing a pipeline of clean energy projects.** Risk mitigation instruments deliver development impact when they are aligned with national priorities and supported by a robust regulatory environment and well-developed clean energy project pipelines. Donors, DFIs and MDBs could consider implementing risk mitigation programmes in combination with technical assistance and capacity building solutions, and within the framework of national strategies or country platforms.
- **Offering flexible products** to adapt to the fast-evolving energy transition needs of EMDEs, and to support their leap-frogging and innovation efforts.
- **Ensuring alignment and harmonisation across product offer.** In particular, aligning due diligences and reporting can yield benefits and not hamper products' flexibility.

- **Integrating guarantees at the early stages of financial transaction design** and involving public and private partners from the outset.
- **Increasing collaborations and synergies.** Donors, DFIs and MDBs could increase collaboration among themselves as well as with domestic or international specialist guarantee providers, to counter- or co-guarantee clean energy projects and portfolios.
- **Engaging with credit rating agencies.** Donors, DFIs and MDBs could increase engagement with credit rating agencies to better understand the rating implications of adjusting their capital adequacy rules regarding guarantees.
- **Supporting partners in EMDEs** to increase awareness and build capacity to use risk mitigation instruments effectively to mobilise finance for clean energy projects.
- **Designing and establishing aggregator vehicles for energy efficiency/ESCO projects** to help aggregate demand for guarantee and insurance products and allow insurers to take on more risk exposure in EMDEs.

Recommendations for EMDE governments and offtakers

- **Enhancing enabling environment.** Guarantees do not work effectively without a robust enabling regulatory environment. This includes for example ensuring and enforcing minimum standards, setting up competitive and transparent clean energy tenders, opening the market to IPPs, streamlining permitting processes, removing fossil fuel subsidies, improving information availability and offering financial and non-financial incentives, among others.
- **Prioritising government support in strategic areas.** Strong and explicit government support is required to attract private investment in clean energy in EMDEs, especially in countries with financially weak offtakers. Such support can take the form of sovereign guarantees and, if they are not feasible, letters of support, put and call option agreements (PCOAs), clear termination clauses in PPAs, as well as PRIs and PRGs.
- **Building capacity on clean energy.** Technical assistance and capacity building can be useful to develop the skills and knowledge needed to implement and maintain clean energy projects. This can involve training programs for local engineers, auditors and technicians, local insurance providers, financial institutions and government officials, as well as support for project developers in navigating the regulatory landscape and accessing financing.
- **Maximising local currency contracts for clean energy.** In countries with well-developed domestic financial and capital markets, utilities could prioritise denominating PPAs in local currency (at least partially) to mitigate the risks of currency devaluations undermining offtakers' ability to make payments to power producers in hard currency.
- **Aggregating small clean energy projects.** Relevant government energy agencies and offtakers can bundle small-scale clean energy projects (e.g. through public tenders and bulk procurement programmes to aggregate demand) to achieve the scale needed to attract institutional investors, which can be then de-risked through portfolio guarantees. The establishment of financing or risk sharing facilities backed with guarantees can reduce risks for local financial institutions, thereby supporting the financing of a multitude of small to medium-scale individual projects.

Recommendations for financial regulators

Adjusting the technical interpretation and implementation of financial regulations would enable the recognition of the benefits and effects of guarantees and other risk mitigation instruments. Without clear regulatory treatment, banks and investors may not benefit from reduced capital requirements. Regulators could consider the following proactive steps to ensure that the technical interpretation and implementation of the regulatory framework is conducive to the use of guarantees, while maintaining financial stability:

- **Updating the evidence base** on the effects of prudential regulations on finance and investment for clean energy in EMDEs, through new targeted empirical analysis.
- **Encouraging the Basel Committee on Banking Supervision to promote consistent technical interpretation of the Basel Framework, by:**
 - **Clarifying the definition of a timely payment by the guarantor.** The impact of risk mitigation instruments depends on both the clarity of this definition and its alignment with market realities.
 - **Recognising guarantees that cover specific risks** (such as PRIs and PRGs) and other types of risk mitigation instruments as valid credit risk mitigants under both the Standardised Approach (SA) and the Foundation Internal Ratings-Based (F-IRB) Approach of Basel III.
 - **Regularly updating the list of eligible MDBs and guarantee providers.** International organisations and governments increasingly support and provide risk mitigation instruments for clean energy, including by creating new specialised institutions. Adjustments to financial regulations would reinforce such efforts.
 - **Considering the double default effect.** Some transactions benefiting from a guarantee could have a lower credit risk than the guarantor's, as default on the lender happens only if both the primary borrower and the guarantor default. If the absence of correlation between these two defaults can be documented in a simple and reliable way, such lower risk could be taken into account.
- Encouraging both Members of the Basel Committee and non-Members to consistently and clearly apply the technical interpretation of Basel III in domestic regulations in their respective jurisdictions.

Recommendations for financiers and insurance providers

To facilitate the up-take of guarantees and other risk mitigation instruments for clean energy projects, financiers could consider the following:

- **Using guarantees strategically** to improve lending terms and conditions as well as enter underserved markets, such as early-stage technologies, distributed renewables, or energy efficiency projects or new countries.
- **Training credit and risk teams** on the structure, benefits and applications of risk mitigation products, and strengthening in-house capacities for financing and underwriting clean energy projects.
- **Partnering with MDBs, DFIs and other actors offering local currency guarantees** to avoid foreign exchange mismatches that deter project developers.
- **Partnering with MDBs, DFIs and other actors to create energy efficiency project portfolios**, e.g. through Super ESCOs, to facilitate the market entry of commercial insurance products in EMDEs.
- **Promoting better synergies between insurances and guarantees**, by stripping insurable risks (e.g. equipment failure, natural disasters, etc) out of the guarantee market, to deal with them in a cheaper and faster manner through insurance markets.
- **Improving data collection and use.** Collaborating with relevant national authorities, associations and knowledge partners in collecting and analysing market and technology performance data.

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Annex A. International case studies

This Annex provides details on the international case studies analysed in this report. Each case study provides insights on: context; instruments and results; lessons learned; and limitations. The case studies include:

- Case study 1: GuarantCo local currency partial credit guarantees for solar rooftops in Pakistan;
- Case study 2: MIGA credit guarantees for hydro and geothermal in Indonesia;
- Case study 3: InvestEU/EBRD – First loss credit risk guarantee for merchant solar projects in Croatia;
- Case study 4: Sida portfolio guarantee for an EMDE distributed renewable energy debt fund
- Case study 5: Bpifrance – Partial risk guarantee for Corporate Power Purchase Agreements in renewables in France;
- Case study 6: Sovereign Guarantee to facilitate investment for solar projects in South Africa;
- Case study 7: Put and call option agreement for renewables in Chad;
- Case Study 8: Partial risk sharing facility for energy efficiency in India;
- Case Study 9: Political Risk Insurance for energy efficient street lighting in Saint Lucia;
- Case Study 10: Energy Savings Insurance Scheme in Colombia; and
- Case Study 11: Energy Efficiency Insurance in the UK.

Case study 1: GuarantCo local currency partial credit guarantees for solar rooftops in Pakistan

Context

Pakistan's energy mix is dominated by fossil fuels, with coal, oil and natural gas representing approximately 60% of Pakistan's total energy supply and electricity generation (IEA, 2025^[83]). Pakistan faces persistent power outages and an increasing gap between energy demand and supply (Shams Power, 2025^[84]). With an overdependence on imported fossil fuels, conventional power generation cannot match the increased demand, leading to prolonged load shedding, harming both households and businesses.

Pakistan is endowed with high levels of solar radiation and solar power has rapidly expanded in recent years – Pakistan was the sixth-largest installer of solar panels in 2024 (WEF, 2024^[85]). However, the country underutilised its solar energy potential. The solar commercial and industrial (C&I) sector is still nascent (PIDG, 2024^[86]). In remote and rural locations, solar energy represents a secure and decentralised option that helps minimise reliance upon the national grid and provides a continuous supply of electricity. Accessing local commercial financing by local developers can be challenging in Pakistan due to high collateral requirements and limited familiarity of financiers with clean energy (Shams Power, 2024^[87]).

In 2021, Shams Power Limited, Pakistan's leading solar energy developer and investor, established a PKR 2 billion (USD 11.3 million) lending facility from Bank Alfalah with a partial credit guarantee (PCG) from GuarantCo, part of the Private Infrastructure Development Group (PIDG).

Instrument and results

In 2021, GuarantCo provided a PCG covering 75% of the lending facility of Bank Alfalah to Shams Power (GuarantCo, 2021^[88]). This PCG covered the non-payment of scheduled debt service of the underlying loan between the beneficiary and the borrower up to the limit of the guarantee. The loan from Bank Alfalah is for 10 years and benefits from the Renewable Energy Refinancing Scheme set up by the State Bank of Pakistan (Bank Alfalah, 2021^[89]).

This financing enabled Shams Power to install approximately 21 MW rooftop and ground mounted solar plants at commercial, industrial and institutional (e.g. university, hospital) sites across Pakistan to reach grid connected users. This transaction contributed to the development of the rooftop solar market in Pakistan by demonstrating the ability for rooftop solar developers to access debt financing locally. Eighteen projects with a capacity of 21.2 MW were completed and became operational under this lending facility.

Given the success of this first facility, in 2024 Bank Alfalah provided Shams Power with an additional PKR 1.5 billion (USD 5.2 million) senior debt to support the construction of 10 MW of small rooftop and ground mounted solar plants at commercial and industrial sites across Pakistan to reach grid connected businesses. This loan was 75% guaranteed by GuarantCo (GuarantCo, 2024^[90]).

Lessons learned

Key lessons learned include:

- **Domestic currency coverage:** PCGs denominated in local currency are effective de-risking tools to facilitate the mobilisation of local debt financing and increase local financial institutions' familiarity with solar projects of different sizes, thus contributing to build local green financial markets.
- **Public financial incentives:** Favourable financing conditions from the Renewable Energy Refinancing Scheme of the State Bank of Pakistan allowed local banks that are new to renewables to be more comfortable with lending for this type of projects.
- **Complementary support:** A PIDG grant for technical assistance allowed Shams to provide skills and knowledge on solar energy technologies to local female engineering students, by partnering with local universities. Such programmes can significantly contribute to empower women to pursue careers in the clean energy sector (PIDG, 2024^[91]).

Limitations

Some limitations with local currency PCGs include the following:

- **Scope:** GuarantCo's products primarily cover loans or bonds in local currencies, which can limit their applicability in projects aiming to crowd in international institutional investors in hard currency. GuarantCo can offer hard currencies guarantees in certain cases.
- **Residual risk:** Although PCGs help improve the credit profile of projects, the lender still retains a share of the borrower's credit risk, as the PCG covers only a portion of the debt exposure.¹⁸ This partial coverage implies that lenders must still conduct their own due diligence, which can be costly, especially for small projects. However, it can be argued that when a commercial lender takes the time to conduct its own due diligence, it is more likely to increase its familiarity to the sector, change its risk perception and potentially lend directly in the future without the need for guarantees.

¹⁸ In some cases, GuarantCo also provided full credit guarantees. The extent of coverage depends on case-by-case assessments.

Case study 2: MIGA credit guarantees for hydro and geothermal in Indonesia

Context

In 2021 during the COVID-19 pandemic, Indonesia's state-owned utility PLN faced issues to access short-to-medium term credit from commercial lenders to finance working capital expenses for renewable energy projects (MIGA, 2021^[92]). The Multilateral Investment Guarantee Agency (MIGA), a member of the World Bank Group, provided a Non-Honoring of Financial Obligations by State-Owned Enterprises (NHFO-SOE) guarantee to commercial lenders, protecting them against losses resulting from a failure by PLN to honour its financial obligations under an unconditional payment guarantee. A NHFO-SOE guarantee works similarly to a partial credit guarantee (PCG).

Instrument and results

MIGA provided a USD 522 million NHFO-SOE guarantee to cover loans by a consortium of international commercial and development banks to finance working capital expenses in relation to PLN's USD-denominated tariff payments under a PPA to buy electricity from the seven existing hydro and geothermal IPP projects (MIGA, 2023^[47]). The guarantee covered NHFO-SOE risk for 5 years.

The guarantee allowed PLN to address temporary liquidity constraints, reduce borrowing costs and diversify financing sources. Timely payments to IPPs are also a signal to foreign investors that the sector remain investable and that PLN remains committed to honour its obligations under the PPAs with USD-denominated tariff payments (MIGA, 2021^[92]).

Lessons learned

Key lessons learned include:

- **Liquidity support:** Partial Credit Guarantees (PCGs) denominated in hard currency can be effective in de-risking loans such as the one PLN needed to honour its PPA payments in USD. The guarantee mitigated the risk of PLN falling short of its tariff payments. The guarantee instrument not only helped PLN to access financing and alleviate short-term liquidity pressures, but it also de-risks investors and IPPs in a period of exceptionally tough conditions due to the COVID-19 crisis.
- **Streamlined Environmental, Social and Governance (ESG) due diligence:** The fact that the IPPs involved had benefited from DFI and MDB financing eased MIGA's due diligence on the application of ESG standards (MIGA, 2021^[93]).
- **No need for an arbitral award:** The NHFO-SOE guarantee does not require the investor to obtain an arbitral award, making it an attractive option for lenders and investors (MIGA, 2022^[94]).
- **Flexibility:** Providing NHFO-SOE guarantees for working capital loans was a relatively new undertaking for MIGA, which demonstrated adaptability by responding to exceptional circumstances and addressing PLN's needs during a period of crisis.

Limitations

There are two main limitations with this type of guarantee:

- **Limited scope:** MIGA's PCG-type clause called "SOE non-honouring of financial obligations" only applies to public borrowers and only covers non-payment risks.
- **High credit rating threshold:** This type of guarantee requires the SOE to have a strong credit rating (at least BB-), a threshold that many utilities in EMDEs do not meet. The effectiveness of this guarantee depends on the utility's economic and financial stability.

Case study 3: InvestEU/EBRD – First loss credit risk guarantee for merchant solar projects in Croatia

Context

InvestEU is a European Union (EU) program that aims to mobilise at least EUR 372 billion of public and private investment to support key policy priorities, including the green transition, digital transformation, and sustainable growth across the EU. InvestEU benefits from an EU budget guarantee of EUR 26.2 billion. The guarantee is provisioned at 40%, which means that EUR 10.5 billion of the EU budget is set aside in case calls are made on the guarantee, with the remaining amount being a contingent liability (InvestEU, 2023^[95]). By leveraging the EU budget, InvestEU provides guarantees to support investment and financing operations, helping to de-risk projects and attract private investors. Its financial partners, such as the European Bank for Reconstruction and Development (EBRD), are expected to contribute at least EUR 6.55 billion (25% of the EU budget allocation) in risk-bearing capacity. The EBRD aims to finance up to EUR 2.1 billion of investment in eligible sectors by leveraging EUR 450 million of InvestEU guarantee (EBRD, 2022^[96]). InvestEU aims to attract commercial financing and only supports projects where financing could not be obtained at all or not at the required terms without InvestEU support. The first project of the EBRD under the InvestEU programme was initiated in Croatia.

EBRD's InvestEU project in Croatia will finance the construction of 30 MW of new solar generation, marking the EBRD's first solar photovoltaic (PV) investment in the country. The EBRD and a Croatian bank each extended loans worth EUR 10.6 million to three special purpose vehicles (SPVs) incorporated in Croatia by the Encro Group, a leading renewable energy developer in the country (EBRD, 2023^[97]). These SPVs will construct and operate three solar PV plants: Pelegrin, Donji Humac, and Gradac – known as the Solis Solar portfolio. The first two plants will be located on the island of Brač, near Split, while the third will be in the Benkovac municipality of Zadar County.

The project introduces a novel financing structure that relies on the wholesale market to offtake the produced electricity, without benefiting from any state subsidies. This innovative business model is an alternative to take-or-pay provisions set in power purchase agreements, which create long-term commitments for public utilities. Here the IPP does not benefit from a secured revenue stream, making its financing challenging. Specific risk mitigation instruments can help support the first projects of this type and demonstrate their viability.

Instrument and results

To mitigate the higher risks associated with this innovative structure, the EBRD financing benefited from an InvestEU first loss guarantee. The InvestEU first loss guarantee covers 25% of the loan amount and effectively mitigates risks born by the lenders. This guarantee is a key enabler as there is no track record for such business models and a significant level of uncertainty on the future revenue stream of the project. Thanks to the first loss guarantee, the EBRD delivered products that were not previously offered by the bank and mobilised additional commercial financing into the project. In this case, the guarantee does not only reduce risk margins but actually brings the project to bankability.

The IPP's leverage, with 40 to 45% of equity, is lower than in projects benefitting from long term PPAs signed with a bankable power utility. Furthermore, the sponsors accepted a full cash-sweep. The merchant risk also entails much shorter tenors. Thanks to the first loss guarantee, EBRD could extend a loan of 16 years door-to-door. Its co-financing partner, a commercial bank, does not benefit from the InvestEU guarantee, but is slightly more senior in the cash sweep and could extend its tenor to 10 years. In addition, following this first successful transaction and thanks to the lessons learned, EBRD managed to close merchant risk IPP deals with 30 to 35% of equity in neighbouring countries.

The electricity generated by the solar plants will be sold directly on the market, with the option for the client to enter into corporate power purchase agreements (CPPAs) at any time. This flexibility allows the Encro Group to adapt to market conditions and to possibly secure long-term revenue streams. The project aligns with Croatia's green transition goals and contributes to the expansion of installed solar capacity in the country. It also supports the energy transition plan developed under the European Commission's "clean energy for EU islands" initiative, reducing the island of Brač's energy dependence on the mainland.

Lessons learned

The Solis Solar programme in Croatia highlights several key lessons:

- **Innovative risk-mitigation model:** The use of a first loss guarantee by the InvestEU through EBRD shows how risk mitigation tools can unlock commercial financing for first-of-a-kind, innovative renewable energy projects.
- **Market-based solutions:** Thanks to the first loss guarantee and EBRD financing, the Solis projects demonstrate that renewable energy development can be successful without subsidies, relying instead on market mechanisms. This approach served as a model for other renewable energy projects in Croatia and the broader region.
- **Strategic partnerships:** The collaboration between the EBRD, Encro Group and the InvestEU programme underscores the importance of strategic partnerships in achieving clean energy goals. In this case, the political will of the EU aligns with the appetite for innovation and green assets of the EBRD and with the strategy of the investor.

Limitations

There are several limitations to the replicability of the Solis Solar programme and the first loss guarantee instrument:

- **Market risks:** The project's reliance on the wholesale market for electricity offtake exposes it to market risks, including price volatility and demand fluctuations. Although the first loss guarantee mitigates some of these risks for the lender, the long-term financial viability of the project will depend on stable market conditions or its ability to sign CPPAs.
- **Cost and scalability:** First loss guarantees are costly for guarantors, in terms of capital requirements. This is usually reflected in guarantee fees. While the project demonstrates the feasibility of market-based renewable energy development, its scalability may be limited by the availability of financing and the willingness of private investors to accept the associated risks.
- **Regulatory environment:** The success of the project is contingent upon a supportive regulatory environment. Changes in energy policies or market regulations could impact the project's profitability, as well as its ability to enter into corporate PPAs.

The Encro Group's solar projects in Croatia, supported by the EBRD's lending backed a first loss guarantee product under the InvestEU programme, represent an innovative approach to renewable energy development. By relying on market mechanisms and mitigating risks through a first loss guarantee, the project demonstrates a viable model for the green transition in Croatia and beyond. Since the Encro project, EBRD has scaled this approach across Europe for an additional 1 173 MW signed in project-finance loans, leveraging just EUR 33.4 million of EU guarantee. It managed to increase the debt-to-equity ratio of subsequent transactions, including through financing holding companies in debt to enhance their equity investments. However, market risks, regulatory challenges and scalability considerations must be addressed to ensure the long-term success and replicability of this approach.

Case study 4: Sida portfolio guarantee for the Gigaton Fund, a distributed renewable energy debt fund

Context

Distributed renewable energy (DRE) is critical to tackling persistent development challenges in EMDEs, such as limited energy access, poverty, low productivity, unemployment, and climate change. DRE systems – such as solar home systems¹⁹ and mini-grids – offer decentralised, scalable, and low-carbon alternatives to grid extension, particularly in remote and underserved areas. However, despite their transformative potential, DRE markets in many countries in Sub-Saharan Africa (SSA) and Southeast Asia (SEA) remain underdeveloped and face significant investment gaps due to high perceived risks, limited track records and weak enabling environments.

The Swedish International Development agency (Sida) supports the DRE sector across SSA and SEA, deploying a suite of blended finance instruments that span the project lifecycle – from early-stage innovation to commercial scale-up. These instruments include challenge funds, results-based financing and guarantees. One type of guarantee that Sida provides is portfolio guarantees for debt funds. To ensure impact, Sida requires that its interventions demonstrate both development and financial additionality. This means that guarantees must not only crowd in private capital on the liability side of a fund but also ensure that investments on the asset side target high-impact and underserved market segments.

Instrument and results

Mirova Gigaton Fund (MGF) is a blended finance revolving debt fund that provides medium-to-long term debt financing to clean energy infrastructure projects and SMEs, predominately in SSA. The bulk of investments are in least developed countries (LDCs), lower and upper middle income countries (LMICs and UMICs). The MGF's mission is to accelerate the transition to a low-carbon economy and improving energy access in emerging markets.

MGF targets key innovative sectors including solar home systems, agri-solar, commercial and industrial (C&I) solar, telecommunication (telco) solarisation²⁰ and mini-grids. Additionally, the fund is expanding into emerging areas such as e-mobility, energy efficiency, carbon pre-financing and storage solutions. The fund targets a total size of USD 400 million and is capitalised through junior equity shares, mezzanine notes and senior notes.

The USD 50 million guarantee that Sida provided was structured with the following features (see Figure A.A.1 below):

- **Pari-passu, loan-level guarantee:** In most scenarios this means pari passu with junior equity, providing proportional coverage of losses on individual loans. This structure ensures alignment of incentives between the fund manager, investors and Sida.
- **Portfolio reference and cap:** The guarantee references a loan portfolio of USD 400 million, with a maximum payout capped at USD 50 million. The guarantee covers only new lending, to ensure financial additionality.

¹⁹ Solar home systems are small-scale photovoltaic and battery stand-alone systems, i.e. with capacity higher or equal to 10 watt peak, supplying electricity for single households or small businesses.

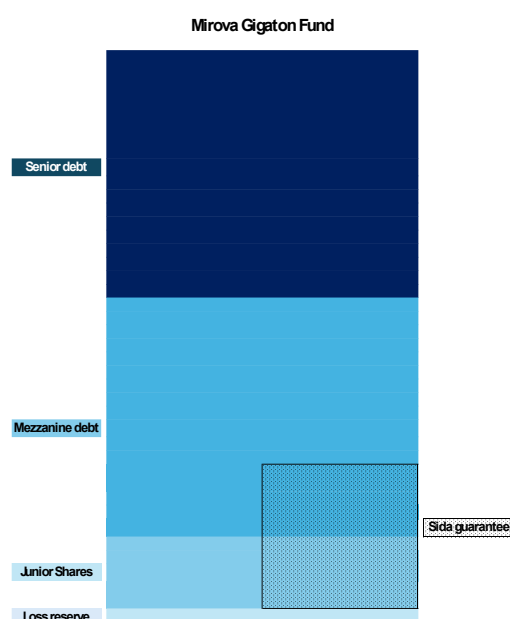
²⁰ Telco solarisation refers to the process of integrating solar energy systems into telco infrastructure, particularly telecom towers and base stations. The goal is to reduce reliance on fossil fuels and grid electricity by using solar photovoltaic (PV) panels to power telecom equipment.

- **Differentiated risk coverage:** A degree of differentiated risk coverage in function of country income classification and segment – LDC and segments perceived as riskier benefitted from a higher risk sharing. This targeted approach supports financial additionality by enabling transactions that would otherwise not meet risk-return requirements.
- **Second-loss structure via first-loss reserve:** A first loss reserve is built up by the fund by reserving a small percentage of each loan amount. This liquidity reserve effectively makes the Sida guarantee a second-loss guarantee, which decreased the guarantee premium and ensured that the fund manager and junior investors retained skin in the game.

Sida provided a guarantee to the MGF to bridge development imperatives and investor requirements, with the aim to meet the following objectives:

- **Enhancing subordination to crowd in senior capital:** Increasing the level of subordination – i.e. the amount of junior capital available to absorb losses before they affect senior investors – is a key lever for attracting senior capital, including from private investors, by enhancing the risk-return profile. All else being equal, the higher the subordination, the more appealing the investment becomes to commercial private capital.
- **Differentiated risk-sharing to incentivise high-impact lending:** The guarantee provided a degree of differentiated risk-sharing on individual loans so that investment in highly impactful and underserved segments and countries perceived as riskier can be incentivised. For example, a loan financing mini grids in a LDC may benefit from a higher risk coverage ratio compared to a C&I solar loan in a LMIC. This approach aligns with Sida's development mandate by directing capital to geographies and technologies with the greatest need and impact potential.

Figure A A.1. Illustration of the structure of Mirova's Gigaton Fund



Source: Sida

By the second half of 2025, the MGF committed USD 130 million to DRE projects and disbursed over USD 100 million, targeting to provide energy access for 4.6 million people, 8 million tons of carbon emissions avoided and up to 60 000 direct and indirect jobs created (Mirova and Convergence, 2025^[98]).

Lessons learnt

To date the MGF financed companies in most of the targeted sectors and countries. As of year-end 2024, fund investments have included sectors such as agri-solar, clean cooking, C&I, telco solar, solar home systems and e-mobility. Investments have been made in LDCs and LMICs and UMICs countries in West, East, Central and Southern Africa and in South Asia. Sida's guarantee enabled the mobilisation of capital at a larger scale compared to guarantees provided to individual projects.

The guarantee structure of the MGF may serve as a replicable model for blended finance initiatives that aim to reconcile multiple objectives – such as poverty reduction, energy transition and private capital mobilisation – within a single instrument. Key lessons learnt from the MGF include the following.

- **Differentiated risk-sharing:** The guarantee's risk-sharing approach – offering higher coverage for loans in LDCs and riskier segments – represents a promising approach to incentivise lending to underserved markets that would otherwise be commercially unattractive.
- **Stakeholder collaboration:** Close and intensive collaboration between the fund manager and guarantee provider was key to align diverse stakeholder needs and reconcile multiple development and financial objectives. Collaboration with other donors was also essential. Given the significant leverage in the guarantee, the large-referenced portfolio and the mix of countries targeted, Sida co-operated with the Norwegian Agency for Development Cooperation (Norad) to provide a guarantee of the required size and scope within budget frameworks available.
- **Tiered structure:** The fund's multi-tranche structure mobilised a diverse range of investors, each with distinct risk, return and impact preferences. Risk protection provided by the junior and mezzanine investors played a pivotal role in directly mobilising private capital into the senior tranche. Donors, DFIs, MDBs and impact investors willing to take a subordinate position are instrumental in unlocking more risk averse but often more scalable sources of institutional capital.

Sector-level limitations

Despite progress, impact investment fund sector still faces structural challenges that limit their ability to mobilise commercial capital at scale in underserved countries and markets:

- **Liquidity and risk barriers:** Liquidity remains limited, due the lack of a well-developed secondary market for this asset class. Addressing this challenge will likely require mechanisms such as securitisation and the use of concessional financing in junior tranches to attract private investment.
- **Perceived risks:** There is a persistent risk perception associated with investments in LDCs. Private investors may be hesitant to invest in LDCs due to their low sovereign credit ratings, even when underlying projects or companies have a strong credit profile and security package.
- **Limited concessional capital:** Junior and concessional capital providers, such as donors, DFIs and MDBs as well as foundations play a catalytic role in mobilising commercial investors. However, this type of capital is increasingly limited and there is a need for improved co-ordination among concessional capital providers.
- **Regulatory complexity:** Securitisation regulations in some jurisdictions can limit structures with loss-layer guarantees as these sometimes risk triggering onerous legal and financial structuring and compliance requirements. Competition and state support rules in some jurisdictions can also make it complex for concessional finance or risk-sharing providers to engage more directly with commercial investors to fully tailor solutions for crowd-in. EU Solvency II capital charges often fail to recognise the risk mitigation offered by subordinated capital and guarantees, constraining institutional participation (Mirova and Convergence, 2025^[98]). Resolving these challenges could allow cost-effective offering of higher subordination levels and even more targeted risk-return enhancement to help crowd in more commercial investors to underserved segments and countries.

Case study 5: Bpifrance – Partial risk guarantee for Corporate Power Purchase Agreements in renewables in France

Context

Bpifrance, the French state-owned investment bank, developed a Partial Risk Guarantee (PRG) product to support the development of Corporate Power Purchase Agreements (CPPA) in France. This PRG compensates Independent Power Producers (IPPs) in case of corporate off-taker default.

France has a low energy emission factor compared to other OECD countries, largely due to its nuclear park – the world second largest after the United States – covering 62% of its domestic electricity generation and 37% of its total energy supply (IEA, 2022^[99]). France is an open access power market, where businesses can contract with power generators to procure electricity.

CPPAs are long-term contracts under which a corporate agrees to buy electricity directly from a renewable energy generator connected to the grid. This differs from behind-the-meter systems, where customers self-consume their on-site energy production, and from the traditional approach of buying electricity from licensed power suppliers.

CPPAs have proved useful for corporates to decarbonise their power supply and lower their carbon footprint, by directly procuring clean energy. In addition, they have been used to mitigate the risk born by renewable energy projects that often rely on payments by a single public offtaker. In such cases, the CPPA can serve as a complement to a utility PPA or replace such utility PPA with a CPPA contract whose corporate counterpart has a higher credit rating, thereby securing a more reliable and stable revenue stream. At the level of power systems, CPPAs have contributed to the roll-out of renewables without imposing take-or-pay liabilities on power utilities.

Instrument and results

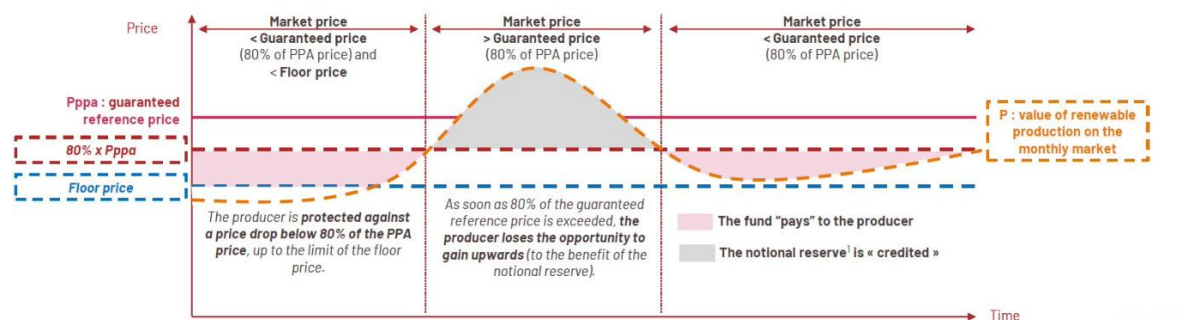
The French government, to support renewables with less subsidies and shield electro-intensive industries from electricity market price fluctuations, asked Bpifrance to develop an instrument that would accelerate CPPAs. The horizon of renewable energy investment²¹ often extends beyond the shorter horizon of corporate credit risk analysis. Lenders often need additional comfort regarding the credit worthiness of a private offtaker over the long-term. PRGs can mitigate offtake risk over long periods. To do so, the guarantor pledges to pay for the electricity generated in case the offtaker defaults.²² Bpifrance's PRG covers commercial or industrial off-taker (C&I) risk in France to provide such comfort and visibility to CPPA parties.

The French public bank covers part of the IPP's revenue losses in case of CPPA termination. Bpifrance pays the difference between 80% of the CPPA price and the price obtained on the wholesale spot electricity market, in case an IPP has to sell at a lower price on wholesale markets (Bpifrance, 2023^[100]; Bpifrance, 2025^[101]). Bpifrance decided to set a floor and does not compensate negative prices. Whenever wholesale prices are higher than 80% of the CPPA price, Bpifrance will deduct the extra revenue received by the IPP from future payments (see Figure A A.2).

²¹ 15 to 25 years for wind and solar PV, longer for biomass and hydropower.

²² Directly or through a letter of credit emitting bank or through a different liquidity instrument.

Figure A A.2. Bpifrance PRG revenue compensation in case of CPPA termination



Source: Bpifrance

The first guarantee fund can cover up to 500 MW of new renewable energy capacity. This cap, as well as the fees attached to the PRG, were established by Bpifrance based on the EUR 68 million budget allocated by the French government. Bpifrance looked at past power market prices, future market price scenarios and offtakers default risk using Banque de France's credit ratings. It calculated a leverage (total guarantee issued to budget allocation, expressed in MW of installed capacity) and equilibrium fees. Fees range from EUR 0.9 EUR to EUR 5.0 per MWh over 15 years, and the programme is designed to ensure that below-invest grade industries and SMEs can access it, as large, highly bankable buyers do not need such product.

To contribute to actual renewable energy capacity development in the country, this guarantee scheme is only applicable to new capacity, as opposed to pre-existing power plants that would sign CPPAs to sell their power. To be eligible, the corporate offtaker must have a credit rating above a pre-defined threshold. This guarantee instrument only covers sleeved CPPAs (as opposed to virtual CPPAs): it encourages matching load and generation between interconnected generators and consumers. In addition, because of transaction costs, Bpifrance only considers PPA that are expected to represent a generation of 5 GWh per year minimum (this is approximately 3 to 4 MW of installed solar capacity, depending on resources).

Italy, the Netherlands and the European Investment Bank are developing similar products. They cooperate with Bpifrance to benefit from lessons learned.

Lessons learned

The Bpifrance PRG programme for CPPAs represents an innovative approach to renewable energy development. It provides IPPs with long-term visibility on revenue streams and demonstrates that relevant guarantors can play a key role in CPPAs expansion. These contracts contribute to national decarbonisation plans while not creating long-term liabilities for the utility.

The Bpifrance PRG programme highlights several key lessons:

- **Risk Mitigation for CPPAs:** Long term visibility on revenue stream is necessary for project finance in the clean energy space. Such visibility is not always available with CPPAs. By mitigating the offtake risk, PRGs can unlock finance and investment for renewables.
- **The role of national development banks (NDBs):** NDBs and institutions like Bpifrance are best placed to extend such guarantees, as they have an extensive knowledge of credit quality of the local corporates. Leveraging this knowledge, they can select the most viable projects and support them where other guarantors may not have appetite or have additional due diligence costs. Data on power market prices are also necessary to develop such a programme.

- **Multiple benefits:** This instrument facilitates long-term investment in renewables, thanks to enhanced revenue security. In addition, the PRG contributes to better financing conditions for the projects. Finally, it helps French industries procure renewable energy and support the development of a CPPA market.

Limitations

While this PRG for CPPAs represents a promising instrument, there are several limitations to consider:

- **Complexity:** PRGs often generate an additional layer of complexity, with a guarantee contract that in most cases covers a letter of credit emitting bank against the risk of repayment default by the offtaker. Such derisking mechanism thus necessitates three additional contracts: (i) the tripartite letter of credit scheme with the offtaker, the bank and the IPP; (ii) the guarantee contract between the guarantor and the bank, and finally (iii) the counter indemnity agreement that allows the guarantors to claim repayment from the sovereign – the utility – or in the case of CPPAs the corporate offtaker. Bpifrance managed to simplify this structure, as it is able to take care of the liquidity element of the guarantee, thus not needing a letter of credit.
- **Utility death spiral:** Clients with good payment records may use CPPA solutions to procure power, with public utilities consequently losing some of their best clients, raising tariffs to cover for these losses, and in turn losing more clients. Based on this analysis, many utilities have been reluctant to develop CPPAs. They have restricted the expansion of CPPAs, by influencing regulation or withholding contract approvals. Although such contracts need to be regulated to dovetail power master plans and grid operations, an adequate wheeling tariff can in most cases provide sufficient revenues to power utilities and allow countries to leverage CPPAs to develop renewables.
- **Coverage:** Bpifrance only guarantees 80% of the CPPA revenue in case of default. Feedback from the private sector shows this cap is considered to be low. It creates a strong, positive incentive for finding a new CPPA, but can make bankability difficult in a market where project finance deals are closed with optimised debt service cover ratio (DSCR). State Aid rules in the European Union prevent Bpifrance to set this cap above 80%.

Case study 6: A sovereign guarantee to facilitate foreign direct investment for solar projects in South Africa

Context

The government of South Africa identified small-scale power generation such as solar rooftop PV as one of multiple solutions to overcome load shedding challenges and unreliable power supply that South African households and SMEs are facing. However, SMEs and households both struggled to meet the high upfront costs required to install such solutions, especially after the economic disruptions caused by the COVID-19 pandemic. Limited demand in turn constrains ESCOs and rooftop suppliers' development (WEF, 2022^[102]). In addition, the investment size for rooftop solar projects is often too small to match the scale appetite of large commercial banks.

Instrument and results

In 2023, the South African National Treasury launched the Energy Bounce Back (EBB) Loan Guarantee Scheme. By guaranteeing solar-related loans to SMEs, households and ESCOs, the scheme aimed to support 1000 MW of rooftop solar generation in its first 12 months of existence (National Treasury and South Africa Reserve Bank, 2023^[103]). To achieve this goal, the government partnered with banks, DFIs and non-SME finance providers to identify projects and provide loans to SMEs and households.

The EBB provides works through three mechanisms:

- **Guarantees for loans to SMEs and households for rooftop solar power systems:** This mechanism covers solar panels, batteries, inverters, and other installation related costs.
- **Guarantees for loans to Energy Service Companies (ESCOs) for rooftop solar:** This mechanism requires ESCOs to assess the individual needs of households and SMEs and to conclude leasing, instalment sale, and power purchase contract with them.
- **Working capital loans for businesses in the rooftop solar supply chain:** This mechanism helps to increase the supply of rooftop solar solutions by allowing businesses to source equipment with minimum delays.

The sovereign guarantee has been financed by a budget allocation of ZAR 8 billion (EUR 392 million) for 18 months, for loans of up to 7 years. The EBB scheme was part of a package of policy reforms that the South African government efforts to advance the restructuring of the power sector to promote long-term energy security and a low carbon transition, including with support of a policy loan from KfW to the Just Energy Transition Partnership (JETP) of South Africa.

The maximum loan amount is ZAR 10 million (EUR 490 thousand) per business and ZAR 300 thousand (nearly EUR 15 thousand) per household. Businesses in the rooftop solar supply chain can borrow up to ZAR 100 million (EUR 4.9 million) for working capital. The EBB scheme targets 30% of beneficiaries being woman-led households or businesses. Eligible financial institutions are commercial banks with a repo facility with the South African Reserve Bank (SARB).

The National Treasury provided a sovereign guarantee reserve for anticipated losses to a Special Purpose Vehicle (SPV) hosted at the SARB. Participating banks would pledge their loan portfolios to the SPV and any loss would accrue within the SPV. The guarantee covers 20% first losses on loans, with participating banks assuming the remaining risk.

The guaranteed loan portfolio performed strongly, with a very low share of non-performing loans. However, uptake of guaranteed loans was lower than initially anticipated. This was mainly because many SMEs had recently invested in reliable diesel generators, and it was too expensive for them to invest in replacing these with solar rooftops so soon after their initial outlay. Overall, SME loans saw higher uptake than household loans, as power outages had begun to decline around the time the guarantee scheme was launched.

The EBB scheme was a complementary initiative to the tax incentive scheme for rooftop solar. This incentive was another, parallel initiative of the government of South Africa, and it takes the form of a rebate in tax liabilities for individuals or households, to the value of 25% of the cost of new and unused solar photovoltaic (PV) panels.

Lessons learned

The government identified bottlenecks to small scale renewables in both costs and access to financing. The sovereign guarantee was used for a critical sector that is difficult to kickstart yet vital to expand solar energy generation and mitigate load shedding. Key lessons learnt include the following:

- **Complementary reforms and support:** The sovereign guarantee would have not been as effective without complementary policy reforms and financial support, such as a broader power sector policy reform agenda, feed-in-tariffs in some municipalities, tax credits and policy loans.
- **Inclusiveness:** The EBB scheme is comprehensive as it covers loans for SMEs, ESCOs and households as well as working capital for businesses in the supply chain, with a focus on women-led SMEs, to foster the development of the entire ecosystem while reducing gender gaps. The inclusion of ESCOs in the scheme allowed to expand leasing products to households and businesses who lack capital to finance the full upfront costs of rooftop solar equipment themselves.

- **Financial market confidence boost:** This sovereign guarantee helped increase financial institutions' confidence in the rooftop solar market, thanks to the availability of first loss capital. It helped reduce the cost of loans by lowering the perceived risk of solar investments while also encouraging major financial institutions from the private sector (e.g., ABSA Bank, First National Bank and Standard Bank) to participate in the scheme.
- **Policy timing:** Contrary to initial assumptions, households did not dominate uptake. The wealthier segment already had willingness to invest and did not need price incentives, while the more price-sensitive household cohort hesitated to invest as load-shedding declined, reducing the urgency. The timing of the sovereign guarantee proved suboptimal, as many small businesses had recently investments in diesel generators and power shortages were beginning to subside. Effective policy sequencing is critical to ensure that such interventions are introduced in a manner that aligns with market dynamics and business and household needs.

Limitations

Despite the positive outcomes of the EBB scheme, several limitations emerged that highlight important considerations for future implementation:

- **Fiscal constraints:** The use of sovereign guarantees might be restrained if fiscal space is limited. Lending support from MDBs and DFIs as well as technical assistance for reform implementation is likely to remain crucial for countries with fiscal constraints.
- **Additionality assessments:** Given the fiscal implications of sovereign guarantees, robust assessments of additionality need to be conducted to avoid windfall effects (occurring when the benefits of a guarantee are captured by parties who would have proceeded with their investments even without the guarantee).

Case study 7: Put and call option agreement for renewables in Chad

Context

Put and Call Option Agreements (PCOAs) are commercial contracts designed to provide financial security and risk mitigation for private investors in the energy sector. PCOAs grant private investors the right to sell their power plants to the host government at a predefined price in case of protracted default on contractual obligations by the government. This type of contract is used to replace PPA termination clauses and direct sovereign guarantees.²³ PCOAs include a put option allowing shareholders to require the government to purchase the project assets in case of default and a call option enabling the government to require shareholders to sell the assets.

Chad is currently considering a PCOA to support its first solar Independent Power Producer (IPP). In an overall fragile context, Chad faces significant challenges in its electricity sector, with a heavy reliance on oil for power generation. Despite its subsidised electrification programmes, the country's available capacity is insufficient to meet demand, and only 12% of the population had access to electricity in 2022 (ESMAP, 2025_[104]). Frequent power outages affect both households and businesses. The government of Chad recognises that a reliable and affordable electricity network is crucial for the country's social and economic development. With high levels of solar irradiation, solar energy presents a potential solution to transform

²³ PPAs typically include termination clauses that allow investors to exit the agreement if the host government fails to meet its obligations. However, these clauses can be complex and challenging to enforce. Direct sovereign guarantees, on the other hand, involve the government explicitly guaranteeing the financial obligations of the project, which can strain public finances and expose the government to significant liabilities.

Chad's energy sector, reduce production costs, and decrease the need for subsidies while expanding access to electricity.

The Djermaya Solar project, to be located 30 km north of N'Djamena, is a pioneering initiative aimed at integrating renewable energy into Chad's national grid. Developed by InfraCo Africa through Anergi Africa Development Ltd in partnership with Smart Energies (MIGA, 2019^[105]), the project attracted long-term investment from international firm Denham Capital in partnership with Africa specialist Neo Themis (Hogan Lovells, 2022^[106]). The envisaged project consists of a 34 MW solar plant and a 4 MWh Battery Energy Storage System, along with an 18 km transmission line and a substation.

Instrument

The Djermaya Solar project secured financing pre-agreements from several senior lenders, including the African Development Bank, Proparco, and the Emerging Africa Infrastructure Fund (EAIF), part of the Private Infrastructure Development Group (PIDG). AfDB committed an USD 18 million senior loan and a Partial Risk Guarantee²⁴, while Proparco and EAIF committed EUR 9.3 million of senior debt respectively in November 2021 (EAIF, n.d.^[107]). Additionally, the project has received EUR 6.35 million of grant from the EU-Africa Infrastructure Trust Fund (EU-AITF) for the interconnection infrastructure (EU AITF, n.d.^[108]), and grant funding from PIDG technical assistance and other sources.

A critical component of the project's financing approach is the Put and Call Option Agreement (PCOA) between the government of Chad and the project company, Djermaya CDEN Energy. The PCOA is an innovative risk mitigation tool, used in major power projects in Nigeria and Ghana, which establishes direct contractual obligations between the host country and the project shareholders. This type of agreement provides a mechanism for investors and lenders to exit the project and recover their investments following a termination trigger event, without the government recording it as a liability on its balance sheet.

Although financial close is not yet confirmed, the PCOA has been instrumental in unlocking financing commitments for the Djermaya Solar project, by addressing significant risks such as some political risks, non-payment by the offtaker, and grid connection issues. It is to be combined with a Partial Risk Guarantee (PRG) from the African Development Bank to address short-term liquidity problems. As the first solar IPP in Chad, the project would demonstrate the feasibility of such long-term investment in Chad's power sector, and the potential of solar energy to support sustainable economic development in the country.

Lessons learned

The early lessons from Djermaya Solar include several key points for future renewable energy initiatives, especially in frontier markets:

- **Innovative risk mitigation:** The use of a PCOA can be effective in attracting financing. If well designed, this instrument is perceived as mitigating termination risks as effectively as a sovereign

²⁴ The PRG is designed to mitigate the risk of non-payment of electricity bills by the offtaker Société Nationale d'Électricité (SNE) under the PPA. "In the event that SNE does not meet its obligations to the IPP under the PPA, the IPP may draw on the letter of credit (L/C) which will be opened in favour of the IPP by a commercial bank (L/C bank) upon request by SNE. Following a drawing on the L/C by the IPP, SNE or, if the case may be, the government of Chad would be obligated to repay the L/C bank the amount drawn together with accrued interest within a reimbursement period (...). In case the SNE or the government do not reimburse the L/C bank within this reimbursement period, the L/C bank can call the PRG and request the reimbursement of the amount drawn from the L/C, together with all interest accrued on that amount during the reimbursement period" (African Development Bank, 2019^[127]). Recruiting a L/C issuing bank was challenging. Commercial banks do not have the experience to participate in L/Cs for projects with long credit maturities. The situation was all the more difficult because of the financial situation of the SNE.

guarantee, while not creating the same liabilities for the government. It could be replicated in other countries to unlock investments in renewable energy.

- **Preferred by governments:** PCOAs do not impact national balance sheet as sovereign guarantee do. The IMF included a cap on sovereign guarantees in its discussions with some EMDE countries, but did not include PCOAs in the same perimeter. In addition, in many countries, a sovereign guarantee must be approved by the Parliament. PCOA not being a guarantee but instead creating direct contractual obligations between the host government and the project company, the same requirements often do not apply to a PCOA (Hunton, 2021^[109]). Finally, as opposed to a guarantee, a PCOA does not cover ongoing payment obligations, but only termination payments – which can make a difference for governments, as they do not have to deal with short term liquidity issues but only protracted payment defaults.
- **Public-Private Partnerships:** This first solar IPP project is a complex endeavour, in a challenging environment. The collaboration between government agencies, private investors, and international financial institutions is proving crucial for the project's advancement.
- **Technological integration:** The inclusion of a Battery Energy Storage System and advanced tracking technology enhances the project's reliability and efficiency; it would set a benchmark for future solar projects in the region.
- **Strong government support:** Strong backing from the Government of Chad, including the signing of a 20-year Power Purchase Agreement (PPA) with the national utility (SNE), alongside a tax agreement, and of a PCOA, is essential in securing long-term investment.

Limitations

While PCOAs can be relevant solutions in frontier markets, and the Djermaya Solar project represents an innovative approach to the use of PCOA and guarantees to kickstart the solar IPP market in a fragile context, several limitations and challenges remain to both the instrument and the project:

- **PCOA instrument's limitations:** Local governments may be more comfortable with PCOAs than with sovereign guarantees or direct liabilities. On the other hand, it does only provide investors and lenders with a local government backing, as opposed to an offshore, investment grade guarantee such as those provided by MDBs, DFIs or ECAs.
- **Complexity:** PCOAs are detailed documents, implying complex negotiations. The list of default cases and their definition, as well as the price calculation formulas (often different for different categories of default), require in-depth discussions. As a consequence, PCOAs are typically applicable only to large scale projects unless they are standardised.
- **Liquidity issue:** While the PCOA is an effective tool to mitigate significant risks, it may not be sufficient on its own. The PCOA primarily addresses events triggering termination and does not provide enhancements for continuing payment obligations. Therefore, it may need to be complemented by additional liquidity instruments, such as letters of credit, Partial Risk Guarantees (PRGs) or debt service reserve accounts, to address short-term liquidity problems and ensure the project's financial stability.
- **Regulatory environment:** The regulatory framework in Chad still present hurdles, for Djermaya solar and for future projects, requiring continuous engagement with government agencies to ensure a conducive enough environment for investment.
- **Financial sustainability of the utility:** Although the PCOA and PRG provide robust risk mitigation, the long-term financial sustainability of the project will depend on the stability of the national grid and the ability of SNE to meet its payment obligations.

- **Scalability:** While the project's first phase has secured financing commitments and is waiting for financial closing, the success of the second phase will depend on continued support from investors and lenders, as well as the project's operational performance.

Case study 8: Partial risk sharing facility for energy efficiency in India

Context

The Government of India, represented by the Bureau of Energy Efficiency (BEE), and the World Bank designed a partial risk sharing facility (PRSF) in 2015 to support India in achieving energy savings by unlocking commercial financing for the local ESCO market and to demonstrate innovative financing and implementation mechanisms (World Bank, 2024^[110]).

The BEE estimates the Indian energy efficiency market to be worth INR 150 000 Crore (EUR 14.5 billion), out of which only 5% potential has been tapped by ESCOs (Bureau of Energy Efficiency (BEE), 2025^[111]), mainly through the public Super ESCO and several smaller ESCOs. The Indian ESCO market faces several challenges, including limited access to affordable financing due to high risk-perception and lack of collateral, lack of supportive and consistent policy and regulatory frameworks for ESCOs and low awareness among potential clients. This is combined with limited technical expertise of existing ESCOs, inadequate measurement and verification (M&V) protocols, and a fragmented energy efficiency market without standardised contracts and procedures (UNEP-CCC, 2025^[65]).

The Bureau of Energy Efficiency under the Ministry of Power of the government of India provides policy support to develop the energy efficiency market and support ESCOs. Key initiatives include energy efficiency standards and labelling of appliances and equipment, energy conservation building codes, the Perform-Achieve-and-Trade (PAT) scheme for industry as well as awareness raising and capacity building, amongst others.

The PRSF was created to address barriers faced by local ESCOs in accessing finance for energy efficiency improvements, minimise the risks perceived by local banks in providing loans to ESCOs and energy efficiency projects, and mobilise over USD 125 million of commercial financing for energy efficiency (World Bank, 2024^[110]). It addresses the lack of requisite collateral or guarantees as a barrier to apply for project finance, but also provides technical assistance and capacity building to ESCOs and financial institutions. The partial credit guarantee covers a share of the default risk faced by participating financial institutions in extending loans to eligible energy efficiency projects implemented through ESCOs.

Instruments and results

The PRSF consists of (i) a USD 37 million **Partial Risk Sharing Facility for Energy Efficiency**²⁵, providing partial credit guarantees to cover a share of the default risk faced by participating financing institutions when extending loans to eligible energy efficiency projects (with coverage up to 75% of the loan amount), and (ii) a **Technical Assistance and Capacity Building** component of USD 6 million, which also provides capacity building and operations support. The PRSF became effective on August 21, 2015, with a closing date of April 1, 2024. The overall project duration is 15 years. The facility is managed by the Small Industries Development Bank of India (SIDBI) with funding from the Global Environment Facility (GEF) and a Clean Technology Fund (CTF) guarantee. The World Bank is the implementing agency for the GEF and CTF Funding. The Indian Bureau of Energy Efficiency is co-chairing the advisory committee of PRSF, providing policy guidance to the programme (Bureau of Energy Efficiency (BEE), 2025^[112]).

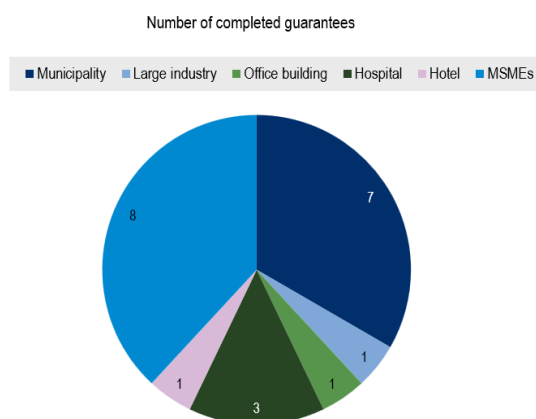
²⁵ USD 12 million were provided as risk-sharing funds by the GEF, which are backstopped by a CTF Guarantee in the form of contingent finance of USD 25 million (OECD, 2023^[125]).

Eligible hosts and sectors include large industries such as cement, steel, paper or chemical plants, MSMEs, municipalities and buildings including hotels, office buildings and hospitals. Each energy saving loan given by participating financial institutions is partially guaranteed for a maximum tenure of 5 years with a guarantee coverage ranging from 40-75% of the loan amount or maximum INR 15 crore (USD 1.75 million) per project. The non-refundable annual guarantee fee amounts to 0.5-1%, depending on the guaranteed loan amount, and on the grading of the ESCO. As of 2025, 15 scheduled commercial banks and non-banking financial companies are empanelled with SIDBI for the PRSF, including YES Bank, Corporation Bank, Tata Cleantech and others (Bureau of Energy Efficiency (BEE), 2025^[112]).

Component 2 of the PRSF provides technical assistance (TA), capacity building and operations support, and is managed jointly by SIDBI and the Indian SuperESCO Energy Efficiency Services Limited. The TA component supported the establishment of SIDBI's Green Vertical, focusing on green and decarbonisation investments. Until 2024, SIDBI has developed a portfolio of USD 2 billion, including USD 1.7 billion in energy efficiency and USD 350 million in renewable energy business. This led to an indirect leverage of 46 times of the PRSF (World Bank, 2024^[110]).

The PRSF provided partial default risk coverage to the 15 participating financial institutions on loans for energy efficiency projects that are implemented through ESCOs. By 2024, 79 guarantees were issued with USD 78.5 million guaranteed amount and a 2.34 leverage ratio mobilising total energy efficiency investment of almost USD 132 million. 21 of these guarantees were completed successfully with a cumulative guarantee amount of USD 16 million. 58 sub-projects were at different stages of implementation, and guarantee claims were received for a total of two projects (2.5% of issued guarantees; or as per the World Bank a 0.01 default rate of loans with risk sharing coverage). As of May 2024, projects with PRSF risk coverage achieved 375 GWH of annual energy savings, including through the replacement of inefficient equipment and appliances, and the installation of efficient street lighting and 286 000 Mt carbon emissions reductions per year (World Bank, 2024^[110]).

Figure A A.3. Completed guarantees across sectors



Source: (World Bank, 2024^[110]), Implementation Status & Results Report, Partial Risk Sharing Facility in Energy Efficiency

Lessons learned

- **Risk mitigation potential:** India's Partial Risk Sharing Facility (PRSF) is a good example of how partial credit guarantees can mitigate the perceived risks associated with investments through ESCOs and can drive significant energy efficiency improvements.
- **Additionality:** The PRSF facilitated access to financing to a range of projects and companies that would not be able to mobilise financing otherwise and helped mobilise energy efficiency investments of around USD 132 million. The risk mitigation model allows for the enhancement of

private finance mobilisation, which is demonstrated by the increase of the guarantee amount year-on-year (OECD, 2023^[113]).

- **Technical capacity and risk perception:** PRSF was able to minimise the perceived risk of lending institutions through technical expert screening of the project proposals received, and by enhancing awareness and capacities of loan officers in the participating financial institutions (OECD, 2023^[113]). Overall, technical assistance and capacity building on the demand and supply side, including through awareness programmes, stakeholder workshops and project visits, have been instrumental in the success of the initiative. This demonstrates the need and potential to combine guarantee instruments with further support measures. As shown by the PRSF, standardisation and digitalisation of energy audit and reporting processes can help achieve economies and reduce transaction costs.
- **Scalability of risk sharing facilities:** Based on the learnings from the PRSF, SIDBI and Shell Foundation are developing a risk sharing facility to unlock commercial financing for electric vehicles by financing institutions to low-income transport operators, e.g. MSMEs in two- and three-wheeler operations. In this second-loss facility, participating financial institutions will take up the first loss of 3%, while the facility will cover 75% of the losses from 3% to 13% at the portfolio level (NITI Aayog, SIDBI and RMI, 2024^[114]).
- **Enabling conditions:** PCGs are more effective in the long run with an enabling environment in place to mature and scale the energy efficiency market. This includes government support through dedicated policies for energy efficiency enhancement (e.g. minimum energy performance standards, technology lists and incentives) and ESCOs, as well as technical assistance, for instance through the establishment of an ESCO association.

Limitations

- **Timeline:** It takes time to create market demand for energy efficient products and services, and to establish credibility of energy efficiency vendors, suppliers and manufacturers.
- **Need for technical assistance:** Supporting measures, including capacity building and technical assistance, are needed to ensure the effectiveness of the PCG.
- **Reforming markets and phasing out guarantees:** In the long run, energy efficiency market development needs to rely on cost-reflective energy pricing and regulatory measures like minimum energy performance standards with increasing stringency and coverage.

Case study 9: Political Risk Insurance for energy efficient street lighting in Saint Lucia

Context

Saint Lucia depends heavily on imported petroleum products to power its economy. While the commercial and residential sectors account for most of the electricity consumption, street lighting also accounts for 3% of the total energy consumption in the country. Against this background, in 2021, the government of Saint Lucia launched a nationwide streetlight modernization initiative to replace aging, high-consumption sodium-vapor lamps with energy-efficient LED fixtures. With approximately 22 000 outdated lights and a growing national energy burden, the country sought to reduce emissions, cut electricity costs, and improve public safety.

The project was implemented as a Public-Private Partnership (PPP) with KLED Capital Ltd., a private infrastructure company specializing in smart energy transitions in the United Kingdom, Ireland, Italy and the Caribbean. The total project entailed the installation of 24 640 LED fixtures, corresponding to 100% of

existing streetlights in Saint Lucia plus 2 460 new units in previously unlit areas. The project also aimed to obtain a commercial loan from Corporación Interamericana para el Financiamiento de Infraestructura, S. A. (CIFI S.A), a non-bank financial institution operating in Latin America and the Caribbean.

However, as a small island developing state (SIDS), Saint Lucia faced challenges in securing affordable capital for infrastructure upgrades due to perceived political and commercial risks.

Instrument and results

To catalyse private sector capital in the form of equity and commercial loan into the project, the Multilateral Investment Guarantee Agency (MIGA) provided political risk insurance (PRI) on:

- An equity investment and retained earnings of USD 11.6 million by KLED Capital (BVI) for up to 15 years against the risks of expropriation, breach of contract, and transfer restrictions; and
- a commercial loan and future interests of USD 9.9 million by CIFI S.A. (Panama) for up to 8 years against the risks of expropriation, Breach of Contract and Transfer Restriction (MIGA, 2023^[115]).

The project was completed in June 2024 with the entire 24 640 LEDs installed, and is under the maintenance and warranty stage. The project is expected to derive the following benefits:

- Energy savings of about 6.8 GWh per year, corresponding to budgetary savings of about USD 2.3 million per year, freeing public funds for other uses;
- GHG emission reduction of approximately 5 000 tCO₂e per year due to greater energy efficiency via the replacement of 18 150 70W sodium lamps in residential areas and 3 850 250W sodium lamps in main highways with energy-saving LED streetlights; and
- a further widespread adoption of LED lights by the public sector, households, and the private sector, thereby contributing to increased energy efficiency in the country (MIGA, 2023^[115]).

Lessons Learned

- **PRI plays a role as an enabler for green infrastructure:** MIGA's political risk insurance de-risked both private equity and commercial loans, enabling capital inflows into a high-impact energy project in a relatively small market with limited sovereign creditworthiness.
- **Effective PPP design can accelerate delivery:** A fixed-price PPP allowed clear performance metrics and transferred key risks to the private partner, facilitating efficient implementation and reducing fiscal burden from the host country's perspective.
- **Energy transitions in SIDS can be scalable and bankable:** With quantifiable climate and fiscal co-benefits, small-island energy projects can be attractive for climate-aligned investors, especially when supported by global risk-mitigation institutions and regional commercial banks.
- **Public sector cost savings reinforce long-term viability:** Reducing operating expenditures through energy efficiency creates budgetary space for future development investments, making green projects fiscally responsible.

Limitations

- **PRI cannot address all risks:** While MIGA covered key political risks, non-political risks such as low local technical capacity, installation delays, natural disasters including hurricane or long-term maintenance shortcomings may not be insurable and still pose real risks.
- **Limited local capacity may constrain sustainability:** Implementation depended on adequate local workforce training and co-ordination. Gaps between technical ambition and institutional local

capacity, or spare part supply chains in smaller states could affect long-term project sustainability, especially after the warranty period.

- **Replicability requires enabling legal and policy environment:** Saint Lucia's relatively robust PPP laws and political commitment were key to the success of the project. In other countries, for example, in similar SIDS Caribbean countries, if lacking these conditions, the projects with the same structure may face institutional and procurement hurdles even with PRI support.

Case study 10: Energy Savings Insurance Scheme in Colombia

Context

The Energy Savings Insurance (ESI) Model was developed by the Inter-American Development Bank (IDB) together with Basel Agency for Sustainable Energy (BASE) in 2015. The model consists of a package of financial and non-financial measures with the energy savings insurance products at its core, which is complemented by a standardised energy performance contract with guaranteed savings, independent technical validation, and a financing instrument, often in the form of green loans.

Since the early 2000s, population growth and economic progress drove up energy consumption and lead to a sharp increase in electricity demand in Colombia. Apart from the government's Indicative Action Plan 2017-2022, which defined energy efficiency targets, objectives and strategies for the largest energy consuming sectors, there were no supportive policy measures to enhance energy efficiency or address market barriers (OECD, 2023^[116]). The ESI pilot programme in Colombia was launched by the IDB in 2016 to promote energy efficiency investments, particularly among small and medium-sized enterprises (SMEs), and concluded in December 2022. The programme was jointly funded by IDB, the Danish Energy Agency (DEA) and the Clean Technology Fund (CTF), implemented jointly with Bancoldex and supported by BASE.

The ESI model implementation initially prioritised SMEs in the health and hospitality sector where significant savings potential was identified. The programme later expanded to broader services including educational institutions, banks, shopping centres and airports, as well as the commercial and manufacturing sectors.

Instrument and results

DEA provided a USD 300 000 grant to support the technical design and implementation of the ESI model. IDB and CTF provided USD 48 million in the form of concessional loans to Bancoldex, the public development bank of Colombia, to fund energy efficiency projects. Of these, USD 20 million were allocated exclusively to ESI projects. Based on these loans, Bancoldex was able to on-lend participating local commercial banks at preferential conditions. The CTF provided an additional USD 1 million grant to support the development of the energy efficiency market in Colombia, providing additional incentives such as free validation of projects or capacity building.

Several commercial banks with interest and technical capacity in energy efficiency lending and project development, including Bancolombia, Davivienda, BBVA and Banco de Bogotá, were involved as financial intermediaries for the disbursement of energy efficiency credit lines (OECD, 2023^[116]).

Seguros Suramericana S.A. (SURA), Colombia's leading insurance company, developed the ESI policy on the basis of an existing surety bond product. The bond was complemented by a mechanism to cover shortfalls in contracted energy savings, transforming it into a performance guarantee. The adaptation of an existing product proved to be both time and resources efficient, while avoiding any potential regulatory challenges.

The Colombian Institute of Technical Standards and Certification (Icontec) acted as independent technical validation entity according to a standardised verification methodology based on ISO 50001. A standardised energy performance contract was adapted from a typical construction completion contract.

The government of Colombia was involved through the Ministry of Finance and the national Mining and Energy Planning Unit to approve the structure and operations of the programme, and other public technical entities were consulted on the structure of the programme.

The ESI pilot programme covered twelve energy efficient and renewable energy technologies for application in the priority sectors²⁶ (OECD, 2023^[116]). Already before the end of the pilot programme, the energy savings insurance became a commercially viable product with a default ratio below 1%.

By 2024, SURA successfully issued more than 600 ESI policies across the services, commercial and manufacturing sectors. The insurance covers the promised energy from an energy efficiency or renewable energy project with a maximum coverage term of five years, where the insured value is determined by the promised energy savings (kWh) and energy costs (USD/kWh). Over time, SURA developed in-house expertise for the project assessment and validation procedures, allowing for a greater efficiency in insurance operational processes.

Hospital Méderi, the largest hospital network in Colombia, for instance, installed 220 solar collectors on the Bogota facility's rooftop to improve the reliability and efficiency of its water heating supply. With an initial investment of USD 200 000, the hospital achieved annual guaranteed energy savings of around USD 23 000, resulting in a payback period of nine years (Basel Agency for Sustainable Energy (BASE), 2024^[66]).

Lessons learned

- **Developing supporting policies:** The ESI model mitigates financial risks related to project performance but requires additional support policies as part of a broader strategy to establish a market for energy efficient technologies and services in the long run.
- **Building on existing instruments:** Building on existing instruments, contractual documents and methodologies, helps to develop an ESI programme in a cost-effective and market appropriate manner.
- **Enhancing government support:** Government support plays a pivotal role to create policy certainty and investment security, and to raise awareness on the potentials and benefits of energy efficiency among end users.
- **Prioritising energy intensive sectors and technologies:** This proved essential to build a compelling business case, proof of concept and to establish a track record.
- **Independent validation entities:** Collaboration with independent validation entities helped to ensure transparency and the credibility of committed energy savings, thereby strengthening trust among market stakeholders and improving uptake of the mechanism.
- **Partnerships for awareness:** Strong partnerships among involved actors, such as the active involvement of consumer associations and technology providers, played a significant role in creating market awareness and demand for insurance-backed energy efficiency services and technologies.
- **Building on existing business relations:** Starting the programme rollout with existing clients of Bancóldex and SURA allowed to leverage existing trusted partnerships to test demand, before putting in place a comprehensive marketing and communications plan.

²⁶ Eligible technologies included light-emitting diode (LED) bulbs, heating, ventilation, and air conditioning (HVAC) systems, boilers, cogeneration units, solar thermal, motors, ovens, air compressors, cooling systems, motorcycle and cab fleets, biogas, and solar PV.

- **Capacity building:** IDB support in strengthening the capacities of technology suppliers helped to create awareness about the programme and improve communication with end users.
- **Replicability:** The adaptation and replication of the ESI scheme in other Latin American countries, in Europe, Asia and Morocco demonstrate its potential in mitigating risks and risk perceptions related to energy efficiency projects, and in contributing to substantial energy savings.

Limitations

- **Financial regulations:** Local insurance regulations may limit the coverage or duration of an ESI product and require thorough assessment and potential adaptation
- **Complexity:** The ESI model has an innate level of complexity by involving a multitude of stakeholders in its implementation, which requires thorough market assessment as well as good communication and co-ordination.
- **Supporting policies:** To leverage the potential of the ESI model, supporting policies and measures need to be put in place, including technical assistance, capacity building, awareness raising/marketing and effective stakeholder co-ordination
- **Not all project sizes:** While there is no minimum or maximum size of eligible energy efficiency projects, the instrument is not suitable for all project sizes (e.g. very small or very large projects) and sectors (e.g. residential sector).

Case study 11: Energy Efficiency Insurance

Context

The UK's building stock of around 30 million buildings is among the oldest in Europe, and accounted for 41% of energy demand in 2022, with residential buildings responsible for 29% and service sector buildings for 12% of total final energy consumption. Direct emissions from buildings accounted for almost a quarter the UK's energy-related GHG emissions. Building energy efficiency retrofits and the rapid exchange of fossil fuel-based heating systems towards electric heating are therefore priority areas for decarbonising the building sector (IEA, 2024^[117]).

The Energy Efficiency Insurance offered by HSB, a specialised engineering and technology insurance provider which is part of reinsurer Munich Re, in the United Kingdom (UK) as a commercial product has been designed for investors in energy conservation measures, energy service companies and financiers of energy efficiency projects. Equipment breakdown cover is provided as a standard product, while loss of revenues and shortfall in energy savings cover are available as options. The insurance product was launched in 2016 to cover some of the risks of energy conservation measures implemented in commercial buildings that often prevent banks and other financiers from providing loans to energy efficiency projects (Munich Re, 2016^[118]). The insurance product mitigates the performance uncertainty of energy efficiency retrofit measures, thereby making the financing of such projects more attractive to building owners and investors.

Instrument and results

HSB's energy efficiency insurance covers material damage to installed systems, including equipment breakdown, protection against loss of revenue in case of business interruption due to equipment failure and asset performance by protecting against a shortfall in energy savings.

Insurance coverage is provided for up to five years. Based on an insurance enquiry, in-house energy efficiency experts conduct a full technical audit of each energy-saving initiative, utilising an asset

performance model to develop different outcome scenarios. HSB then calculates the level of improvement in credit rating for the policyholder (Munich Re, 2016^[118]).

Example: A five star hotel in the UK built in the mid-1990s with 174 rooms faced high operational costs including energy expenses of roughly USD 4 million per year. The hotel implemented an energy efficiency retrofit with a total investment of about USD 3.8 million comprising seven energy savings initiatives, including LED lighting installation, upgrades to the air conditioning and extraction systems, variable speed drives for motors and pumps, building management system upgrade, as well as a combined heat and power plant and rooftop solar PV panels. Annual energy savings were estimated at approximately USD 618 000 per year with annual revenues of USD 400 000 per year (from feed in tariff and renewable heat incentive). HSB's EEI covered:

- All risks and breakdown of installed initiatives of USD 3.76 million
- Loss of revenue of USD 400 000
- Insured energy savings of USD 618 000 over five years.

Lessons learned

- **Improved creditworthiness:** Insurance coverage improves the creditworthiness of clients by protecting against technical and financial uncertainties and can facilitate better access to financing.
- **Customised products:** The project demonstrates how customised insurance products can unlock comprehensive energy efficiency retrofits in commercial buildings.

Limitations:

- **Sectoral focus:** To date, the EEI has only been available for commercial buildings. This is due to the type of actors that developed it and their market positioning.
- **Need for technical assistance:** As a commercial product, the EEI does not provide additional support in the form of technical assistance for project developers and/or financiers, which might be needed in less developed market.

Annex B. Data methodology

This Annex presents the methodology used to define and analyse data on guarantees presented in Chapter 2. The quantitative analysis in Chapter 2 was conducted using different data sources, namely OECD Development Assistance Committee (DAC) statistics on private finance mobilised by official development interventions, from the OECD Creditor Reporting System database (OECD, 2025^[38]), custom blended finance data from Convergence Market Data on and results from a new survey conducted by the authors.

OECD data

The OECD DAC methodology for measuring the amounts mobilised from the private sector from official development finance interventions was developed under a high-level mandate from DAC members. Official development finance includes: (i) bilateral official development assistance (ODA), (ii) other official flows (OOF) for development purposes (including refinancing loans) that do not meet the criteria set by the ODA definition, and (iii) the concessional and non-concessional operations of multilateral financial institutions. This is in line with the OECD definition of blended finance, which is “the strategic use of development finance for the mobilisation of additional finance towards sustainable development in developing countries (OECD, 2018^[12]). Development finance, in the context of this definition, includes Official Development Finance as well as private funds that are governed by a development mandate e.g. financing provided by philanthropic organisations. The term “additional finance” refers primarily to commercial finance.

OECD data on private finance mobilised is publicly available in the OECD Creditor Reporting System database (OECD, 2025^[38]). The official development finance providers who report official data on private finance mobilisation to the OECD include bilateral development co-operation agencies and DFIs, MDBs and multilateral DFIs and multilateral funds (thus excluding philanthropic organisations).

OECD data on private finance mobilised by official development finance interventions for clean energy include the following energy-related sub-sectors: energy policy, energy generation from renewable sources (including hydro, solar, wind, geothermal and marine energy and biofuel), hybrid power plants that contribute to climate mitigation, as per the Rio marker on climate mitigation, and some distribution-related activities (such as heat plants, district heating and cooling, and transmission and distribution for centralised grids and isolated mini-grids). Data analysed for this paper is at sector-level and not at activity-level, due to confidentiality constraints.

Convergence Blended Finance data

The analysis using data from Convergence Blended Finance was conducted using proprietary data from Convergence Market Data prepared for exclusive use by the OECD. Convergence Market Data is sourced from public and private sources and is subject to updating, completion, revision, verification and amendment. Therefore, such information may change materially.

Convergence defines blended finance as a structuring approach whereby concessional capital from public or philanthropic sources is used to mobilise private sector investment in sustainable development. Convergence's database only captures transactions that include both concessional capital (either public or philanthropic) and private capital at the transaction level, whereas the OECD data focuses on private finance mobilised by official development finance interventions (both concessional and non-concessional).

Convergence captures the total deal size (including the development finance deployed), while the OECD accounts only for the amount of private finance mobilised in each operation.

The analysis used aggregated annual blended finance data for 98 clean energy deals (2014 - 2024) that use guarantees or insurance as a blending archetype. The clean energy deals concern activities related to both renewable energy and energy efficiency, as well as some cross-cutting activities, whose purpose is unspecified in financing documents.

Convergence distinguishes between the number of investments and number of deals. The number of investments refers to the number of individual investment commitments, whereas the number of deals refers to actual blended finance deals. Since there are typically more than two investment commitments per deal, the number of investments is always higher than the deal count.

The analysis distinguishing on-grid and off-grid projects is based on a lower number of deals due to data gaps caused by limited public disclosure at the portfolio-level or project-level.

Convergence data analysed in this paper includes data for 2024 – which the OECD database does not have as OECD data on private finance mobilised is reported directly by development finance providers, which causes a time lag in the data reporting cycle.

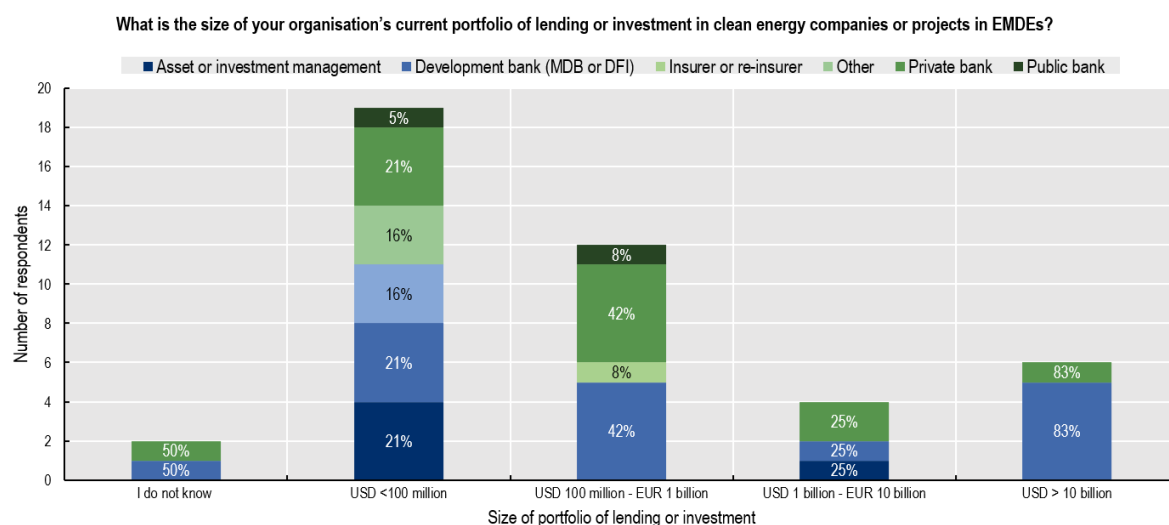
OECD survey

In April-May 2025, the OECD developed and rolled out a survey on the role of guarantees and other risk mitigation instruments for clean energy in EMDEs to gather financial institutions' and non-financial corporates' perspectives on their usefulness. The survey was disseminated among financial and non-financial corporates through OECD communication channels as well as many other organisations (listed in the Acknowledgment section).

The total number of survey respondents was 71. Of these, 76% represented the financial sector (mainly multilateral development banks (MDBs) and private banks), while 24% were from non-financial businesses such as Energy Service Companies (ESCOs) and other corporates. A significant proportion of respondents reported active engagement in clean energy lending, investment or operations in clean energy in emerging markets and developing economies (EMDEs).

In terms of size, most respondents' clean energy lending or investment portfolios in EMDEs are of small size (below USD 100 million), with asset managers, development banks, and private banks making up the majority of respondents in this range (Figure A B.1). Only a small share of respondents has large portfolios (over USD 1 billion), primarily held by development banks and asset managers. Among non-financial businesses, the majority report clean energy turnover under USD 10 million, with very few reaching higher turnover brackets.

Figure A B.1. Respondent's portfolio

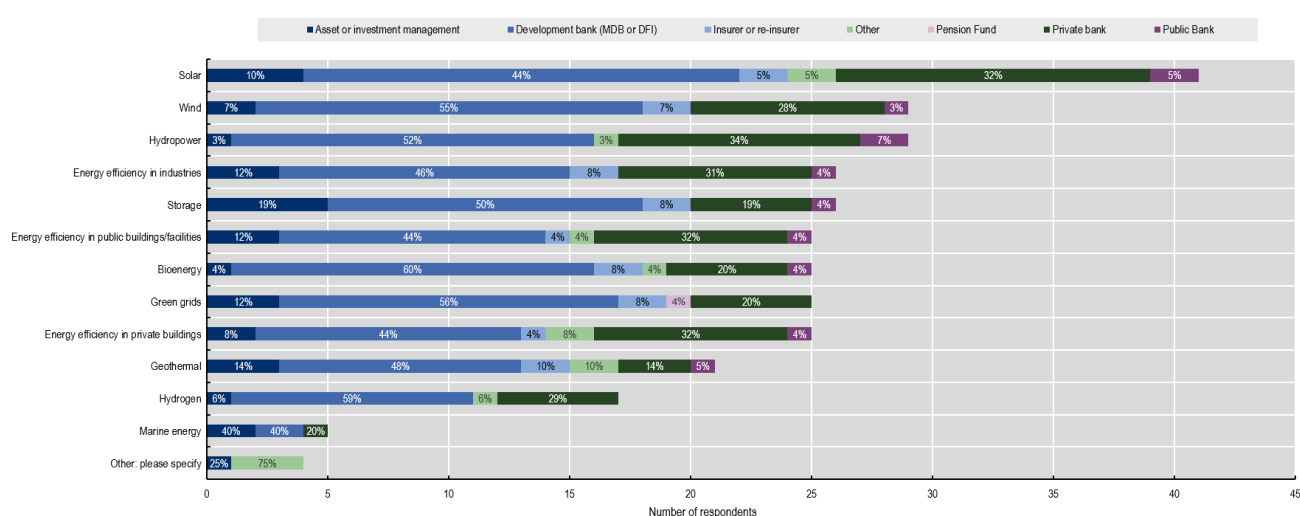


Source: 2025 OECD Survey on Guarantees and other risk mitigation instruments for clean energy in EMDEs

Geographically, respondent financial institutions' portfolios in EMDEs are primarily concentrated in Africa and Southeast Asia. Development banks (MDBs/DFIs) and private banks are the main financiers in these regions. For example, 58% of development banks' portfolios and 25% of private banks' portfolios are concentrated in Africa. In contrast, non-financial business activities are geographically more scattered, mainly across South America, Southeast Asia, and Africa.

In terms of types of renewables, solar, wind, and hydropower are the most widely invested energy sources among respondent financial institutions, with strong participation from both private banks (32%) and MDBs/DFIs (44%) (Figure A B.2). Energy efficiency projects, particularly in industries and public buildings, also attract substantial interest, especially from development banks and insurers. Storage and green grid investments receive lower overall attention, with grid investment primarily driven by development banks, and other sectors such as bioenergy, geothermal, and hydrogen seeing moderate but consistent activity from MDBs/DFIs.

Figure A B.2. Types of energy projects of survey respondents

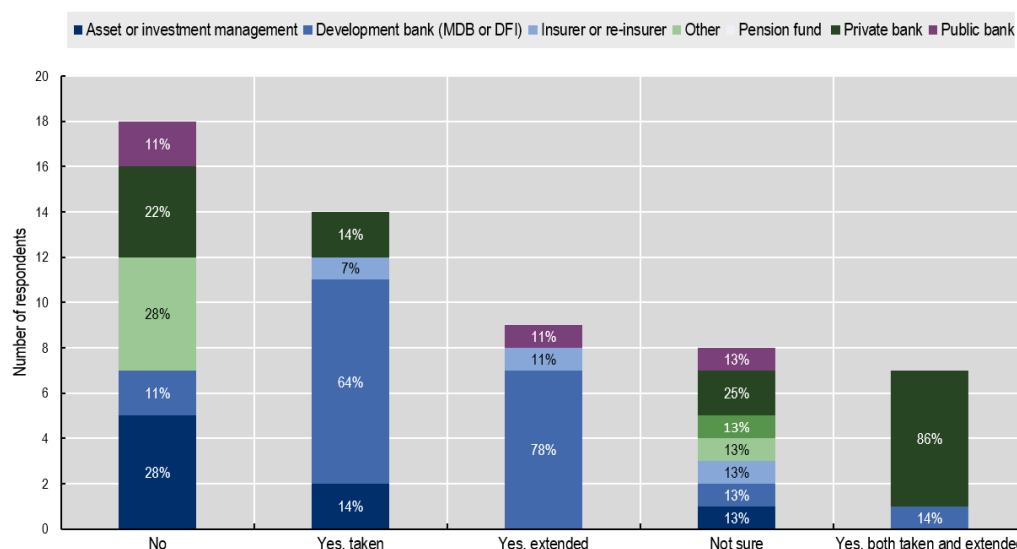


Source: 2025 OECD Survey on Guarantees and other risk mitigation instruments for clean energy in EMDEs

A similar pattern is observed for non-financial businesses, where energy efficiency projects in industries and private buildings are most prominent. Investments in solar, green grids, and hydrogen remain comparatively limited for these actors, indicating a narrower focus on energy efficiency within the non-financial sector.

Development banks (MDBs/DFIs) are the primary entities extending guarantees for clean energy, making up 78% of those who have extended such guarantees and 64% of those who have taken them, underscoring their dual role as both providers and beneficiaries (Figure A B.3). Private banks are the dominant group among those respondents indicating that they both took and extended guarantees, accounting for 86% of those responses. The data suggests that even development finance institutions, despite their mandate, frequently seek to de-risk themselves rather than solely assume the risks these instruments were designed to address. This pattern points to a complex landscape where the intended external risk transfer of green guarantees is often replaced by internal risk management strategies among major institutional actors.

Figure A B.3. Use of guarantees



Source: 2025 OECD Survey on Guarantees and other risk mitigation instruments for clean energy in EMDEs

Annex C. Measuring the financial efficiency of guarantees

Calculating the financial efficiency of guarantees

For guarantees to prove additional and efficient, they must either enable a project that would otherwise not happen or reduce costs borne by the project. In the latter option, guarantee fees must be significantly lower than the reduction in costs captured in the weighted average cost of capital for debt and equity. If the guarantee reduces costs in other ways, such as through longer tenor, reduced cash collateral, avoided security fees, etc., this must be taken into account when calculating the financial efficiency of guarantees. To evaluate this, a net present value (NPV) approach is recommended (Deloitte, 2024^[119]). The **NPV** is the sum of discounted cash inflows (positive) and discounted cash outflows (negative) of the project, here excluding the cost of the guarantee so as to calculate a ratio. The efficiency of the guarantee is then assessed by comparing the difference between **NPV gtee**, which is the project's NPV in a scenario with the guarantee, and **NPV nogtee**, which is the project's NPV in a scenario without the guarantee, against the **Cost of guarantee**, which is the discounted cost of the guarantee.

$$\text{Efficiency} = \frac{\text{NPV gtee} - \text{NPV nogtee}}{\text{Cost of guarantee}}$$

Non-financial transaction costs induced by the guarantor as an additional actor in the project, such as additional project lead time and additional negotiation at various stages of the project, are often not fully reflected in developers' development fees and management fees, or in banks' arrangement fees, and thus not accurately captured in the NPV calculation. As a result, the guarantee would be considered as efficient if this ratio is *significantly* higher than 1.

The case of a Partial Risk Guarantee (PRG) in different off-taker risk contexts

The Levelised Cost of Electricity (LCOE)²⁷ of a power generation project is a proxy of its NPV as it reflects the level of discounted cash inflows that is necessary to offset the discounted cash outflows of the project. The difference between the LCOE without the guarantee and the LCOE with the guarantee would need to be significantly positive for the PRG in such a project to be considered efficient.

In the two illustrative cases presented below (Figure A C.1), the PRG reduces the lender's risk margin, its Debt Service Reserve Account requirements, as well as the investor's Internal Rate of Return (IRR) expectations and the guarantor's on-risk fees, with different impacts on the LCOE depending on the level of off-taker risk. In the high off-take risk scenario, the PRG reduces year 1 price per kWh by 4.4%, while in the medium off-take risk scenario, it reduces such price by 2.7%. This illustrates how guarantees' efficiency decreases with the level of risk, in part because of fixed costs (charged by guarantors and by lenders) that do not decrease in proportion with the risk level, and in part because guarantee instruments such as PRGs do not address the entire risk spectrum.

²⁷ The Levelised Cost of Electricity (LCOE) divides the total costs of a project by the power production volume over the entire life cycle of a power plant.

Figure A C.1. Illustrative examples of PRG impacts on the LCOE of solar projects, in different off-taker risk scenarios

High off-taker risk			
Indicative assumptions and calculations, for illustration purpose only			
Assumptions, with PRG		Assumptions, without PRG	
Capacity (MWp)	40	Capacity (MWp)	40
Net yearly yield (en Wh/W)	1700	Net yearly yield (en Wh/W)	1700
CAPEX excluding DSRA (M USD)	44	CAPEX excluding DSRA (M USD)	44
DSRA + upfront fees → additional CAPEX (M USD)	1.7	DSRA → additional CAPEX (M USD)	5.0
Number of months of PPA payments covered by PRG	12	Number of months of PPA payments covered by PRG	0
Number of months of debt repayment in DSRA	6	Number of months of debt repayment in DSRA	18
IPP gearing (debt / (debt+equity))	75%	IPP gearing (debt / (debt+equity))	75%
Equity IRR	11%	Equity IRR	12%
IPP loans interest rate (% p.a.)	6	IPP loans interest rate (% p.a.)	6.5
IPP loans life (years)	16	IPP loans life (years)	16
L/C fees (% p.a.)	1.5		
PRG fees (% p.a.)	2.7		
L/C interest rate (% p.a.)	5		
Time before PRG trigger (months)	12		
Result, with PRG		Result, without PRG	
Price per kWh (c.USD), year 1	9.74	Price per kWh (c.USD), year 1	10.17
Difference in price per kWh year 1		4.4%	

Medium off-taker risk			
Indicative assumptions and calculations, for illustration purpose only			
Assumptions, with PRG		Assumptions, without PRG	
Capacity (MWp)	40	Capacity (MWp)	40
Net yearly yield (en Wh/W)	1700	Net yearly yield (en Wh/W)	1700
CAPEX excluding DSRA (M USD)	44	CAPEX excluding DSRA (M USD)	44
DSRA + upfront fees → additional CAPEX (M USD)	0.8	DSRA → additional CAPEX (M USD)	1.5
Number of months of PPA payments covered by PRG	6	Number of months of PPA payments covered by PRG	0
Number of months of debt repayment in DSRA	3	Number of months of debt repayment in DSRA	6
IPP gearing (debt / (debt+equity))	75%	IPP gearing (debt / (debt+equity))	75%
Equity IRR	10%	Equity IRR	11%
IPP loans interest rate (% p.a.)	5	IPP loans interest rate (% p.a.)	5.5
IPP loans life (years)	16	IPP loans life (years)	16
L/C fees (% p.a.)	1.5		
PRG fees (% p.a.)	2.3		
L/C interest rate (% p.a.)	5		
Time before PRG trigger (months)	12		
Result, with PRG		Result, without PRG	
Price per kWh (c.USD), year 1	8.90	Price per kWh (c.USD), year 1	9.14
Difference in price per kWh year 1		2.7%	

Source: Authors' assumptions and calculation based on an anonymised real example of a solar project in an EMDE.

Measuring the efficiency of public funds used to deploy guarantees

Another approach to measuring the financial efficiency of risk mitigation instruments in development finance is to compare public funds used and private finance mobilised. This is often measured by using leverage ratios. Such ratios can either compare the volume of a given type of guarantee which is issued to the amount of public funding required, or the volume of private finance mobilised to the amount of guarantee issued.

The amount of public funds utilised by a guarantee instrument can be assessed in three different ways:

- Difference with market price: This calculation is based on a comparison between a guarantee's financial terms (guaranteed amount, maturity, exposure and fees) and the market price and conditions of a similar instrument.
- Grant element calculation: This calculation assesses the level of subsidy applied to the premium (compared to an equilibrium premium). It is based on discount rates reflecting operating costs, market conditions and risk margins. The OECD Development Assistance Committee (DAC) has developed such a methodology that is used by DAC members (OECD, 2024^[120]; OECD, 2025^[121]).
- Amount of ringfenced public money, dedicated to pay claims and that can be leveraged through guarantees. This solution works for dedicated funds, such as those covering geothermal exploration risks, or SMEs credit risk.

Particular care shall be taken when comparing leverage ratios claimed by different institutions to assess the efficiency of guarantees (OECD, 2023^[20]). This is because limited information is available on how leverage ratios are calculated by different institutions, which hinders comparability and consistency as the numerator and denominator of such ratios can include or exclude different categories of public and private finance (Jachnik and Raynaud, 2015^[122]).