

CAPSTONE PROJECT

De-Risking Climate Mitigation Finance: Mobilizing Private Investment in Emerging Economies

Capstone Project Number: CP-2025-05

Submitted by: Mr Shitiz Jha (MPP Cohort: 2023-25)

Under the Supervision of: Dr. Amrendra Pandey Assistant Dean (Research) and Associate Professor at Kautilya School of Public Policy

Cite this Report as Jha, S. (2025). De-Risking Climate Mitigation Finance: Mobilizing Private Investment in Emerging Economies. Kautilya School of Public Policy [online]. Available at: https://kspp.edu.in//capstone-project/de-risking-climate-mitigation-finance-mobilizing-private-investment-in-emerging-economies

De-Risking Climate Mitigation Finance: Mobilizing Private Investment in Emerging Economies

Submitted to Kautilya School of Public Policy in Partial Fulfillment of the Requirement for the Degree of Master of Public Policy (MPP) 2022-24

Shitiz Jha 2023004828

Under the Supervision of Dr. Amrendra Pandey Assistant Dean, Research



Kautilya School of Public Policy, Gandhi Institute of Technology and Management (Deemed to be University) Rudraram, Telangana 502329 25th March 2025

SELF-DECLARATION

This is to certify that the thesis titled "De-Risking Climate Mitigation Finance: Mobilizing Private Investment in Emerging Economies" is my original work and has not previously formed the basis for the award of any Degree, Diploma, Associateship or Fellowship to this or any other University.

> Shitiz Jha 25th March 2025

ACKNOWLEDGMENTS

I would like to extend my sincere gratitude to the Climate Policy Initiative (CPI) for partnering with me for this study and providing invaluable insights and data that significantly contributed to this project. I also appreciate the guidance and support from Dr. Jaspreet Kaur, Ms. Harsha Srivastava, Ms. Neha Khanna, Mr. Amandeep Singh, Ms. Sharmila Chavaly, and Dr. Amrendra Pandey, whose expertise and encouragement were instrumental in shaping this work. Thank you for your contributions to my academic journey.

LIST OF TABLES

Table 1. De-Risking tools: Risks Addressed and Impact on Risk-Return Profile

 Table 2. Global Best Practices

 Table 3. Policy Recommendations

LIST OF FIGURES

Figure 1. India's annual tracked green finance investments for mitigation sectors reached \$50 billion in FY 2021/22, representing approximately 30% of estimated annual requirement of \$11 trillion to meet its NDC targets for the period 2015-2030

Figure 2. Emerging Markets and Developing Economies (EMDEs) need to increase climate mitigation investments from 3.4% (USD 0.4 trillion) in 2020 to 12% (USD 2 trillion) by 2030, with a significant reliance on private sector financing.

Figure 3. De-Risking tools

Figure 4. The RUMS project following a PPP model, has lenders (IFC) financing to several developers. Power is then supplied under a PPA to DMRC and MPPMC

TABLE OF CONTENTS

Section	Title	Page Number
1	Glossary	9
2	Executive Summary	11
1	Introduction	12
4	Literature Review	15
5	Research Methodology	23
6	Analysis and Discussion	27
7	Policy Recommendations	44
8	Conclusion	49
9	Policy Relevance	50
10	Ethical Considerations	52
11	Bibliography	55

GLOSSARY

Climate Finance: Financial flows targeted towards climate change mitigation and adaptation initiatives, to lower greenhouse gas emissions and increase resilience to the effects of climate change.

Emerging Markets and Developing Economies (EMDEs): Nations with developing

economies that are challenged by structural and market obstacles to access climate finance

Nationally Determined Contributions (NDCs): The country-level climate action plans submitted to the Paris Agreement, the details of which set forth their emission reduction and climate adaptation goals.

De-Risking Mechanisms: Policy or financing tools aimed at lowering the perceived risks of investing in climate mitigation initiatives to mobilize private capital.

Blended Finance: The strategic approach of using public or philanthropic capital to attract private investors by reducing risk or increasing return.

Green Bonds: Bonds that provide fixed returns to fund companies engaged in an activity with a positive environmental impact.

Carbon Pricing: Market instruments (e.g., carbon taxes or cap-and-trade) that assign a cost to carbon emissions to create the incentive to reduce carbon output.

Currency Volatility: Fluctuation in foreign currency exchange rates that impose additional costs on foreign investors looking to develop climate projects.

Stranded Assets: Assets that lose economic value due to changes in market conditions, regulations, or the environment (e.g., coal-based power plants).

Risk-Return Principle: A principle of finance that suggests higher risks must come with a higher possible return to incentivize investment.

Greenwashing: The misrepresentation of financial projects or products as environmentally friendly or sustainable with limited evidence to demonstrate its green credentials.

Mitigation Projects: Actions that reduce greenhouse gas emissions, including installing renewable energy technology or energy efficiency upgrades.

Multilateral Development Banks (MDBs): An international financial institution that provides funding and technical assistance to support development projects in member states.

Green Finance Taxonomy: Defines the range of economic activities that are classified as sustainable investments for environmental uses.

Renewable Energy Certificates (RECs): tradable certificates that provide evidence that electricity was generated from renewable energy.

Carbon Offtake Agreements: Agreements made regularly in which buyers agree to purchase carbon credits from mitigation programs at a predetermined price and revenue certainty.

Sustainable Development Goals (SDGs): A collection of 17 global goals established by the United Nations in 2015 with the aim of accelerating sustainable development by 2030. SDG 7 is for Affordable and Clean Energy, and SDG 13 is for Climate Action.

Green Climate Fund (GCF): An international fund developed under the UN Framework Convention on Climate Change (UNFCCC) to support developing countries with climate change mitigation and adaptation.

International Solar Alliance (ISA): A group of countries committed to increasing the adoption of solar energy through collaborative actions, and innovative financing models.

Energy Transition: A transition from fossil fuel-based energy systems to low carbon and renewable energy systems to address climate change.

Geopolitical Risks: Risks derived from political instability, trade wars, and international political relationships that threaten the feasibility of projects or investment flows.

EXECUTIVE SUMMARY

Emerging Market and Developing Economies (EMDEs) face a huge climate finance gap of \$2.8 trillion annually by 2030, with private capital required to cover up to 80% of the needed investment (Gouled, 2024). Despite India's ambitious climate targets, including net-zero emissions by 2070, the country has reached only \$50 billion annually in the financial years 2021/22 against the required \$170 billion annually by 2030 (CPI, 2024). Unlocking private climate finance in mitigation projects is important but financial, policy and market risks deter private investors.

This research critically examines the barriers to private climate finance in EMDEs like India and analyses de-risking mechanisms to enhance investor confidence. Policy risks such as regulatory instability, retroactive changes, and land acquisition challenges decrease trust, while financial risks like high capital costs, currency volatility and limited credit access limit private investment flows. Market and technology risks further dis-incentivize the private players to invest in climate mitigation projects in EMDEs.

Drawing insights from global models, this research identifies key de-risking strategies like blended finance, political risk insurance, and partial credit guarantees among others along with case studies from Brazil, Kenya, and South Africa.

This study proposes a comprehensive de-risking framework for India, advocating regulatory consistency, financial innovations, risk-sharing instruments and strategic partnerships. By implementing these policy recommendations, India can unlock billions in private climate finance, fast pace its clean energy transition and set a benchmark for De-risking climate finance in EMDEs.

Introduction

Climate change has presented a serious challenge particularly for emerging market and developing economies (EMDEs), which are vulnerable to its serious impacts and play an important role for global mitigation efforts. But achieving low-carbon transition in these regions require huge financial resources. Although responsibility lies with Global public finance to bridge this gap, taking into consideration the historical emissions, it is insufficient to do this. By 2030, EMDEs will need \$2.8 trillion annually for climate investments, with private finance expected to contribute upto 60% of this amount. (IFC, 2023). Several barriers and risk hinder private investments in climate mitigation projects in EMDEs. This highlights the importance to come out with innovative mechanisms and create a safe investment environment to mobilize private capital.

India, as one of the largest EMDEs, plays a very important role in global climate action. India has set ambitious climate goals under its Nationally Determined Contributions (NDCs), including achieving net-zero emissions by 2070, installing 500GW of non-fossil fuel electricity capacity by 2030 (MoEFCC, 2020). However, these goals require substantial climate finance. The country needs \$170 billion per annum till 2030 to meet the Nationally Determined Contributions (NDCs) submitted to UNFCCC on Dec, 2022, yet current investments in mitigation sectors amount to only an average of \$50 billion annually (FY 21/22), which is substantial gap to fill (CPI, 2024). Mobilizing private finance is important to ensure India's smooth transition to a net-zero economy.

Context

Currently, private climate finance remains concentrated in the developed world, leaving EMDEs underfunded despite their significant mitigation potential. The urgency of addressing this financing gap is also because of the potential **economic impacts of climate change**. India may lose up to **35% of its GDP by 2050** due to severe temperature increases if greenhouse gas emissions are not reduced globally (Swiss Re Institute, 2021). This vulnerability is there across countries, with Africa historically experiencing GDP losses of 2-5% annually due to climate change (Ngala Killian Chimtom & Ngala Killian Chimtom, 2024).

Problem Statement

The private sector faces several risks such as Financial, Market, Policy, Sovereign and Geopolitical risks. These risks and barriers create a risk-return profile that often seems on the riskier side to investors, resulting in climate mitigation projects being significantly underfunded. De-risking tools and mechanisms can help prevent these by addressing structural barriers and incentivizing private investment in high-impact projects in India.

Research Gap

Existing research on climate finance and de-risking mechanisms has limitations:

- Limited focus on EMDE specific strategies
- Lack of comparative analysis on how de-risking approaches have been implemented in EMDEs.

• Not enough in-depth research on innovative financial instruments for accessing private climate finance for mitigation projects in India.

This study aims to address these gaps by examining how de-risking mechanisms can be effectively deployed to mobilize private climate finance in such mitigation projects in India, while drawing lessons from other EMDEs.

Objectives and Research Questions

This research focuses on three primary objectives:

1. Objective: **To identify and evaluate the risks and barriers** deterring private investment in climate mitigation projects in India

• Research Question: What are the key financial, policy and market barriers that impede private investment in climate mitigation projects?

2. Objective: To assess **available tools and de-risking instruments** in climate mitigation finance.

• Research Question: What are existing global and domestic derisking mechanisms for mitigating barriers to climate mitigation projects?

3. Objective: To propose **scalable strategies** to mobilize private climate finance in EMDEs in India

- Which de-risking tools would be best suited for India?
- What lessons can be drawn from case studies of other

countries/regions in de-risking climate finance?

By addressing these objectives, this research seeks to provide actionable insights for policymakers, financial institutions, and investors aiming to scale up private climate finance in India and other EMDEs. This research will analyze barriers to investment, analyze exiting derisking mechanisms, and propose targeted strategies to mobilize private capital for climate mitigation projects in India.

Literature Review

India's Climate Finance Context

India has set ambitious climate targets, including achieving net-zero emissions by 2070 and reducing emissions intensity by 50% by 2030 compared to 2005 levels. These commitments align with its updated Nationally Determined Contributions (NDCs) under the Paris Agreement. Other goals include installing 500 GW of non-fossil fuel energy capacity and meeting 50% of electricity demand through renewable energy by 2030. Achieving these goals requires \$2.5 trillion climate finance and \$1 trillion alone for adaptation by 2030 (CPI, 2024).

Current Landscape

India's green finance flows reached on average \$50 billion annually in FY 2021/22, which is a 20% increase from FY 2019/20. However, this represents only about 30% of annual investment required to meet its NDC targets. Adaptation finance rose threefold to \$15 billion per year in FY 2021/22, largely driven by government budgetary allocations and improved tracking (CPI, 2024). This research specifically focuses on climate mitigation finance.



Figure 1. India's annual tracked green finance investments for mitigation sectors reached \$50 billion in FY 2021/22, representing approximately 30% of estimated annual requirement of \$11 trillion to meet its NDC targets for the period 2015-2030 (Source: CPI, 2024)

Some key characteristics:

• **Domestic Dominance:** Domestic sources accounted for approximately 83% of mitigation finance.

• Sectoral Imbalances: Mitigation finance was majorly concentrated in clean energy (47%) and energy efficiency (35%), while clean transportation received only 18%.

• **Large gap:** Finance flows to mitigation reached \$50 billion in FY 2021/22, still short of annual requirement of \$170 billion (CPI, 2024)

Gaps in Policy Implementation

• Lack of De-risking mechanisms: India lacks robust financial instruments to attract private investments in climate projects

• **Data challenges:** The absence of a harmonized green finance taxonomy complicates tracking and tagging climate related investments.

• **Limited International Finance:** Only 17% of the mitigation finance i.e.

\$8.3 billion, in India came from international sources (CPI, 2024), indicating a need to better leverage global capital markets.



Figure 2. Emerging Markets and Developing Economies (EMDEs) need to increase climate mitigation investments from 3.4% (USD 0.4 trillion) in 2020 to 12% (USD 2 trillion) by 2030, with a significant reliance on private sector financing. (Source: IMF)

Emerging economies, including India, are projected to face significant challenges in addressing climate change. Public finance is alone insufficient to meet the financial requirements, therefore requiring innovative strategies to de-risk private climate finance.

Barriers to Private Investment in Climate Mitigation Projects

Private investment in climate mitigation projects is crucial for India's transition to a lowcarbon economy, yet multiple risks deter capital flows into the projects. These risks are:

1. Financial Risks:

Financial risk in climate mitigation projects refers to uncertainties related to returns on investment, high costs of capital, and credit risks associated with financing low-carbon technologies and infrastructure. In the Indian context, these risks are particularly important as climate investments are often perceived to have lower credit quality compared to conventional investments.

India requires approximately \$10 trillion by 2070 to achieve the net zero target. With around \$50 billion needed annually for climate mitigation initiatives (Tiwari, 2025). Financial institutions in India generally lack robust climate risk assessment frameworks, with a 2022 report by Climate Risk Horizons revealing that most Indian banks have not begun to factor climate change into main operations, making risk assessment of various projects more challenging for private investors.

2. Policy and Regulatory Risks:

Policy and regulatory risks stem from uncertainties in the policy landscape, inconsistent implementation, and evolving regulatory frameworks that govern climate investments. These risks majorly impact investor confidence by affecting the stability as well as predictability of the investment environment. In India, regulatory bodies have begun addressing climate related financial risks through policies and frameworks. In February 2024, the Reserve Bank of India (RBI) issued draft guidelines on "Disclosure framework on climate-related financial risks", which mandates regulated entities to disclose the information on four key areas: governance, strategy, risk management, and metrics and targets (PWC Annual Report, 2024). The Securities and Exchange Board of India (SEBI) has also introduced frameworks to integrate climate-related financial risks into regulatory regimes, aligning with global standards like the EU's Corporate Sustainability Reporting Directive (Nishith Desai, 2024). Despite the positive steps, policy clarity still remains a concern for private investors. Research indicates that "unclear or frequently changing policies decrease financing success by 55%" (Anjanappa, 2025). The Indian regulatory landscape is evolving but still needs to overcome challenges in streamline procedures.

3. Market and Technology Risks:

Market and Technology risks include uncertainties related to market demand for low-carbon products, technology performance, rapid technological changes, and risks that affect commercial viabilities of mitigation projects.

These risks are further increased in context of lack of technology transfers from developed nations. According to India's biennial update report submitted to the UNFCCC, "This lack of technology transfer has forced India to rely on domestic sources and stretch national capacity, slowing its efforts to achieve critical climate objectives" (Pti, 2025b). For private investors, these technological uncertainties translate into potential market risks, as project developers may face difficulties in accessing and implementing the most efficient and cost effective technologies, thereby increasing project costs and reducing returns.

4. Sovereign Risk:

Sovereign risk refers to the potential impact of climate change on a country's macroeconomic stability, public finances, and ability to service debt obligations. This risk category is increasingly recognized as material for financial institutions and investors considering climate investments in emerging markets.

For India, climate change poses significant sovereign risk concerns. Research demonstrates that "climate risk and resilience influence the cost of sovereign borrowing, with econometric analysis showing that higher climate risk vulnerability leads to significant rises in sovereign bold yields" (Climate Change and Sovereign Risk, 2020). There are two main types of climate related risks affecting India's financial stability: physical risks from climate events and transition risks for shifting to low carbon economy. These sovereign level vulnerabilities directly influence investor confidence in climate projects, as deteriorating sovereign creditworthiness can lead to depreciation of currency, capital controls or other macroeconomic policy changes that affect project returns (Climate Change and Sovereign Risk, 2020).

5. Geopolitical Risk:

Geopolitical risk includes uncertainties arising from international relations, global power dynamics, trade tensions and climate diplomacy that influence cross-border investments in climate mitigation projects. In terms of technology transfer and international climate finance support, geopolitical factors act as a barrier for India. Both these barriers should be looked at within the framework of the 'Common but Differentiated Responsibilities and Respective Capabilities' (CBDR-RC) principle" (Pti, 2025b). Geopolitical risk uncertainty in the Indian financial sector leads to varying level of shock transmission across different market conditions (Kumar and Rao, 2024). These geopolitical dynamics create an additional layer of complexity for international investors considering climate mitigation projects in India.

These risks and barriers create a **risk-return profile** that often seems on the riskier side to private investors, resulting in climate mitigation projects being significantly underfunded. Derisking tools and mechanisms can help prevent these by addressing structural barriers and incentivizing private investment in high-impact projects in India.

Global Climate Finance Mechanisms and De-risking Tools:

• **Political Risk Insurance (PRI):** It is a financial product that protects investors against losses arising from any government action or political instability. These risks include expropriation of assets, currency inconvertibility, and breach of contract by sovereign entities, and political violence such as war or civil unrest. By mitigating governance related uncertainties, this instrument enhances investor confidence in volatile jurisdictions (UNCTAD, 2025).

• **Partial Credit Guarantees (PCG):** These are financial mechanisms where a guarantor (often a multilateral agency) assumes responsibility for a portion of borrower's

debt, in case of default. These guarantees improve the project's creditworthiness, increasing access to commercial loans at lower interest rates (IFC, 2021).

• **Blended Finance:** It refers to the strategic combination of public, philanthropic, and private capital to reduce project risks. Public funds absorb the early-stage risks through concessional loans or grants. This therefore incentivizes private sector participation in high-risk sectors like renewable energy (Garbacz et al., 2021).

• Foreign Currency Guarantees: These are financial tools that stabilize the revenue streams by hedging against exchange rate volatility. These guarantees will ensure that investors receive payments in stable foreign currencies, therefore mitigating losses from local currency depreciation (Masse, 2025).

• Offtake Agreements: These are long term contracts where buyers commit to purchasing an output of the project at fixed terms. These agreements lock in revenue, reducing demand uncertainty for developers.

• **Public-Private Partnerships:** These are collaborative frameworks where governments and private entities co-develop infrastructure. Risks and returns are shared, with most often government providing land, permits, or revenue guarantees (PUBLIC-PRIVATE-PARTNERSHIP LEGAL RESOURCE CENTRE, n.d.).

• Export Credit Agency Support: These agencies are government backed institutions that provide loans, guarantees, or insurance to domestic firms operating abroad. These agencies mitigate risks tied to cross-border investment flows, such as contract cancellations or payment defaults (HSBC, 2024b). • Feed-in Tariffs and Power Purchase Agreements: Feed-in Tariffs are policy mechanisms that guarantee renewable energy producer fixed premiums for feeding electricity into the grid. PPAs are bilateral contracts between generators and buyers, often with pre-defined price structures (IRENA et al., 2023).



Figure 3. De-Risking tools

Risk-Return Theory and De-Risking Mechanisms in Climate Mitigation Finance

Risk-Return theory is a foundational concept in finance that states there is a direct relationship between risk and expected return. Higher risks require higher returns to attract investments (Sharpe, 1964). This principal holds importance in context of climate mitigation projects in EMDEs, where projects face many risks.

Research Methodology

This research methodology outlines the approach employed to analyze the role of derisking mechanisms in mobilizing private finance for climate mitigation projects in **Emerging Market and Developing Economies (EMDEs)**, with a specific focus on India. Given the scope and objectives of the study, this research relies entirely on **secondary data**, drawing from reputable sources to ensure the validity and reliability of findings. The analysis will explore global de-risking mechanisms like blended finance, political risk insurance (PRI), partial credit guarantees, accessing them from India's lens. By looking at successful strategies from EMDEs, this review aims to identify scalable solutions that can align private capital with climate action. The aim is to provide actionable insights for policymakers and financial institutions seeking to accelerate climate finance flows in EMDEs.

Research Design

The study uses a **qualitative, descriptive research design** grounded in **secondary data analysis** of the time period 2017-2025. This approach is suitable for exploring complex issues related to climate finance, where understanding stakeholder perspectives, contextual factors, and policy implications is crucial. The research aims to examine the barriers to private climate mitigation finance, assess the de-risking mechanisms, and propose scalable solutions for EMDEs like India.

Data Collection

Data Type: The study uses **secondary data** to analyze the application and impact of derisking tools in mobilizing private climate finance.

Data Access: Data is accessed through institutional subscriptions, public databases, and credible online repositories. Proper citations are maintained to ensure transparency and academic integrity.

Analytical Framework

- **Theoretical Framework:** The study applies **risk-return theory** to understand how derisking tools adjust the risk-return balance and influence private investment decisions.
- **Risk Categorization:** Based on the literature, the risks have been analysed and concised down to three categories. These are the primary barriers in the context of climate mitigation projects in EMDEs.
 - Policy Risks: Regulatory uncertainty, political instability,

inconsistent policies.

• Financial Risks: High upfront costs, limited access to credit, currency volatility.

• Market Risks: Demand uncertainty, price volatility, and unstable revenue streams.

• Analysis of De-Risking Tools:

The study evaluates the role of eight de-risking tools for addressing the identified primary barriers to climate mitigation finance in India:

Political Risk	Blended Finance	Partial Credit	Foreign Currency
Insurance (PRI)		Guarantees (PCG)	Guarantees
Offtake Agreements	Public-Private Partnerships (PPPs)	Export Credit Agency (ECA) Support	Power Purchase Agreements (PPAs)/ feed-in Tariffs (FITs)

• Analytical Techniques:

• Thematic Analysis: Identifies recurring themes and patterns to understand the effectiveness of de-risking tools.

• **Comparative Analysis:** Assesses India's approach alongside other

EMDEs, like South Africa, Brazil, and Kenya, to identify successful strategies.

• Scope:

The research focuses on India's experience while drawing lessons from other EMDEs to understand the global applicability of de-risking mechanisms.

• Delimitations:

• The study is limited to **secondary data** due to time and resource constraints.

• The research is specific to private finance for **climate mitigation** projects, excluding adaptation measures.

• Limitations:

• The exclusive reliance on secondary data may limit the depth of country-specific insights.

• The rapidly evolving landscape of climate finance may affect

relevance of some data.

• Cross-country comparisons may not funny capture unique socioeconomic factors in each country.

Ethical Considerations

• All secondary data sources are appropriately cited to ensure academic integrity and avoid plagiarism.

• The research uses publicly accessible data, minimizing ethical risks

• Adherence to **APA 7th edition** citation style is maintained for proper referencing.

This research methodology employs a structured approach to assess the role of de-risking tools in attracting private finance for climate mitigation projects. By looking at comprehensive secondary data and backed by a theoretical framework, this study aims to provide actionable insights for policymakers, MDBs and private institutions. The findings will contribute to understanding the potential of de-risking mechanisms in India's climate finance landscape.

Analysis and Discussion

Analysis by Risk Category

1. Policy Risks:

India's climate mitigation projects face significant policy risks that deter private investment. These risks are majorly regulatory instability, political uncertainty, and land acquisition issues.

• **Regulatory instability** severely hinders private climate finance in India. Research shows unclear or frequently changing policies decrease financing success probability by 55% (Anjanappa, 2025). Additionally, the delayed implementation of India's climate finance

taxonomy for six months creates uncertainty, deterring potential investors (Bakshi, 2025b). Similar abrupt increases in solar import duties can disrupt project economics, forcing developers to renegotiate contracts and reducing investor confidence. Such inconsistent policies can create uncertainty and deter long term investments in climate projects.

• Land acquisition challenges further complicate the implementation of renewable energy projects. For instance, the 6,115 bigha (3.8 GW) solar park by Adani Renewable Energy Park Rajasthan Ltd (AREPRL) faced legal disputes over 1,452 bighas (~24% of the total land) after villagers claimed ancestral farming and grazing rights. The Rajasthan High Court canceled the allotment of this disputed land in 2021, leading to delays and increased costs. While exact cost escalation percentages are unavailable, experts note that new land registration laws in Rajasthan (2025) have increased land expenses by 8–10%, which could compound delays in project timelines (Padrikar R., 2021).

• Inadequate policy incentives also restrict private sector contribution. The Government of India's Production Linked Incentive (PLI) scheme allocated \$2.4 billion for solar manufacturing, yet only 12% of these funds were disbursed due to bureaucratic delays (NITI Aayog, 2023). While renewable energy receives considerable policy support, sectors like carbon capture receive limited incentives. There is no direct subsidy for Research and Development for Electric vehicle manufacturers in India (NITI Aayog, 2024). This narrow focus on select sectors restricts the diversity of investments in climate mitigation projects.

De-Risking Tools analyzed for Policy Risks:

To address these policy risks, several de-risking tools have been employed:

• **Political Risk Insurance (PRI):** PRI serves as a safety net against adverse government actions that could lead to significant monetary losses for investors (Marsh, 2025). While PRI is available in India, its accessibility and effectiveness for domestic investors in climate mitigation projects remain limited. International providers like the Multilateral Investment Guarantee Agency (MIGA) have supported projects in other emerging markets, such as a \$1.85 billion guarantee to HSBC Mexico for climate finance investments (MIGA, 2024). However, similar large-scale support for Indian projects is not evident.

• **Public-Private Partnerships (PPPs):** The Rewa Ultra Mega Solar Project in Madhya Pradesh is a compelling example of how PPPs can de-risk climate finance. The 750 MW solar park, developed by Rewa Ultra Mega Solar Limited (RUMSL) with support from the World Bank and IFC, achieved a record-low tariff of Rs. 2.97/kWh without viability gap funding, marking grid parity with coal-based power. Key de-risking measures included integrating institutional buyers like Delhi Metro, a three-tier payment security mechanism, shared infrastructure financing. All this under a PPP model ensured that revenue risks were mitigated, project was bankable and mobilized \$575 million in private investment (Das, 2024).



(Figure 4. The RUMS project following a PPP model, has lenders (IFC) financing to several developers. Power is then supplied under a PPA to DMRC and MPPMC)

• Export Credit Agency (ECA) Support: ECA also played a role in addressing policy risks in mitigation projects in India. The Export-Import Bank of USA (Ex-Im Bank) approved \$103.2 million in financing for solar transactions in India in 2011 (EXIM.GOV, n.d.). Due to general lack of available long-term financing at commercially feasible terms for solar projects in India at that time, this support was particularly important for accessing finance.

Effectiveness and Gaps

The effectiveness of these de-risking tools in protecting investors against policy risks in India has been mixed: 1. **Partial Protection**: While tools like PRI and PPPs offer some protection, they do not fully shield investors from all policy risks. The retroactive changes to PPAs in Gujarat demonstrate that significant policy risks persist despite these mechanisms.

2. Successful Examples: The Rewa Ultra Mega Solar project showcases how well-structured PPPs can effectively mitigate policy risks and attract private investment. However, such success stories are not widespread across all climate mitigation sectors in India.

3. **Remaining Barriers:** Lack of clarity in regulations and inconsistent policy enforcement continue to pose challenges. The absence of a standardized green finance taxonomy in India has led to fragmented classifications, increasing greenwashing risks and led to undermine investor confidence (Tandon, 2025).

Comparative Perspective

Other emerging markets have implemented effective strategies to manage policy risks:

• South Africa: The country has taken proactive steps to address climaterelated financial risks. The South African Reserve Bank (SARB) and other financial regulators have recognized climate change as a systemic risk to the financial system. In 2022, the Prudential Authority issued a communication reiterating that climate change poses a financial stability risk, demonstrating a clear regulatory stance on climate issues (South Africa, n.d.)

• **Brazil:** The country has shown broad engagement of the financial community in green finance initiatives. The Central Bank of Brazil (BCB) adopted

guidelines for environmental and social responsibility of financial institutions as early as 2014. In 2020, it launched a sustainability agenda aimed at promoting sustainable finance and incorporating sustainability variables into decision-making processes (Sustainable Finance Observatory, 2025).

These examples highlight the importance of clear regulatory frameworks and proactive engagement from financial regulators in managing policy risks effectively. India could benefit from adopting similar approaches to enhance investor confidence in climate mitigation projects.

2. Financial Risks

• **High upfront costs** are a primary deterrent. For context, solar photovoltaic (PV) installations in India cost **\$793 - \$916 per kW, which is 30-40% higher** than in developed countries. This is due to import duties, financing expenses, and underdeveloped local supply chains (IRENA, 2023). These costs are compounded by long gestation periods for large-scale solar projects, misaligned with investors' preferences for quicker returns. While small-scale solar projects take **6-8 months** to complete, large utility scale solar projects often require **several years** due to land acquisition, regulatory clearances and infrastructure development (Bellini, 2024). The consistent decline in solar tariffs has reduced profit margins, making the sector less appealing to long-term investors. India's solar tariffs hit a record low **of Rs. 1.99/kWh in 2020**, reducing returns and increasing risks for developers (Gulia et al.,2 022). According to **risk-return theory**, investors seek higher returns for higher risks, but uncertain returns disrupt this balance, deterring private finance (Sharpe, 1964).

• Limited access to affordable finance increases these challenges. Cost of renewable energy projects in India has a 24-32% higher cost compared to similar projects in the USA, because of much more developed capital markets and lower perceived risks (CPI, 2025b). Foreign investors also face **currency volatility**, for e.g., the Indian rupee depreciated by 11% against the US dollar from 2020 to 2023, increasing hedging costs by 7% and eroding returns (RBI, 2024b). Another example can be, a 500 MW solar park in Rajasthan experienced an 18% rise in project costs due to currency fluctuations, delaying its financial closure (IEEFA, 2022c).

• The misrepresentation of financial products or projects as environmentally sustainable also known as – **Greenwashing**, further decreases investor confidence.

De-Risking Tools analyzed for Financial Risks:

To address these financial risks, several de-risking tools have been employed in India:

• **Partial Credit Guarantees (PCGs):** PCGs are financial mechanisms where a guarantor assumes responsibility for a portion of the borrower's debt in case of default. In India, the Partial Risk Sharing Facility for Energy Efficiency (PRSF) Project, backed by the World Bank, aims to provide **\$37 million** in risk coverage to reduce the risks perceived by commercial institutions in financing energy efficiency projects (PRSF Project – SIDBI, n.d.). However, the effectiveness of PCGs in lowering borrowing costs and increasing access to credit for climate mitigation projects in India remains limited due to insufficient scale and institutional backing • **Blended Finance:** Blended finance initiatives, such as the International Solar Alliance's (ISA) Global Solar Facility (GSF), aim to catalyze solar investments in underserved segments. The GSF is set to receive a capital contribution of **\$35 million** to stimulate investments into solar power projects across Africa (International Solar Alliance, n.d.). While this demonstrates the potential of blended finance, similar large-scale initiatives specifically tailored for India's climate mitigation projects are still in nascent stages.

• Foreign Currency Guarantees: The Currency Exchange Fund (TCX) offers currency hedges between \$150 million and \$300 million with tenors of up to 30 years for renewable energy projects in India (IISD, 2025b). However, the accessibility and effectiveness of these guarantees for a broad range of climate mitigation projects in India remain limited, particularly for smaller-scale initiatives.

Effectiveness and Gaps

The effectiveness of these de-risking tools in improving access to affordable finance and mitigating currency volatility and high upfront costs in India has been mixed:

1. **Improved Access to Finance:** While tools like PCGs and blended finance have shown potential in improving access to finance, their impact in India has been limited. The PRSF project, for instance, aims to leverage funds and unlock private sector financing to over three times of World Bank funds. However, the scale of such initiatives remains insufficient to address the climate finance gap in India.

2. **Mitigation of Currency Volatility:** Foreign currency guarantees, such as those offered by TCX, have helped stabilize cash flows for some international investors.

However, their reach is limited, and they do not fully address the broader issue of currency risk for the majority of climate mitigation projects in India.

3. Addressing High Upfront Costs: The current de-risking tools have not sufficiently addressed the issue of high upfront costs for renewable energy projects in India. The cost disparity between India and developed countries in solar PV installations remains significant, indicating that more targeted interventions are needed.

Limitations of current de-risking tools include:

• **Restricted Market Reach:** Many de-risking instruments are not widely accessible to smaller-scale projects or local developers, limiting their overall impact on the market.

• **Inadequate Institutional Backing:** The scale of government and multilateral agency support for de-risking tools in India is not commensurate with the size of the climate finance gap.

• **Complexity:** The application process for many de-risking instruments is often complex and time-consuming, deterring potential beneficiaries.

Comparative Perspective

Analysing successful blended finance initiatives in other emerging markets provides valuable lessons for India:

• Kenya's Lake Turkana Wind Power Project: This project successfully utilized blended finance to become sub-Saharan Africa's largest wind power project. The

European Investment Bank provided €200 million in senior debt, while the EU-Africa Infrastructure Trust Fund contributed €25 million in preferred equity (LAKE TURKANA WIND POWER, n.d.). This structure helped mitigate risks and attract private investment, demonstrating the potential of well-structured blended finance initiatives.

• Rwanda's Climate Finance Partnership: Rwanda has developed innovative financial instruments with support from the World Bank-administered Climate Support Facility and Climate Investment Funds. These instruments aim to channel climate finance and leasing opportunities to businesses and entrepreneurs. The European Investment Bank recently signed a €20 million loan agreement with the Development Bank of Rwanda, which is part of a larger €100 million financing package to support Rwanda's green transition (Eib, 2023).

Lessons for India:

• **Diverse Financing Structures:** India can learn from Kenya's approach of combining different financial instruments (senior debt, preferred equity) to create a more attractive risk-return profile for investors.

• **Targeted Sector Support:** Rwanda's focus on developing specific financial instruments for climate-smart business development could be adapted to address India's sector-specific challenges, such as high upfront costs in solar PV installations.

• **Multilateral Partnerships:** Both Kenya and Rwanda have effectively leveraged partnerships with international financial institutions. India could explore similar collaborations to scale up its de-risking mechanisms.

• Technical Assistance: Rwanda's approach of combining financial instruments with technical assistance could be valuable for India in building capacity among local financial institutions and project developers.

3. Market and Technology Risks:

• Market uncertainties in emerging green sectors can create hesitancy among investors. India's EV market can be an example. EV adoption rate in India is only around 5% in 2024 due to limited charging infrastructure and consumer scepticism (MyGov, n.d.). Similarly, sustainable buildings in India represent less than 5% of real estate investments, despite their potential for long term cost savings (IIHS, 2023). Weak market demand can limit the scale and profitability of climate mitigation projects, discouraging private finance.

• Supply chain vulnerabilities also undermine project viability. India relies on imports from China for 85% of its solar modules, making projects vulnerable to geopolitical risks. During COVID-19 supply disruptions delayed approximately 3 GW of solar projects in India, exposing the risks of reliance on such external suppliers (Deshwal et al., 2021). Disruptions like these not only increase the cost of projects but also create an environment of uncertainty for investors, who fear potential delays and budget overruns. • Stranded asset risks pose a serious threat to investments in carbonintensive sectors. India's coal fired power plants, averaging 13 years in age, face potential write-offs of \$38 billion if phased out rapidly (Vasudha Foundation, 2018). The slow progress in implemented the **Carbon Credit Trading Scheme** (2022-2025) further increases uncertainty (Climate Risk Horizons, n.d.). Investors are uncertain about funding assets which may soon become financially unviable due to stricter climate policies and shifting market dynamics. As a result capital may be diverted away from such carbonintensive projects, impacting the financial stability and delaying country's energy transition.

• The lack of a clear **carbon pricing framework** adds to the market uncertainty. The absence of a formal carbon market limits investments in low-carbon projects. With a stable price, investors can't accurately evaluate the profitability their investments.

De-Risking Tools Analyzed for Market Risks:

• Offtake Agreements: Power Purchase Agreements (PPAs) have been a crucial tool in providing revenue stability for renewable energy projects. The Bhadla Solar Park in Rajasthan is a good example, where a 25-year PPA at a fixed tariff of ₹4.35 per unit provides long-term revenue visibility for the project developers (CARE Ratings Ltd., 2025). Such long-term agreements help mitigate demand uncertainty and price volatility risks. However, the effectiveness of PPAs has been challenged by instances of retroactive changes, as seen in Gujarat (Gupta, 2025b).

• Feed-in Tariffs (FiTs): India has dealt with feed-in tariffs, particularly for small-scale renewable projects. The Ministry of New and Renewable Energy (MNRE)

issued a clarification in 2018 calling for procuring power from small solar (less than 5 MW) and wind projects (below 25 MW) through feed-in tariffs determined by their respective State Electricity Regulatory Commissions (SERCs) (Prateek, S., 2018). While FiTs can provide price stability and incentivize investments, their implementation in India has been very limited

• **Blended Finance:** Blended finance initiatives have done well in stabilizing market demand and attracting private investment. India's blended finance market has grown at an annual rate of 18.8% from 2010 to 2022, reaching market size of USD 1.3 billion in 2022 (Dua et al., 2023). The energy sectors have dominated this market, accounting for approximately 65% of the market value. However, the average transaction sizes in India remain lower than both the global average and those of neighbouring Asian countries, indicating that there is a lot of room for growth and more such blended finance initiatives.

Analysis and Gaps

These de-risking tools in mitigating market risks in India have seen mixed results:

1. **Partial Mitigation of Risks:** While tools like PPAs and FiTs have provided some stability, they have not fully addressed market risks. The retroactive changes to PPAs in some states have undermined investor confidence, highlighting the need for more robust policy frameworks to support these agreements.

2. **Limited Scope**: The application of de-risking tools like FiTs has been limited to specific project sizes or sectors, leaving gaps in coverage for larger projects or

emerging technologies. This piecemeal approach may not provide comprehensive market risk mitigation across the entire spectrum of climate mitigation projects.

3. **Investor Perception:** Despite these tools, investor skepticism is there, particularly in emerging sectors like EVs and energy-efficient buildings. The low adoption rates in these sectors tell that current de-risking measures may not be sufficient to overcome market uncertainties and attract significant private investment (Niti Aayog, 2023).

4. **Supply Chain Challenges:** Existing de-risking tools have not adequately addressed supply chain vulnerabilities. The heavy dependence on imports for critical components remains a significant risk factor that current mechanisms do not fully mitigate.

Comparative Perspective

Comparing India's market stabilization strategies with those of Indonesia and Chile offers some good insights:

• Indonesia: Indonesia has also built its carbon market in a more comprehensive context for market stabilization. The country has introduced a carbon pricing (carbon taxes and a carbon offset credit mechanism) system to create a more predictable market for the financing of low-carbon investments. Indonesia's carbon market framework (established through Presidential Regulation No. 98 of 2021) seeks to create demand for carbon credits and to spark low-carbon technology investment. While the carbon pricing at present is too low to generate sufficient demand, this framework provides an initial structure for market stabilization/prediction for India to consider using as an alternative. • **Chile:** Chile's approach to market risk mitigation provides a different view. The country now has a National Finance Strategy (NFS) for climate change, which focuses on coordinating policies and mobilizing a range of financing sources for climate projects. Chile has also issued green sovereign bonds, for a total of USD 2,377 million, to pay for climate mitigation projects (Climate Bonds Initiative, n.d.). The approach of using sovereign financial instruments to support the green market may be worth considering for India; it may provide additional stability and confidence for private investors.

Table 1. De-Risking tools: Risks Addressed and Impact on Risk-Return Profile

De-Risking Tool	Type of Risk Mitigated	Impact on Risk-Return Profile
Political Risk Insurance	Policy Risk	Reduces policy uncertainty, lowering required return.
Partial Credit Guarantees (PCGs)	Financial Risk	Lowers borrowing costs, improving access to finance
Blended Finance	Financial and Market Risk	Absorbs early-stage risks, attracting private capital
Foreign Currency Guarantees	Financial Risk	Stabilizes cash flows, minimising currency risk.
Offtake Agreements	Market Risk	Secures predictable revenue, lowers market risk.
Public-Private Partnerships (PPPs)	Policy and Financial Risk	Shares risks, enhancing project viability
Export Credit Agency (ECA) Support	Policy and Financial Risk	Reduces political and payment risks, increasing investor confidence
Power Purchase Agreements (PPAs)/ (FITs)	Market Risk	Guarantees stable revenue, ensuring predictable returns.

Table 2.	Global	Best	Practices
----------	--------	------	------------------

Best Practice	Country	Key Insights	Potential Application in India
Public-Private Partnerships (PPPs)	Brazil	Brazil's successful use of PPPs to fund renewable energy projects has attracted significant private capital in large-scale solar and wind projects.	Implement similar PPP models for clean energy infrastructure, offshore wind, and battery storage. Extend PPP frameworks to clean transportation, including EV charging networks and mass rapid transit systems.
Green Banks	United Kingdom	Green banks mobilize low-cost financing for renewable energy by blending public and private funds, using concessional loans, guarantees, and technical assistance.	Establish a dedicated climate finance bank on the lines of IREDA to enable access to international climate funds and attract private capital into high-priority mitigation sectors.
Blended Finance Models	Indonesia	The SDG Indonesia One platform combines grants, concessional loans, and commercial capital to fund renewable energy and sustainable infrastructure projects.	Expand existing blended finance initiatives by creating sector-specific funds for solar PV manufacturing and EV adoption, offering credit enhancements and first-loss guarantees.
Risk Mitigation Instruments	South Africa	Deployed partial credit guarantees and political risk insurance to attract foreign direct investment in renewable energy projects.	Scale up similar instruments through multilateral partnerships with the World Bank or Green Climate Fund's Private Sector Facility. Use partial credit guarantees to lower borrowing costs for solar developers and political risk insurance to address regulatory concerns in clean transportation.
Capital Market Innovations	India (Existing), Global Example	Green bonds help de-risk investments, but the corporate bond market remains underdeveloped. Instruments like Infrastructure Investment Trusts (InvITs) can help recycle capital.	Strengthen the corporate bond market with regulatory reforms such as tax incentives for green bond issuances and credit enhancements to unlock more private capital for mitigation projects. Leverage InvITs for operational renewable energy assets.
Data Transparency & Standardization	Germany	Standardized green finance taxonomies improve investor confidence and ensure transparency.	India's proposed green finance taxonomy should prioritize harmonization with global standards while addressing local needs. A robust MRV system will enhance risk assessment and attract international investors.

Analysis Conclusion

India's approach to de-risking private climate finance shows mixed value across policy, financial, and market risk categories. While tools like PPAs, PCGs, and blended finance have improved access to capital in specific sectors, some gaps still persist. Policy risks remain inadequately addressed due to regulatory instability and weak enforcement. Financial risks,

including high borrowing costs and currency volatility continue to deter private and foreign investors. Market risks highlight the systemic demand uncertainties and supply chain vulnerabilities unresolved by available instruments.

It is important to recognize that the issue extends beyond the implementation phase. India's limited pipeline of **bankable projects** often deter private investors, requiring interventions like **Technical Assistance (TA) and Advisory Services** from Multilateral Development Banks (MDBs) and Development Finance Institutions (DFIs) to make sure the projects are viable and investment ready.

For policymakers, these findings highlight the urgency of stabilizing regulatory frameworks and expanding guarantees to mitigate such risks. Blended models must be prioritised and standardizing green taxonomies becomes important.

The analysis reveals three priority areas for improvement:

1. **Enhancing regulatory credibility** through transparent enforcement mechanisms.

2. Strengthening institutional capacity to deploy de-risking tools at scale

3. Innovating **risk-sharing instruments** tailored to India's unique market dynamics.

Policy Recommendations

1. Regulatory Reforms and Institutional Framework:

• Strengthen Policy Consistency and Regulatory Certainty

- Establish a dedicated Climate Finance Regulatory Authority to standardize regulations across states and ensure policy continuity beyond electoral cycles.

- Develop a national policy on sanctity of contracts that explicitly prohibits retroactive changes to PPAs and other climate finance agreements, with clear consequences for violations

- Create a specialized dispute resolution mechanism for climate finance contracts, ensuring timely resolution within defined timeframes (120 days maximum).

Streamline Land Acquisition Processes

- Create a unified land bank specifically for renewable energy and other climate mitigation projects, with pre-cleared titles and environmental clearances.

- Implement digital land record management systems integrated with the PM Gati Shakti portal to identify optimal project locations and minimize acquisition conflicts

- Establish standardized compensation frameworks for land acquisition based on market values and future income potential.

- Formulate a comprehensive, legally binding green finance taxonomy aligned with international standards but adapted to India's development context.

- Mandate independent third-party verification for all green-labelled financial products to prevent greenwashing.

- Establish gradual implementation timelines with clear disclosure requirements for different asset classes.

2. Financial Innovation and Risk Mitigation Instruments:

• Scale Up Blended Finance:

- Create a National Climate Finance Facility that combines public, private, and philanthropic capital to fund high-risk, early-stage climate projects.

- Design sector-specific blended finance vehicles for underserved areas like energy efficiency, and industrial de-carbonization .

- Leverage multilateral climate funds to provide first-loss capital that can absorb initial risks and attract commercial investors.

• Deploy Advanced Credit Enhancement Mechanisms:

Scale up partial credit guarantee programs to cover at least 3050% of principal for qualifying climate mitigation projects, prioritizing
first-time borrowers and innovative technologies.

- Implement portfolio guarantees rather than project-specific guarantees to reduce transaction costs and increase coverage.

-Introduce tiered guarantee structures where coverage decreases over time as projects establish track records.

Harness Blockchain Technology

- Develop a standardized reporting framework that leverages blockchain to provide real-time verification of green impact metrics.

- Create regulatory sandboxes to test blockchain applications in climate finance before full-scale deployment.

3. Strategic Partnerships and Capacity Building:

• Strengthen Public-Private Partnerships

- Develop standardized PPP frameworks specifically for climate mitigation projects across different sectors.

- Implement risk-sharing mechanisms within PPP contracts where the government assumes policy risks while private parties manage operational and market risks.

• International Climate Finance Collaborations

- Create joint risk mitigation facilities with multilateral development banks that combine guarantees, technical assistance, and policy support.

- Develop country platforms that coordinate climate finance flows from multiple international sources to priority sectors.

- Establish South-South cooperation mechanisms to share knowledge and resources with other EMDEs facing similar climate finance challenges.

4. Enhance Technical Assistance (TA) Programs:

• Capacity Building

Establish a dedicated Climate Finance Technical Assistance
 Facility to support the development of bankable climate mitigation projects
 across various sectors.

- Provide targeted TA to private project developers, focusing on early-stage project development, feasibility studies, and financial structuring to create a robust pipeline of investable projects.

- Develop comprehensive TA programs to strengthen the capacity of key institutions like NABARD and IREDA in structuring and managing climate finance instruments.

• Market Development and Cross-Sector Coordination

- Implement TA programs to support the development of financial products, such as climate-linked bonds and resilience bonds, tailored to India's market conditions.

- Establish a Climate Finance Coordination Unit on the lines of Climate Change Finance Unit (CCFU, Dept. of Economic Affairs) that provides TA to align efforts across government departments, financial institutions, and private sector actors.

Table 3. Policy Recommendations

Policy	Recommendations	Key Actions
Area		
Regulatory Reforms	Strengthen Policy Consistency	 Establish Climate Finance Regulatory Authority Prohibit retroactive PPA changes Specialized dispute resolution (120 days)
	Streamline Land Acquisition	 Unified land bank with pre-cleared titles Digital land records integrated with PM Gati Shakti portal Standardized compensation frameworks
	Develop Green Finance Taxonomy	 Legally binding taxonomy Mandate third-party verification Gradual implementation timelines
Financial Innovations	Scale Up Blended Finance	 National Climate Finance Facility Sector-specific blended finance vehicles Leverage multilateral funds for first-loss capital
	Deploy Credit Enhancement Mechanisms	 Expand partial credit guarantees (30-50% coverage) Portfolio guarantees to reduce costs Tiered guarantee structures
	Use Blockchain Technology	Real-time verification of green metricsRegulatory sandboxes for blockchain applications
Strategic Partnerships	Strengthen Public-Private Partnerships	 Standardized PPP frameworks for climate projects Risk-sharing mechanisms within PPP contracts
	Enhance International Collaborations	 Joint risk mitigation facilities with MDBs Coordinate international climate finance flows through country platforms
Capacity Building	Establish Technical Assistance Programs	 Climate Finance Technical Assistance Facility for bankable projects Targeted support to NABARD and IREDA
	Market Development	 Develop innovative financial products (e.g., climate bonds) Climate Finance Coordination Unit for cross-sector alignment

Conclusion

Mobilizing private climate finance is essential for attaining global climate goals, especially in emerging market & developing economies (EMDEs) such as India. This research has identified a number of obstacles to obtaining private investment in climate mitigation projects: financial, policy, and market risks. The study underscores the role of de-risking mechanisms in creating an enabling environment for private mitigation finance. In terms of effective resolution to the identified barriers, key findings of this research underline the need for regulatory reform, financial innovation, strategic partnerships, and technical assistance. Regulatory reform can recommence with the establishment of a Climate Finance Regulatory Authority, including initiatives to simplify processes to acquire land, and develop a standard taxonomy on green financing. Likewise, financial innovation such as blended finance, partial credit guarantees, and blockchain can minimize risk exposure in financing climate action and provide greater transparency to stakeholders. Strategic partnerships with international bodies can build resources and expertise while developing technical assistance programs to build capacity across institutions and sectoral work. While the role of private finance is widely established, it is estimated to account for more than 60% of the \$2.8 trillion annual financing gap needed by 2030. To achieve its ambitious climate targets which include net-zero emissions by 2070, India will require massive private support along the required climate finance path of roughly \$120 billion a year.

India's de-risking model for climate finance can be a reference point for other EMDEs with similar challenges. By leveraging best practices from around the world and adapting them to its specific socio-economic and regulatory context, India can develop a scalable and replicable model for mobilizing private climate finance.

Overall, closing the climate finance gap in India and other EMDEs calls for an integrated approach with policy reforms, financial innovations, strategic alliances, and technical support. With the implementation of these steps, India can not only fulfill its climate obligations but also make a sizeable contribution towards global action on climate change.

Policy Relevance

The recommendations proposed in this research align closely with India's Nationally Determined Contributions (NDCs), Sustainable Development Goal 7 (Affordable and Clean Energy), and SDG 13 (Climate Action), while also offering valuable insights for international climate forums like COP30.

<u>Alignment with India's NDCs</u>

India's updated NDCs include achieving 500 GW of non-fossil fuel electricity capacity by 2030, meeting 50% of energy requirements from renewable sources, and reducing emissions intensity by 45% from 2005 levels. The proposed de-risking mechanisms directly support these targets by addressing barriers to private investment in renewable energy and other mitigation projects. The standardized green finance taxonomy and regulatory certainty framework would create an enabling environment for scaling up renewable capacity, while the blended finance facilities and risk-sharing mechanisms would help mobilize the capital needed to achieve the 500 GW target. The carbon pricing mechanism recommendation aligns with India's commitment to reduce emissions intensity, providing economic incentives for businesses to adopt cleaner technologies. Similarly, the land acquisition reforms would accelerate the deployment of largescale renewable projects, contributing to the 50% renewable energy target.

Contribution to SDG 7 and SDG 13

SDG 7 aims to ensure access to affordable, reliable, sustainable, and modern energy for all. The recommendations support this goal by addressing financial barriers that currently limit the expansion of renewable energy in India. The proposed financial innovations, particularly sustainability-linked bonds and blended finance facilities, would increase the flow of capital to renewable energy projects, making clean energy more accessible and affordable.

SDG 13 calls for urgent action to combat climate change and its impacts. The comprehensive de-risking framework proposed in this research would accelerate climate mitigation efforts in India, contributing to global climate action. The strategic partnerships and technical assistance consortium would enhance India's capacity to implement effective climate policies and projects, aligning with SDG 13's emphasis on strengthening resilience and adaptive capacity.

Relevance to International Climate Dialogues

As the world turns its eyes to COP30, the results of this study provide much food for thought for international climate negotiations, especially in terms of climate finance for EMDEs. The models of public-private risk-sharing and multilateral guarantee platforms we put forward could potentially contribute to thinking and discussions on improving international climate finance effectiveness. Likewise, the advocacy for India becoming a regional climate finance hub is consistent with the emphasis on South-South cooperation for climate action. By sharing its own experiences and capabilities with other EMDEs, India can place itself in a leadership role in the discussion of climate finance solutions aimed ultimately at helping developing economies overcome the challenges of climate finance. Examining the successful de-risking strategies of other countries, like South Africa, Brazil, Kenya and Chile, gives an international picture of successful work - and comparison between countries can only contribute to a more fruitful international conversation on best practices in climate finance. These case studies show that customized de-risking approaches that are tailored to local circumstances is crucial for effectively mobilizing climate finance. By implementing the recommended de-risking mechanisms, India could showcase a model for effective private sector engagement in climate action, potentially influencing the development of the NCQG framework as part of the Baku to Belem Roadmap at COP30 and beyond.

Ethical Considerations

Transparency in Data Collection and Analysis

This study has depended on secondary data from credible sources, such as international institutions, national think tanks, industry reports, and government documents. All sources of data have been accurately referenced to uphold academic integrity and transparency. Nevertheless, there are some limitations in the data utilized that should be noted:

1. Data Gaps: The fast-moving climate finance landscape implies that some of the data are not fully reflective of recent developments. Future studies would be helped by better and more recent data for private climate finance flows to India. 2. Methodological Transparency: The analysis has used thematic and comparative methods in assessing de-risking mechanisms. These approaches are insightful but may fall short of capturing all the intricacies of the climate finance ecosystem.

3. Potential Biases: The reliance on published reports and studies may introduce selection biases, as successful initiatives are more likely to be documented than failures. A more balanced assessment would require systematic documentation of both successful and unsuccessful climate finance interventions.

Ethical Impact of De-Risking Mechanisms

The proposed de-risking mechanisms aim to accelerate climate mitigation efforts, but their implementation raises several ethical considerations:

1. **Distributional Justice:** De-risking tools like partial credit guarantees and blended finance may disproportionately benefit large-scale projects and established developers, potentially excluding smaller, community-based initiatives. The recommended technical assistance consortium should prioritize support for smaller actors to ensure more equitable access to climate finance.

2. **Community Rights:** In designing land acquisition reforms, community rights should be recognized, especially for affected local communities, Indigenous peoples and tenure security. Proposed "green corridor" approval systems should have sufficient and appropriate requirements for community consultation, free prior and informed consent, and fair compensation for the affected communities.

3. **Transparency and Accountability:** The proposed blockchain-based green asset registry and standardized taxonomy should ensure strong governance protocols are in place to avoid manipulation and ensure accountability. The public should be able to access information on funded projects and their outcomes to increase trust in the climate finance system.

4. **Just Transition:** Restructuring to a low carbon economy in India, for example, implies that workers and communities dependent on carbon-intensive inputs will endure economic challenges. De-risking strategies should incorporate just transition policies to ensure that affected communities are supported in the transition through skills programs and alternative livelihoods.

5. **Intergenerational Equity:** Climate finance decisions made today will have implications for future generations. Proposed long-term incentive structure should favour projects with sustainable benefits over projects which have a localized, short-term benefit, but could have larger negative implications for future generations.

By addressing these ethical considerations in the design and implementation of de-risking mechanisms, India can ensure that its climate finance approach not only accelerates mitigation efforts but also promotes social equity, respects human rights, and contributes to sustainable development for all.

BIBLIOGRAPHY

African Development Bank. (2022). *Sustainable Energy Fund for Africa: Annual report* 2022.

https://www.afdb.org/sites/default/files/documents/publications/2022sefaannualreportlr.pdf

Asian Development Bank. (2023). *Green bonds for municipalities in Southeast Asia*. <u>https://www.adb.org/sites/default/files/publication/1019361/green-bonds-municipalities-</u> southeast-asia.pdf

Asian Development Bank. (2024, July 19). *People's Republic of China: In-Depth.* https://www.adb.org/where-we-work/prc/overview

Anjanappa, J. (2025, January 31). Overcoming Barriers to Climate Finance: A Logistic

Regression Analysis of India's Nationally Determined Contributions (NDCs). Available at

SSRN: <u>https://ssrn.com/abstract=5119825</u> or <u>http://dx.doi.org/10.2139/ssrn.5119825</u>

Bakshi, P. (2025, February 13). Lost in Transition: India's climate finance taxonomy. The

Secretariat. https://thesecretariat.in/article/lost-in-transition-india-s-climate-finance-taxonomy

Bazilian, M., & Chattopadhyay, D. (2018). Powering India: Making the case for secure,

inclusive and sustainable energy. Brookings Institution. https://www.brookings.edu/wp-

content/uploads/2018/09/India-Renewable-Power-v10.pdf

Bellini, E. (2024, January 29). PV commissioning times up by 6 months over past 20 years, claim scientists. Pv Magazine International. <u>https://www.pv-</u>

magazine.com/2024/01/29/commissioning-times-of-solar-projects-increased-by-0-5-years-inpast-two-decades/ BloombergNEF. (2022, June 21). \$223bn investment needed for India to meet 2030 wind and solar goals. *BloombergNEF*. <u>https://about.bnef.com/blog/223bn-investment-needed-for-</u>

india-to-meet-2030-wind-and-solar-goals/

Bruegel. (2025, March 24). The economic case for climate finance at scale.

https://www.bruegel.org/policy-brief/economic-case-climate-finance-scale

Carbon markets. (2022, May 18). UNDP Climate Promise.

https://climatepromise.undp.org/what-we-do/areas-of-work/carbon-markets

CARE Ratings Ltd. (2025, February 11). Press release [Press-release]. Rising Bhadla 1

Private Limited.

https://www.careratings.com/upload/CompanyFiles/PR/202502120256_Rising_Bhadla_1_Privat

e_Limited.pdf

Choi, E. (n.d.). How to de-risk low-carbon investments. World Resources Institute.

https://www.wri.org/insights/de-risking-low-carbon-investments

Climate change and sovereign risk. (2020, December 22). Asian Development Bank.

https://www.adb.org/publications/climate-change-and-sovereign-risk

Climate Bonds Initiative. (n.d.). *Chile sovereign green bond framework*.

https://www.climatebonds.net/files/files/Chile%20Sovereign%20Green%20Bond%20Framewor

<u>k.pdf</u>

Climate Investment Funds. (n.d.). Public-private partnerships in power transmission in

Africa. https://www.cif.org/sites/cif_enc/files/knowledge-

documents/ppp_in_power_transmission_in_africa_1.pdf

Climate Policy Initiative. (2024). A decade of climate finance innovation: Impact lessons from the Lab. <u>https://www.climatepolicyinitiative.org/wp-content/uploads/2024/09/Lab-10th-</u> <u>anniversary-publication.pdf</u>

Climate Policy Initiative. (2024, January 22). Blended Finance.

https://www.climatepolicyinitiative.org/the-topics/blended-finance/

Climate Policy Initiative. (2025, March 29). Climate Risks and Opportunities.

https://www.climatepolicyinitiative.org/publication/climate-risks-and-opportunities/

Climate Policy Initiative. (2025, March 29). Global Landscape of Climate Finance 2023.

https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/

Climate Policy Initiative. (2025d, April 3). Solving India's renewable energy financing challenge: Instruments to provide low-cost, long-term Debt - CPI. CPI.

https://www.climatepolicyinitiative.org/publication/solving-indias-renewable-energy-financingchallenge-instruments-to-provide-low-cost-long-term-debt/

Climate Policy Initiative. (2025c, March 29). *Landscape of Green Finance in India* 2024. https://www.climatepolicyinitiative.org/publication/landscape-of-green-finance-in-india-2024/

Council on Energy, Environment and Water. (2019). *Green bonds for renewable energy* and electric transport in India. <u>https://www.ceew.in/sites/default/files/ceew-study-on-</u> greenbonds-for-renewable-energy-and-electric-transport-india-17Jun19.pdf

Climate Risk Horizons. (n.d.). *India's carbon market needs more than good intentions to succeed*. <u>https://climateriskhorizons.com/blogs/india%E2%80%99s-carbon-market-needs-more-than-good-intentions-to-succeed-d721882c/</u>

Council on Energy, Environment and Water. (2023). *Developing resilient renewable* energy supply chains for global clean energy transition. https://www.ceew.in/sites/default/files/developing-resilient-renewable-energy-supply-chains-forglobal-clean-energy-transition.pdf

Council on Energy, Environment and Water. (2023). *India must aim for 600 GW clean* energy to meet rising electricity needs and power demand by 2030. <u>https://www.ceew.in/press-</u> releases/india-must-aim-for-600-gw-clean-energy-to-meet-rising-electricity-needs-and-powerdemand-by-2030

Das, T. K. (2024, August 22). 750 MW Rewa Ultra Mega Solar Limied (RUMSL): Things to know. Solar Energy, Solar Company. <u>https://dasenergie.com/blog/rewa-ultra-mega-solar-</u> power-plant-overview/

Department of Mineral Resources and Energy, South Africa. (2023). South African energy sector report 2023.

https://www.dmre.gov.za/Portals/0/Resources/Publications/Reports/Energy%20Sector%20Report ts/SA%20Energy%20Sector%20Report/2023-South-African-Energy-Sector-

<u>Report.pdf?ver=6TOu3ZWrjDaMhxVQWcR3vQ%3D%3D</u>

Deshwal, D., Sangwan, P., & Dahiya, N. (2021). How will COVID-19 impact renewable energy in India? Exploring challenges, lessons and emerging opportunities. *Energy Research & Social Science*, 77, 102097. <u>https://doi.org/10.1016/j.erss.2021.102097</u>

Dua, A., Chauhan, S., Menon, M., Shah Gupta, S., Asha Impact Trust, Pai, R., Pinge, D., & The Blended Finance India Narrative. (2023). The Blended Finance India narrative. In *The Blended Finance India Narrative*. <u>https://ashaventures.in/wp-content/uploads/2023/05/The-</u> <u>India-Blended-Finance-Narrative-Report-1.pdf</u> Eib. (2023, December 13). COP28: Rwanda Climate Finance Partnership Powers

Innovative Climate Action. European Investment Bank. <u>https://www.eib.org/en/press/all/2023-</u> 491-rwanda-climate-finance-partnership-powers-innovative-climate-action

ENS Economic Bureau, & ENS Economic Bureau. (2024, September 6). MIGA and ISA launch solar facility to accelerate global solar energy adoption. *The New Indian Express*. <u>https://www.newindianexpress.com/business/2024/Sep/06/miga-and-isa-launch-solar-facility-to-</u>

accelerate-global-solar-energy-adoption

Ex-IM Bank announces \$103.2 *million in export financing for solar projects in India / EXIM.GOV.* (n.d.). <u>https://www.exim.gov/news/ex-im-bank-announces-1032-million-export-</u> <u>financing-for-solar-projects-india</u>

Finserv, B. (2024, November 7). Portfolio risk.

https://www.bajajfinserv.in/investments/portfolio-risk

Fraunhofer Institute for Solar Energy Systems ISE. (2024). *Recent facts about photovoltaics in Germany*.

https://www.ise.fraunhofer.de/content/dam/ise/en/documents/publications/studies/recent-factsabout-photovoltaics-in-germany.pdf

Fund, G. C. (2024, February 4). *Launch of Green Guarantee Company to mobilise billions in climate*. Green Climate Fund. <u>https://www.greenclimate.fund/news/launch-green-</u> guarantee-company-mobilise-billions-climate-finance

Garbacz, W., Vilalta, D., & Moller, L. (2021). THE ROLE OF GUARANTEES IN BLENDED FINANCE. In OECD, *OECD DEVELOPMENT CO-OPERATION WORKING PAPER* (p. 97). OECD Publishing. https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/06/the-role-ofguarantees-in-blended-finance_cef700a2/730e1498-en.pdf

Gouled, M. (2024, August 23). 5 Ways to unlock private capital to tackle climate change.

World Bank Blogs. https://blogs.worldbank.org/en/voices/5-ways-to-unlock-private-capital-to-

tackle-climate-change

Gulia, J., Garg, V., Akhil Thayillam, & Prabhakar Sharma. (2022). *Solar tariffs to rise by* ~21% in the next 12 months. <u>https://jmkresearch.com/wp-content/uploads/2022/05/Solar-Tariffs-</u>to-Rise-by-_21-in-the-Next-12-Months_May-2022.pdf

Gupta, M. (2025, March 4). GERC reviews dispute over retrospective energy accounting revisions and recovery actions in Gujarat. *SolarQuarter*.

https://solarquarter.com/2025/03/04/gerc-reviews-dispute-over-retrospective-energy-accountingrevisions-and-recovery-actions-in-gujarat/

Hussain, F. I., & Dill, H. (2023). India Incorporates Green Bonds into Its Climate

Finance Strategy. World Bank Blogs. https://iihs.co.in/knowledge-gateway/wp-

content/uploads/2023/11/20231128_Climate-Finance-in-India2023.pdf

International Institute for Sustainable Development. (2025). Credit enhancement

instruments: The Currency Exchange Fund (TCX). Available at https://www.iisd.org/credit-

enhancement-instruments/institution/currency-exchange-fund/

India Energy Outlook 2021 – Analysis. (2021, February 1). IEA.

https://www.iea.org/reports/india-energy-outlook-2021

International Energy Agency, International Renewable Energy Agency, & REN21.

(2018). Renewable energy policies in a time of transition. https://www.irena.org/-

/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_IEA_REN21_Policies_2018.pdf

IRENA, Roesch, R., Gorini, R., Taylor, M., Ralon, P., Al-Zoghoul, S., Wagner, N.,

Jimenez Navarro, J. P., Dhavle, J., Lim Go, S., Boshell, F., Van Zwieten, R. W., Vivares, S., Singh, G., Sivaram, V., Gottlieb, M., Sidhu, G., Dutt, A., Etschmann, D., . . . Kaur, K. (2023). Low-cost finance for the energy transition. In Ministry of New and Renewable Energy of India & The Group of Twenty (G20), *International Renewable Energy Agency*.

https://www.irena.org/-

/media/Files/IRENA/Agency/Publication/2023/May/IRENA_Low_cost_finance_energy_transiti on_2023.pdf

International Finance Corporation. (2023). Blended finance for climate investments in India. <u>https://www.ifc.org/content/dam/ifc/doc/2023/Report-Blended-Finance-for-Climate-</u> Investments-in-India.pdf

IFC. (2021). Partial credit guarantees [Report].

https://www.ifc.org/content/dam/ifc/doc/2023/ifc-product-description-partial-credit-

gurantees.pdf

International Institute for Sustainable Development. (n.d.). Risk allocation in public-

private partnerships: Maximizing value for money [Discussion paper].

https://www.iisd.org/system/files/publications/risk-allocation-ppp-maximizing-value-for-money-

discussion-paper.pdf

International Monetary Fund. (2023). Global financial stability report – October 2023:

Chapter 3. https://www.imf.org/-

/media/Files/Publications/GFSR/2023/October/English/ch3.ashx

International Monetary Fund. (2024). IMF working paper 2024/167.

https://www.imf.org/-/media/Files/Publications/WP/2024/English/wpiea2024167-print-pdf.ashx

International Renewable Energy Agency. (2020). Renewable energy statistics 2020.

https://www.irena.org/-

/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020. pdf

International Renewable Energy Agency. (2024). *Renewable power generation costs in* 2023. <u>https://www.irena.org/-</u>

/media/Files/IRENA/Agency/Publication/2024/Sep/IRENA_Renewable_power_generation_cost s_in_2023.pdf

International Solar Alliance's Global Solar Facility set to receive a capital contribution of \$35 million dollars. (n.d.). PIB.

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1973514®=3&lang=1

Internationale Klimaschutzinitiative (IKI). (n.d.). *Blended Finance – a powerful tool to scale up private climate and biodiversity finance*. <u>https://www.international-climate-</u> <u>initiative.com/en/iki-media/news/blended-finance-a-powerful-tool-to-scale-up-private-climate-</u> <u>and-biodiversity-finance/</u>

Kumar, R., & Singh, A. (2023). *Electric vehicle adoption in India: Challenges and policy interventions*. <u>https://www.ijmh.org/wp-content/uploads/papers/v9i5/E1550019523.pdf</u>

LAKE TURKANA WIND POWER. (n.d.). European Investment Bank.

https://www.eib.org/en/projects/all/20090484

Marsh. (n.d.). Political Risk Report 2025. <u>https://www.marsh.com/sg/services/political-risk/insights/political-risk-report.html</u>

Masse, P. L. P. (2025, January 10). The scalability of Credit-Enhanced EM Climate Debt: What role can guarantees, collateralization, securitizations, and investment funds play? IMF. <u>https://www.imf.org/en/Publications/WP/Issues/2025/01/10/The-Scalability-of-Credit-</u> Enhanced-EM-Climate-Debt-What-Role-Can-Guarantees-560546

Mayer Brown. (2019). *Export credit agencies and political risk insurers in international project financing*. <u>https://www.mayerbrown.com/-/media/files/perspectives-</u>

events/publications/2019/05/export-credit-agencies-and-political-risk-insurers-in-internatinalproject-financing_v5.pdf

MyGov, T. (n.d.). Driving the Future – Join NITI Aayog Led Shoonya campaign's webinar on EVs and clean mobility in India. <u>https://blog.mygov.in/editorial/driving-the-future-join-niti-aayog-led-shoonya-campaigns-webinar-on-evs-and-clean-mobility-in-india/</u>

Ngala Killian Chimtom, & Ngala Killian Chimtom. (2024, September 17). *Climate extremes cost African economies billions, threatening growth & poverty alleviation efforts*. Down to Earth. <u>https://www.downtoearth.org.in/africa/climate-extremes-cost-african-</u> <u>economies-billions-threatening-growth-poverty-alleviation-efforts</u>

NITI Aayog. (2023). Status quo analysis of various segments of electric mobility and low-carbon passenger road transport in India. <u>https://www.niti.gov.in/sites/default/files/2023-</u>03/Status-Quo-Analysis-of-Various-Segments-of-Electric-Mobility-And-Low.pdf

NITI Aayog. (2023). EV adoption in India.

https://www.niti.gov.in/sites/default/files/2023-07/Niti-Aayog_Report-

VS_compressed_compressed.pdf

Opportunities in the net zero transition – a look at export credit agencies. (2024, March 11). <u>https://www.gbm.hsbc.com/en-gb/insights/sustainability/opportunities-in-the-net-zero-</u>transition-a-look-at-export-credit-agencies

Organisation for Economic Co-operation and Development (OECD). (2021). *The role of guarantees in blended finance*.

https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/06/the-role-of-guaranteesin-blended-finance_cef700a2/730e1498-en.pdf

Organisation for Economic Co-operation and Development (OECD). (2023). *Climate finance provided and mobilised by developed countries in 2013-2021*.

https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/11/climate-financeprovided-and-mobilised-by-developed-countries-in-2013-2021_517fec8e/e20d2bc7-en.pdf

Organisation for Economic Co-operation and Development (OECD). (2023). *Scaling up the mobilisation of private finance for climate action in developing countries.*

https://www.oecd.org/en/publications/scaling-up-the-mobilisation-of-private-finance-for-

climate-action-in-developing-countries_17a88681-en.html

Pardikar, R. (2021, August 16). A dharna here, a court victory there: How Rajasthan villages try to keep their land from solar firms. *Down to Earth*.

https://www.downtoearth.org.in/renewable-energy/a-dharna-here-a-court-victory-there-howrajasthan-villages-try-to-keep-their-land-from-solar-firms-78479

Prateek, S. (2018, February 6). Feed-In tariffs to make a comeback in India for small

solar and wind projects. Mercom India. https://www.mercomindia.com/feed-in-tariff-solar-wind

PRSF Project - Small Industries Development Bank of India. (n.d.).

https://www.sidbi.in/prsf-project

Pti. (2025b, January 2). Lack of tech transfer slowing climate action in India: Govt to

UNFCCC. *The Economic Times*. <u>https://economictimes.indiatimes.com/news/india/lack-of-tech-</u>transfer-slowing-climate-action-in-india-govt-to-unfccc/articleshow/116886426.cms

Schwerhoff, F. J. K. P. (2024, October 8). *Policies to foster Green FDI: best practices for emerging market and developing economies*. IMF. <u>https://www.imf.org/en/Publications/staff-</u> <u>climate-notes/Issues/2024/10/08/Policies-to-Foster-Green-FDI-Best-Practices-for-Emerging-</u> Market-and-Developing-Economies-555062

South Africa. (n.d.). Climate Governance Initiative. <u>https://hub.climate-</u> governance.org/Primer/Geography/za

Swiss Re Institute. (2021). The economics of climate change: no action not an option. In *Swiss Re Institute* (p. 1). <u>https://www.swissre.com/dam/jcr:e73ee7c3-7f83-4c17-a2b8-</u>

8ef23a8d3312/swiss-re-institute-expertise-publication-economics-of-climate-change.pdf

Swiss Re Corporate Solutions. (2023). CorSo guide of parametric insurance.

https://corporatesolutions.swissre.com/dam/jcr:0cd24f12-ebfb-425a-ab42-0187c241bf4a/2023-

01-corso-guide-of-parametric-insurance.pdf

Tandon, A. (2025, February 14). *Taxonomy for climate finance remains the missing link in India's green transition*. Mongabay-India. <u>https://india.mongabay.com/2025/02/taxonomy-</u>for-climate-finance-remains-the-missing-link-in-indias-green-transition/

TCX Fund. (2023). Green energy projects in Africa. https://www.tcxfund.com/wp-

content/uploads/2023/05/Green-energy-project-in-Africa_-MFW4A-_-TCX.pdf

Tiwari, S. (2025, April 2). *Transforming India's Climate Finance through Sector-Specific Financial Institutions*. CPI. <u>https://www.climatepolicyinitiative.org/transforming-indias-climate-finance-through-sector-specific-financial-institutions/</u>

UK Government. (2024). Contracts for difference (CfD) allocation round 4 results.

https://assets.publishing.service.gov.uk/media/65b1463d160765000d18f834/contracts-for-

difference-cfd-allocation-round-4-results.pdf

UNCTAD. (2025). Policy monitor: investment. In Policy Monitor.

https://unctad.org/system/files/official-document/diaepcbinf2025d1_en.pdf

Vasudha Foundation. (2018). India's stranded assets: A ticking carbon bomb.

https://www.vasudha-foundation.org/wp-content/uploads/India%E2%80%99s-stranded-

assets_September-2018.pdf

World Bank. (2022). PPI 2022 annual report.

https://ppi.worldbank.org/content/dam/PPI/documents/PPI-2022-Annual-Report.pdf

World Economic Forum. (2024). Unlocking private sector investment into natural

climate solutions in India.

https://www3.weforum.org/docs/WEF_Unlocking_Private_Sector_Investment_into_Natural_Cli

mate_Solutions_in_India_2024.pdf

World Energy Investment 2023 – Analysis. (2023, May 1). IEA.

https://www.iea.org/reports/world-energy-investment-2023