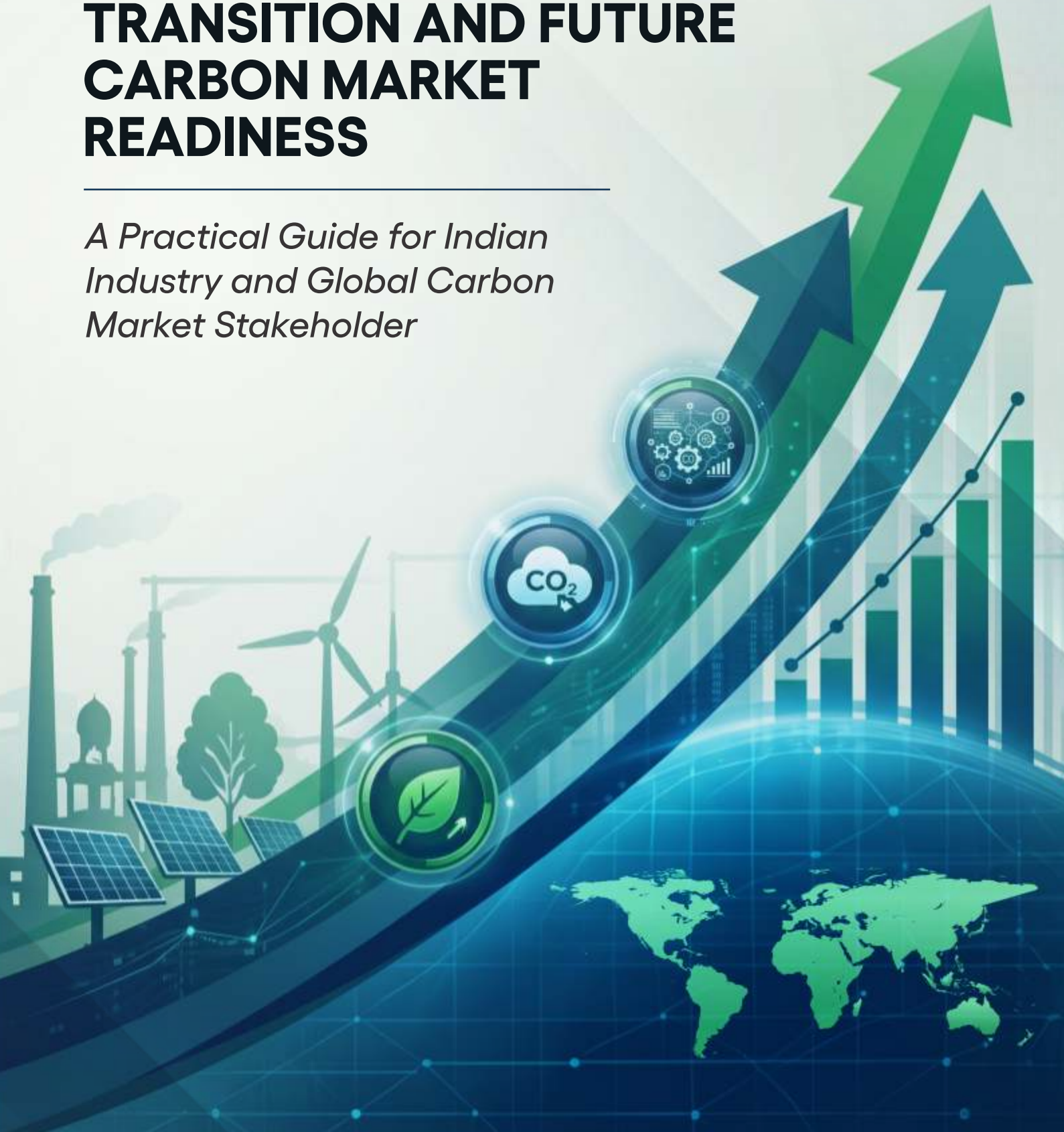
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FROM CDM-to-PACM

TRANSITION AND FUTURE CARBON MARKET READINESS

A Practical Guide for Indian Industry and Global Carbon Market Stakeholder



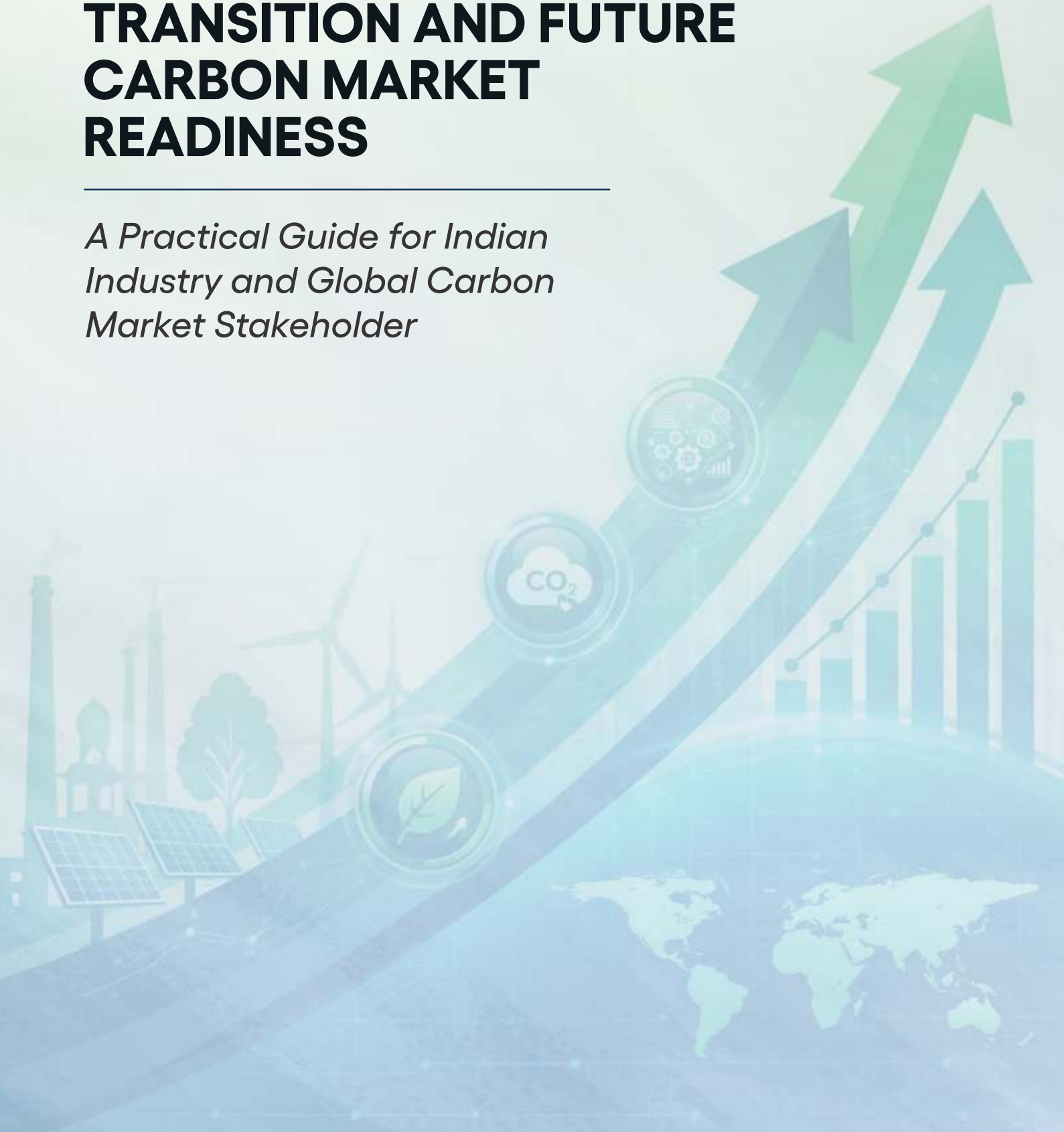
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Foreword

Carbon markets can help industry mobilise investment, adopt cleaner technologies and advance climate action. Realising this potential requires clear rules, credible mitigation outcomes and confidence among governments, businesses and buyers.

The transition from the Clean Development Mechanism (CDM) to the Paris Agreement Crediting Mechanism (PACM) under Article 6.4 presents an opportunity to build on India's carbon-market experience. It also calls for a fresh assessment of existing projects, future opportunities and participation requirements. Past registration or credit issuance should not be taken as assurance of future eligibility or commercial value.

This brief provides a practical reference for legacy CDM project developers, Indian corporates with mitigation assets, MSMEs and supply-chain companies, financial institutions, banks and investors. It is also intended for ESG and sustainability teams, carbon market consultants and advisors, validation and verification bodies, technology and MRV providers, corporate buyers of carbon credits, sector associations, FICCI committees and state-level industry bodies. Policymakers and government stakeholders seeking structured industry feedback form another important audience.

For government, the brief can help identify where industry needs greater clarity, capacity and engagement on PACM, Article 6.4 and future carbon-market participation. It brings together practical questions related to project eligibility, methodologies, monitoring, reporting and verification (MRV), approval processes, authorisation, incentives and international market access. It can also inform dialogue on how businesses view carbon markets within wider climate action, including technology deployment, bilateral cooperation, CORSIA-related opportunities and carbon-related trade measures.

For industry, the brief explains what follows CDM and how companies can prepare for potential PACM opportunities. It supports the assessment of legacy experience and new mitigation projects, the identification of MRV and technology needs, and an understanding of buyer and financier expectations. It also considers how CORSIA, CBAM and other international climate-related trade measures may influence business decisions, while distinguishing their purposes and requirements.

FICCI can play an important convening role by bringing together businesses, policymakers and technical experts to identify barriers, strengthen capacity and develop actionable recommendations. While grounded in India's experience, this brief offers insights relevant to stakeholders in other countries navigating the transition.

We hope this publication supports informed decisions, constructive government–industry dialogue and practical steps towards credible, commercially informed carbon-market participation.


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Introduction

The transition from the Clean Development Mechanism (CDM) to the Paris Agreement Crediting Mechanism (PACM) marks an important turning point in the evolution of global carbon markets. For many years, CDM provided a familiar framework through which developing-country mitigation projects could generate Certified Emission Reductions (CERs). India was one of the most active participants in this system, building significant experience across renewable energy, energy efficiency, waste management, biomass, industrial mitigation and programme-based activities.

However, the Paris Agreement has changed the context in which carbon markets operate. Under PACM, carbon market activities are no longer assessed only as individual project-based offset opportunities. They must now be understood in relation to national climate commitments, host-country governance, sustainable development priorities, environmental integrity, transparency, authorisation, accounting and future use of emission reductions.

This guide has been developed to help stakeholders understand that shift. It is not intended to be a technical manual or a narrow procedural note on transition deadlines. Instead, it is a practical industry-readiness guide that explains what has changed from CDM to PACM, why the transition still matters after several formal deadlines have passed, and how Indian industry can prepare for the next phase of Paris-aligned carbon markets.

The guide is especially relevant because many stakeholders remain familiar with CDM but are less clear about PACM, Article 6.4 emission reductions, host-country approval, authorisation, corresponding adjustments, methodology transition, digital MRV, buyer claims and future market access. This creates a need for simple, practical and reliable guidance that can support better decision-making by project developers, corporates, MSMEs, financial institutions, ESG teams, consultants, technology providers, buyers and policymakers.

The guide also looks beyond legacy CDM assets. While it explains how CDM-origin projects should be assessed in the current market context, it also uses the CDM-to-PACM transition as an entry point to examine wider future opportunities. These include new mitigation project development under PACM, technology-enabled monitoring, reporting and verification, CORSIA-linked demand, bilateral Article 6 cooperation, CBAM-related competitiveness, domestic carbon market preparedness and the role of large corporates and MSMEs in future climate action.

For government and public institutions, the guide can help identify where industry needs clarity, capacity and structured engagement. For industry, it can support practical readiness by explaining risks, opportunities, due diligence requirements and next steps. For FICCI, it provides a basis for convening stakeholders, developing checklists, identifying bottlenecks, supporting capacity building and strengthening government-industry dialogue on carbon market readiness.

The guide is organized into twelve chapters. It begins by explaining what has changed from CDM to PACM and why the subject remains relevant in the post-deadline landscape. It then examines legacy CDM assets, CERs and Article 6.4 emission reductions, buyer claims, future PACM project opportunities, technology and digital MRV, government-industry collaboration, international linkages, MSME participation, adaptation-linked co-benefits, practical decision pathways and an action agenda for government, FICCI and industry.

The objective is to help readers move from general awareness to practical action. By translating complex Article 6.4 and carbon market developments into clear industry guidance, this guide aims to support a more informed, credible and future-ready carbon market ecosystem in India.



Background

The transition from the Clean Development Mechanism (CDM) to the Paris Agreement Crediting Mechanism (PACM) under Article 6.4 represents a significant shift in the architecture of international carbon markets. Established under the Kyoto Protocol, the CDM enabled eligible emission-reduction and removal activities in developing countries to generate Certified Emission Reductions (CERs). It also helped build technical expertise, institutional capacity and carbon-market infrastructure across many host countries.

The PACM operates within the fundamentally different policy and accounting framework of the Paris Agreement, under which all Parties communicate nationally determined contributions (NDCs). Activities must therefore be considered not only as individual carbon projects but also in relation to host-country climate commitments, sustainable development priorities and long-term decarbonisation pathways.

Compared with the CDM, the PACM introduces strengthened requirements relating to environmental integrity, additionality, baseline setting, robust quantification, sustainable development, stakeholder engagement, safeguards, transparency and host-Party oversight. Host-Party approval is required, while authorisation and corresponding adjustments apply where Article 6.4 emission reductions are authorised for specified international uses. These distinctions affect how credits may be issued, transferred, claimed and valued.

Many countries accumulated substantial experience under the CDM. Governments, project developers, consultants, designated operational entities, financial institutions and technology providers developed projects and programmes across renewable energy, energy efficiency, waste management, biomass, industrial mitigation, land use and other sectors. This legacy remains valuable, but CDM-era knowledge must now be adapted to a Paris-aligned system with stronger national governance, more demanding integrity requirements and closer alignment with NDC implementation.

India provides an especially important example. As one of the world's most active CDM host countries, it developed a large and diverse base of projects, technical expertise and market participants. The transition therefore has considerable implications for Indian industry and India's evolving carbon-market ecosystem. At the same time, many of the challenges facing India—including the treatment of legacy activities, methodology transition, host-country readiness, MRV capacity, project finance and access to international demand—are shared by countries across Asia, Africa, Latin America and other regions.

Although the principal procedural deadlines for requesting the transition of eligible CDM activities and obtaining host-Party approval have now elapsed, the subject remains highly relevant. The question is no longer limited to whether a particular CDM activity met a transition deadline. It extends to the treatment and future value of legacy carbon assets, lessons for new PACM activities, host-country institutional readiness, buyer and investor due diligence, digital monitoring, reporting and verification, potential CORSIA-related demand, connections with bilateral Article 6 cooperation and the development of credible domestic and international carbon markets.

The shift also has wider implications for industrial competitiveness and access to climate finance. **PACM credits do not replace the emissions-reporting or financial obligations arising under instruments such as the European Union's Carbon Border Adjustment Mechanism (CBAM)****.

However, investments in emissions measurement, verification, traceability and industrial decarbonisation can help businesses respond to emerging carbon-accounting, supply-chain and market-access requirements.

Drawing on India's experience while addressing internationally applicable rules and lessons, this guide is intended to support both Indian and global stakeholders in understanding the transition and preparing for participation in the evolving Paris Agreement carbon-market architecture.

This guide has been developed from an Indian industry perspective, with practical relevance for host countries, project developers and carbon-market participants globally.

* Because **PACM and CBAM perform different functions**:

- A **PACM credit** represents one tonne of emission reduction or removal achieved against an approved baseline.
- **CBAM** calculates the emissions embedded in specified goods imported into the EU and requires the importer to surrender **CBAM certificates** corresponding to those emissions.
- An importer cannot purchase or cancel PACM credits instead of surrendering CBAM certificates.
- CBAM may recognise a carbon price already effectively paid in the producing country, but it must be a tax, levy, fee or emissions-trading allowance applied to the emissions generated during production—not simply the voluntary purchase or retirement of carbon credits. This is set out in Articles 3 and 9 of the CBAM regulation [https://eur-lex.europa.eu/eli/reg/2023/956/2025-10-20/]

For example, if an Indian steel producer has 100 tonnes of verified embedded emissions:

- Buying 100 PACM credits from a separate renewable-energy project does not reduce the steel's reported embedded emissions to zero.
- Installing cleaner technology that genuinely reduces the steel plant's emissions from 100 to 70 tonnes could reduce its CBAM exposure.
- A qualifying carbon price already paid in India on those production emissions might also be deducted, subject to CBAM rules and evidence.

** PACM and CBAM serve different regulatory purposes. PACM credits cannot be surrendered in place of CBAM certificates or used to offset the embedded emissions reported under CBAM. Nevertheless, PACM-supported mitigation activities may help businesses reduce emissions within production processes and supply chains, strengthen emissions data and verification systems, and mobilise finance for industrial decarbonisation. These outcomes can contribute indirectly to lower embedded emissions and improved CBAM preparedness. Where a qualifying carbon price has been effectively paid in the country of production on the declared embedded emissions, it may be recognised under the applicable CBAM rules.

Sources and Reference Note

This guide has been prepared using publicly available information and documentation. The hyperlinks, rules, procedures, forms and other resources referenced throughout the guide have been drawn primarily from official publications of the UNFCCC, Article 6.4 Supervisory Body, relevant national authorities and other recognised public institutions. Where appropriate, supplementary publicly available industry and technical sources have also been referenced.

Every effort has been made to ensure that the information and hyperlinks were accurate and current as of September 2026. However, the PACM regulatory framework continues to evolve, and procedures, forms, methodologies, deadlines and web links may subsequently be revised. Readers should therefore consult the latest official sources before taking project, regulatory, investment or compliance decisions.

This guide is intended for informational and capacity-building purposes and does not constitute legal, financial, investment or regulatory advice.

Rationale

The whole point of transitioning from CDM under the Kyoto protocol to PACM under article 6.4 is not only driven by the need for higher environmental integrity, more clarity, stronger oversight, and all above perfect alignment with Nationally Determined Contributions (NDCs).

Rationale for the Shift

- Addressing Legacy Flaws: The CDM faced serious criticism for allowing offsets that did not always result in real or additional emission cuts, as well as suffering from geographic concentration and weak community consultation.
- Alignment with NDCs: PACM ensures that carbon crediting directly supports countries' Nationally Determined Contributions (NDCs) rather than functioning on simple, isolated one-to-one offsets that risked double-counting.
- Centralized Governance: The UNFCCC established a dedicated Supervisory Body to enforce robust methodologies, transparent registries, mandatory cancellation of shares for adaptation, and strict host-country authorization.
- Cost Efficiency: Transitioning to a unified global market mechanism is estimated by the UN to significantly reduce the overall implementation costs of global climate targets.

Purpose of the Brief

The purpose of the proposed brief is to provide an informative, actionable and forward-looking analysis of the CDM-to-PACM transition and its implications for Indian industry.

- Explain the CDM-to-PACM transition in simple but technically accurate language;
- Clarify why the subject remains relevant even after key procedural deadlines;
- Assess implications for legacy CDM project owners and future PACM participants;
- Identify opportunities for large corporates, MSMEs, project developers, consultants, banks, investors and ESG teams;
- Examine the role of AI, digital MRV, remote sensing, data platforms and registries in future carbon market integrity;
- Connect PACM readiness with CORSIA, CBAM, bilateral cooperation and domestic carbon market preparedness;
- Outline practical next steps.

Core Framing

The proposed work will use the CDM-to-PACM transition as an entry point to examine India's future carbon market readiness.

The value of the brief lies not only in explaining transition deadlines, but in helping stakeholders understand what the transition signals for the future of carbon markets: how projects will be assessed, how MRV systems will evolve, how buyers will conduct due diligence, how credits may be used, how industry can participate, and how government and industry can strengthen the wider carbon market ecosystem.

The brief will be framed around three central questions:

1. What does the CDM-to-PACM transition mean for India's legacy carbon market experience?
2. What lessons can industry draw for future PACM and Article 6.4 project development?
3. What actions can government, FICCI and industry take to prepare for the next phase of carbon markets?



CHAPTER 1

From CDM to PACM - What Has Changed?

1 From CDM to PACM - What Has Changed?

This chapter will explain the transition from the Kyoto Protocol's CDM to the Paris Agreement Crediting Mechanism. It will introduce the core differences between CDM and PACM, including the shift from a project-based offset mechanism to a Paris-aligned crediting system linked to national climate commitments, host-country governance, sustainable development and environmental integrity.

It will also explain why CDM-to-PACM is not an automatic conversion. A CDM project does not become a PACM activity merely because it was previously registered or generated CERs.

The Paris Agreement's Article 6.4 mechanism (often called the Paris Agreement Crediting Mechanism or Sustainable Development Mechanism) succeeds and improves upon the Kyoto Protocol's Clean Development Mechanism (CDM) by establishing stricter oversight, unified country participation, and robust safeguards against double counting.

1.1 A New Mechanism for a different Climate Regime

The Clean Development Mechanism (CDM) was established under Article 12 of the Kyoto Protocol. It enabled emission-reduction and removal projects in developing countries to generate Certified Emission Reductions (CERs), which countries with Kyoto Protocol targets could use towards part of their commitments. The CDM also aimed to support sustainable development in host countries. [UNFCCC: CDM overview]

The Paris Agreement Crediting Mechanism (PACM), established under Article 6.4 of the Paris Agreement, builds upon this experience but operates in a fundamentally different policy environment. Under the Paris Agreement, all Parties communicate nationally determined contributions (NDCs). Crediting activities must therefore be considered in relation to the host country's own climate targets, policies and development priorities. [UNFCCC: Paris Agreement Crediting Mechanism]

PACM is still an activity-based crediting mechanism covering projects and programmes of activities. The principal change is that these activities are now embedded within a broader national and international accounting framework.

Key message: The transition is not simply from one carbon-credit standard to another. It is a shift from Kyoto-era project crediting to a Paris-aligned mechanism connected to national climate action, host-country governance and more demanding integrity requirements.

Issue	CDM	PACM
Legal foundation	Article 12 of the Kyoto Protocol	Article 6.4 of the Paris Agreement
Climate-policy context	Developed countries had quantified Kyoto commitments; developing host countries generally did not	All Parties communicate NDCs and undertake national climate action
Crediting unit	Certified Emission Reduction (CER)	Article 6.4 Emission Reduction (A6.4ER)
Governing body	CDM Executive Board	Article 6.4 Supervisory Body, accountable to the CMA

Issue	CDM	PACM
Host-country role	Host-country approval and confirmation of contribution to sustainable development	Participation requirements, activity approval, explanation of how the activity relates to the host NDC, and decisions concerning the authorization of units
International transfer	CERs could be used towards Kyoto commitments, subject to applicable rules	A6.4ERs authorized for use towards another NDC or another international mitigation purpose require corresponding adjustments
Non-authorized units	No directly comparable distinction	Units not authorized for international use can serve as mitigation contribution units supporting the host country's mitigation action
Baselines and additionality	Emissions compared with the scenario that would occur without the CDM activity	More ambitious and conservative methodological approaches aligned with the Paris Agreement and encouraging increased ambition over time
Sustainable development	Assessed primarily under host-country arrangements	Supported by a mandatory Article 6.4 Sustainable Development Tool containing environmental and social safeguards
Overall mitigation	No mandatory cancellation specifically designed to deliver an overall reduction in global emissions	At least 2% of issued A6.4ERs are cancelled to deliver an overall mitigation in global emissions
Adaptation contribution	A 2% share of issued CERs, subject to exemptions, supported adaptation	A 5% share of issued A6.4ERs, together with a monetary contribution, supports the Adaptation Fund

These differences arise principally from the Article 6.4 rules, modalities and procedures adopted through Decision 3/CMA.3, subsequent CMA guidance and the regulatory documents adopted by the Supervisory Body. The current standards, procedures, guidelines and tools are maintained on the UNFCCC Article 6.4 Rules and Regulations page.

1.3 Host Countries have a Stronger and more Strategic Role

Under the CDM, the host country's designated national authority approved the project and confirmed that it contributed to sustainable development. Under PACM, host-country involvement extends further.

A host Party must meet the mechanism's participation requirements and approve activities before registration. It may also specify the types of activities, methodological approaches and crediting-period conditions that it will accept. The host Party must consider how an activity relates to the implementation of its NDC and longer-term climate strategy. UNFCCC: Article 6.4 rules, modalities and procedures.

Activity approval and authorization of emission reductions are related but distinct decisions:

- **Approval** permits an activity to proceed under PACM.
- **Authorization** determines whether some or all its A6.4ERs may be used towards another country's NDC or for another international mitigation purpose.

Where A6.4ERs are authorized and transferred for such uses, the host Party must apply a corresponding adjustment to avoid double counting. A6.4ERs that are not authorized for international use may contribute to the host country's mitigation efforts. [UNFCCC: Article 6.4 glossary]

1.4 Environmental Integrity and Sustainable Development

PACM places greater emphasis on conservative crediting, increasing ambition and alignment with the long-term goals of the Paris Agreement. Its methodologies must address matters such as additionality, baseline setting, leakage, uncertainty and the risk of locking in emissions-intensive technologies or practices.

Sustainable development is also supported through a common mechanism-level framework. Activity participants must apply the Article 6.4 Sustainable Development Tool, assess environmental and social risks, undertake stakeholder engagement and identify measures to avoid, minimise or mitigate adverse impacts.

PACM also goes beyond offsetting by requiring:

- The cancellation of at least 2% of issued A6.4ERs to deliver an overall mitigation in global emissions; and
- The transfer of 5% of issued A6.4ERs to support the Adaptation Fund.

These requirements are contained in Article 6.4 rules and subsequent CMA guidance. [UNFCCC: Article 6 decisions and documentation]

1.5 Why Transition is not Automatic

A CDM project does not become a PACM activity merely because it was previously registered, implemented or issued CERs.

Transition is available only to eligible CDM project activities and programmes of activities that satisfy the applicable conditions. These include:

1. Submission of a transition request within the applicable deadline;
2. Approval of the transition by the host Party;
3. Continued eligibility of the activity and its crediting period;
4. Compliance with PACM activity-design and sustainable-development requirements;
5. Use or replacement of the applicable methodology as required;
6. Validation of the required transition documentation; and
7. Approval of the transition by Article 6.4 Supervisory Body.

The general deadline for CDM participants to request transition was 31 December 2023. Separate arrangements subsequently applied to eligible afforestation and reforestation activities. Following Decision 20/CMA.7, the deadline for host Parties to submit their approval of transition was extended to 30 June 2026. [UNFCCC: Transition of CDM activities]

The detailed eligibility and design requirements are contained in the Standard for the transition of CDM activities to the Article 6.4 mechanism. The UNFCCC transition FAQs provide additional practical explanations.

In practical terms: CDM registration establishes a project's history, not its automatic eligibility under PACM. Transition requires a fresh assessment against the Paris Agreement framework, host-country decisions and PACM rules.

1.6 What this means for Industry

For Indian and international businesses, project developers and financial institutions, CDM experience remains valuable. Existing monitoring systems, technical data, institutional relationships and project documentation may provide a useful foundation.

However, past CDM performance alone is insufficient. Stakeholders must now assess:

- Whether the activity is eligible for transition;
- Whether the host country approved of its transition;
- How the activity relates to the host country's NDC;
- Which methodology and crediting-period requirements apply;
- Whether the resulting units will be authorized;
- Whether corresponding adjustments will be applied; and
- Whether the activity meets current sustainable-development and environmental-integrity requirements.

The transition should therefore be treated as a regulatory, technical and strategic reassessment—not as an administrative relabelling of CERs.

Source note: The hyperlinks and reference materials used in this chapter are drawn from publicly available UNFCCC decisions, standards, procedures, tools and explanatory resources. As the PACM framework continues to evolve, readers should consult the latest versions published by the UNFCCC and the Article 6.4 Supervisory Body.

Official UNFCCC Resources

1. https://cdm.unfccc.int/about/index.html
2. https://unfccc.int/process-and-meetings/the-paris-agreement/article-64-mechanism
3. https://unfccc.int/documents/309980
4. https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-6-decisions-and-documentation
5. https://unfccc.int/process-and-meetings/bodies/constituted-bodies/article-64-supervisory-body/rules-and-regulations
6. https://unfccc.int/process-and-meetings/the-paris-agreement/paris-agreement-crediting-mechanism/CDM_transition
7. https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/CDM_transition/faqs


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CHAPTER 2

The Post-Deadline Landscape — Why It Still Matters

2 The Post-Deadline Landscape — Why It Still Matters

The formal transition deadlines have largely passed, but the CDM-to-PACM transition is not yet complete. The focus has now shifted from submitting an intention to transition towards completing documentation, securing regulatory clarity, assessing technical eligibility and determining whether activities remain commercially viable.

For industry, the question is no longer simply, *"Was the deadline met?"* It is:

Which CDM activities still have a credible PACM pathway, and what additional work, approval and investment will be required?

2.1 The Transition Window has Narrowed—Not Disappeared

The principal transition milestones were:

- **31 December 2023:** Deadline for transition requests for eligible non-afforestation/reforestation CDM activities.
- **31 December 2025:** Deadline for transition requests for eligible afforestation and reforestation activities.
- **30 June 2026:** Extended deadline for host Parties to approve transition requests.
- **31 December 2026:** Deadline for certain additional documentation where an activity continues using its existing CDM methodology.

Where an applicable PACM methodology is used, documentation may be submitted within one year of host-Party approval or of the relevant methodology becoming available, whichever is later.

Therefore, meeting an earlier deadline does not mean that an activity has completed transition. It may still require additional documentation, fee payment, technical assessment, possible review and final approval under PACM rules.

2.2 Three Categories of CDM Activities now require different Treatment

Status of Activity	What it Means	Recommended Response
Transition request and host-Party approval submitted	The activity may continue through the PACM transition process, but approval is not automatic.	Complete outstanding documentation; review methodology, monitoring, safeguards, stakeholder engagement and commercial viability.
Transition requested but host-Party approval not obtained by the deadline	The activity cannot assume that the CDM transition route remains available.	Confirm its official status and assess whether a redesigned activity could potentially enter PACM through the normal activity cycle.
No eligible transition request submitted	The activity cannot now rely on its CDM registration to enter PACM through the transition route.	Assess alternative markets, domestic use, continued operation without credit revenues, or development of a materially updated activity under current rules.

A project should not describe itself as "PACM transitioned" merely because a transition request was submitted or because the host Party supported the request. Final transition depends on completing the applicable PACM process.

2.3 Why Technical and Commercial Uncertainty remains

Even activities within the transition pipeline may face important questions:

Methodology Compatibility

An existing CDM methodology may not remain appropriate indefinitely. Activities may need to adopt a PACM methodology or demonstrate compliance with updated requirements on baselines, additionality, monitoring, suppressed demand, leakage, lock-in risks and removals.

Environmental and Social Requirements

Transitioning activities must comply with PACM requirements, including the sustainable development tool and applicable environmental and social safeguards. Earlier CDM documentation may therefore require substantial updating.

Host-country Decisions

Host countries have a stronger role under the Paris Agreement. Transition approval does not by itself settle every question relating to authorization, the intended use of credits, corresponding adjustments or alignment with the host country's nationally determined contribution.

Cost and Operational Readiness

Developers may need to incur expenditure for documentation, validation, monitoring systems, stakeholder engagement, fees and technical upgrades. The expected volume and value of future credits should be tested against these costs before further investment commitment.

Buyer Expectations

Buyers and financial institutions are increasingly examining the quality and use of credits rather than relying only on the name of the standard. Project history, additionality, safeguards, host-country approval, authorization status and the proposed claim attached to the credit may all influence demand.

2.4 Practical Portfolio Examples

Example 1: Renewable-energy Project with Transition Approval

An Indian wind-energy project obtained host-country transition approval. This is an important milestone, but the developer must still confirm its documentation pathway, methodology, remaining crediting period, monitoring capability and expected demand for the resulting units.

Example 2: Landfill-gas Project that missed the Transition Pathway

A registered CDM landfill-gas project did not complete the required transition steps. Its CDM registration alone cannot be treated as PACM eligibility. The project owner should assess whether a new or substantially redesigned activity could meet current PACM requirements or whether another carbon-market pathway is more appropriate.

Example 3: Afforestation Project with long-term Monitoring Obligations

An afforestation activity entered the transition pipeline but faces additional requirements relating to removals, reversal risks, environmental and social safeguards and long-term monitoring. Its commercial feasibility must be reassessed using PACM requirements rather than historical CER expectations.

2.5 The Continued Importance of Legacy CERs

The winding down of the CDM and the treatment of existing CERs are separate from the transition of an underlying activity. Transfer of eligible CERs to the PACM registry does not automatically convert the project into a registered PACM activity or turn the CERs into newly issued PACM emission reductions.

The CDM registry timetable therefore requires separate attention. The UNFCCC indicates that transfers of eligible CERs to the PACM registry, as well as cancellations and other remaining CDM registry transactions, are scheduled to end on 31 December 2026.

The detailed treatment and possible use of legacy CERs will be discussed separately later in this guide.

2.6 What Stakeholders should do Now

Project Owners and Developers should classify their CDM portfolios by official transition status and identify outstanding documentation, methodology and investment requirements.

Host-country Authorities should maintain transparent records of transition decisions and clarify national approaches to PACM participation, authorization and credit use.

Buyers and Financial Institutions should verify the activity's status directly rather than relying on statements that it has "applied for" or been "approved for" transition.

Consultants and Auditors should distinguish clearly between CDM registration, submission of a transition request, host-Party approval and final PACM registration.

Key Takeaway

The passing of a transition deadline does not end the issue. It determines which pathway remains available. Every legacy CDM activity now requires a status check, technical reassessment and commercial decision.

Main Users of this Chapter

- CDM project owners and activity participants.
- Project developers, consultants and auditors.
- Host-country authorities and designated national authorities.
- Carbon-credit buyers and intermediaries.
- Banks, investors and other financial institutions.

Official UNFCCC Resources

1. https://cdm.unfccc.int/about/index.html
2. https://unfccc.int/process-and-meetings/the-paris-agreement/article-64-mechanism
3. https://unfccc.int/documents/309980
4. https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-6-decisions-and-documentation
5. https://unfccc.int/process-and-meetings/bodies/constituted-bodies/article-64-supervisory-body/rules-and-regulations
6. https://unfccc.int/process-and-meetings/the-paris-agreement/paris-agreement-crediting-mechanism/CDM_transition
7. https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/CDM_transition/faqs



CHAPTER 3

Legacy CDM Assets – Risks, Value and Practical Checks

3 Legacy CDM Assets – Risks, Value and Practical Checks

3.1 Purpose and Context

The legacy of the Clean Development Mechanism (CDM) remains relevant across the Global South because many projects, technical systems, datasets, and commercial relationships created under it still exist. However, their present value cannot be judged solely by the fact that a project was once registered or generated Certified Emission Reductions (CERs). The Paris Agreement carbon-market landscape places greater emphasis on national alignment, environmental integrity, transparent accounting, host-country governance, stronger monitoring and clear claims. Each CDM-era asset therefore requires a fresh assessment before it becomes a viable carbon-market opportunity.

This chapter provides project owners, buyers, financial institutions, investors and advisors with a practical framework for reviewing such assets. The objective is to identify what remains valuable, what requires further technical or regulatory action, and what may no longer be commercially viable. The analysis focuses on transition status, host Party approval, ownership and carbon rights, crediting periods, methodology risk, documentation quality, CER treatment, the prospect of future Article 6.4 emission reductions (A6.4ERs), buyer confidence, and the principal legal, regulatory, reputational and commercial risks that can affect a legacy asset.

3.2 Assessing Residual Value

A legacy CDM asset is more than a stock of old credits. It can include the physical mitigation activity, project design documents, baseline data, monitoring records, verification history, contractual rights, operating knowledge and the institutional capacity developed around the project. Some of these elements may retain significant value even where the original crediting arrangement has changed. For example, a renewable-energy, waste management or industrial-efficiency project may still have operating infrastructure, reliable historical data and an experienced project team that can support future mitigation activity.

Residual value should therefore be assessed in layers. The first layer is the continuing technical value of the underlying activity. The second is the quality of the evidence attached to it, including monitoring records and verification documents. The third is the legal and regulatory position, particularly the identity of the rights holder and the status of the activity. The final layer is commercial: whether a credible buyer, bank, or investor would accept the project after due diligence. A strong asset is one in which these layers reinforce each other. A weak asset is one whose value depends mainly on historic registration or assumptions about future eligibility.

3.3 Transition Status and Host Party Approval

Transition status is the starting point for any serious review. A CDM activity does not become an Article 6.4 activity simply because it was previously registered or generated CERs. Eligible non-

afforestation and reforestation activities had to request transition by 31 December 2023; eligible afforestation and reforestation activities had until 31 December 2025. Article 6.4 designated national authority of the Host Party had until 30 June 2026 to submit its transition approval. As those deadlines have passed, project owners should check the activity-specific UNFCCC transition record, including the request, host Party approval and final registration status, before describing an activity as transitioned.

For a host Party-approved activity, further steps may still be required. Where the existing CDM methodology continues to be used at transition, the project participant must submit the prescribed additional documentation by 31 December 2026. Where a PACM methodology replaces the CDM methodology, revised design documents must be validated and submitted within the applicable timetable. Historic CDM approval is therefore part of the evidence base, but it is not a substitute for the specific host-country and mechanism actions required for the intended pathway. Any unresolved status should be disclosed explicitly in valuation and buyer materials. Approval of transition must also be distinguished from the host Party statement on whether and for what uses future A6.4ERs are authorized; the latter is required before first issuance and may follow the transition approval.

3.4 Ownership and Carbon Rights

Ownership and carbon rights are frequently underestimated in legacy projects. Over time, project companies may have changed shareholders, lenders, operators or counterparties, while earlier emission-reduction purchase agreements or financing contracts may still affect who controls the carbon value. The owner of the physical facility is not necessarily the only party with rights over historical or future emission reductions. For multi-country programmes of activities, identify the relevant host Party and rights for each component project activity as well.

Before an asset is marketed, financed or offered to a buyer, the chain of titles should be clear. This requires a review of the current project entity, historic contracts, assignments, security interests and any previous transfer of carbon rights. A project with unclear ownership may suffer delays, disputes or loss of buyer confidence, even where the mitigation activity itself is credible. A simple carbon-rights schedule showing the current rights holder, previous assignments and unresolved claims is therefore a basic due-diligence requirement.

3.5 Crediting Period, Methodology and Documentation

The continuing operation of a mitigation project should not be confused with a continuing right to generate marketable carbon units. Project owners need to establish the crediting history of the activity, what period has already been used, and whether any viable future crediting pathway remains. This review should be commercial as well as technical: even where a pathway is possible, the expected value of future units must be weighed against the cost of monitoring, verification, legal review and any system upgrades. Record whether the CDM crediting period was active on 1 January 2021 and whether it has expired, since these dates affect transition eligibility and the remaining crediting opportunity.

Methodology risk is another major consideration. A methodology, baseline or additionality approach used during the CDM period may not automatically remain suitable for future Article 6.4 participation. The value of historical methodology experience lies in the data and technical learning it provides, not in an assumption of automatic continuity. A gap assessment should therefore compare the legacy project design and available data with the requirements of any proposed future pathway.

Documentation quality often determines whether these assessments can be completed efficiently. Core records should include project design documents, monitoring reports, verification materials, contracts, ownership records, approval correspondence and evidence relating to issued or transferred units. Where records are fragmented, inconsistent, or held by former advisors, the project may incur high costs simply to reconstruct its history. A well-organized data room and document register can materially improve both transaction readiness and buyer confidence. The data room should also include the CDM reference number, transition request and status, host Party transition approval, any unit-authorization statement, modalities of communication and a serial-number-level CER inventory.

3.6 CER Treatment and Future A6.4ER Issuance

Historical CERs, a transitioning CDM activity and potential future A6.4ERs are legally and commercially distinct. CERs already issued under the CDM do not automatically become A6.4ERs when an activity transitions. Under the applicable CMA rules, only eligible CERs may be transferred to Article 6.4 mechanism registry, where they remain identified as pre-2021 emission reductions. The CDM registry is being wound down: requests to transfer eligible CERs must be completed by 31 December 2026, and the UNFCCC currently advises submission by 25 October 2026 where guaranteed processing is required. Units left in the CDM registry after the deadline cannot be transferred, canceled, or otherwise transacted through that registry. The transfer window concerns eligible CERs, including the applicable registration-date and vintage conditions; eligibility must be checked for each holding rather than inferred from the activity transition. The date – 25 October 2026 – is the secretariat's action timeline for guaranteed processing of transfer requests, while 31 December 2026 is the decision deadline for completion of registry transactions.

Potential future A6.4ER issuance should be treated as contingent rather than guaranteed. It depends on successful transition or registration, the applicable methodology, monitoring and verification, host-country decisions, and completion of Article 6.4 activity cycle. Authorization also affects the permitted use of units, the claims a buyer may make, and whether a corresponding adjustment is required. Financial models should therefore separate: (i) existing CERs and their present registry status; (ii) the underlying physical and documentary value of the activity; and (iii) conditional future A6.4ER value. This avoids overstating carbon revenue and gives buyers, banks and investors a sounder basis for decision-making. Distinguish authorized A6.4ERs for specified uses from mitigation-contribution A6.4ERs and confirm the applicable accounting and claims treatment before pricing either category.

3.7 Buyer Confidence and Risk Exposure

Buyer and investor confidence is built on evidence, not on project history alone. A sophisticated counterparty will want to understand the status of the activity, the identity of the rights holder, the quality of the monitoring system, the unit being offered, the intended claim and the unresolved risks. Projects that can answer these questions clearly are more likely to attract serious commercial interest.

The main risks fall into five broad categories. Legal risk may arise from unclear ownership, contract terms or authority to transact. Regulatory risk may arise from uncertain transition status, approval or future issuance pathways. Technical risk may result from weak methodologies, data gaps or inadequate monitoring systems. Reputational risk arises where the status or environmental value of an asset is overstated. Commercial risk arises when transaction costs, weak buyer demand, or uncertain eligibility reduce the asset's value below expectations. Assess these risks together because weakness in one area can quickly affect the others.

3.8 Practical Due-Diligence Checks

Before significant expenditure, financing, buyer engagement, or public claims, a legacy CDM asset should pass a structured first-stage screening. At minimum, project owners and their advisors should:

- Confirm the identity of the project and the current project entity.
- Establish the activity's present transition status through documentary evidence.
- Review the relevant host Party approval or approval pathway for the intended use.
- Confirm ownership, carbon rights, historic assignments and any encumbrances.
- Prepare a complete crediting and issuance history.
- Assess methodology-suitability and identify monitoring or data gaps.
- Create a document register covering technical, contractual, regulatory and unit records.
- Classify the unit or mitigation outcome involved and define the intended buyer claim.
- Test the asset against likely buyer and financier due diligence expectations.
- Prepare a risk-adjusted valuation that separates confirmed value from conditional future upside.

This screening can then be used to classify assets into three practical groups: assets that retain credible value and can proceed to detailed transaction preparation; assets that remain potentially viable but require technical, documentary or regulatory remediation; and assets whose legal, technical or commercial weaknesses are so significant that further investment

may not be justified. For a Nigeria-hosted activity, confirm the competent national authority's documented decision and applicable national carbon-market requirements separately from the UNFCCC mechanism record. A screening record should cite the date and source of each status check, identify the person responsible for resolving each gap, and mark unverified claims as provisional.

Illustrative example: A waste-management project may still have functioning equipment, reliable monitoring records and an experienced operating team. Those features retain practical value. However, if its transition request or host Party approval cannot be verified within the applicable deadlines, it should not be valued or marketed as a transitioning PACM activity. Any alternative crediting pathway would require a separate eligibility assessment. If transition was requested but host Party approval was not submitted by the deadline, the project should be assessed under a separately available pathway, subject to its own rules and national approvals.

3.9 Conclusion

Legacy CDM assets should neither be written off automatically nor valued simply because they were once registered under the mechanism. Their current value depends on the strength of the underlying mitigation activity, the clarity of transition status and host-country position, ownership and carbon rights, crediting history, methodology fit, documentation, monitoring quality, unit classification and market confidence.

The practical shift required is from a legacy-credit mindset to a legacy-asset due-diligence mindset. This approach preserves the useful experience, data, and institutional capacity created through the CDM while recognizing that Article 6.4 environment demands a fresh assessment of integrity, rights, evidence, and commercial viability. For project owners, buyers, banks and advisors, careful screening before valuation or transaction is the most effective way to protect value and reduce legal, reputational and commercial exposure.

Regulatory position checked against publicly available UNFCCC materials as of 20 September 2026. Users should verify the latest rules, activity status, and registry timelines before taking transaction or investment decisions.



CHAPTER 4

CERs, A6.4ERs and Buyer Claims

4 CERs, A6.4ERs and Buyer Claims

4.1 Why Distinction Matters

Carbon units are not interchangeable. Their permissible use depends on the mechanism or programme under which they were issued, the applicable rules, their vintage, authorisation status, and the purpose for which they are acquired.

Three separate questions should therefore be asked:

1. **What is the underlying activity?**
   Is it a CDM activity, a transitioned Article 6.4 activity or an activity registered under an independent carbon standard?

2. **What unit has been issued?**
   Is it a Certified Emission Reduction (CER), an authorised A6.4ER, a mitigation-contribution A6.4ER or a voluntary carbon credit?

3. **What claim or use is proposed?**
   Is the unit intended for an NDC, CORSIA, another compliance system, voluntary offsetting, a contribution claim or domestic use?

The transition of an activity does not automatically convert its existing CERs into A6.4ERs. Similarly, purchasing or retiring credit does not automatically entitle the buyer to make every type of climate claim.

4.2 The Principal Categories

Category	Issuing Framework	Basic Position
Historical CER	Clean Development Mechanism under the Kyoto Protocol	A unit issued for verified emission reductions achieved under the CDM
Transitioned CDM Activity	PACM Transition Process	An underlying CDM project or programme seeking or completing transition; this is an activity, not a new category of credit
A6.4ER	Paris Agreement Crediting Mechanism	A unit issued for verified emission reductions or removals generated under Article 6.4 requirements
Voluntary Carbon Credit	Independent Carbon-crediting Programme	A unit issued under the rules of a non-UN crediting programme; its uses depend on programme rules and applicable claims or compliance frameworks

4.3 Historical CERs

Certified Emission Reductions were issued under the CDM. Existing CERs remain identifiable as Kyoto-era units even where the underlying CDM activity seeks transition to the PACM.

Article 6.4 rules permit a limited category of CERs to be used towards a Party's first NDC. Among other conditions, the CDM activity must have been registered on or after 1 January 2013, and the CERs must be transferred to the mechanism registry and identified as pre-2021

emission reductions. These CERs may be used only towards the first NDC, and the CDM host Party is not required to apply a corresponding adjustment. Temporary and long-term CERs are excluded from NDC use under these arrangements. [Decision 3/CMA.3]

These provisions do not mean that every historical CER is automatically acceptable for:

- NDC achievement;
- CORSIA;
- Domestic compliance;
- Voluntary offsetting; or
- Corporate net-zero claims.

Eligibility must be assessed against the rules governing the proposed use.

4.4 Transitioned CDM Activities

A transitioned CDM activity is a project or programme of activities moving from the CDM into the PACM. Transition is subject to eligibility conditions, host-country approval and compliance with the applicable Article 6.4 requirements. The UNFCCC maintains information on activities that have requested transition and their procedural status. [UNFCCC CDM-transition Portal]

An important distinction must be maintained:

The activity transitions; historical CERs do not automatically become A6.4ERs.

Once an activity is registered under the PACM, eligible post-2020 emission reductions or removals may be issued as A6.4ERs following monitoring, verification, certification and approval of issuance. Existing CERs retain their original identity and remain subject to the rules applicable to CERs.

4.5 Two Forms of A6.4ERs

A6.4ERs are issued through the PACM registry. Their treatment depends principally on whether the host Party has authorised them for an international use.

Feature	Authorised A6.4ER	Mitigation-contribution A6.4ER
Host-country Authorization	Authorised for an NDC and/or another international mitigation purpose	Not authorised, or not yet authorised, for an international use
Corresponding Adjustment	Required upon first transfer in accordance with the Article 6 rules	Not applied while the unit remains unauthorised
Mitigation Accounting	Mitigation is not counted towards the host Party's NDC after the corresponding adjustment	Mitigation contributes to the host Party's NDC
Possible Use	Acquiring Party's NDC or an authorised other international mitigation purpose	Contribution to host-country mitigation; other uses remain subject to applicable rules
Later Authorisation	Already authorised for the specified use	May potentially be authorised later, subject to Article 6.4 requirements and its transaction status

Authorisation must be read carefully. It may cover use towards another Party's NDC, another international mitigation purpose, or both. A unit should not be described simply as "Article 6 authorised" without identifying the purpose and scope of the authorisation. [https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/registry]

4.6 Voluntary Carbon Credits

Voluntary carbon credits are issued by independent crediting programmes rather than by Article 6.4 Supervisory Body. Their quality and permitted uses depend on the relevant programme, methodology, host-country framework and buyer-claims rules.

Voluntary credit does not become an A6.4ER merely because:

- The project is located at a Paris Agreement Party;
- The activity supports the host country's NDC;
- The host country provides an authorisation;
- A corresponding adjustment is applied; or
- The credit is accepted under a separate compliance programme.

Some independently issued credits may receive host-country authorization for international use and be accounted for through Article 6.2. They nevertheless remain credits issued under the relevant independent programme, rather than A6.4ERs.

4.7 Matching the Unit to the Intended Use

Intended Use	Principal Considerations
Acquiring Party's NDC	Host-country authorisation, corresponding adjustment, Article 6 reporting and applicable registry requirements
CORSIA	Eligibility of the crediting programme, activity, unit type and vintage under current ICAO rules, together with any required host-country authorisation and safeguards against double claiming
Domestic Compliance	Acceptance under the relevant national or subnational law or trading system
Voluntary Offsetting or Compensation	Credit quality, retirement, claims framework, double-counting treatment and consumer-protection requirements
Contribution Claim	Transparent explanation that the buyer financed or supported mitigation without implying that the mitigation outcome was transferred for use against the buyer's own emissions
Host-country NDC	Treatment of the mitigation within the host country's national accounting and absence of an inconsistent international claim
Climate Finance or Results-based Finance	Contractual purpose, ownership of units, attribution of results and whether credits are issued, transferred or cancelled

CORSIA eligibility is not determined simply by describing a credit as "high quality" or "Article 6 aligned". Airlines must use units meeting ICAO's applicable eligibility requirements. The current ICAO list, applicable dates, programme conditions and unit vintages must therefore be checked at the point of procurement. [https://www.icao.int/CORSIA]

4.8 Buyer Due-diligence Checklist

Before purchasing or using a carbon unit, a buyer should establish:

- The issuing mechanism or crediting programme.
- The project, methodology, monitoring period and unit vintage.
- Whether the unit has already been issued.
- Whether the underlying CDM activity has transitioned or is only seeking transition.
- The unit's authorisation and corresponding-adjustment status.
- The precise purpose covered by any host-country authorisation.
- Eligibility under the intended compliance or claims framework.
- Registry ownership, transfer and retirement arrangements.
- Whether another entity or country may claim the same mitigation outcome.
- The evidence supporting any public statement made by the buyer.

4.9 Implications for Indian and International Stakeholders

Project developers should avoid marketing credits before confirming their status, intended market and host-country treatment. Buyers should specify the proposed use before selecting the unit, rather than purchasing first and determining the claim later.

For Indian stakeholders, this requires attention to India's Article 6 authorisation arrangements, the Indian Carbon Market and any sector-specific restrictions or approval requirements. International buyers must also consider the rules of the jurisdiction or programme in which the unit will ultimately be used.

Key Takeaway

A transitioned activity, an issued unit and a buyer claim are three different things. The credibility of the claim depends on correctly matching the unit's origin, vintage, authorisation, accounting treatment and eligibility to its intended use.





CHAPTER 5

Future PACM and Article 6.4 Project Opportunities

5 Future PACM and Article 6.4 Project Opportunities

The transition from the Clean Development Mechanism (CDM) to the Paris Agreement Crediting Mechanism (PACM) creates opportunities for new mitigation activities, but project potential must be matched with methodology availability, host-country requirements and commercial evidence. Part A explains how developers can prepare a credible pipeline. Part B draws practical lessons from international experience. India is the main reference point, with lessons relevant to other host countries.

Part A: Project Opportunities and Readiness

5A.1 From Legacy Experience to a new Pipeline

Indian industry has substantial CDM experience in renewable energy, efficiency, waste and industrial mitigation. That experience can support PACM development, but historical registration or CER issuance does not establish eligibility for a new activity. New projects and activities transitioning from the CDM follow different procedures; the latter are addressed in the earlier chapters. [1]

Approved PACM methodologies now include flaring or use of landfill gas (A6.4-AMM-001), nitrous oxide abatement from nitric acid production (A6.4-AMM-002), and electricity generation from renewable sources connected to an electricity system (A6.4-AMM-003). A methodology's existence is a starting point: developers must check its current version, scope and applicability against their actual project. [2–4]

Pipeline development should therefore begin with an activity-level screen rather than a broad sector label. A company should identify the proposed investment, its start date, ownership and boundaries, the technology to be installed, and the emissions it expects to reduce. This makes it possible to assess the actual intervention against the host-country list and methodology before spending heavily on design documentation.

Three separate questions determine whether an opportunity can progress: is the activity acceptable to the host country; can its mitigation be quantified under an applicable methodology; and is there a credible financial and implementation case? Passing one test does not resolve the others. Developers should distinguish activities ready for detailed assessment from those awaiting a methodology, policy clarification or an investable delivery model.

5A.2 Identify Eligible Opportunities

India's published host-party participation requirements identify 14 priority activities. These include renewable energy with storage, limited to the stored component; solar thermal power; offshore wind; green hydrogen; compressed biogas; fuel-cell mobility; and high-end energy-efficiency technologies. Other listed activities include sustainable aviation fuel, process improvements in hard-to-abate sectors, ocean energy, qualifying transmission infrastructure, renewable-energy clean cooking at scale, green ammonia, and carbon capture, utilisation and storage. The current host-country list and any subsequent conditions should guide project screening. [5]

Global methodology availability and national eligibility are separate tests. For example, an approved grid-connected renewable-electricity methodology does not mean that every Indian solar or wind project will receive approval. Similarly, forestry, agroforestry and soil-carbon opportunities should not be presented as already covered by India's published 14-activity list. Their possible participation requires separate assessment of national acceptance and applicable PACM rules. [2–5]

Sector Considerations for Indian Industry

Renewable energy and storage. Assess the specific technology and qualifying component, rather than assuming that all renewable electricity is eligible. For storage, establish what the methodology measures, how charging and discharging are accounted for, and which data demonstrate the mitigation effect. Grid-connected generation must satisfy the applicable methodology as well as India's host-country requirements. Existing generation assets should be screened separately from new investments. [4,5]

Green hydrogen, green ammonia and emerging mobility. A preliminary assessment should identify electricity sources, system boundaries and the production or transport activity being displaced. Developers must check whether an approved methodology covers the proposed intervention and avoids counting the same reduction at several points in a value chain. The potential of technology alone is insufficient to support a credit-volume forecast. [1,5]

High-end efficiency and hard-to-abate industry. Define the process change, current performance, applicable regulatory requirements and a defensible baseline. An attractive financial investment efficiently may still face an additionality challenge. Evidence should address why the proposed intervention differs from normal replacement, routine maintenance or improvement that would proceed without the mechanism's incentive. [1,5]

Compressed biogas and waste-related activities. Identify feedstock sources, collection arrangements, competing uses and alternative treatment of the waste. Account for relevant project emissions and leakage and verify that the technology and project boundary fit the chosen methodology. Landfill gas has an approved PACM methodology globally, but this does not establish national approval for every Indian waste project. [1,2,5]

Clean cooking. India's published list refers to renewable-energy clean cooking at scale through government or public–private partnership projects. A distributed cookstove activity should therefore be checked against that description rather than presumed eligible. Monitoring must capture actual adoption and use, not only the number of devices distributed. Part B examines why assumptions in this sector require particular care. [5]

Carbon capture, utilisation and storage. Developers should distinguish a claimed reduction from a removal and demonstrate the relevant boundaries, fate of captured carbon and any storage obligations. Inclusion on the national activity list does not establish an approved quantification route. For removal activities, permanence, reversal risk and the applicable monitoring requirements need early technical assessment. [1,5]

5A.3 Establish Additionality and a Conservative Baseline

Developers must demonstrate that the mitigation would not occur without the mechanism's incentive, using the applicable additionality requirements and tools. Map national, state and

local regulation, document the credible alternative to the proposed activity, and apply investment analysis where required. A legally mandated activity does not become additional simply because it offers measurable emission reductions. [1]

Baselines must be conservative and consistent with increasing ambition. PACM standards require downward adjustment, including an initial adjustment for relevant baseline approaches and adjustment over time. UNFCCC describes a 10% adjustment for historical or current-emissions baselines and a minimum 1% adjustment over time across approaches. Developers must apply the adopted standard and methodology rather than treat these figures as a universal project formula. Maintain transparent evidence for data, assumptions and uncertainty. [6]

The investment case should use consistent assumptions with and without carbon revenue. Record capital expenditure, operating costs, other revenues, financing terms and the chosen financial benchmark where applicable. Preserve the evidence supporting decisions at the relevant time: a retrospective statement that carbon finance was important is weaker than dated board papers, financial models and documented investment conditions.

The baseline is the reference against which mitigation is calculated, not simply a company's historic emissions inventory. Developers should establish which baseline approach the methodology permits, which parameters require site-specific measurements, and which defaults may be used. Estimate project emissions and leakage as required, and test how uncertainty or downward adjustment affects expected credit volumes. A realistic forecast is more useful to financiers than an optimistic figure that cannot survive verification. [1,6]

5A.4 Design Monitoring and Safeguards from the Outset

Prepare a monitoring plan that records the parameters required by the methodology, responsibilities, quality controls and treatment of missing data. Digital systems can support reliable collection and audit trails, but they do not replace sound measurements or independent validation and verification by an accredited designated operational entity (DOE). Monitoring frequency and any post-crediting obligations depend on the applicable rules and activity type. Chapter 6 examines digital MRV in more detail. [1]

Apply the Sustainable Development Tool and relevant stakeholder-consultation requirements early. Identify environmental and social risks, sustainable-development contributions, mitigation measures and grievance arrangements. Free, prior and informed consent applies where required by the safeguards; it should not be confused with the separate local and global consultation processes. Transitioning CDM activities may have specific transitional provisions. [1]

An effective monitoring system assigns responsibility for measurement, equipment calibration, record retention, data review and correction. Contracts should clarify who owns and can access the data when a supplier, aggregator or platform collects it. Developers should also budget for verification and ensure the monitoring records can be understood independently of the platform provider.

Safeguard assessment should influence site selection and project design. For example, feedstock collection can affect local users, infrastructure can affect land access, and household technologies can create maintenance or affordability concerns. Consultation should identify these issues while the project can still be changed. Claims of employment, health or livelihood benefits should be supported by evidence appropriate to the claim rather than assumed from the technology. [1]

5A.5 Separate Approval from Authorisation

Host-country approval allows an activity to proceed within Article 6.4 framework. Authorisation is a separate decision governing specified uses of its emission reductions, including use towards another country's NDC or other international mitigation purposes. Authorised outcomes require corresponding adjustments under the applicable accounting rules. For a transferring host country, this generally means adding the transferred quantity to its adjusted emissions balance so it cannot also count that mitigation towards its own NDC. [1,7]

Non-authorised A6.4ERs are mitigation contribution units and support mitigation in the host country. Accounting cannot be determined solely by whether a buyer is domestic or foreign: the authorisation status, permitted use and applicable rules matter. Developers should agree to the intended credit use with the host authority and prospective buyer early, and refer to Chapter 4 for buyer claims. [1,7]

Early engagement with the designated national authority should establish the documents, responsible institutions and conditions relevant to approval and any proposed authorisation. Ask whether the activity aligns with national priorities, how sustainable-development contributions will be assessed, and whether the government imposes conditions on permitted uses or volumes. A national eligibility list supports screening; it is not an individual project approval.

Contracts should address the intended use of the credits and what happens if authorisation is delayed, limited or unavailable. Developers should avoid promising an authorised product before the necessary decision is made. Buyers should review the actual authorisation, registry status and delivery terms. The host country retains responsibility for its own Article 6 accounting and reporting; the developer's role is to supply the required project evidence and comply with applicable conditions. [1,7]

5A.6 Test Commercial Viability

Assess expected credit volumes after conservative baseline treatment, applicable deductions and fees, and the full costs of development, validation, verification, monitoring and safeguards. Model lower prices, delayed issuance and reduced volumes. UN oversight does not guarantee a price premium, buyer demand or greater market access than an Article 6.2 route. Buyer eligibility and offtake terms require their own due diligence.

Programmes of activities can pool smaller activities where the rules and methodology allow. Blended finance and long-term purchase arrangements may improve viability, but revenue assumptions should be supported by actual buyer interest. India's CCTS provides a domestic

carbon-market framework; mutual recognition or international use of its certificates must follow applicable government rules and should not be assumed to occur automatically. [1,8]

Commercial planning should distinguish development funding from revenue received after verified issuance. Early expenditure may include feasibility studies, methodology work, consultation, legal advice and validation before any credits are available. Financing should cover this period, with clear responsibilities for delays and cost overruns. Grants or concessional funds may help address specific preparation gaps; a purchase agreement may support the revenue case where its terms are sufficiently firm.

For smaller activities, aggregation can share administrative and monitoring costs but creates its own governance needs. Agreements should explain participant eligibility, credit ownership, the aggregator's fees, revenue distribution, data responsibilities and exit arrangements. Grouping activities do not remove additionality, safeguards or verification requirements. A viable programme needs repeatable activity design and enough revenue to cover both central administration and local delivery. [1]

Illustrative Project Screen for Landfill Gas Recovery

Consider a proposed landfill-gas recovery investment in a host country that permits the activity. This is a hypothetical screening example, not a registered project or a claim of Indian eligibility. The developer first checks the applicability of A6.4-AMM-001, the landfill's circumstances and whether existing legal obligations already require the proposed intervention. It then investigates waste and gas data, land and operating rights, the baseline, and the planned treatment or use of the captured gas. [2]

The commercial assessment considers revenues from energy or gas sales alongside carbon revenue, operating costs and the required monitoring. Safeguards and stakeholder engagement are incorporated into the design, with approval and any needed authorisation treated as separate milestones. If the project cannot obtain reliable gas-flow data, meet methodology conditions or demonstrate additionality, its credit forecast should be revised or the crediting route paused. The lesson is to resolve critical eligibility, and evidence gaps before treating potential credits as bankable revenue.

5A.7 Practical Readiness Checklist

- Confirm the activities meet current host-country requirements and the intended credit use.
- Check the approved methodology, additionality tests and any prior-consideration notification deadlines.
- Build the baseline and credit-volume estimate using conservative, verifiable data.
- Prepare monitoring, safeguards, consultation and grievance arrangements.
- Map host approval, any required authorisation, validation, registration, verification and issuance milestones.
- Test costs, financing, buyer eligibility and offtake terms before committing to development.

Part B: International Experience and Practical Lessons

International experience illustrates how national institutions, buyer rules and project-level integrity affect market participation. These examples complement the readiness requirements in Part A. Article 6.2 arrangements offer governance lessons, but their procedures do not substitute for PACM registration and crediting requirements.

5B.1 Case Study Ghana and Singapore connecting Governance with Demand

Ghana has established a Carbon Market Office and a national registry to support its Article 6 framework. The office provides administrative and technical services, including support for activity development, MRV, accounting, registry operations and transfers. Its published Article 6.2 activity process explains steps for developers seeking authorisation and transfer of mitigation outcomes. [9]

Singapore and Ghana signed an Article 6 implementation agreement in May 2024 and subsequently launched a call for project applications. Eligible credits under the agreement may be used by Singapore's carbon-tax-liable companies within the permitted international-credit limit. Project eligibility and authorisation are still required; the bilateral agreement itself does not approve every project or guarantee a sale. [10]

The practical lesson is to connect the project pipeline with both host-country procedures and an identifiable demand channel. For Indian developers and industry bodies, the useful questions are who reviews applications, which activities and methodologies are accepted, what documents are required, and which buyers can use the resulting outcomes. This is an Article 6.2 example, not evidence that the same projects have been registered under PACM.

Ghana's published activity process offers a practical example of the documents and institutional interactions needed beyond a policy announcement. Developers can identify the authority handling requests, the relationship between recognised crediting standards and national authorisation, and the registry steps associated with a proposed transfer. This makes it easier to prepare a complete application and to distinguish national requirements from those of the chosen crediting programme. [9,9a]

Singapore's project-application route adds a second layer: a buyer jurisdiction may specify eligible programmes, methodologies and uses even when a host country is willing to authorise an activity. The host approval or authorisation, the crediting standard's requirements and the buyer's acceptance criteria must all be aligned. A project can be attractive environmentally yet unsuitable for a particular buyer or compliance use. [10,10a]

For industry associations, a useful adaptation is a project information sheet covering technology, methodology, host decision, intended buyer use and unresolved conditions. This does not replicate sovereign decision-making. It gives companies and financiers a common basis for assessing where a proposal stands and which decision or evidence is needed next.

5B.2 Kenya Building Capacity before Transactions

In July 2025, GGGI and Kenya's Ministry of Environment, Climate Change and Forestry launched the Fast-Start Article 6 Readiness Support project. This initiative illustrates the role of targeted readiness support in building a national approach to Article 6 participation. [11]

For India and other host countries, the lesson is that announcing a designated authority or a sector list is only part of readiness. Developers also need accessible guidance, a workable review process and institutions able to evaluate proposals. Industry associations can help by identifying common data gaps, building sector pipelines and coordinating training, while leaving sovereign approval and authorisation decisions with the responsible government authorities.

Readiness support is most useful when it resolves practical questions: who receives applications, how technical review is organised, what data the government needs, and how mitigation transfers fit national climate commitments. Training alone does not demonstrate that these functions operate. Industry engagement can support implementation by testing guidance against real project proposals and identifying unclear requirements before they become recurring delays.

This example supports a distinction between a readiness initiative and a transaction outcome. The launch of a support programme should not be described as proof that projects have already been authorised, issued credits or attracted buyers. Its relevance lies in the institutional preparation that can make later participation more credible and predictable. [11]

5B.3 Case Study Myanmar Cookstoves Methodology Assumptions and Confidence

On 26 February 2026, the Article 6.4 Supervisory Body approved the first PACM credit issuance from a Myanmar clean-cooking activity. UNFCCC stated that updated values and more conservative calculations produced credited reductions approximately 40% lower than older systems would have issued. The official transition record identifies the Climate Change Center programme as PoA 10471. [12]

Carbon Market Watch's June 2026 analysis questioned the robustness of the cookstove methodology and assumptions associated with PoA 10471. Its earlier 2025 analysis concerned a different Myanmar programme, PoA 10415. These should not be combined into a single project history, and external critiques must be distinguished from formal findings or decisions by the Supervisory Body. [13]

The lesson is that formal eligibility and buyer confidence require separate attention. Developers and buyers should examine fuel-use baselines, actual stove use, continued use of older stoves, sampling, the non-renewable biomass fraction and uncertainty treatment. Registration and independent verification do not remove the need for careful scrutiny of the assumptions supporting credit volumes. Conservative estimates can reduce expected revenues, making this an integrity issue and a commercial planning issue.

The Myanmar discussion also shows why project identity matters. A claim about the first activity to transition, the first issuance approval, or an external rating may refer to different

programmes, monitoring periods and decisions. Readers should be able to trace each statement to the specific project and source. Critical assessments should be attributed to their authors and not presented as a formal UNFCCC finding unless the relevant decision says so. [12,12a,13,13a]

For a cookstove developer, the practical response is to design monitoring around sustained household behaviour. Evidence should distinguish distribution from use, measure or substantiate relevant fuel savings, and account for continued use of traditional devices where required. Buyer due diligence should test how estimates change under conservative assumptions and whether local conditions support the parameters used.

For financiers, the important implication is the sensitivity of revenue to credit quantities. A project can deliver useful social benefits while generating fewer defensible credits than initially forecast. Those benefits may strengthen the wider financing case, but they do not justify overstating emission reductions. A robust proposal separates verified mitigation, other development benefits and the cash flows associated with each.

5B.4 Turning Lessons into an Investable Pipeline

The examples point to three practical priorities: predictable host-country procedures, a clear route to eligible buyers, and defensible mitigation estimates. Indian industry should use these lessons alongside the checklist in Part A, building proposals around national priorities and credible evidence rather than anticipated premiums or headline credit volumes. International comparisons are useful for learning; each project still needs assessment under its own country, methodology and intended use.

A workable industry pipeline should record the status of each proposal rather than group all opportunities under one headline. Early concepts need eligibility and feasibility checks; prepared proposals need methodology and evidence review; activities approaching validation need a complete monitoring and safeguards package; and projects seeking finance need realistic delivery and buyer terms. The next step should follow the outstanding issue, not an assumed timetable.

The objective is to turn experience into credible proposals that can withstand technical review and commercial due diligence. Part A provides the project-development foundation; Part B shows how institutions, demand arrangements and methodological scrutiny shape the result. Together they support a practical approach to PACM opportunities in India and beyond.

Consolidated References

All references below are publicly available documents or webpages. Numbered references apply across both parts. National eligibility, methodologies and procedures may change; consult the current versions before project decisions. Sources checked on 30 September 2026.

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[11] https://gggi.org/gggi-launches-article-6-readiness-project-in-kenya-collaborating-with-eu/

[12] https://unfccc.int/zh/node/655916

[12a] https://unfccc.int/process-and-meetings/the-paris-agreement/paris-agreement-crediting-mechanism/CDM_transition/PoA10471

[13] https://carbonmarketwatch.org/2026/06/09/out-of-the-frying-pan-into-the-cookstove-too-many-carbon-credits-enter-un-carbon-market/

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CHAPTER 6

Technology, AI and Digital MRV

6 Technology, AI and Digital MRV

The transition from CDM to PACM is a technological inflection point as much as a regulatory one. This chapter sets out what digital MRV can and cannot yet do for Indian carbon projects, and what Indian industry should do about both.

6.1 Why Digital MRV Matters Now

Under the CDM, Monitoring, Reporting and Verification relied heavily on manual data collection, periodic site visits, paper-based documentation and retrospective verification – an approach that was costly, slow and, in many cases, vulnerable to data gaps and integrity questions. PACM introduces a fundamentally different paradigm: stronger environmental safeguards, transparent baselines, tighter additionality rules, and verification systems capable of ensuring that every issued credit reflects real, measurable climate impact. Digital MRV (dMRV) – automated, technology-enabled data collection, processing and verification – is emerging as the critical enabler of this paradigm, and the Article 6.4 framework explicitly recognizes digital validation and verification as a credible alternative to conventional approaches; the UNFCCC has identified digitizing MRV as a key pathway for incentivizing private-sector participation.

The clearest proof of concept so far came in February 2026, when Verra approved its first credits under a dMRV pilot for high-frequency issuance, generated by the Foumbouni-Mitsamiouli solar farm on Grande Comore in the Comoros, with SustainCERT conducting an entirely digital verification of the monitoring data. Under the pilot, an approved high-frequency installment can release 80% of credits immediately, with 20% withheld as a safeguard until the project completes a full annual verification covering additional parameters such as safeguards and stakeholder engagement; Verra is now extending the pilot to other project types, including carbon capture and storage and clean cookstoves. Gold Standard has launched a parallel digitalization pathway and dMRV pilot running through October 2026, together with digital assurance tools, and its updated framework mandates that any credit vintaged from 1 January 2026 onward be quantified using PA-aligned methodologies. For Indian industry, the CDM-era MRV challenge is also the opportunity: rather than retrofitting legacy systems, India can leapfrog directly to a modern, technology-enabled MRV infrastructure that reduces costs, strengthens credibility and positions Indian projects favorably with international buyers and regulators from the outset.

6.2 The Technology Stack

Satellite-based monitoring is the backbone of modern dMRV. High-resolution optical and radar satellites – Sentinel-1/2, Landsat-8/9, MODIS – provide wall-to-wall coverage of project areas down to 10-metre resolution, tracking land-use change, vegetation health through NDVI, forest cover, water bodies, burned areas and biomass carbon stocks without requiring

physical site access; India's own ISRO already operates advanced remote-sensing systems monitoring crop patterns, flooding cycles and land-use change that Indian projects can draw on alongside international assets. Artificial intelligence and machine learning increasingly do the heavy analytical lifting: automating land-cover classification, detecting over-crediting and leakage in forest-carbon projects by analyzing vegetation indices across project boundaries, estimating soil organic carbon by combining satellite data with IoT soil sensors and biogeochemical models, and flagging anomalies that might indicate reversal events or data-quality issues – AI-driven baselines and predictive models are increasingly treated as essential for high-integrity nature-based-solutions markets specifically. IoT sensors supply the ground-truth data that calibrates these satellite observations: soil sensors measuring temperature, moisture and carbon content at high frequency, energy meters tracking renewable generation or consumption in real time, and methane detectors monitoring fugitive emissions from waste or industrial facilities, all generating continuous, timestamped data streams that reduce reliance on periodic manual sampling.

Digital MRV platforms integrate these streams – satellite, IoT and other sources – into unified dashboards, automating monitoring-report generation, maintaining audit trails, and preparing data for registry submission; India's Carbon Market Portal, launched March 2026, provides a centralized platform for registration, monitoring, reporting and verification of industrial emissions, with digital MRV being built into this infrastructure from the outset. Blockchain and distributed-ledger technology add a further, tamper-evident layer: platforms built on Hedera, described as the world's greenest distributed ledger, enable end-to-end MRV, registry-grade traceability and digital credit issuance, addressing one of the CDM's persistent weaknesses – the difficulty of verifying that reported data has not been altered after the fact. That promise is not automatic, however: it depends entirely on how technology is governed, a caution explored in Box 6.2 below.

Beyond India's own ecosystem, a cluster of international technology providers is actively shaping what buyers now expect from any project, Indian or otherwise. Sylvera applies classical machine learning and deep learning to optical, radar and LiDAR satellite imagery to score forestry projects pixel by pixel. Pachama, an early pioneer of AI-powered forest-carbon dMRV, was acquired by Carbon Direct in November 2025 to combine monitoring technology with scientific advisory capacity. CTrees' JMRV platform now covers 263 countries and territories at 100-metre resolution; its November 2024 global data release revised tropical deforestation emissions estimates 15% lower and forest-degradation emissions 73% higher year-on-year, illustrating how materially AI-driven analysis can change what the market believes it knows about baseline emissions. On the methane side, GHGSat's satellite constellation can detect releases as small as roughly 100 kilograms per hour at facility level, while UNEP's Methane Alert and Response System uses AI to pre-screen large majority of satellite detections before any human reviews them, cutting processing time more than tenfold. For Indian oil and gas, coal-mine methane and waste-sector developers in particular, these systems are becoming a live source of independent, third-party verification data – not just a domestic ecosystem to build alongside.

6.3 India's Emerging Ecosystem and Its Institutional Backbone

This private-sector activity is being built on top of a public digital MRV backbone that already has a decade of scale behind it. India's Perform, Achieve and Trade (PAT) scheme has measured, verified and traded energy-efficiency outcomes across more than 1,000 energy-intensive entities since 2012. The Carbon Credit Trading Scheme, notified in 2024, extends this institutional muscle directly: BEE certifies performance, the offset mechanism opened for project registration on 1 January 2025 with eight approved methodologies, Accredited Carbon Verification agencies began applying for accreditation from June 2025, and Grid Controller of India Limited is designated to operate the underlying registry. If this registry is built for interoperability with the UNFCCC's own international registry infrastructure from the outset, India's existing MRV maturity could become a genuine competitive advantage in PACM project development, rather than a second system requiring retrofitting later.

Several Indian firms are already building the technologies this transition requires. KrishiTwin uses AI-powered carbon measurement, combining satellite data, IoT soil sensors and AI models, to track soil organic carbon, emission reductions and farm-level carbon baselines. TRST01 has launched an AI-native Carbon Intelligence Platform on a three-hub operating model, with India serving as the technology and AI-analytics base, integrating AI-native analytics, digital MRV systems and blockchain traceability. Prithu has raised INR 10 crore to scale high-integrity carbon credits, focusing on onboarding small landholder farmers while strengthening its blockchain-powered digital MRV infrastructure with satellite monitoring, ground truths and machine learning. Varaha, founded by IIT alumni, uses satellite data and blockchain-verified MRV to certify carbon credits. Pi Green and EcoGuard have partnered to deploy digital MRV systems for carbon-capture projects, building a digital framework for carbon accounting and climate-impact verification. RenewCred enables continuous MRV at the level of each individual credit issued through its proprietary Net Zero platform. Collectively, this ecosystem demonstrates that Indian firms are not passive observers of the digital MRV transition but active developers of the technologies that will define the next generation of carbon markets.

6.4 Limits, Standards and What Indian Industry Should Do

These gains should not obscure real, current limitations. Even leading satellite-and-AI providers caution that biomass and emissions estimate still require calibration against field or reference data – remote sensing strengthens MRV, but does not yet fully replace it. Accreditation and verification bodies have also adapted more slowly than the sensing technology itself: ISO-aligned standards permit digital approaches in principle, but verification practice in many contexts still defaults heavily to site visits, leaving a gap between what technology can already measure and what registries and buyers are yet comfortable crediting on that basis. For Indian developers, the practical implication is to treat digital MRV as a complement to, rather than a wholesale replacement for, independent verification – particularly during PACM's early years, while buyer and regulator trust in purely digital evidence is still being established. Internationally, India's registry design choices sit within a wider field of active experimentation: Indonesia relaunched an upgraded national climate registry (SRN PPI) in 2025 alongside a new

Presidential Regulation strengthening transparency; Thailand's TGO partnered with the Singapore-based ESG fintech STACS to bring blockchain-based transparency – used specifically for tamper-evidence, not tokenisation --- to its T-VER registry; Singapore operates Climate Impact X, a carbon exchange founded jointly by Temasek, DBS, the Singapore Exchange and Standard Chartered; and Kenya is piloting AI- and satellite-based remote sensing for soil-carbon and biodiversity monitoring in place of traditional soil sampling. Each system reflects a different starting point, but all face the same underlying requirement PACM imposes on India's own registry: eventual interoperability with the UNFCCC's international registry under common reporting standards.

For project developers, the priority is to assess current MRV systems against PACM and dMRV standards, invest in satellite and IoT infrastructure, design monitoring plans for high frequency rather than only annual reporting, and engage directly with methodology development, where over 20 proposals and five past Initial Assessment already offer a live opportunity to shape methodologies reflecting Indian conditions. Large corporates and buyers should require dMRV evidence in procurement – hashed, independently reproducible audit trails – and support supply-chain partners in adopting the same standards. MSMEs and smallholders should pursue pooled, programme-of-activities monitoring, lean on satellite-derived baselines instead of costly consultant-driven assessments, and engage Indian platforms such as KrishiTwin, Prithu or RenewCred that are built for smaller-scale participants. Financial institutions should fold dMRV credibility into investment and lend due diligence and consider concessional finance for platform adoption, particularly for MSMEs. Digital MRV is not a futuristic concept – it is operational today, and Article 6.4 already recognizes it as a credible alternative to conventional verification. For Indian industry, the question is not whether to adopt it, but how quickly, and with what safeguards against the limitations this section has described.

Box 6.1 – India's Digital MRV Startups at a Glance

- KrishiTwin: AI-powered soil-carbon and farm-baseline tracking via satellite and IoT sensors.
- TRST01: AI-native Carbon Intelligence Platform with blockchain traceability, India-based technology hub.
- Prithu: INR 10 crore raised to scale blockchain-backed MRV for smallholder farmers.
- Varaha: IIT-founded; satellite data plus blockchain-verified MRV for credit certification.
- Pi Green / EcoGuard: Digital MRV partnership for carbon-capture project accounting.
- RenewCred: Continuous, credit-level MRV through its proprietary Net Zero platform.

Source: *Company Disclosures compiled 2025–2026.*

Box 6.2 – The Tokenisation Lesson

Blockchain's tamper-evidence promise is not automatic. From 2021, platforms such as Toucan and KlimaDAO tokenised carbon credits on the same transparency logic this chapter describes --- but in practice this enabled buying up the cheapest available credits, including dormant older-vintage CERs, to back tokens, undermining rather than strengthening market integrity. Verra banned tokenisation of its retired credits in May 2022 for exactly this reason. For India's registry designers building on Hedera or any other distributed ledger, the lesson is direct: blockchain adds value only when the credits entering it are already credible --- it is not a substitute for credit quality.

Source: *TIME (2022); Verra Retirement-tokenisation Policy, May 2022.*



CHAPTER 7

Government and Industry Ecosystem for Carbon Market Readiness

7 Government and Industry Ecosystem for Carbon Market Readiness

Africa's experience under the Clean Development Mechanism (CDM) offers a practical lesson for future carbon-market readiness. The continent accounted for less than 3% of registered CDM project activities worldwide. This uneven distribution highlights the importance of addressing barriers to participation in the transition to the Paris Agreement Crediting Mechanism (PACM). Businesses need finance, technical expertise and clear institutional guidance to develop credible projects and meet applicable requirements. Strengthening these foundations can broaden participation, enabling smaller enterprises to access opportunities alongside established developers.

From a Global South perspective, readiness also concerns the ability of host countries to make informed decisions and retain economic value. Governments need to protect national climate commitments and development priorities. Industry needs predictable processes and commercially viable investment opportunities. Cooperation should establish clear responsibilities for public institutions, companies and the professional services supporting them.

Shared principles can give this cooperation direction. The African Principles on Integrity and Equity in Carbon Markets, developed through the African Union Development Agency–NEPAD, establish integrity and equity as shared priorities for market participation. They can provide a common reference point for national guidance, project assessment and commercial arrangements. Translating these priorities into clear expectations on community rights, benefit sharing and accountability would help align government oversight with responsible business practice.

Government's first contribution is accessible policy guidance. Businesses need to understand which activities may qualify, which authorities are responsible, what evidence is required and how applications will be assessed. Guidance should distinguish domestic carbon-market requirements from those governing Article 6 participation. Published procedures, indicative processing timelines and explanations of decisions help companies plan expenditure. Coordination across ministries and implementing agencies can reduce duplication while preserving environmental and social safeguards.

Clarity on approval and authorisation is particularly important. Approval of a PACM activity is distinct from authorisation of its emission reductions for specified international uses. Authorised outcomes are subject to corresponding-adjustment requirements in national climate accounting. Governments therefore need to assess implications for their nationally determined contributions, while developers and buyers need clarity on the scope and conditions of authorisation before committing capital or entering purchase agreements.

Industry has an equally substantive role. Companies should bring credible project pipelines, reliable emissions data and realistic implementation costs into discussions with government. They should explain where carbon finance could influence investment decisions and identify methodological or administrative barriers. Within firms, operational, finance, legal and sustainability teams need to coordinate preparation. Companies must understand monitoring obligations, contractual responsibilities and exposure to delayed issuance or lower-than-expected revenues.

The cost and availability of expertise deserve attention. Developers require competent advisers, independent validators and verifiers, and staff who maintain dependable monitoring records. Building domestic capability can improve access and retain professional opportunities within the economy. Government, industry associations and training institutions could identify skills gaps and support practical training linked to supervised assignments. Relevant accreditation, quality management and safeguards against conflicts of interest remain essential. Project advisory work and independent assurance must be appropriately separated.

Investment in data systems should accompany this professional capacity. Companies need auditable records, while authorities require information for oversight and accounting. Shared data definitions and reporting guidance can reduce repeated work. Technology arrangements should address access rights, confidentiality, data ownership and the ability to maintain or change systems throughout a project's life.

Finance must also be available before carbon revenue arrives. Feasibility studies, documentation, consultation, monitoring equipment and validation require expenditure. Targeted project-preparation support could help viable proposals progress, particularly where smaller firms cannot absorb these costs. Early engagement with banks and potential buyers can clarify financing requirements. Purchase commitments or carefully structured advance payments may improve financing prospects. Public support should have transparent selection criteria, with commercial responsibilities allocated explicitly. Support should also help companies assess whether expected carbon revenues justify the costs and risks of participation.

Smaller enterprises may benefit from aggregation, where permitted, by sharing development and monitoring services across similar activities. In sub-Saharan Africa, the World Bank's Carbon Initiative for Development (Ci-Dev) has combined commitments to purchase verified emission reductions from energy-access programmes with support for national crediting capacity. Its programmatic approach groups small activities within larger programmes, while its Standardised Crediting Framework (SCF) strengthens country ownership and simplifies crediting procedures through standardised baselines and monitoring approaches. In Rwanda, an SCF pilot supported the development of national crediting rules and templates and aligned monitoring requirements with a cookstove company's operational data, helping to reduce monitoring and verification costs. This experience illustrates how purchase commitments, institutional capacity and practical procedures can support wider participation. These lessons can inform PACM readiness, with their application subject to the mechanism's requirements.

Participation also depends on transparent commercial arrangements. Where farmers, communities or smaller businesses contribute resources or implementation effort, agreements should explain their rights, responsibilities and expected benefits. Participants need clarity on revenue deductions, payment conditions and the consequences of underperformance. Accessible grievance arrangements and reporting on benefits delivered strengthen accountability. Government can establish appropriate protections, while industry incorporates them into project design and contracting.

Government–industry dialogue is more effective when organised around specific challenges. Sector working groups could consolidate concerns about eligibility, monitoring costs, verification capacity and finance, presenting supporting evidence to relevant authorities. Project clinics involving technical specialists and prospective financiers could help companies assess readiness before committing significant resources. Guidance should distinguish current requirements from proposals under discussion and be updated as rules change. Smaller enterprises and independent experts should contribute to these exchanges.

Progress should be assessed through more complete submissions, clearer public processes, better access to competent services and viable projects securing investment. Regular government–industry review can refine guidance and support. Readiness should ultimately be judged by whether a wider range of enterprises can develop credible projects, attract investment and deliver verified mitigation that supports national development priorities.



CHAPTER 8

International Linkages: CORSIA, Bilateral Cooperation and CBAM

8 International Linkages: CORSIA, Bilateral Cooperation and CBAM

8.1 Three Converging Pressure Points

Until recently, the compliance carbon market ecosystem readiness, development and establishment was limited to UNFCCC process which is no longer true. Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) under the aegis of International Civil Aviation Organization which moved through a pilot phase from 2021 to 2023, is now in its voluntary First Phase (2024-2026), and becomes mandatory for nearly all ICAO member states from 2027 through 2035. Least-developed, small-island and landlocked states are exempted under this scheme.

As of the most recent count, 126 states have committed to the voluntary First Phase; India, China, Russia and Brazil have notably not joined. As CORSIA offsetting obligations apply only to flights between two participating states, most India-origin and India-destination international flights currently sit outside CORSIA's offsetting requirement. India is nonetheless actively preparing for the 2027 mandatory phase, with policy attention concentrated on scaling Sustainable Aviation Fuel production. Indian airlines industry is gearing up to its participation in CORSIA as well.

CBAM is best understood as one instrument within this fast-consolidating global system, not an isolated EU measure. The European Union's Carbon Border Adjustment Mechanism (CBAM), meanwhile, has already begun to bind. Its transitional (emissions reporting) period ran between the period 2023 and 2025. The definitive compliance phase began on 1 January 2026 and stipulates EU importers to actually purchase and surrender CBAM certificates matched to embedded emissions, covering iron & steel, cement, aluminium, fertilizers, hydrogen and electricity. India is significantly exposed to CBAM across iron & steel, aluminium, cement, fertilisers, hydrogen and electricity. For India, steel dominates CBAM-covered exports to the EU (for 2024, US $5.4 billion was from iron & steel out of total exports of CBAM – covered goods of US $6.3 billion). The financial impact could be substantial, with Indian steel facing 9–22% margin compression, 15–22% price pressure and potentially 15–40% of EU-bound exports becoming commercially unviable. India's CCTS is therefore strategically important because carbon prices effectively paid domestically can potentially reduce CBAM liabilities. At the recently concluded 2026 BRICS Summit in New Delhi, BRICS countries explicitly opposed carbon border adjustment mechanisms such as the EU CBAM, characterising unilateral measures of this kind as punitive, discriminatory and protectionist and warning that they could undermine developing countries' efforts to address climate impacts and build resilience (pmindia.gov.in). However, recently, the United Kingdom recognised India's CCTS as a qualifying carbon-pricing scheme in September 2026 for its CBAM commencing in 2027. The EU is also developing implementing rules governing recognition of third-country carbon prices, creating an important pathway for India to seek recognition of its domestic carbon-pricing architecture and potentially eligible Article 6 credits, subject to the final EU rules.

Bilateral Article 6.2 cooperation, finally, is visibly outpacing the centralised Article 6.4 mechanism in speed if not yet scale. Switzerland's KliK Foundation has built agreements with Peru, Ghana, Vanuatu, Thailand, Georgia and Senegal, among others, and Singapore's Implementation Agreements with Ghana, Papua New Guinea, Bhutan, Indonesia, Peru among others, let Singaporean firms count Article 6.2 credits toward its domestic carbon tax. India's own bilateral pathway arrived more recently but has picked up pace. India and Japan signed a Memorandum of Cooperation on the Joint Crediting Mechanism (JCM) in August 2025, explicitly under Article 6.2, and adopted detailed Rules of Implementation in June 2026 covering compressed biogas, renewable hydrogen and ammonia, high-emission industry, carbon capture and storage, and efficiency project types against a wider JCM network that had selected more than 290 projects across 32 countries by April 2026, targeting roughly 100 million tonnes of cumulative CO2e reduction by fiscal year 2030. Also India and the Republic of Korea concluded a Memorandum of Cooperation (MoC) under Article 6.2 of the Paris Agreement on 20 April 2026, establishing a bilateral cooperative approach for investment-driven mitigation projects and the transfer of mitigation outcomes, while supporting achievement of both countries' NDCs.

8.2 Progress and a Significant September 2026 Development

On CORSIA eligibility, notably, the picture for Article 6.4 remains unfavourable. ICAO's October 2025 list of CORSIA-eligible emissions units names six approved crediting programmes, and Article 6.4 A6.4ERs are not among them. A March 2025 legal analysis by CACE and HFW notes that ICAO's Technical Advisory Body has committed only to assess the Article 6.4 mechanism once it is "operational," without a firm timeline, and that any future eligibility would in any case require corresponding adjustments to avoid double counting. Further, ICAO formally "noted" updates on the operationalization of Article 6.4 in October 2025. This means that high-integrity Article 6.4 credits generated in India (in compliance with its positive list of 13 eligible sectors) cannot yet be sold into CORSIA demand even as that demand grows toward 2027.

On CBAM, the EU adopted a 2025 Omnibus simplification package for CBAM ahead of full compliance, introducing a de minimis exemption for importers of 50 tonnes or less of covered goods annually (excluding hydrogen and electricity), which removes roughly 90% of importers while still covering about 99% of embedded emissions. First certificate sales were delayed from January 2026 to February 2027, with 2026 emissions to be settled retroactively. The annual declaration deadline was moved to 30 September, and the quarterly certificate-holding requirement was reduced from 80% to 50% of embedded emissions.

Crucially for India, CBAM rules allow deduction of a carbon price "effectively paid" in the country of origin from the certificate obligation meaning a credible, verifiable CCTS carbon price could, once operative, directly reduce Indian exporters' CBAM costs. Where no reliable price exists, a higher default applies instead. On 8–9 September 2026, the UK officially recognised India's CCTS as a qualifying carbon-pricing scheme under its own CBAM, effective 1 January 2027, allowing carbon prices already paid on imported goods to be credited against UK CBAM liability and preventing double taxation. The recognition covers aluminium, cement, fertiliser, hydrogen, and iron and steel, sectors that align with India's own carbon-market framework, though importers must still provide UK-standard verification, accurate emissions data, and documented evidence of the carbon price paid.

Bilateral Article 6.2 cooperation continues to expand rapidly in signature volume but remains constrained by a persistent gap between agreements and delivered credits. Over 112 bilateral arrangements have been formalised globally, with 68 parties engaged in cooperative approaches, many not operational. Actual ITMO transfers remain significantly low as host countries build the necessary ecosystem. India's bilateral pathway has accelerated notably, with the Japan JCM Rules of Implementation adopted in June 2026 and a Korea MoC concluded in April 2026, positioning India within a wider network that had selected over 290 JCM projects across 32 countries by April 2026. The principal challenges remain institutional capacity in host countries, unclear authorisation guidance, and the absence of a settled legal framework for credit ownership, all of which slow the transition from paper agreements to functioning markets.

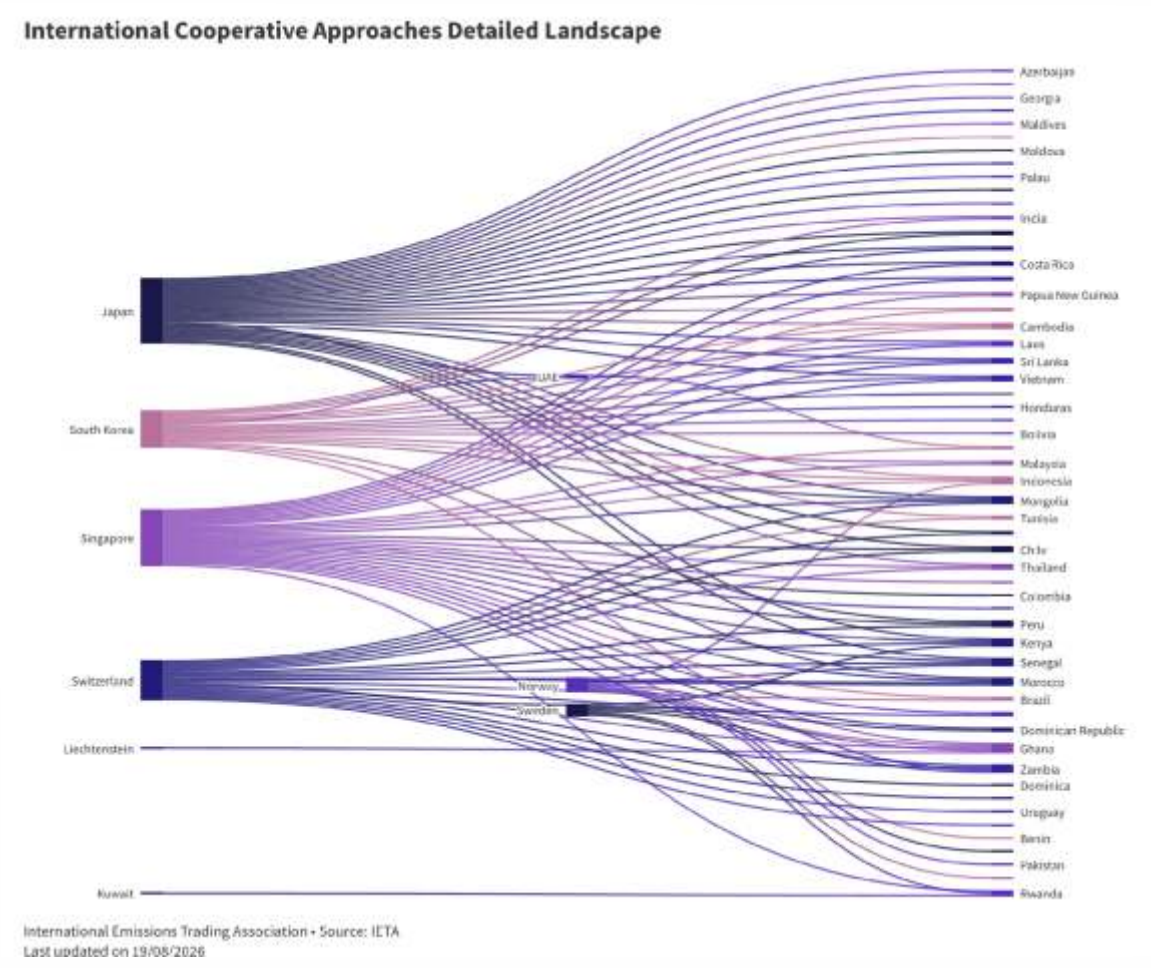
8.3 The Path Forward

For India, the following recommendations are presented for operationalizing Article 6 under the Paris Agreement:

- Extend the UK – CBAM recognition model to the EU as a matter of priority.
- Fast-tracking a credible, published, verifiable domestic carbon price under CCTS explicitly designed to meet the EU's "effectively paid" standard for CBAM implementation.
- Pursue CORSIA eligibility for Article 6.4 credits through sustained diplomatic engagement with ICAO's Technical Advisory Body.
- Expand India's bilateral Article 6.2 network (beyond Japan and South Korea) and establish co-operation with Switzerland, Sweden, Norway and Singapore.

For Indian Industry, it is imperative to implement the following:

- Invest urgently in plant-level, independently verified digital MRV data, linking directly to the technology and registry solutions.
- Treat a credible domestic carbon price, once UK-style recognition is secured more broadly, as an export-competitiveness asset rather than only a compliance cost.
- Engage directly in carbon-price-collar modelling work such as the CII-IIM Ahmedabad report published in August 2026, which modelled an illustrative range of USD 22 to 60 per tonne of CO2e (with USD 35 offered as an illustrative discovered price) for how a domestic carbon price could be structured for CBAM recognition.
- Explore the India-Japan JCM and future bilateral pathways as alternative buyer and finance channels alongside Article 6.4.
- Indian industry associations should convene a dedicated CBAM, CORSIA and Article 6 readiness helpdesk, with particular attention to MSME exportersand advocate, alongside for EU recognition of CCTS to follow the UK's, and for an expanded bilateral cooperation network.



(***Source:*** *https://www.ieta.org/article-6-2-bilateral-agreements-tracker)*





CHAPTER 9

Interoperability

9 Interoperability

Carbon markets are moving from a world of separate, self-contained registries towards a single, interconnected system. In that system, one mitigation outcome may be recognised by several frameworks at once: credit issued under one programme may count towards a domestic compliance scheme, qualify for CORSIA, and be authorised for a corresponding adjustment under Article 6.2 of the Paris Agreement. As the boundaries between voluntary and compliance markets blur, the question is no longer only whether a credit exists, but whether every system that touches it can agree on what it is and where it has been used. That agreement is what interoperability provides. Without it, credit tracking fragments, double-counting risk rises, buyer confidence falls and transactions slow.

Interoperability is best understood as a chain of three dependencies, each resting on the one before. First, every unit must carry a clear identity — a label that says what it is and where it may be used. Second, that identity is portable only if the systems exchanging it share a common language — the work of standardisation. Third, a common language delivers value only when connective infrastructure carries it reliably across every registry layer and into international accounting — the role of application programming interfaces (APIs) and the Centralized Accounting and Reporting Platform (CARP). This chapter follows that chain — identity, language and connection — and closes with what it means for Indian Industry and for FICCI.

Step in the Chain	What it Requires	Covered In
1. Identity	Label every unit at issuance with what it is and where it may be used, in a machine-readable form.	9.1 Unit-level Eligibility Labelling
2. Common Language	Describe units, projects and methodologies the same way across platforms, using shared data standards.	9.2 Standardisation and Efforts under Way
3. Connection	Move data across all registry layers and into the CARP through automated, API-driven exchange.	9.3 Cross-registry Exchange and the CARP

9.1 Knowing what a Unit is: Unit-level Eligibility Labelling

The chain begins with identity. Every registry must be able to define, at the level of the individual unit, what that unit is and where it may be used — because a tonne is no longer simply a tonne. Under the Paris Agreement Crediting Mechanism, the same activity may give rise to Article 6.4 emission reductions (A6.4ERs) that are authorised for international use, or to Mitigation Contribution Units (MCUs) that are not authorised and carry no corresponding adjustment. An authorised unit may become an Internationally Transferred Mitigation Outcome (ITMO) when transferred; it may or may not be eligible for CORSIA; and a share of issued units is cancelled to deliver Overall Mitigation in Global Emissions (OMGE). Each of these statuses changes what a buyer can legitimately claim.

Registry platforms must therefore attach a clear eligibility label to each unit — capturing its authorisation status, whether a corresponding adjustment has been applied, and which

schemes (Article 6, CORSIA, a domestic compliance market, or the voluntary market) it may serve. Crucially, this label must be applied consistently at the unit level regardless of whether eligibility is determined at project, methodology or programme level; expressed in a standardised, machine-readable format; and shared with other registry platforms. Only then can a unit be recognised, aggregated and safely reconciled as it moves between systems. Where labels are inconsistent, or held only as free text in scattered documents, automated cross-checking breaks down and the risk of a single reduction being counted twice increases. For Indian project owners and buyers, standardised labelling is what will allow a PACM unit or a transitioned CDM asset to be identified at a glance as authorised or unauthorised, adjusted or unadjusted — the single most important fact behind any credible claim.

A label, however, is only useful to the next system if that system can read it. A unit's identity becomes portable only when platforms describe units, projects and methodologies in the same way — the problem that standardisation sets out to solve.

9.2 Speaking a Common Language: Standardisation and Efforts under Way

Labels and data can travel between systems only if those systems agree on a common vocabulary. Today they largely do not. Project location may be recorded as coordinates in one registry and as a shapefile or a text description in another; methodologies are named inconsistently; MRV outputs arrive as PDF reports in one place and as structured data in another; baseline assumptions are buried in narrative rather than parameterised fields. This fragmentation isolates precisely the information — ownership, verification, and emission reductions — those other systems most need to interoperate.

Achieving interoperability therefore depends on genuine standardisation, and several international initiatives are now converging on that goal — spanning open-source infrastructure, technical protocols, formal standards and UNFCCC guidance. While many operate independently, they increasingly build shared building blocks, in particular the open-source data model developed by the Climate Action Data Trust and guidance from the UNFCCC, which informs much of the other work. The main efforts referenced in this brief are described below.

Climate Action Data Trust (CAD Trust)

The CAD Trust provides an open-source registry data model and decentralised infrastructure for transparent carbon-credit tracking across registries. It was jointly founded by the World Bank, the International Emissions Trading Association (IETA) and the Government of Singapore and has operated under a multi-stakeholder governance structure — Council, Board, Technical Committee, User Forum and Secretariat — since 2022, building on the World Bank's Climate Warehouse prototypes of 2020–2021. Each participating crediting programme maps its own registry fields to a common schema and connects through an API, without changing its internal data structures. The CAD Trust model underpins the proposed ISO standard and informs both the G20 and CDOP efforts, with near-term work focused on alignment with Article 6 reporting.

Carbon Data Open Protocol (CDOP)

CDOP is an initiative to create a standardised data schema for carbon-crediting projects, covering project definitions, methodologies and digital MRV (DMRV) formats, together with guiding principles for its use and a governance framework for maintenance and updates. It was founded by Sylvera and is co-chaired on a rotating basis with the Global Carbon Market Utility (GCMU), the Rocky Mountain Institute (RMI) and S&P Global Commodity Insights, with governance designed to keep the protocol open and extensible. Its first version, focused on pre-issuance data fields, was expected around September 2025.

G20 Common Carbon Credit Data Model

Delivered by the G20 Sustainable Finance Working Group (SFWG), the Common Carbon Credit Data Model is intended as a globally recognised reference point that enhances the transparency, comparability and interoperability of carbon-credit data across markets. It defines the minimum key data attributes required across the full credit lifecycle — from project development and validation through issuance and trading to retirement — and recommends how those fields are incorporated into new and existing market infrastructures. The SFWG sought to deliver it in Q4 2025 under South Africa's G20 presidency, as a public good for voluntary adoption and a minimum floor on which others can build. (This is the initiative referred to in the concept note as the G20 "Climate Data Steering Committee".)

ISO TC 322 — Data Model for Carbon Credit Markets

A new work item under ISO Technical Committee 322 (Sustainable Finance) aims to deliver a formal international standard data model for carbon credit markets, building on the CAD Trust model and proposed by the Singapore Standards Council. It entered the ISO ballot process in mid-2025, followed by an anticipated 24-month consultation, with first publication expected in early 2027. As a formal standard, it could in time inform registry design and the integration of carbon credit into global financial markets.

Article 6.2 Crediting Protocol

Launched at COP29 by the Government of Singapore, Verra and Gold Standard, the Article 6.2 Crediting Protocol develops standard guidance for inter-registry information flows, helping governments authorise independent-crediting-programme credits for bilateral Article 6 trades. It addresses how to identify the credits underlying an ITMO in a standard way — authorisation labels, ITMO identities and reporting templates — to align transactional and accounting registries. Guidance was expected in the second half of 2025, with its data-field and labelling requirements anticipated for integration into the CAD Trust data model.

UNFCCC registry-interoperability guidance and the Agreed Electronic Format (AEF)

Underpinning these market-led efforts is the UNFCCC's own guidance, driven by CMA decisions from COP26 to COP29 and implemented by the UNFCCC Secretariat. It provides frameworks and templates for Article 6 tracking and global registry alignment, including interoperability arrangements between the international registry, the Paris Agreement

Crediting Mechanism and the CARP, and the Agreed Electronic Format (AEF) for reporting. Use of the AEF is encouraged but, at present, remains optional — making voluntary alignment with it an important readiness step.

Summary of Standardisation Efforts

Initiative	What it Is	Lead/ Status
CAD Trust	Open-source registry data model and infrastructure; registries map to a common schema and connect via API.	World Bank, IETA, Singapore; live, used by multiple registries.
CDOP	Standardised scheme for project definitions, methodologies and DMRV formats, with a governance framework.	Sylvera with GCMU, RMI, S&P Global; first version c. 2025.
G20 Common Carbon Credit Data Model	Minimum key data attributes across the credit lifecycle; a global reference point and voluntary public good.	G20 SFWG; sought for Q4 2025 (South Africa presidency).
ISO TC 322 Data Model	Formal international standard data model, building on CAD Trust.	ISO / Singapore Standards Council; publication expected early 2027.
Article 6.2 Crediting Protocol	Inter-registry guidance for ITMOs - authorisation labels, ITMO identities, reporting templates.	Singapore, Verra, Gold Standard; guidance c. H2 2025.
UNFCCC Guidance & AEF	Frameworks and templates for Article 6 tracking, registry interoperability and CARP reporting via the AEF.	UNFCCC Secretariat (CMA decisions, COP26-29); AEF encouraged, optional.

A shared language, however, still needs channels to travel through. Even perfectly standardised data delivers nothing while it remains locked inside individual registries. The final link in the chain is the infrastructure that carries it.

9.3 Connecting the Layers: Cross-registry Exchange and the CARP

The third requirement concerns the full chain of registries that a unit's information must reach. Data cannot sit in one place. It must flow between carbon crediting-programme registries, national registries, the mechanism (PACM / international) registry and other international registries, so that issuance, transfer, retirement and cancellation are visible and consistent across every layer. For Article 6 purposes, this information must ultimately land in the UNFCCC's Centralized Accounting and Reporting Platform (CARP), which supports transparent accounting of internationally transferred mitigation outcomes and their contribution to Parties' Nationally Determined Contributions. Reporting into the CARP must follow specific formats — notably the Agreed Electronic Format — so that national data can be consolidated without manual re-keying.

Creating such an environment is fundamentally a challenge of homogenisation and standardisation: many systems, built at different times to different specifications, must be made to speak to one another reliably and in near real time. Application programming interface (API)-driven solutions are key to overcoming this challenge. Rather than periodic,

manual file exchange, APIs enable automated, real-time, machine-readable data exchange between crediting-programme registries, national registries and UN systems, reducing errors, lowering transaction costs and keeping accounting synchronised as units move. For India, this means designing any national carbon registry from the start with AEF alignment, API connectivity to crediting-programme and UNFCCC systems, and a clear issuance-and-authorisation strategy — so that Indian units can be tracked seamlessly into the international registry and the CARP, and India's Article 6 reporting is both credible and efficient.

Identity, a common language and connection are therefore not three separate tasks but one continuous requirement. Where that chain holds, a credit is trusted wherever it travels; where any link is missing, its value stops at the border of its home registry.

9.4 What this means for FICCI and Indian Industry

For Indian Industry, interoperability ultimately determines whether a credit is trusted and tradable beyond its home registry. As India builds a domestic Carbon Credit Trading Scheme alongside participation in Article 6 and exposure to CORSIA and CBAM, the three requirements above are not back-office technicalities — they are preconditions for legacy CDM assets and future PACM units to be recognised in international markets. FICCI can add value by helping industry and government understand these requirements early and by encouraging design choices that keep Indian units connected to international systems. In practical terms, the brief can encourage stakeholders to:

- Adopt unit-level eligibility labelling as standard practice, so that authorisation and corresponding-adjustment status travel with every unit in a machine-readable form.
- Engage with international standardisation efforts — the CAD Trust, the Carbon Data Open Protocol and the G20 Common Carbon Credit Data Model — rather than building closed, bespoke formats.
- Design any national or programme registry for API connectivity and AEF alignment from the outset, so data can flow into the international registry and the CARP without manual re-keying.
- Connect to global aggregator platforms such as the CAD Trust to improve cross-registry visibility and reduce double-counting risk across systems and jurisdictions.
- Treat interoperability as an architectural decision taken early — not a retrofit — to protect the value of India's legacy CDM assets and position future PACM projects for international demand.



CHAPTER 10

Opportunities for Large Corporates and MSMEs

10 Opportunities for Large Corporates and MSMEs

Large corporates and micro, small and medium enterprises (MSMEs) can contribute to carbon markets through different but connected roles. Corporates can mobilise capital, technology and demand, while MSMEs can implement distributed mitigation across industrial clusters and supply chains. This chapter examines how these roles can support participation in the Paris Agreement Crediting Mechanism (PACM), alongside domestic and voluntary pathways, using India as a practical example.

10.1 Participation across the Enterprise Spectrum

Participation ranges from conglomerates with dedicated sustainability teams to small enterprises with limited familiarity with carbon crediting. Large firms can act as developers, buyers, financiers, aggregators and supply-chain anchors. MSMEs are more likely to enter through shared programmes, supplier partnerships and cluster coordinators that provide technical support and reduce transaction costs.

The scale of the opportunity is substantial. Official Indian data report that MSME gross value added represented 30.1% of GDP in 2022–23, while MSME-related products accounted for 45.73% of exports in 2023–24. These dated indicators establish economic importance; they do not measure MSME participation in carbon markets. [1]

The appropriate route depends on the activity and intended use of the credits. Article 6.2 supports cooperation between countries, while Article 6.4 establishes PACM. Host-country activity approval and authorisation for international use are distinct requirements. Authorised A6.4ERs involve the applicable corresponding-adjustment treatment; non-authorised mitigation contribution units support the host country's NDC. A domestic certificate or verified reduction does not automatically become an internationally transferable mitigation outcome. [2, 3]

India's Carbon Credit Trading Scheme (CCTS) already provides an offset route for eligible non-obligated entities. MSME status alone does not determine compliance obligations, and enterprises should check the applicable notifications. For many smaller firms, aggregation, voluntary crediting or supplier decarbonisation will be more practical than managing a standalone project. Access to the CCTS offset route remains subject to its methodologies and procedures. [4]

10.2 Opportunities for Large Corporates and MSMEs

Corporate Investment and Procurement: Large firms can assess carbon finance for industrial efficiency, electrification, methane abatement, waste management and selected removal activities. Renewable energy, storage, hydrogen and other technologies require route-specific eligibility and additionality checks. Equity, concessional finance and conditional long-term offtake can support project development, but carbon revenues should be modelled conservatively against price, authorisation and issuance risks.

Supplier and Cluster Participation: Corporates can finance upgrades, lease equipment, provide technical assistance or aggregate supplier projects. MSME opportunities include efficient boilers and motors, furnaces, waste-heat recovery, rooftop solar, waste management and biogas, where eligible. Shared audits, monitoring systems and verification services can reduce costs in foundries, textiles, ceramics and food processing. Compressed biogas merits assessment for aggregation, with careful measurement of methane leakage and project emissions.

Domestic and Non-credit Finance: Where crediting or international use is unsuitable, enterprises can still benefit from green loans, efficiency incentives, results-based finance and corporate supplier investment. Green credit programmes and carbon-credit mechanisms have different purposes and should not be treated as interchangeable.

Physical supply-chain improvements and credit transactions must be accounted for separately. Purchased or retired offsets are not deducted from Scope 1, 2 or 3 inventories. Supplier emissions improvements should be measured under the relevant inventory rules, while credit purchases, sales and associated claims are disclosed separately. [5]

10.3 Existing Programmes provide a Foundation

India's energy-efficiency and supplier-development programmes show that smaller enterprises can be reached at scale. They offer institutional experience that could support future carbon-project development, although their reported outcomes do not establish PACM registration or credit issuance.

Box 10.1 Existing Programmes and Reported Outcomes

Programme	Reported Outcome
BEE-GEF-UNIDO	12 Energy Management Centres; annual energy savings of 24,102 tonnes of oil equivalent; 145,935 tonnes of CO2 avoided annually; INR 244 crore investment attracted. [6]
BEE-GEF-World Bank-SIDBI	25 clusters by the third phase; energy-efficiency implementation in more than 1,250 MSME units; reported emissions reductions of 1.9 million tonnes of CO2. [6]
BEE-SDC SAMEEEKSHA	Profiles of 108 energy-intensive MSME clusters, providing a basis for identifying interventions. [6]
MSE GIFT under RAMP	INR 478 crore scheme outlay, with interest subvention and risk-sharing support for green investment. [7]
Walmart Vriddhi	More than 50,000 MSMEs supported by February 2024 through training, mentoring and digital tools. This is a supplier-development achievement. [8]

These figures describe programme outputs, avoided emissions or financing allocations. They are not counts of issued carbon credits, and they should not be added together without checking periods, boundaries and overlaps. MSE GIFT's published sectors already include carbon credit and carbon capture activities; further support should clarify how eligible enterprises can develop credible projects. [6, 7]

10.4 Barriers and Integrity Requirements

The main barriers are limited technical capacity, upfront development costs, weak operational data and unequal bargaining power with intermediaries. Aggregation can reduce costs, but each participating activity still needs an appropriate baseline, evidence of additionality, reliable monitoring and safeguards. Digital measurement, reporting and verification (MRV) should improve auditability while retaining site evidence, calibrated instruments and independent checks.

Programme reach is also an incomplete measure of market access. India-specific monitoring should distinguish enterprises trained, projects developed, activities registered, credits issued and net revenue received by MSMEs. This would provide a stronger basis for policy than if energy-efficiency participation translates directly into carbon-market participation.

Fair contracts should identify equipment ownership, carbon rights, data access, intermediary fees, revenue allocation and liability for underperformance. Participating firms need accessible grievance and exit arrangements. Governments should also assess the effect of authorised transfers on NDC achievement. Corresponding adjustments change national accounting balances, not physical emissions; any retained share or authorisation buffer is a policy choice rather than a universal Article 6 requirement. [2]

10.5 Actions to Close the Participation Gap

Government and Public Finance Institutions: Make existing CCTS offset requirements accessible to MSMEs and explain how domestic, voluntary and Article 6 pathways differ. BEE and SIDBI should assess carbon-project feasibility within suitable cluster programmes, finance early-stage audits and data systems, and use guarantees or concessional lending where appropriate. Multilateral partners can support pilot assessments and consistent participation metrics. Financing should remain realistic under low or zero carbon-revenue scenarios.

Large Corporates: Extend supplier programmes with practical decarbonisation, MRV and carbon-market literacy modules. Consider acting as cluster financiers, aggregators or long-term buyers, with transparent terms for participating MSMEs. Platforms such as Walmart Vriddhi illustrate potential outreach channels; extending them into carbon-project support would require deliberate programme design and eligibility assessment.

Industry Associations: Convene corporate–MSME matchmaking for supplier upgrades and project aggregation; publish concise guidance on CCTS offsets and PACM; connect sector associations with BEE and SIDBI financing; and track participation and enterprise-level benefits. Selected pilots should establish costs, crediting suitability and revenue-sharing arrangements before wider replication.

10.6 Key Message

Carbon-market inclusion depends on affordable project development, credible evidence and fair access to finance. Large corporates can help smaller enterprises participate through existing commercial relationships and cluster platforms. The same approach can inform other countries, if projects follow national rules, protect NDC achievement and deliver measurable benefits to participating enterprises.

References and Public Resources

All resources below are publicly available. Numbers in the text identify the supporting sources.

[1] https://www.pib.gov.in/PressReleasePage.aspx?PRID=2035073&reg=48&lang=2

[2] https://unfccc.int/documents/647300

[3] https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/registry

[4] https://beeindia.gov.in/show_content.php?lang=1&level=1&lid=294&ls_id=116

[5] https://ghgptechassistance.zendesk.com/hc/en-us/articles/47992123292052-Can-carbon-offsets-be-used-to-reduce-a-company-s-scope-3-emissions

[6] https://udit.beeindia.gov.in/sme-programme/

[7] https://ramp.msme.gov.in/ramp/index.php/RAMP-initiative/mse-gift/gift-interest-subvention

[8] https://corporate.walmart.com/news/2024/02/13/walmart-vriddhi-supplier-development-program-meets-and-exceeds-50000-msmes-goal





CHAPTER 11

Adaptation-Linked Considerations and Climate Action Co-Benefits

11 Adaptation-Linked Considerations and Climate Action Co-Benefits

The Paris Agreement treats mitigation and adaptation as complementary but distinct pillars of climate action. Article 7 establishes the global goal of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change. Article 6.4, by contrast, establishes a mechanism for generating verified greenhouse-gas emission reductions and removals while supporting sustainable development.

Accordingly, an activity does not generate Article 6.4 emission reductions merely because it improves resilience or provides adaptation benefits. To receive A6.4ERs, the activity must produce measurable, additional and verifiable emission reductions or removals under an approved Article 6.4 methodology and satisfy the applicable baseline, monitoring, safeguards and activity-cycle requirements.

Key Distinction: Adaptation benefits can strengthen the overall value of a mitigation activity, but they do not replace the requirement to demonstrate quantified mitigation.

Concept	Primary Purpose	Relationship with Carbon Crediting
Mitigation Outcome	Reduce greenhouse-gas emissions or increase removals.	May generate A6.4ERs if all applicable requirements are met.
Adaptation Outcome	Reduce exposure or vulnerability and strengthen resilience.	Does not independently generate A6.4ERs.
Sustainable-development Co-benefit	Deliver social, economic or environmental benefits alongside mitigation.	May be assessed and reported but is not an additional carbon unit.
Adaptation Finance through Article 6.4	Channel a share of mechanism proceeds towards adaptation.	Provides separate financial support and does not convert adaptation outcomes into carbon credits.

11.1 Adaptation Finance under Article 6.4

Article 6.4 mechanism has a direct institutional link to adaptation finance. Five per cent of issued A6.4ERs are levied as a share of proceeds for the Adaptation Fund, alongside a monetary contribution related to the scale of the activity. The purpose is to assist developing countries that are particularly vulnerable to the adverse effects of climate change in meeting adaptation costs.

This creates two distinct adaptation-related channels:

1. **System-level Adaptation Finance:** Article 6.4 share of proceeds supports the Adaptation Fund.
2. **Activity-level Adaptation Co-benefits:** Individual mitigation activities may also strengthen resilience in their host communities or ecosystems.

These channels should not be confused. The share of proceeds is a formal mechanism-level contribution, while project-level resilience benefits must be identified, assessed and monitored separately.

11.2 Mitigation Activities with Adaptation Co-benefits

Certain activities may combine a credible mitigation basis with significant resilience benefits.

Illustrative Activity	Potential Mitigation Basis	Possible Adaptation and Development co-benefits	Important Caution
Mangrove or Coastal-wetland Restoration	Carbon sequestration and avoided emissions, covered by an applicable methodology.	Coastal protection, erosion control, fisheries support and livelihood resilience.	Carbon ownership, land tenure, permanence and community rights must be addressed.
Agroforestry and Landscape Restoration	Increased biomass and soil-carbon removals.	Improved soil health, shade, water retention, crop diversification and drought resilience.	Removals, leakage and reversal risks require robust monitoring.
Biochar Application	Durable carbon storage where methodology requirements are met.	Soil improvement, moisture retention, reduced fertiliser dependence and potentially improved yields.	Agronomic benefits vary by feedstock, soil and application conditions.
Wastewater Treatment with Methane Capture	Avoided methane emissions.	Improved sanitation, water quality and public health.	Adaptation benefits should not be assumed without evidence.
Climate-smart Irrigation powered by Renewable Energy	Displacement of fossil-fuel energy.	Improved water access and resilience to rainfall variability.	Increased groundwater extraction could create environmental harm.
Distributed Renewable Energy for Essential Services	Avoided fossil-fuel emissions.	More resilient power for clinics, cooling, water systems and communications.	The mitigation baseline and resilience service must be monitored separately.
Improved Land and Forest Management	Reduced emissions or increased removals.	Watershed protection, erosion reduction, livelihood diversification and reduced heat exposure.	Safeguards, permanence, leakage and benefit-sharing are critical.

Not every activity delivering adaptation benefits will qualify for carbon crediting. Sea walls, early-warning systems, climate-risk information, heat-action plans or drought-resistant crops may be highly valuable adaptation investments, but they will not ordinarily generate A6.4ERs unless they also produce eligible and quantifiable mitigation outcomes under an approved methodology.

11.3 Sustainable-development and Safeguards Requirements

Article 6.4 Sustainable Development Tool provides a framework for identifying and addressing environmental and social risks and for assessing how activities contribute to host-country sustainable-development priorities and the Sustainable Development Goals. Article 6.4 activity standard describes these risk-management requirements as mandatory.

For activities with adaptation-linked benefits, developers should therefore:

- Identify the relevant climate hazards and affected communities;
- Explain the causal link between the activity and the claimed resilience benefit;

- Assess whether the activity could unintentionally increase vulnerability;
- Consult affected stakeholders, including women, Indigenous Peoples and vulnerable groups where relevant;
- Establish indicators for significant co-benefits;
- Monitor environmental and social risks throughout the activity period; and
- Maintain accessible grievance and remedial processes.

A project should not be described as "climate-resilient" solely because it is low-carbon. For example, a renewable-energy installation may reduce emissions but remain vulnerable to flooding, extreme heat, water stress or supply-chain disruption. Physical climate risk assessment should therefore inform project design.

11.4 Financing Blended Mitigation and Adaptation Components

Where a project contains both mitigation and adaptation components, it may require more than one source of finance.

Possible financing arrangements include:

- Carbon revenue for the verified emission-reduction or removal component;
- Adaptation grants for resilience measures that do not generate credits;
- Concessional finance or guarantees for commercially marginal components;
- Public finance for enabling infrastructure;
- Development-finance institution participation;
- Insurance or risk-transfer instruments; and
- Payments for ecosystem services or biodiversity finance, where appropriate.

The financial structure should transparently identify which source supports which outcome. Project participants should avoid double claiming, double counting or implying that the same verified result simultaneously represents a carbon credit, an adaptation unit and another environmental asset unless the applicable standards expressly permit this and the attributes are transparently separated.

11.5 Practical Screening Questions

Before presenting an activity as both mitigation- and adaptation-linked, governments, developers and financiers should ask:

1. What is the measurable greenhouse-gas reduction or removal?
2. Is there an applicable Article 6.4 methodology?
3. What climate hazard or vulnerability does the activity address?

4. Who benefits from the adaptation outcome, and who could be adversely affected?
5. Are mitigation outcomes and adaptation co-benefits supported by separate indicators?
6. Is the adaptation benefit additional to business-as-usual project design?
7. Could the activity create maladaptation, for example, increased water stress, ecosystem damage or unequal access?
8. How will benefits, risks and grievances be monitored?
9. Which component is financed through carbon revenue, and which requires other finance?
10. Are communications to buyers and investors accurate and free from double claiming?

11.6 Implications for Industry and Host Countries

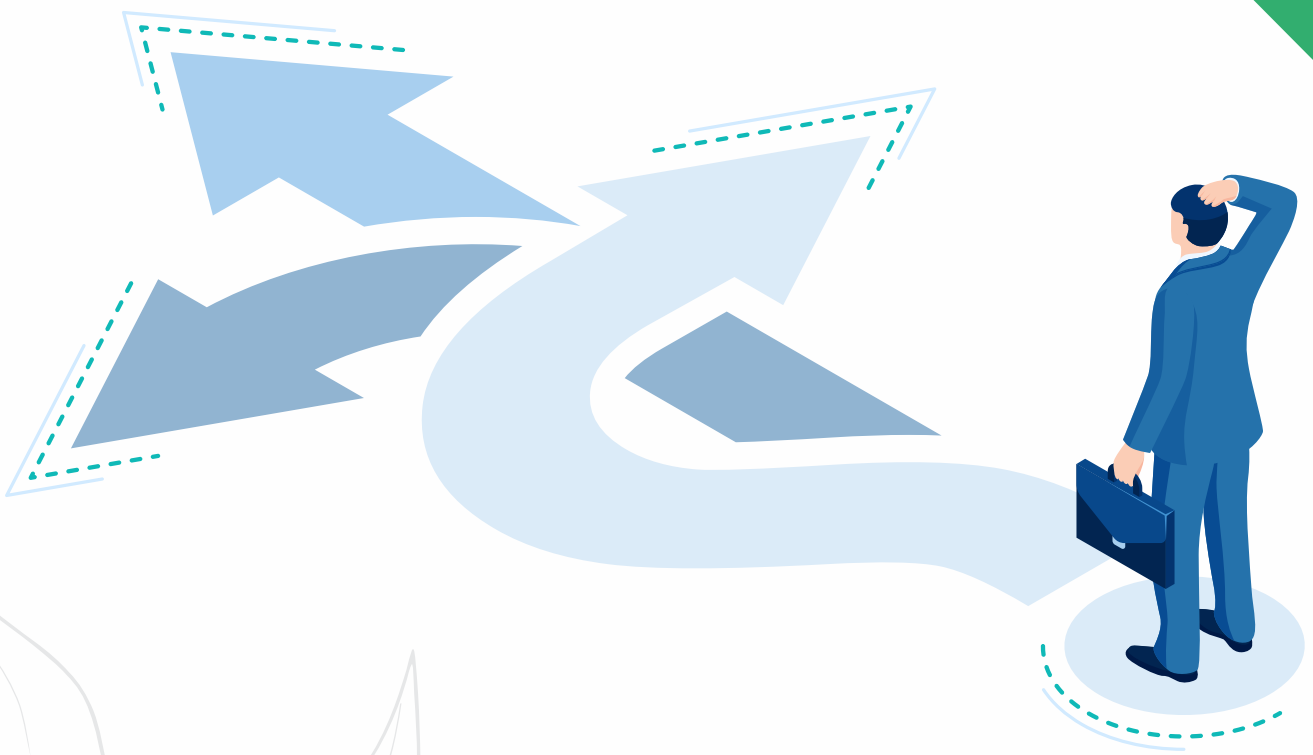
For industry, well-designed activities with resilience benefits may offer stronger operational continuity, community acceptance, investor interest and alignment with broader ESG objectives. However, such benefits should be supported by credible evidence and should not be used to compensate for weak carbon accounting.

For host countries, adaptation-linked screening can help ensure that Article 6.4 activities support national priorities, including NDCs, national adaptation plans, sectoral strategies and sustainable-development objectives. Host-country authorities may also use approval processes to encourage activities that deliver high-quality mitigation together with locally relevant resilience and development benefits.

Key Takeaway

Article 6.4 remains a mitigation-crediting mechanism. Adaptation and resilience outcomes can substantially improve project quality and host-country value, but they do not independently generate A6.4ERs. The strongest activities will maintain a clear boundary between:

- The verified mitigation outcome underlying the credit;
- Adaptation and sustainable-development co-benefits;
- Environmental and social safeguards; and
- Separate adaptation-finance flows.





CHAPTER 12

Practical Decision Pathway for Industry

12 Practical Decision Pathway for Industry

Companies, buyers and financiers should assess three things before committing: The activity's status, the unit's eligibility and its commercial value.

Step	Question	Practical Action
1	Was the activity registered under CDM?	Verify its registration and crediting history. If not, assess the appropriate new-activity route.
2	Was a valid transition request submitted?	Check the UNFCCC record and applicable deadline. CDM registration alone does not establish transition eligibility.
3	Was host Party approval obtained?	Verify formal transition approval; distinguish it from authorisation of credit use.
4	Can the activity meet Article 6.4 requirements?	Assess methodology, additionality, monitoring and safeguards, and confirm whether transition has been approved.
5	What unit is involved?	Identify the CER, A6.4ER, voluntary credit or other mitigation outcome, including vintage and registry status.
6	What is its intended use?	Define the proposed claim or market and check its eligibility rules.
7	Is authorisation required?	Verify host-country authorisation where required for use towards another country's NDC or other international mitigation purposes.
8	Are corresponding adjustments relevant?	Check the accounting requirements and first-transfer trigger. Mitigation contribution A6.4ERs do not require corresponding adjustments.
9	Is MRV credible?	Review monitoring data, independent verification and controls against double counting.
10	Is there commercial demand?	Test buyer acceptance, achievable prices, delivery costs and contractual conditions.
11	What should happen next?	Proceed, close evidence gaps, assess another eligible route or stop if requirements cannot be met.

The transition checks follow UNFCCC requirements; unit authorisation and accounting depend on the applicable use and registry rules. CORSIA eligibility requires a separate check against ICAO's approved scope. [unfccc.int]

Decision Rule: A CDM history does not automatically establish PACM eligibility, buyer acceptance or commercial viability.



FINAL STEPS:

Action Agenda for Government, FICCI and Industry

Final Steps: Action Agenda for Government, FICCI and Industry

Moving from CDM experience to PACM participation requires coordinated action. The following agenda proposes practical steps to improve policy clarity, project readiness and market confidence.

Stakeholder	Priority Actions
Government	Build awareness of PACM and Article 6.4; clarify activity approval, unit authorisation and applicable accounting pathways; strengthen digital monitoring, reporting and verification (MRV); identify mitigation priorities aligned with national climate commitments; and support industry consultations, capacity building and international cooperation.
Industry	Map legacy CDM projects and credits, verify transition status and carbon rights, and assess commercial viability. Identify new mitigation opportunities, improve emissions data and MRV, prepare evidence for buyer due diligence, assess carbon-related trade exposure, and participate in FICCI consultations.
FICCI	Disseminate this industry brief; convene government, developers, buyers, financiers and MSMEs; prepare buyer and developer checklists; map sector readiness; organize practical training; and submit consolidated industry feedback to relevant authorities.

For legacy assets, industry assessments should use the current UNFCCC transition requirements and project records. Historical CDM registration alone does not establish PACM eligibility. [UNFCCC]

Market assessments should also distinguish specific requirements: CORSIA opportunities depend on applicable programme and unit eligibility, while CBAM readiness requires attention to embedded emissions and relevant verification obligations. [icao.int]

Suggested Implementation Sequence

- **Initial Three Months:** Convene an initial consultation, circulate readiness checklists and collect sector-level evidence on assets, opportunities and barriers.
- **Three to Six Months:** Deliver targeted training, shortlist potential projects and consolidate policy and operational questions.
- **Six to Twelve Months:** Support project preparation, buyer and financier engagement, and progress reviews.

Success should be measured through clearer procedures, stronger project evidence and commercially credible mitigation opportunities.

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NOTES

About FICCI

Established in 1927, Federation of Indian Chambers of Commerce and Industry (FICCI) is the largest and oldest apex business organisation in India. Mahatma Gandhi addressed FICCI's fourth AGM in 1931. Our 98th AGM was held in November 2025. With our rich legacy, FICCI would play an even greater role as India emergence as the 3rd largest economy.

FICCI works with its key stakeholders to foster active engagement and dialogue with decision makers, to support steps that are good for commerce and industry.

As a member-led and member-driven organisation, FICCI represents over 2,50,000 companies across all segments of economy including public, private, and multinationals. The diverse membership base of FICCI across all Indian states includes both direct and indirect members through its 300 affiliated regional and state level industry associations. FICCI has a large international presence via partner agreements with 250 national business associations in over 100 countries.

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