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Issue Brief | August 2025

Unlocking India's Voluntary Carbon Market

Challenges and the Path Forward

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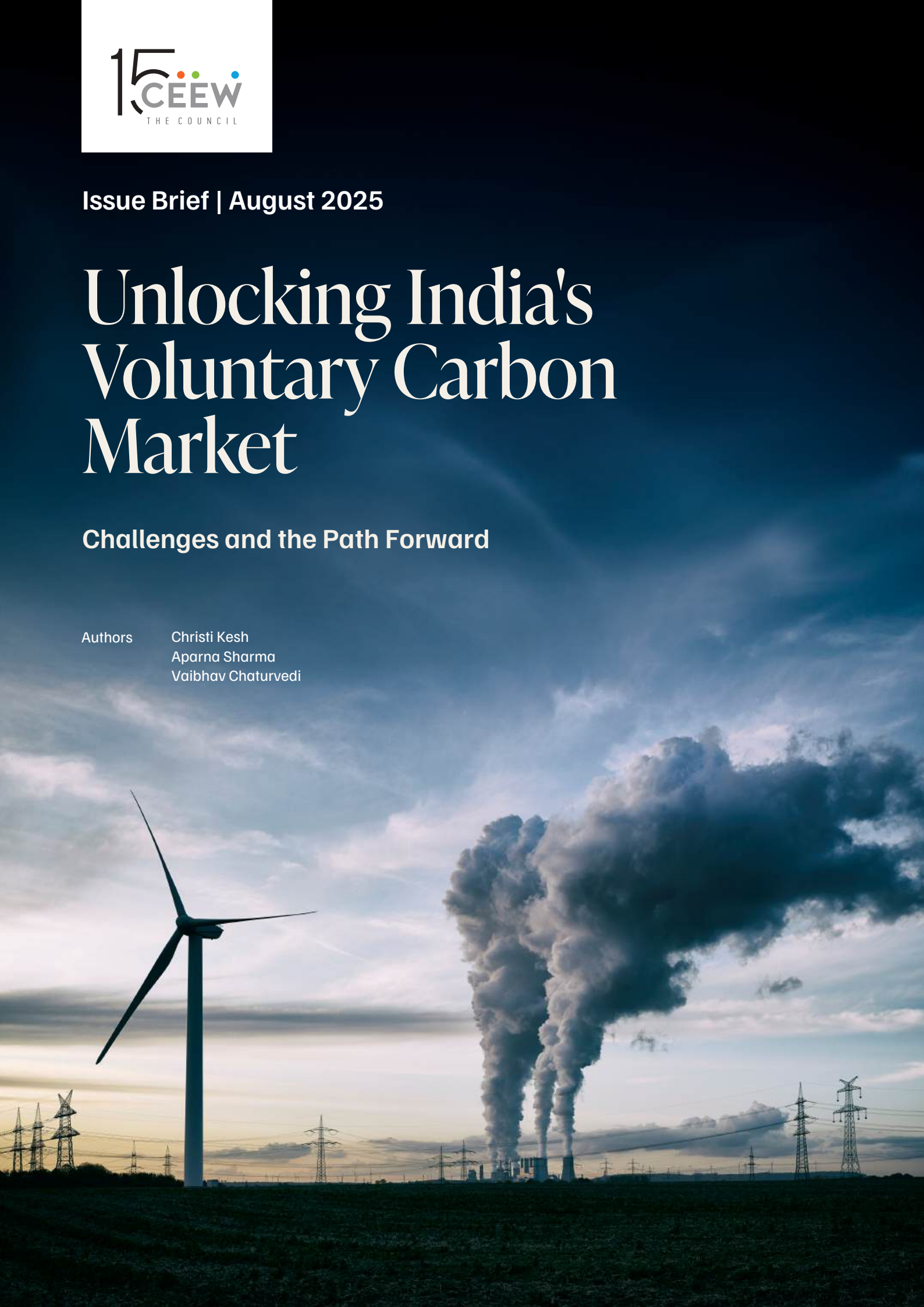

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About CEEW

The Council on Energy, Environment and Water (CEEW) is one of Asia's leading not-for-profit policy research institutions and among the world's top climate think tanks. The Council uses **data, integrated analysis, and strategic outreach to explain—and change—the use, reuse, and misuse of resources**. The Council addresses pressing global challenges through an integrated and internationally focused approach. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions, and engages with the wider public. CEEW is a strategic/ knowledge partner to 11 ministries for India's G20 presidency.

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The Council's major contributions include: Informing India's net-zero goals; work for the PMO on accelerated targets for renewables, power sector reforms, environmental clearances, *Swachh Bharat*; pathbreaking work for India's G20 presidency, the Paris Agreement, the HFC deal, the aviation emissions agreement, and international climate technology cooperation; the first independent evaluation of the *National Solar Mission*; India's first report on global governance, submitted to the National Security Advisor; support to the National Green Hydrogen and Green Steel Missions; the 584-page *National Water Resources Framework Study* for India's 12th Five Year Plan; irrigation reform for Bihar; the birth of the Clean Energy Access Network; the concept and strategy for the International Solar Alliance (ISA); the Common Risk Mitigation Mechanism (CRMM); India's largest multidimensional energy access survey (ACCESS); critical minerals for *Make in India*; India's climate geoengineering governance; analysing energy transition in emerging economies, including Indonesia, South Africa, Sri Lanka, and Viet Nam. CEEW published *Jobs, Growth and Sustainability: A New Social Contract for India's Recovery*, the first economic recovery report by a think tank during the COVID-19 pandemic.

The Council's current initiatives include: State-level modelling for energy and climate policies; consumer-centric smart metering transition and wholesale power market reforms; modelling carbon markets; piloting business models for solar rooftop adoption; fleet electrification and developing low-emission zones across cities; assessing green jobs potential at the state-level, circular economy of solar supply chains and wastewater; assessing carbon pricing mechanisms and India's carbon capture, usage and storage (CCUS) potential; developing a first-of-its-kind Climate Risk Atlas for India; sustainable cooling solutions; developing state-specific dairy sector roadmaps; supporting India's electric vehicle and battery ambitions; and enhancing global action for clean air via a global commission 'Our Common Air'.

The Council has a footprint in over 20 Indian states, working extensively with 15 state governments and grassroots NGOs. Some of these engagements include supporting power sector reforms in Uttar Pradesh, Rajasthan, and Haryana; energy policy in Rajasthan, Jharkhand, and Uttarakhand; driving low-carbon transitions in Bihar, Maharashtra, and Tamil Nadu; promoting sustainable livelihoods in Odisha, Bihar, and Uttar Pradesh; advancing industrial sustainability in Tamil Nadu, Uttar Pradesh, and Gujarat; evaluating community-based natural farming in Andhra Pradesh; and supporting groundwater management, e-auto adoption and examining crop residue burning in Punjab.

Contents

Executive summary

The Government of India has launched the Carbon Credit Trading Scheme (CCTS) offset mechanism under the Indian Carbon Market (ICM) framework. This mechanism will serve as a government-certified standard within the voluntary carbon markets in India, distinct from independent certification standards such as Verra, Gold Standard etc. This new mechanism mirrors the operational structure of the private voluntary markets and involves a similar set of stakeholders. India has a long history with carbon markets—starting with its participation in the Clean Development Mechanism (CDM) under the Kyoto Protocol to its engagement with current voluntary markets—all of which have been offset-based systems.

While these markets have immense potential to boost climate ambition, they might also introduce significant uncertainty. Key challenges arise from informational silos, misaligned interests, and unequal resource distribution among stakeholders. These issues often manifest as operational inefficiencies that can limit the overall effectiveness of the market.

In this study, we examine the procedural dynamics and assess the key challenges faced by offset-based projects in India, with a particular focus on existing VCMs. Our analysis focuses explicitly on the early stages of the credit issuance cycle—particularly the registration phase to identify early-stage

Our analysis focussed on early credit-issuance cycle stages upto registration, to identify bottlenecks hindering market operation

While carbon markets have immense potential to boost climate ambition, challenges arise from informational silos, misaligned interests, and unequal resource distribution among stakeholders.

procedural bottlenecks, such as project registration delays, sectoral vulnerabilities, and related issues such as limited sectoral participation—that hinder market operations. The objective is to inform the development of the offset mechanism within the ICM. Our research combines quantitative analysis of project timeline delays with qualitative insights from expert stakeholders on these quantitative findings. Our study interprets data from the Verra Verified Carbon Standard (VCS) Registry, which contains over 70 per cent of the world's offset projects.

The Verra VCS divides project types into 16 sectoral scopes. Under these scopes, various projects, activities, and methodologies can be developed. Projects can be grouped with various components, such as other scopes and ongoing projects, to scale mitigation efforts. We designed a mixed-methodological framework to evaluate registration timelines, sectoral participation patterns, and delays in the early stages, specifically in project registration in India and the rest of Asia within the existing VCMs. Our study uses data processing, descriptive statistical techniques, and expert stakeholder interviews to examine challenges and provide recommendations to mitigate them in the upcoming CCTS offset mechanism.

The comprehensive dataset, which includes registered and unregistered projects, included 2,800 projects from 80 countries; we focused the scope of our work on India and the ROA. We calculated registration timelines as the difference between listing and registration dates. We determined the interquartile range to assess registration delays and used the third quartile (Q3) values to benchmark registration timelines. Consequently, we compared these benchmarks against all the remaining unregistered projects in India within the VCS pipeline to identify registration delays. Additionally, data were analysed for sectoral vulnerabilities and participation to provide more robust insights. Furthermore, we interviewed three expert industry stakeholders using unstructured interviews to validate these results and understand their views and perspectives on the delays.

Key results

Agriculture, Forestry, and Other Land Use (AFOLU) sector: Regulatory hurdles, land-use conflicts, and vulnerability to natural hazards have led to significantly higher registration times in India. In terms of registered projects, at least 75 per cent of registered projects in India have taken 1,689 days to be registered, against the 623 days (Q3 value) taken by similar projects in the ROA. In terms of unregistered projects, when compared to the ROA's Q3 benchmark, we found that approximately 25 per cent of unregistered Indian AFOLU sector projects are already experiencing registration delays. Furthermore, 94 per cent of all on-hold projects belong to this sector.

Energy industries sector: Difficulty proving financial additionality, market saturation, and a focus on non-carbon certifications have led to delays, with 71 per cent of unregistered projects experiencing delays in the pre-registration phase compared to the ROA benchmark.

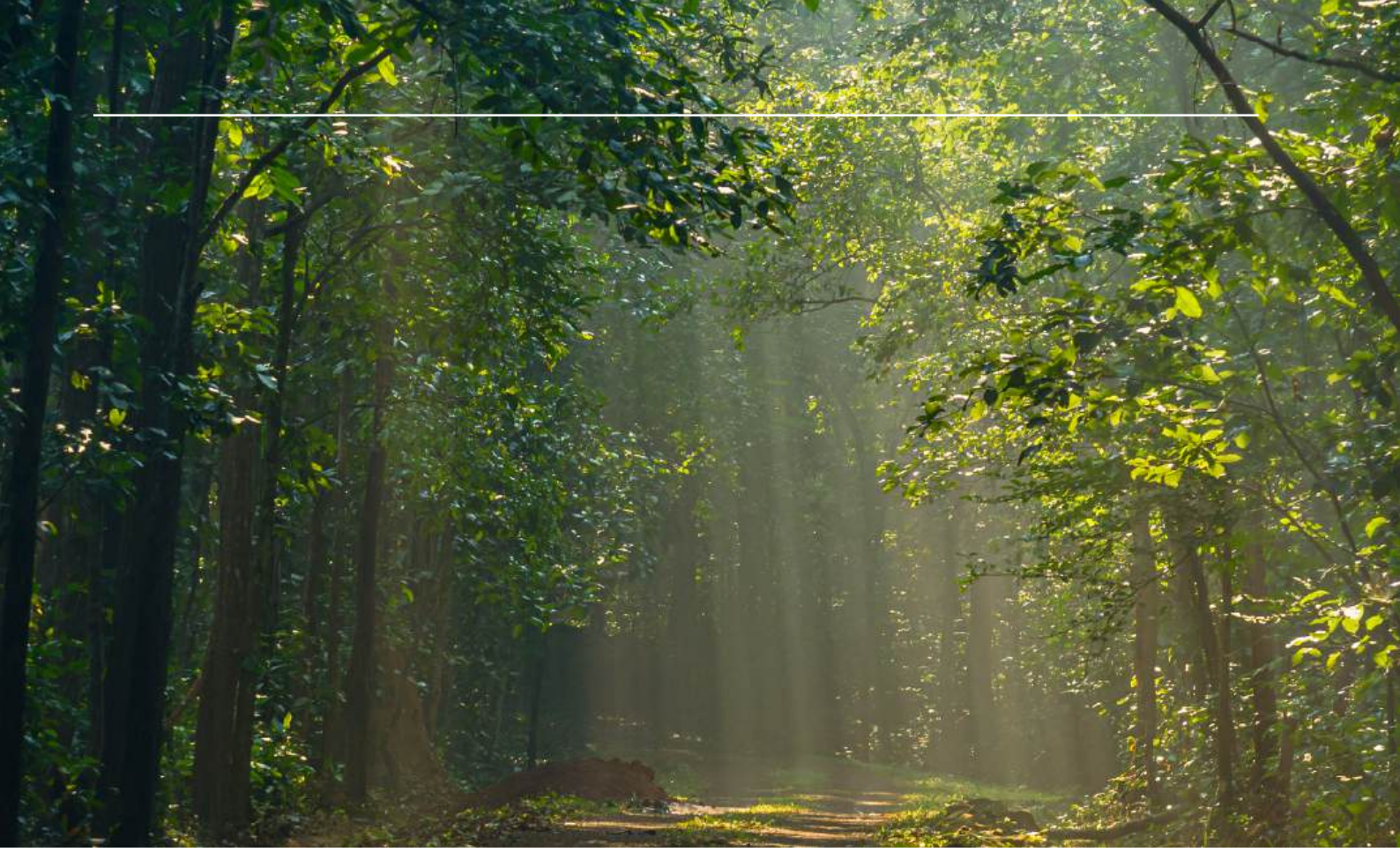
Energy demand sector: In this sector, 66 per cent of unregistered projects have already passed the ROA benchmarked registration timeline and are facing delays in **pre-registration.**

Sectoral diversity: We observed limited participation in the transport, agriculture, and waste handling sectors and no active participation in the carbon capture and storage CCS, metal, and mining industries.

Recommendations for the CCTS offset mechanism

To address these challenges, we recommend an institutionalised monitoring and reporting structure to regularly brief the National Steering Committee for Indian Carbon Market (NSCICM) and take its guidance on various challenges that the ICM faces. Specifically, we recommend that the NSCICM be briefed quarterly vis-à-vis:

- the establishment and performance of a 'single-window clearance system' for AFOLU projects,
- the status and progress of project portfolio diversification,
- the real-time status and progress of project applications through a project tracking system,
- the performance reviews of accredited carbon verification agencies (ACVAs) and validation and verification bodies (VVBs) through an 'annual performance review system',
- the capacity-building activities undertaken by project developers with stakeholders, and
- the status and progress related to 'high-additionality' energy projects.
- integrate standardised baselines (SBs) to streamline project development within the CCTS offset mechanism.

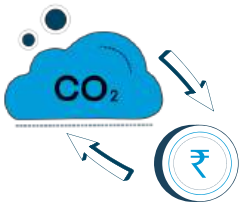


1. Introduction

Carbon markets will be a game changer in advancing climate action (World Bank 2024). There is a global need to raise emission reduction ambitions to combat global warming. To this end, well-operating carbon markets are essential to accelerate carbon reduction and removal as well as support the financing of decarbonisation, especially in developing economies.

Currently , carbon markets operate in two main forms. The first is through emission trading schemes (ETS), whereby companies are expected to meet intensity-based or absolute targets for emission reductions. To do so, they can buy and sell allowances/carbon credits. For example, the Government of India's CCTS includes a compliance mechanism based on a baseline and credit system: companies that emit less than the assigned baseline earns carbon credits, which can then be sold to companies that exceed their limits. Similarly, the European Union's ETS follows a cap-and-trade model, where in the total amount of emissions permitted is set, and companies must hold enough allowances to cover their emissions, trading these as needed. The second is project-based carbon markets, also called offset-based carbon markets, which include mechanisms that enable emission reduction projects to generate tradable carbon credits. These include the compliance offset markets under Article 6 of the Paris Agreement; the erstwhile CDM under the Kyoto Protocol (Broekhoff et al., 2025); privately operated voluntary carbon markets (VCMs)- such as Verra and Gold Standard; and government-run voluntary schemes, such as India's CCTS - offset, which was launched in December 2023.

Thus, carbon offsetting is a sub-category under the larger umbrella of carbon markets. While the terms' carbon offset' and 'carbon offset credit' may be used interchangeably, they represent two related but different activities. A carbon offset refers to a project/activity undertaken to reduce or remove GHG emissions to compensate for emissions that occur elsewhere. In contrast, a carbon offset credit is a transferable instrument certified by a government or independent certification body that represents an emission reduction of 1 metric tonne (Mt) of CO_2 or an equivalent amount of other GHGs. The purchaser of an offset credit can 'retire' these credits to meet their GHG reduction goals.



Between 2010 and 2022, India issued 278 million carbon credits traded in VCMs, accounting for 17% of the global supply

Offset credits are used by countries, companies, and individuals to balance their emissions by paying for climate-positive activities undertaken by a separate entity. This is because GHGs mix globally in the atmosphere, so it does not matter where they are reduced. Consequently, if an organisation (a) halts an activity that causes emissions or (b) causes/finances emission-reducing activities elsewhere in the world, the overall impact on climate change remains the same. Properly functioning carbon markets can provide the most efficient and cost-effective emission reduction options.

India has rich experience in the offset markets. The CDM has been operational since 2006 and remained highly relevant in the early 2000s with the introduction of EU-ETS until 2012. CDM enabled emission reduction and removal projects in developing countries to earn certified emission reductions (CERs), each equivalent to 1 tonne of CO_2 (e). These credits could be traded, sold, and used by industrialised countries to meet a part of their emission reduction targets under the Kyoto Protocol. It was estimated that India would produce 16 per cent of the world's CERs by 2010 and would become one of the most significant contributors globally by 2012 (The Economic Times 2010).

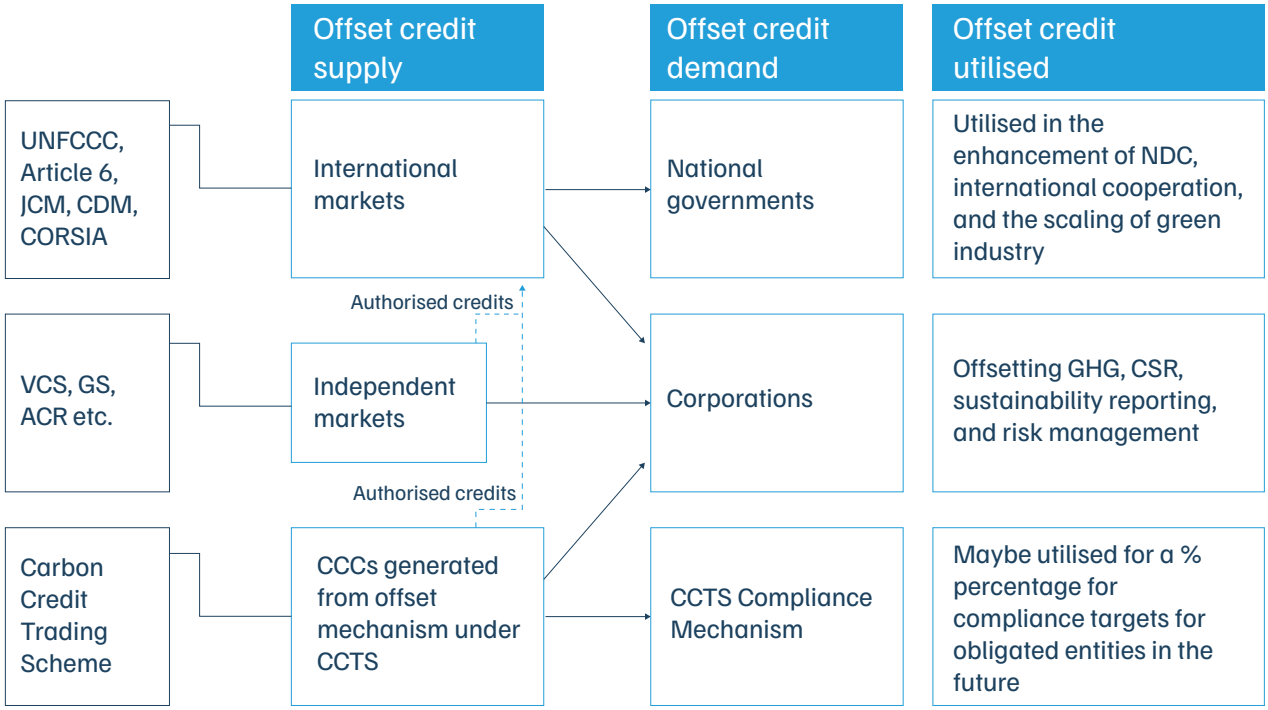
In the early 2000s, parallel to the development of market mechanisms under the Kyoto Protocol and the introduction of the European Union's ETS, the voluntary market emerged and strengthened rapidly after 2007 (Kärt Johanna Ojamäe 2024). The formation of certification bodies such as Gold Standard (2003), Verra (2005), and Climate Action Reserve (2001) helped mobilise private-sector players to make voluntary commitments towards offsetting their GHG emissions.

Currently, the major VCM certifiers include the Verified Carbon Standard (VCS; 2006) and the Sustainable Development Verified Impact Standard (SD Vista; 2024) launched by Verra, the Gold Standard established by the World-Wide Fund for Nature (WWF) in 2003, and the Plan Vivo Standard created by the Plan Vivo Foundation in 2001. Economies in South Asia, South America, the Caribbean, and Africa are significant suppliers to VCMs. India, in particular, is a major contributor (Dyck et al., 2023). For example, between 2010 and 2022, India issued 278 million carbon credits traded in VCMs, accounting for 17 per cent of the global supply. Despite the many challenges surrounding integrity, demand and credit prices around project-based offsets within the voluntary market, India's revenue from voluntary carbon credits is projected to reach USD 20–40 billion by 2030 (Singh and Ghosh 2023; *India's national carbon market to seek links with international registries*. S&P Global Commodity Insights).

In December 2022, the Government of India amended the Energy Conservation Act, 2001, establishing a framework for the Indian carbon market (ICM). Subsequently, in June 2023, the central government notified the CCTS. The CCTS includes an offset mechanism that allows non-obligated entities to register projects that use government-established sectoral methodologies to account for GHG reductions and removals. These projects are then allowed to issue carbon credit certificates (CCCs).

In India, offset market credits are used in several ways: in the United Nations Framework Convention on Climate Change (UNFCCC) compliance markets under Article 6, a voluntary offset mechanism within the CCTS for non-obligated entities, and other private VCMs. Figure 1 illustrates the various types of carbon markets and interlinkages in India.

Figure 1. Types of offset markets currently operating in India



Source: Authors' compilation from Gaurav Sishodia et al. 2024; PIB 2023, and BEE 2024

Carbon markets are complex governance arrangements (Ahonen et al. 2022). They are driven by policy and operate across various governance levels, involving both public and private sectors. These markets have independent governance structures, connected through formal market links or aligned through information exchange, capacity building, and the shared aim of meeting international climate mitigation commitments (Burtraw et al. 2013).

While these market mechanisms have the potential to enhance climate ambition, they also introduce uncertainty. The VCMs are fragmented and unregulated, leading to regulatory gaps and inefficiencies. Further complications may arise due to the presence of informational silos and the misalignment of interests and resources among stakeholders (Betz et al. 2022). As discussed earlier, India has a high volume of offset projects registered with various independent certifying authorities, which engage a wide range of actors in this ecosystem. Effective management of offset projects is imperative for India to secure climate investment, advance sustainable development, integrate corporate climate ambitions, supply high-integrity credits, and develop robust processes to facilitate the effective management of project resources.

In this study, we investigate the procedural dynamics of project-based offset systems, focusing on the registration phase of the project cycle using data from the Verra VCS Registry. We aim to identify inefficiencies in this phase and make recommendations to mitigate issues early on. Further, we aim to provide guidance for the development of an efficient and well-coordinated offset mechanism framework within the CCTS.

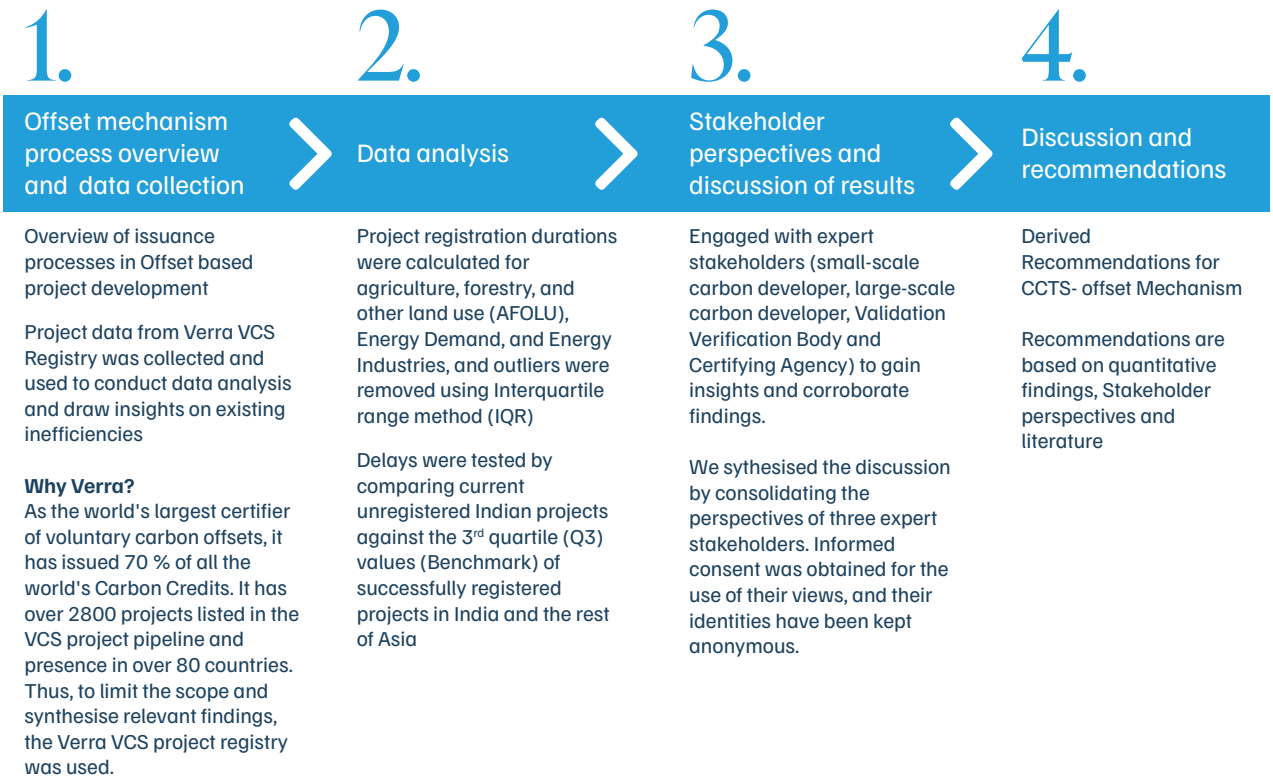
2. Approach and overview

We followed a four-step process to understand and draw insights on the early stages of the credit issuance cycle of Verra VCS projects as listed on the publicly available VCS Registry (as of January 2024). The approach is illustrated in Figure 2.

2.1 Verified Carbon Standard Process Overview

Verra's Verified Carbon Standard (VCS) is one of the world's most widely used voluntary frameworks for certifying GHG emission reduction projects. Initially launched in 2005 as the Voluntary Carbon Standard by Climate Wedge and Cheyne Capital, it was designed to ensure rigour and transparency in carbon offset projects that operate outside of Compliance/regulated markets (Verra,).

Figure 2. Approach of the study for understanding bottlenecks in voluntary carbon market processes



Source: Authors' analysis

The VCS covers a broad range of project types, and each project must adhere to approved methodologies that guide the calculation and monitoring of emission reductions. Independent third-party verifiers, called validation and verification bodies (VVBs), assess these projects. After successful validation, registration, verification, and tracking, carbon credits called verified carbon units (VCUs), representing tCO2-eq, are issued. These credits must be real, verifiable, and additional; double counting should be avoided. In this section, we give a procedural overview of VCS's credit issuance cycle (Verra,).

Project development and certification process

Most certifying agencies have similar processes for developing carbon offset projects. Figure 3 illustrates the procedural flow of project development, validation, verification, and issuance of credits.

- **Project developers choose a methodology and develop a project description**: Project developers select either an existing VCS methodology or one from an approved GHG programme such as the CDM. Next, they must draft a project description using the VCS project description template. The project is then submitted to the Verra Registry for pipeline listing. The project is then posted on Verra's platform for public viewing for a 30-day period, during which anyone can submit feedback or raise concerns.

- **Validation and registration**: After finalising the project description following public comments, projects are validated by a Verra-approved VVB to ensure compliance with all VCS requirements. Project proponents pay the VVB a fee to conduct the validation process. As of January 2024, 34 VVBs were accredited under VCS, offering developers a range of options. Once the validation is complete, the VVB submits its report to Verra for further approval. Project developers can submit their projects for registration in the Verra Registry upon successful verification.

- **Monitoring and verification**: Project developers prepare and submit monitoring reports to track GHG emission reductions or removals for a defined monitoring period, using the latest VCS monitoring report template to document their findings. Subsequently, for verification, developers select an accredited and certification body–approved VVB and pay the necessary verification fee. Once the VVB verifies the project, the developer submits it to the certification body for verification approval.

- **Issuance of VCUs**: After Verra approves the project's verification, project developers must submit an issuance request. Verra then issues VCUs to the project proponent's registry account. These credits are credited for the period specified in the project description with each round of successful submission of the monitoring report.

Figure 3. Procedural flow of the credit issuance cycle

Source: Authors' compilation based on Verra VCS Program details

Note: This study focuses primarily on the registration phase. The scope of our analysis is limited to this stage because it provides the most consistent data, allowing us to identify delays in the early stages of project timelines. While critical, the subsequent monitoring, reporting, and verification stages are subjected to more variability and are outside the scope of this analysis.

Project sectoral scopes

The VCS categorises project types into 16 sectors. Projects, activities, or methodologies can be developed under these sectoral categories. Projects can include various components – from other sectors and ongoing projects – to scale mitigation efforts. We compiled the potential for GHG mitigation in India from multiple reports. Table 1 gives an overview of 16 sectors.

Table 1. Sectoral scopes and mitigation potentials

S. No	Sector	Description and initiatives	Mitigation potential in India
1	**Energy industries**	Emissions are reduced through renewable energy use and/or fossil fuel efficiency. Examples include renewable energy projects such as solar, wind, and hydro, and efficiency upgrades in fossil fuel plants.	High
2	**Energy distribution**	Energy enhancement to enable lower transmission losses using smart grids and improved infrastructure.	Low
3	**Energy demand**	Reduction of emissions from industries and appliances via the implementation of energy-efficient tech and industrial energy management systems.	Medium
4	**Manufacturing industries**	Reduction of emissions in the manufacturing sector through process optimisations and efficiency upgrades.	High
5	**Chemical industry**	Reduction of emissions through cleaner production methods, energy recovery, and decreased use of carbon-intensive materials in chemical processes.	Low
6	**Mining/mineral production**	Energy improvement and emission reductions in extraction and processing through automation, process optimisation, etc.	Medium
7	**Metal production**	Reduction of emissions through advanced smelting, waste heat recovery, and integration of renewable energy in metal production processes.	Low
8	**Construction**	Reduction of emissions by using recycled/eco-friendly materials, energy-efficient designs, and modular construction methods.	Low
9	**Transport**	Emission reductions through improved fuel efficiency, vehicle electrification, and improved mass transit.	High
10	**Fugitive emissions (fuels)**	Capture of emissions during fossil fuel extraction and distribution through methane recovery and improved pipeline sealing.	Low
11	**Fugitive emissions (industrial gases)**	Minimisation of leakage of high-global-warming gases by replacing high global warming potential (GWP) substances and enhancing containment and recovery systems.	Low
12	**Solvent use**	Reduction of emissions by substituting high-emission solvents with eco-friendly alternatives and improving solvent recycling in industrial processes.	Low
13	**Waste handling and disposal**	Reduction of GHGs such as methane through recovery and capture, recycling, composting, waste-to-energy projects, and biogas facilities.	High
14	**Agriculture, forestry, and other land use (AFOLU)**	Reduction and removal of emissions via sustainable agriculture, forest management, afforestation/reforestation, and peatland restoration.	High
15	**Livestock and manure management**	Reduction of methane emissions from livestock by improving manure management, implementing biogas recovery, and dietary interventions to reduce enteric fermentation.	Moderate
16	**Carbon capture utilisation and storage (CCS)**	Capture of CO_2 from industrial processes securely storing or utilising it; for example, in concrete or via geological sequestration.	High

Source: Authors' compilation based on Verra VCS Program details – Sectoral Scopes; Rajat Gupta, Shirish Sankhe, Naveen Unni, and Divy Malik, "Decarbonising India: Charting a Pathway for Sustainable Growth," McKinsey Sustainability, 2022; and Sonia Duhan, "Invest India – Decarbonisation and Various Opportunities in Potential Sectors in India," 2022.

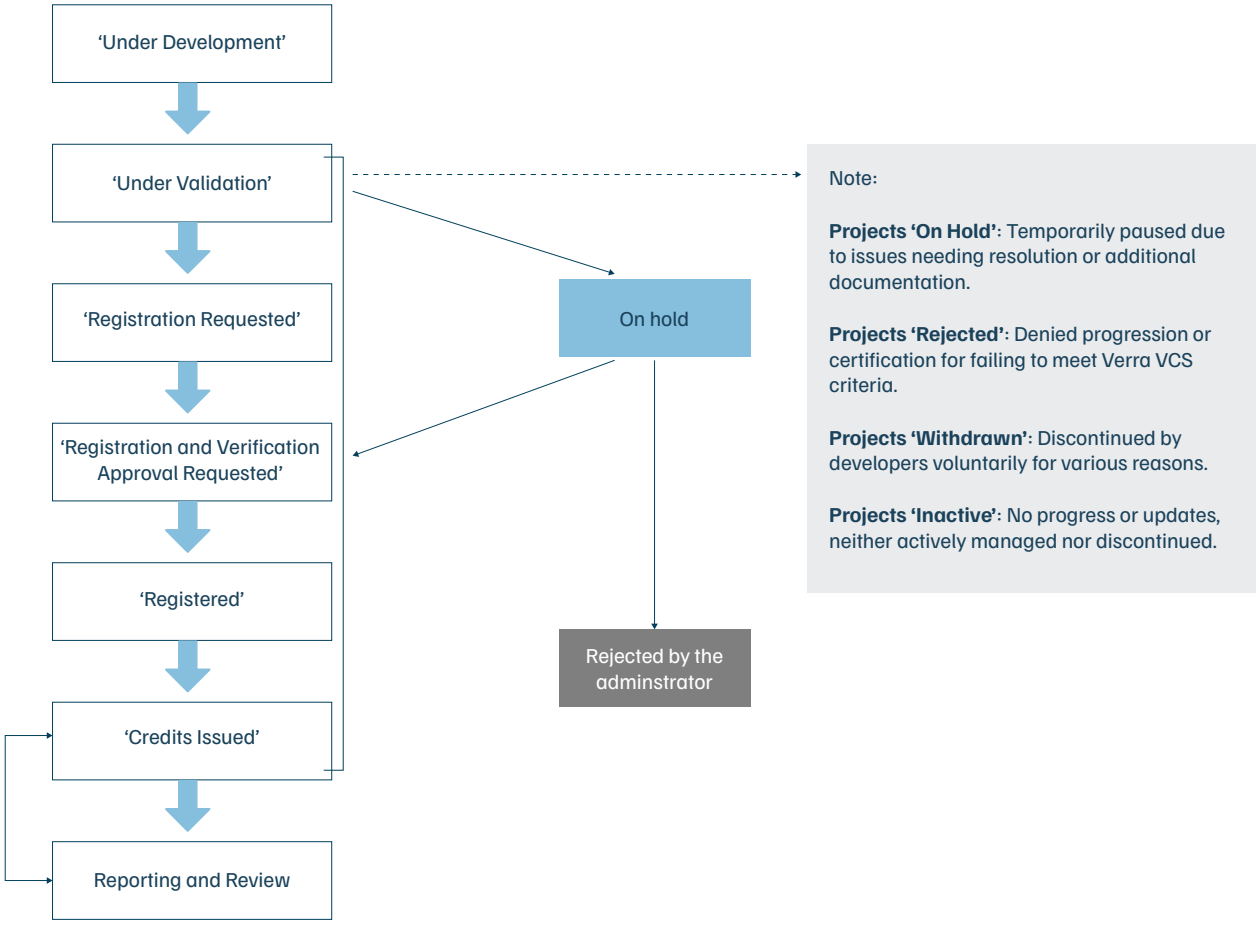
Validation verification

VVBS conduct validation and verification to vet projects listed under Verra VCS. They are independent third-party auditors accredited by Verra who evaluate whether a project complies with all relevant VCS guidelines. During the validation phase, VVBs assess whether a project meets certain criteria to be eligible for registration under the VCS programme. During the verification phase, they evaluate whether a project has accurately quantified and achieved the outcomes outlined in its documentation. VVBs must meet specific criteria outlined in the guidelines of the particular programme. This includes accreditation by a VCS-recognised body, authorisation by Verra, and payment of an annual fee to Verra. VVBs may lose their accreditation due to non-compliance or failure to perform responsibilities.

Credit issuance cycle

The credit issuance cycle consists of multiple phases. Until January 2024, the Verra VCS Registry only provided phase-wise data for the stages illustrated in Figure 4.

Figure 4. Phases of the credit issuance cycle according to VCS data availability in its registry



Source: Authors' adaptation based on Verra VCS Program details

2.2 Comparative overview of other VCM standards

While this study primarily analyses data from the Verra VCS Registry, the landscape of carbon offset standards is diverse. An overview of other prominent standards, such as the Gold Standard and the CDM, offers valuable insights into methodology, procedural frameworks, and the integration of sustainable development objectives. Table 2 presents a brief overview of other popular standards.

Table 2. Comparative overview between major Carbon Market Standards

Aspect	Clean Development Mechanism	Gold Standard	American Carbon Registry
Governance and Accounting	UNFCCC-managed centralised public body (CDM executive board) Validation and verification performed by independent third parties Credits issued and tracked via a UNFCCC-administered registry	Managed by the Gold Standard Foundation Use of a public disclosure platform – such as IHS Markit – for project documentation and credit tracking	Managed by the Verra VCS board Validation and verification performed by independent third parties called validation and verification bodies Use of own multi-registry system linked to a central project database
Scope and eligibility	Project deployment in developing countries only Project scope and eligibility defined by stringent project criteria Defined crediting periods; for example, 7–10 years, longer for forestry	Project deployment allowed globally Broader project scope with multiple activities under each project type Excludes projects with fossil fuel dependence and specific high-risk sectors	Project deployment allowed globally Wide sectoral coverage Typically offers a 10-year crediting period
Environ-mental integrity	Baseline setting determined on a project-by-project basis Additionality assessed through specific CDM tools Uses unique serial numbers in a centralised registry to avoid double counting	Stringent and conservative baseline setting to avoid over-crediting Uses positive/negative lists to ensure additionality	Baseline setting determined on a project-by-project basis Standardised tests to avoid overestimation of credits Registry system in place to prevent double counting
Monitoring, reporting, and verification (MRV)	MRV and compliance developed in a bottom-up approach under UNFCCC guidelines Independent third-party verification and extensive documentation required	Similar to MRV processes of the CDM, additional monitoring is needed to capture sustainable development impacts Rigorous verification processes to include social and environmental co-benefits	MRV requirements similar to those of the CDM Independent verification by VVBs Standardised MRV to streamline the process

Source: Authors' compilation

Table 3. Availability of methodologies under standards

Sectors	Number of methodologies (CDM)	Number of methodologies (Gold Standard)	Number of methodologies (VCS)
AFOLU	12	14	19
Energy demand	31	27	10
Energy industries	59	25	19
Waste handling and disposal	22	21	21
Transport	22	20	8
CCS	0	3	1
Fugitive emissions	19	1	6
Construction	2	1	5
Manufacturing industries	28	7	7
Chemical industries	23	6	3
Energy distribution	9	3	3
Mining and metal industries	9		2
Total	**236**	**128**	**104**

Source: Authors' compilation based on Verra VCS Program details; and UNFCCC Clean Development Mechanism Methodology – Gold Standard Eligibility for Large-Scale CDM Methodologies (AM & ACM), 2021.

Note: The CCTS has released the first set of methodologies for Phase 1 sectors: energy (including industry, distribution, and demand), industry (including chemical and manufacturing), waste handling and disposal, agriculture, and afforestation and reforestation (A/R). Methodologies for the transport sector are still awaited. In this initial phase, eight methodologies have been released—two each for energy, industry, and waste handling and disposal, and one each for agriculture and A/R.

2.3 Data analysis

We designed the methodological framework for this study to evaluate procedural timelines, sectoral participation patterns, and delays in project registration within the ICM. We used data from the Verra VCS Registry, which was subsequently cleaned and processed. We analysed the data using descriptive statistical techniques to estimate registration timelines, delays and deviations from the timelines, and project distribution and diversity. This section provides a concise overview, with detailed steps and results elaborated under **Annexure 1**.

Key methodological steps

1. **Data collection and cleaning**

    - The dataset downloaded included 2,800 projects from 80 countries; the scope was then limited with a focus on India and the ROA. This data was cleaned and validated to improve data quality and coherence.
    - We extracted key project attributes such as project identification details (ID), proponent, type, methodology, status, registration date, and geographic location.
    - Data was validated by removing rows with incomplete data.
    - The listing date was extracted for each project.

2. **Data set organisation**

    - The master dataset was segmented into thematic sheets for ease of analysis. These included:
        - » India (registered and unregistered projects)
        - » ROA (registered projects)
        - » Sectoral delay: specific datasets – for example, AFOLU, energy demand, and energy industries

3. **Statistical analysis**

    - **Timeline determination**: Registration timelines were calculated as the difference between the listing and registration dates.
    - **Benchmarking**: Third-quartile (Q3) values for registration timelines were derived using the interquartile range (IQR) method. The ROA values were used as a benchmark for delay testing.
    - **Delay assessment**: ROA benchmarks were used against each unregistered project within the unregistered projects dataset for India. The projects that surpassed the benchmarked thresholds were identified as ‘delayed’.

4. **Sectoral diversity assessment**

    - Project distribution was observed across 16 VCS sectors.
    - Consequently, we compared the number of methodologies available across sectors in the VCS Registry. We examined how they relate to sectoral participation rates and highlighted the disparity in methodology availability and its impact on project development.
    - High participation and zero/minimal participation sectors were identified as well.

5. **Derivation of results and graphs and engagement with sector experts**

    - Results were then synthesised into tabular and/or graphical representations, visualising delays, sectoral vulnerabilities, and sectoral participation. These results were used to engage sector experts further and focus on understanding the underlying implications of these results.

Data limitations

Our analysis is limited by the granularity of data in the Verra VCS Registry, as it lacks detailed phase-wise information through the credit issuance cycle. We have developed sector-specific generalised timeframes using Q3 values to provide liberal estimates for each sector. The delay testing was performed by comparing the timelines of each unregistered project with the sector-specific timeline set under the ROA benchmark. ROA was compared because it has a sectoral distribution similar to that of India. It should be noted that other countries, such as Turkey, have a similar sectoral distribution; however, we limited the scope to Asia for analysis purposes. Furthermore, the analyses consider only the three major sectors – AFOLU, energy industries, and energy demand – for delay comparison because the highest number of projects in India's VCS portfolio belong to these sectors.

3. Results

Building on the methodology described in Section 2, we analysed projects in the Verra registry to quantify registration delays and sectoral participation patterns.

Our objectives were twofold: first, to benchmark how quickly projects move from listing to formal registration in India relative to the ROA, and second, to map which sectors Indian developers actively engage in and the reasons that influence participation. We structured the presentation of findings into two parts:

- **Delay assessment** by comparing (a) the third-quartile registration timelines in India and ROA and (b) the proportion of unregistered Indian projects that have already exceeded ROA benchmarks for each sector.

- **Sectoral representation**: Tabulate the total number of projects listed in India across each of the 16 VCS sectors and highlight concentrations and gaps.

3.1 Delay assessment across project types

Two key factors influence the observed time difference between project listing and registration. First, there is a time lag between listing a project and the VVB initiating the audit process. This delay can result from scheduling constraints and the need for preparatory documentation, internal review procedures, and internal stakeholder consultations with the certification body. Second, once the audit begins, the VVB must complete a comprehensive review of the project's data through multiple rounds of validation, stakeholder consultations, and checking compliance with the project description. This validation process can also lead to delays in the registration phase. The available data do not allow for differentiation between these two factors; thus, we selected a more liberal Q3 value for benchmarking timelines.

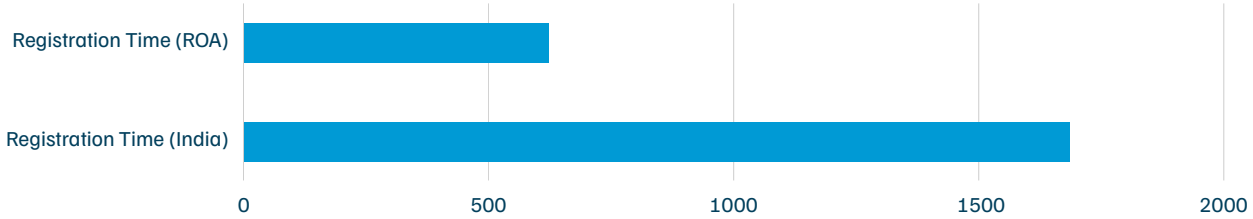
AFOLU

The number of registered AFOLU projects in India is notably low, with only 10 successfully registered compared to over 108 in the issuance cycle. Moreover, only 8 per cent of AFOLU projects in India are registered, compared to more than 20 per cent in the ROA. Among the registered projects, 75 per cent of India's projects took more than 1,689 days to be registered, while in the ROA, 75 per cent of the projects required only 623 days. These three observations indicate that prolonged registration timelines are prevalent in India, demonstrating that AFOLU projects in India generally take much longer to register than those in other parts of Asia. Figure 5 shows India's significantly longer registration timelines for AFOLU projects than the ROA.

When unregistered projects are evaluated and delays are compared to the ROA benchmark of 623 days, it is revealed that approximately 25 per cent of unregistered Indian AFOLU sector projects are experiencing delays in registration timelines. Although Indian AFOLU projects face fewer delays than other sectors in India (such as the energy sector), their overall timelines remain significantly longer than those in the ROA.

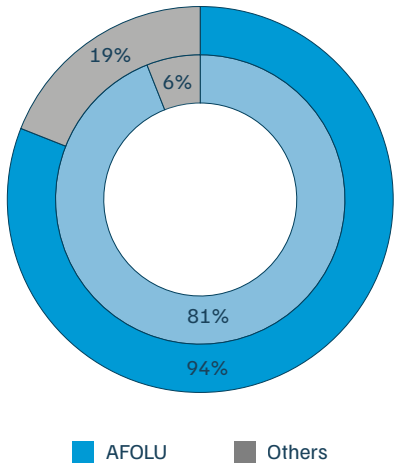
Another critical statistic on AFOLU projects further clarifies the current trends and challenges in the AFOLU sector. This is related to sectoral vulnerabilities that exacerbate timeline delays. Sectoral vulnerability implies the number of projects on hold or rejected for various reasons. Among all projects in the registry – registered and unregistered, across 84 countries – the AFOLU sector has the highest proportion of projects put 'on hold' or 'rejected by the administrator'. Specifically, 93 per cent of all global on-hold projects and 81 per cent of all global rejected projects belong to this category.

Figure 5. AFOLU projects in India take significantly longer to be registered when compared to the ROA



Source: Authors' analysis

Figure 6. The highest number of ‘on hold’ and ‘rejected’ projects is in the AFOLU sector



Source: Authors’ analysis

The energy sectors

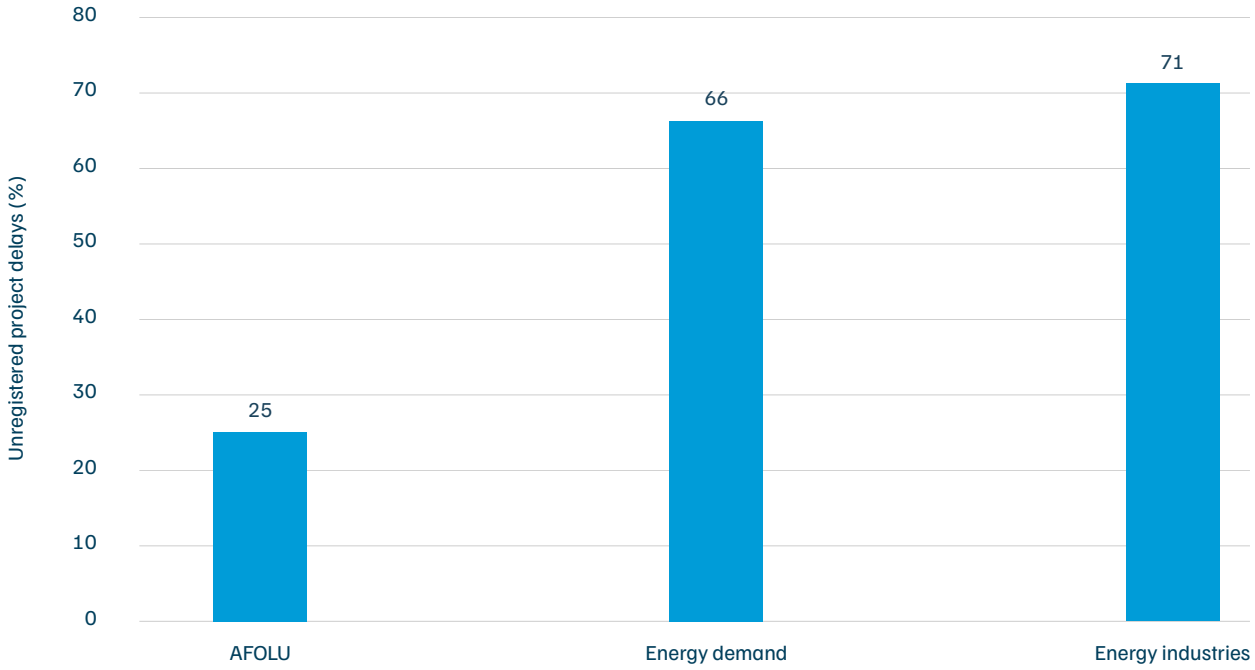
Energy sector–related projects have been broadly classified into two categories: energy industries and energy demand (Refer to Table 1 for sector related description). We found that the energy industries sector in India has been the most active in this area over the past decade, with over 75 successfully registered projects. More than 75 per cent of these registered projects in India take at least 360 days to register successfully. However, in the rest of Asia, registration of Energy Industries projects takes longer—over 75 per cent of the projects in the region have taken at least 427 days to get successfully registered.

While this indicates that, historically, registration timelines in India have been shorter than those in the ROA for the energy industries sector, the current trend in India tells a different story. Extended delays are evident among the 60 unregistered projects in India currently listed in the VCS Registry. Analysing these projects against the benchmark (427 days) reveals that 71 per cent of unregistered energy industries projects have already exceeded this threshold. This indicates that, in India, the highest delays among unregistered projects are observed in the energy industries sector.

In the **energy demand** sector, the Q3 benchmark for project registration in India is 536 days, based on data from 31 registered projects. This is closely aligned with the Q3 benchmark of 534 days for projects in the ROA, derived from 30 registered projects. The similarity in these values, combined with the substantial number of projects in this sector in India, indicates that energy demand projects in India have historically demonstrated a degree of procedural efficiency.

However, current trends reveal substantial delays among the 102 unregistered projects in India in this sector. When these projects are evaluated against the ROA benchmark of 534 days, approximately 66 per cent are found to have exceeded this threshold, signalling significant delays. Although this percentage is lower than the 71 per cent observed in the energy industry sector, it still represents a considerable portion of projects that experience extended timelines.

Figure 7. Delays observed amongst 'unregistered' projects across sectors



Source: Authors' analysis

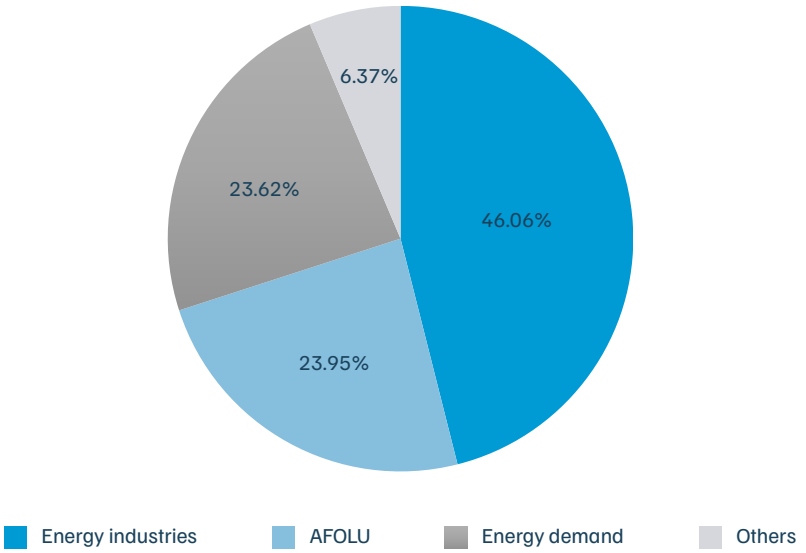
3.2 Sectoral representation across projects

To assess sectoral representation in India's voluntary carbon market, we analysed all projects listed in the Verra VCS Registry, including registered and unregistered projects. Through this approach, we aimed to evaluate the participation of Indian project developers across sectors. All 598 projects (including registered and non-registered projects) in the Indian data set (post-data validation) were used to assess participation across 16 sectors.

As reflected in the VCS Registry, India's project portfolio shows significant disparities in sectoral representation. Most projects are concentrated in the energy demand, energy industries, and AFOLU sectors. Specifically, energy industries account for 46 per cent, energy demand for 23 per cent, and AFOLU for 24 per cent of the total portfolio. In contrast, there is zero participation in several sectors, including construction, mining and mineral production, metal production, fugitive emissions, solvent use, and carbon capture and storage (CCS). Furthermore, participation is limited in sectors such as energy distribution (0.17 per cent), manufacturing industries (1.17 per cent), and the chemical industry (0.5 per cent). Notably, sectors considered to have moderate to high mitigation potential—including transport, waste disposal, mineral/mining production, CCS, livestock management, agriculture within AFOLU, and durable carbon dioxide removal—remain underutilised.

It is critical to ensure wide sectoral representation to harness India's emission mitigation potential and attract funding to facilitate industry transitions. Our assessment, however, shows that a lot needs to be done to ensure adequate representation of projects across sectors. Figure 8 shows sectoral participation in India, indicating that the energy industries have the highest participation, followed by AFOLU and energy demand.

Figure 8. Participation in project development across sectors in India



Source: Authors' analysis

4. Key challenges across sectors

In this section, we highlight the key challenges across sectors based on our discussion with three expert stakeholders – a large-scale carbon project developer, a small-scale carbon project developer, and a certification body.

4.1 AFOLU sector-related challenges

Systematic issues in AFOLU projects are leading to extended registration timelines in India. According to stakeholders, in many cases, projects being implemented on ground face barriers that , often deters investors, developers (especially new entrants) and local communities , leading to disinterest and distrust need among stakeholders. Projects remain in limbo without any guarantee of successful credit generation, and the brunt is faced by local communities and investors who have invested time, land, and money in project deployment. In this section, we discuss the various issues hindering projects in this sector.

Regulatory and legal hurdles

Ambiguity in land titles and overlapping jurisdictions between local panchayats and state forest departments delay AFOLU project development from the outset

In India, the complexity of legal and regulatory frameworks causes significant delays to forest carbon projects in the AFOLU sector. Experts reported that forest carbon projects have stringent standards for precise control as well as clear demarcation of large land parcels. This ensures that the project is economically viable and effectively managed throughout the duration of the project. However, ambiguity in land titles and overlapping jurisdictions between various government levels – from local panchayats up to state forest departments – add delays in the initial phases of project development. The involvement of multiple legal frameworks, such as the Forest Conservation Act and the Land Acquisition Act, often places these regulations at odds with local land usage. Land use is traditionally governed by customary practices and statutory regulations, compounded by bureaucratic processes overseen by central bodies and various state-level authorities.

A study (Aggarwal 2020) highlights the challenges encountered when implementing afforestation projects in Himachal Pradesh, particularly due to land tenure matters. These projects face multiple challenges in clarifying land titles due to the involvement of local village councils as well as the state's forest department. Resistance from local communities' delays progress further, as the project intervention caused conflict with traditional land-use practices. In this case, a lack of adequate consultation led to land rights and resource access disputes. A policy paper from the Indian Institute of Management, Bangalore, studies land disputes and delays in decision-making related to property rights over agricultural lands in Maharashtra. It revealed that most of the disputes were over land ownership, such as non-clarity of title, doubtful transactions, administrative loopholes, and legal multiplicities (Mane 2013).

Other Asian countries—such as China, Bangladesh, Indonesia, and Thailand—have faced similar land-use and management issues. Many countries have developed, or are currently developing, policies to support greater efficiency in land use, land management, and rights-related issues. Many Indian states are also adopting state-level policies to decrease these hurdles. However, it is essential to note that land titles and legal frameworks around tenure are shaped by decades of political and social negotiation. Implementing forest carbon projects requires alignment with these established frameworks while simultaneously scaling and accelerating development across large parcels of land, which involves numerous stakeholders.

Decreasing market confidence, coupled with market manipulation

India's AFOLU sector faces significant challenges due to declining foreign investor interest. This decline, as explained by experts, can be attributed to a combination of factors, including reduced demand for carbon credits generated by such projects in India, relatively low prices in the carbon market, and the perceived low permanence of Indian AFOLU projects as a result of the media backlash in the past two years. For example, a CSE study published an exposé on various malpractices, questioning the overall effectiveness of ongoing offset projects (Dev and Krishnamurthy 2023). *The Guardian* reported that the market value of carbon offset credits has fallen by 61 per cent, indicating significant volatility in global carbon markets. This was further attributed to a combination of factors, including oversupply, shifting policy priorities, and investor scepticism about the integrity and long-term viability of many offset projects (Greenfield 2024).

Experts have further pointed out that certification bodies may deliberately delay project registration to balance the supply and demand in the market. Delays may be used to manipulate market dynamics to maintain price stability, but disadvantage project developers who rely on timely credit sales for project viability. This practice can deter foreign investors seeking more predictable and reliable returns on investment, leading to a cautious or even negative investment outlook towards Indian AFOLU projects.

AFOLU projects face natural risks like fire, pests, and climate change; internal management risks and external risks from community engagement and land tenure

The presence of multiple disaggregated stakeholders at various levels

This vulnerability stems from several inherent challenges associated with managing land-based projects and involves complex interactions between environmental, social, and regulatory factors. The Indian AFOLU sector deals with multiple disaggregated local-level stakeholders such as small landholders, indigenous communities, local government bodies, and non-governmental organisations, each with distinct interests and levels of engagement. These long-term projects span large land parcels with many local-level stakeholders. This invites multiple uncertainties at different stages of project development and implementation. AFOLU projects might frequently intersect with spaces owned by local communities that depend on these lands for their livelihoods through agriculture, livestock grazing, and the collection of forest products (Aggarwal 2020). Experts pointed out that these overlapping interests can lead to conflicts over land rights and resource access, as social acceptance is considered a critical factor for project viability, especially over a long period. Projects that fail to engage local communities or secure their consent and cooperation adequately are more likely to face challenges during the verification process, leading to possible suspensions or rejections.

Vulnerability to natural hazards

AFOLU projects, particularly afforestation/reforestation and soil carbon sequestration projects, are more exposed to natural hazards, with significant risks stemming from prolonged nature-based carbon removals. The successful issuance of credits in these projects depends on the stability of ecosystems, which makes them highly susceptible to adverse climatic events such as floods, droughts, and cyclones. The biggest challenges for AFOLU projects are the appropriate handling of natural risks, such as fire, pests, hurricanes, and climate change; internal management risks, such as those surrounding project management and financial viability; and external risks related to community engagement and land tenure (Verra).

Coupled with this, India's vulnerability to climate hazards is a menacing factor in the minds of many investors. A CEEW study showed that 27 of 35 Indian states and union territories are highly vulnerable to extreme hydro-meteorological disasters such as floods, droughts, and cyclones (Mohanty and Wadhawan, 2021). Thus, there is a general belief among developers, investors, and buyers that the risks associated with this sector are increasing due to the worsening effects of climate variability. Experts noted that this major factor causes AFOLU sector projects to be suspended and rejected more often than those in other sectors. It also deters investors who are increasingly cautious about committing to long-term projects, as they are susceptible to significant non-permanence and implementation hurdles.

4.2 Energy sector-related challenges

Saturated market and strict additionality tests now stall registration of conventional renewable energy projects in India's carbon market

India's renewable energy sector experienced rapid growth in the early 2010s as policy support, competitive auctions, and large-scale investments accelerated capacity additions (Dyck, Melaina et al. 2023). However, while the cost of renewable power has plummeted in recent years, few registrations of traditional renewable energy projects have been observed. This is partly due to market saturation and a shift in focus to newer technologies and innovative project formats—such as hybrid or distributed solutions—that promise better grid stability and better economics. Thus, historical success was driven by supportive policies and competitive pricing and now it has been tempered by market saturation and evolving investor preferences. These factors, along with administrative challenges and changing policy frameworks, contribute to the slow pace of registering conventional renewable projects today.

Financial additionality

Large-scale, non-grid-connected renewable energy projects frequently encounter challenges in demonstrating financial additionality, particularly in nations outside the least developed countries (LDCs) group, that is, where these projects are already economically viable and competitive with fossil-fuel alternatives. Since 2010, over 750 million voluntary carbon credits have been issued by 1,700 renewable energy projects worldwide, accounting for about 30 per cent of all carbon credits generated in the VCM,these credits however, contributed to less than 4 per cent of total revenue for large-scale wind, hydro, and solar installations (Loffler et al., 2024).

Furthermore, geographic context is essential in addressing additionality concerns, particularly in emerging economies such as India, where high renewable energy adoption makes it harder to prove that new projects provide emission reductions beyond business as usual. A 2021 study on India's wind power sector found that many projects were financially viable without carbon credits. This resulted in only infra-marginal projects taking off, which weakened the overall impact on global emissions (Calel et al. 2024).

Market saturation

This sector is increasingly seen as highly saturated within VCMs. Large volumes of credits are generated at low costs and fetch very low prices. Recently, Verra and Gold Standard restricted the certification of new renewable energy projects only to LDCs, underserved regions, and small island developing states (SIDS) to focus carbon financing on areas facing considerable barriers in adopting renewable energy (Verra 2024). This has led to many projects being halted in the validation phase, as registries revisit and scrutinise the genuine impact of these projects beyond what would occur in a business-as-usual scenario.

Shift in focus to other types of certifications

Most standards in VCMs have stringent additionality requirements. Many large-scale market players in the energy industries sector, which do not need to be supported by carbon revenue, are shifting their focus to other energy certifications, such as international renewable energy certificates (I-RECs) or renewable energy certificates (RECs). These certificates often do not require a demonstration of additionality, making them a better alternative for already economically viable projects.

4.3 Sectoral diversification–related challenges

Sectors with more approved methodologies offer more options for project developers, encouraging participation in diverse sectors for mitigation activities

Many sectors in India have high- to medium-level potential for decarbonisation, and these sectors can leverage the VCM to seize these opportunities and scale financing. India's greatest decarbonisation potential lies in the power; industrial, particularly steel and cement; and agriculture sectors. The power sector can reduce emissions significantly by rapidly expanding renewable energy capacity and upgrading the efficiency of fossil fuel plants. Industrial sectors, such as steel and cement, can leverage process innovations, green hydrogen adoption, and carbon capture, utilisation, and storage (CCUS) to cut emissions substantially. Meanwhile, being a high-emission sector, agriculture offers numerous opportunities through sustainable farming practices, A/R, and improved land management, all of which can increase carbon sequestration (Duhan 2022). However, around 90 per cent of offset projects in the ICM portfolio are traditional energy and A/R projects in the AFOLU sector. Multiple factors enhance the attractiveness of these sectors to investors and project developers. These factors, if made available for other high-medium potential sectors, can help build a stronger and more diversified decarbonisation portfolio in India's VCM.

Availability of methodologies

Interviewed stakeholders note that the availability of approved methodologies within each sector influences sectoral participation. Sectors with more approved methodologies offer more options for project developers, encouraging participation in diverse sectors for mitigation activities. Increased engagement also signals investors to invest in particular industries that are cost-effective, can fetch higher prices, have moderate to high mitigation potential, and have minimal risks. Conversely, sectors with fewer approved methodologies may face barriers to entry, limiting the number of projects and participants.

To understand this better, we looked at the methodology portfolio to identify one of the directly linked factors that might influence sectoral participation: the availability of diverse methodologies under each sector or subsector. As validated by the stakeholders engaged in our study, sectors such as AFOLU, energy industries, and energy demand appear to have higher participation and more available methodologies. However, despite the availability of methodologies, the waste-handling sector and transport sector have not been utilised by developers as abundantly as the other three. Stakeholders report that these sectors face additional challenges in setting baselines and accounting for emission reductions due to the presence of complex value chains in waste-handling and transport sectors , which may influence low uptake. Table 4 compares the sectors with the highest availability of methodologies and their activity in the VCM side-by-side.

Table 4. Side-by-side comparison of (a) the availability of methodologies under each sector and (b) participation in each sector

Sectors	(a) Availability of methodologies	(b) Participation
Energy industries	High	High
AFOLU	High	High
Energy demand	Medium	High
Waste handling and disposal	High	Low
Transport	Medium	Low
Manufacturing industries	Medium	Low
Fugitive emissions	Low	Low
Construction	Low	Low
Chemical industries	Low	Low
Energy distribution	Low	Low
Mining and metal industries	Low	Low
Carbon capture and storage	Low	Low

Source: Authors' analysis from the sectoral representation in Figure 8 and Table 2.

Domestic policies

The current Indian Carbon Market has a significant focus on energy sector and AFOLU sector projects. This is due to it's alignment with the country's climate goals as outlines in it's NDC. These targets include reducing GDP emissions intensity by 33–35 per cent by 2030 from 2005 levels, increasing non-fossil-fuel capacity to about 40 per cent of the total power capacity by 2030, and creating an additional carbon sink of 2.5–3 billion tonnes of CO_2 equivalent through expanded forest and tree cover (MNRE 2024).

Complementing these measures, the implementation of proactive initiatives such as the *National Green Hydrogen Mission*, *Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan* (PM-KUSUM), *PM Surya Ghar*, and the *Production-Linked Incentive* (PLI) schemes for solar PV modules highlight the Indian government's strategic focus on enhancing energy generation capacity while reducing dependence on fossil fuels. This corroborates with the Government of India setting up the ambitious target of achieving 500 GW from non-fossil sources by 2030 (MNRE 2024). In addition, wind energy programmes are being encouraged through capital subsidies, and the National Clean Energy Fund—funded by a coal tax—provides financial support for clean technology projects.

India's supportive policies for greening initiatives – such as the *National Afforestation Programme* (NAP), *Green India Mission* (GIM), compensatory afforestation under the Compensatory Afforestation Fund Management and Planning Authority (CAMPA), the *National Agroforestry Policy*, and the *Green Credit Programme* – have given impetus to afforestation, reforestation, and sustainable agriculture activities. These measures collectively promote several projects in these sectors by signalling their growth.

India's forward-looking policies are driving momentum in afforestation, reforestation, and sustainable agriculture efforts

Technological advancements in clean energy and energy efficiency

In India, renewable energy technologies such as solar and wind have now matured. Their scaling has resulted in cost reductions and efficiency improvements, making them viable for large-scale deployment. Innovations and developments such as integrating solar photovoltaic materials and efficient wind turbine designs – such as bifacial solar panels and larger rotor diameters – have massively improved energy capture and operational efficiency (Rodrigues et al. 2023). Infrastructure development, particularly in grid integration and advanced energy storage solutions such as lithium-ion batteries, supports integrating intermittent renewable sources into the energy system. Furthermore, India's manufacturing capabilities have become more enhanced, which has reduced costs and strengthened local supply chains, aided by government policies such as incentives for local production and feed-in tariffs. This has lowered the entry barrier and operational risks, making renewable energy technologies attractive and viable options for investors. However, some of these aspects have also led to difficulties in demonstrating the financial additionality of the projects.

Foreign and Indian investments in clean energy

India's renewable energy sector has experienced substantial growth, with foreign direct investment (FDI) reaching USD 2.5 billion in FY 2023—marking a 56 per cent year-on-year increase. Total FDI in the sector surpassed USD 12.47 billion by December 2022(Ranjan, 2023). Key investors from countries such as Singapore, Mauritius, and Japan have fuelled this growth (Cyrill, 2024). The country's renewable energy landscape, driven by affordable capital and regulatory incentives, has attracted global strategic investors targeting net-zero goals (Duhan, 2022). As a result, the influx of FDI has accelerated India's clean energy transition, contributing to substantial scaling of the renewable energy market and increased interest in developing clean energy projects in India's VCM portfolio.

5. Key recommendations

Our study recommends establishing a robust monitoring and reporting framework that submits systematic and regular assessment reports to the National Steering Committee for Indian Carbon Market (NSCICM) on various aspects related to the functioning of the CCTS offset mechanism. This framework will not only keep the governance body well-informed regarding the functioning of the mechanism, but it will also enable the timely redressal of systemic and process-related challenges and irregularities. We recommend the following key aspects to be considered for inclusion within the monitoring and reporting assessment report to be submitted quarterly to the NSCICM.

Establish and review the performance of a single-window clearance system for AFOLU projects

Our assessment highlights that projects in the AFOLU sector face the most delays due to the myriad challenges associated with this sector. Other countries in the ROA that face similar issues have modernised their land administration systems to address challenges such as overlapping jurisdictions, ambiguous land titles, and bureaucratic delays. For example, Vietnam's National

Land Information System issues authenticated digital e-certificates for land registration, reducing processing times and enhancing transparency (ASL Law Firm 2018). Similarly, Thailand's efficient land administration – managed by the Department of Lands under the Ministry of Interior – completes most titling and registration procedures in less than a day at minimal cost. It is supported by legislative frameworks such as the 1954 Land Code and subsequent reforms (Open Development Thailand 2016). Bangladesh and Indonesia promote digitisation by establishing e-service centres and adopting digital governance frameworks to preserve records and streamline service delivery. However, data consistency and inter-agency coordination issues remain (Akter, 2022).

Early detection of regulatory, environmental, or social issues on land parcels during planning allows developers to rectify, reassess, and select suitable sites

Thus, we recommend a single-window clearance system for AFOLU projects on the CCTS offset mechanism website, which can help address key challenges such as land disputes, regulatory hurdles, and land title identification. Drawing from models such as the National Single Window System (NSWS), and utilising the growing database under the *Digital India Land Records Modernization Programme* (DILRMP), this system would streamline approvals for land titles, environmental clearances, and regulatory compliances through the use of a centralised digital platform. Key features would include automated land title verification, time-bound application processing, and coordination among central departments such as the Ministry of Environment, Forest and Climate Change (MoEFCC) and state revenue bodies. This would enable regulatory issues and environmental or social disputes related to a particular land parcel to be detected early on in the planning stage, presenting developers with options to carefully rectify, reassess, and select land parcels.

The NSCICM should be quarterly apprised of the progress in establishing such a single-window clearance system for AFOLU projects, as well as its performance once it is operational.

Monitor the status and progress of project portfolio diversification

Our assessment reveals the disproportionate participation of the energy demand and energy industries sectors in the mechanism. While these two sectors hold significant potential, India has the scope to diversify the carbon offset market to other high-potential and emerging sectors as well. For example, the transport sector, which is responsible for nearly 14 per cent of India's emissions, can attract significant climate financing by adopting electrification and fuel-efficient logistics, tapping into global funds to reduce transport emissions (Climate Action Tracker 2024). The waste management sector, which accounts for 3–4 per cent of national emissions (Cheteau, Dang, and MacDonald 2023), holds significant potential for waste-to-energy projects and landfill gas capture, which can draw carbon revenues and enhance environmental, social, and governance (ESG) investment.

In agriculture (within the AFOLU sector), sustainable practices can sequester 85.5 Mt CO_2 annually (Sapkota et al., 2019) while enhancing rural incomes and engaging a large section of the economy. India's CCS potential is sizeable and has the potential to mitigate up to 50 million tonnes of CO_2 annually from large sources near oil and gas fields, with an additional 100 million tonnes near coal fields (Beck et al., 2013). To encourage participation in diverse sectors, the CCTS mechanism may consider:

- **Providing financial incentives**: Offer reduced registration fees for projects in under-represented sectors.
- **Enhancing market visibility**: Develop a project pipeline database showcasing opportunities for buyers and investors in these sectors.
- **Increasing and simplifying sector-specific methodologies**: Increase the number of methodologies in underutilised sectors and streamline processes for project registration to reduce barriers for developers.

A quarterly report on the pool and diversity of projects registered over time should be submitted for assessment to NSCICM.

Monitor the real-time status and progress of project applications through a project tracking system

Based on our analysis, it is essential to incorporate real-time tracking for each stage of the registration cycle, such as project submission, validation, verification, stakeholder consultations, and certification issuance. These thresholds should align with historical timelines and best practices from frameworks such as the CDM, Verra VCS, and Gold Standard. A centralised database should include phase-wise timelines, detect delays, and notify stakeholders via automated alerts. In case of delays, a grace period may be provided, followed by the submission of a mandatory issue report by the particular ACVA outlining the reasons, mitigation measures, and revised timelines. This approach would ensure early identification and resolution of issues in the project development and credit issuance cycle.

This database can also be a repository for project-related data accessible to authorised users. Such data would be useful for research, transparency, adaptive management practices, and content creation for capacity-building programmes. It can be integrated with an automated quarterly report submitted to the NSCICM that summarises the status of project applications, any delays, and the actions being taken to address these delays.

Institute annual performance review of accredited carbon validation and verification bodies (ACVAs/VVBs)

An annual performance review system for accredited carbon validation and verification bodies (ACVAs) should be established to enhance accountability and maintain high operational standards. As independent third parties, these organisations are essential for upholding the market's integrity and ensuring the successful issuance of carbon credits. Since they are deeply involved in validating and verifying projects, their role is crucial. A performance review system should assign performance-based grades to all certified ACVAs, enabling project developers to make informed decisions based on cost-effectiveness and performance metrics.

The following key points may be included within the performance review system:

- **Project documentation review**: Conduct randomised or flagged reviews of submitted projects to ensure ACVAs adhere to compliance standards. Repeated delays, anomalies, or stakeholder feedback should also trigger reviews.
- **Validation and verification monitoring audits**: Conduct randomised remote or onsite audits to observe ACVAs' performance during validation and verification.
- **Accountability and compliance mechanisms**: Address non-conformities through warnings, mandatory corrective actions, or suspensions for severe issues.
- **Accreditation body feedback**: Collaborate with accreditation bodies to improve review systems, share relevant insights, and develop capacity-building resources for ACVAs.

The NSCICM should be briefed about the key results and actions should be taken based on the suggested annual performance review of ACVAs.

Share status and progress updates of capacity-building activities undertaken by project developers with stakeholders

Our consultation with experts revealed that many offset-based projects, especially in the AFOLU sector, become delayed when the stakeholders within the project ecosystem are not well informed. Therefore, to ensure the efficient functioning of the mechanism, there is a need to deliver timely and regular capacity-building activities. The developers should undertake such activities at the project's onset as well as at the time of listing. They should then record and report on these activities for each project. Information related to capacity-building activities should be reported quarterly to the NSCICM.

Share status and progress updates related to 'high-additionality' energy projects

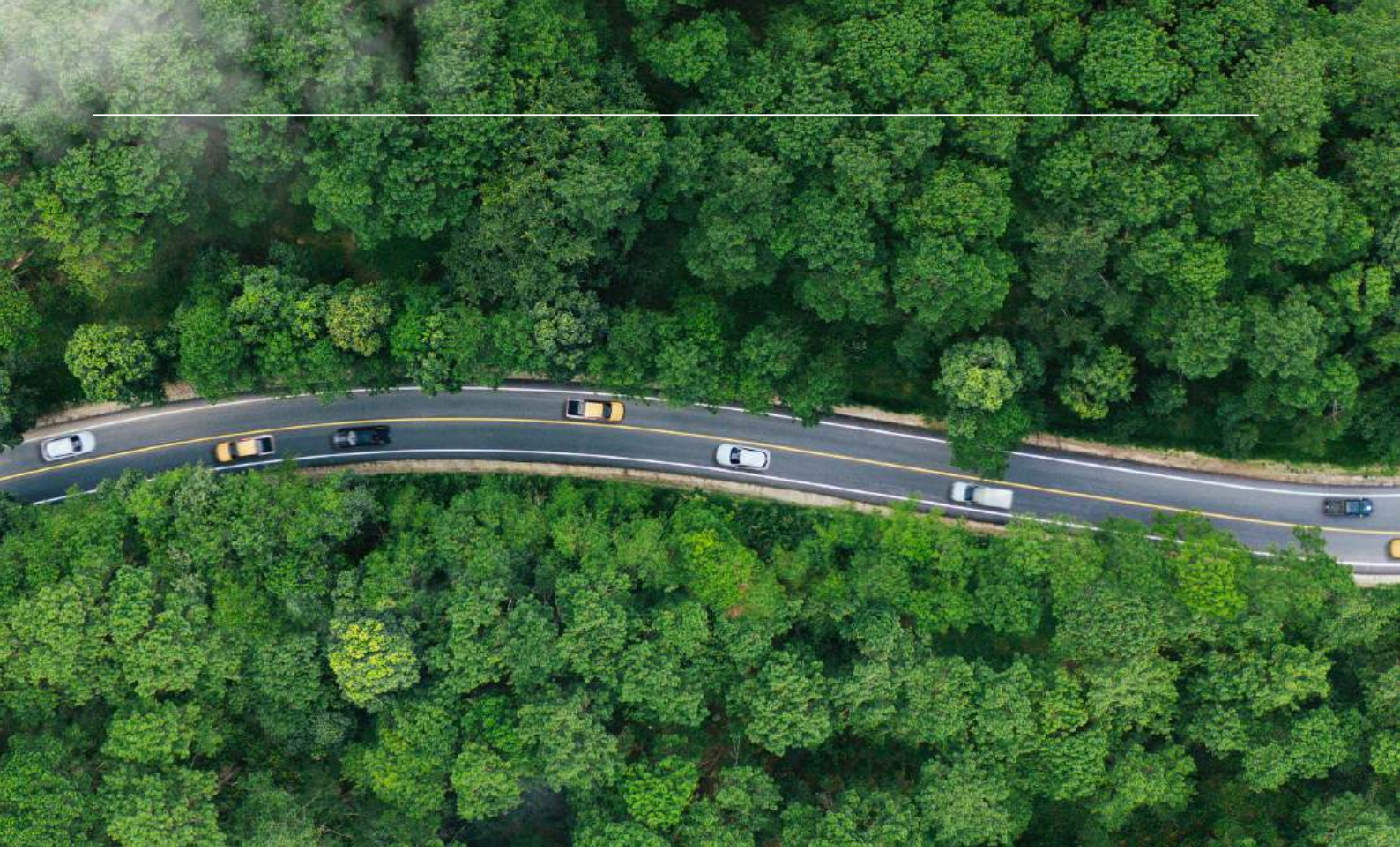
Our assessment shows that many projects in the energy sector are on hold for a long time, as demonstrating additionality is challenging, given that renewable energy costs have fallen significantly in the last few years. To address this, new standards within the CCTS offset mechanism should prioritise high-additionality projects that can demonstrate financial and environmental benefits, such as energy storage systems (ESS), CCUS, and durable carbon removal–based projects. Developers should conduct robust barrier analyses to establish financial additionality, ensuring carbon financing is directed toward projects that would not be viable without such support.

Gradually, reliance on traditional renewable energy projects within the ICM should be reduced as they become increasingly cost competitive and do not need additional carbon revenue to be supported. Other projects that may be considered high additionality now might also become cost competitive in the future with the scaling of such industries. The NSCICM should be briefed quarterly about the progress of such high-additionality energy projects.

Integrate standardised baselines to streamline project development within the CCTS offset mechanism

The CCTS offset mechanism should consider integrating standardised baselines (SBs) to streamline the carbon credit issuance process and overcome barriers to project development. A use case has been demonstrated in the development of the rice mill sector in Cambodia under CDM, for which SBs were successfully applied to address challenges such as small project sizes, long project cycles, and high transaction costs (UNDP 2013). Similarly, in India, projects by small-scale developers, or projects with limited data availability—especially in the energy sectors—could benefit from employing SBs, as they provide an agreed-upon baseline emissions factor, thereby simplifying the baseline identification and additionality demonstration process. Adopting SBs would further reduce the complexity of monitoring as well as calculation requirements for individual projects, thus significantly reducing transaction costs and delays within the credit issuance cycle and streamlining project development and implementation processes.

Standardised baselines can simplify baseline identification and additionality tests for Indian energy projects by small-scale developers or with limited data availability



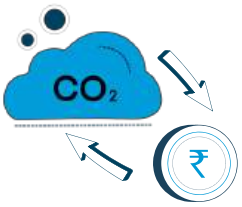
6. Conclusion

Based on the historical experiences of private-sector VCMs, our assessment reveals some of the challenges and opportunities relevant to the offset mechanism under the CCTS . Based on our analysis on three major sectors, we highlight that the AFOLU sector in India currently encounters multiple challenges – including complex regulatory frameworks related to land ownership, land use conflicts, and susceptibility to natural hazards – which result in prolonged project timelines and high vulnerability for projects. Similarly, the energy industries sector grapples with issues of financial additionality, large credit volumes, and market saturation, leading to significant delays. The energy demand sector, while less affected, still faces notable bottlenecks in the early project stages. Moreover, we learned that India's overall carbon market portfolio is heavily concentrated in a few sectors, with limited representation in high-potential areas such as transport, waste management, agriculture, and CCS, leaving significant mitigation opportunities untapped.

Tracking the advent of these issues and managing them in the early stages can help regulate an otherwise unregulated market and strengthen the market framework for the CCTS mechanism. This will act as a differentiating factor for the CCTS offset mechanism standard and drive demand for offsets certified under it. The most compelling insight emerges not from raw data but from an understanding of how complex this market is and the need for adaptive frameworks and regulatory nudges. These tools can be used to navigate various externalities and consequently utilise market opportunities and deliver on the promise of scaling emissions mitigation and climate financing.

To address these challenges, we recommend implementing an institutionalised monitoring and reporting structure to regularly brief the NSCICM and benefit from its guidance on the various challenges that the ICM faces. Specifically, we recommend that the NSCICM be quarterly briefed about the establishment and performance of a single-window clearance system for AFOLU sector projects, the status and progress of project portfolio diversification, the real-time status and progress of project applications through a project tracking system, the performance of ACVAs/VVBs through an annual performance review system, capacity-building activities undertaken by project developers with stakeholders, and the status and progress of high-additionality energy projects.

We believe that if the key recommendations of our study are implemented, India's CCTS can differentiate itself from existing private-market standards and become a robust, transparent mechanism by embracing flexibility, promoting sectoral diversity, and maintaining stringent integrity standards. India stands at a critical juncture for climate action, where its rich experience in VCMs should be able to propel its journey.



India stands at a critical juncture for climate action, where its rich experience in VCMs should be able to propel its journey

Acronyms

GHG	greenhouse gas
SD-Vista	Sustainable Development Verified Impact Standard
WWF	World Wide Fund for Nature
JCM	Joint Crediting Mechanism
ACR	American Carbon Registry
CSR	corporate social responsibility
GWP	Global Warming Potential
I-REC	International-Renewable Energy Certificates
REC	Renewable Energy Certificates
NSWS	National Single Window System
DILRMP	*Digital India Land Records Modernization Programme*
A/R	afforestation/reforestation
ACVA	accredited carbon verification agency
AFOLU	agriculture, forestry, and other land use
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CDM	Clean Development Mechanism
CCS	carbon capture and storage
CCUS	carbon capture, utilisation, and storage
CCTS	*Carbon Credit Trading Scheme*
CORSIA	*Carbon Offsetting and Reduction Scheme for International Aviation*
CO_2	carbon dioxide
ETS	emissions trading scheme
ESS	energy storage system(s)
FDI	foreign direct investment
GIM	*Green India Mission*
ICM	Indian carbon market
ICVCM	Integrity Council for the Voluntary Carbon Market
IQR	interquartile range
LDC	least developed countries
MOEFCC	Ministry of Environment, Forest and Climate Change (India)
MRV	monitoring, reporting, and verification
Mt	metric tonne
NAP	*National Afforestation Programme*
NSCICM	National Steering Committee for Indian Carbon Market
PLI	*Production Linked Incentive Scheme*
PM-KUSUM	*Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan*
ROA	rest of Asia
SB	standardised baseline(s)
SIDS	small island developing states
Solar PV	solar photovoltaic
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VCM	voluntary carbon market
VCS	Verified Carbon Standard
VCU	verified carbon unit
VVB	validation and verification body

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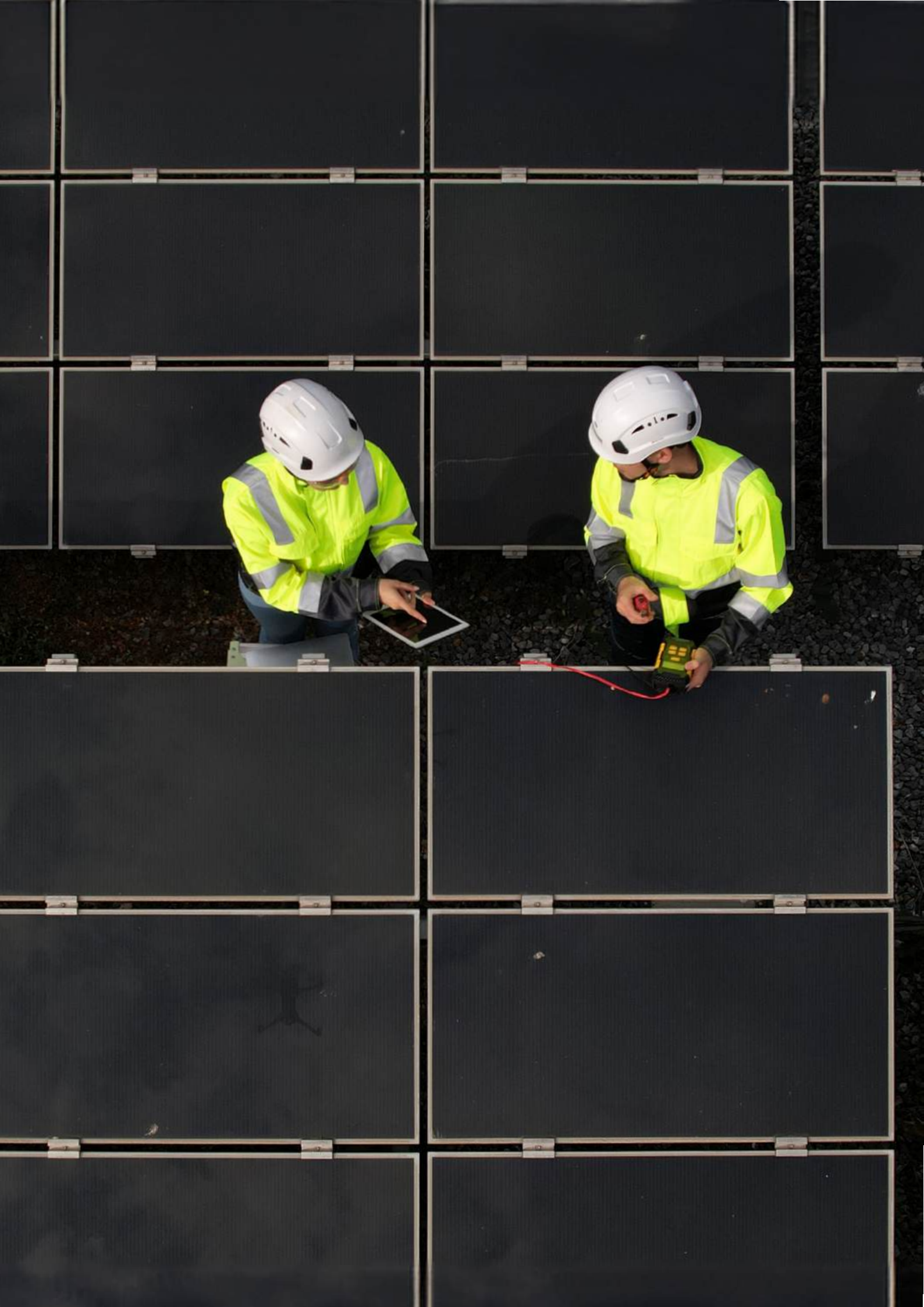

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