

# Understanding Carbon Markets

## Prospects for India and Stakeholder Perspectives

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Image: Alamy

### Executive summary

The Government of India's announcement regarding the creation of a carbon credits market is a path-breaking one. This follows numerous other actions like the net-zero announcement that demonstrate India's leadership in and ambition for climate change mitigation. Against this backdrop, our issue brief discusses alternative forms of carbon markets and assesses the perspective of Indian stakeholders on this subject. We highlight and explain the two alternative

approaches of carbon markets: 'offset market (project-based)' and 'cap-and-trade (or emissions trading scheme [ETS])'. The two approaches are significantly different from each other in terms of the key characteristics that define their structure, as well as quality, environmental integrity, and operational boundary of tradeable units. In this context, we conducted an industry stakeholder discussion to understand their perspectives on the recent developments.

The key takeaways from the stakeholder discussion are:

- The Indian experience is entirely about the offset/project-based approach and there is limited understanding of the ETS approach;
- There is a need for a sustained and deep engagement on the cap-and-trade or ETS approach;
- An India-specific taxonomy is required for various types of carbon credits;
- There is scope for clarifying the meaning of ‘voluntary’ in the carbon markets discourse;
- Exploring alternative approaches for providing value for unsold energy saving certificates (ESCerts) and renewable energy certificates (RECs), rather than making these fungible with carbon credits, would help provide greater clarity;
- The domestic carbon offset market might not be a channel for international finance unless it is linked with other similar international ETS programmes, although it can be a significant source of domestic finance; and
- All three alternative forms of carbon markets—those based on the United Nations Framework Convention on Climate Change (UNFCCC), voluntary, and India’s domestic ETS—could eventually co-exist in the long term.

Our overall recommendation is that India should align the early phase of the transition process as proposed by the Bureau of Energy Efficiency (BEE) with the development of an ETS that is similar to various other ETS systems prevalent in Asia and around the world, like the EU-ETS and the Korean ETS. Additionally, while learning from the experiences of other ETS systems around the world, the Indian ETS should be designed to reflect its national circumstances and economic structure.

## 1. Introduction

Several countries worldwide are exploring ways of pricing greenhouse gas (GHG) emissions as a climate change mitigation tool. There are international, supranational, national and subnational functioning carbon markets in the world (World Bank 2022). However, carbon markets could be devised through multiple approaches which differ from each other fundamentally. To realise market-based instruments’ full potential and maintain their integrity and quality, it is important to understand their inherent characteristics and environmental boundaries.

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The Government of India has passed an amendment to the *Energy Conservation Act, 2001*, which leads to establishment of a carbon credit market in India (The Energy Conservation (Amendment) Bill, 2022).

The amendment provides a legal framework for a carbon market with the objective of incentivising actions for emission reduction. Under the Indian carbon credit market, entities can register themselves as “Registered Entities” for the carbon credit trading scheme. The carbon credit certificate will be issued by the central government or any agency authorised by it. Any other person or entity may also purchase ESCerts or carbon credit certificates on a voluntary basis. Details of the operational nitty gritty and technical details of the carbon markets are yet to be outlined by the BEE.

This brief outlines the different types of carbon markets, other market-based instruments in India unrelated to carbon dioxide emissions, and stakeholder concerns around the announcement of the Indian carbon credit market.

Section 2 introduces alternative forms of carbon markets and their key characteristics. Section 3 is a brief history of carbon markets under the United Nations. Section 4 describes the existing emission mitigation market-based instruments in India and the details of the carbon credit market in the proposed amendment to the *Energy Conservation Act, 2001*. Section 5 outlines the key takeaways from a stakeholder consultation meeting with industry representatives at CEEW and the proposed recommendations. Section 6 is our recommendation for the way forward.

## 2. Alternative forms of carbon markets

Carbon markets are markets where a tonne of carbon dioxide equivalent (CO<sub>2</sub>e) is commodified as a tradeable unit either as an emission allowance issued in an ETS system or as a verified emission reduction/removal credit (offset) issued in an offset (project-based) system. Carbon markets are intended to bring a price signal to GHG emissions leading to emission reduction. As mentioned, there are two alternative forms of carbon

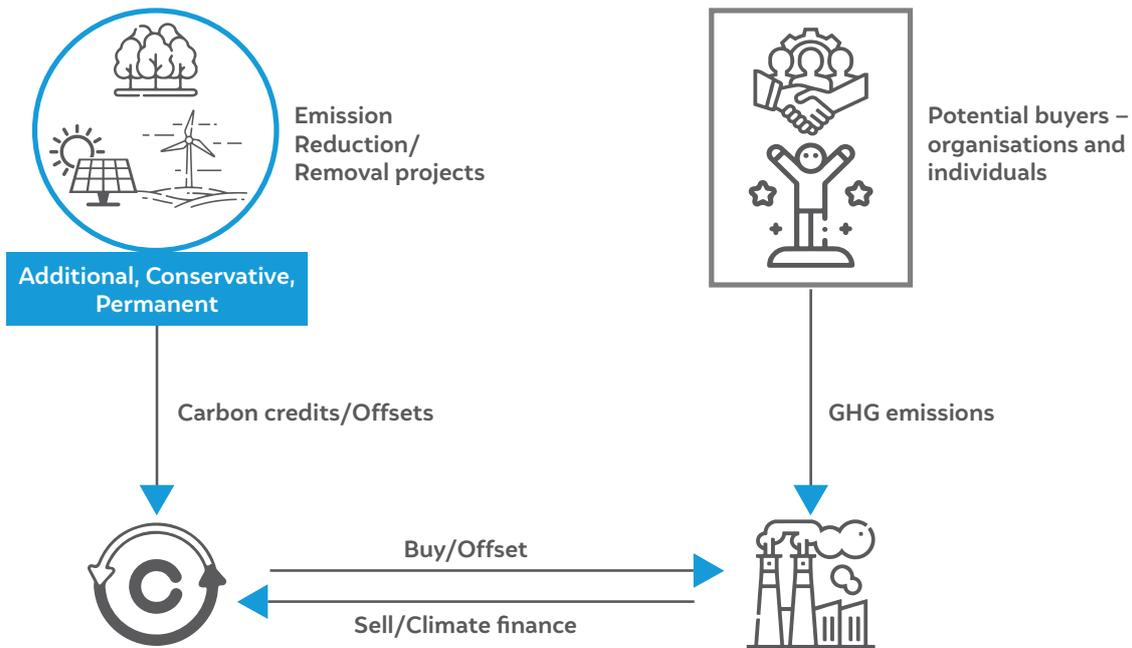
markets, offset and ETS. These alternative forms can also co-exist within the same jurisdiction. The following section describes these alternative forms.

## 2.1 Offset (Project-based) approach

The offset approach, also known as the baseline-and-credit system, is a project-based mechanism where emission reduction is measured in reference to a baseline (counterfactual) scenario that is estimated based on the assumption that emissions will be higher if the proposed project does not materialise. For example, the cost of wind-based power generation was very high in India in 2005. Any wind-based power project was not financially viable given that power buyers would prefer cheaper coal-based power. Within this context,

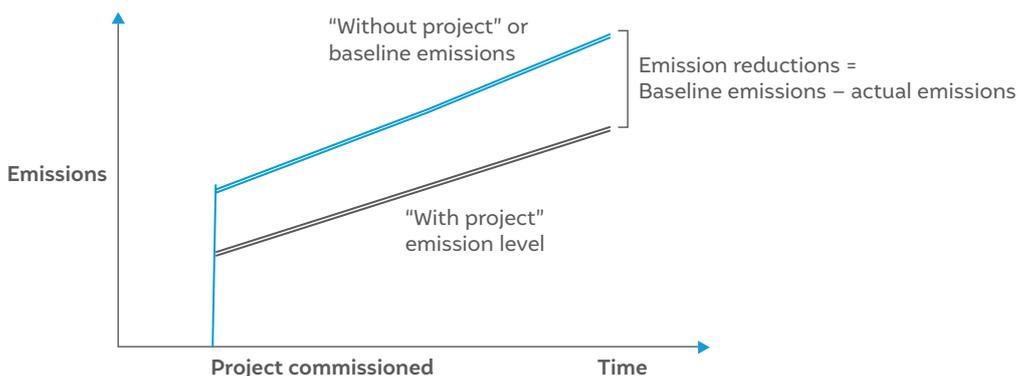
offset credits from the Clean Development Mechanism (CDM) market helped such wind-power projects achieve financial viability. The baseline for any such wind-based project was a coal-power project that would have come in if financial support through carbon markets was not available. Many such wind-based projects were supported through the CDM market in India. In this way, the offset system helps get funding for GHG emission reduction/removal projects and acts as an instrument to get climate finance. Such investments determine the supply of carbon credits. On the demand side, there are companies that have emission reduction targets to meet, either voluntary or compliance-based. These companies are the buyers of carbon credits. The quantum of demand and supply of emission reduction credits determines the price of carbon in offset markets.

Figure 1 Project-based offset mechanism—generation and usage of offset/credits



Source: Authors analysis

Figure 2 Calculation of emission reduction for generation of credits



Source: Bayon, Hawn, and Hamilton, 2007.

The concepts of baseline and additionality are critical in this system. The difference between the baseline level of emissions (i.e., in the absence of the proposed project) and emissions in the scenario where the proposed project is functional is the basis of the quantum of carbon credits given to a project developer (Figure 2). For example, if a hydrogen-based steel manufacturing project is proposed under such an approach, the project developer will have to show that in the absence of funding support through this route, fossil-based steel manufacturing will lead to a higher emissions trajectory (the baseline). Hence, the proposed investment will lead to emissions reduction relative to the baseline. The emission reduction is calculated against this hypothetical baseline emission that would have happened in the absence of the project. The difference between the actual emissions and the baseline emissions results in the issuance of carbon credits. To generate emission credits, ex-post verification by an officially recognised institution (a verifier) of the reduction/removal is necessary. The emission credits are then bought by individuals, entities or countries which aim to offset their GHG emissions voluntarily or under a mandatory scheme.

## Understanding carbon offsets

Offsets (or project-based credits or carbon credits) are produced through the project-based mechanism. If a project results in GHG emission reduction or removal, the project developer can claim carbon credits with one credit claimed per tonne of emissions reduced/removed. The project developer can then sell these credits to individuals or organisations planning to offset their emissions. Therefore, the emissions reduced at the project site act as coupons for buyers to emit elsewhere. Carbon credits, in principle, are used to offset hard-to-abate<sup>1</sup> emissions; therefore, they should be used as a “balancing act” after an organisation has undertaken all feasible measures to reduce its Scope 1, Scope 2 and Scope 3 emissions.

Therefore, the nature of carbon credits invites a more rigorous process of scrutiny and a longer project cycle leading up to the generation of credits. To maintain environmental integrity and quality of credits, the project developer needs to demonstrate the following:

- **Additionality:** Showing that the project is additional demonstrates that the project would not have happened in the business-as-usual scenario in the absence of the funding provided by the carbon credit scheme. This concept is extremely important because, for every retired credit, additional GHG emission is being allowed into the atmosphere. If the emission reduction would have happened anyway, that is, they are not additional—then when they are used to offset other emissions, their net effect on the atmosphere is negative. Additionally, the cost of generation of carbon credits will be zero or negative if non-additional activities are accepted under the baseline-and-credit mechanism. It will result in project developers of non-additional activities selling credits at any price that covers their transaction costs (Betz et al. 2022). This will eventually result in an increase in credit volume and a decrease in credit prices.

There are four additionality tests (Bayon, Hawn, and Hamilton 2007):

- **Investment:** The developers must establish financial additionality by proving that the revenue generated from the sales of carbon credits has been important for the financial feasibility of the project.
- **Technology:** The developers need to prove that they are using a specific technology only to reduce emissions. Had they used an alternative technology, it would have led to higher emissions. The primary benefit of the use of the technology is emissions reduction.
- **Regulatory:** The project should demonstrate regulatory additionality by proving that the emission reduction is over and above as mandated by law.
- **Common practice:** The developer also needs to demonstrate that the project reduces GHG emissions compared to similar projects that employ ‘common practice’.

**The concepts of baseline and additionality are critical in the carbon offset system.**

1. Here ‘hard-to-abate’ does not imply sectors like steel and cement where it is hard to abate emissions due to lack of availability of cost-effective mitigation options as of now. Hard-to-abate here simply means that for any company in any sector that has to achieve its company-level mitigation target, there would be cheaper options and more expensive options. If cheaper options for in-house emission mitigation are exhausted, then the company can invest through the offset (project-based) route to gain carbon credits so that it is able to avoid investing in more expensive (hard-to-abate because of the high cost) in-house options for the given time period. Hard-to-abate also implies emissions that can never be abated due to lack of mitigation options for some applications. Ultimately, every company will have to use all options available to it, cheap or expensive, to move towards the net-zero target.

- Conservative baseline:** The calculation of baseline emission is critical in ensuring the environmental integrity of carbon credits. The number of credits generated is the difference between baseline emissions and emissions after the implementation of the project. Inflated baseline emissions could lead to the generation of surplus and compromised carbon credits. For instance, if a project showcases baseline emissions of 200 tonne CO<sub>2e</sub> and gets credit against that instead of the actual 100 tonne CO<sub>2e</sub>, the project developer will get 100 compromised carbon credits. Therefore, it is imperative to ensure a stricter baseline (Bayon, Hawn, and Hamilton 2007).
- Permanence:** The project should guarantee emission mitigation over the stated period of time. This is critical in long-term projects. For instance, risks in a reforestation project like fire would affect the delivery of credits. Similarly, all types of sequestration projects need to ensure that the stored carbon in grounds or in trees will not be released into the atmosphere someday (Bayon, Hawn, and Hamilton 2007).
- Leakage:** Emissions leakage occurs when a reduction in emissions at one site or at a given point leads to an increase in emissions at another site or at a later time. The project developer must ensure that the project avoids any kind of leakage. An example of emission leakage is if a forest is protected through a carbon credit scheme limiting logging in that area, the possibility of deforestation in another area should be considered (Bayon, Hawn, and Hamilton 2007).

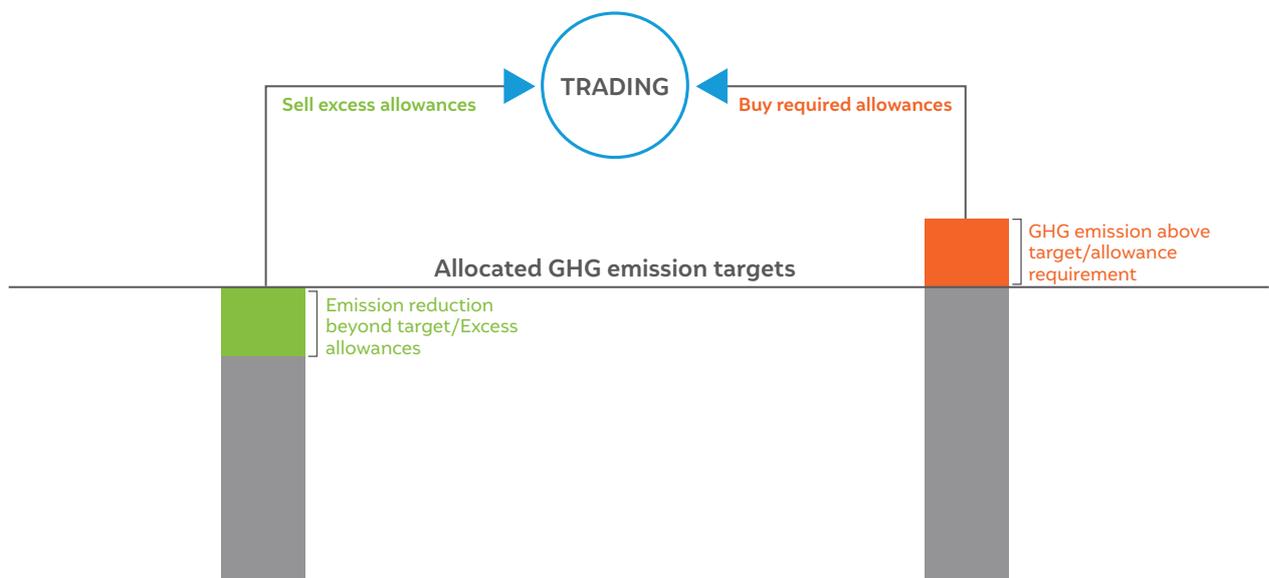
### Compliance versus voluntary offset markets

The offset markets approach could be further classified as either compliance-based or voluntary. The compliance market implies that the demand for emission reduction is driven by regulation. As against this, demand in the voluntary market is driven by company-level voluntary obligations to demonstrate low-carbon and sustainability-related actions to shareholders. Approval and verification of emission-reduction credits in the compliance market are driven by an extensive regulatory architecture that approves projects based on certain pre-determined conditions, while approval and verification of credits in the voluntary market is done by private companies that have built a brand for themselves for this critical task in the value chain.

### 2.2 Emissions trading scheme approach

ETS is a quantity-based instrument where a regulator outlines the maximum level of GHG emission (cap) for a specified group of entities (for example, companies, countries or facilities). The cap is then divided into a distinct number of emission allowances and distributed (ideally through an auction process) over the entities to be regulated under the ETS. The regulated entities need to submit one allowance for each tonne of CO<sub>2e</sub> emitted during the compliance period. The following aspects, among others, are important for an ETS:

Figure 3 Emissions trading scheme



Source: Authors' analysis

- **Cap-setting approaches:** The cap can work in a bottom-up way, whereby the maximum level of emissions relates to the overall emissions factor of the covered installations (with total allowable emissions varying dependent on the output of covered installations) or a top-down way, whereby the maximum level of emissions relates to the overall amount of emissions allowable under the ETS (with an absolute limit on total emissions not dependent on the output of covered installations). An example of the former approach is China's initial design of its national ETS. Examples of the latter are the EU-ETS, Korean ETS (K-ETS), California Cap-and-Trade Program, etc. There is an expectation that China's national ETS will also transition to the latter type due to the greater economic efficiency and ability to reduce GHG emissions of this type.
- **Cap across sectors:** Ideally, there should be multiple sectors subsumed within a single high-level cap on emission. For example, the regulator could say that all the large industrial entities operating under the steel, cement, power, and petrochemical sectors in India have a common cap of X million tonnes of CO<sub>2e</sub> for 2025. There is no need for sector-specific caps, although sector-specific GHG mitigation potential and costs can be considered in determining the overall cap and allocation amounts to entities, for example, as applied in the K-ETS. A single cap across sectors enables the inherent cost-efficiency of an ETS to be fully utilised by allowing emissions reductions to take place where they are cheapest across all covered sectors (IEA 2022).
- **Certainty:** The regulator should consider announcing a cap trajectory for a sufficiently long period that can provide policy certainty to promote effective long-term investment decision-making (Kuo 2022). This effect can also be achieved by establishing a clear relationship between the level of the ETS cap and the country's NDC target, such as in the case of the K-ETS. For example, the regulator could announce the cap trajectory in 2019 that specifies an emissions cap from 2021 to 2030. The 10-year period gives a sense of certainty to the market participants.
- **Allocation:** The regulated entities need to submit one allowance for each tonne of CO<sub>2e</sub> emitted during the compliance period. Initially, ETSs

**ETS is a quantity-based instrument where a regulator outlines the maximum level of GHG emission (cap) for a specified group of entities.**

typically provide high levels of free allowances to enable a relatively soft start with limited financial implications. Given that many entities can pass through some or all of their carbon costs to product prices, this risks creating 'windfall' profits so the level of free allocation is gradually reduced and replaced by auctioning, which creates a stronger carbon price signal to drive GHG emission reductions and provides a valuable source of finance from auction revenue<sup>2</sup> which can be used to support investments in low-carbon technology as well as protect vulnerable stakeholder groups from higher energy costs. Free allocation remains important as a means of safeguarding international competitiveness of energy-intensive/trade-exposed sectors and preventing 'carbon leakage'. The preferred method of free allocation is based on GHG emissions intensity benchmarks.

- **Monitoring, reporting and verification (MRV):** Apart from specifying the cap and allocation details, the other critical aspect of an ETS system is a robust MRV process to measure GHG emissions from entities under the cap (ICAP 2021). This is critical because entities need to surrender allowances corresponding to their emissions at the end of the compliance period. It is imperative to ensure high-quality verification and transparency at the entity level at this stage.
- **Complementary policies:** An ETS works best in a policy ecosystem that supports a competitive carbon price along with providing incentives for the covered and uncovered sectors to reduce emissions. Complementary policies enable the ETS to function more efficiently by providing enabling infrastructure, market certainty, and incentives for innovation, while reducing the disproportionate and regressive impact of a carbon price. An ETS system does not cover 100 per cent of emissions. The coverage is limited to large point sources as the administrative cost of monitoring emissions from small and dispersed sources is huge. The EU-ETS, for example, covers 45 per cent of the

2. For example, under the EU-ETS the auctioning of allowances has generated approximately \$120 billion of revenue. A key challenge and opportunity in Asia to achieve high levels of auction revenue is implementing mechanisms to pass-through carbon costs to wholesale and retail electricity prices.

EU's GHG emissions, while the Korean ETS covers almost 73 per cent of Korea's GHG emissions. The extent of emissions covered under the ETS depends on the structure of the economy, the sectoral profile of emissions, and the share of large versus small industrial units in the economy, among other aspects. India's power sector emissions currently account for 50 per cent of India's CO<sub>2</sub>e emissions, and the industrial sector accounts for almost a quarter of India's emissions. After accounting for the micro, small, and medium enterprises (MSMEs), it is possible that India's ETS could account for over 50 per cent of India's carbon dioxide emissions (the share in overall GHG emissions will be lower). The other 50 per cent will have to be mitigated through dedicated and complementary sectoral policies. These could be in the form of labelling and standards of energy-efficient equipment, capital subsidies for electric vehicles, etc. Additionally, complementary policies like Renewable Purchase Obligations (RPO) and feed-in-tariff can also interact with the ETS and help enhance its efficiency. In addition, there can be policies for sectors covered within the ETS as well for, say, encouraging innovation or other critical policy targets. While ETS could be one important and central instrument to achieve long-term decarbonisation goals, the importance of complementary policies can't be emphasised enough (IEA 2022).

- **Indicator for success:** One of the most debated variables in an ETS system, arguably, is the carbon price. There are many market participants, especially financial institutions, for whom this variable is probably the most important (Narassimhan, Gallagher, Koester, and Alejo 2017). From the regulator's point of view, the success of an ETS system depends on whether it is able to control the combined emissions of the regulated entities to the given cap as decided and communicated by the regulator. The ETS is a means to an end, which is emissions mitigation. The carbon price is important as a driver for low-carbon action and to avoid lock-in of high-carbon assets, which is why the EU took action to implement the Market Stability Reserve to address historically low carbon prices under the EU-ETS.

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## Understanding an emission allowance

An emission allowance is a 'right to emit' within an ETS cap-and-trade mechanism imposed by the central authority. As in the case of carbon credit, an allowance is also one tonne of CO<sub>2</sub>e. However, allowances and credits are completely different in nature. While the sites of generation of credits and where they are used as an offset differ, an allowance must be used within the entity's boundary or sold if the entity's emissions are less than the allowances it has purchased from the regulator.

Allowances are a part of the compliance market mostly aligned with jurisdictional nationally determined contributions (NDC). The effectiveness and environmental integrity of allowances depend on the cap's stringency and effective sanctions against non-compliance.

## 2.3 Price discovery process

Price discovery in an ETS is a function of the demand and supply of emission permits at the jurisdictional level. There can be reasons for fluctuations in the demand and supply of carbon credits.

### Price discovery in ETS

Both supply and demand can fluctuate due to macroeconomic developments, technological progress or policy changes. While the supply of permits depends on the cap's stringency, the demand can vary based on economic growth trajectory and technology development. For example, an economic recession implies that goods production and associated emission will be low due to reduced demands for goods and services, consequently leading to reduced demand for emission reduction (European Commission 2010). The reduced demand for emission reduction leads to downward pressure on prices within an ETS. Technology cost trends also have a significant influence on the price. The rapidly declining cost of renewable energy would imply that mitigation in the power sector would become cheaper. It would be thus more likely that power sector companies will invest in-house in renewable energy to reduce emissions rather than buy emission reduction credits/allowances from the market, putting downward pressure on carbon prices in the ETS. Ultimately, macro factors and technology cost trends play a huge role in determining the price of carbon within the ETS system (IEA 2022).

## Price discovery in the offset market

As against the ETS, price discovery in the *compliance-driven* offset system could be based either on a business-to-business pre-purchase agreement or in the spot market. The project-based vehicle provides an opportunity for the project developer to scout for buyers while the project is being conceptualised or developed and enter into an agreement with them at a pre-determined price. Such an approach eliminates any future price risk for both the buyer and the seller.

The offset system in the *voluntary* market offers an additional feature as compared to the compliance-driven offset market. While a carbon credit in the latter strictly means a tonne of carbon dioxide reduction, in the former, there could be some differentiation based on the kind of project and the sustainable development benefit the project offers (Trove Research 2022). Credits in the offset system in a voluntary market are heterogeneous in nature. The price of the credit depends on the type of project—renewable energy, energy efficiency, nature-based solutions, etc.—it has been generated from. Some credits, like afforestation-based credits that help in biodiversity conservation and the livelihood of local communities, could charge a premium in the voluntary market. The demand for voluntary credits also comes from voluntary buyers—individuals and corporations—to offset their emissions and demonstrate sustainability initiatives to their stakeholders. As in the case of a project-based compliance system, the basic price of emission-reduction credits under a voluntary market could be based on either a business-to-business pre-

purchase agreement or could happen in the spot market for voluntary emission-reduction credits (Trove Research 2022).

The initial issuance of allowances and credits by the regulatory authority forms the primary carbon market. These credits and allowances are then traded between entities in the spot market facilitated by brokers or traded at an exchange. This forms the secondary carbon market. For trading at an exchange, prior standardisation of contracts is required. However, in over-the-counter (OTC) transactions facilitated by brokers, parties have more freedom to negotiate the price and volume of the units being traded. OTC transactions are also more opaque in nature because the details of the transactions are not published anywhere. Another component of carbon markets is the derivative market which consists of financial instruments like futures and options contracts. These contracts help hedge credit and emission allowance risks (Betz et al. 2022).

## 3. United Nations and carbon markets—a brief history

In 1997, the Kyoto Protocol to UNFCCC introduced three market-based mechanisms at the global level. Subsequently, Article 6 was brought through Paris Agreement. A brief about these instruments is provided below.

**Table 1** Differences between offset-based and ETS mechanisms

Offset-based scheme	Emissions trading scheme
Baseline and credit system where emission reductions or removals compared to baseline generates tradeable credits	Allocated tradeable allowances, which allow holders to emit a specific quantity of emissions
Units are credits and are generated ex-post after verification (and certification)	Units are allowances and allocated/auctioned ex-ante to regulated entities
Credits are heterogeneous in nature	Allowances are homogeneous at a jurisdictional level
Wide participation in unit generation and trade—project developer, verifier, wide range of buyers	Tradeable surplus of units can only be created and traded between regulated entities
System needs to be integrated and linked to other types of policies such as an ETS system or carbon tax, or to corporate or individual voluntary mitigation targets	System needs implementation by the authorities but works on its own design
Examples: Clean Development Mechanism, Joint Implementation, the Article 6.4 Mechanism under the Paris Agreement, Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), Voluntary carbon standards (e.g., Gold Standard, Verra)	Examples: Subnational, national, and supranational emissions trading systems (such as the Californian, the Swiss, or the South Korean systems, or the EU-ETS), International emissions trading under Article 17 of the Kyoto Protocol

Source: Adapted from (Parappurathu et al. 2018)

### 3.1 Kyoto Protocol—CDM, JI and IETS

The market-based instruments introduced through Kyoto Protocol were: Clean Development Mechanism (CDM), Joint Implementation (JI), and International Emission Trading (IET). Of the three mechanisms, CDM and JI are offset mechanisms. CDM helped finance emission reduction projects in non-Annex I countries which did not have emission-reduction targets under the Kyoto Protocol. The CDM projects generated Certified Emission Reductions (CERs, another nomenclature for carbon credits) bought by the Annex B countries (essentially developed countries) and counted against their emission-reduction targets. However, JI projects were developed in Annex B countries, and the units generated were called Emission Reduction Units (ERUs, another nomenclature for carbon credits). There are two forms of JI projects: Track 1 and Track 2. Track 1 projects are not subject to international oversight, but Track 2 projects are. Additionally, IET allows Annex B countries to trade the unused Assigned Allowance Units (AAUs), the total assigned amount of GHG that each Annex B country was allowed to emit during the Kyoto Protocol's first commitment period (2008–12) (Betz et al. 2022).

### 3.2 Paris Agreement: carbon markets under Article 6

Similar market mechanisms were negotiated and agreed upon under Article 6 of the 2015 Paris Agreement at COP26 in 2021. Article 6.2 allows for direct bilateral cooperation, which may include the linking of national, subnational, and supranational ETSs and the trading of Internationally Transferred Mitigation Outcomes (ITMOs) in a way comparable to IET and to JI Track 1 projects. Each authorised ITMO under Article 6.2 will be subjected to the corresponding adjustment to avoid double counting. Corresponding adjustment means that upon the transfer of the ITMO, the host country which carried out the emission mitigation activity will not account for emission reduction in its NDC. Emission reduction will be accounted for by the country that bought the ITMO. Under Article 6.2, countries can choose to become either buyers or sellers of ITMOs in pursuit of achieving their NDCs.

Article 6.4 of the Paris Agreement is a multilateral baseline-and-credit system similar to CDM and JI Track 2 projects. Article 6.4 will have more stringent methodologies for determining additionality and conservative baselines compared to CDM projects. The existing CDM projects can transition to the Article 6.4

mechanism if they have an active crediting period. The rules and methodologies of Article 6.4 are yet to be designed. In the recent COP27, there was no significant decision on Article 6.4; therefore, it appears that the mechanism will take longer to come into force.

## 4. Other market-based instruments in India and recent developments

India has experience in implementing market-based instruments to enhance energy efficiency and promote the uptake of renewable energy. The existing market-based instruments in Indian jurisdiction are discussed in this section.

### 4.1 Energy saving certificates: Perform, Achieve and Trade (PAT) scheme

Under the National Mission for Enhanced Energy Efficiency (NMEEE), as outlined in the National Action Plan on Climate Change (NAPCC), the BEE launched the Perform, Achieve, and Trade (PAT) scheme. The PAT scheme aims to enhance industrial energy efficiency in India by specifying energy-saving targets and enabling the trading of energy-saving certificates. The scheme was announced in 2008 and was implemented in 2012. The PAT scheme is an entity-based model of setting targets for energy efficiency. In this scheme, the metric to calculate baseline and target energy efficiency is SEC (specific energy consumption), which is defined as:

**SEC = Net energy input into the designated consumer (DC) boundary / Total quantity of output exported from the DC boundary**

SEC is expressed in terms of a metric ton of oil equivalent per unit of product.

Under the PAT scheme, energy consumption norms and standards are specific to each DC (entity) and are decided after a thorough audit of the site. In case an audit is not possible, norms and standards for a DC are decided based on the average rate of reduction of SEC across different sectors or a policy objective for reduction of SEC. Detailed methodologies to calculate energy consumption and SEC for each sector have been provided in the PAT policy document developed by the BEE. At the end of the PAT cycle (three years), ESCerts are provided to DCs.

India has experience in implementing market-based instruments to enhance energy efficiency and promote the uptake of renewable energy.

**The number of ESCerts provided = (SEC notified for the target year - SEC achieved in the target year) \* Production in the baseline year**

If a DC fails to achieve its SEC target, it has to buy ESCerts from a DC that has outperformed to fulfil the target. The trading happens on the platforms provided by Indian Energy Exchange (IEX) and Power Exchange India Limited (PXIL).

### 4.2 Renewable energy certificates trading scheme

Renewable Purchase Obligations (RPOs) mandate a specific percentage of renewable energy share of power generation to be achieved by the Indian states. The Renewable Energy Certificate (REC) trading scheme, launched in 2010, is a nationwide market for trading renewable energy certificates between Indian states to fulfil their RPOs. A REC is measured in terms of megawatt-hours (MWh) of renewable electricity produced. The Central Electricity Regulatory Commission (CERC) provides a dedicated institutional architecture to issue RECs to generating companies, who can trade these on approved dedicated trading platforms like IEE and PXIL (Indian Energy Exchange 2022). The RPO scheme allows states that do not have significant renewable potential to still have RE in their procurement portfolio by buying RECs from developers in states with higher renewable energy potential.

### 4.3 Planned evolution of the existing PAT scheme into an ETS

Early in 2022, the BEE published a white paper with a detailed phase-wise plan for moving from a PAT system to an ETS. This plan has been designed in three phases:

**1. Phase 1: Increasing demand in the voluntary carbon market (short term)**

This phase proposes to open the Indian voluntary markets to voluntary buyers in addition to the existing DCs. In this, the fungibility of ESCerts and RECs will be worked on and will be traded as carbon offsets.

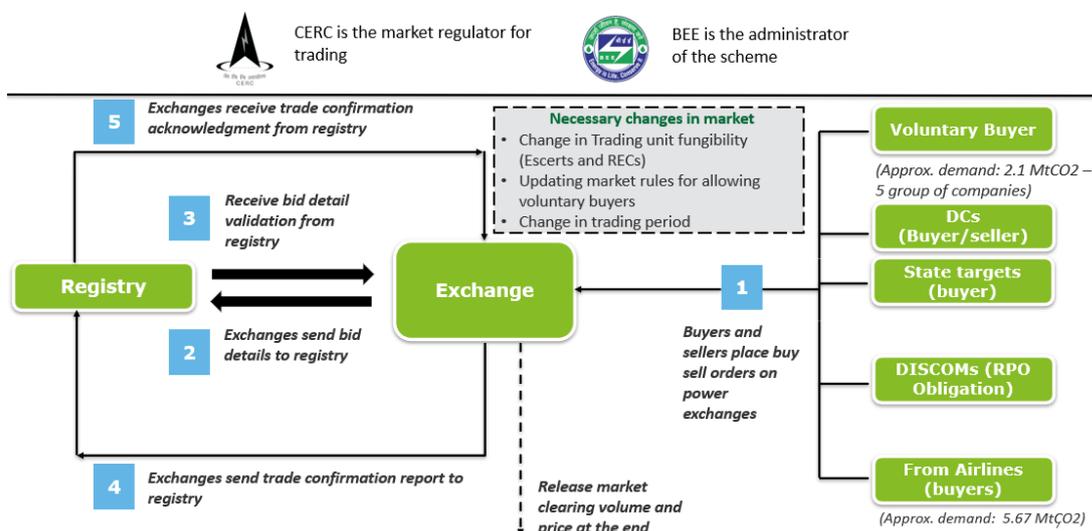
**2. Phase 2: Increasing supply in the voluntary carbon market (medium term)**

In this phase, it is proposed that the voluntary carbon market will open to sellers other than the DCs. As part of the proposal, a thorough process will be enacted to issue carbon credits to the sellers, which can then be traded.

**3. Phase 3: Moving to an ETS (long term)**

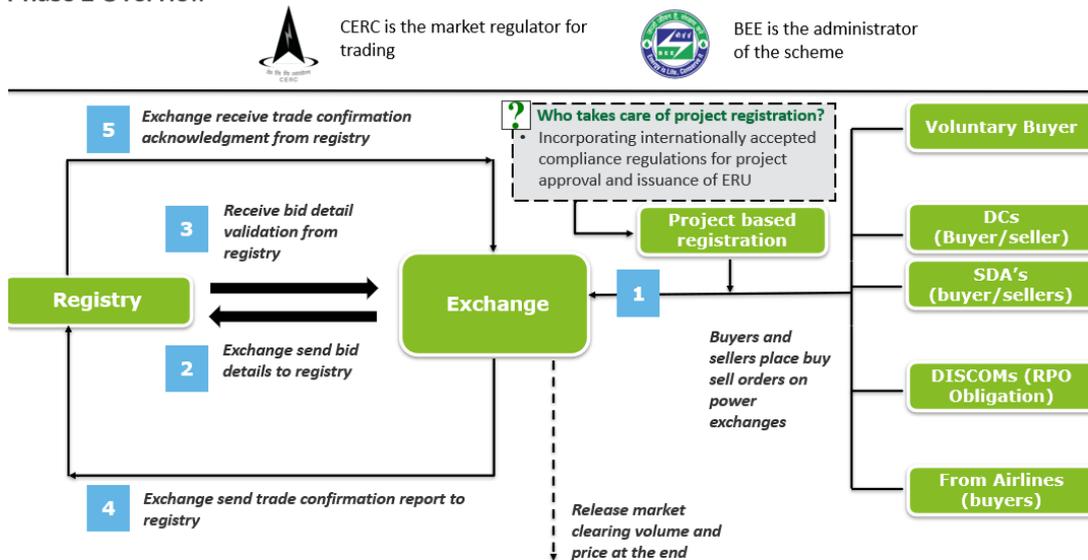
For the third phase, it is proposed that the system will eventually evolve into an ETS system wherein “an entity-specific GHG-emissions intensity factor is determined (e.g. t CO<sub>2</sub>/MWh electricity output, or t CO<sub>2</sub>/t aluminium) for the current situation. Then, the expected sectoral growth for the next years will be used to determine ‘business as usual (BAU) emissions’ for the first crediting period of the scheme as a preliminary reference. In order to achieve alignment with the Indian NDC, an NDC-alignment coefficient (NAC) will be introduced”.

Figure 4 Phase 1 Overview



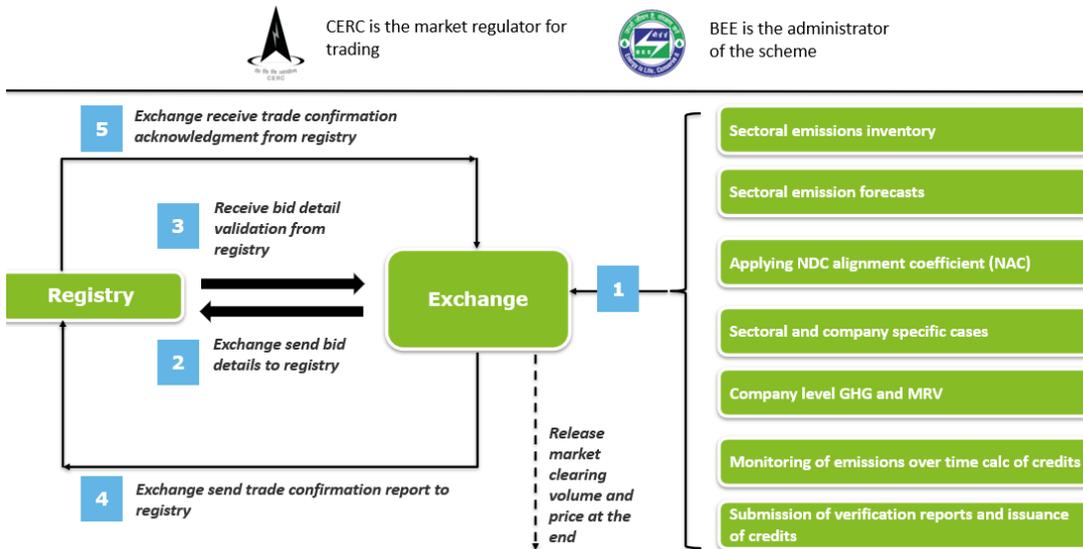
Source: BEE 2022

Figure 5 Phase 2 Overview



Source: BEE 2022

Figure 6 Phase 3 Overview



Source: BEE 2022

### 4.4 Key developments communicated at the stakeholder consultation meeting organised by the BEE

The BEE conducted a stakeholder consultation on 19 October 2022 to get inputs on a draft policy paper on the Indian Carbon Market (ICM). In this policy paper, the proposed three-phase transition in the white paper published by the BEE earlier in 2022 has been changed to a two-phased transition. The first two phases suggested earlier have been merged into one phase.

The ICM will comprise carbon credits certificates (CCC) as a tradeable commodity, with each CCC equal to one tonne of CO<sub>2</sub>e. CCC can further be divided into

Converted CCC (C-CCC), Mandatory CCC (M-CCC), and Offset CCC (O-CCC).

The ESCerts, RECs and surplus CDM credits will be converted to carbon credits or offsets as C-CCC. The obligated entities under the ETS mechanism will generate and trade M-CCC, and the O-CCC will be generated as part of the offset scheme under the ICM.

The first transition phase (2023-25) will focus on the fungibility of ESCerts and RECs into offsets and will be available to be bought from non-obliged entities. Entities with surplus ESCerts and RECs can choose to convert them into C-CCC. Based on fuel mix and principles of additionality and conservativeness, an entity-specific conversion factor will be calculated for the conversion

of surplus ESCerts into offsets. In the first phase, the PAT scheme will be in force, and along with the development of the offset market, the Monitoring, Reporting and Verification (MRV) guidelines, setup of registry, and a comprehensive governance structure for both offset and compliance market will be developed in consultation with the relevant stakeholders.

In the second phase (2026 onwards), it is proposed that a fully functional national ETS will be launched with sectors and entities that are already part of the PAT scheme. The obligated entities will be given a GHG emission intensity target (tCO<sub>2</sub>e/t product) and will be allocated M-CCC accordingly. Based on their performance on emission intensity, the entities will choose to abate or trade emissions.

## 5. Issues identified at the stakeholder discussion

CEEW curated a discussion with industry stakeholders on the implications of India's domestic carbon markets for the voluntary carbon market, international carbon market and alternative market-based instruments in India<sup>3</sup>. This section outlines the key insights from the discussion:

### 5.1 The Indian experience is entirely about the project-based/offset approach

As highlighted in Section 2, broadly speaking, there are two alternative approaches to markets—one is offsets (project-based), and the other is ETS. The BEE white paper and policy paper envisages an eventual evolution of the PAT scheme into an ETS. Indian stakeholders across the private sector and civil society have an extensive experience in the project-based approach, be it through the compliance market (CDM) or the voluntary market. On the other hand, there is negligible knowledge and understanding of how the ETS system works in practice. This has important implications as market participants view any announcement related to carbon markets through the 'offsets' approach rather than an ETS approach.

### 5.2 Need for a sustained and deep engagement on the ETS approach

A follow-up to the point highlighted above is that there needs to be a sustained engagement between the government, private sector and civil society on issues related to theoretical and operational aspects of an ETS for them to be better prepared and have a nuanced understanding of various issues related to an ETS. It is in everyone's interest to ensure that the design of ETS is aligned with the realities of the country and that it incorporates learning from various forms of ETS systems being implemented in Asia and across the world. A deeper knowledge of this system is imperative for Indian stakeholders to look and think beyond the *offset* approach that they are most familiar with.

### 5.3 An India-specific taxonomy for various types of carbon credits

In the global carbon debate, carbon credits are given different names: certified emission reduction (CER) in the CDM market, emission reduction unit (ERU) in the JI market, allowance in the EU-ETS, and so on. As Indian stakeholders have experience related to the offset market approach, carbon credits is the term most commonly used in India and is used to define emission reduction or removal units of various forms. However, in the latest communication, the BEE has outlined three different types of carbon credit certificates: C-CCC, M-CCC and O-CCC. Additionally, there are still provisions in the document that some credits will be only traded domestically, some credits will be traded internationally, and they will have to undergo scrutiny through different methodologies with no specific taxonomy. It would be useful to clearly define and name different kinds of credits in the Indian market so that communication between various stakeholders is clear. A taxonomy of emission mitigation units in compliance and voluntary markets within India would be very useful for domestic stakeholders.

**Indian stakeholders across the private sector and civil society have an extensive experience in the project-based approach, be it through the compliance market (CDM) or the voluntary market.**

3. Please refer to Annexure 1 for the list of participants of the stakeholder discussion.

## 5.4 Scope for clarifying the meaning of 'voluntary' in the carbon markets discourse

The amendment to the *Energy Conservation Act, 2001* and the policy paper proposes to create a 'voluntary' carbon credit market where carbon credits will be issued by an agency authorised by the government and will be sold to voluntary buyers, including organisations and individuals. Voluntary buyers can also buy ESCerts in the market. This has created some confusion among market participants, as there already exists a thriving voluntary market, that is truly voluntary in the sense that there is no government intervention in this market, and the demand, supply, and verification of these credits are all undertaken in the private sector. Introducing the term 'voluntary' in a scheme that will be administered by the government is understandable and sensible as market participants should not be forced in the initial stages before they understand how the market will function in practice. The government, however, should clarify that there is no linkage of the government-administered 'voluntary' market with the existing voluntary market driven by the private sector.

## 5.5 The fungibility issue: Exploring alternative approaches for settling ESCerts and RECs

Among the biggest challenges of the existing PAT scheme and the REC scheme are the shortage of demand for ESCerts and RECs in the market. Oversupply has led to a crash in the prices of RECs and ESCerts. The proposed carbon credit market aims at creating a demand for ESCerts and RECs, which is laudable. It is expected that in due course, the rules governing the fungibility of ESCerts and RECs to carbon credits will be finalised, and conversion will begin a post that. This approach, however, does not necessarily mean new and additional carbon emissions reduction. The last phase of the proposed market which will be an ETS, would not be an organic evolution from the initial phase mainly due to the fungibility issue. Providing value to companies with an unsold inventory of ESCerts and RECs is critical, but involving these in a carbon market could be complex and create confusion as far as the long-term ETS market design is concerned. It would be useful to explore alternative ways to address this. For example, when the government introduces auctioning, it could use some of the revenue proceeds to settle unsold CERs and ESCerts. This would allow for a simpler design for ETS from the beginning itself. Furthermore, an ETS

Providing value to companies with an unsold inventory of ESCerts and RECs is critical, but involving these in a carbon market could be complex and create confusion as far as the long-term ETS market design is concerned.

design using benchmark-based allocation would reward the best performers under the PAT scheme that have surplus unsold ESCerts as they would get a greater share of free allowances in an ETS compared to their actual emissions, and would benefit financially by having less need to buy allowances and greater potential to sell.

## 5.6 Domestic carbon market might not be a channel for international finance unless it is linked with other similar international emission trading schemes, but it would be a good source of domestic finance

India has historically been the seller of carbon credits through the CDM route. Along with this channel, the private sector-driven voluntary carbon market has also been a driver of climate finance in India. The voluntary suppliers of credits have received finance from both international companies as well as Indian companies. Ultimately, all these are offset systems. The ETS approach is fundamentally different, as the focus is on the end goal of cost-effective domestic GHG mitigation. Participants in the ETS system are trading among themselves to achieve a collective emissions cap in a cost-effective manner. Money for purchasing credits is hence flowing from one participant in the domestic ETS to the other. The only way to ensure that there is a flow of foreign money to fund India's mitigation actions is if India's ETS is linked (as a seller) to global ETSs like the EU-ETS. In the absence of that, only the UNFCCC-based (e.g., Article 6-related carbon markets) or the voluntary actions-driven markets would be a source of international climate finance for Indian companies. Notwithstanding this, an important aspect of an ETS is that it can provide an opportunity to generate a significant amount of domestic finance from auction revenue which can play a key role in financing the net-zero transition for the energy-intensive industry and power sectors, similar to the experience in the EU, while also protecting vulnerable stakeholder groups from increases in energy prices.

## 5.7 All three alternative forms of carbon markets—UNFCCC-based, voluntary, and India's domestic ETS—could eventually co-exist in the long term

The UNFCCC-based market would stay in some form or the other. Also, it is important for the private sector-driven voluntary market to stay so that more ambitious actions (beyond what is necessary due to regulation) in the private sector can be driven through this market. Both these would be sources of finance for companies through offset (project-based) related investments. In addition to these, an ETS will serve as a key instrument for achieving country-level decarbonisation targets. All these three alternative forms of the market have the potential to deliver international finance as well as achieve India's domestic mitigation targets. It is important to understand how a balance should be created between these three alternative market designs to flourish in India.

## 6. Recommendation

The announcement of the setting up of a carbon credit trading scheme by the Government of India is a path-breaking one. Based on stakeholder discussions, the key recommendation our assessment makes is that India should align the initial phase of the transition process with the development of an ETS similar to various other ETSs prevalent in Asia and around the world like the EU-ETS and Korean ETS. The Indian government should not intervene in the voluntary offset carbon market and let it function efficiently and independently. However, India's compliance market, i.e., the ETS should reflect its national circumstances and economic structure while learning from the experiences of other ETS systems around the world. Indian stakeholders should view the domestic ETS as an instrument for decarbonisation and domestic climate finance rather than international climate finance. Ideally, the process for setting up the same should be a clean and simple process and avoid the pitfalls of fungibility-related issues that could confuse market participants. There should be enough time given to market participants and regulators to understand the operational nature of the ETS through a pilot phase. To achieve success, it is imperative that we start by clarifying all necessary concepts and bring all the stakeholders to par with an evolved understanding of alternative forms of the market, which is also the motivation behind this issue brief.

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## Annexure

**Table A1** List of participants in the stakeholder meeting conducted on 6 September, 2022 at the CEEW office.

S.No	Name	Organisation	Designation
1	Aparna Sawhney	JNU	Professor
2	Deepak Gupta	Renew Power	Vice President
3	Manish Dabkara	Enking International	CEO
4	Sandeep Roy Choudhury	VNV Advisory	Director
5	Shikhar Jain	Confederation of Indian Industry (CII)	Deputy Head, CESD
6	Anupam Badola	Dalmia Cement (Bharat) Ltd	Assistant General Manager
7	Vikash Kumar	NTPC Ltd	Manager (SD)
8	Gaurav Sarup	Vedanta	Director, ESG
9	Rohit Mukund Nanoty	Vedanta	Sustainability Manager
10	Prasanth V. Regy	NITI Aayog	Consultant (Public Policy)
11	Prabhajit Kumar Sarkar	PXIL	MD & CEO
12	Anil Kumar Jain	JK Cement	Head of Environment & Sustainability
13	Syed Zeeshan Ali	International Financial Services Centres Authority	Deputy General Manager
14	Swaroop Banerjee	JSW Cement Limited	VP Sustainability
15	Alistair Ritchie	ASPI	Director
16	Rohit Jain	Tata Motors	Deputy General Manager
17	Pinaki Dasgupta	ASSOCHAM	Senior Consultant
18	Rohit Kumar	EKI	Vice President
19	Samrat Sengupta	EKI	Vice President
20	Diksha Gairola	CII	Associate Counsellor
21	Anil Kale	PXIL	Senior Manager

Source: Authors' compilation

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