



Building the Indian Carbon Market: A Work in Progress

1. Introduction

India, like many Paris Agreement signatories, is in the process of establishing domestic regulations and procedures to operate a carbon market.¹ Under the Kyoto Protocol, emission reductions were only used by the developed country buyer to achieve a climate change mitigation target and not by the country hosting the mitigation project. The global context for carbon markets has vastly changed: while the Kyoto Protocol required only developed countries to reduce emissions, the Paris Agreement recognized that climate change is a shared problem and called on all countries to set emission targets through nationally determined contributions (NDCs).

The new NDC context, where many large developing countries have also taken on emission reduction targets, poses important challenges. Specifically, there may be competing interests around the role that offsetting emissions across borders can play in the future. This is particularly relevant for large developing economies with ambitious NDC targets of their own—such as India—where a substantial share of mitigation actions will be funded with the country's own public and private resources. More clarity is needed on whether and how voluntary purchasing and cross-border retirement of carbon credits fits into this new global framework. The link between international climate finance and cross-border trading of emission reductions also needs to be better understood.

Articles 6.2 and 6.4 of the Paris Agreement provide for new international carbon market mechanisms to contribute to the mitigation of greenhouse gas (GHG) emissions and support sustainable development.² India is focused on establishing a domestic market first and identifying limited conditions under which trade can take place. This is a mammoth undertaking. A major challenge for India, as well as for other developing countries, will be to evaluate the trade-off from selling carbon credits against the costs of reducing its own emissions in terms of achieving its NDC objectives.

Decision-makers in India have announced that their priority is to use domestic resources to fund a domestic carbon market to support the country's NDC targets, mainly using mature technologies. Trading in emission reductions will not be part of this domestic market.³ The Government of India

¹ A draft paper for public comments on the carbon market governance structure was issued by the Ministry of Power on 28 March 2023 (<https://powerline.net.in/wp-content/uploads/2023/03/Mail-dated-27-03-2023-to-Industry-Association-reg-CCTS.pdf>). Detailed regulations for this governance arrangement will be specified in the coming months.

² Article 6.2 sets robust accounting rules for the bilateral trade of emission reduction units between parties. Article 6.4 provides a more centralized mechanism, with a structured framework for parties willing to engage in international carbon markets, but initially with limited country frameworks.

³ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/082922-indian-ban-on-carbon-credit-exports-could-damage-global-market-industry-players>

proposes to strictly limit cross-border selling of credits if a non-Indian entity would claim those carbon credits. Such cross-border sales can occur only when new, cutting-edge technologies with accompanying finance are brought to India by the project sponsor and are deployed in the associated mitigation investment. The Government of Indonesia has taken a similar position⁴ in banning exports of carbon credits though recently the government has decided to allow foreign entities to purchase credits in the Indonesian carbon market. Indian private sector carbon credit market-makers fear there may be insufficient domestic demand from local buyers.

However, the Government of India is confident that it will create adequate incentives in the domestic market (for example, through government procurement from carbon-neutral suppliers) so that the NDC targets can be reached in time and that it will be able to quickly transition to a domestic carbon market. This confidence stems from India's more than 20 years of experience with a domestic compliance market for large energy consumers (designated consumers, or DCs), which has traded Energy Saving Certificates (ESCCerts) since 2001.⁵ The country also has over a decade of experience with another compliance market for domestically tradeable renewable energy certificates (RECs).⁶ An important feature of the future Indian carbon market (ICM) is that it will be in part a transition from these two existing frameworks to a broader market-based mechanism, for which the current units will be converted to the equivalent tonnes of CO₂ emissions (from the current tonnes of oil equivalent and megawatt-hours).

What is involved for India and other countries in the transition to Article 6 as well as the establishment of a domestic carbon market that will operate in parallel? First, a major institution-building element and a significant capacity-building effort will likely be required in each country. Each carbon market framework will require, at a minimum, a suitable national carbon registry (or 'meta-registry') that is interoperable with registries of other countries as well as with multilateral and supranational carbon registries. The countries will also need to put in place adequate monitoring, reporting, and verification (MRV) facilities for grassroots verification and validation advice on methodology, as well as arrangements for recording the corresponding adjustments in the national registry to avoid double counting of traded credits.⁷ These are some of the mechanisms that will allow a country to participate in the post-Kyoto Protocol carbon market.

Clearly, a substantial analytical and capacity-strengthening effort will help governments understand the volume and nature of projects needed for their own NDC targets. This will be helpful in assessing whether, or for how long, a ban on trading is necessary. Institutional strengthening through the tightening and better enforcement of existing domestic regulations (on pollution control, transportation of hazardous materials, or deforestation etc.) may also be required. The regulations are often perfectly adequate but remain unenforced due to weaknesses in state and local government administrative capacity or constraints on staffing or budget. This is particularly observed in areas such as pollution control or forest protection. The lowest hanging fruit is to first enforce the regulations already in place to minimize failures that lead to excessive GHG emissions. In this respect, transitioning to Article 6 poses a large institutional challenge for many developing countries. The required capacity-building efforts at the local level have not yet been adequately resourced and identified.

⁴ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/040722-carbon-credit-issuances-from-indonesia-on-hold-developers-await-clarity> and <https://carboncredits.com/restrictions-indonesia-png-may-cut-forest-carbon-credits>

⁵ <https://pib.gov.in/PressReleasePage.aspx?PRID=1747407>

⁶ [https://www.recregistryindia.nic.in/pdf/Others/Analysis of Indian Renewable Energy Certificate \(REC\) Market.pdf](https://www.recregistryindia.nic.in/pdf/Others/Analysis%20of%20Indian%20Renewable%20Energy%20Certificate%20(REC)%20Market.pdf)

⁷ Some low- and middle-income countries that have few options but to outsource this entire market-building activity to foreign consultants are finding that the MRV cost becomes prohibitive. Using expensive consultants for each step does not permit the carbon market to take off since it becomes unaffordable and/or unattractive for any voluntary emission reduction project to be certified. The low prevailing global carbon prices, particularly in the voluntary offset market, do not support outsourced MRV and market operations such as accurate maintenance of the national registry with timely entry of corresponding adjustments. This failure to account for institutional weaknesses in many low-income countries is likely to become an obstacle for the timely implementation of Article 6 in many parts of the developing world.

The first requirement in India was to obtain authorization from parliament to establish a carbon market. New legislation was passed in 2022 to amend the Energy Conservation Act (ECA) of 2001 and create a broader set of legal powers for the government to support its climate goals and the NDCs in particular. It is expected that the enacted amendments to the ECA⁸ will accelerate progress on decarbonization of the Indian economy and enable it to meet the country's NDC commitments to (i) reduce the carbon emission intensity of its gross domestic product (GDP) by 45 per cent by 2030 from 2005 levels and (ii) achieve about 50 per cent cumulative electric power installed capacity from non-fossil-fuel-based energy resources by 2030. The amended provisions in the updated ECA, which came into force on 1 January 2023, support India's climate goals in several ways:

- They enable the central government to impose the use of non-fossil fuels on large energy consumers.
- They enable the central government to implement a carbon trading scheme.
- They confer powers on the central government and state governments to mandate energy conservation standards for buildings, appliances, and vehicles. Previously only large buildings with over 500 kW connected load were subject to energy conservation standards, but now medium-sized buildings with loads of 100 kW and higher must comply.
- They empower the state electricity regulatory commissions to impose penalties, and they specify procedures under which the commissions should discharge their functions. This is likely to increase the prospect of regulatory enforcement by the commissions.
- They expand the governing council of the Ministry of Power's Bureau of Energy Efficiency (BEE) to include members from six ministries, departments, and regulatory institutions and members from industries and consumer groups. This will improve cross-sectoral coordination and potentially enable joint design of the carbon registry.

This paper examines in detail only one of the ECA amendments listed above, which is the new power to proceed with developing a carbon trading scheme. Rules and procedures for this newest trading scheme in the Indian energy market are currently being worked out, and details will be announced during 2023. For now, the BEE's effort is primarily to build the domestic ICM over the next three years, to enable the country to fulfil its NDCs. This paper showcases some of the early thinking that has been shared as work in progress by the agencies and ministries that will be responsible for domestic carbon market design, governance, and oversight.

2. Context and Recent Developments of the Indian Carbon Market

The emission intensity of India's GDP has been falling over time,⁹ despite relatively fast economic growth. However, to accelerate the transition to a low-carbon economy, the government's policy document¹⁰ for stakeholder consultation suggests that India needs an additional tool at its disposal: the establishment of a domestic carbon market. Specifically, the government believes that it should prioritize adoption of a strategy to develop a domestic carbon market focused on meeting the country's NDCs. If emissions are to be reduced at an accelerated rate relative to what has already been achieved

⁸ Amendments to the ECA are found here: <https://egazette.nic.in/WriteReadData/2022/241246.pdf>. The original ECA is found here: <https://legislative.gov.in/sites/default/files/A2001-52.pdf>. (Chapter V Paragraph 14A of the original Act, which referred previously only to ESCerts, has now been amended to include carbon certificates.)

⁹ See second-to-last paragraph of this press release issued by the government stating a 24 per cent reduction in emission intensity between 2005 and 2016: <https://pib.gov.in/PressReleasePage.aspx?PRID=1885731>. See page 23 of the UN Energy Compacts *Annual Progress Report 2022* for details on how emission intensity was reduced in India

¹⁰ Bureau of Energy Efficiency (2022), *Policy Paper on Indian Carbon Market (ICM)*, Government of India.

without a carbon market, the government believes it needs full control and visibility over mitigation investments, actions, funding, and the emission reduction progress being achieved.¹¹

Indian policymakers frequently state in informal interviews that a major trust deficit lingers after the debacle of the Clean Development Mechanism (CDM) in 2012, where millions of Indian certified emission reductions (CERs) lost their value overnight due to the decision of European buyers to stop purchasing from India and other countries, without consultation. Hence, Indian government officials have no appetite to enter such arrangements again immediately. They will keep a carve-out only where there is a clear benefit for India. Internationally transferred mitigation outcomes and other activities requiring corresponding adjustments will go on the back burner for now (other than in the specific circumstances that have been indicated—for example, cutting-edge mitigation, carbon removal technology, or green ammonia production—and the accompanying international finance). All NDC-supporting mitigation actions involving mature technologies, incentivized by a domestic market to mobilize domestic funding, will take priority.

Carbon credits are a familiar concept in India, which used to be the second largest issuer of CERs under the Kyoto Protocol. But in addition to its past contribution to the CDM, India has a long-standing, sophisticated domestic compliance market (Perform, Achieve and Trade, or PAT) for ESCerts and another one (Renewable Purchase Obligation, or RPO) for RECs. The government intends to build the new ICM using its established market-based mechanisms, the PAT scheme and the RPO scheme, as a foundation.

This effort will require transitioning from the existing tradeable certificates for energy efficiency and renewable energy generation, which are expressed in tonnes of oil equivalent and megawatt-hours, respectively, to new carbon certificates expressed in tonnes of CO₂ equivalent. Designing an appropriate MRV methodology, setting up a meta-registry that will be compatible with international registries to record corresponding adjustments when trades take place in future, and adopting professional accreditation protocols for hiring sufficient human resource capacity in terms of verifiers and validators will all be activities needed to prepare for launching the ICM.

A future competitive domestic compliance market for carbon credits involving obligated entities (entities assigned individual GHG mitigation targets), which act as both buyers and sellers, will help ensure that mitigation costs are minimized at plant, sector, and national economy levels. Today, over 1000 of India's largest energy consumers are already obligated entities (or DCs) under the PAT and RPO schemes. The government plans to start by transitioning these consumers to the new compliance carbon market.

In relation to international carbon markets, India is cautious about overselling mitigation outcomes internationally as this may impact the NDC targets due to corresponding adjustments. The approach is to designate carve-outs for allowable activities. Several observers have raised concerns about the signals that such a stance may send to the market.¹² In the future, India's designated authority may announce additional carve-outs based on experience. If so, this would gradually expand the country's participation in the international carbon market created under Article 6 of the Paris Agreement and would likely be linked to attracting finance and technology for additional climate change actions.

¹¹ The government's draft policy document states on page 4 that India was unprepared for the European Union's abrupt unilateral decision in 2012 to purchase certified emission reductions (CERs) only from least developed countries, which caused prices to crash and India's CERs to become worthless: 'The CDM market crashed in 2012, when the EU, through a unilateral decision, decided to give preference to CERs from Least Developed Countries (LDC) for the 2013-2020 period. This resulted in the demand for a majority of the CERs falling, and there were no corresponding domestic markets in developing countries, so the prices fell from the highs of US\$ 20 per CER to less than US\$ 0.5 per CER.' There is evidently no wish to repeat such a scenario of dependency on other decision-makers regarding market rules, and India prefers to independently attempt to develop and manage its own domestic carbon market.

¹² Indian market players who are directly affected by the international trading ban on credits generated from mature technologies, and other observers, have expressed grave concerns about the implications, as indicated in these two articles: <https://www.ecosystemmarketplace.com/articles/a-ban-on-exporting-carbon-credits-and-its-impact-on-the-domestic-carbon-market> and <https://www.verdantix.com/insights/blogs/india-s-ban-on-the-export-of-carbon-credits-what-are-the-implications>.

A first carve-out or exceptional step towards such future participation by India in the international carbon market was signalled in early 2023. India's National Designated Authority for the Implementation of Article 6 of the Paris Agreement (NDAIAPA) is mandated, inter alia, to decide what types of project may take part in the international carbon market under Article 6 mechanisms.¹³ The NDAIAPA's current decision appears to be that, for a carbon credit generated in India to be traded before the NDC is met, India must receive a quid pro quo in the form of a high value-added new technology or a suitably high financial investment.¹⁴ Otherwise, compliance credits generated in India will remain in the country and be counted towards the NDC targets. (This situation is expected to prevail until India has full certainty of achieving its NDC by 2030.)

The first carve-out or exception to the 'no international trading' rule came around six weeks after the ECA amendments took effect on 1 January 2023. On 17 February 2023, the NDAIAPA announced a list of cutting-edge activities potentially eligible for international trading of carbon credits under the Article 6.2 mechanism. The activities, which require technologies that are not yet mature in the Indian market, were announced under three headings: GHG mitigation, alternative materials, and carbon removal activities.¹⁵ Market participants were informed that foreign-funded projects using this list of new technologies (new for India, which lacks experience in the technologies listed) were welcome. Foreign project sponsors and investors would be permitted to own (and repatriate, with a corresponding adjustment) the resultant emission reductions.

Technologies under the GHG mitigation heading of the NDAIAPA list include renewable energy with storage (but only the stored component, since generation is a mature technology), solar thermal power, offshore wind, green hydrogen, compressed biogas, emerging mobility solutions (like fuel cells), high-end technology for energy efficiency, sustainable aviation fuel, use of best available technologies for process improvement in hard-to-abate sectors, tidal energy, ocean thermal energy, ocean salt gradient energy, ocean wave energy, ocean current energy, and high voltage direct current transmission in conjunction with renewable energy projects. The list of activities under the remaining two headings is much shorter: green ammonia received final approval as an alternative material. Carbon capture utilization and storage was categorized as an eligible cutting-edge activity under the carbon removal category.

Foreign investors willing to facilitate transfer of any of these specific emerging technologies and who can mobilize international finance to India to set up such projects will be able to obtain the corresponding carbon credits for their own account under Article 6.

3. The Indian Carbon Market: A Domestic Carbon Market with Very Limited Exceptions

The policy paper for the ICM,¹⁶ released for stakeholder consultation by the BEE, the Ministry of Power, and the Government of India, is an initiative to develop a domestic carbon market in which the emission credits issued to private and public entities will provide incentives for decarbonization measures within many entities across multiple sectors. India's announced intention to substantially prevent exports of carbon credits until its NDCs are met has been explained as follows in the BEE policy paper:

To facilitate the achievement of India's enhanced NDC targets, the Government has initiated the development of a domestic carbon market which will mobilize new mitigation opportunities through demand for emission credits by private and public entities. Carbon Markets are

¹³ <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1900216>.

¹⁴ See the quote in this article about the Government of India's 'smart play' (<https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/022423-indias-cross-border-carbon-credit-list-focused-on-innovative-green-technologies>): 'if you are coming to invest here bring us good technologies that we do not have.' (This viewpoint is also repeated in private conversations with policymakers.)

¹⁵ <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1900216>

¹⁶ https://cer.iitk.ac.in/odf_assets/upload_files/Comments_Carbon_Market_Policy_DocumentFor_Stakeholder_Consultation.pdf

expected to be a vehicle for mobilizing a significant portion of investments required by Indian economy to transition toward low-carbon pathways... To transition quickly to a low carbon economy, this policy document suggests that India should adopt a strategy to develop a domestic carbon market focused on meeting its NDCs. In the future, India may participate in the international carbon market created under Article 6 of the Paris Agreement (PA) to attract finance and technology for additional climate change actions.

As mentioned, India was a prominent participant in the CDM, as the second largest issuer of CERs globally.¹⁷ Indian CERs were generated from projects in the areas of renewable energy, energy efficiency, industrial gases, fuel switching, municipal solid waste, and forestry. About 85–90 per cent of these projects were developed by the private sector. The CDM especially supported the early deployment of large-scale renewable energy technologies, such as solar, wind, small hydro, and biomass. The news that India's upcoming carbon credits resulting from the use of mature (or mainstream) technologies are not eligible to be traded internationally until its NDCs are met has therefore attracted attention and caused some concern among external observers.¹⁸

Segregation or ring-fencing of the ICM, as well as the relationship between the ICM and the international carbon market under Article 6 of the Paris Agreement, is outlined in a series of points in the government's draft policy paper, which includes the selected items below:

- The domestic carbon market would assign GHG reduction targets to so-called "obligated entities" whose participation would be mandatory; the actual GHG reductions achieved, that would form the basis for carbon credit claims, would be carefully and transparently monitored. Likewise, any trades of such credits would be recorded to avoid double counting.
- The domestic market mechanism is distinct from the corresponding international carbon market arrangements under Article 6 of the Paris Agreement and cannot be substituted for the international markets for trading on the Article 6 market mechanisms. Neither can domestic market mechanisms be declared as 'equivalent' under any provision of the Paris Agreement.
- Although carbon credits for trading in the ICM would be issued under domestic arrangements, those for international trading under Article 6 (for example, resulting from advanced technologies invested in Indian projects) would need to be issued as per the international protocols.
- Targets assigned to obligated entities for national compliance would be aligned with the NDC target of decreasing the GHG intensity of the GDP. Any excess GHG mitigation actions above these targets may potentially (with the permission of the NDAIAPA) be eligible for carbon credits under the Article 6 mechanisms, provided the carbon certificates corresponding to such excess mitigation are compliant with the international standards and procedures including those on MRV.¹⁹

¹⁷ Out of a total of 7847 projects registered by the CDM Executive Board, 1686 projects are from India, and around 12.6 per cent (255 million) of CERs issued are to Indian projects.

¹⁸ As mentioned in the previous section, only investors bringing cutting-edge technologies that are not available in India at present will be entitled to the carbon credits generated from their projects located in India. All other emission reductions resulting from familiar or mature technologies will be recorded as part of the target for domestic reduction of GHG intensity by 45 per cent over 2005 levels by 2030.

¹⁹ While the regulations and procedures are yet to be issued, it seems that the administrative authority is seeking a balance between proper verification of emission reductions and avoidance of placing the full cost burden on an individual project. Hence, the preferred approach seems to be sectoral emission reductions. The priority is to retain the verification methodologies of PAT and REC but convert the avoided units to tonnes of CO₂ emissions rather than tonnes of oil equivalent or megawatt-hours. It is very clear that monitoring and verification at the individual project level will not necessarily be consistent with the Paris Agreement requirements. Informal interviews indicate that the Government of India prefers to reduce emissions in the compliance market in a way that does not load the individual project-specific verification costs onto the same entity that is supposed to make the investment in mitigation technology. On 28 March 2023, the government announced the different stakeholders that would be needed to establish the market rules (<https://powerline.net.in/wp-content/uploads/2023/03/Mail->



The BEE policy document, accordingly, distinguishes between two streams of carbon credits: (i) domestic carbon credits and voluntary purchases issued by national authorities, and (ii) carbon credits issued under provisions of the Article 6 rulebook of the Paris Agreement for the international carbon market. Links between the two may be possible, depending on the international rules, subject to approval by the designated national authority.

Specific sectors, such as renewable energy, industrial energy efficiency (already commercialized technologies), and other GHG mitigation projects with a lower cost of carbon, are preferentially reserved for the ICM. Depending on the market conditions in the ICM, the designated national authority may provide permissions (host country approvals) for credits reserved for the domestic market to be supplied to international voluntary markets or, if compliant with the standards, to be supplied to international compliance markets (which would then allow other governments to use these Indian credits to meet their own NDCs).

The ICM's mechanism would evolve along with the framing of the rules under the Article 6 mechanisms²⁰ to ensure the elimination of double counting and the environmental integrity of all credits, whether used in domestic markets or traded internationally.

The stakeholder consultation paper prepared by the BEE,²¹ which will be the administrator of the ICM on behalf of the government, contains the following important text:

The principles that India may consider for allowing credits to be purchased by buyers outside India should be based on India's ability to achieve its emission reduction targets and its climate finance considerations. Below are some of the principles that can be followed:

- **Government and non-government projects:** Any progress made in achieving NDC targets that are sourced through government funds (including public sector enterprises) may be counted as part of the NDC and may not be allowed for international trading. However, private sector-funded initiatives such as agroforestry, social forestry, or renewable and energy-efficiency measures with communities can be considered as 'outside of the NDC' and can be traded internationally. This will ensure that carbon credits generated through the country's initiatives are accounted for in mitigation efforts towards the NDC and are not correspondingly adjusted for the international transfer of mitigation outcomes. For example, it is in India's interest to be able to account for emission reduction from national missions such as the National Mission for Enhanced Energy Efficiency and to apply these towards India's NDC targets.
- **Allowance for new technologies:** Technologies that are not 'business as usual', such as offshore wind, renewable energy with battery storage, green hydrogen, hydrogen fuel cells, clean transport solutions, carbon capture and utilization, and nature-based solutions (in agriculture, land use, and forestry), can be more advantageous under international transfers than under the domestic ICM. These projects can use their credits generated for climate finance from outside India in the initial years. These credits will not be counted against India's NDCs,

[dated-27-03-2023-to-Industry-Association-reg-CCTS.pdf](#)), and prominent among these stakeholders are accredited carbon verifiers (see paras 1 and 7 of the cited document). It is not yet known what procedures will be followed by these agencies. It is a near certainty that a different verification procedure will be followed for credits that will be internationally traded in future than for domestic (ICM) credits.

²⁰ At COP26, parties of the Paris Agreement agreed to operationalize Article 6 in its two forms either under a bilateral trading framework under Article 6.2 or via a centralized framework, supervised by the UNFCCC (United Nations Framework Convention on Climate Change), under Article 6.4. While taking different forms, both mechanisms are designed to ensure the highest level of environmental integrity and avoid double counting, requiring among other things the set-up of specific registries and the standardization of units. For more details on Article 6 and its broader implications for voluntary carbon markets, see Fattouh, B. and Maino, A. (2022), '[Article 6 and Voluntary Carbon Markets](#)', Oxford Institute for Energy Studies. For more recent developments of Article 6 post-COP27, see: Oxford Institute for Energy Studies (2023), '[Key Themes for the Global Energy Economy in 2023](#)'.

²¹ Bureau of Energy Efficiency (2022), '[Policy Paper on Indian Carbon Market \(ICM\)](#)', Government of India.



requiring no host country approval. This way, new and 'additional' clean technologies can access climate finance.

- **Sustainable Development Goals (SDGs):** Projects with specific SDG benefits that are critical for India's development and population can be allowed for international trading. Projects that are unable to demonstrate effective additionality will not be allowed to trade credits internationally.
- **Sectors not included in the NDC:** India will in due course identify a list of sectors and subsectors that are not included in the NDC to seek financial support for technologies not yet available in the country.

4. A Closer Look at PAT and RPO: The Foundations of the Upcoming Indian Carbon Market

While India does not have an explicit carbon market, it does have instruments that closely resemble carbon markets, in the form of PAT²² and RPO:²³ two major market-based approaches to regulate energy consumption and transition to cleaner energy, facilitated by the Ministry of Power. India also has vast experience in the CDM, implemented by the Ministry of Environment, Forest and Climate Change.

PAT Scheme to Increase Energy Efficiency in Large Industrial Energy Users²⁴

The PAT scheme of the BEE is focused primarily on reducing the energy intensity of large energy-using entities through accelerated adoption of energy-efficient and low-carbon technologies. It covers 13 energy-intensive sectors, including thermal power plants, cement, metals, fertilizers, petrochemicals, and textiles. The crux of the scheme is that selected DCs are given mandatory energy intensity targets over a specified period based on their relative energy intensity performance in their sector peer group. If the DC consumes less energy per unit of production than the set target, it is awarded ESCerts equal to the saving relative to the target energy use for the actual production; these certificates can be traded on a dedicated exchange. If the DC consumes greater energy than the target, it is required to purchase ESCerts on the exchange to cover the shortfall in its energy saving achievement or to pay a penalty. The ESCerts, equivalent to 1 tonne of oil equivalent of energy savings, are awarded based on quantified energy savings verified by an accredited energy auditor. The ESCerts are awarded after a DC surpasses its target and can then be sold to another DC that has failed to achieve its target. Existing ESCerts will continue to be issued in India for two more years, with the option of converting to carbon credit certificates (CCCs). After 2026, there will be only CCCs.

A PAT cycle lasts for three years, and seven PAT cycles have been launched up to April 2022. The PAT scheme has covered 1,104 DCs from 13 industrial and service sectors, representing around 50 per cent of the country's energy consumption. Based on a PAT assessment study undertaken by the BEE looking at the conversion of tonnes of oil equivalent to tonnes of CO₂ equivalent, in just its first two cycles the scheme had already enabled the reduction of nearly 100 million tonnes of CO₂ equivalent. In addition to its coverage and impact, the earlier PAT scheme was able to establish a strong and robust MRV system for assessing the energy consumption and performance of the DCs. The scheme was also able to establish an ecosystem for facilitating the assessment of the baseline and the verification of performance through accredited energy auditors.

The accredited energy auditors have developed the required capacity, knowledge, and expertise to meet various requirements under the PAT scheme. The PAT scheme was largely successful and met most of its targets in the completed cycles. However, some lessons learned from the PAT scheme will

²² For further details on the PAT scheme, see: <https://beeindia.gov.in/en/programmes/perform-achieve-and-trade-pat>.

²³ For further details on RPOS, see:

https://powermin.gov.in/sites/default/files/Renewable_Purchase_Obligation_and_Energy_Storage_Obligation_Trajectory_till_2029_30.pdf.

²⁴ <https://www.iea.org/policies/1780-perform-achieve-trade-pat-scheme>

provide important input for the design of the domestic carbon market, as noted in the BEE draft policy paper. The first lesson is that the PAT scheme suffered from an oversupply of ESCerts in the market. The oversupply was perhaps driven by lenient goals set in the scheme's earlier cycles that led to plentiful ESCerts. There was also an absence of market-makers or financial traders, which provide liquidity and manage oversupply and deficit market situations, and—most importantly—there was no provision for carry-over of unused ESCerts to subsequent PAT cycles. Due to excess supply and limited take up in the market, the value of ESCerts fell in subsequent trading sessions. ESCerts became so cheap at one point, due to oversupply, that buying ESCerts was much easier for thermal plants than installation of energy-saving measures. Based on lessons from the European Union's Emissions Trading System, which had a similar experience of supply–demand imbalance, the Government of India is looking at the introduction of a stabilization fund.²⁵ The source of funding for such a mechanism is still under discussion.

Other lessons from PAT (which will be considered in the carbon market rules) include that participation was limited only to identified 'compliance' DCs (DCs who were mandated to achieve energy-efficiency improvements year on year, or pay penalties, or alternatively purchase ESCerts from their peers who had overachieved their targets). The big weakness was that the market rules precluded the voluntary participation of other buyers, which was self-defeating in a situation of low demand. Trading of ESCerts was periodic, largely occurring at the end of each three-year cycle. In addition to the long intervals between trading sessions, there was a lack of interchangeability between the ESCerts of PAT (measured in tonnes of oil equivalent) and the emission reduction in tonnes of CO₂ equivalent required for international compliance or voluntary markets. Surplus ESCerts could therefore not be offered in voluntary carbon markets, even though they were accomplishing the mitigation result sought by those markets.

Renewable Energy Certificate Scheme

The second pillar on which the new ICM is being built is the existing REC scheme²⁶ resulting from RPOs on large energy users. The REC scheme was designed to ensure sufficient demand and a ready offtake market for renewable energy generation investors. Certificates were intended to support the regime of RPOs by obligated entities²⁷ to cover possible shortfalls in their compliance with their obligations to use a minimum specified percentage of renewable energy. Obligated entities included electricity distribution companies (DISCOMs) and large captive generation plants, which use fossil fuels to generate power. The DISCOM would either buy renewable energy directly from a generator under a power purchase agreement, or it would purchase a sufficient volume of RECs that would meet, for example, the RPO as a percentage of its total bulk power purchases (which could be 8 per cent, 10 per cent, or higher, depending on the state and the calendar year; RPO trajectories have increased over time). From 1 April 2023, the RPO has been raised to 40 per cent for new thermal power plants.²⁸

RPOs were defined for solar and non-solar generation separately and varied from state to state, as indicated by the respective state electricity regulator. The obligated entities had the option to buy RECs from renewable energy generators, from any state, if they fell short of their RPO target as mandated by their electricity regulator. Thus, the REC scheme aimed at large-scale deployment of renewable energy across the country in an efficient manner, while facilitating the inter-state exchange of RECs, thus providing an additional financing mechanism for driving investments in renewable energy. The REC scheme has also provided experience that will be considered in the design of the ICM.

²⁵ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/021723-india-works-on-market-stabilization-fund-details-for-upcoming-carbon-market>

²⁶ <https://www.mercomindia.com/rec-jumps-clearing-price-%E2%82%B91000-new-regulations>

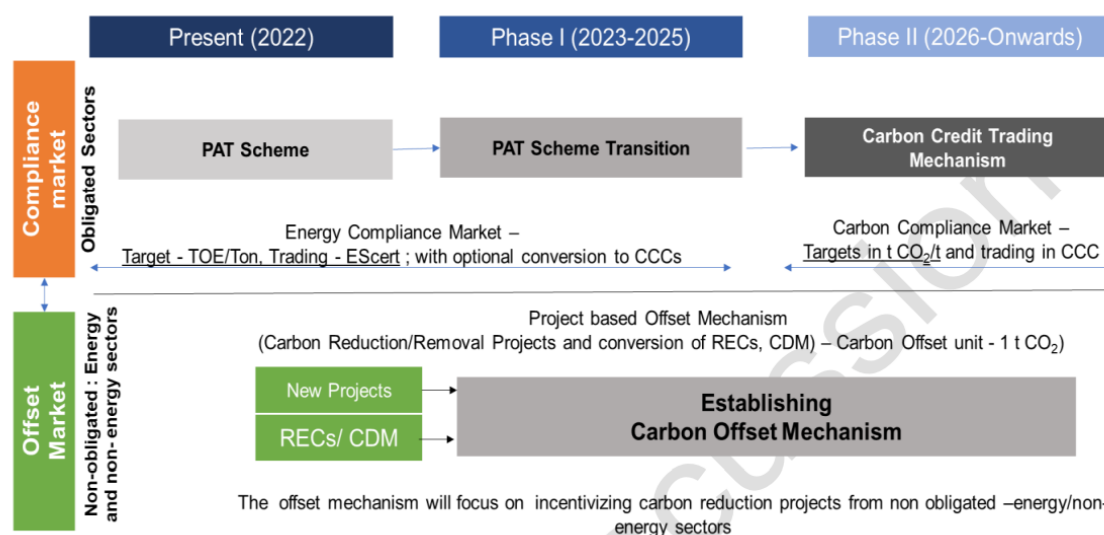
²⁷ The term 'obligated entities' is used in the renewable energy generation sector; large energy consumers are obligated to purchase a portion of their energy in the form of renewables, as specified by their respective regulator. The term 'designated consumers' is used in the energy-efficiency sector, under the PAT scheme, and refers to a number of energy-intensive large industrial sectors that must continuously improve their energy efficiency year on year, or buy ESCerts or pay penalties.

²⁸ https://www.business-standard.com/article/current-affairs/power-min-mandates-40-renewable-purchase-obligation-for-thermal-plants-123030700741_1.html

The REC scheme, similar to ESCerts, suffered from oversupply. This is because the DISCOMs did not purchase enough RECs, despite being obligated, due to their financial distress and lack of liquidity to pay for the RECs. Further, the RECs were perceived by DISCOMs as an additional cost without any additional benefits. Other problems with the REC scheme related to a modest level of purchase obligations (these very low levels of RPOs were deliberately set by state regulators, who were aware of the inability of their state’s DISCOM to pay for RECs due to a lack of funds). In addition, the RPO levels (expressed as a percentage of the total energy purchases of the DISCOM) needed frequent resets due to falling costs of renewable energy generation and the need for renewable energy generators to correspondingly expand their off-taker market so as not to be left holding a pile of worthless RECs. As with the PAT scheme, there was an absence of traders and financiers to smooth the market and provide liquidity. Significant barriers to the generation of RECs were deliberately introduced at one point to alleviate the oversupply problem in the REC market (for example, renewable generators were not granted RECs if they supplied directly to DISCOMs or if they received benefit from the transmission charge waivers that were standard sectoral policy for clean energy generation to keep costs low in the early years), but these barriers were ultimately inconsistent with the desired growth of the renewable energy market.

Figure 1 illustrates the planned phased transition to the ICM based on the evolution of the two main market-based mechanisms in place today. This is taken from the draft policy paper issued by the BEE for comments and feedback from stakeholders.

Figure 1: Proposed Development Phases of the Indian Carbon Market



Note: CCC: carbon credit certificates; CDM: clean development mechanism; ESCert: energy-efficiency savings certificate; PAT: Perform–Achieve–Trade; REC: renewable energy certificate.
 Source: Bureau of Energy Efficiency (2022), Policy Paper on Indian Carbon Market (ICM), Government of India, p. 22.

Key Principles of ICM Design, Based on Learnings from PAT and RPO

The BEE, under the Ministry of Power, will be the administrator of the ICM. The following is an extract from the draft BEE policy paper for stakeholder consultation on the ICM. It may be considered as an important guide to what to anticipate in terms of market rules and operating principles.²⁹ BEE’s document lists the following six lessons of experience that will inform the design of the market:

²⁹ Bureau of Energy Efficiency (2022), Policy Paper on Indian Carbon Market (ICM), Government of India.

- 'The market needs to have a robust MRV system and processes in place to monitor performance and compliance, ensure environmental integrity, and remove apprehensions of any form of double counting of the carbon credit units generated and traded.
- To improve liquidity and mitigate problems of oversupply, measures for strengthening demand, primarily through setting suitably stringent targets and properly enforcing these, besides enabling trading at any time through shorter compliance cycles, and carry-over of credits across compliance cycles, levy of effective penalties and permitting third-party buyers and sellers, should be considered.
- Experience, capabilities, and learnings from other similar markets, including stock markets or commodity markets, should be brought in, especially to check and control market distorting operations by operators, and to set rules accordingly. The aim would be to ensure a competitive market for carbon credits, in which the price mechanism would bring supply in balance with demand.
- To ensure a competitive market, it is better to have a single commodity rather than fragmented markets with varieties of credits overlapping with each other. Further, to ensure comparability with international carbon market mechanisms, including voluntary markets, the commodity (regardless of origin) should be in terms of tonnes of carbon dioxide equivalent.
- The Administrative Authority needs to actively track demand and supply and develop approaches to keep them in balance over time so that the market remains healthy. This would require the administrator to set appropriate emission targets, and bring in additional sectors when needed, to release sufficient demand.
- For a successful emissions trading system (ETS), there should be a well-defined registry. The registry should have a transparent system and a well-versed web portal for easy accessibility by users.'

5. The Building Blocks of the Indian Carbon Market

In developing the ICM, the BEE stakeholder consultation paper³⁰ points out the following ten major building blocks that need to be addressed:

- **Carbon price discovery:** A major challenge faced by India's market mechanisms, PAT and RPO is that their measurement (the metric unit of their certificates) is not stated in terms of CO₂ equivalent but in terms of tonnes of oil equivalent or megawatt-hours, respectively. This aspect of the two market-based mechanisms imposes a serious limitation on their growth potential and their ability to be a price discovery mechanism for carbon as it constrains the generators and buyers of these certificates and fragments the scale of the domestic energy market without allowing for cross-linkages. This limitation, along with previously mentioned issues of low targets and weak enforcement, has also resulted in an oversupply of PAT certificates and RECs. (In the case of RECs, the issue of surplus certificates is due to the cash constraints of distribution utilities and their inability to purchase RECs even when the regulator requires them to do so.)
- **Importance of MRV:** In the carbon markets, MRV plays a crucial role because well-functioning trading mechanisms require trust in the market. Carbon market participants want to have the assurance that credit in one system is comparable to credit in another system. Stringent MRV contributes to trust since MRV requires high accuracy and comparability of approaches. Furthermore, third-party verification according to common principles and standards ensures high-quality data. A robust MRV system is the backbone of every domestic and international

³⁰ Bureau of Energy Efficiency (2022), [Policy Paper on Indian Carbon Market \(ICM\)](#), Government of India.

carbon market. This will be a high priority area as the measurement and reporting systems transition from PAT and REC to the carbon credit trading system.

- **Need for a unified national carbon market:** This is expected from 2026 onwards. A unified domestic carbon market mechanism will encompass the existing PAT and REC schemes, with all certificates generated under it expressed in terms of tonnes of CO₂ equivalent. A single market at the national level, as opposed to having multiple sectoral market instruments, would reduce transaction costs, improve liquidity, enhance common understanding and targeted capacity development, and streamline the accounting and verification procedures. This carbon market mechanism will set targets for the mandated participants, as per existing and emerging policy objectives, and their achievement will count towards India's NDCs. The intention is that all future NDCs will be expressed in terms of CO₂ equivalent. The creation of a unified ICM can help create eligible carbon credits, increase the liquidity of credit trading, and thus lay the foundations for a good price discovery mechanism for carbon in India.
- **For RECs, a change in the regulated entity from financially weak DISCOMs to a financially strong renewable energy generator:** A major problem of the REC market was weak enforceability on DISCOMs, which were financially stressed and, as 'cost-plus regulated entities', had limited incentives to minimize costs. To address these shortcomings, it is suggested that in the power sector, in place of the DISCOMs, the regulated entities under the unified carbon market mechanism would be power generators, who would be assigned CO₂ equivalent intensity targets, like regulated entities in other sectors. (Thermal power generators are therefore expected to invest in substantial renewable energy projects, as has already been observed in power plants of NTPC and other companies seeking early compliance with the new regulation issued by Ministry of Power. This regulation states that all thermal plants commissioned after April 1, 2023, are required to additionally invest 40% of their thermal capacity in the form of renewable energy³¹.)
- **Additionality:** Additionality criteria when seeking to meet NDC targets through the domestic carbon market may be different from those applicable to traditional carbon markets. Since the targets under the national carbon market will be policy mandated, the carbon credits supplied may not always cover the requirement of 'additionality' in the Article 6 mechanisms (for example, when the project depends on carbon finance and would not happen under business as usual). The BEE's policy paper notes: 'any carbon credits for international trading under Article 6 would first need to be above the domestically mandated targets or generated under a bilateral or plurilateral commercial agreement with other Party(ies) and subject to international review as provided under Article 6.2. The domestic MRV and issue processes cannot substitute for these international processes. Carbon credits proposed for international trading under the Article 6 mechanisms will thus have to undergo NDAIAPA full scrutiny and endorsement, distinct from the ICM processes.' This will require considerable institutional preparation.
- **Contribution to sustainable development:** The carbon markets, both compliance-based and project-based baseline and crediting mechanisms, will be expected to deliver on several SDGs as well as providing much-needed climate action under Goal 13 of the SDGs. The ICM will span sectors including energy, manufacturing, chemicals, waste management, afforestation, agriculture, and community development. Given this wide canvas, the ICM should have significant positive impacts on India's SDG targets, provided the environmental integrity and interests of communities are considered.
- **Voluntary carbon markets:** Although the domestic compliance carbon market is critical for India's NDC and net-zero ambitions, there is also significant opportunity to leverage the voluntary carbon market.³² India could potentially be one of the major destinations for global

³¹ <https://www.mercomindia.com/daily-wrap-up-thermal-plants-renewable-capacity>

³² <https://economictimes.indiatimes.com/small-biz/sme-sector/how-india-can-benefit-from-voluntary-carbon-markets/articleshow/92077194.cms>

capital pools chasing voluntary carbon projects in the Global South. For this, a more structured mechanism for private sector participation in voluntary carbon credit projects is needed. A proactive approach from India on developing a framework to promote public-private partnerships and to attract private investment in carbon projects through inclusive business models could unlock significant social, economic, and environmental benefits. The additional revenue streams from carbon credits have the potential to fundamentally alter the economics of key activities such as agriculture, forestry, cooking, and waste management.³³ India's priority is to focus on domestic projects and investors first while it establishes the required legal, institutional, and technical infrastructure, including an appropriate registry, to support the domestic market. These frameworks will be able to address issues of double counting, corresponding adjustments, and the quality and integrity of the credits, all of which will enhance the credibility of the carbon market and increase investor confidence.

- **Phased approach to introduction of the ICM.** It is proposed that under the ICM there will be two mechanisms: (i) a carbon credit trading mechanism for the obligated sectors—the 'extended PAT scheme'—to be based on carbon emission targets instead of energy targets, and (ii) a project-based offset scheme for non-obligated and non-energy sectors. As India already has a market-based mechanism in the form of PAT and REC, the obligated sectors covered under the PAT and REC schemes would remain obligatory under the ICM. The ICM would also allow participation from other sectors (currently not covered under PAT and REC) for the trading of offsets, as this is believed to boost demand. A shortfall in demand was identified as a shortcoming of the previous arrangement, where participation was strictly limited to DCs.
- **Supply–demand balance in the carbon credit market and avoidance of surplus ESCerts and RECs:** The price of carbon credits will be a key determinant of the effectiveness of the market in terms of acting as an incentive for real emission reductions. If priced too low, industries will find it easier to buy credits than to achieve any real emission cuts. If the cost of purchasing credits is prohibitive, it might lead to low industry participation and the pricing-out of smaller players from the market.³⁴ The government can take special measures to encourage demand, for example encouraging the procurement of products and services from carbon-neutral companies. This initiative can be promoted as part of sustainable public procurement, through public sector organizations and institutions can provide preferential benefits to carbon-neutral organizations, products, and services. Carbon offset projects in India registered under other voluntary schemes, including the CDM, should be given the option to register under the ICM to sell credits to Indian entities. As part of the ECO Mark Scheme, carbon-neutral certification for products and services can also be explored. This will have a pull effect on carbon markets and can boost demand for carbon-neutral products and services. To ensure demand from voluntary buyers, the quality and environmental integrity of carbon credits must be ensured. The ICM must therefore ensure a quality supply of carbon units through a robust MRV mechanism to attract demand from non-obligated entities.
- **Launch of the ICM with DCs under the existing rules:** For the introduction and rollout of the carbon market mechanism, the high carbon-emitting and energy-intensive industries, as

³³ India has been an important global leader in the implementation of nature-based solutions, and its NDC has an important target of 2.5–3 billion tonnes of avoided emissions through additional forest and tree cover by 2030. See The Energy and Resources Institute (2021), [Will India Attain Its Forestry NDC Target of Achieving 2.5–3 Billion Tonnes of CO₂Equivalent through Additional Forest and Tree Cover by 2030?](#)

India also joined the Mangrove Alliance at COP27. Mangroves are regarded as very effective sinks for carbon sequestration; see <https://www.downtoearth.org.in/blog/forests/india-should-focus-on-protecting-its-existing-mangroves-88568>. It is likely that voluntary carbon markets including international emissions trading will be an important funding source to support India's nature-based climate initiatives.

³⁴ <https://carboncopy.info/a-voluntary-carbon-market-wont-have-a-significant-impact-on-indias-emissions>

identified under the existing BEE schemes,³⁵ are expected to be brought into the domain of the ICM. These industries have experienced a range of regulations over the last decade, including those being covered under the PAT and REC schemes for compliance needs, driving them to improve their energy efficiency and meet mandated targets. Through these schemes, they have already developed a good understanding of the emerging climate regulations and have been building their capacities to address them. They are also likely to benefit from converting their existing unused stock of certificates from the PAT and REC mechanisms to CCCs under the ICM to remain competitive, as many of these high energy-consuming sectors may also be subject to GHG intensity-based cross-border regulations in the future under Carbon Border Adjustment Mechanism policies in the European Union.

The Government of India's draft policy paper notes that a dynamic ICM that will enable India to fulfil its future NDCs is necessary. Although for now the ICM is envisaged to cover the mandated energy and industry sectors, going forward this may need to change to benefit from the voluntary market's large potential to contribute to emission reductions. Further, in the long term, the ICM may not remain primarily a compliance market but may emphasize and incentivize voluntary participation from the private sector, the public sector, and international voluntary carbon market buyers, distinct from the Article 6 carbon market. India's primary interest in the Article 6 carbon market at this stage is to gain access to cutting-edge technologies and 'additional' climate finance to set up projects in India using such technologies.

³⁵ <https://pib.gov.in/PressReleaselframePage.aspx?PRID=1811051>