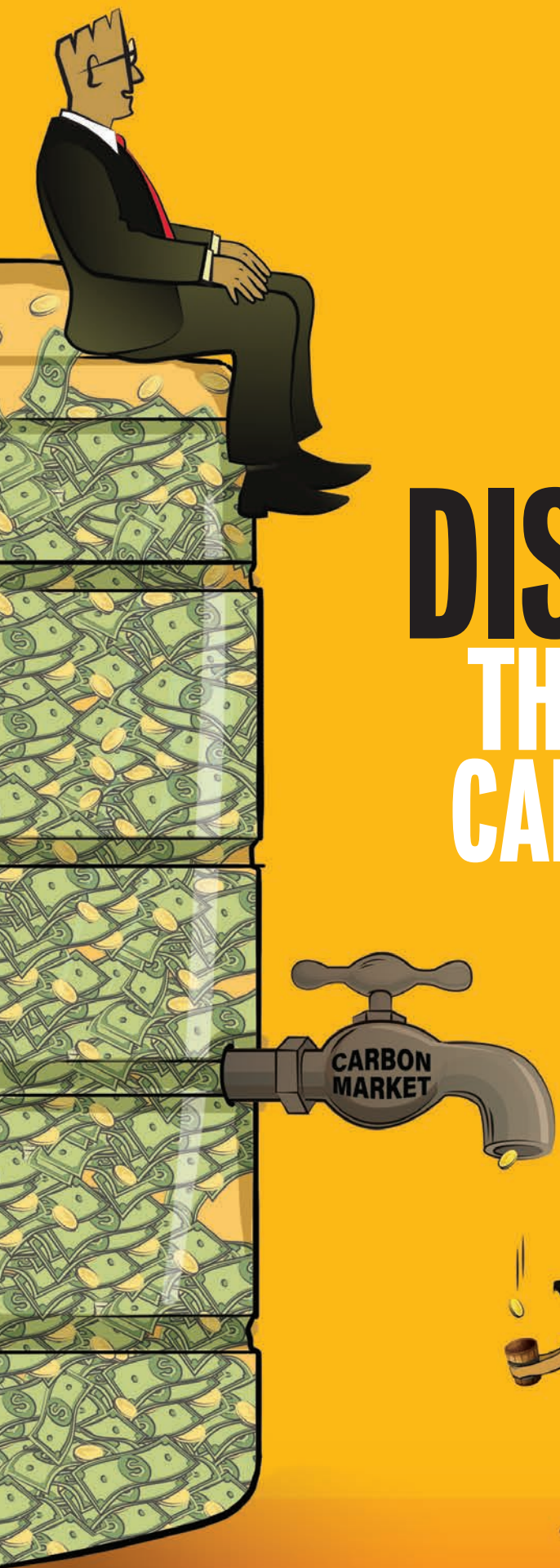

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THE VOLUNTARY CARBON MARKET IN INDIA

DO PEOPLE AND CLIMATE BENEFIT?

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DO PEOPLE AND CLIMATE BENEFIT?

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THE ECOSYSTEM

- **Appetite for participation in both voluntary and compliance carbon markets has steadily escalated in the last two decades, with the former recording US $2 billion worth of transactions in 2021.**

- **Voluntary carbon markets operate without regulatory oversight, and lack uniformity and standardization. They are managed through a paraphernalia of registries, project developers, validators and verifiers, traders, brokers, and carbon exchanges.**

- **The value of a carbon credit can vary from US $1 to over $100, depending on market dynamics—often an opaque arrangement between sellers and buyers. The value may not always reflect the project's actual cost and the need for finance.**

THE ECOSYSTEM

In a race against time, corporations and governments have been scrambling to check boxes that award them a coveted green label in the easiest and quickest way possible. To achieve this status, they have turned to carbon markets—systems designed to place a price on carbon emissions and create economic incentives for emission reduction.

Carbon markets have steadily evolved over the last two decades in both scale and scope. This has also resulted in their broad classification as compliance and voluntary markets. In practice, these markets have evolved differently from each other, and, while this is truer for voluntary markets, neither have a set design nor a principle that guides the stakes and stakeholders. Moreover, an emerging class of participants, complicated standards and opaque transactions have made voluntary markets even more complex.

Thus, there is a need to understand how carbon credits are generated, traded and appropriated in voluntary carbon markets and how they affect the stakeholders, especially buyers and sellers.

Furthermore, as the appetite for participation in voluntary carbon markets increases, the questions also increase. How effective are carbon markets in reducing global emissions? Do they actually benefit those who need benefits the most?

Suspicion and mistrust of voluntary carbon markets have only increased in recent years, with multiplying allegations of greenwashing and fraud—charges that are supported by the existing black box in which the ecosystem functions. Observers and stakeholders, therefore, demand transparency, accountability and, above all, environmental integrity from the system. This begs the question: Do laissez-faire voluntary carbon markets need to be regulated? If yes, in what way?

As the dark horse in the market, the questions are even more important for India which is supplying a lion's share of carbon offset projects under independent voluntary carbon credit programmes.

This report seeks to answer some of these questions while informing the reader of the latest developments in voluntary carbon markets and India's role and relevance in the ecosystem.

The concept behind carbon offsetting is to hold greenhouse gas (GHG) emitters accountable for their actions. In essence, they are expected to make up for their emissions by financially supporting a project that reduces or removes carbon emissions. A carbon offset refers to an approach in which GHG emissions are reduced or removed through projects in order to balance or 'offset' emissions elsewhere. For example, a company wanting to reduce its carbon footprint but unable to directly do so (either because of want of technology or the high cost of reducing emissions) could offset its emissions by investing in a project that either reduces emissions (a solar project replacing a fossil fuel-based power project) or increases carbon stock (land restoration or a plantation project).

1.1 CARBON MARKETS

If we were to apply market principles to carbon offsetting, we would have buyers in the form of countries, companies or individuals who are willing to purchase an offset to compensate for their own emissions. These buyers would be matched with sellers who have reduced their emissions below designated caps, or who have removed GHGs from the atmosphere, resulting in unused 'rights to emit'. These unused 'rights to emit' are denominated in terms of tonnes of CO_2 equivalent (tCO_2e) and are the commodity sold on the market.

One of the first reported instances of carbon offsetting was the funding of an agroforestry project in Guatemala in 1989 by Applied Energy Services (AES) to offset its emissions from a new coal power plant in the United States.[1] Thus, the concept of carbon markets had been in existence for some years before it was discussed by governments as a probable mechanism to meet climate goals under the Kyoto Protocol in 1997. The Kyoto Protocol created three market mechanisms for countries to conduct trade in emissions.

Kyoto mechanisms

The Kyoto mechanisms consist of three primary market-based tools:

- **Emissions Trading**: It permits countries that have exceeded their emissions limits to purchase unused emissions allowances from countries that have not exceeded the limits.
- **Joint Implementation:** It enables countries to invest in emissions reduction projects in other countries that are subject to emissions reduction targets under the Kyoto Protocol.
- **Clean Development Mechanism:** It permits developed countries to invest in emissions reduction projects in developing countries. The reductions achieved through these projects can then be counted towards the developed country's own emissions reduction targets.

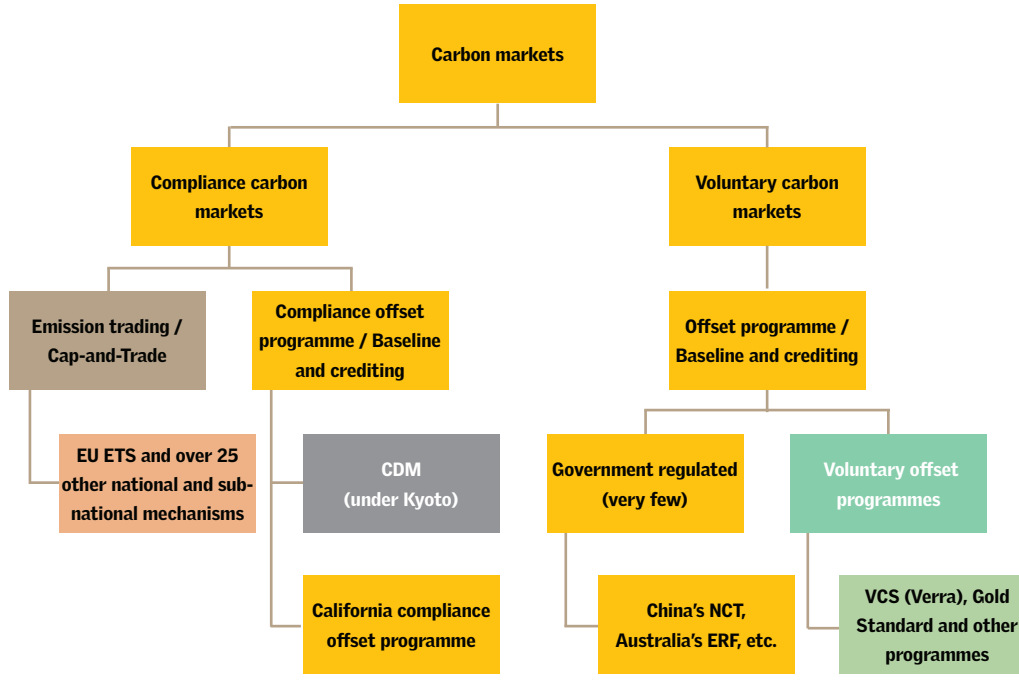
Building on this, countries started coming up with mandatory 'cap-and-trade' systems that created **'compliance markets'** around the world. An example of such a market is the European Union Emissions Trading Scheme (EU ETS) launched in 2005. The market sets a legally mandated limit on the emissions of participating entities and issues allowances that can be traded by companies to meet emission limits.

At the same time, markets developed for interested individuals or organizations who voluntarily participated to offset their emissions. One of the first such markets was the Chicago Climate Exchange (CCX) founded in 2003. The commodity traded on CCX was certified emission reduction (CERs) that were validated by third-party agencies. Such markets came to be known as **'voluntary carbon markets'**.

1.1.1 Compliance carbon markets

As discussed above, compliance carbon markets are government-mandated systems that aim to limit GHG emissions. These markets set up a cap on the amount of GHGs that can be emitted within a specific period, with each participant being given allowances or permits to emit a specific amount. If a participant emits more GHGs than their allowances permit, they must purchase additional allowances on the market from those who have extra allowances.

Figure 1: The broad structure of carbon markets as they exist



Source: CSE

Examples include the EU ETS, involving 30 participant countries, and California's cap-and-trade programme for businesses and utilities.

There are more than 36 emission trading regimes around the world. Over 20 other national and sub-national emission trading markets are planned.[2] In March 2023, these markets covered 8.91 $GtCO_2e$ or about 17.64 per cent of global GHG emissions. India is working on its own framework for a domestic carbon market.[3]

1.1.2 Voluntary carbon markets

Voluntary carbon markets are not government-mandated, and they offer an opportunity for companies, institutions and individuals to voluntarily offset their GHG emissions. Entities purchase carbon credits—which represent a reduction or removal of GHG emissions from the atmosphere—from project developers or brokers. The credits may be verified by independent third-party standards organizations to ensure that the carbon reduction is legitimate

and meets specific criteria. These markets are often used by organizations as part of their corporate social responsibility (CSR) efforts to offset their carbon emissions and demonstrate their commitment to reducing their environmental impact.

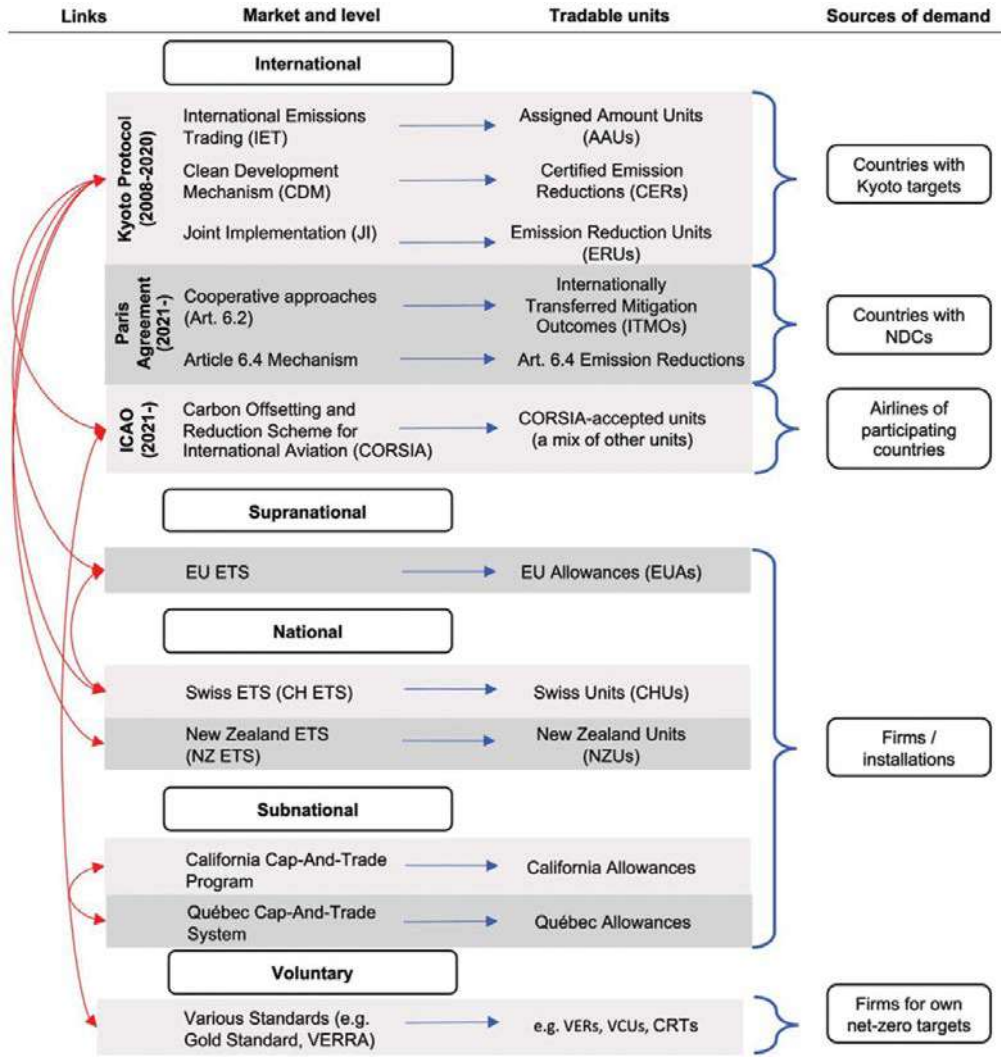
Voluntary carbon markets are largely run by private players, but there are exceptions. Some government-operated carbon markets can also be voluntary, such as the Australian Emissions Reduction Fund (ERF) or the Thailand Voluntary Emission Reduction Program.

Voluntary carbon markets typically work on the **baseline and crediting mechanism**, which is an alternate to the cap-and-trade system (also called ETS). The baseline is the reference level against which emissions reductions or removals are measured, and the crediting mechanism is the process by which carbon credits are generated and tracked.

Voluntary carbon markets are usually smaller in scale than compliance carbon markets, but they provide a more flexible and accessible option for companies and individuals to offset their emissions. This has led to increased participation as well as greater liquidity in the markets. These developments have also brought about new challenges in standardization and regulation, as the lack of a uniform set of rules and standards can make it difficult to ensure the validity of the carbon offsets being sold.

Figure 2 gives an overview of international carbon markets as they exist today. The Kyoto Protocol, Paris Agreement and the International Civil Aviation Organization (ICAO) represent international mechanisms; EU ETS is an example of a supra-national mechanism; then there are national, sub-national and independent (voluntary) mechanisms. The inter-operability between these markets/frameworks is represented through connecting arrows, like the ICAO framework for aviation allows credits to be sourced from independent/voluntary mechanisms.

Figure 2: Overview of international carbon markets



Source: The Carbon Market Challenge[4]

1.2 UNDERSTANDING VOLUNTARY CARBON MARKETS

Comprehending the structures and regulations of carbon markets is crucial as they involve an intricate web of participants and transactions with varying levels of credibility and impact. This is particularly true for voluntary carbon markets, which have a diverse range of actors. Carbon markets can also affect economic aspects such as the costs of goods and services, energy prices and

investment decisions. As such, understanding carbon markets is vital for policymakers, investors and those interested in the intersection of the environment and the economy.

1.2.1 The participants

Several entities have emerged within voluntary carbon markets, establishing their own distinct functions and regulations for engaging in the system. These bodies often have varying interests and objectives, leading to a diverse range of approaches to trading carbon credits. As a result, navigating the carbon market can be complex and requires a thorough understanding of the different players and their respective roles.

Standards bodies

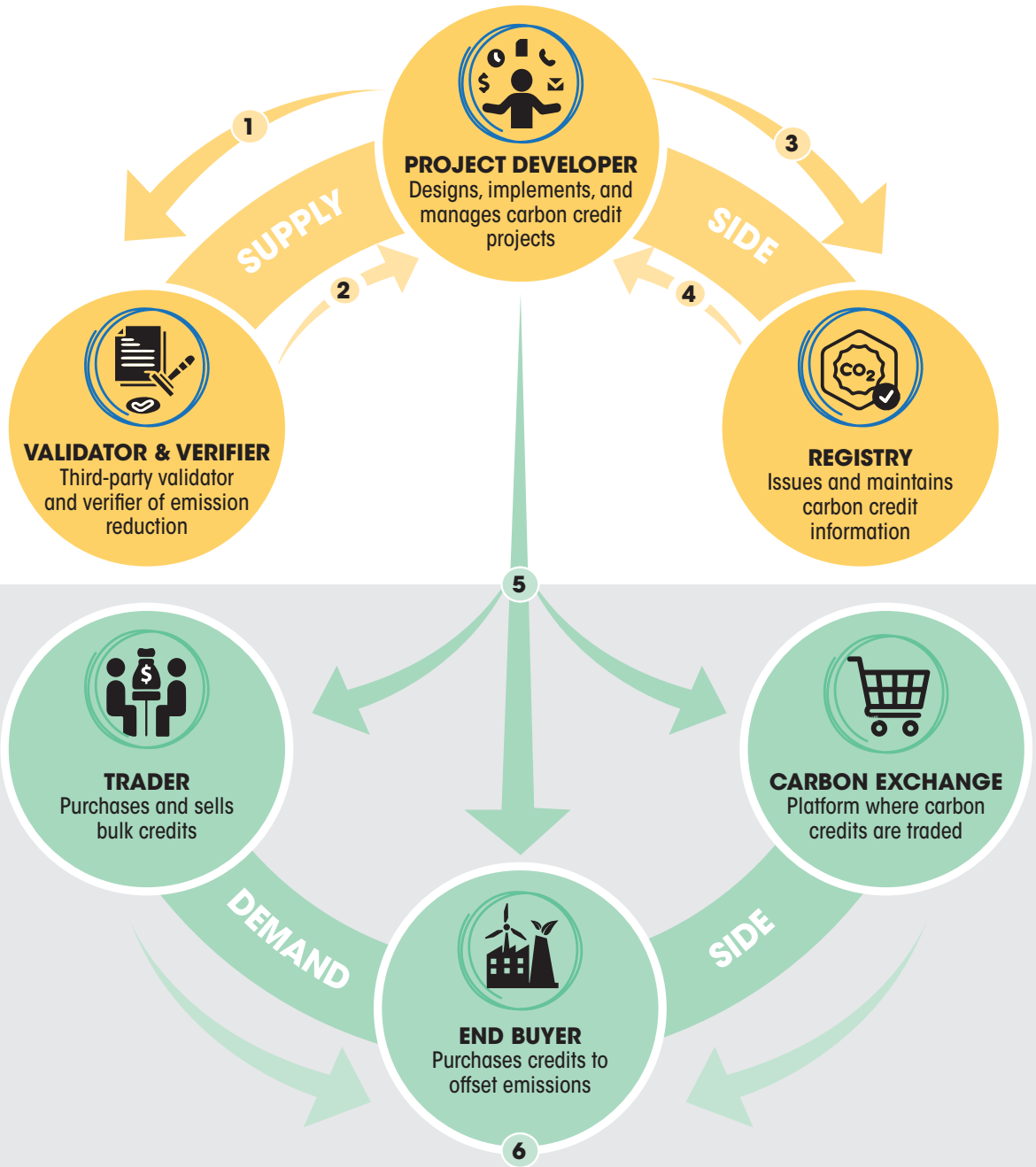
With the first carbon offset projects coming up in the late 1990s and early 2000s, organizations were formed to set standards and guidelines for the development, verification and trading of carbon credits. The Climate Action Reserve, then named California Climate Action Registry, was setup in 2001 as a reporting forum for GHG emissions of corporations, organizations, government agencies, etc. Some non-profits, including the World Wildlife Fund (WWF), launched the Gold Standard in 2003, which started a standards programme for voluntary carbon markets in 2006 (GS VER); another group of institutions launched the Verified Carbon Standard Program (VCS) in 2007, which is now one of the biggest carbon credit programmes in voluntary carbon markets.

Standard-setting programmes evolved to include several functions that the bodies perform today:

1. Developing general rules and requirements for carbon offset projects;
2. Maintaining methodologies that prescribe quantification, verification and reporting procedures for GHG emission reduction or removal associated with specific kinds of projects;
3. Providing a platform for project developers to register their projects and get them verified;
4. Issuing carbon credits for verified projects that meet the criteria and demonstrate GHG reduction or removal.

Figure 3: Billion-dollar business

The workings of a voluntary carbon market and its ecosystem



1. **Project developer hires a validation and verification body (VVB) to audit its claimed emissions reductions**
2. **VVB submits its report to the developer**
3. **Developer applies for project registration with the registry**
4. **Registry issues carbon credits to the developer once the project is registered**
5. **Developer trades carbon credits in the market**
6. **End buyers retire carbon credits to offset their emissions**

Source: CSE

Apart from the Gold Standard's programme and Verra's VCS programme, there are other certification bodies such as BioCarbon Registry which runs the BioCarbon Registry Standard, and Plan Vivo Foundation which certifies projects under the Plan Vivo Standard. Each certification body and their respective standards differ from one another and are guided by their own protocols.

Table 1: Carbon credits issued till May 2023 by major registries in voluntary carbon markets

Registry	Credits issued (in millions)
VCS	1,158.0
Gold Standard	261.0
CAR	189.1
ACR	240.6

Source: VCS Registry, Gold Standard Registry, ACR Registry, CAR Registry, Voluntary Registry Offset Database v8, Berkeley Carbon Trading Project—UC Berkeley[5]

Project developers

Project developers are responsible for developing projects aimed at reducing or removing GHGs from the atmosphere, with the potential to earn carbon credits. These organizations can be private or public entities, such as companies, NGOs or governments.

The types of projects that can qualify for carbon credits can vary, but some examples include agroforestry projects, where trees are planted to sequester carbon from the atmosphere, or solar power plants, which can replace fossil fuel-based energy sources.

Project developers are responsible for the implementation and monitoring of the project to ensure that it meets the necessary standards and requirements for carbon credits. This involves tracking and verifying the actual reduction or removal of GHG emissions resulting from the project.

Carbon credits earned from these projects can be traded in carbon markets or used to offset emissions in other sectors, such as aviation or shipping, which may have difficulty reducing their emissions directly.

Table 2: Global players
In 2022, three Indian project developers were among the world's top 15 in generating carbon credits

Rank	Developer	Issued credits (tCO_2e)	YoY % growth* (Credit issuance)	No. of projects	YoY % growth* (No. of projects)
1	**Wildlife Works Carbon LLC, US**	98.8	55	14	0
2	**Finite Carbon, US**	92	0	68	6
3	**South Pole Holding Ag, Switzerland**	54.6	20	232	50
4	**Anew Environmental LLC, US**	53.9	9	119	17
5	**Permian Global, UK**	43.6	30	2	0
6	**Infinite EARTH, Hong Kong**	37.5	12	1	0
7	**EnKing International, India**	34.2	39	198	80
8	**ACATISEMA, Colombia**	29.9	19	1	0
9	**CIMA, Peru**	28	11	1	0
10	**Jaiprakash Power Ventures, India**	27.8	18	2	0
11	**Terra Global Capital, US**	22.5	25	12	9
12	**New Forests, Australia**	21.6	0	23	10
13	**Himachal Baspa Power Company, India**	20.1	32	1	0
14	**Bosques Amazonicos, Peru**	19.5	90	4	100
15	**Ecosystem Services LLC, US**	19.5	14	2	0

*Year-on-year growth data is compared against December 2021
Source: The State of the Carbon Developer Ecosystem, 2022, by Abatable

Bluesource LLC—which is now known as Anew Environmental LLC—as well as EKI (Enking International), InfiniteEARTH, Ecosecurities, and Wildlife Works are all project developers in voluntary carbon markets.

According to a report published in 2023 by Abatable, 180 new project developers entered the market across the four major registries (ACR, CAR, VCS, GS), contributing to 500 new projects and over 100MtCO_2e of claimed annual offsets.[6]

Validation and verification bodies

Validation and verification bodies (VVBs) are third-party entities engaged by developers to independently validate projects and verify their claimed offsets. In the voluntary offset market, these bodies are accredited by standards bodies and a developer can choose an accredited company to serve as a VVB for its project. Until a VVB provides the necessary certifications, projects cannot be registered in the market. Examples of VVBs are the Bengaluru-based EPIC Sustainability Services and the Delhi-based Carbon Check (India) Pvt. Ltd.

Buyers

Voluntary carbon markets attract buyers who choose to act on climate change by purchasing carbon offsets. These buyers may come from various sectors—including companies, individuals, NGOs, governmental organizations and even event organizers. They buy carbon offsets as a means to show their commitment to sustainability and carbon neutrality. The demand from these buyers is the driving force behind voluntary carbon markets. Disney, Microsoft, Salesforce and Nike are some of the biggest absorbers of carbon credits.

Brokers

Brokers in voluntary carbon markets function much as they do in standard financial or commodities markets. They serve as a way to link developers with buyers.

Brokers may procure offset credits and then transfer or retire the credits on the carbon credit registry for their buyers for a fee or a commission. They can help create a portfolio of different projects or help facilitate small transactions. They are knowledgeable about the projects they sell and can share significant information about those projects, including their own diligence activities such as site visits. In some cases, brokers may make an investment in credits ahead of issuance. That can affect the transparency of pricing or affect the neutrality of the broker to judge whether the credits are of high quality or not.

With the recent growth in voluntary carbon markets, some buyers are turning to exchanges to procure large volumes of credits on listed prices. When purchasing through an exchange, the amount of information related to the credits may be limited, and it is up to the buyer to do the necessary research before making their purchase. Companies like ClimatePartner, myclimate and South Pole Holding are some of the brokers in voluntary carbon markets.

Marketplaces and trading platforms

Trading platforms and marketplaces act as intermediaries for buyers and sellers. Carbon Trade Exchange was founded in London in 2009 as one of the first spot exchange platforms for voluntary carbon credits. Sellers maintain accounts with the exchange and

list credits from VCS (Verra), Gold Standard, etc. on it. Buyers pay for listed credits and the credits are settled in real-time. AirCarbon Exchange, NCX, Cloverly, Puro.Earth are examples of marketplaces where these credits are traded.

Other entities

There are several other entities in the market. For instance, Sylvera and BeZero are rating companies which rate the quality of carbon credits. Some companies like Toucan, Flowcarbon and SingleEarth 'tokenize' carbon credits into digital tokens that utilize blockchain technology to track transactions and make exchange easy. After tokenizing credits, they introduce them to Decentralized Finance (DeFi) markets.

1.2.2 How do voluntary carbon markets work?

There is little understanding of the working of voluntary carbon markets, especially because there are no descriptions of these markets as coherent systems or explanations for how they exist the way they do. Further, since the rules and the markets are evolving, it becomes difficult to establish a stable and consistent understanding of them.

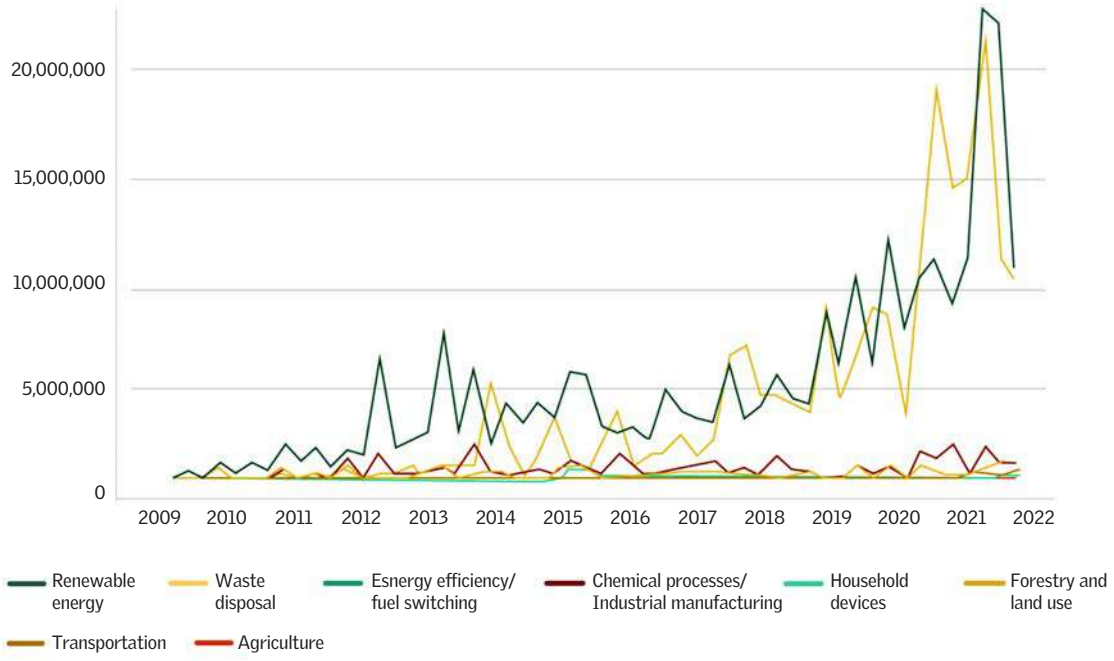
Let's start with observing some of the features of existing offset markets.

Size of the markets: Projects, players and scale of transactions

Privately regulated voluntary carbon markets consists of a few standard programmes, namely Verra's Verified Carbon Standard, Gold Standard, the American Carbon Registry, and the Climate Action Reserve. Voluntary carbon markets have experienced significant growth in recent years (*see Graph 1 and Graph 2*).[7]

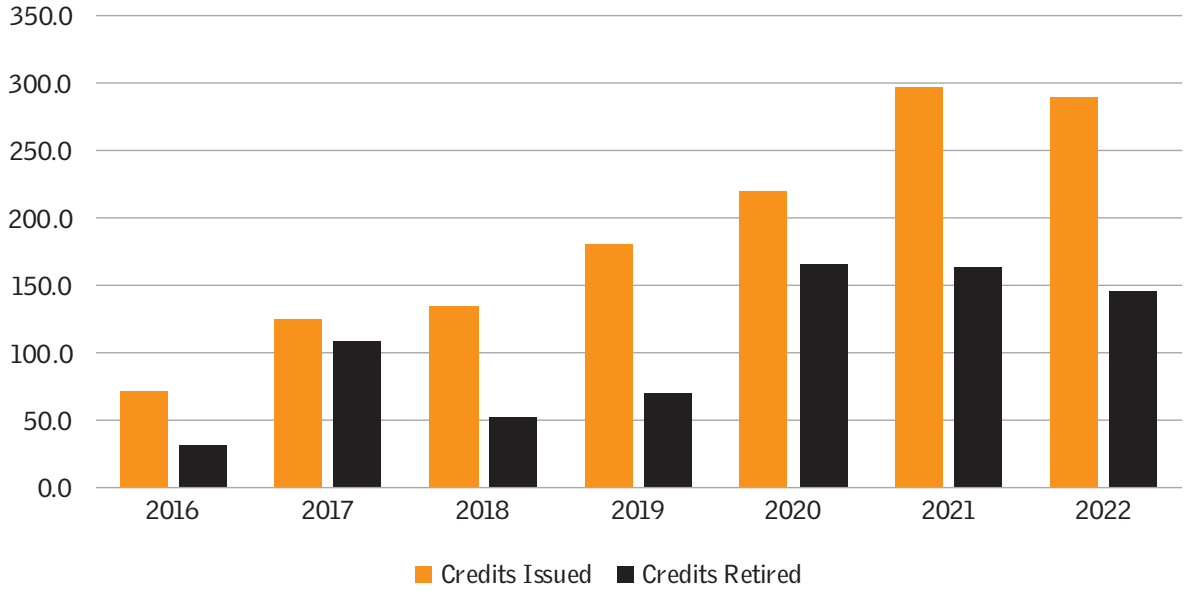
CBL, an exchange dealing in carbon credits, reported that 121.6 million and 116.1 million credits with trade values of US $551.3 million and US $795.1 million were traded on the platform in 2021 and 2022, respectively.[8] Market researcher Ecosystems Marketplace recorded transactions of 493.1 million carbon credits worth US $1,985 million in 2021 in the carbon market.[9] About 196 million credits were 'retired' in 2021—40 per cent of the total credits

Graph 1: Credits issued in voluntary carbon markets over the years



Source: 2022 VCM Forecast & Retirement Analysis, Allied Offsets

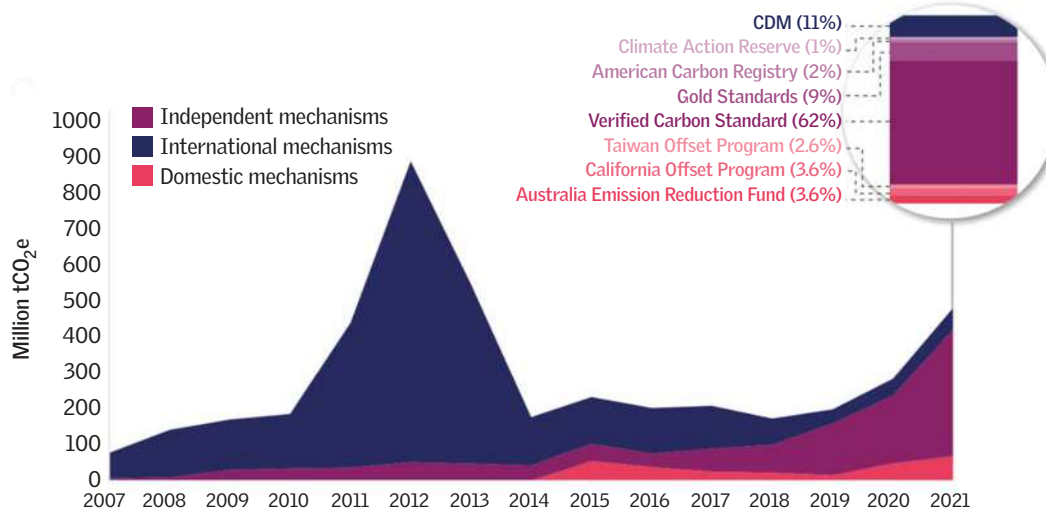
Graph 2: Volume of credits issued and retired across four major registries—VCS, GS, ACR, CAR



Source: Berkeley Carbon Trading Project

that exchanged hands that year.[10] Graph 2 represents the volume of credits exchanged under different crediting mechanisms (both voluntary and compliance mechanisms). Graph 3 represents the volume of carbon credit issuance by crediting mechanisms in 2022.

Graph 3: Global volume of issuance by crediting mechanism



Source: State and Trends of Carbon Pricing 2022, World Bank[11]

Table 3: Share of global volume of carbon credit issuance by crediting mechanism in 2022

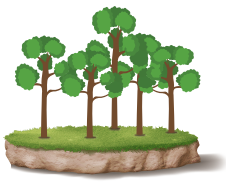
Mechanism	Scope	Share
Verified Carbon Standard	Independent	42%
Clean Development Mechanism	International	32%
Gold Standard	Independent	8.2%
American Carbon Registry	Independent	4.6%
Australia ERF	Domestic	3.7%
Climate Action Reserve	Independent	2.5%
California Compliance Offset Program	Domestic	2.4%
Alberta Emission Offset Program	Domestic	1.3%
British Columbia Offset Program	Domestic	1%
Thailand Voluntary Emission Reduction Program	Domestic	0.9%
Plan Vivo	Independent	0.4%

Source: State and Trends of Carbon Pricing 2023, World Bank

CARBON CREDITS: ISSUANCE TO RETIREMENT

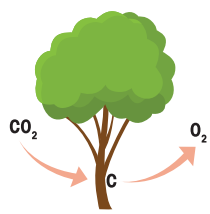
The Stella McCartney Summer 2023 Fashion Show, held in Paris, was labelled as a 'low-carbon event'. This was made possible by offsetting the corresponding emissions of the event through carbon credits. Some of the offsets came from trees planted two decades ago by farmers in central India with the assistance of Mangalam Timber Products Limited, a timber company.[12,13] But how exactly did this happen?

Issuance



A timber company entered into an agreement with farmers to plant eucalyptus trees in their land. The company provided seedlings and fertilizer to farmers at competitive prices, and agreed to buy back the harvested timber at the prevailing market price.

For earning carbon credits, the company registered the project with a **certifying platform** (a standard programme like the **Verified Carbon Standard Program**).



In this case, the **scientific premise** is that the saplings planted would grow up to become trees, thereby storing carbon all those years and removing carbon dioxide from the atmosphere.

The timber company engaged a **'project developer'** to make the project certification-ready. The project developer conducted a **baseline emissions assessment**. This assessment determined the emission scenarios of the land in absence of the project.

The developer then prepared a **Project Design Document** (PDD). It described the project and its expected GHG removal over the next few years. It included information on the project's design, methodology (used for calculating the baseline emission and GHG removal through the project), monitoring and verification plan.

The next step was to have the project **validated and verified** by an independent **third party**. The validator reviewed the PDD and the project documentation to ensure that the project met the standard programme's requirements.

Upon successful verification, the validator issued a validation report (and a verification report). This report confirmed that the project was eligible for carbon credits.

The project was registered with the **standards programme** after submitting the validation report, PDD, and other relevant documentation. The standard programme reviewed the project documentation and registered it for carbon credits.

After registration, the project developer needed to **monitor and report** emissions reductions to the standard programme, which included measurements of the plantation project's carbon sequestration. The project had to be verified by an independent third party annually through on-site inspections and documentation review to ensure accurate emissions reductions.

When the project's emissions reductions were verified, the standard programme **issued carbon credits** to the project developer, which were then ready to be sold on the carbon market.

This is typically how a carbon credit is generated in the voluntary carbon market. But this still does not explain how the credits ended up with a fashion event in Paris and what they did with the credits. In fact, what purpose did it serve the timber company? For this, an understanding of the trade and retirement of credit is important.

Trade and retirement

What the timber company wanted to do with the credits was to sell them in the market and receive money in return. There were several ways to achieve this, but information on trades is mostly confidential. Therefore, we can only consider the possible ways.

One possible way is that the company engaged a broker, who had connections with the event organizers and sold the credits to them. The broker and the company had a contract, and the broker received a cut from the sale.

Alternatively, the company could have sold the credits directly on the marketplace.

The credits may have also been 'tokenized' into digital tokens and traded on a blockchain platform. Tokenization allows carbon credits to be divided into smaller units, making them more accessible and tradable. Asset tokenization is being carried out through blockchain technology. Blockchain is a distributed digital ledger technology that records transactions without a central authority. The technology is used to create tamper-resistant, traceable, hard-to-fake transaction records.

Or, the credits could have changed hands multiple times through sale and resale by intermediaries working in speculative markets, who buy credits when the prices are low and sell carbon credits when the prices are high, before reaching the company organizing the event in Paris.

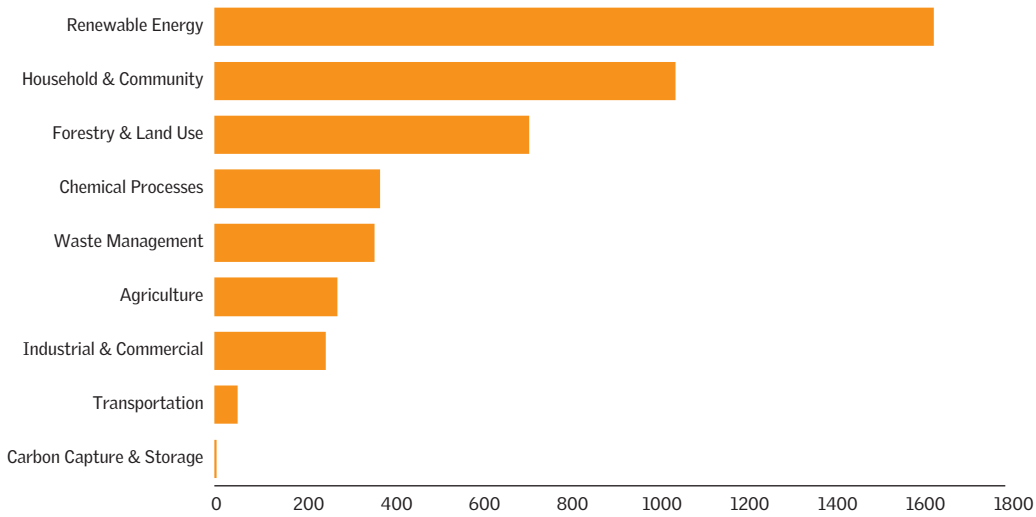
Once the event organizers purchased the carbon credits as end buyers, they were retired. This means that the credits were removed from circulation and could no longer be used or traded. Retirement ensures that the carbon credits are not double-counted, meaning they cannot be sold to more than one buyer or used by the project itself to meet emissions reduction targets.

Credit retirement is typically recorded and tracked on a registry, which is a public database that lists all the carbon credits issued and retired by a particular project or organization.

Types of projects

Projects can be categorized based on 1) the sectors from which the credit originates, and 2) intended outcomes—removal of carbon from the atmosphere or reduction of emissions from an existing activity. These categories help in understanding the different approaches used to reduce GHG emissions and generate credits.

Graph 4: Sectoral types of carbon credit projects registered with four independent registries (VCS, GS, ACR, CAR)



* Household and community projects include biodigesters, cookstoves, etc.
Source: Berkeley Carbon Trading Project[14]

Types of projects by sector:

- **Renewable energy**: This category promotes the use of clean energy sources to reduce GHG emissions. Common projects include grid-connected electricity generation from solar, wind, hydropower, geothermal or biomass. In fact, 32.4 per cent of all credits issued in voluntary carbon markets belong to this category. About 90 per cent of these credits are for centralized electricity generation from renewable sources, with wind (49 per cent), hydropower (33 per cent), and centralized solar (15 per cent) being the most common. About 40 per cent of all renewable energy projects with issued credits come from India (across the four major registries—VCS, GS, ACR, CAR).
- **Nature-based solutions:** Projects in this category focus on ecosystem-based approaches to reduce emissions and/

or increase the removal of GHGs from land-use activities, forestation, agricultural techniques, agroforestry, wetland restoration, etc. This category constitutes the largest share of issued credits in voluntary carbon markets, with the highest mobilization across the US, Indonesia, Brazil and Peru.

- **Household and community**: This category has drawn the third-largest share of issued credits. Most of the credits are earned by clean cookstove projects, and there are over 500 clean cookstove projects registered with major programmes.
- **Transportation**: Close to 1 per cent of all registered projects belong to the transportation sector. Most of the projects are focused on electric vehicles and charging, as well as energy efficiency projects for public transportation.
- **Waste management**: Projects in the market from the waste sector mainly involve the flaring of landfill methane or using it in other applications. The US and China have two-thirds of the projects with issued credits.
- **Industrial and commercial**: This category mostly includes coal-mine methane capture projects from the US, China and Germany. Other projects include waste heat recovery, industrial energy efficiency, and natural gas electricity generation.
- **Chemical processes**: Most listed projects are those that recover and destroy ozone-depleting substances. Over 90 per cent of these projects originate from the US.
- **Carbon capture & storage**: This category includes projects that capture and store carbon. The number of projects in this category is currently low, but it is expected to grow as there is a push for carbon capture technologies, including direct air capture.

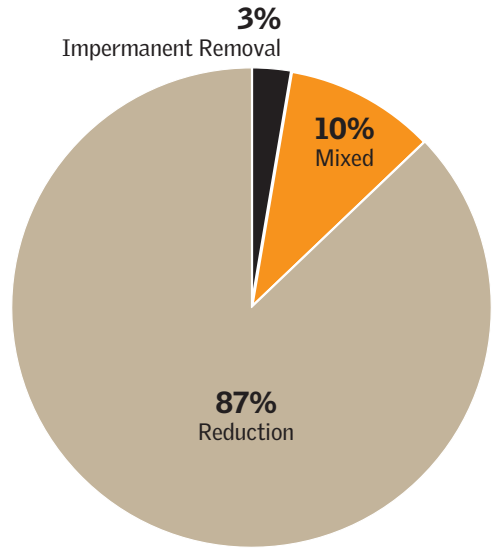
Types of projects based on intended outcomes:

- **Reduction/avoidance:** Reduction or avoidance offsets are from changing practices which lead to lower emissions, like shifting from fossil-based power generation to renewable power generation. This could also be a cookstove project that reduces or completely avoids the use of firewood for cooking or a waste management project that manages landfill methane.
- **Removal:** Removal offsets are from activities that remove CO_2 and other GHGs from the atmosphere. These offsets involve activities or projects that actively capture/sequester and store

carbon, such as reforestation, afforestation or carbon dioxide removal (CDR) technologies. Removal projects can further be of two types based on the length of storage of removed carbon: **Permanent Removal** projects, such as engineered removal technologies like direct air capture, which store carbon in underground storages for a long time; **Impermanent Removal** projects which have relatively short-lived storage, such as afforestation projects, where there is a risk of losing sequestered carbon back to the atmosphere if a forest fire occurs.

- **Mixed:** There are certain projects that claim to both reduce/avoid and remove carbon, such as Improved Forest Management (IFM) projects or REDD+ projects.

Graph 5: Classification of projects across four key registries—VCS, GS, ACR, and CAR—based on the nature of offset

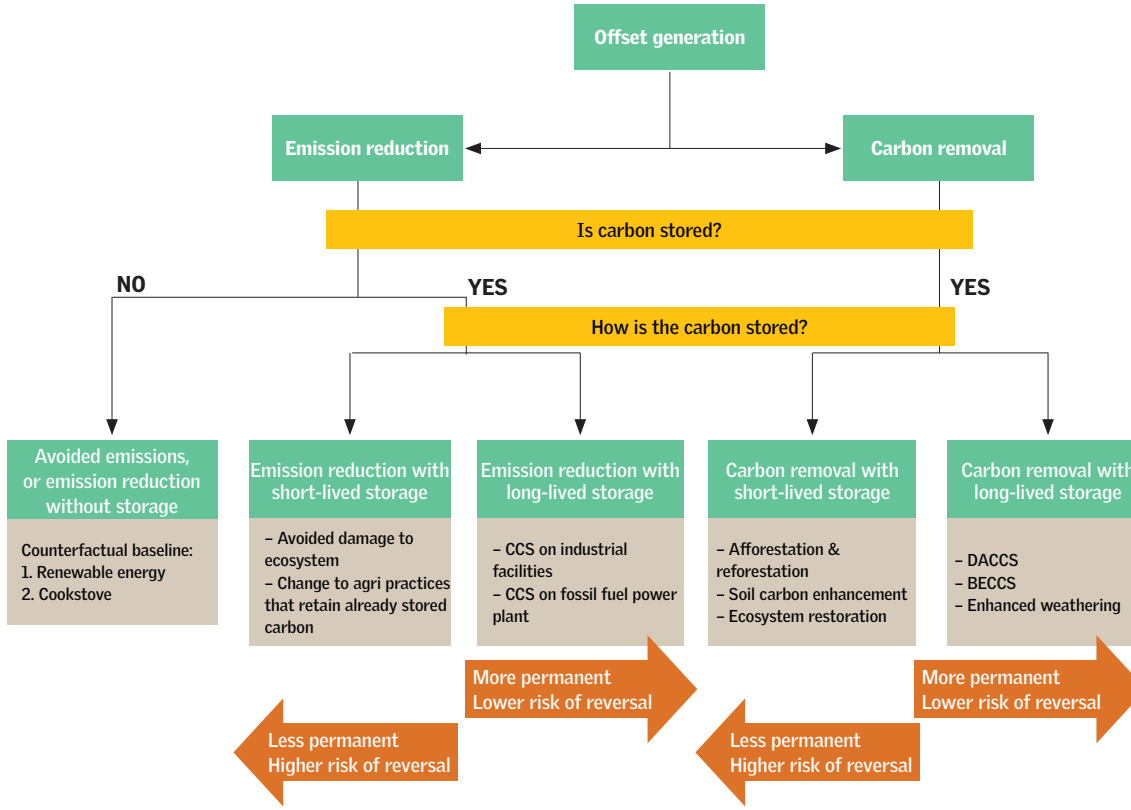


Source: Berkeley Carbon Trading Project

What is the value of a carbon credit and how is it determined?

Offsetting implies that the marginal cost of abatement is higher than the selling price of offsets (and so companies buy offsets instead of abating emissions). Thus, the higher the price of offsets, the higher the preference for abatement. A free-flowing market in this sense would divert money to offsetting options where abatement incurs the lowest cost.

Figure 4: Carbon offset classification



Source: Oxford Principles for Net Zero Aligned Carbon Offsetting[15]

The value of a carbon credit, however, depends on several factors, including the market demand and supply of credit, the type of project that generated the credit, etc.

Type of project: For instance, clean cookstove projects, which claim to reduce emissions by providing efficient/clean cookstoves to communities in Asia and Africa, typically sell one tonne of CO_2 equivalent (tCO_2e) for around US $7–10. In contrast, direct air carbon capture and storage (DACCS) sells one tCO_2e for around US $300–1,100. This is because the cost of applied technology is different; also, removals can more concretely be established in a DACCS setup than in a cookstove distribution programme.

Removal or avoidance: Projects where carbon is 'removed' from the atmosphere (sequestration), such as an agroforestry initiative

Table 4: Forestry, renewables in focus

Globally, most carbon credit transactions occur in forestry and land-use sectors

Sector	2021		
	Volume (tCO_2e)	Price ($/tonne)	Value (mn $)
Forestry and land use	227.7	5.8	**1,327.5**
Renewable energy	211.4	2.26	**479.1**
Energy efficiency / Fuel switching	10.9	1.99	**21.9**
Agriculture	1	8.81	**8.7**
Waste disposal	11.4	3.62	**41.2**
Transportation	5.4	1.16	**6.3**
Household devices	8	5.36	**43.3**
Chemical processes/ industrial manufacturing	17.3	3.12	**53.9**

Source: Ecosystem Marketplace

or direct air capture, are under-supplied in the market compared to 'avoidance' projects, where emissions are claimed to have been avoided due to the project activity, such as renewable energy projects or REDD+ projects.

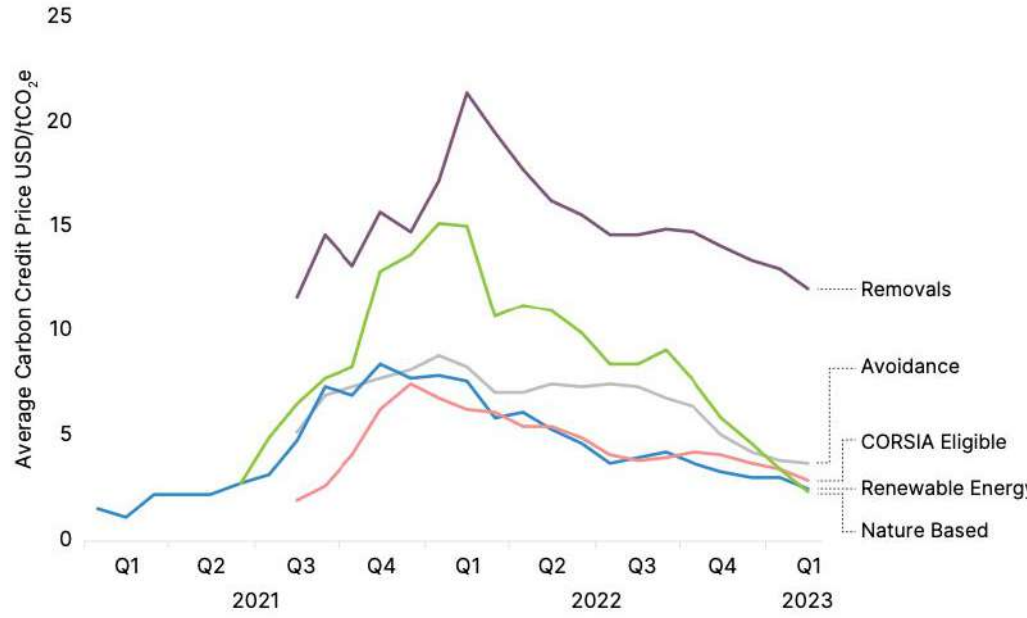
Graph 6 shows removals as a combination of nature-based and engineered-removal projects. Avoidance represents carbon credits from projects that avoid emissions. Nature-based reflects nature-based carbon credits from projects that either reduce/avoid or remove emissions. Renewable energy reflects carbon credits from renewable energy projects that avoid emissions. CORSIA Eligible reflects carbon credits eligible for use in the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) programme.

Country of origin: Price is also affected by the location of the project. For instance, carbon credits from a REDD+ project can command higher prices if the rates of deforestation are high in the country or the region, such as a REDD+ project based in Brazil.

Vintage: Vintage of a carbon credit indicates the year in which the emission reduction or removal occurred that corresponds to the credit. Credits with older vintages may have a lower value.

Project co-benefits: A project can get other kinds of certifications, such as an SDVista certification from Verra that considers aspects of community benefit and SDG fulfilment from the project.

Graph 6: Removal credits are clearly sold at a premium as against other types of carbon credits



Source: State and Trends of Carbon Pricing 2023, World Bank

Certification improves the quality and price of the carbon credit associated with it.

Other than the actual value derived from the project's impact on reducing GHG emissions and resulting benefits, the price of carbon credits is also determined by fundamentals of the market—such as supply and demand, economies of scale, wholesale value, etc. In other words, the price of carbon credits is not necessarily a direct reflection of the actual impact of a project in reducing emissions.

What are the different types of transactions?

There are several ways in which entities transact carbon credits in voluntary carbon markets.

- A buyer can purchase listed credits on carbon exchanges such as the London-based Carbon Trade Exchange. These may typically be listed by project developers, brokers and traders, and owners of credit.
- Buyers may purchase carbon credits through brokers who specialize in offset sales. Brokers usually buy credits in bulk directly from project developers. Brokers may also help buyers

to create portfolios of credits that serve their best interests, and offer consulting services.

- Buyers may directly negotiate with project developers or credit owners to purchase carbon credits. This may involve the buyer providing funding for the development of a new offset project, in exchange for the resulting carbon credits.
- Buyers may directly fund project developers. In 2020, the oil giant Shell launched a joint venture with an Indian project developer, EKI Energy Services, to develop nature-based solutions projects in India.
- Some companies specialize in selling carbon offsets to individuals and businesses, typically for small-scale emissions reductions. These retailers may purchase carbon credits from project developers or brokers, and then sell them to their customers at a markup.
- Some companies offer ongoing carbon offsetting subscriptions, where customers pay a regular fee to offset their emissions. These services typically work by purchasing carbon credits on behalf of their customers from project developers or brokers.

Abatable notes in its report that financial models prevalent in the carbon market are fast evolving alongside the carbon project development curve.[16] Corporates and carbon funds are getting involved in the early stages of project development. That could potentially reduce the role of standard setting, traditional intermediaries and the way carbon credit is transacted.

What benefits are offered to the community?

There are projects which involve communities as stakeholders. These could most prominently be:

i. Cookstove distribution projects where the end-user or offsetting entities are households that transition to relatively cleaner cooking fuel by using efficient firewood-based cookstoves,.
ii. Agroforestry, community forestry, REDD+ projects and other afforestation/reforestation projects that use private or community-owned lands to sequester carbon.
iii. Agriculture projects such as those that claim benefits derived from adoption of sustainable farming practices.
iv. Community borehole projects and safe drinking water supply projects for community use.

COOKSTOVE PROJECTS

There are projects, mostly based in Africa and South Asia, that distribute cleaner cookstoves to communities that traditionally utilized firewood for cooking. In recent years, cookstove distribution as a business model in the carbon market has really picked up. Over 300 cookstove projects were added in key registries in 2022 alone.[17]

Illustration of transactions in a cookstove project

Source: CSE

Clean cookstoves are sourced from manufacturers by developers and then distributed by them. In some cases, developers act as both manufacturers and distributors. Typically, a 'clean cookstove' costs anywhere between US $2–100. Each cookstove is reported to offset between 2–4 tCO_2e per year. Carbon credits are given for a typical period of 5–7 years considering the cookstove's life.[18] Considering these figures, in a five-year lifetime, a cookstove could generate 10–28 carbon credits. Current prices in the market are between US $7–10 per credit for cookstove projects. Thus, US $70–280 could be earned per cookstove.

Therefore, the cookstove distribution industry is thriving in the carbon market with lucrative returns for developers and their investors.

But, as we will discover in the India-specific section of this report, serious concerns exist with the cookstove business. These concerns include a range of critical issues, including problematic offsetting claims and exploitative practices masquerading as climate action.

v. Biodigester installations, solar lamp distributions and efficient lighting.

A carbon credit project that involves a community directly or indirectly should create value for the people of the community. This value can be both financial, such as through the share of proceeds from the sale of carbon credits, and non-financial, through free and equal access to resources that the community is entitled to receive.

While voluntary carbon credit programmes encourage benefit-sharing, standardized rules on benefit-sharing do not exist within the ecosystem. Nevertheless, project developers engage in benefit-sharing arrangements with the community, as this improves the quality of the project and offers a premium on carbon credit sales. However, these arrangements vary widely from project to project and are often opaque, making it difficult to test the veracity of claims made by the project.

1.3 INTERACTION OF VOLUNTARY CARBON MARKETS WITH OTHER MECHANISMS

As the carbon market system lacks uniformity and standardization, understanding the working of various frameworks within the carbon market can be a challenge. REDD+, CORSIA and Article 6 of the Paris Agreement are important mechanisms whose relevance for voluntary carbon markets needs to be understood.

1.3.1 REDD+

REDD or Reducing Emissions from Deforestation and Forest Degradation was introduced as a framework to incentivize forest conservation and prevent degradation in developing countries through financial mechanisms including carbon credits. REDD+ was introduced to incentivize enhancement of forests and forest carbon stock through these mechanisms.

Countries develop a 'reference level' as a baseline scenario during the development of their national REDD+ strategy and this reference level serves as a benchmark against which their emissions reductions are measured.

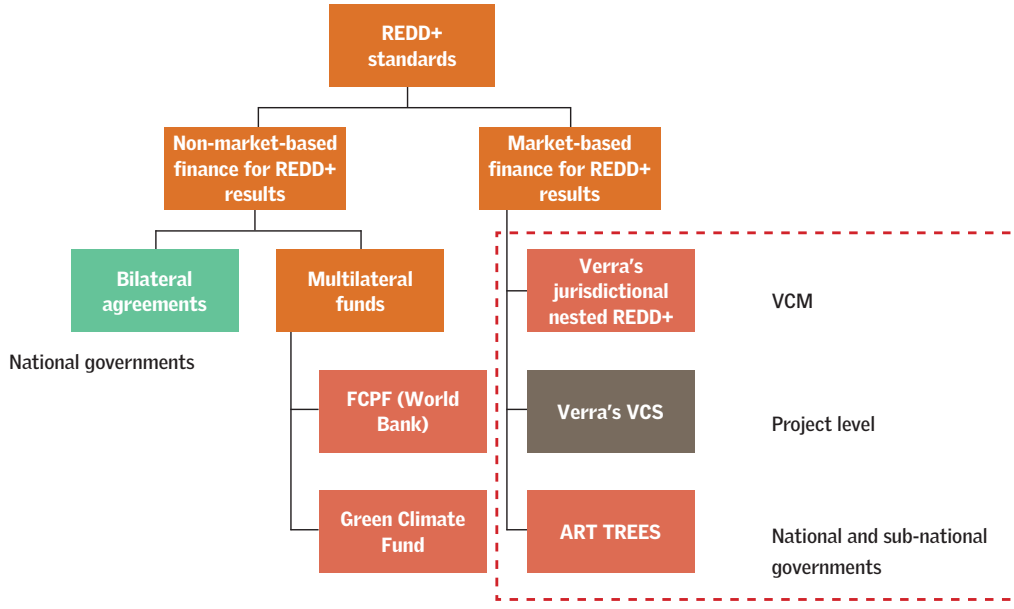
How are REDD+ projects financed?

Financing for REDD+ projects happens from varied sources and can be both market-based as well as non-market-based. Therefore, different standards and frameworks have evolved to finance REDD+ projects.

There are bilateral agreements between countries wherein one country agrees to pay another for taking up REDD+ activities i.e., achieving emission reduction from preventing deforestation.

Then there are multilateral funding mechanisms and corresponding frameworks such as the World Bank's Forest Carbon Partnership Facility (FCPF) that provides grants, loans and results-based payments for the development and implementation of REDD+ projects. In 2021, FCPF issued the world's first payment for independently verified jurisdictional REDD+ emission reductions to Mozambique. Jurisdictional REDD+ programmes cover an entire region and are run only by governments. In contrast, individual REDD+ projects may be run by private companies, NGOs, communities or governments.

Figure 5: Financing of REDD+ projects



Source: CSE

Pilot result-based payments were also made from the Green Climate Fund between 2017–22 for a few REDD+ projects.

The standards body Verra operates two frameworks under market-based approaches—the Jurisdictional and Nested REDD+ (JNR) framework for national and sub-national governments and the common Verified Carbon Standard (VCS) framework for other stakeholders hosting individual projects.

The Architecture for REDD+ Transactions (ART) operates the REDD+ Environmental Excellence Standard (TREES) framework. This only considers national and sub-national government-led projects.

How are they related to voluntary carbon markets?
REDD+ projects under market-based frameworks—such as the projects under Verra's VCS or ART's TREES—can be considered as belonging to voluntary carbon markets. The results achieved against a set offset are sold like other credits in the offset market.

As of August 2023, 93 REDD+ projects were registered with Verra's VCS programmes and over 431 million carbon credits (i.e., 431 million tonnes of CO_2e) have been issued under it.[19]

1.3.2 CORSIA

CORSIA or the Carbon Offsetting and Reduction Scheme for International Aviation is a mechanism put in place by the International Civil Aviation Organization (ICAO) to promote carbon neutrality in the aviation sector. It is essentially a baseline-and-crediting mechanism and a first-of-its-kind for any sector. Airlines and aircraft operators are supposed to offset the growth of their emissions after 2020. The pilot phase of the mechanism began in 2021 and is only applicable to international aviation. CORSIA will remain voluntary for participants until 2027 and over 115 countries have agreed to participate in the programme. Beyond 2027, the programme will become mandatory with a few exceptions.

Participants can source emission reduction units (carbon credits) from voluntary registries including Gold Standard, ACR and VCM. Emission reduction units can also be sourced from REDD+

frameworks such as FCPF and ART. Thus, obligated parties can source offsets from voluntary carbon markets.

1.3.3 Article 6 of the Paris Agreement

The Paris Agreement is a major global agreement adopted by the United Nations Framework Convention on Climate Change (UNFCCC) and signed by over 195 countries to combat climate change and limit global warming below 2 ^{o}C above pre-industrial levels. Under the agreement, each country has committed to take a set of climate actions called 'Nationally Determined Contributions' (NDCs), as a voluntary contribution to the international effort. Article 6 of the Paris Agreement discusses how countries can work together to take climate action, i.e., it discusses rules for cooperative approaches to fulfil NDCs. In other words, using carbon markets (Article 6.2, 6.4) and non-market approaches (Article 6.8).

The main features of the article are described in the following sections.

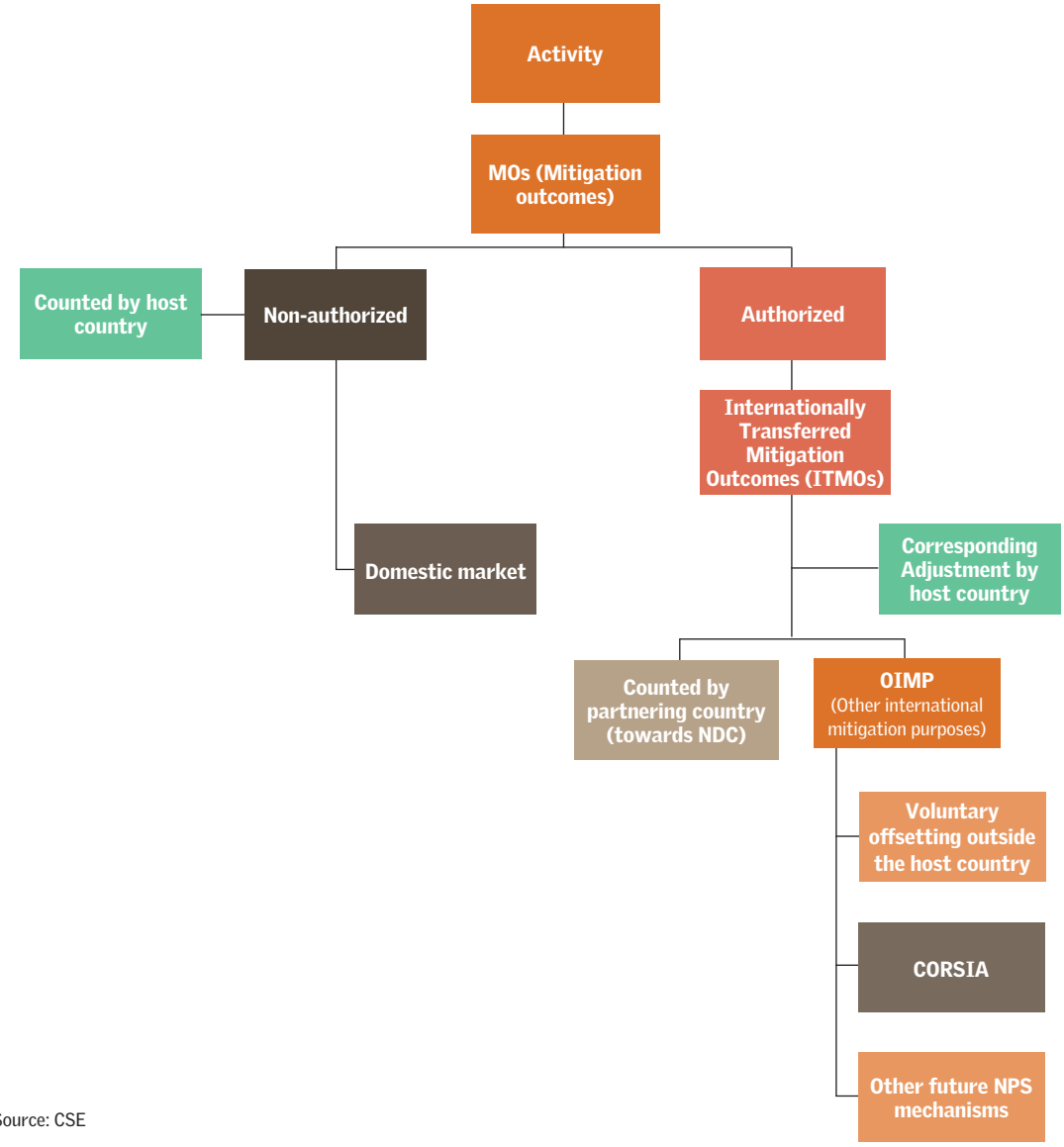
Article 6.2

It allows countries to enter into agreements that let them issue and transfer emission reduction units called Internationally Transferred Mitigation Outcomes (ITMOs) generated through GHG-reducing projects. The transfer can be made towards any of the following objectives:

a. To another country which would be accounted towards the other country's NDC objective.
b. Transfers to other market-based international mechanisms such as CORSIA.
c. Transfers for 'other purposes', such as to non-state agencies or private companies, also called Non-Party Stakeholders (NPS) by the UNFCCC.

The transfer would be contingent upon the host country making a 'corresponding adjustment' (CA) that would require it to not use the emission reductions, sold outside the country, towards its own NDC goal.[20]

Figure 6: Depiction of Article 6.2 mechanism



Source: CSE

Interpretation:

i. The market would be regulated by domestic government norms.

ii. Mitigation outcomes could be used to meet both compliance (NDC obligations) as well as voluntary (transfer for other purposes) objectives. But the choice of satisfying these demands remains with the government.

iii. It does not directly address voluntary carbon markets based on independent certification programmes.

iv. A private entity might choose to offset its emission from credits 'authorized' by Article 6.2 (transfers for other purposes) or credits that are sourced from non-authorized programmes.
v. As for independent standard programmes of the voluntary market, they may tweak their processes and methodologies to conform with Article 6 rules and norms.

Authorization: Authorization is a process that decides if the mitigation outcomes, that is real, additional emission reduction or removal would become ITMOs and thereby be used for fulfilling the other country's NDCs or for other international mitigation purposes, such as CORSIA. Host countries would apply 'corresponding adjustment' to their emissions against the transferred ITMOs so that they are not double counted.

Article 6.4

It establishes a global carbon market overseen by a centralized UN body called the 'Article 6.4 Supervisory Body'. It's a multilateral mechanism that replaces the old CDM, thus effectively establishing an international carbon market within the scope of the Paris Agreement. Article 6.4 based emission reductions would be called A6.4ERs

Interpretation:

i. It creates a compliance market allowing both compliance and voluntary demands to be met, like the Article 6.2 mechanism (assuming that it replaces the CDM).
ii. Article 6.4 based emissions reductions can be used in two ways. If authorized by the host country, it would become an ITMO, and be utilized in the same way ITMOs are utilized under the 6.2 mechanism. Non-authorized emissions reductions will go as A6.4ERs to support domestic market and voluntary ambitions within the host country.

Article 6.8

It recognizes non-market approaches to international cooperation wherein parties may cooperate in the fulfilment of their NDCs but without ITMOs.

Interaction with voluntary carbon markets

Independent carbon crediting programmes, such as Verra's VCS, which primarily operate within what is known as voluntary carbon markets, are not regulated by Article 6 of the Paris Agreement. There are uncertainties surrounding how the voluntary markets will function with the operationalization of Article 6. Will 'corresponding adjustment' be applicable to voluntary carbon market-based carbon credits? Will there be fungibility between voluntary carbon market-based carbon credits and ITMOs?

If voluntary carbon markets are to operate under the umbrella of Article 6, they will be required to comply with Article 6 rules. This means addressing regulatory and integrity issues in the markets. Nevertheless, some countries have already been considering the use of voluntary carbon market-based carbon credits for Article 6 purposes. For instance, Singapore has signed an MoU with Verra to offset 5 per cent of its emissions reduction obligations starting in 2024.

While the Article 6 rulebook has been finalized, modalities are still being worked out. It will take some time before the rules are fully operationalized. Its influence on voluntary carbon markets will depend on each country's actions and decisions regarding independent crediting programmes.

Until then, however, voluntary carbon markets will continue to gain traction, attracting more private engagement, especially since they are free from regulations.

2

INDIA AND VOLUNTARY CARBON MARKETS

- **One-fifth of the issued credits under the two major crediting programmes Verra and Gold Standard originate in Indian projects. About 90% of the credits issued belong to renewable energy projects; while project categories such as improved cookstoves are rapidly growing.**

- **Carbon credits issued to Indian entities till mid-2023 were worth about 10% of India's annual GHG emissions in 2020.**

- **CSE visited about 40 projects in India and found that the labour and land of communities living there were central to the projects, but they were excluded from the benefits of the carbon market.**

Under the Clean Development Mechanism (CDM) of the Kyoto Protocol, India emerged as one of the largest issuers of Certified Emission Reductions (CERs). Until 2015, over one and a half billion CERs were issued through the CDM, with 13.1 per cent of them originating from projects in India, which was second only to China (which accounted for 59 per cent of all CERs).[21] The Mid-Himalayan Watershed Development Project was one of the largest CDM projects in the world. India, therefore, is not new to crediting mechanisms in the carbon market.

2.1 INDIA-BASED PROJECTS IN VOLUNTARY CARBON MARKETS

Even in voluntary carbon markets led by independent crediting mechanisms, Indian projects hold a fair share of the supply side of the market. It must be highlighted that India has a **dominant supply-side ecosystem** with about 1,451 projects registered or under various stages of consideration under two major crediting programmes, VCS (Verra) and Gold Standard, as of May 2023. This represents 23 per cent of all projects registered or under consideration in the two programmes.[22]

Many of these projects are new and under consideration as the process for them began in the last two years. They are yet to be recognized as registered projects. About 59 per cent (860) of the projects under the two programmes mentioned above are registered/certified as eligible to receive carbon credits.

2.1.1 Credit issuance

Verra and Gold Standard represent almost 50 per cent of all crediting programmes by issuance volume of carbon credits and about 90 per cent of all independent crediting programmes.[23] India dominates the two programmes with around 298 million credits having been issued to India-based projects (over one-fifth of all credits issued under the two programmes). Of these, 41.3 million were issued in 2020 and another 25.5 million in 2021 (*see Table 5*).

2.1.2 Credit retirement

India has retired the highest number of carbon credits among all countries, with 176.8 million credits retired until 2022, amounting

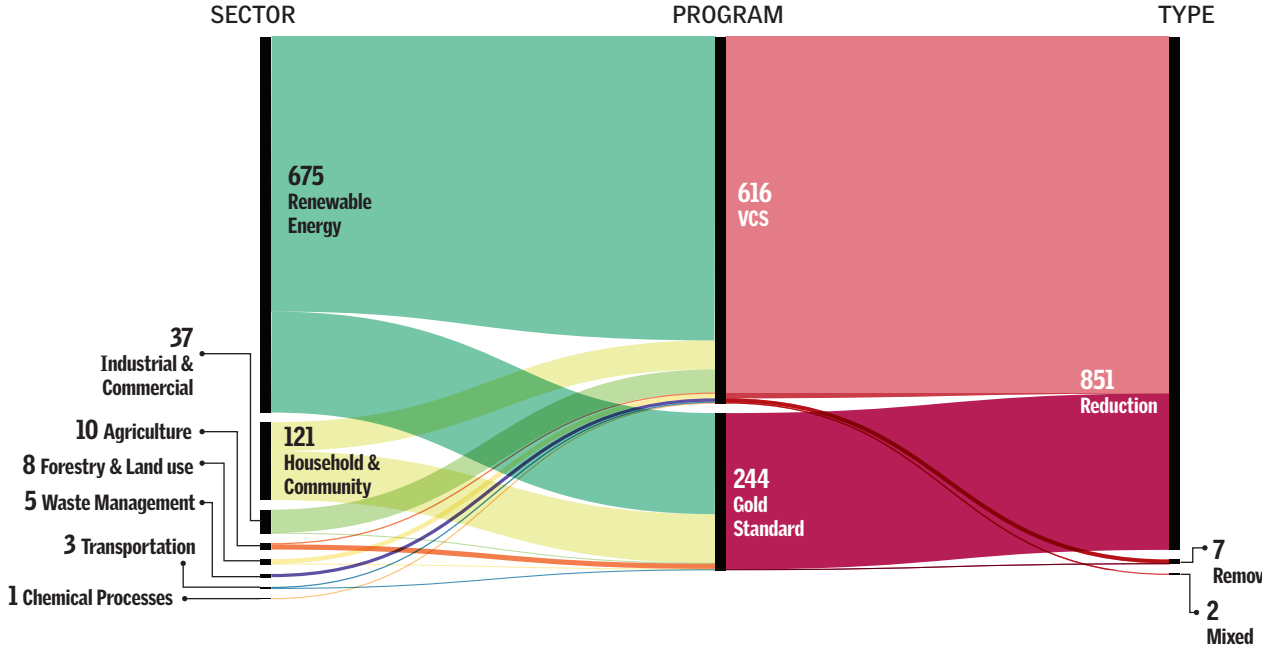
to 17.8 million tCO_2e consumed for offset in approximately 15 years.[24] China follows with the next largest set of retired credits, at 108.3 million.

Table 5: India's vibrant carbon market

India has 860 projects eligible for carbon credits. Till May 2023, the projects have bagged 298 million credits; 55 per cent of these credits have been retired (used or claimed) by firms to offset their emissions

Projects by scope & type	Registered projects	Credits issued	% of credits issued	Credits retired	% of retired credits
Agriculture	10	570,092	0.19	511,373	0.31
Chemical processes	1	408,975	0.14	0	0
Forestry & land use	8	2,229,948	0.75	537,469	0.33
Household & community	121	11,769,724	3.95	4,525,043	2.76
Industrial & commercial	37	14,028,974	4.71	9,657,484	5.89
Renewable energy	675	268,241,741	90.01	148,460,360	90.57
Transportation	3	186,613	0.06	90,004	0.05
Waste management	5	572,135	0.19	138,807	0.08

Graph 7: Projects from India certified by Verra and Gold Standard as eligible to receive credits



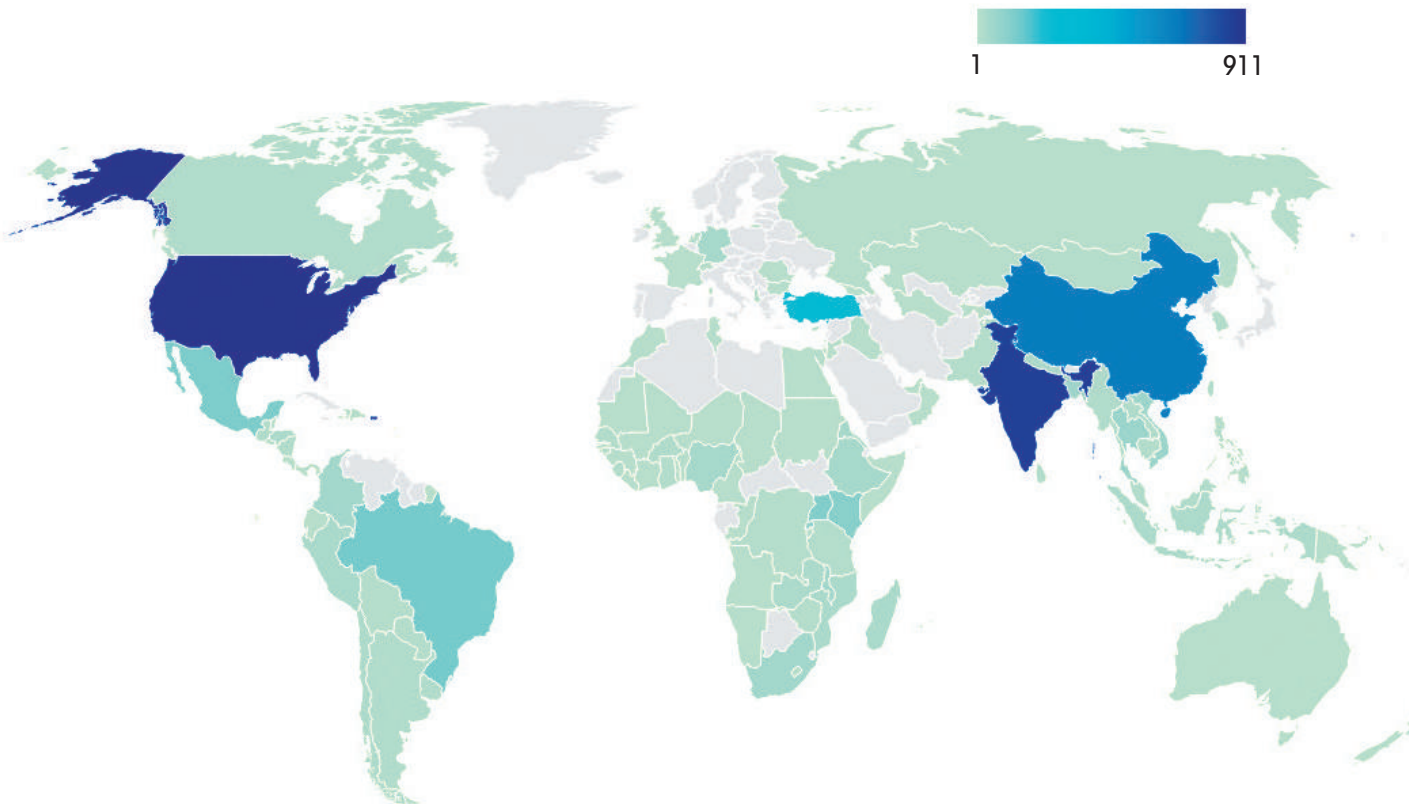
*The projects have been classified based on sectors and reduction/removal type. Mixed category projects have both reduction and removal elements, for example, a land restoration project.

Source: Berkeley Carbon Trading Project

Table 6: Countries and their preferred carbon-offset projects
Seven of the top eight countries in terms of carbon credit projects are in the Global South

	Agriculture	Carbon capture and storage	Chemical processes	Forestry and land use	Household and community
Uganda	-	-	-	-	10
Kenya	1*	-	-	12	88
Mexico	4	-	-	104	4
Brazil	15	-	-	31	4
Turkiye	2	-	-	-	-
China	42	-	2	46	122
India	9	-	1	6	113
United States	182	6	341	246	2

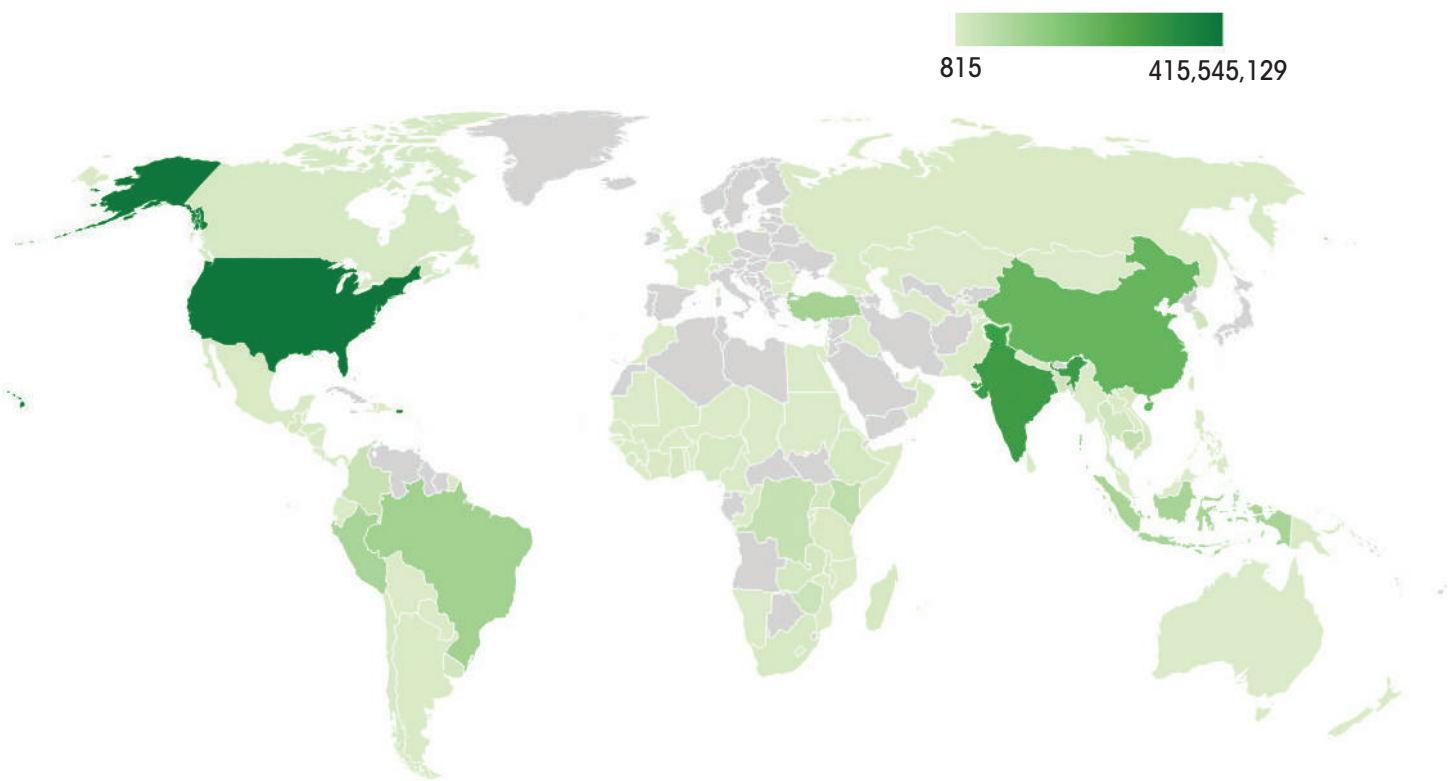
Map 1: Country-wise registered carbon projects across four major independent crediting programmes—VCS, GS, ACR, CAR



Industrial and commercial	Renewable energy	Transportation	Waste management
86	-	4	1
-	5	-	-
1	6	-	5
1	68	2	10
2	207	1	11
39	327	-	46
33	579	3	4
70	14	38	166

*Number of project(s); Source: Berkeley Carbon Trading Project

Map 2: Credits issued by Country across four major crediting programs—VCS, GS, ACR, CAR



Source: Berkeley Carbon Trading Project

2.2 INDIAN PARTICIPANTS IN VOLUNTARY CARBON MARKETS

While the number of intermediary firms including developers, VVBs, brokers, and others cannot be definitively estimated, a broad picture of the ecosystem as it exists in India can be drawn.

2.2.1 Project developers

Over 500 project developers from India have participated in major carbon crediting programmes. Most of these are big renewable power developers like Renew Power, Adani Greens, Orb Energy, etc. However, there are others that primarily function as developers of carbon credit projects.

As of 2022, the Indore-based EKI Energy Services Ltd. was among the top ten largest project developers and the fastest-growing project developer in the world. EKI has seen phenomenal year-on-

Table 7: Global stocktake

At least 6,481 projects are registered or listed with the world's two leading carbon registries, Verra and Global Standard. Till May 2023, these registries have issued 1.4 billion carbon credits

Project Type	Projects (registered and listed)			Credits (issued only for registered projects)		
	World	India	India's % share of world	World	India	India's % share of world
Agriculture	606	61	10.07%	15,401,128	570,092	3.70%
Chemical Processes	19	1	5.26%	11,428,040	408,975	3.58%
Forestry and Land Use	703	71	10.10%	525,406,487	2,229,948	0.42%
Household and Community	2,198	352	16.01%	124,132,149	11,769,724	9.48%
Industrial and Commercial	238	50	21.01%	96,737,867	14,028,974	14.50%
Renewable Energy	2,278	891	39.11%	583,862,426	268,241,741	45.94%
Transportation	45	11	24.44%	462,757	186,613	40.33%
Waste Management	388	14	3.61%	58,185,213	572,135	0.98%
Carbon Capture and Storage	6	0	0.00%	14,581	0	0.00%
Grand Total	**6,481**	**1,451**	**22.39%**	**1,415,630,648**	**298,008,202**	**21.05%**

Source: Berkeley Carbon Trading Project, University of California, US

year growth of 40 per cent, with 34.2 million carbon credits issued in 198 projects. The company has projects in renewable energy, afforestation and cookstoves under its name in the carbon market. There are also other big developers like Envirofit International, VNV Advisory Services and Core CarbonX Solutions.

Table 8: Top 12 RE-based developers based on carbon credits issued

The top 12 renewable energy project developers account for 57% credits bagged by the sector

Project developers (renewable energy)	Credits issued (in million)	Major sectoral source of credits
Jaiprakash Hydro Power Limited	28	Hydropower
JSW Energy	20	Hydropower
Adani Renewable, Enterprise and other Adani Group Subsidiaries	15	Solar
CLP India	12	Wind
Mytrah Group	12	Wind
Tamil Nadu Spinning Mills Association	11	Wind
Acme Group	11	Solar
NHPC	11	Hydropower
Wind World (India) Limited	10	Wind
Orange Renewable Power Pvt Ltd	9	Wind
ReNew Solar Power Private Limited	8	Solar
Azure Power	5	Solar

Table 9: Top non-RE-based developers based on carbon credits issued

The top 12 non-renewable energy project developers deal with household and forestry, and account for 36% credits issued to the sectors

Project developers (non-renewable)	Credits issued (in million)	Major sectoral source
Envirofit International Ltd	1.69	Household & Community
Value Network Venture Advisory Services Pvt Ltd	1.36	Household & Community
Mangalam Timber Products Limited	1.22	Forestry & Land Use
G K Energy Marketers Pvt Ltd	1.13	Household & Community
Brightspark Energy Pvt Ltd	0.89	Household & Community
atmosfair gGmbH	0.82	Household & Community
EKI Energy Services Limited	0.69	Household & Community
Livelihoods Fund SICAV SIF	0.65	Forestry & Land Use
Myclimate Foundation	0.62	Household & Community
First Climate Markets AG	0.6	Household & Community
Greenway Grameen Infra Pvt Ltd	0.5	Household & Community
Greneity Infocom Service Pvt Ltd	0.42	Household & Community

Source: Berkley Carbon Trading Project; data as of May 2023

2.2.2 Validation and verification bodies (VVBs)

Many of the accredited VVBs are Indian-based certification companies. For instance, of the 30 active VVBs accredited with Verra's VCS programme, ten are from India.

Table 10: Accredited VVBs from India in Verra and Gold Standard

VVB	Accreditation
4k Earth Sciences Pvt. Ltd.	VCS, Gold Standard, CDM, GCC
Bureau Veritas India Pvt. Ltd.	VCS, Gold Standard, CDM
Carbon Check (India) Pvt Ltd.	VCS, Gold Standard, CDM, GCC
Earthood Services Pvt. Ltd.	VCS, Gold Standard, CDM, GCC
Ecolance Pvt. Ltd.	VCS
Epic Sustainability Pvt. Ltd.	VCS, Gold Standard, CDM
KBS Certification Pvt. Ltd.	VCS, Gold Standard, CDM
TUV SUD South Asia Pvt. Ltd.	VCS, Gold Standard, CDM, GCC
VKU Certifications Pvt. Ltd.	VCS, Gold Standard

Source: CSE

3 CASE STUDIES

FIELD RESEARCH BY CSE AND DOWN TO EARTH

CSE partnered with Down to Earth and travelled to almost 40 locations of carbon offset projects in four Indian States between April and September 2023. CSE-DTE spoke to project developers, traders, verifier bodies, farmers, rural households, activists, journalists, local leaders, and NGOs. We also studied hundreds of project records.

When Down to Earth and the Centre for Science and Environment (DTE-CSE) began its investigation, the team quickly learnt that there are no rules in the voluntary carbon market. Worse, there is a shroud of secrecy. There is no government database of projects that generate carbon credits. Individual companies are at liberty to make deals to get the credits issued. These companies also do not want to share much about their projects or their partners. They certainly will not reveal the price at which they have bought the credit and at which they will sell it. This suggests that the market has much to hide.

DTE-CSE was blocked in every enquiry it made (*see Annexure 3*). So, the first step was to deep dive into the two leading global registries—Verra and Gold Standard. The databases of these registries provide information on projects by country and the name of the project developer. The team had to locate each project on the database to find its size and location. Needless to say, the registries are designed for disaggregated information.

But it helped draw up a list of projects operating and being set up across India; know who these project developers are; and where the projects are located. It also gave insight into the type of projects for which carbon credits are claimed. Roughly 90 per cent of the credits issued are for renewable energy projects across the country—from solar to wind to hydroelectric.

The investigation also revealed that a massive number of projects is being implemented under the household and community category, largely through the distribution of improved cookstoves and setting up of biogas plants in households. These projects reduce greenhouse gas emissions by reducing the amount of firewood or by replacing it with biogas for cooking food.

The databases also gave information about the older companies whose energy projects have got carbon credits. Jaiprakash Hydropower Ltd (now JP Power Ventures) has got 28 million credits issued for its hydropower projects mostly in Himachal Pradesh.

Adani companies have been issued 15 million carbon credits for solar projects.[25]

The newer companies engaged with projects in categories of household and community and forestry and land-use do not match the credits generated by the large-scale energy project developers, but they make up for it in terms of number of projects. While international organization Envirofit, which manufactures energy-efficient cookstoves, leads the list because of highest number of credits issued, Indian companies are fast catching up.

But these were just the initial clues. So DTE-CSE got in touch with the listed project developers, requesting more information. The team also wanted to visit the project sites, particularly where local partners (non-profits or other organizations) were involved, to understand what was happening on the ground. It was met with a wall of silence.

In a few cases, where the team received responses after repeated calls, emails and messages to project developers and local partners, it was asked to sign a non-disclosure agreement (NDA) before visiting the project; or was refused permission in writing. One project developer, Livelihoods Funds, based in France emailed, saying that DTE-CSE should not visit its project sites in Andhra Pradesh because "Most areas in Araku are cut-off now due to poor road conditions during the monsoons and insurgency is also an issue there."

The team did not give up. From the list of 1,451 projects drawn from the two global registries, the team identified the ones in different categories that could be visited. Where the project developer had refused to share information on the location, the team did further research to identify the villages that are part of the carbon credit scheme.

DTE-CSE's visits to the project sites have brought out the following information.

CASE 1

IMPROVED COOKSTOVES

PROJECT NAME: Dissemination of improved cookstoves in India by Greenway Grameen Infra Pvt Ltd (id: GS10821; status: registered with Gold Standard)

PROJECT DEVELOPER: Greenway Grameen Infra Pvt Ltd, Mumbai

PROJECT TYPE: Household and community

LOCATION: Karnataka

PROJECT DETAILS: 15,500 cookstoves distributed to households dependent on firewood, charcoal, chips

EMISSION REDUCTION
39,126 tonnes of CO_2e per year

PROJECT NAME: Installation of high-efficient cookstoves by EnKing International (id: VCS2473; status: registered with Verra)

PROJECT DEVELOPER: EKI Energy Services, Indore

PROJECT TYPE: Household and community

LOCATION: Across India

PROJECT DETAILS: 15,100 cookstoves distributed to households with traditional cookstoves

EMISSION REDUCTION
86,825 tonnes of CO_2e per year

Source: Project document

Last year, Jyoti Shital Chavan, a resident of Yarnaal village in Belagavi district, was introduced to 'improved' cookstoves at a meeting hosted by Shri Kshethra Dharmasthala Rural Development Project (SKDRDP), a charitable trust that provides infrastructure and finance through micro-credit for Karnataka's rural population. These stoves manufactured by Greenway Grameen Infra Pvt Ltd, headquartered in Mumbai, were distributed to reduce consumption of fuelwood, and thereby reduce carbon dioxide (CO_2) emissions. Chavan already had an LPG (liquefied petroleum gas) connection and a traditional mud *chulha* before the meeting. Deepa Murghali, a village resident and representative appointed by SKDRDP, explained to Chavan that she could reduce her reliance on the more expensive LPG by switching to the improved cookstove, which was being sold at a subsidized rate of Rs 2,350 (US $29). Murghali also assured Chavan that SKDRDP would provide her a loan to buy it.

"We show a video of women not weeping and looking happy," Manoj Vinages, agriculture director, SKDRDP, told DTE-CSE at his office in Dharmasthala. He also informed that his organization has been the facilitator of the project for the past three years and annually receives 10–20 per cent of the revenue earned through the carbon credits issued to the project. However, he was reluctant to divulge further details.

DTE-CSE asked Ankit Mathur, founder of Greenway Grameen Infra Pvt Ltd, why the stoves were being sold to village residents and not

given for free as the project was part of the carbon credits programme. Mathur said the company is primarily a stove designer and manufacturer and that the project proponents decide on the level of subsidies for the cookstoves based on their business models. Mathur also pointed out that his company has not yet made any revenue from the sale of carbon credits.

The project DTE-CSE visited is part of the carbon credit scheme, Dissemination of Improved Cookstoves in India by Greenway Grameen Infra Pvt Ltd, registered with Gold Standard in 2020, 2021 and 2022, under the identification number 10821. According to the project document with the registry, this project will reach 15,500 households and result in a reduction of 39,126 tonnes of CO_2 or the equivalent greenhouse gas (CO_2e) per annum. This would mean that each improved stove would result in a reduction of 2.5 tonnes of CO_2e each year. Greenway estimates that each stove will lead to 65 per cent fuel saving (9.198 MWh per year in terms of energy savings)

Vasanta from Danagalli village in Karnataka's Mysuru district got a subsidised improved cookstove under Greenway Grameen's carbon-offset project. She depends on LPG and uses the stove only during emergencies

and 70 per cent reduction in smoke. As a result, each improved cookstove "is expected to save 3.83 tonnes of woody biomass", says the project document. It also says Greenway would act as a coordinating managing entity for the voluntary project activity. According to the database of Gold Standard, the project has been issued 67,737 carbon credits till May 2023.[26]

Each project is required to be 'validated' by a registered third party, which in this case is 4K Earth Science Pvt Ltd based in Bengaluru. Its validation report for the project, submitted in February 2023, says "there is sufficient evidence to determine the voluntary project activities fulfilment of all stated criterion." According to the document, the end-users (households) have consented to the transfer of rights to carbon credits. This is done at the time of installation; households are asked to sign a consent form, where carbon rights are transferred to Greenway. The Yarnaal village residents DTE-CSE met with said they remembered signing a paper but were not informed about the transfer of carbon rights.

Another cookstove project is being implemented by EKI Energy Services. Registered with Verra in 2022, the project is called Installation of High-Efficient Cookstoves by EnKing International (now renamed as EKI Energy Services). The scope of the project is across India for the distribution of 15,100 cookstoves which, as per the claims, will reduce 86,825 tonnes of CO_2e annually. In this way, EKI claims that it will reduce 0.6 million tonnes of CO_2e through this project in seven years. In other words, each of these super-efficient stoves will reduce 5.75 tonnes of CO_2e annually (this is against the reduction of 2.5 tonnes of CO_2e per year by Greenway's stove). Verra records that this project by EKI, with identification number VCS 2473, has been issued 190,034 carbon credits for the first three years.[27]

DTE-CSE contacted officials with EKI for further information about the project sites. EKI representative responded by saying that they have non-disclosure agreements with the investors and so they would not be able to provide field information. DTE-CSE therefore based its visit to the field on the information that its project validator

TUV SUD South Asia Pvt Ltd provided in its report issued in October 2021. According to this report, "we confirm that a reasonable level of assurance has been achieved during the process."

DTE-CSE travelled to seven of the villages listed in the report in Dhar district of Madhya Pradesh. In most villages, the cookstoves had indeed been distributed for free by a company and in some places by the local panchayat, on the basis of submission of the Aadhaar card—universal identity number issued by the Indian government. Residents told DTE-CSE that they were asked to sign on registers as receipts of the improved cookstoves. They admitted that the stoves were indeed better than the traditional mud *chulha*. However, they did not confirm using the improved stoves regularly.

IMPROVED COOKSTOVE PROJECTS ASSUME THAT BY MERELY PROVIDING THE APPLIANCE, PEOPLE'S BEHAVIOUR WILL CHANGE AND THEY WILL USE IT REGULARLY

Greenway and EKI are not the only ones in this cookstove business. Worldwide, over 1,200 cookstove projects are registered or under various stages of development with Verra and Gold Standard. Around one-fifth of these projects are in India. According to "State of Carbon Developer Ecosystem report 2023" by UK-based market research organisation Abatable, clean household device projects had a 50 per cent year on year growth—expansion of developers portfolio—in Africa and India.[28]

In all the cases, the project developer gets carbon credits issued based on the removal of tonnes of CO_2e. For instance, EKI would get 5.75 carbon credits issued per cookstove per year, while Greenway would get 2.5 carbon credits. Since each carbon credit represents the reduction or removal of 1 tonne of CO_2e, these credits can be sold at an undisclosed price. But the fact is this reduction or removal of greenhouse gas emissions would depend on the usage of the stove and how carefully the project is being monitored.

OVER-CREDITING GAINS OF REMOVAL

The field visits showed glaring gaps in the project design and

implementation. In the case of projects of Greenway and EKI, the first fundamental flaw was the baseline used to estimate the reduction of greenhouse gas. Both projects are based on the assumption that the target population is primarily dependent on non-renewable biomass, ignoring the fact that many possess LPG connections and also use it, if not regularly. They also assume that people's behaviour will change by merely providing the improved cookstoves.

This was far from what DTE-CSE saw during its visits to as many as 13 villages across Karnataka and Madhya Pradesh. Shakarya Kalacharantimath from Bidi village in Karnataka's Belagavi district got the improved cookstove from her daughter three years ago. She uses it only once a month and primarily relies on mud *chulha* and LPG cylinders. "An improved cookstove, which has one burner, is not convenient in a large family setting," she told DTE-CSE. In the village of Phoolsagar in Madhya Pradesh's Mandla district, Rahul Sonwani received not one but two cookstoves from different distributors. He purchased a Greenway stove for Rs 400 (US $4.9) from a salesperson and received the other stove for free from the panchayat. He also possesses an LPG connection. Pointing to the Greenway cookstove, Sonwani said, "This cookstove is good for boiling water and making tea." He has not used the other cookstove since receiving it earlier this year. Households in all other villages that DTE-CSE visited shared similar information.

EMISSION REDUCTION POTENTIAL OF IMPROVED COOKSTOVES IS REALISED ONLY BY A COMPLETE SHIFT, FOR EACH MEAL EACH DAY

Another frequent complaint was that the improved cookstove required the already over-worked women to cut the fuel wood to specifications, which they said was arduous. The improved thermal efficiency of stoves depends on the improvement in the quality of fuel supply. In fact, in a few cases, households were doing *jugaad* (local innovation) to speed up combustion in the stove. They simply added plastic waste into the stove, mindless of the toxicity of this emission.

Switching to improved cookstoves is important as it not only improves the health of women and children in the households but also reduces

greenhouse gas emissions. But the question is if this estimated reduction actually happens. In 2016, the Indian government launched its social welfare scheme Pradhan Mantri Ujjwala Yojana which provided 50 million concessional LPG connections to women of below the poverty line households. Almost all households DTE-CSE visited had LPG connections, though it was apparent that LPG was being used sparingly because of the cost of refilling. Therefore, the actual emission reductions would depend on the usage of the cookstove and not on the mere distribution of it.

Gold Standard and Verra provide methodologies—a standard set of parameters, criteria and operations—that help project developers calculate emission reductions or removals. The Greenway project uses a Clean Development Mechanism (CDM) methodology, called AMS-II. G, Version 12, and EKI use the Verra VMR0006, and estimates its emission reductions by calculating the amount of wood saved, the emission factor based on displaced fossil fuels and the fraction of non-renewable biomass but they miss out accounting for the usage of the appliance. Greenway estimates that its project would reduce the use of 3.83 tonnes of woody biomass per stove per year because of increased thermal efficiency. EKI in its emission reduction calculation document says that each stove would reduce the use of woody biomass by 3.7 tonnes per year. This estimate, even if the thermal efficiency is taken at face value, would depend on the complete shift to the improved biomass stoves by households for each meal each day in a year.

Second, there is the tricky question of ownership of carbon credits. Project design documents available with Gold Standard and Verra suggest that customers have transferred their carbon credits to Greenway and EKI, respectively. These rights allow the companies to sell the carbon credits in the voluntary carbon market. EKI's project design document states that "The end users are informed in advance that the use of ICS [improved cookstoves] generates carbon finance which in turn is used to cover the price of ICS and for recovering project implementation costs."[29] However, none of the village residents that DTE-CSE spoke with knew anything about carbon

credits or remember signing any document regarding the transfer of carbon rights to Greenway or EKI. It is important to note that in Greenway's Karnataka project, the intermediary SKDRDP suggested that it was receiving a share of the carbon revenue but there is no detail of this arrangement.

VERIFICATION OR NOT

The third problem is that there is no evidence of robust monitoring. Atharva Mahesh Bidikar, the field officer of Greenway, told DTE-CSE that he conducts surveys once every year to monitor the use of cookstoves and to know about the problems people face. Savitri Ramesh Malleshi from Bidi village in Belagavi district, however, informed that Bidikar visited her only once six months ago when she got her damaged three-year-old cookstove replaced. None of the village residents that DTE-CSE spoke with recall interacting with Greenway or SKDRDP employees about the stove. "The service is bad. No one has come to ask us if we are facing any problems with the cookstove," Shatragun Divate, community leader of Yarnaal village in Belagavi, stressed.

This is also true for cookstoves distributed by EKI in Madhya Pradesh. Om Prakash Kamdar, a hardware store owner in Bagdi village of Dhar district, has given the EKI cookstove he received to his daughter. No one has visited him to check if the stove is with him and if it is being used. It is clear that there is much missing in this tricky accounting of carbon reduction, which is based on the continuous usage of the appliance.

The validation and verification bodies, which are third-party entities, receive money from project developers to audit the claims. EKI project was validated and verified by TUV SUD South Asia Pvt Ltd and was monitored from 2019 to 2021. According to the validator's report, on-site inspections were not conducted for the project, citing lockdown restrictions during the novel coronavirus (COVID-19) pandemic. Fourteen Greenway projects in Karnataka were verified and validated by 4K Earth Science Pvt Ltd, which conducted on-site visits during July 20–22 in 2022. 4K Earth Science says it determined the baseline

Rahul Sonwani from Phoolsagar in Madhya Pradesh's Mandla district has received two improved cookstoves from different distributors. He uses only one of the stoves, that too for boiling water

by randomly asking users a few questions such as the fuel used previously, whether they still depend on fuel wood and if they experienced any health issues. They also interviewed Greenway and SKDRDP employees. Both the validation and verification bodies gave Greenway and EKI a clean chit, citing that there is no additionality issues (meaning, the project would not have existed without revenue from carbon credits) and recommending the projects for registration under Gold Standard and Verra. DTE-CSE reached out to the validation and verification bodies, requesting information on their monitoring

methodology and to understand why their reports contradict the team's field reports. 4K Earth Science responded: "On the outset, we are [a] third-party certifying agency and are bound by confidentiality law. We regret we would not be of much help to you. You can contact the client for information."

DO COMMUNITIES BENEFIT?

This is the fourth issue. Typically, a "clean cookstove" costs anywhere between Rs 160 and Rs 8,000 (US $2–$97). EKI cookstove costs between Rs 1,500 and Rs 3,000 (US $18–$36) and the Greenway model is sold at RS 3,490 (US $42).

Each cookstove is reported to offset 2–4 tonnes of CO_2e per year (in the case of EKI, it is some 5.75 tonnes of CO_2e) based on its thermal efficiency and the amount of woody biomass it reduces or replaces. Carbon credits are given typically for five to seven years, considering the cookstove's lifespan. In its five-year lifespan, a cookstove would generate 10–28 carbon credits (in the case of EKI, it would be 40).

There is no organized marketplace to monitor the price of carbon credit for improved cookstoves, or for that matter any other type of project. A review done by market researcher Abatable in its paper, "Not all cookstoves are the same", published in March 2023 shows that the current price ranges from US $7 to $10 (Rs 577–825) per carbon credit in cookstove projects. Now, taking the offset average as 3 tonnes of CO_2e per year and the price average as US $8.5 (Rs 701) per credit, each cookstove would fetch US $25.5 (Rs 2,102) per year, and over its seven-year lifespan would earn the developer US $178.5 or Rs 14,687 on a conservative basis. This more than covers the capital cost of the cookstove, even assuming that the village residents are given this for free. This scam is not cooked up, but real. In its project document, Greenway argues that carbon credits are essential to finance the project as the sales revenue, which is used to subsidise the cookstoves given to low-income households, helps the company recover only a small sum of the total investment. But Greenway has sold its cookstove in Karnataka for Rs 2,350 (US $29). "People in my house are annoyed that I paid so much for the stove. It is a waste of

Lakshmi bought the clean cookstove three years ago. She has had a gas stove for the past seven years too. She uses both the gas stove and the clean cookstove for cooking

money. We barely use it five to six times in a year. Also, we do not have enough fuel wood. The little fuel wood we buy is used in our cement *chulha* to boil water for bathing," Shilpa from Dhangalli village in Mysuru district told DTE-CSE. She bought the cookstove a year ago.

In his reply to DTE-CSE, Ankit Mathur, co-founder, Greenway, distances himself from carbon markets. "These carbon projects are run and operated by the likes of EKI, MEC, C Quest Capital and others. In Karnataka, the majority of Greenway stoves have been distributed (with/without SKDRDP) under the programme operated by Seattle based MicroEnergy Credits (MEC)." EKI has responded with deafening silence. Finally, after repeated messages, DTE-CSE received the following cryptic email on 31 August 2023 from a senior EKI representative, which read: "At this point of time the company is in a silent period and we will not be able to respond."

CASE 2

PLANTING TREES FOR CARBON

PROJECT NAME: Araku Valley Livelihood Project (id: VCS 1328; status: registered with Verra)

PROJECT DEVELOPER: Livelihoods Funds, France

PROJECT TYPE: Afforestation/Reforestation

LOCATION: Araku Valley, Andhra Pradesh

PROJECT DETAILS: Afforestation on 6,000 ha of degraded land

EMISSION REDUCTION: 80,666 tonnes of CO_2e per year

Source: Project document

In 2010, some 6,000 hectares (ha) of plantation spread over 333 villages across the Araku Valley in the Eastern Ghats of Andhra Pradesh began earning carbon credits. The tribal communities took up plantation on their private land, but the carbon credits are owned by the developer of the project, Livelihoods Funds, a Paris-based entity. On its website, Livelihoods Funds says that it is an impact investment fund with initial investment from the food multinational, Danone.

Janni Mithula of Thotavalasa village in Andhra Pradesh's Araku valley owns coffee and mango plantations. For 20 years she has been planting saplings provided by Naandi Foundation. In 2010, Naandi Foundation became part of a carbon-offset project that has received over 96,000 carbon credits for reforestation activities. Mithula says she is not aware of carbon credits

Called Araku Valley Livelihood Project, it officially started in 2014. As per the project design document, its implementer is the well-known and respected social funding organization Naandi Foundation, based in Hyderabad. The project will continue till 2030. But the document says that its longevity will actually be more as the project design does not include harvesting or thinning of the planted trees. As trees get planted, the project will progressively increase its emission reductions—from 2,415 tonnes of CO_2e in 2011 to 145,134 tonnes of CO_2e in 2030. In its 20 years, the project document claims that it would reduce 1.6 million tonnes of CO_2e—with an average of 80,660 tonnes of CO_2e each year. The project has been registered with Verra and has received 96,386 carbon credits till May 2023.[30]

In this project, a variety of tree species would be planted over 6,000 ha, of which 60 per cent is classified as barren and the rest shrubby and grassland, according to the document. These trees would also provide shade to the coffee plantations, which are spread over 3,000 ha. The document says that this land is owned by 9,700 farmers—all smallholder tribals.

According to the project document, these communities have 'agreed' that they will have the right to the fruits and other produce of the horticulture trees, but not to the carbon credits generated by the project. The document says, "farmers and the communities have agreed that the property rights on the carbon credits generated by this restoration are exclusively allocated to the developer of the Project." Furthermore, "under this agreement, the beneficiary community is committed not to assert any property rights over the carbon credits generated and/or to be generated by the Project." This agreement is a legally binding commitment to manage and protect the credited carbon stocks over the length of the crediting period of 20 years.

SCS Global Services, a verification agency based in the US, says in its 2014 validation report that although "the ownership is with the farmers, each farmer has signed an agreement with Naandi Foundation, acting on behalf of Danone, whereby they transferred the

right of use on the carbon credits generated by the project." Furthermore, "although the agreements were made in the name of Danone, the audit team confirmed that Danone transferred any right on the project to Livelihoods Fund, a fund participated by Danone." It confirms that "Naandi Foundation does not have any right of use, since it is planting and implementing, it may claim rights linked to its role as a project implementer."

Interestingly, in 2022, a popular Danone brand, luxury water Evian, was hit by a lawsuit on its carbon neutrality claim. The company responded saying, "We partner with the Livelihoods Fund, which has planted 130 million trees so far, sequestering carbon emissions from the atmosphere," and so we are carbon neutral.

THE AGREEMENT UNDER WHICH ARAKU'S TRIBAL FARMERS HAVE GIVEN UP THEIR CARBON RIGHTS TO THE DEVELOPER IS LEGALLY BINDING FOR 20 YEARS, AS PER THE PROJECT VALIDATOR'S REPORT IN 2014

DTE-CSE travelled to Araku Valley in August 2023 despite Livelihoods Funds declining its request for field visits citing difficulties in accessing the villages because of insurgency and inclement weather. Naandi Foundation also did not provide field information, but it did respond to queries after the visit. There are two major questions about this project: one, whether communities are benefitting from carbon credits and whether the emission reduction by the project is 'additional' and would not have occurred without revenue from carbon credits.

DO COMMUNITIES BENEFIT?

It was clear from the visit that the real benefit to the communities comes from coffee plantations. In villages like Doravalasa, Thotavalasa, Kondavalsa and Garudaguda, tribal families had shifted from millets to coffee—trees were planted to shade the plantations. Naandi Foundation provides training on organic coffee plantations and the tribals DTE-CSE spoke with acknowledged that this shift had improved their lives. But they knew nothing of carbon credits. G Apaliamma of Doravalasa has set up a coffee plantation on her 0.8 ha farmland. She sells part of her harvest through Naandi and the rest

through middlemen. She told DTE-CSE that her husband had signed a document but they do not know what it said. Thamala Vimala, another resident of Doravalasa who owns 4.8 ha and grows coffee, also narrates a similar story.

On being questioned about the revenue-sharing model, Rohini Mukherjee, head of global partnerships and strategy at the Naandi Foundation, replied "that tribals have become '*lakhpatis*' (millionaires), thanks to the Livelihoods project." However, DTE-CSE found no evidence to back that claim. The tribal farmers had certainly benefitted from growing and selling coffee. Quality of the coffee has also improved and the brand Araku is now well known. But they have not benefitted from the carbon credits.

It leaves one wondering whether benefit sharing in carbon credits can only be claimed by providing free saplings and training, given that farmers contribute the land and labour towards growing and maintaining the plantations that sequester carbon. It is also the land of the tribals, where the 'ownership' of the trees has been transferred to a private entity.

In Naandi Foundation's model, farmers pay an annual membership fee of Rs 100 (US $1.2) to the cooperative it has set up, the Small and Marginal Tribal Farmers Mutually Aided Cooperative Society (MACS). "By becoming a member [of MACS], farmers start receiving support with saplings, training, organic bio-inputs, farm gate collection of harvested cherries and buy back at prices higher than any other buyers' offer," Mukherjee says. But DTE-CSE during its field visit has found that some farmers were not aware that a membership fee was being charged. Khroaa Ruthama, a tribal from Thotavalasa village, said that she had never heard about a subscription fee. Kilo Buddu from Garudaguda village knew that money was being charged but did not know the exact amount. This is because MACS deducts the membership fee every year while buying the produce.

ADDITIONALITY CONCERNS

Then, there is the additionality issue, which suggests that the project

would not have existed without revenue from carbon credits. Several residents of Doravalasa and other villages informed DTE-CSE that several other private agencies also provide them saplings of coffee and other trees for free. The Integrated Tribal Development Agency (ITDA), a government agency, has been providing free saplings and training to the tribal farmers since 1985.

The region has seen some deforestation in the past due to *podu* (shifting cultivation), where forest patches are cleared for agriculture by burning. Bauxite mining, banned only in 2019, had also added to land degradation. In the 1990s, ITDA, through the state government of Andhra Pradesh, launched a massive plantation drive in Araku Valley. "Tens of thousands of silver oak saplings were distributed, making the mountains green in the 1990s. The plants also provided shade for coffee saplings. In this way, deforested areas were converted into coffee plantations," V Abhishek, project officer of ITDA, told DTE-CSE. Naandi Foundation entered the region only in the 2000s.

LIVELIHOODS FUNDS WHICH CARRIES OUT AFFORESTATION ACTIVITIES IN ARAKU VALLEY EXPECTS TO GET 1.6 MILLION CARBON CREDITS, WHICH IS WORTH $12.8 MILLION BY CONSERVATIVE ESTIMATES

Mukherjee does not agree that the project violates additionality. "Naandi's livelihoods-supported carbon sequestration programme began in 2010 and includes strictly only those fruit and forest trees that were planted at the start of this programme, and grown and nurtured by farmers from that time," she says.

The project calculates its annual emission reductions by following a CDM methodology "ARACM0003: Afforestation and reforestation of lands except wetlands (Version 2.0)". The 2014 validation report by SCS Global Services shows that the shrub cover prior to the project was non-woody weed with scarce biomass. It has been calculated that the annual emission reduction from the project is 38,551 tonnes of CO_2e after considering the project's risk rating, which was found to be 10 per cent due to hazards like fire and cyclones. In October 2014, a strong tropical cyclone Hudhud caused extensive damage to the

planted trees. Naandi Foundation clarified that a replantation activity was undertaken in 2015. The validation document points out that no study was done to assess and quantify the damage.

The revenue model of the project is not obvious. Livelihoods Funds finances Naandi Foundation to provide technical support and saplings to farmers. The financial details on its website shows that Naandi Foundation has received Rs 21.5 crore between 2016 and 2022 from Livelihoods Funds. The real money would be in the sale of the

Lalitha of Kondavalasa village in Araku Valley of Andhra Pradesh says the government's Integrated Tribal Development Agency has been providing free saplings of coffee and horticulture crops to the tribal farmers of the region much before Naandi Foundation started its plantation programme in Araku. Naandi Foundation's afforestation activities are part of a carbon-offset project of Paris-based Livelihoods Funds

carbon credits, which are owned by Livelihoods Funds. As per the project document, Livelihoods Funds expects to get 1.6 million carbon credits. According to Abatable, forestry projects earn between US $8 and $30 (Rs 660–2,474) per credit, with the average being US $14 (Rs 1,154). At the conservative rate of US $8, the value of held credits would amount to US $12.8 million (Rs 106 crore), which as explained above is not being distributed among the growers of trees.

This project, however, is not selling credits in the open market. As per information gathered by DTE-CSE from various sources, the carbon credits are issued to private companies, which have invested in the fund. These investor companies, whose names are listed on the website of Livelihoods Funds, include Danone, Schneider Electric, Crédit Agricole SA, Michelin, Hermès, SAP, Groupe Caisse des Dépôts, La Poste, Firmenich, Voyageurs du Monde. DTE-CSE found on the Verra registry that in 2019 and 2020, Michelin Group retired credits from this project to offset the emissions from travel of its employees. The public data on retirement is sketchy. Livelihoods Funds also does not have information on how much credits it has issued to its investors. The carbon credits game, once again, is about non-transparency and all in the name of climate action and poor people.

CASE 3

MANAGING METHANE

PROJECT NAME: Core Carbon Sustainable Rice Productions (id: VCS 3238; status: under consideration with Verra)

PROJECT DEVELOPER: Core CarbonX Solutions Pvt Ltd, Hyderabad

PROJECT TYPE: Agriculture

LOCATION: Telangana

PROJECT DETAILS: Methane emission reduction by promoting alternate wetting and drying method across 550,000 ha

EMISSION REDUCTION: 52,920 tonnes of CO_2e per year

PROJECT NAME: Sustainable rice productions for marginal farmers in Madhya Pradesh (id: VCS 3156; status: under consideration with Verra)

PROJECT DEVELOPER: Value Network Ventures Advisory Services, Bengaluru

PROJECT TYPE: Agriculture

LOCATION: Madhya Pradesh

PROJECT DETAILS: Implement alternate wetting and drying method in fields of smallholder farmers

EMISSION REDUCTION: 189,404 tones of CO_2e per year

Source: Project document

Venkat Reddy, a farmer from Nemmany village in Telangana's Nalgonda district expects to receive Rs 6,400 (US $78) annually for changing the way he cultivates rice. A year and a half ago, Core CarbonX Solutions Pvt Ltd, a Hyderabad-based carbon trading, environmental consulting and sustainability advisory firm, had introduced him to a new technique called alternate wetting and drying, in which paddy fields are alternately flooded and dried. In fact, many other farmers in Telangana also expect to be rewarded from next year for collaborating with the company, which has applied for registration with Verra—identification number (ID) VCS 3238—and hopes to enter voluntary carbon market in 2024.

The conventional method of paddy cultivation accounts for roughly 2 per cent of the global greenhouse gas emissions from anthropogenic sources. Typically, paddy is continuously flooded during cultivation to check weed growth. This practice, however, leads to proliferation of bacteria that generate methane, a powerful greenhouse gas. According to a review paper by the International Rice Research Institute, the Philippines, experiments in South Asia have shown that alternate wetting and drying method helps reduce methane emissions by an average of 43 per cent and water use by 30 per cent. Using the 2006 guidelines of the Intergovernmental Panel on Climate Change (IPCC), it is estimated that if continuously flooded rice fields were drained at least once during the growing season, global methane emissions would reduce by 4.1 million tonnes per year, which is 2.5

per cent of the global methane emissions from agriculture in 2021. The idea is to allow the soil to dry out until fissures appear before re-flooding it. This creates alternate wet and dry cycles for the rice plants. "We keep the fields fully flooded only seven days before and after flowering," says Niruj Mohanty, managing director and chief executive officer of Core CarbonX, who accompanied DTE-CSE to meet the farmers of Nalgonda.

Core CarbonX has partnered with Swamy Vivekananda Rural Development Society (SVNRDS), a local non-profit that provides educational, social development and humanitarian services to the rural population, to recruit farmers in the district. Core CarbonX also provides training to farmers and supplies field water tubes to them. Measuring 30 cm in length and 15 cm in diameter, the field water tube is essentially a plastic pipe with drilled holes, which is sunk into the rice field so that 10 cm of it protrudes above the soil. When the water level drops to about 15 cm below the surface of the soil, farmers can re-flood the field to a depth of about 5 cm. As of August 11, 2023, when DTE-CSE visited Nalgonda, Core CarbonX claimed that 150,000 ha in Telangana had been brought under this new method of cultivation, and that farmers in at least 17 districts, where rice is grown in both rabi and kharif, were adopting the technique. Core CarbonX has appointed supervisors in each village to conducted surveys and monitor the project.

IN INDIA, 13 COMPANIES HAVE ALREADY APPLIED FOR REGISTRATION FOR ALTERNATE WETTING AND DRYING METHOD OF PADDY FARMING, EVEN IF IT IS RELATIVELY NEW IN THE VOLUNTARY CARBON MARKET

A similar project has also been readied for roll out in Madhya Pradesh. Called Sustainable Rice Cultivation for Marginal Farmers in Madhya Pradesh, the project is listed with Verra (ID: VCS3156) and hopes to get registered soon.[31] Its project proponent Value Network Ventures Advisory Services (VNV) is based out of Bengaluru and the project is being implemented by Shriram Education and Welfare Society (SEWS) based in Seoni, Madhya Pradesh. Rameshwar Pardhi, who runs SEWS, told DTE-CSE that under this project they would form

groups of farmers who would collectively own 60–70 ha. The farmers would be trained to conduct the practices, monitor water levels, record observations in monitoring diaries, and ensure adherence to the overall practice. They would be supervised by appointed individuals responsible for overseeing operations.

Alternate wetting and drying method is relatively new in the Indian voluntary carbon market. In India, 13 companies have already applied for registration for such projects with Gold Standard and Verra. They are located in three states: Telangana, Madhya Pradesh and Maharashtra.

Farmers in Thummalagudam village in Nalgonda district of Telangana follow alternate wetting and drying method to curb emissions of methane, a greenhouse gas, from paddy farming. Project developer Core CarbonX plans to join the voluntary carbon market to claim carbon credits against the methane reduction

Projects to reduce methane emissions from paddy fields currently use a CDM methodology called AMS-III-AU-Methane emission reduction by adjusted water management practices in rice cultivation, to estimate emission reduction. The methodology focuses on reducing anaerobic decomposition of organic matter in rice cropping. Baseline emissions of methane gas are measured in reference fields using 'closed chamber method'. This results in a emission factor that is measured in kilogram methane per hectare per season. To demonstrate a decrease in emissions, project practices are carried out in reference fields and similar measurements are performed.

According to Mohanty of Core CarbonX, measuring methane from the field is tedious and expensive. Instead, he uses a formula present in Verra's methodology that allows him to calculate emission reductions by multiplying the adjusted daily emission factor (coefficient that describes the rate at which a given activity releases greenhouse gases into the atmosphere) with the area of project fields in a year, the cultivation period of rice in a year and global warming potential of methane. The formula suggests that alternate wetting and drying method could result in 52,920 tonnes of CO_2e reduction per year. The project is expected to be active for seven years, resulting in emission reductions of 370,440 tonnes of CO_2e. Prithvi Ram from Dr Reddy's Foundation, sister organization of Hyderabad-based pharmaceutical company Dr Reddy's Laboratories, also plans to claim carbon credits for alternate wetting and drying projects in Telangana in the future. He says that measuring methane emissions can help check whether theoretical estimates match ground measurements. "It is expensive but doable. The implementation might not be the same everywhere. When you scale up or extrapolate the data, the measurements may look different. So it is important to validate them," Ram says.

PLANNED TO SHARE

The methodology also says that the shift in practice should not lead to decreased yields. Dhasharata Reddy, a farmer from Urumadla village in Chityala mandal of Nalgonda, told DTE-CSE that he benefitted from the alternate wetting and drying method. "Last rabi,

my yield was 2.9–3 tonnes per acre (roughly 1.2 tonnes per ha). This is an increase of 0.4–0.5 tonnes," he said. Muthian Shetty from Wattimarthy village in Chityala mandal, who has been following the technique for over a year now, however, informed no changes in the yield. DTE-CSE was not able to ascertain if the farmers' expenditure had increased in terms of labour and farm inputs because of the shift in method.

Both Core CarbonX and VNV have signed agreements with the farmers stating that the latter has agreed to transfer the rights to carbon credits to the companies. These agreements outline the farmers' relinquishment of their carbon rights, their commitment to adhering to specified methods and their willingness to seek advice for sustainable farming practices.

The farmers DTE-CSE spoke with were unaware of carbon credits but said that they have been assured of incentives for following the alternate wetting and drying method. Mohanty told DTE-CSE that his company would give the farmers Rs 800 per acre (Rs 1,920 or US $23 per ha) per annum. "Almost 25 per cent of revenue from the sale of carbon credits would be used by the company and their partner non-profits. Farmers would get 35–45 per cent share and 30 per cent would go to their investors, Carbon Streaming and Vida [Canada-based companies that invests in carbon credit projects]," he explained. The company expects the value of one carbon credit to be US $8 (Rs 660). Each hectare where paddy is grown using alternate wetting and drying generates 5–8 carbon credits or 6.5 credits per ha on average. At this rate, the company would fetch a carbon revenue of Rs 4,313 (US $52), of which it plans to share Rs 1,920 per ha or roughly 45 per cent with the farmers. However, some farmers said that the incentive may not be sufficient. "Because of alternate wetting and drying method, we now use more herbicides to control weeds and our input costs go up," said A Ram Reddy from Nemmany village.

As for the Madhya Pradesh project, Pardhi shared that participating group (each group is expected to have 60–65 farmers) would receive a

financial support of Rs 50,000 (US $606) annually—roughly Rs 800 (US $9.7) per farmer per year—to cover operational expenses. He estimates that the project cost per group will be roughly Rs 1 lakh (US $1,213) per annum, which includes the cost of registering the project and annual monitoring. This will be secured through the sale of carbon credits.

The questions that remain in this important mitigation effort are if the incentives that will flow to the farmer are sufficient to drive the change and if the methodology for estimating emission reduction is robust. The fact is this change in cultivation system of a subsistence crop will need to be carefully managed so that it benefits both the farmer and the planet.

CASE 4

BIOGAS BONANZA

PROJECT NAME: Household biogas Carbon Offset Project for Clean, Convenient and Efficient Cooking (ID: VCS 2754, status: registered with Verra)

PROJECT DEVELOPER: INSEDA Engineers and Consultants Pvt Ltd, Delhi

PROJECT TYPE: Household and communities

LOCATION: Madhya Pradesh

PROJECT DETAILS: Set up 8,519 biogas plants across Madhya Pradesh

EMISSION REDUCTION: 25,892 tonnes CO_{2e} per year

PROJECT NAME: Household biogas plants installed in rural areas of Madhya Pradesh (ID: GS 7510, status: registered with Gold Standard)

PROJECT DEVELOPER: Value Network Ventures Advisory Services. Bengaluru

PROJECT TYPE: Household and communities

LOCATION: Madhya Pradesh

PROJECT DETAILS: Commissioned 14,301 biogas plants in Mandla, Seoni, Balaghat and Chhindwara districts

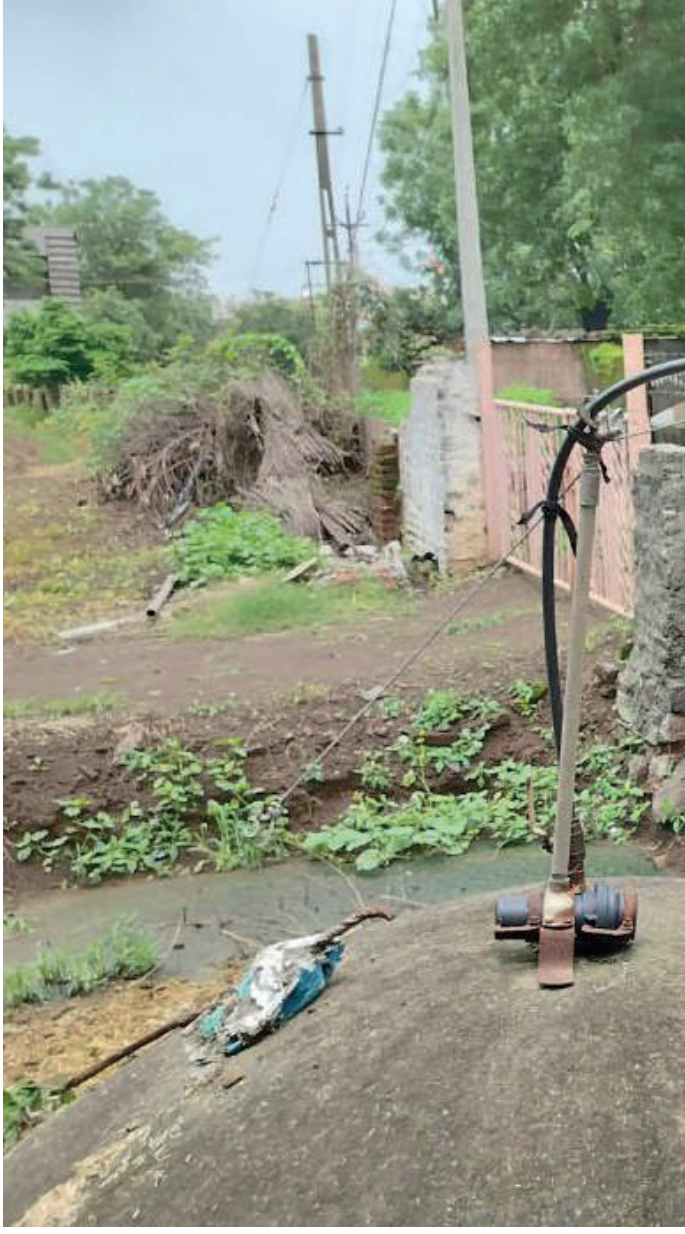
EMISSION REDUCTION: 51,235 tonnes CO_{2e} per year

Source: Project document

Unkalal Ji Patidar has a 4 cubic metre biogas plant in his backyard in the Alniya village of Ratlam district in Madhya Pradesh. Biogas plant, also known as biogas digester, is a system that converts organic waste into methane and organic fertiliser through anaerobic digestion. Unkalal Ji's house has had the plant for about 30 years, but the technology kept changing. Previously, it was a simple brick structure with lesser capacity. Now the one built with the help of New Life Centre, a Ratlam-based non-profit, is an RCC (reinforced cement concrete) digester. His family has used LPG in the past, but stopped using it because of high refill costs. The construction of the RCC biogas plant cost him Rs 35,000–40,000 (US $424–485), which was initially borne by the household. But New Life Centre helped him avail a 40 per cent subsidy on the expenditure under the state government's Biogas Vikas Yojana, which is being implemented by the Madhya Pradesh State Agro Industries Corporation Ltd (MP Agro). DTE-CSE verified this claim by checking the list of beneficiaries on the MP Agro website.

Unkalal Ji's neighbour Lalchand Ji Patidar also got a biogas plant built in 2020. It cost him around Rs 29,000 (US $352) and New Life Centre helped him obtain a subsidy of Rs 14,000 (US $170) from MP Agro. Lalchand Ji was satisfied with the plant, which he said has never caused any problems and is the only source of cooking fuel in his house.

CASE STUDY 4



DTE-CSE visited these biogas plants in Alniya village because they are part of the project of INSEDA Engineers and Consultants Pvt Ltd, Delhi-based non-profit, which has been issued carbon credit under Verra. The project, called "Household Biogas Carbon Offset Project for Clean, Convenient and Efficient Cooking" (identification number VCS 2754), has been issued 35,820 credits till date for installation of 8,519 biogas plants across Madhya Pradesh. It has a seven-year crediting period till 2027.

The project seems to run well on the ground with biogas plants actually being used, yet concerns abound. First, the biogas plants have been set up using the Madhya Pradesh government's subsidy scheme. The households DTE-CSE visited have all received the subsidy and paid the balance money. This raises questions about the additionality of the project, as the role of carbon credit in running the project cannot be substantiated. Second, while the ownership of carbon credits has been claimed by INSEDA, possibly through an agreement between the company and the implementing agency New Life Centre, and the member organization has an agreement

A BIOGAS PLANT WOULD TYPICALLY EARN US $16–56 FROM CARBON CREDITS IN A YEAR. CAPITAL COST OF SETTING UP SUCH A PLANT IS US $364. IN THIS WAY, THE BUYER OF CARBON CREDITS IS SHORT-CHANGING FARMERS OF THE DEVELOPING WORLD

Lalchand Ji Patidar from Alniya village in Madhya Pradesh's Ratlam district has set up a biogas plant using subsidy from the state government. The plant is part of a carbon-offset project

with the beneficiaries, the latter were not aware of carbon credits, nor did they recall signing any document relinquishing their carbon credit rights. Third, if the project is receiving carbon credits, it remains unclear how the resulting revenue is being utilized.

Another concern around the project is monitoring. Biogas systems need to be fed with a large amount of biomass daily and often need maintenance to keep them running. If such plants are being counted for emission reductions, their usage needs to be monitored.

Globally, over 200 household biogas projects are registered with Verra and Gold Standard, mostly from India and China. Of these, more than 50 projects are from India, which have collectively generated over 4 million carbon credits. One such biogas project registered with Gold

Standard is "Household Biogas Plants Installed in Rural Areas of Madhya Pradesh" (ID: GS7510). It has been developed by a Bengaluru-based company VNV Advisory, which is working along with Seoni-based non-profit SEWS (Shriram Education and Welfare Society) for implementation of the project. In 2018, as many as 14,301 biogas plants were commissioned in Mandla, Seoni, Balaghat and Chhindwara districts under the project, which claims over 51,235 tonnes of emission reduction per year. Till date, the project has been issued 143,966 credits.

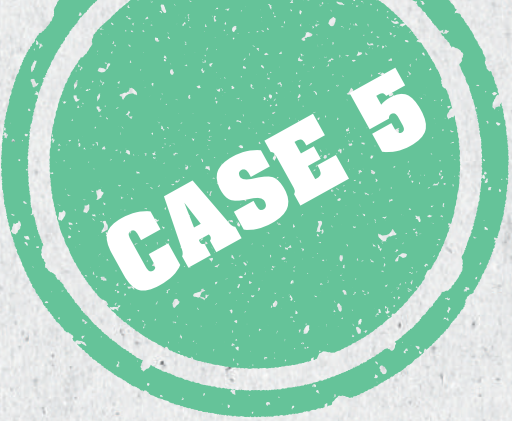
Rameshwar Pardhi, who runs SEWS, maintains biogas service centres in Seoni and Balaghat. He claimed to have been building biogas plants in the region for almost three decades now. He mentioned that the government's subsidy system is functionally weak with inordinate delays, so his project does not rely on subsidies. Instead, the funding comes from carbon credits. On the question of monitoring, Pardhi claimed that they have affiliated biogas service centres in all the towns around which the project is clustered. He showed a servicing card which mentions free biogas repair services, saying that they keep track of biogas plants that they install through their teams.

Even with that setup, maintaining over 14,000 biogas plants is challenging. In a small village called Bhawal, 70 km from Jabalpur, Naresh Malgam got a biogas plant built for free in his backyard in 2018. He used it initially, but the system was no longer in use. The family has an LPG connection received under the Pradhan Mantri Ujjwala Yojana but uses the mud *chulha*, which he said is more affordable. Another resident in his village Brijesh Yadav had a similar story to narrate. "About 40 kg of cow dung is required to feed a digester per day. There is no way a household can get that much cow dung each day," said Suvedas Bairagi, another resident of the village. Elsewhere, such as in Seoni, people were found to be using biogas as the sole source of cooking fuel. Thus, even if biogas plants are funded through carbon credits, questions arise regarding subsidy implications and manual project monitoring. This, in turn, raises questions about the projects' additionality and the actual emission reduction benefits they provide.

A group of elders from Alniya, Ratlam (Madhya Pradesh). Most of them have biogas digesters, and some are beneficiaries of the carbon credit project, though none of them is familiar with carbon credits

Carbon credit-based project developers install biogas plants in households that traditionally use wood or other forms of non-renewable biomass. As a renewable biomass, cow dung is anaerobically digested to produce biogas that is utilized in cooking. According to INSEDA's estimates, a 4 cubic metre biogas plant reduces greenhouse gas emissions by 8 tonnes per year. This is because when households move to biogas they switch from using wood based fuels or even fossil fuel like LPG. INSEDA's project uses a CDM methodology, AMS-IE-Switch from non-renewable biomass for thermal applications by the user, to estimate this emission reduction. Project developers DTE-CSE spoke with estimate that the price is US $2–7 (Rs 155–577) per credit. In other words, a 4 cubic metre plant would earn US $16–56 per year (Rs 1,319–4,617).

This is clearly a pittance, as compared to the capital cost of building the plant (Rs 30,000 or US $364) and then its management and maintenance. In this way, the buyer of the carbon credit is short-changing the farmers of the developing world. This can be called a fundamental flaw in the 'market' as it underestimates the real cost of reducing emissions.



CURIOUS CASE OF RENEWABLES

Registered renewable energy (RE) projects in India
675 projects

Total RE credits issued
268 million credits

Emission reduction
268 tonnes of CO_2e

Number of retired credits
148 million

Source: Berkley Carbon Trading Project

The biggest chunk of carbon credits are awarded for renewable energy projects, which include wind, solar, biomass and hydropower projects. Good, you would say, as India has plans to greatly augment its clean energy portfolio and in this way, offsets can be used to make the transition. Sadly, this does not add up.

About 675 projects are registered under Verra and Gold Standard for 268 million carbon credits, of which 148 million have been retired (or claimed against offsets)—this is over 90 per cent of the carbon credits issued. There are no new projects in this sector, as since 2020, both Verra and Gold Standard have stopped accepting new grid-connected renewable energy projects, except from the least developed countries. The reason cited is that "these projects are now cost-competitive with fossil-fired power generation facilities and have become common practice."[32]

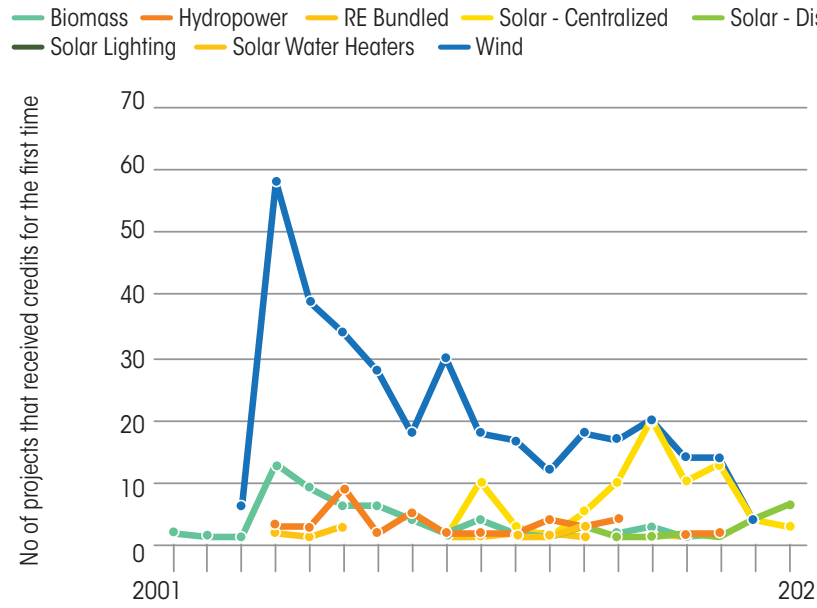
Till then, the concept behind awarding carbon credits to renewable energy projects was straightforward: these projects generate energy without emitting greenhouse gases that would have been released had fossil fuels been used for electricity generation. The difference in emissions between the project's actual performance and a hypothetical scenario where fossil fuels were used was calculated, and based on that carbon credits were issued. Renewable energy projects include, wind, solar, biomass and hydropower projects.

ADDITIONALITY IS NOT AN ISSUE BUT PRICE IS

It is widely accepted that renewable projects would not pass the test of additionality—the reason is that government and private

Graph 8: Diminishing charm

Grid-connected renewable energy projects no longer preferred for carbon credits



Source: Berkley Carbon Trading Project, CSE

entrepreneurs would invest in these projects regardless of the carbon credit received. In a 2021 paper by the Centre for Climate Change Economics and Policy and the Grantham Research Institute on Climate Change and the Environment, both in the UK, the authors estimated that of the 472 wind farm projects in India registered under CDM, 52 per cent of the 'approved offsets' were allocated to projects that would very likely have been built anyway.[33] Selling these non-additional offsets to emitters has allowed them to increase carbon emissions without any real benefit in terms of emission reductions in the real world.

However, this may not be the real test of the renewable energy's viability in the carbon credit market. The fact is that the world needs to augment clean energy and needs finance to be able to do this. In countries of the South, the high cost of finance restricts the investment in grid-based renewable energy projects, which would help countries make the transition to clean fuel. Therefore, it would help if the carbon credit scheme pays for the cost of the project.

CASE STUDY 5

Table 11: Cost undermined

Carbon credits issued to renewable energy are a fraction of the project cost, with exception of Jaiprakash Hydro

Project	Capacity (MW)	*Total cost (₹ crore)	**Emission reduction estimated per year (tCO2eq)	Potential money from emission reduction in 1st crediting period (₹cr)	Carbon finance as % of total cost
Hydropower project by Jaiprakash Hydro Power Ltd	300	1,650	1,052,463	620.95	**37.6**
Renewable solar power project by ReNew Solar Power Pvt Ltd	927	6,386.2	1,767,281	220.91	**3.6**
Bundled solar photovoltaic project by ACME Solar Holdings Pvt Ltd	1207	6,403	2,078,589	259.82	**4.0**
Solar Energy Projects by SB Energy Pvt Ltd[1]	2250	13,820	4,354,646	544.33	**3.9**
Wind Based Power Generation by Mytrah Energy (India) Ltd	233	1,343	479,448	59.93	**4.4**
Energising India solar energy projects by Azure Power India Pvt Ltd	480	2,721	852,639	106.58	**3.9**
250 MW Wind Power Project by Mytrah Energy (India) Ltd	250	1,890	598,039	74.75	**3.9**
Solar power project in Rajasthan by Azure Power India Pvt Ltd	600	2,150	1,138,724	71.17	**3.3**
Bundled Wind Power Project by Mytrah Energy (India) Ltd	493.5	3,561	921,296	115.16	**3.2**
Ghani Solar Renewable Power Project by Greenko Group[2]	500	3,725	996,010	124.5	**3.3**

* Total cost is specified by the project developer in the project document; ** Emission reduction per year are estimated by project developers and mentioned in the project document; the price per tonne of emission reduction is assumed $1.5 for solar and wind power projects, and $3.5 for hydropower projects; 1. Project developer Adani Renewable Energy Devco Pvt Ltd; 2. Project developer Zuvan Energy Pvt Ltd

Source: CSE, Verra, Gold Standard

Renewable energy carbon projects represent some of the cheapest carbon credits available in the market. For instance, the average price of India-based wind energy carbon credits is approximately US $1.20 (Rs 99) per credit, a price that has significantly decreased over the past decade.

Carbon credits must be based on the cost of the project and not on the whims of the non-existent market. We have analysed the proportion

Table 12: Viability assessment

Hydropower projects offer higher emission reduction than other renewable energy projects

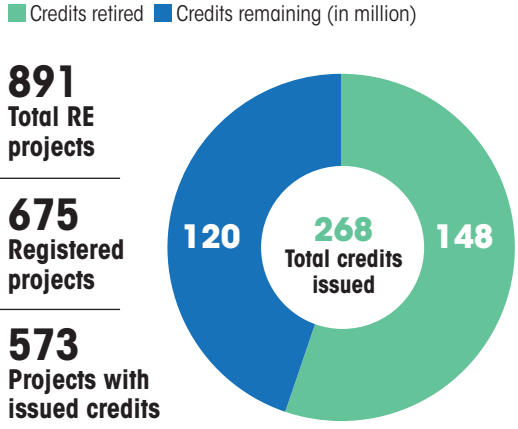
Project Name	Developer	Capacity (in MW)	Cost per MW (in crores)	Emission reduction (tCO_2eq) / per year per MW	Cost per tonne of emission reduction ('000)
300MW Hydropower project by JHPL	Jaiprakash Hydro	300	5.5	3,508.21	**15.68**
Renewable Solar Power Project by ReNew Solar Power Private Limited	Renew Power	927	6.89	1,906.45	**36.14**
Bundled Solar Photovoltaic Project by ACME	ACME Group	1207	5.3	1,722.11	**30.78**
Solar Energy Project(s) by SB Energy Private Limited	Adani Renewable	2250	6.14	1,935.4	**31.72**
Wind Based Power Generation by Mytrah Energy (India) Limited	Mytrah Energy	233	5.76	2,057.72	**27.99**
Energising India using Solar Energy Projects	Azure Power	480	5.67	1,776.33	**31.92**
250 MW Wind Power Project by Mytrah Energy	Mytrah Vayu	250	7.56	2,392.16	**31.60**
Clean electricity generation by solar power project in Rajasthan	Azure Power	600	3.58	1,897.87	**18.86**
Bundled Wind Power Project by Mytrah Group	Mytrah Group	494	7.21	1,864.97	**38.66**
Ghani Solar Renewable Power Project by Greenko Group	Zuvan Energy (Greenko Group)	500	7.45	1,992.02	**37.40**

Note: Cost figures and emission reduction figures are taken from project documents of the respective carbon credit projects.
Source: CSE, Verra, Gold Standard

of the carbon credit in the cost of the key registered renewable energy projects. It is clear that the voluntary carbon market only takes care of a fraction of the costs of these projects—between 3 and 4 per cent in the 10-year crediting period. This is based on the current price of credits for renewable projects at US $1.5 (Rs 124) and the emission reduction potential as cited in the project document. Even assuming the highest cost of carbon credit, it would still be less than 10 per cent. The only outlier is the 300 MW hydroelectric project by Jaiprakash Hydro in Himachal Pradesh. In this case, the credits per megawatt as estimated by the project developer is much higher than what the solar

Renewable option

In India, renewable energy (RE) projects account for 90% of carbon credits issued



Wind power projects receive maximum carbon credits, followed by hydroelectric projects and centralised solar projects

Type	No. of projects	Credits issued
Biomass	110	**6,838,662**
Hydropower	62	**69,229,115**
RE Bundled	24	**4,129,816**
Solar - Centralised	147	**67,652,639**
Solar - Distributed	54	**5,792,296**
Solar Lighting	6	**350,126**
Solar Water Heaters	14	**578,255**
Wind	474	**113,670,832**
Grand total	891	**268,241,741**

Source: Ivy S. So, Barbara K. Haya, Micah Elias. (2023, May). Voluntary Registry Offsets Database v8, Berkeley Carbon Trading Project, University of California, Berkeley. (May 2023)

and wind projects usually command; the project period for which Jaiprakash Hydro would secure credits is also longer at 20 years. With this and a higher carbon credit price of US $3.5 (Rs 289), it adds up to roughly 38 per cent of the capital cost.

OFFSETS IN WHOSE ACCOUNT

Renewable energy carbon credit projects reveal the big issue that needs to be addressed in carbon credits market. In whose account book should the emission reduction from these projects be kept? Should India count renewable capacity addition and emission reduction towards its own Nationally Determined Contribution (NDC) targets under the Paris Agreement? All countries, including India, have taken on targets for reduction of emissions under the Agreement. As per its NDC, India has announced that non-fossil fuel would constitute 50 per cent of the total installed power capacity by 2030. India would count all projects that are non-fossil fuel, including hydroelectricity, wind and solar. This either poses a risk of double counting or short-changes the government's clean energy efforts by attributing carbon rights to foreign entities.

4 THE ISSUES

- **More intermediaries mean more transactions, resulting in more profits being appropriated by middlemen. This is further complicated by the complexity and opaqueness of the market.**
- **Voluntary carbon markets are growing rapidly; driven by private entities, mostly industries and businesses, their benefits to climate and people are seriously questionable.**
- **Non-additionality of emissions reduction is a constant theme plaguing the projects CSE examined.**

Carbon markets are ambitious programmes, and stakeholders are increasingly relying on them to deal with the problem of anthropogenic emissions. This is evident from the significant growth that voluntary carbon offset markets have experienced in recent years.

However, critics argue that the commodification of carbon emissions—treating them as a marketable entity—is problematic because it places too much emphasis on the economy of carbon rather than the environment. Some argue that an accounting process that reduces different kinds of CO_2 avoidance, removal, and storage to the same unit of a tonne of carbon is a poor guide in the design of climate policy. The false equivalence between fossil fuel emissions and biotic carbon sinks through a common denominator overlooks factors like the relative permanence of carbon in undisturbed fossil fuels.[34] Additionally, outsourcing emission reduction responsibility to developing countries neglects developed countries' own emissions. This leads to an argument that the market perpetuates inequality by allowing rich nations and powerful companies to buy their way out of reducing emissions, while less privileged groups, smaller companies and communities are unable to participate in the market.[35]

There is also the question of putting the right price on carbon emissions. What is the most effective price for offsetting our impact on the environment?

An in-depth review by the Stockholm Environment Institute on the effectiveness of the 'joint implementation' mechanism under the Kyoto Protocol concluded that it may have led to 600 million tonnes of increased emissions.[36] The environmental effectiveness of even the best-regulated carbon markets today has been controversial.[37] Further there is clear evidence of 'worthless' offsets generated from the best-recognized voluntary carbon markets.[38]

These concerns highlight the need for caution when relying on market mechanisms. However, if a well-designed carbon market is to be considered as a complementary mechanism to substantive efforts for directly reducing emissions, it is important to address several issues that currently plague voluntary carbon markets.

4.1 ISSUES WITH CARBON MARKETS THAT ARE ALSO APPLICABLE TO VOLUNTARY CARBON MARKETS

These are oft-highlighted issues of carbon markets and instances of abuses under each of these issues have been brought to light since the time the Clean Development Mechanism (CDM) became functional. They apply to voluntary carbon markets as well.

1. **Additionality**: Carbon credits are not rewards for GHG reductions; they are meant to compensate for what is hard to offset elsewhere. For carbon credits to be traded, GHG reductions must be 'additional' in the sense that the reductions would not have happened without a carbon crediting mechanism. For example, a solar power project that can function without additional financing and is already profitable would not be considered additional.

   A climate action likely to pass the additionality test is one that is not expected to attract investment, is difficult to finance due to technical reasons, is not common practice, faces implementation challenges and is not mandated by regulations.[39]

   Evaluating whether a project is truly additional can be challenging and often subjective. Several studies have highlighted additionality as a principal concern in the offset market. A 2016 study by the Institute of Applied Ecology in Berlin found that most energy-related projects under the CDM were unlikely to be additional. For the categories of projects it considered, the study found that 85 per cent of the projects had a low likelihood of ensuring environmental integrity.[40]

   In 2020, an investigative report highlighted that GreenTrees, a project developer in the US, was taking credit for trees that had already been planted or would have been planted even without the carbon credit project. The buyers of these credits were large companies who claimed offsets for activities that were not additional.[41]

2. **Baseline estimation**: The issue of baseline estimation is observed side-by-side with the issue of additionality. To demonstrate an 'offset', there has to be a baseline against which offsets can be measured. For instance, an afforestation project that claims to have offset emissions by sequestering carbon would need to establish a baseline for the amount of carbon that would have been emitted had the land not been afforested. But this requires imagining an alternate scenario that can only be extrapolated.

   In March 2022, Carbon Market Watch flagged a REDD+ project in Papua New Guinea that was put out for public comments by Verra before registration. It critiqued the lack of evidence and detail in the project developer's baseline assumptions on deforestation. The developer had assumed that without the project, there would be 85–95 per cent deforestation over 100 years, which the review deemed as a high estimate without compelling evidence. The review concluded that the baseline scenario does not appear to be the most likely alternate and there were significant shortcomings in information disclosures that could clearly establish a baseline estimation. A moratorium was placed by the government on any new REDD+ projects in voluntary carbon markets after this and other projects were put under the scanner.[42]

3. **Permanence**: GHG emission reductions or removal associated with an activity that sold carbon credits may be reversed. For instance, an afforestation project that sold credits corresponding to the sequestered carbon later gets destroyed by a fire, thereby losing its stock to the atmosphere.

   To address this issue, standards bodies specify criteria for permanence and additionality. The risk nevertheless remains, and in the absence of strong oversight, credits become hot air.

4. **Leakage**: Accounting for net emission reductions from a project activity is a difficult task and not everything can be accounted for. Leakage occurs when a project activity undertaken to reduce emissions creates the unintended consequence of positive emissions elsewhere.

In March 2023, Survival International raised questions on a project that claims to control overgrazing in the Kenyan Savannah—one of the largest offset projects in the world. Leakage was one of the key issues it raised about the project. While livestock grazing was being regulated in the project boundary, it concluded that lands were being grazed outside in lieu of what was being avoided inside, thereby causing a massive leakage. Following accusations, Verra temporarily suspended the issuance of credits under the project.[43]

5. **Double counting:** It describes a situation when the same reductions are counted twice, such as if reductions are claimed both by the party responsible for reducing emissions and the party that purchased carbon credits for those same reductions or if a credit owner sells the same set of carbon credits to multiple buyers.

   An example comes from Interpol's findings from 2010 (which has since been addressed) when credits traded on the EU-ETS and already retired were resold by the Hungarian government.[44]

4.2 ISSUES SPECIFIC TO VOLUNTARY CARBON MARKETS

Other than the long-standing technical issues in carbon markets as described above, the growing voluntary carbon markets are also plagued by specific systemic issues that have a significant impact on the credibility and effectiveness of these markets.

1. **Intermediaries:** In a previous section explaining transactions in voluntary carbon markets, important stakeholders have been described. But intermediaries of all kinds are increasing by the day—brokers, credit quality rating agencies, marketplaces, exchanges, data aggregators, financiers, technological service, retail sellers etc.

   Consider the cost of registering a project with the offset programme (*see Table 13*). This cost is usually recovered from the revenue fetched from the sale of carbon credits. Separately, a fee is also charged for the validation and verification of projects by VVBs. Under the Gold Standard for instance, validation

fee for a standalone project is $5,000 per project, and annual verification fee amounts to US $2,500.[45]

Table 14 represents the fee charged by major exchanges in the carbon market. Based on the number of transactions reported in the overall market and recorded over exchanges, Allied Offsets estimates that exchanges represent approximately 23 per cent of voluntary carbon markets. Rest of the transactions follow other channels and the volumes of credits flowing on these channels is difficult to estimate.

Table 13: Cost of registering a project with offset programmes

Component	Gold Standard	Verra	Beneficiary
Account opening	$1,000	$500	Offset programme
Annual account fee	$1,000	$2500	Offset programme
Project registration fee	$2,900	NA	Offset programme
Credit issuance fee	$.15 per credit	$.10 per credit	Offset programme

Table 14: Fees in carbon market exchanges

Exchange	Registration fee	Annual fee	Trans. fee buyer (per credit)	Trans. fee seller (per credit)
CBL	NA	NA	$0.05	$0.05
AirCarbon	-	NA	NA	$5 per 1,000 credits
CTX (SME)	$1,250	$595	5–10%	5–10%
CTX (Large/ Listed Entities)	$1,995	$995	5–10%	5–10%

Source: AlliedOffsets[46]

More intermediaries mean more transactions, resulting in more profits being appropriated by middlemen, which leads to increased complexity and information opaqueness. An investigation by Unearthed and SourceMaterial investigated some of these dealings and found that brokers were buying projects for modest prices but selling the credits to end buyers at inflated rates.[47] This means that only a fraction of the money goes to the offset project or the owner/community, and the rest is cornered for services and wealth-creation in the markets.

This is not to say that intermediaries are unwanted in the market. They perform an important function of linking

buyers with suppliers, and diversifying the channels of credit consumption. But the raison d'etre of a carbon market is to support climate action in sectors and projects where the flow of investment is constricted and speculative profiteering is counter-intuitive to this cause.

A bigger problem is the opaqueness of the deals intermediaries make in the market. No information or records are available about who bought/sold credits how many times and for how much. A single credit repeatedly sold in the market before retirement would still represent a tonne of CO_2e offset and not more, regardless of the market value it generates. VCS and other carbon registries permit users to input retirement and account holder details. AlliedOffsets notes that there have been approximately 260,000 credit retirement transactions in voluntary carbon markets. Out of these, 153,446 transactions, representing almost 507 million credits, only have details of either the account holder (sellers) or retirement (end-buyers). Only 50,168 transactions have both fields filled in, but the information provided is often unclear on the credits' end-users. This also means that two-fifths of all the credits that have been retired on voluntary markets have been entirely anonymous with no seller-buyer information.

A market study on behalf of Carbon Market Watch conducted by AlliedOffsets said that 90 per cent of the intermediaries did not disclose the fees they charged. The average fee was reported to be about 15.5 per cent by the 10 per cent who disclosed the information. But this figure is inconclusive and this is also highlighted by the watchdog's report.[48]

2. **Asymmetric information:** Some of the participants in the carbon markets are a lot more informed about the processes, transactions, projects and the science behind it all. The head-start made by some others in the early development of the carbon markets gives them an upper hand. Since the markets are complex, evolving and opaque, the circumstances make it really hard for new entrants, especially sellers and buyers, to get a fair deal.

The lack of standardization and transparency in carbon markets exacerbate the problem of information asymmetry. There are various standards and protocols for measuring and verifying carbon offsets, and some are more rigorous than others. This can make it difficult for buyers to compare the quality of different offsets and make informed decisions.

As project owners as well as end-buyers do not properly understand the market, they often rely almost completely on intermediaries. For instance, a project owner may be completely dependent on a consultant (project developer) to get the project certified, handle credits received in the process and sell credits on behalf of the owner. Thereby entering a contract that leaves a little too much with the developer.

In a very different case, consider a retail buyer of credits like an individual offsetting their footprint from a flight journey. The amount they pay to do so may end up offsetting a low-quality credit that has weak certifications, which may not be truly offsetting their journey. But the individual would likely have no idea how the journey became green.

Finally, it's worth noting that information asymmetry is not unique to the carbon market; it's a common feature of many markets, particularly those that involve complex or technical products or services. However, the stakes are particularly high in the case of carbon markets, as it risks jeopardizing climate action with too much hot air all around and more money skimmed off in profiteering.

3. **Conflict of interest:** With all kinds of players operating in the markets, lines between their roles often blurs. Governance committees of standards bodies have representations from project developers. It is often the developers and brokers who author the very methodologies (maintained by offset programmes) that set rules and boundaries for the projects they develop. Consider Verra's Methodology for Installation of High Efficiency Firewood Cookstoves, VMR0006 that was developed by CQuest Capital, a project developer specializing in community projects, in 2021. CQuest Capital has listed 26

cookstove projects from 21 different countries with Verra's VCS programme under the methodology.

Baselines being decided by project developers is another conflict of interest. There is a clear incentive to overstate baseline emissions and a developer may choose to share selective information in support of their argument for a baseline scenario.

One of the most important and yet under-regulated transaction occurs between the project developer and a VVB. Project developers are free to choose the VVB for their project and they may choose to take the services of the same VVB without restrictions any number of times, giving VVBs a perverse incentive to remain culpably negligent and pass a project.

4. **Regulatory issues**: A key issue is the lack of legal structures regulating markets for commodities like carbon. Important legal questions emerge from the carbon credit trade, such as the rights of generation, ownership and use of credits.[49] For instance, in India, ownership of credits on forest projects may run into legal troubles in Fifth Schedule Areas where land ownership is often conflicted. The compensation for communities with mixed systems of ownership needs to be addressed. An emerging issue around carbon capture and storage is the ownership of below-ground resources/storage spaces; as in some countries, land ownership does not give the right to below-ground resources.

   Much like tax regimes that function differently in different countries and are thus prone to abuses by participants who discover loopholes and lack of coherence in mechanisms, coordination in separately governed markets increases the risk of abuse. Consider for instance, projects which use separate crediting programmes to earn credits for the same set of GHG reductions/removal. With increasing layers of market mechanisms (CORSIA, Article 6) coming into the picture, the risk of abuse increases.

   Another relevant issue is transparency. Market participants are not required to make disclosures and thus, we find that there

are significant information gaps in the overall setup. Details of projects—ownership, benefit-sharing, additionality, and offset estimation—elude external observers. Transactions cannot be traced and the effectiveness of the market cannot be verified. It would be difficult for an end-user to verify if their emissions were truly offset or not, for what value and to whose benefit.

UNCOVERED FRAUD IN AN REDD+ PROJECT

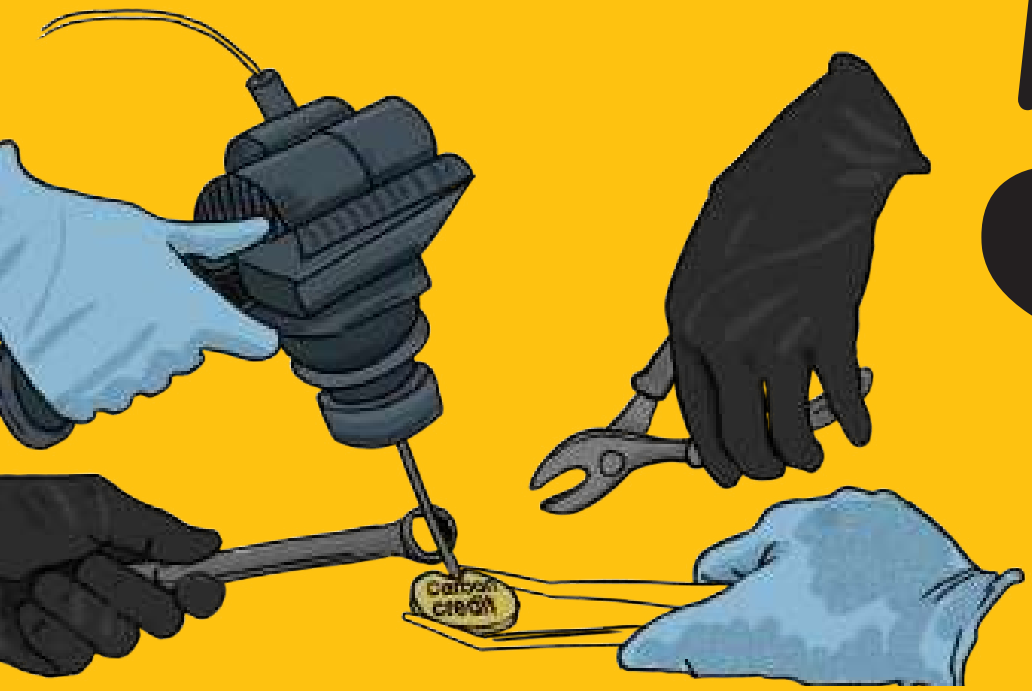
A report by The Guardian, based on an investigation conducted in association with Die Ziet (German Weekly) and SourceMaterial, on Verra's rainforest-based credit programme raised a storm in voluntary carbon markets in early 2023. The investigation revealed that over 90 per cent of rainforest offset credits certified by Verra and retired by corporations like Disney, Shell and Gucci were not representing emission reductions and were essentially hot air.

The investigation was based on three studies conducted on REDD+ projects. Two of these studies investigated 58 of the 87 Verra approved REDD+ projects. 21 projects were found to have no climate benefit and others were similarly noted to be less efficient. In another study, 32 of these projects were analysed. The study found that the threat from deforestation was overstated, thereby leading to an overstatement of baseline emissions by 400 per cent. If three of these projects, which had performed well, are discounted, the average overstatement would be 950 per cent.

Verra disputed the findings and issued its clarification that the methodologies used in the study were inadequate in assessing baseline threats and that such reports "miscalculate the impact of REDD+ projects."

While the report quickly caught critical attention, some voiced concerns over abandoning forest-based offsets—calling them a steady source of critical finance for preventing deforestation.[50] This included scientists from the Centre for International Forestry Research and World Agroforestry (CIFOR-ICRAF).[51]

Gold Standard, an alternative carbon crediting programme, does not have a REDD+ programme and it maintains that such a programme may "face technical and political challenges that may undermine long-term sustainability."



5

GOVERNANCE OF VOLUNTARY CARBON MARKETS

- **Core carbon principles released by ICVCM and guidelines released by VCMI aimed at eliminating greenwashing, in an effort to enhance the reputation of these markets.**
- **In a welcome move, rating agencies have emerged to evaluate projects and assess the quality of credits.**
- **Governments in developing countries are working to tighten regulations against reckless trade, and misappropriation of finance and climate benefits.**

The free run of voluntary carbon markets may just be over. Governments across the world are increasingly concerned about the nature of this unregulated market. In May this year, the Government of Zimbabwe declared all voluntary carbon credit schemes 'null and void', causing huge consternation to the developers of the projects. It said that the government would take 50 per cent of the revenue from the projects and 20 per cent would go to communities. This was clearly too much for the market to bear and finally in August 2023, the Government of Zimbabwe announced that the project developers could keep 70 per cent of the project proceeds, with the government charging 30 per cent as an environmental cess. However, it added that if local communities are affected, project developers would need to provide a quarter of their share of the proceeds.

Rwanda has declared that it would put a floor price on carbon offset projects of US $30 (₹2,473)—which in turn would lead to better quality projects. In 2022, Papua New Guinea and Honduras issued a moratorium on voluntary carbon credit schemes. Indonesia, in June, issued regulations for carbon trading in the forestry sector, under which owners of the land would be allowed to trade in carbon credits. In August it announced the setting up of a national carbon exchange.

Then the Nigerian government has said that it is interested in linking emission reduction certificates from ongoing activities in the country to its Nationally Determined Certificates. “We are entering a new phase of carbon markets,” Hugh Salway, head of markets at project certifier Gold Standard, told S&P Global, an American publicly traded corporation. “More governments may take steps that affect the voluntary market in the next months, some of which may present opportunities for investors and some may come with risks,” he added.

5.1 INDIA’S NOTIFICATION ON CARBON TRADE

India is enacting legislations and policies by different ministries—and it is not clear how coordinated these actions are—to create and regulate a carbon credits market and to incentivize people to join a green credits programme.

On 28 June 2023, the Union power ministry issued a notification on its Carbon Credit Trading Scheme.[52] Under this, the government would constitute a National Steering Committee for the Indian carbon market. The committee would be tasked with the governance of the Indian carbon market and direct oversight of its functioning. The Bureau of Energy Efficiency, an agency under the power ministry would be the designated administrator of the Indian carbon market. It will also issue carbon credits based on the recommendations provided by the committee. The Grid Controller of India Limited shall act as the registry and the Central Electricity Regulatory Commission will be the regulator. The notification is silent on the voluntary carbon market or the issue of export of credits.

Simultaneously, the Union environment ministry in June 2023, notified the Draft Green Credit Programme Implementation Rules, 2023. The programme is a domestic voluntary market that incentivizes voluntary environmental actions so that it promotes government's Mission LIFE (Lifestyle for Environment). It has listed actions, including planting trees, which would get 'green credits' and is described as "singular unit of an incentive provided for a specified activity delivering a positive impact on the environment." It goes on to say that an activity generating green credits under the green credit programme may also acquire carbon credits for the same activity under the carbon market. These green credits will be traded on a domestic market platform.

The steering committee will be in charge of governance while the administrator will be responsible for implementing the programme, including its management, monitoring and operation. The Indian Council of Forestry Research and Education will be the administrator, who will create technical or sectoral committees to develop methodologies, standards and processes for registration of green credit activities and grant of green credits. The trading service provider, accredited by the administrator, will look after the trading aspect. Perhaps the most important aspect of this scheme is that it opens the compensatory afforestation activities by private entities to incentives and participation in the domestic carbon market. It will be important to see how the government plans to

NIGERIA (2023)

Nigeria announces plans to regulate the voluntary carbon market. The country says that sellers of carbon credits need to comply with local regulations and that it is preparing proposals for carbon pricing. The government wants to ensure that every opportunity for harvesting emission reduction certificate from ongoing activities in Nigeria is linked to its Nationally Determined Contributions

RWANDA (2023)

In an effort to shift the control of carbon pricing from buyers to Rwanda, the government says that it will not sell carbon credits below $30 per tonne of CO_2e

HONDURAS (2022)

Honduras imposes a moratorium on the sale of forest-based carbon credits to avoid the colonization of carbon in the country's forests

ZIMBABWE (2023)

Zimbabwe says it would closely regulate voluntary carbon offset trading over fears of greenwashing and also ensure that local communities benefits from it. The country plans to charge an environment levy of 30 per cent on projects (and allow developers to keep 70 per cent share) if communities are not involved. If local communities are affected, project developers would need to provide a quarter of the 70 per cent to the people

MAP 3: ATTEMPTS TO REGULATE

Governments across the world have begun to voice concerns about the unregulated nature of the voluntary carbon market

EGYPT (2023)

Egypt's financial regulator puts forth regulations on the process of verifying and certifying carbon credits to provide an 'effective' mechanism for measuring, recording and documenting projects

KENYA (2023)

Kenya proposes a new legislative draft of the Carbon Credit Trading and Benefit Sharing Bill, 2023, to establish a regulatory framework for carbon credit trading and benefit-sharing, and an authority to oversee the trading

INDONESIA (2022)

The government imposes conditions on the export of carbon credits. It had earlier sent a letter to Verra and a few other voluntary market registries, telling them that they cannot issue credits from 2021 without the government's permission

PAPUA NEW GUINEA (2022)

The government issues a moratorium on voluntary carbon credit deals to protect the country from carbon scams, involving consent and benefits-sharing

TANZANIA (2022)

Tanzania introduces a list of regulations to control and manage carbon trading projects

MALAWI (2023)

Malawi says it would review voluntary carbon market projects on its territory

ZAMBIA (2022)

Zambia develops Interim Guidelines for Handling of Carbon Markets and Trading In Zambia that aim to ensure the country's trade and regulation of carbon meet international best practices while also benefiting local communities that own the natural resources

Source: Government reports; official documents

ensure verification of these credits, being done on non-forest land by private and public agencies.

Then, separately, as an implementation measure for the Paris Agreement, the government in February 2023, issued a list of activities that could be considered for trading of carbon credits under bilateral programmes under Article 6.2.[53] This list includes renewable projects, including solar projects with storage, offshore wind, hydrogen and the best available technologies for the hard-to-abate sector. In this list, the government's effort is to ensure that bilateral trading of carbon credits is in the high-end sectors, which would be expensive for India to undertake. It would work for transformative action and not utilize the low-hanging projects, which are cheaper.

5.2 EFFORTS BY THE MARKET

Recently, there have been calls from various quarters to improve regulations in voluntary carbon markets. Many corporations have been setting net-zero targets backed by offsets bought from voluntary carbon markets, but accusations of greenwashing have followed. As a result, the governance of carbon markets has become a common theme of discussion among stakeholders and observers, especially because the intent is to restore trust in the market.

5.2.1 ICVCM's core carbon principles

A private sector initiative called Taskforce on Scaling Voluntary Carbon Markets (TSVCM) was formed in 2020. It is spearheaded by Mark Carney, the UN Special Envoy on Climate Action and Finance. One of the recommendations of the task force led to the formation of the Integrity Council for the Voluntary Carbon Market (ICVCM).

The ICVCM has come up with a set of 'Core Carbon Principles' that seek to benchmark 'credible' and 'high-quality' credits. Each principle is supported by an assessment framework that will allow credits to receive a 'CCP label'. These principles have been grouped into three categories:

Governance	Emission impact	Sustainable development
1. Effective governance 2. Transparency 3. Tracking 4. Robust third-party validation and verification	5. Additionality 6. Permanence 7. No double counting 8. Robust quantification of emission reduction and removals	9. Sustainable development benefits and safeguards 10. Contribution to net zero transitions

Table 15: Assessment framework for core carbon principles

Governance	Emission impact	Sustainable development
• Carbon-crediting programmes need an independent board of directors, annual reporting, social and environmental responsibility, anti-money laundering measures, and anti-bribery and anti-corruption practices. • Stakeholder consultation, grievance resolution, and accessible grievance processes should be transparently implemented. • Procedures to address incorrect issuances of carbon credits and public availability of relevant documentation for mitigation activities. • The programme should provide missing information upon request and ensure its public availability. • Accreditation and management of verification bodies, addressing poor performance through reporting, suspension, or revocation of participation.	• Carbon-crediting programme must update quantification methodologies. • Methodologies must cover eligibility, accounting, additionality, baseline, GHG quantification, and monitoring. • Procedures to review, suspend, or withdraw methodologies. • Define carbon credits, disclose global warming potential, set crediting periods, assess uncertainty, and consider government policies. • Prevent double issuance, address overlaps, and apply requirements to overlapping activities. • Registry provisions to prevent transfer/cancellation of retired credits. • Ensure compatibility with domestic mitigation schemes, avoiding double counting. • No issuance for GHG reductions or removals already traded in other markets or frameworks.	• Mitigation proponents must comply with laws, regulations and conventions. • Proponents should assess and address negative environmental and social impacts. • Stakeholder consultations and FPIC processes should be conducted. • Safe and fair working conditions, no forced labour or discrimination. • Minimize pollutant emissions, waste generation and habitat conversion. • Respect and protect rights of indigenous peoples and local communities. • Consider human rights, gender equality, and contribute to SDGs.

Source: ICVCM

5.2.2 Voluntary Carbon Markets Integrity Initiative (VCMI)

Yet another body called the Voluntary Carbon Markets Integrity Initiative (VCMI) has been addressing the demand-side problems of carbon credits to ensure that corporate buyers don't end up greenwashing claims. Buyers receive gold, silver or bronze accreditation based on their adherence to the VCMI approach. To do so, buyers must establish science-based targets and follow a

mitigation hierarchy where priority is given to reducing their own emissions.

Other than this, the body has come up with an 'Access Strategy Toolkit' as a guide for policy-makers on how and when to engage with voluntary carbon markets.

5.2.3 G7 principles of high integrity carbon markets

The G7 countries have come up with a set of 'Principles of High Integrity Carbon Markets' that seeks to improve market integrity as well as transparency. It demands a robust supply-side certification standard. It emphasizes transparency, public accountability and sustainable development objectives; and requires programmes to ensure that human rights, gender equality, and the rights of indigenous peoples are respected and safeguarded. On the demand side, it asked entities to make disclosures through a transparent reporting process and provide information on types and sources of offsets.

To ensure integrity, it asks registries to track information publicly. Eligibility of projects, status of authorization of credits and corresponding adjustment related information should be easily available. It asks standard setting bodies to align their standards and clarify their roles.

5.2.4 Nordic Code

In 2022, the 'Nordic Dialogue on Voluntary Compensation' came up with the draft Nordic Code of best practice for voluntary compensation of GHGs. The guidelines cover aspects such as thorough emissions calculation and compensation, setting emission reduction targets which are consistent with a 1.5 ^{o}C warming scenario, supplementing mitigation with credible voluntary compensation, transparent reporting and verification, truthful claims without double counting, achieving carbon neutrality through offsetting and emissions reduction, and adhering to good marketing practices.

5.2.5 Rating agencies

Carbon credit rating agencies have emerged in recent years to independently assess the quality of projects and resulting credits in

the carbon market. This includes firms such as Sylvera and BeZero, both founded in 2020. The influence of ratings has been growing in the market. BeZero raised US $50 million in late 2022 and has come up with a separate carbon removal assessment framework.

Table 16: BeZero provides public access to ratings

Rating	Name	Vintage	Accreditor	Project ID	Sub-Sector	Location
A	Bagepalli CDM Reforestation Programme	01/04/05 - 31/03/21	Gold Standard	GS4240	Afforestation, Reforestation & Restoration	India
BBB	The TIMARPUR-OKHLA Waste Management Company Pvt Ltd's (TOWMCL) Integrated Waste to Energy Project in Delhi BeZero Carbon has reaffirmed the 'BBB' BeZero Carbon Rating assigned to the credits issued by the India-based CDM 1254. This is based on our opinions and reasons expressed below following our analysis of publicly available information. Carbon credits rated 'BBB' provide a moderate likelihood of achieving 1 tonne of CO e avoidance or removal. The 'BBB' rating reflects the project's above-average additionality given its dependence on carbon finance. The rating is further supported by the project's success in an unsupportive policy environment, and moderate non-permanence risks given the strength of India's property rights. Credit risks are moderate with some leakage concerns left unaccounted for, and a risk of over-crediting considering the use of static and default data.	30/03/11 - 31/12/20	CDM	1254	Non-Oil Recycling	India
BBB	Biomass/biogas based heat and power generation at Everest Starch	28/05/14 - 31/07/21	VCS	1535	Fuel Switch	India
BB	CFL Lighting Scheme Bachat Lamp Yojana	30/05/10 - 31/12/12	VCS	1731	Energy Efficiency	India
BB	Energizing Indian homes by Solar rooftop projects	28/12/17 - 30/11/19	VCS	2038	Renewables	India
BB	Grid Connected Renewable Power Generation from Wind Mills by L.S Mills	31/03/06 - 07/03/16	VCS	749	Renewables	India

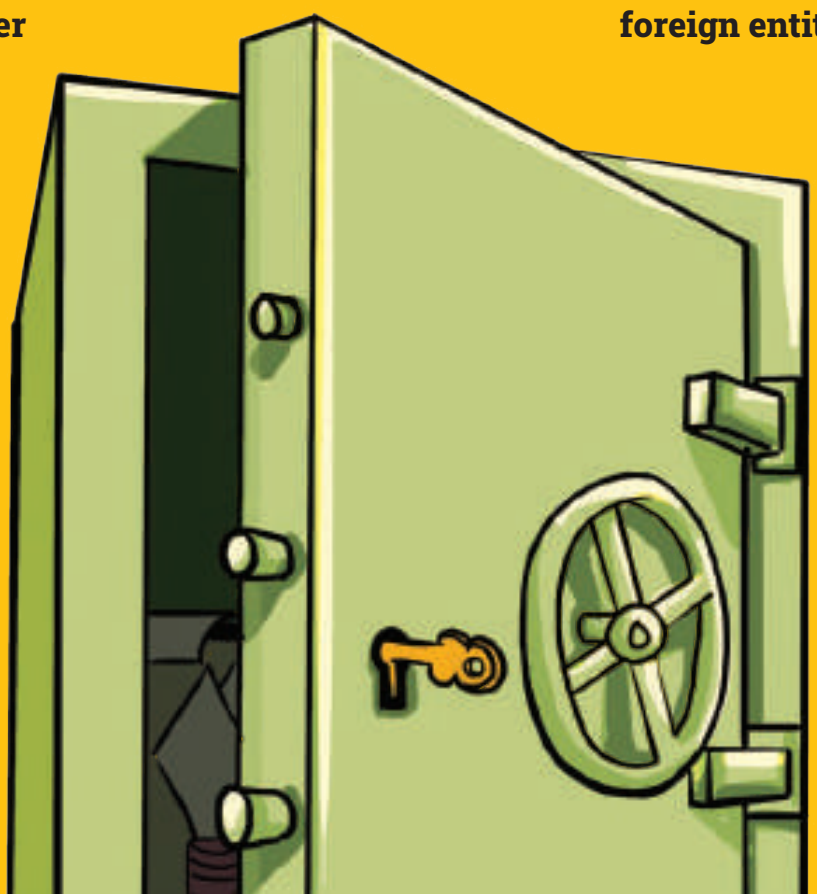
Note: This is how it rates some India-based projects.

Source: BeZero

6

CONCLUSION

- **Voluntary carbon markets need transparency. Prices in these markets should be based on the real costs of implementing the projects, and not on a secret pact between the buyer and seller.**
- **The markets must be required to share the proceeds annually with communities and this should be verifiable and substantial.**
- **Countries should not sacrifice their own climate targets by selling off cheap options of emissions reductions to the balance sheet of foreign entities.**



6.1 WAY AHEAD AND RECOMMENDATIONS

At the next UN climate conference (COP 28) in Dubai later this year, the issue of regulation of carbon markets will be discussed. World leaders need to learn from the mistakes of voluntary carbon markets so that this new market mechanism, which is designed to bring transformation in the world, does not repeat those. One of the fundamental flaws of voluntary carbon markets is that there is no basis of the price put on a project; at times it is inflated and at times it is so low that the project becomes unviable. It seems that the entire purpose of voluntary carbon markets is to serve the interests of project developers, auditors and all the others who make a cut in this carbon business.

The current carbon markets could end up increasing emissions in the world. The buyers of credit—say an airline company that has assured its customers to offset their carbon footprint or a food company that has declared itself net-zero—continue to emit; they even increase their emissions, saying that they have bought credits. But as these credits have been over-estimated or do not really exist, the reductions are notional. This is a double-jeopardy. This is exactly what a climate-risked world does not need.

So, what should be done differently? Here are five steps that can make these markets effective.

6.1.1 Ensure transparency

The first, and the obvious step, is to ensure transparency in the markets. The details of the projects should be listed. There should be information about the price that each credit has earned. CSE's investigation into the workings of the big project developers, carbon registries and the big and small non-profits involved in this business showed there is no transparency; communities are unaware of carbon credits; there is over-estimation of carbon credits; ownership rights on the carbon stored in trees of poor tribals have been transferred to private entities; and worse, there is no real sharing of benefits with the people who are required to change their behaviour. In this way, the gains of the project would be fictitious as the design is flawed. If governments want to design a mechanism that has credibility, it must be based on rules and transparency.

6.1.2 Pay for real change

The second step is to decide once and for all the objective of the markets—voluntary, bilateral or multilateral—and design rules accordingly. If the purpose of the markets is to invest in projects that will lead to reduction in emissions in different parts of the world, then the markets must be based on paying for the real cost of the projects. Consider renewable energy projects, which are critical for making the transition to clean energy in countries of the South. The current voluntary carbon market pays a fraction of the capital cost of these projects in India. It is just a sprinkle of sugar on the already paid-for cake—paid, in many cases, through the scarce public finances. This is when the capital cost of these clean energy projects is still lower than if the investment was made in already industrialized countries, which need to offset emissions. So, the carbon markets could be made to pay for this in the countries of the South, at lower costs—but not dirty cheap. This is the real issue.

It is the same with biogas, which allows households to switch from burning polluting biomass in stoves to using clean energy. They could leapfrog to low-emission technologies. But currently, the voluntary market is farcical in its pricing of this community energy device. It pays anything between 2 and 7 per cent of the cost of building the device; in most cases, the rest is paid by the Indian government's subsidy programme. In this immoral business, the rich who need their emissions offset, are being subsidized by the poor communities and governments.

In the case of nature-based solutions, the question again is the cost of planting trees, the cost of labour to take care of the trees and the opportunity cost of the land, which is being used for sequestering carbon.

The market has to be 'real' and not based on the mechanisms of a non-transparent exchange between buyers and sellers. In the design of the voluntary or official carbon market, it would be important to put a floor price to carbon credit. The Rwandan government's proposal of US $30 (₹2,473) per credit would be a good starting point.

6.1.3 Share the proceeds

The third step to ponder on is who these markets are meant for. Currently, the markets only seems to work in the interest of the project developers and, of course, the paraphernalia of consultants and auditors. This also means that they are ineffective in terms of real emission reduction. The communities get virtually nothing from the proceeds and this means that they also have no stake in the emission reduction programme.

Take the issue of household devices, in this case, cooking stoves. This market segment is growing exponentially. Understandably so, as it is lucrative for the project developers. In this case, the cost of the stove, which is what is given to households in order for project developers to earn credits, is a small component of their overall earnings. The cost of the improved cookstove, which is all that households get in terms of carbon credit benefits, adds up to barely 20 per cent of what the developer would earn over the five to six years of lifespan of the project. In other words, 80 per cent of the carbon revenue is kept as profits and it is a handsome amount as each such project has thousands of devices to be distributed. And, this is assuming that the devices are supplied for free. At place, as we have found, poor households have actually paid for these cookstoves, against which the developer and its rich offset clients have made a killing.

The fact is that there is no incentive for these households to keep using the stoves. If they were receiving money annually, there would be some incentive for compliance. It is the same with all other such projects, from growing trees to installing biogas plants to abate and avoid emissions. If communities continue to earn and get a substantial share—not peanuts—of the proceeds of the carbon market they would be part of the project of change. In this way, they are just used and discarded.

So, the carbon market must be required to share the proceeds annually with communities and this should be verifiable and substantial. This is also what the original Zimbabwe proposal said. It is important we listen to this and not the profit motives of this creative carbon market accountants.

6.1.4 Keep it simple

The fourth is to accept that the voluntary carbon market also shows how the all the King's smart men have fallen. Despite spending on verification, auditing and registration, these agencies seem to have got so much wrong. They cannot even calculate the emission reduction of one cookstove—Greenways says its stove reduces 2–4 tonnes of CO_2e each year; EKI says the reduction is 5.7 tonnes. We know that this has to do with thermal dynamics of a small household device but there is no way it can be so different, especially as the fuel used is still wood. Then they cannot get the baseline right and assume that distributing an improved device will mean automatic emission reduction.

All this means over-estimation of emission reductions—we have literally fudged the data. One lesson that must be learnt is to keep the project design simple and not to trust the army of consultants and profiteers in this business. It means keeping their role minimal and to keep the control of projects with public institutions and people.

6.1.5 Countries must account

The fifth and the most crucial lesson is that the ownership of trees grown on the land of the tribals in Araku valley has been transferred to a foreign entity. Let's for a moment forget that these lands are under Schedule V of the Indian Constitution, which prohibits any outsider from diverting the claim of tribals. The fact is that these trees are grown by people on their lands. Under which agreement can any agencies have the right to decide how the tree will now be used—harvested or not. It is the same question when it comes to countries. Even more so.

Under the Paris Agreement, all countries have taken on emission reduction targets. These are voluntary, but submitted to the UN Framework Convention on Climate Change and are expected to be complied with. This means India has a commitment as submitted to reduce emission intensity of its economy; to augment non-fossil energy so that it can meet 50 per cent of its electric power requirements by 2030 and to increase the 'sink'—grow forests to sequester carbon. These are part of our nationally determined contributions (NDC) under the Paris Agreement. This is unlike the

time of the Kyoto Protocol and its Clean Development Mechanism (CDM), when countries like India did not have nationally determined targets. Now, we have to reduce emissions.

The question is, in whose account should these carbon credits be listed? This is not a hypothetical question. But a real one. To achieve the target of 50 per cent of our electric power requirements from non-fossil fuel sources, every megawatt of renewable power, including hydroelectricity, will need to be counted and factored in. But 675 Indian renewable energy projects are registered under Verra and Gold Standard registries for 268 million carbon credits, of which 148 million have also retired (or claimed against offsets). So, how can these be accounted for in the Indian NDC? Or can they? Will this not lead to double accounting?

It is the same with nature-based solutions. India's submission to UNFCCC is that it will "create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030." It is also known that the bulk of afforestation is happening in trees outside forests (TOFS, as they are known). So, who gets to account for these trees, which, in the case of Araku Valley, are now 'owned' by Livelihoods Funds?

This is why the voluntary carbon market must work within the confines of the government's NDC—it has to contribute to this. The only 'exportable' credit has to be the one that is expensive for the country to do—where there is an advantage for the country as it can transform its emission trajectory.

The fact is that the current voluntary carbon market is based on cheap options and this means that countries have 'sold' off the lowest-hanging fruit—the options of emission reductions that they could afford. They would now be in the balance sheet of foreign entities and governments. This will only mean that countries will not be able to afford to make the investments in the hard-to-abate options; and these will contribute to emissions and jeopardise our common future. Both the voluntary or official carbon markets must work within rules that are designed for integrity—not just for companies, but for communities and the planet.

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Annexure 1: Credits issued and retired by project type in India by May 2023

Project type	Total credits issued	Total credits retired
Agriculture	**570,092**	**511,373**
Improved irrigation management	396,504	383,561
Manure methane digester	173,588	127,812
Chemical processes	**408,975**	**0**
N_2O destruction in nitric acid production	408,975	0
Forestry & land-use	**2,229,948**	**537,469**
Afforestation/Reforestation	1,675,932	403,470
Wetland restoration	554,016	133,999
Household & community	**11,769,724**	**4,525,043**
Biodigesters	4,538,333	2,245,296
Bundled energy efficiency	67,737	0
Clean water	83,653	77,065
Cookstoves	578,8391	2,091,305
Lighting	1,291,610	111,377
Industrial & commercial	**1,4028,974**	**9,657,484**
Aluminium smelters emission reductions	286,468	0
Brick manufacturing emission reductions	1,112,182	686,675
Energy efficiency	312,730	194,809
Fuel switching	160,932	155,311
Natural gas electricity generation	10,773,178	8,026,556
Waste heat recovery	1,383,484	594,133
Renewable energy	**268,241,741**	**148,460,360**
Biomass	6,838,662	3,947,760
Hydropower	69,229,115	39,805,795
RE bundled	4,129,816	2,178,800
Solar - Centralized	67,652,639	29,145,002
Solar - Distributed	5,792,296	3,926,149
Solar lighting	350,126	195,354
Solar water heaters	578,255	69,031
Wind	113,670,832	69,192,469
Transportation	**186,613**	**90,004**
Mass transit	186,613	90,004
Waste management	**572,135**	**138,807**
Composting	374,659	50,953
Methane recovery in wastewater	197,476	87,854
Total	**298,008,202**	**163,920,540**

Source: Berkeley Carbon Trading Project

Annexure 2: Costs and benefits to the community as reported by DTE-CSE from the field under different project types

Project type	Reported/ Estimated credit per participant	Reported/ Estimated price of credit	Name	Place	Money paid by beneficiaries (Rs.)	Benefit to the community (Received / Promised)	Year of joining the programme
Cookstove	2.5 to 3	$3 - $8	Savitri Ramesh Malleshi	Bidi, Belgaum	2,350	Rs 1,000 promised to the community. They haven't received anything. (Developer: Greenway Grameen)	2019
			Nillavva Malleshi	Bidi, Belgaum	2,350		2019
			Parvathy Narayan Kolamuskar	Bidi, Belgaum	2,350		2023
			Mangal Sanjay Shamammewar	Bidi, Belgaum	2,500		2022
			Mallava Shakarya Kalacharantimath	Bidi, Belgaum	2,500		2020
			Jyoti Padadhaiya Poojar	Bidi, Belgaum	2,350		2022
			Parvathy Handappa Hosetti	Bidi, Belgaum	2,350		2022
			Renuka Prakash Pathri	Junjwad, Belgaum	2,350		2022
			Vidya Patri	Bidi, Belgaum	2,350		2022
			Parvathy Kalaiya Poojar	Bidi, Belgaum	2,350		2022
			Namrata Sandeeo Powar	Yarnaal, Belgaum	2,200		2018
			Sangeetha Mallari More	Yarnaal, Belgaum	2,200		2018
			Shakuntala Eknath Sutar	Yarnaal, Belgaum	2,200		2018
			Priyanka Vinayak Sutar	Yarnaal, Belgaum	2,200		2018
			Mallubai Kherba Sankpal	Yarnaal, Belgaum	2,200		2018
			Shatragun Divate	Yarnaal, Belgaum	2,200		2018
			Suvarna Sadshiv Sampath	Yarnaal, Belgaum	2,000		2018
			Janta Suresh Chavan	Gavani, Belgaum	2,350		2022
			Vaishali Kiran Chavan	Gavani, Belgaum	2,350		2022
			Jyoti Shital Chavan	Yarnaal, Belgaum	2,400		2022
			Mangalamma (full name)	Danagalli, Mysore	2,350		2021
			Vasanta (full name)	Danagalli, Mysore	2,350		2021
			Mahadevamma (full name)	Danagalli, Mysore	2,350		2021
			Shueshlamma (full name)	Danagalli, Mysore	2,350		2022
			Shilpa (full name)	Danagalli, Mysore	2,350		2022
			Chikkamma (full name)	Doggegowdanadoddi, Mandya	2,350		2021

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Project type	Reported/ Estimated credit per participant	Reported/ Estimated price of credit	Name	Place	Money paid by beneficiaries (Rs.)	Benefit to the community (Received / Promised)	Year of joining the programme
			Latha (full name)	Doggegowdanadoddi, Mandya	2,800		2021
			Lakshmi (full name)	Doggegowdanadoddi, Mandya	2,400		2021
			Thimamma (full name)	Doggegowdanadoddi, Mandya	2,400		2022
			Jayamma MN	Doggegowdanadoddi, Mandya	2,350		2021
			Om Prakash Kamdar	Bagdi, Dhar	300	Subzidized Cookstove (Developer: EKI Energy Services)	2019
			Dinesh Bairagi	Bagdi, Dhar	250-300		2019
			Jamka Bai	Jirapura, Dhar	150		2022
			Anju Bai	Pandukhal, Dhar	150		2022
			Karan Singh	Bedapura, Dhar	0		2023
			Mohan Muria	Bedapura, Dhar	0		2023
			Manak Girwal	Bhadkiya, Dhar	0		2022
			Rahul Sonwani	Phoolsagar, Mandla	0		2023
			Suraj Nanda	Bakchherdona, Mandla	0		2023
			Santosh Nanda	Bakchherdona, Mandla	0		2023
Biogas	2 to 5	$3-$8	Unkalal Patidar	Alniya, Ratlam	~20,000	Subsidized biogas plant installation (Developer: INSEDA)	2018
			Lalchand Patidar	Alniya, Ratlam	~15,000		2020
			Leela Shankar	Alniya, Ratlam	~16,000		2014
			Savitri Bhopche	Bamhodi, Seoni	10% of the cost	Subsidized biogas plant installation (Developer: VNV Advisory)	2019
			Adhar Singh	Pindrai Khurd, Seoni	10% of the cost		2019
			Brijesh Yadav	Bhawal, Mandla	0		2018
			Naresh Malgam	Bhawal, Mandla	0		2018
			Suvedas Bairagi	Bhawal, Mandla	0		2018
			Suraj Nanda	Bakchherdona, Mandla	0		2018
			Asharam Maravi	Bakchherdona, Mandla	0		Before 2019
			Ashok Singh	Chargaon, Mandla	0		2018

Project type	Reported/ Estimated credit per participant	Reported/ Estimated price of credit	Name	Place	Money paid by beneficiaries (Rs.)	Benefit to the community (Received / Promised)	Year of joining the programme
Alternate wetting and drying (AWD)	2-8 credits/ hectare/ annum (as promised)	$8	Dhasharata Reddy	Urumadla, Nalgonda	NA	Rs 800 per acre/ per farmer (Developer: Core Carbon X)	2022
			Marriah	Wattimarthy, Nalgonda	NA		2022
			Venkat Reddy	Nemmany, Nalgonda	NA		2022
			Nanda Reddy Bhandaru	Thimmula Gudam, Nalgonda	NA		2022
			Muthian Shetty	Wattimarthy, Nalgonda	NA		2022
			Lachaya Shipangi	Wattimarthy, Nalgonda	NA		2022
			Roopani Yadavva Venkaiyaah	Urumadla, Nalgonda	NA		2022
			A Ram Reddy	Nemmany, Nalgonda	NA		2022
			M Venkat Reddy (same person I met the next day)	Nemmany, Nalgonda	NA		2022
Agro-forestry	Not Available	Not Available	Pangi Vimala	Doravalasa, Araku	100/yr as membership fee	Free saplings, training and fertilizers (Developer: Livelihoods Fund)	2000s --year not sure
			G Apallamma	Doravalasa, Araku	100/yr as membership fee		2000s -- they are not sure about the year
			Thamala Vimala	Doravalasa, Araku	100/yr		2014
			Burdilalyanamma	Gondavalsa, Araku	500-600/yr		2014
			Lalita	Gondavalsa, Araku	Rs 500-600/ yr		2014
			Khroaa Ruthama	Thootavalsa, Araku	100/yr		2014
			Janni Mithula	Thootavalsa, Araku	100/yr		2014
			Pujari Pandu	Pitta Mamidavalsa, Araku	100/yr		2022
			Somela Nageshwar Rao	Pitta Mamidavalsa, Araku	100/yr		2022
			Yesh Dombu	Garadaguda, Araku	100/yr		2014
			Kilo Buddu	Garadaguda, Araku	100/yr		2014

Annexure 3: CSE-DTE interactions with voluntary carbon market stakeholders

Project category	Who has been contacted?	Contact channel	Date	Brief
Cookstove	Greenway Grameen	Email (Sent)	19/06/23	Research inquiry
Cookstove	Greneity	Email (Sent)	19/06/23	Research inquiry
Forestry, Biogas, Mangrove	VNV Advisory	Email (Sent)	19/06/23	Research inquiry
Cookstove	Greenway Grameen	Email (Response)	20/06/23	Response email copied co-founder
Cookstove	Greenway Grameen	Email (Sent)	22/06/23	Follow-up email
All	Gold Standard	Email (Sent)	26/06/23	Research inquiry
All	Gold Standard	Email (Response)	26/06/23	Response email
Reforestation	Livelihoods Funds	Web-Meeting	26/06/23	Discussions on Livelihood's work in India
All	Verra	Email (Sent)	28/06/23	Research inquiry requesting a web-call for India specific discussions
All	Verra	Email (Response)	30/06/23	Response email received
Forestry, Biogas, Mangrove	VNV Advisory	Email (Sent)	03/07/23	Research inquiry
Cookstove	Greenway Grameen	Email (Response)	04/07/23	Response email
Cookstove	Greenway Grameen	WhatsApp	05/07/23	Research questions
Forestry	CHEA (Central Himalayan Environment Association)	Email (Sent)	06/07/23	Research inquiry
Alternate wetting and drying	Core Carbon X	Phone Call	06/07/23	Research inquiry on projects
Solar irrigation	Grassroot Trading Network for Women (SEWA) (Gujarat)	Phone call	06/07/23	Research inquiry, asked to call the next day
Clean water	Helioz	Email (Sent)	06/07/23	Research inquiry
Forestry	Infinite Solutions	Email (Sent)	06/07/23	Research inquiry
All	Verra	Email (Sent)	06/07/23	Research inquiry
Alternate wetting and drying	Core Carbon X	Phone Call	07/07/23	Project-related discussions were held. DTE-CSE requested site visit
Solar irrigation	Grassroot Trading Network for Women (SEWA) (Gujarat)	Phone call	07/07/23	Research inquiry
Cookstove	Greenway Grameen	Phone Call	10/07/23	Follow up for visits
Forestry, biogas, mangrove	VNV Advisory	Phone Call	10/07/23	Request for site visits
Multiple - Cookstove, NBS, Waste	EKI Energy	Phone Call	11/07/23	Call made with questions to a representative. Asked to send questions over email
Multiple - Cookstove, NBS, Waste	EKI Energy	Phone Call	11/07/23	Meeting with an EKI representative. Visit denied
Forestry	Infinite Solutions	Phone Call	11/07/23	Research inquiry, Request made for visit

Project category	Who has been contacted?	Contact channel	Date	Brief
Organic waste management	IORA Ecological Solutions	Phone Call	11/07/23	No response
Multiple - Cookstove, NBS, Waste	EKI Energy	Email (Sent)	12/07/23	Email sent with questions
Cookstove	Greenway Grameen	Phone Call	12/07/23	Follow up continuing
Reforestation	Livelihoods Funds	Web-Meeting	12/07/23	2nd discussions and request for visits made
Multiple - Cookstove, NBS, Waste	EKI Energy	Email (Sent)	13/07/23	Email sent with questions
Organic waste management	IORA Ecological Solutions	Phone Call	13/07/23	Scheduled a meeting for 18 July
Reforestation	Livelihoods Funds	Email	13/07/23	Visit requested was denied
Solar irrigation	Grassroot Trading Network for Women (SEWA) (Gujarat)	Web-Meeting	14/07/23	Discussion on projects, request made for a visit
Clean water	Green Springs (Odisha)	Phone Call	14/07/23	Meeting setup for 17 July
Cookstove	Greenway Grameen	Phone Call	14/07/23	Follow up continuing
Forestry, Biogas, Mangrove	VNV Advisory	Email (Sent)	14/07/23	Email requesting site visits
Forestry, Biogas, Mangrove	VNV Advisory	Email (Response)	14/07/23	Developer requested time and sought additional clarity on our work
Solar irrigation	Grassroot Trading Network for Women (SEWA) (Gujarat)	Phone Call	15/07/23	Follow up
Forestry, Biogas, Mangrove	VNV Advisory	Email (Sent)	16/07/23	Clarification and purpose of visits were shared with developer
Clean water	Green Springs (Odisha)	Phone Call	17/07/23	CSE-DTE requested a visit. Received dates for August
Organic waste management	IORA Ecological Solutions	Phone Call	17/07/23	Call to confirm meeting - No response
Multiple - Ccookstove, NBS, Waste	EKI Energy	Phone Call	18/07/23	Request for visit to project sites
Organic waste management	IORA Ecological Solutions	Phone Call	18/07/23	Called on the day of meeting - No response
Multiple - Cookstove, NBS, Waste	EKI Energy	Email (Sent)	19/07/23	Mail sent requesting visits
Organic waste management	IORA Ecological Solutions	Phone Call	19/07/23	No response
Reforestation	Livelihoods Funds	Email	19/07/23	Another visit request was made
Reforestation	Livelihoods Funds	Email	19/07/23	Visit request denied again, citing insurgency and inaccessibility as issues

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Project category	Who has been contacted?	Contact channel	Date	Brief
Alternate wetting and drying	Core Carbon X	Phone Call	20/07/23	Visit agreed on for August
Cookstove	Greenway Grameen	Phone Call	21/07/23	No response
Forestry	Infinite Solutions	Phone Call	21/07/23	Developer put some conditions for a field visit to be allowed, including signing an NDA
Organic waste management	IORA Ecological Solutions	Email (Sent)	21/07/23	Requested a date of meeting
Forestry, Biogas, Mangrove	VNV Advisory	Phone Call	21/07/23	Developer confirmed two sites for visit but only in August
Cookstove	Beneficiaries	Phone Call	22/07/23	Spoke with villagers and arranged a meet in August
Multiple - Cookstove, NBS, Waste	EKI Energy	Phone Call	25/07/23	Developer said they'll reach out to DTE-CSE
Biogas	INSEDA	Phone Call	26/07/23	Asked to send questions over email
Biogas	INSEDA	Email (Sent)	26/07/23	Email sent with questions
Biogas	INSEDA	Follow up call	31/07/23	Requested field visit
Biogas	INSEDA	Email (Sent)	31/07/23	Follow-up mail
Multiple - Cookstove, NBS, Waste	EKI Energy	Email (Sent)	01/08/23	Request for visit to project sites
Multiple - Cookstove, NBS, Waste	EKI Energy	Email (Response)	01/08/23	Response said they'll connect with us
Biogas	INSEDA	Email (Response)	01/08/23	Response received with two documents on the project
Multiple - Cookstove, NBS, Waste	EKI Energy	Office Visit	07/08/23	Asked to return next day
Multiple - cookstove, NBS, Waste	EKI Energy	Office Visit	08/08/23	Meeting with EKI. Site visits denied due to "NDA with Clients"
Reforestation	Naandi Foundation	Office Visit	14/08/23	The concerned person was in a meeting . DTE-CSE was asked to contact by email.
Reforestation	Naandi Foundation	Web-Meeting	17/08/23	Naandi agreed to speak with DTE-CSE
Multiple - Cookstove, NBS, Waste	EKI Energy	Email (Sent)	22/08/23	Email sent with questions based on field observations
Solar irrigation	Grassroot Trading Network for Women (SEWA) (Gujarat)	Phone Call	22/08/23	Representative gave dates in September

Project category	Who has been contacted?	Contact channel	Date	Brief
Cookstove	Greenway Grameen	Email (Response)	22/08/23	Received response naming other entities distributing cookstoves. Questions unanswered
Cookstove	Greenway Grameen	Email (Sent)	22/08/23	Email sent with questions based on field observations
Biogas	INSEDA	Email (Sent)	22/08/23	Email sent with questions based on field observations
Reforestation	Livelihoods Funds	Email (Sent)	22/08/23	Questions were sent to Livelihoods Funds after the field visit. No response
Reforestation	Naandi Foundation	Email (Sent)	22/08/23	Email sent with questions based on field observations
Cookstove	Core Carbon X	Email (Sent)	23/08/23	Email sent with questions based on field observations
Cookstove	Greenway Grameen	Email (Sent)	23/08/23	An email was sent to Greenway Grameen with follow up questions. Awaiting response
Cookstove	4k Earth Science	Email (Sent)	24/08/23	Email sent with questions based on field observations
Reforestation	Naandi Foundation	Email (Response)	24/08/23	Received response on questions
Cookstove	4k Earth Science	Email (Response)	25/08/23	Response received that information enquired is confidential and DTE-CSE should contact the developer
Solar Irrigation	Grassroot Trading Network for Women (SEWA) (Gujarat)	Phone Call	29/08/23	DTE-CSE requested an earlier visit. Received dates in September
Multiple - Cookstove, NBS, Waste	EKI Energy	Email (Response)	31/08/23	Received response without answers. "Company is in a silent period"
Cookstove	Core Carbon X	Email (Sent)	05/09/23	Email sent with questions based on field observations
Cookstove	Core Carbon X	Email (Response)	05/09/23	Received response on questions
Biogas	INSEDA	Email (Sent)	05/09/23	Second email sent with questions based on field observations – no response

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