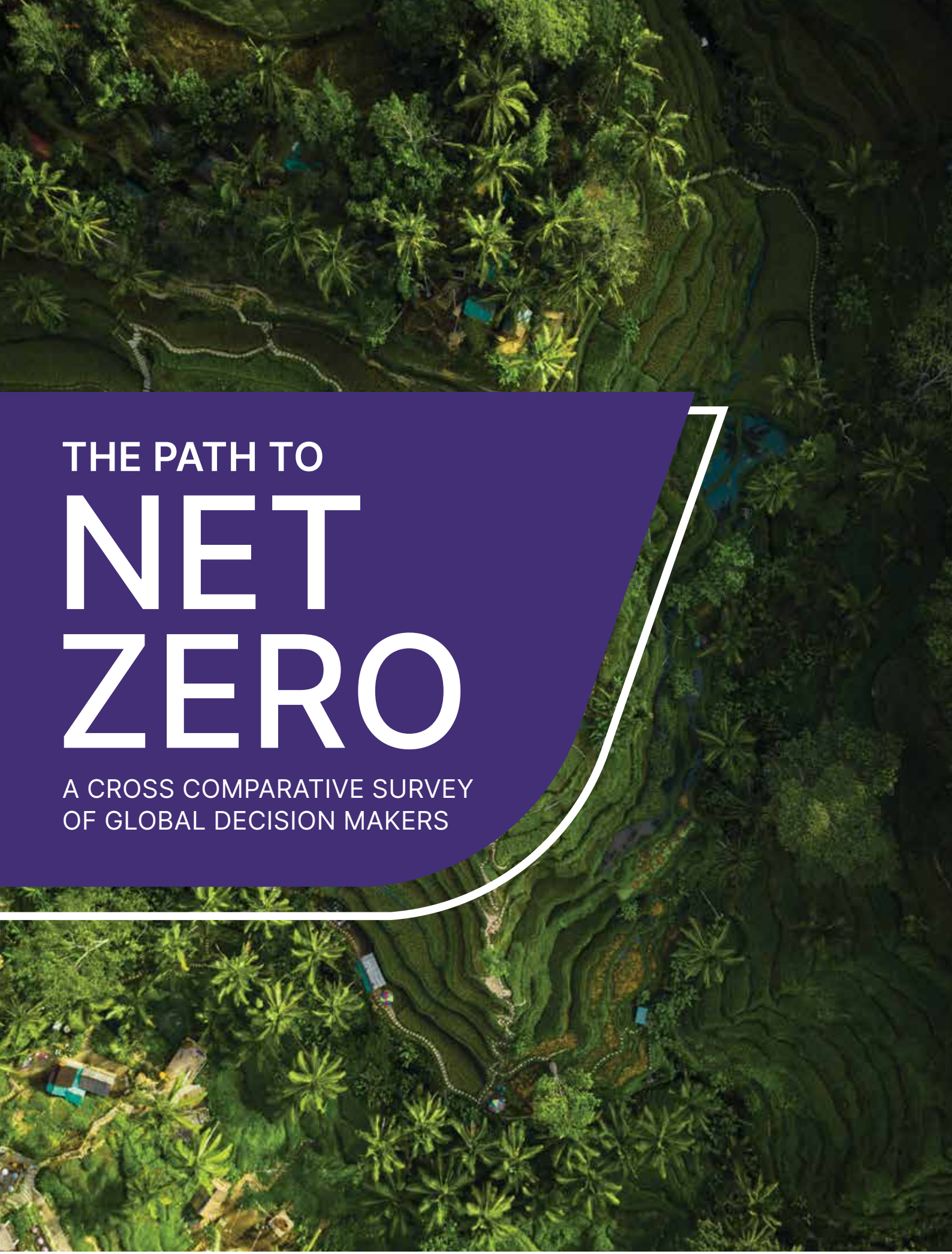
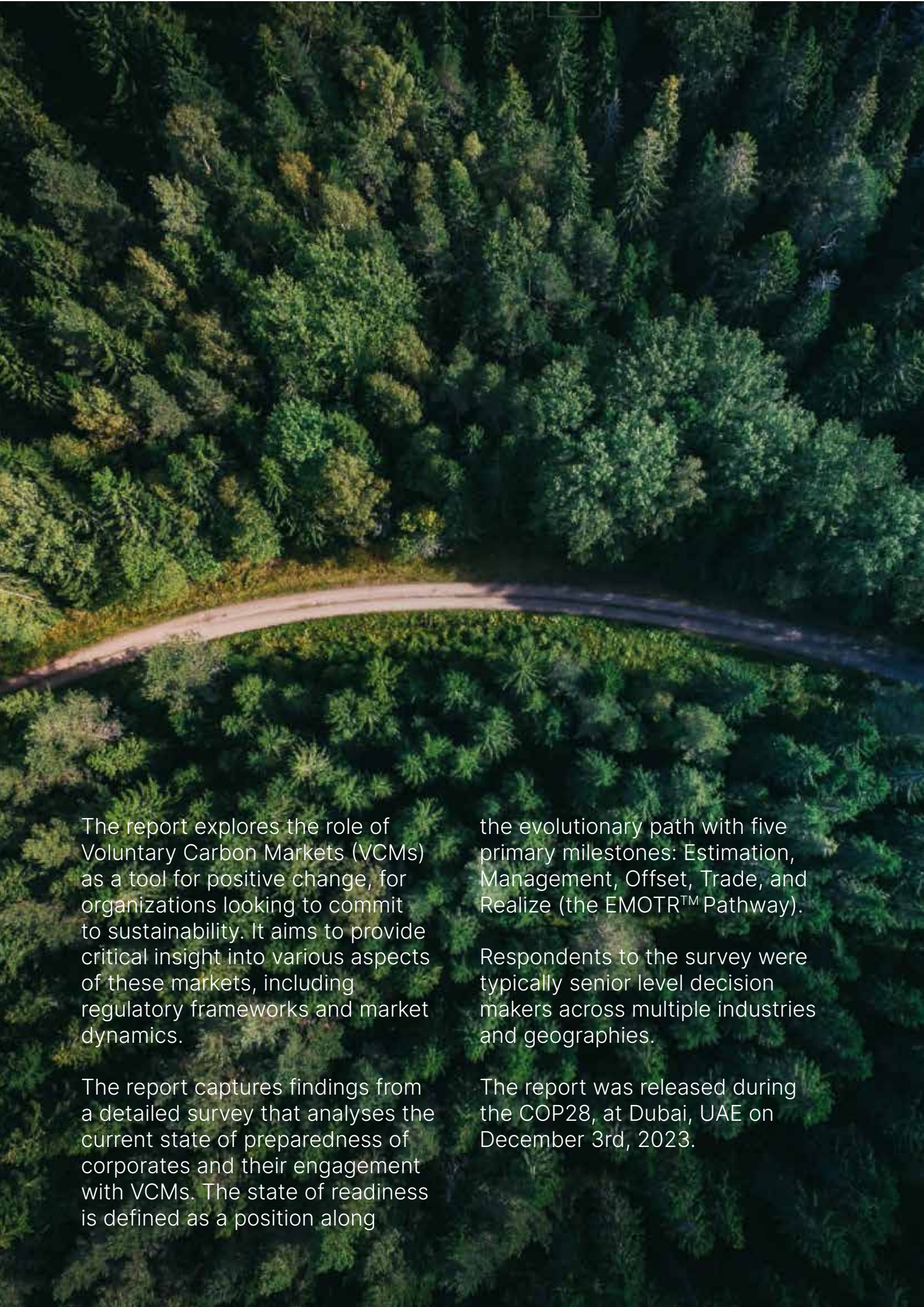


THE PATH TO NET ZERO

A CROSS COMPARATIVE SURVEY OF GLOBAL DECISION MAKERS

envex conil acx Clean Energy Business Council مجلس صناعات الطاقة النظيفة FS



The report explores the role of Voluntary Carbon Markets (VCMs) as a tool for positive change, for organizations looking to commit to sustainability. It aims to provide critical insight into various aspects of these markets, including regulatory frameworks and market dynamics.

The report captures findings from a detailed survey that analyses the current state of preparedness of corporates and their engagement with VCMs. The state of readiness is defined as a position along the evolutionary path with five primary milestones: Estimation, Management, Offset, Trade, and Realize (the EMOTR™ Pathway).

Respondents to the survey were typically senior level decision makers across multiple industries and geographies.

The report was released during the COP28, at Dubai, UAE on December 3rd, 2023.

FOREWORD

Unlocking sustainable goals through Voluntary Carbon Markets

In the face of pressing global challenges posed by climate change, the imperative for sustainable practices within industries has never been more pronounced. The urgency to address carbon emissions & promote environmental responsibility has ushered in a new era where corporations are compelled to navigate a complex landscape of regulations, voluntary initiatives, and emerging market dynamics. In this report, we sought to explore the burgeoning significance of Voluntary Carbon Markets (VCMs) as a potent tool in the pursuit of sustainability, delving into their growth trajectory and the corporate landscape shaping their evolution.

> ..this survey unveils critical insights into the estimation, management, & offsetting of carbon footprints.

VCMs have emerged as transformative arenas, allowing companies to proactively address their carbon footprints beyond regulatory mandates. The voluntary nature of these markets provides businesses with the flexibility to go beyond compliance, fostering innovation and commitment to sustainability. This report delves into the regulatory frameworks evolving across multiple geographies, key industries, market dynamics, and global initiatives shaping the ascent of VCMs, underscoring their pivotal role in the broader context of environmental stewardship.

Central to our exploration is a detailed survey capturing the pulse of corporate preparedness and engagement with VCMs. With responses from 140 entities across 11 countries, this survey unveils critical insights into the estimation, management, and offsetting of carbon footprints. The respondent profile spans diverse leadership roles, emphasizing the significance of these insights in strategic decision-making. By shedding light on regional nuances, industry disparities, and future projections, this survey forms a cornerstone in understanding the ground realities shaping VCM adoption.

As VCMs gain prominence, their challenges come into sharper focus. A comprehensive analysis reveals issues of quality, standardization and transparency plaguing the effectiveness of VCMs. Yet, amidst these challenges, opportunities abound. Technological advancements, especially in monitoring and verification, offer a pathway to enhance transparency and credibility. This report elucidates the dichotomy of challenges and opportunities within the VCM landscape, providing a roadmap for industry stakeholders. By aligning corporate strategies with global sustainability goals, businesses can not only mitigate their environmental impact but also contribute meaningfully to the broader climate agenda.

In essence, this report encapsulates a holistic view of Voluntary Carbon Markets, from regulatory intricacies to on-the-ground corporate practices. It serves as a guide for industry leaders, policymakers and sustainability advocates alike, fostering a collective understanding of the transformative potential inherent in VCMs. As industries stand at the precipice of a sustainability revolution, the insights within this report provide a compass for navigating the complexities of a world where environmental responsibility is not just an option but a necessity for a resilient and sustainable future.

Vishwajit Dahanukar,
Founder & Director, Envex Technologies

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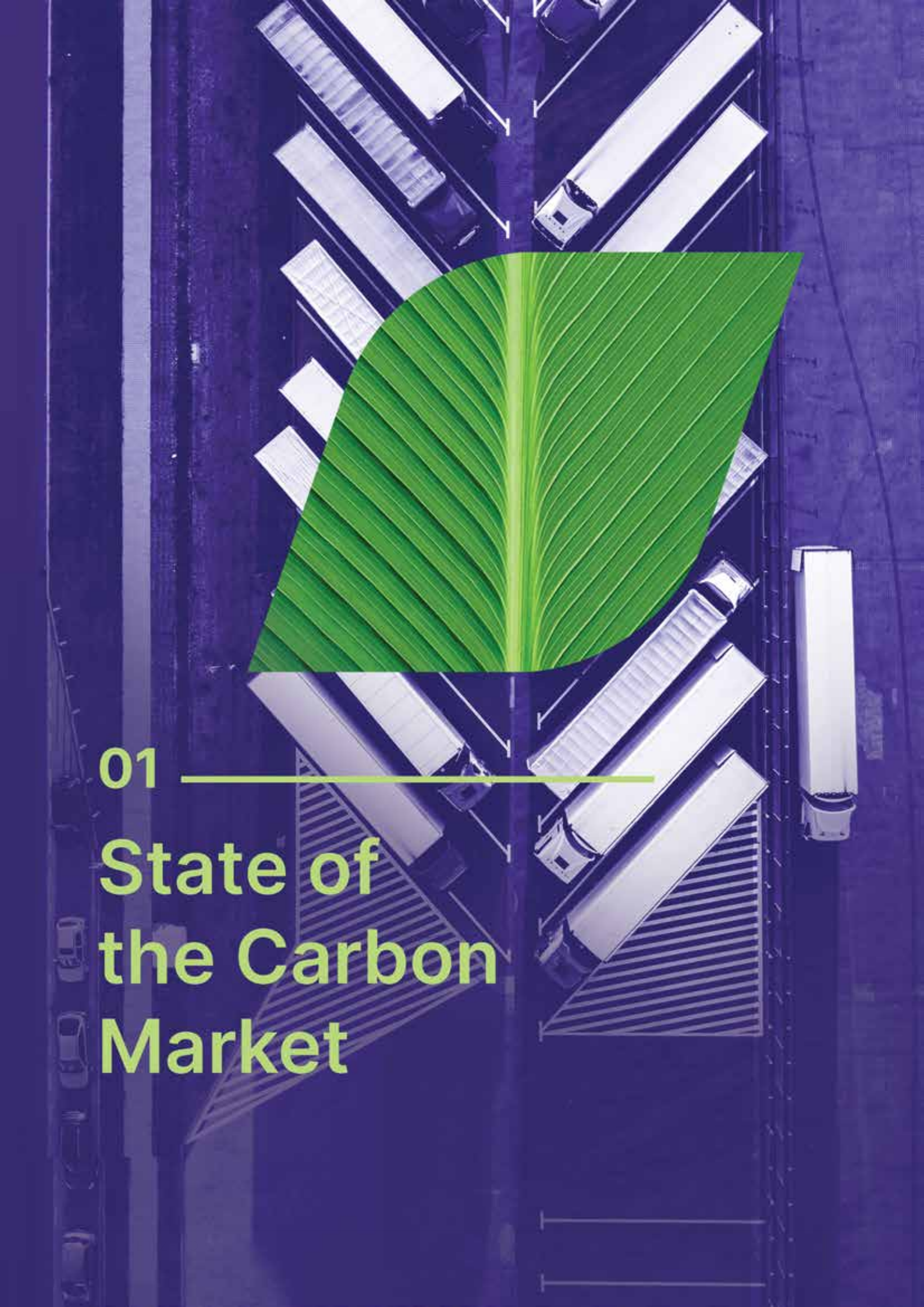


01

State of the Carbon Market

Current State of the Carbon Market

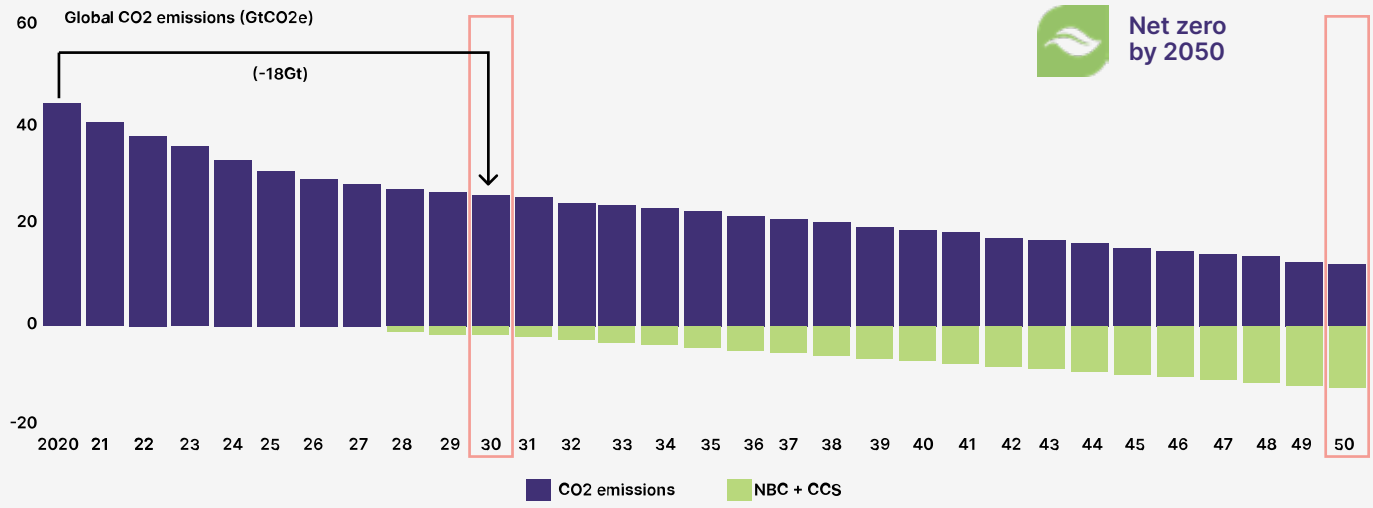
The world's carbon budget is dwindling fast. We can now emit only about 250 GtCO2e to stay within the 1.5ºC limit set forth by the Paris Climate Agreement, about half of the emissions from just a few years ago. At this rate, the carbon budget may run out by the end of this decade.

The latest iteration of the UN summit on climate, COP28, to be held in the United Arab Emirates in November 2023, is being considered as one of the last opportunities for the world to get on track to meet the goals of the Paris Agreement. At COP28, world governments will assess for the first time since 2015, through a "global stock take", how far off the mark they are in honouring their commitments to cut emissions.

It is against this backdrop that this report examines the state of the voluntary carbon credits market and its role in offsetting emissions. While much of the world agrees that decarbonization is the best way to combat climate change, the reality is that this will severely impact economic development, something that many countries are not in a position to undertake. In fact, a study by Rhodium Group found that the post-lockdown economic revival resulted in a bump up of global GHG emissions, up 4.6% from 2020 when GHGs actually declined by 5%.[1.]

In the interim, carbon markets may prove to be a valuable stopgap solution to address the issue while cost-effective decarbonization technologies will require carbon offset strategies and efforts to reduce emissions.

Pathway to net zero by 2050, limiting global warming to 1.5°C, requires offset requirements of -2 Gt of CO2 by 2030



CCS: Carbon capture and storage | Gt: Gigaton | GtCO2e: Gigatons of equivalent carbon dioxide IPCC: Governmental panel on climate change | NBS: Nature-based solutions | NGFS: Network for greening the financial system
Sources: Task force on Scaling Voluntary Carbon Markets; NGFS scenarios; Bain analysis; IPCC

1.1 Carbon Market Adoption

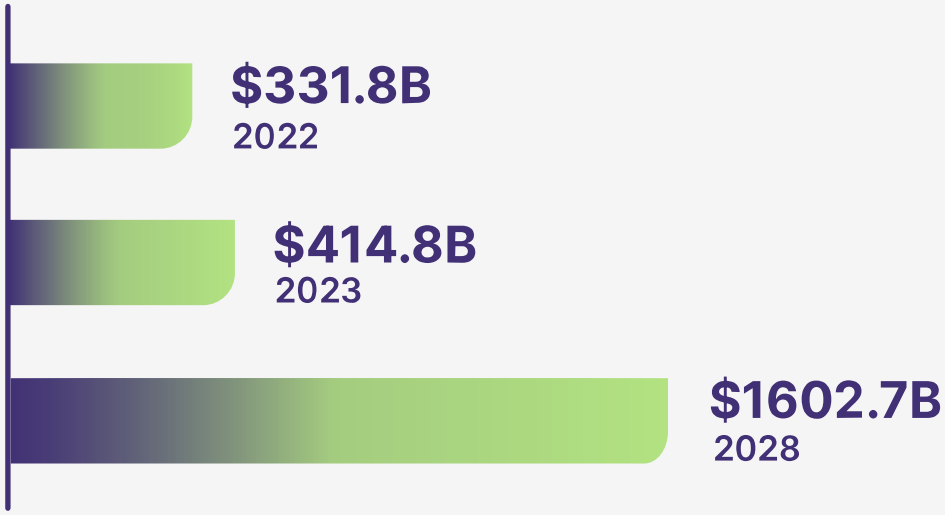
There are currently 2 types of carbon markets:

01 **Mandatory Carbon Schemes or Compliance Markets**

02 **Voluntary Carbon Markets (VCMs)**

Global carbon offset/carbon credit market size (in billion US$)

Source: Statista



There are now around 30 compliance markets across the world, which covered nearly a fifth of global GHG emissions in 2022, up from just 5% in 2005. The largest compliance market is the EU's emissions trading system (EU-ETS).[2]

In the absence of compliance schemes in other parts of the world, industries, companies, and individuals are looking for ways to offset their carbon footprint and get closer to their net-zero goals. The voluntary carbon market (VCM) holds significant potential in helping to offset unavoidable emissions by buying verified carbon credits created by projects that remove or reduce GHGs from the atmosphere.

The VCM, though significantly smaller, has grown alongside compliance markets driven by companies highlighting their net-zero commitments. 2021 proved to be a pivotal year for the VCM[3]

The average price per ton of carbon went up around 60% to

US$4.00

from US$2.52 in 2020

It reaches the value of nearly

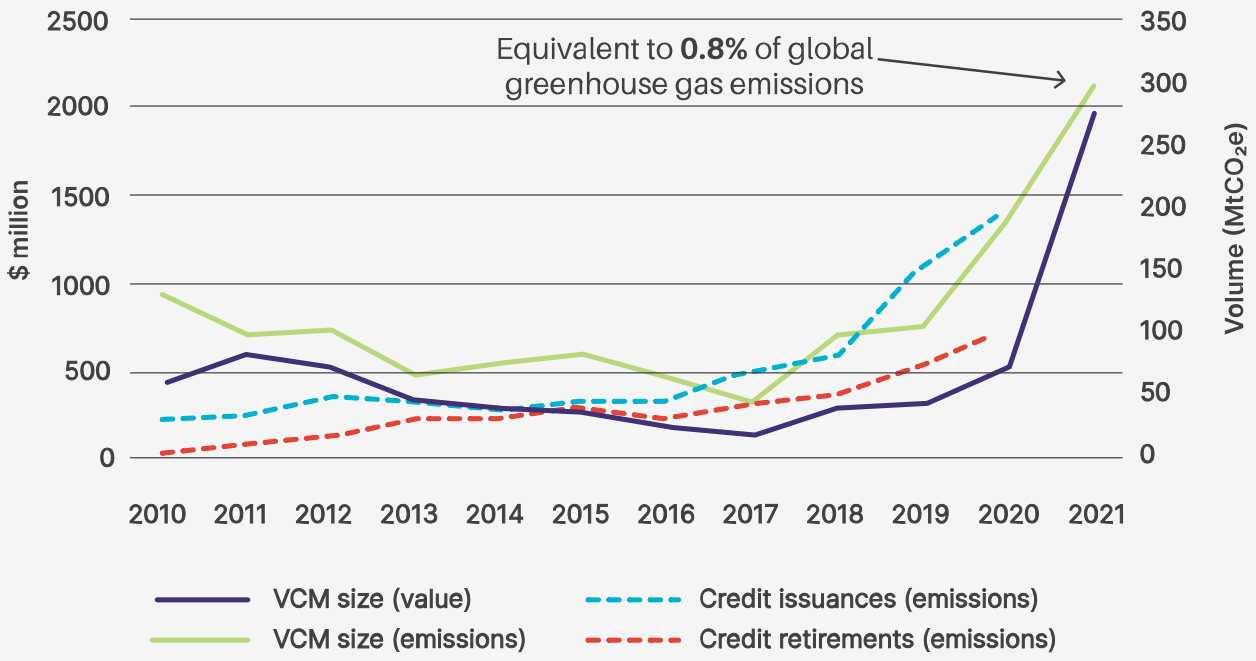
US$2 Billion

up 282% from 2020

500 Million

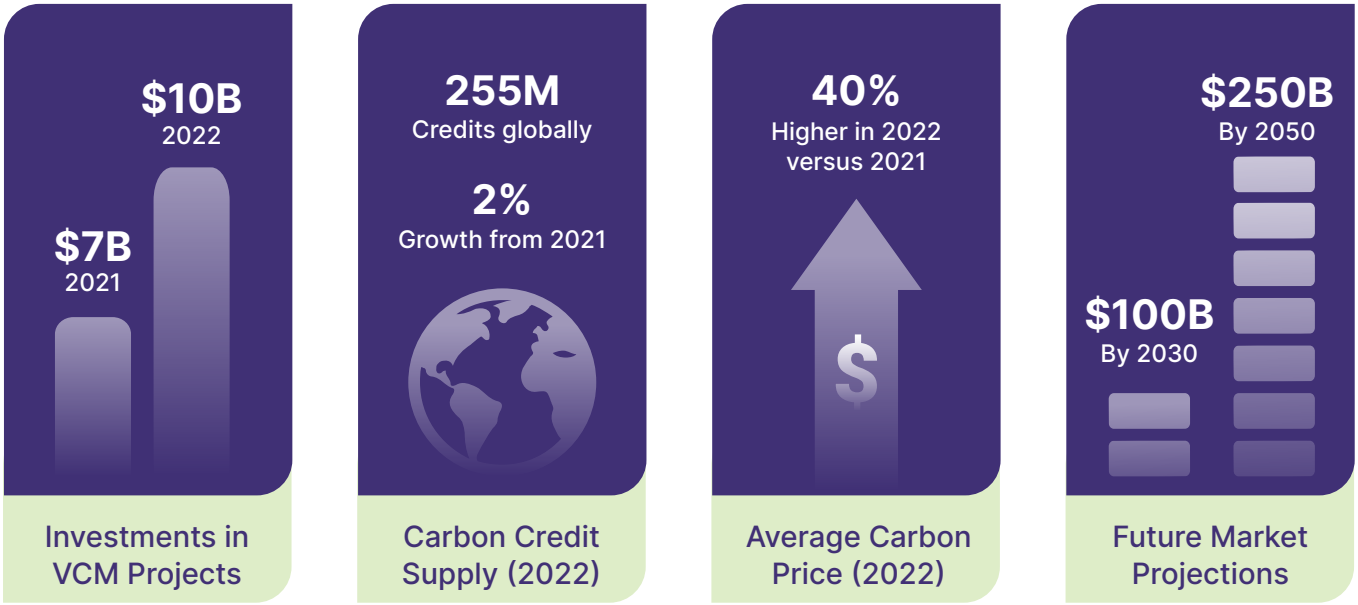
Credits Traded

Estimated growth in size of global VCMs by value and volume



2022 was muted for VCMs as a result of the Russia-Ukraine war and worries over energy availability. In addition, concerns over the quality of the available credits forced organizations to take a more cautious approach to purchasing. According to Bloomberg NEF, corporations purchased and retired just 155 million carbon offsets in 2022, down 3.8% from 161 million in 2021.[4]

Despite these challenges, there are still positive indications for the voluntary carbon market:



In addition to all this, there is growing demand for high-quality – and in turn higher priced – carbon credits, which will ultimately push up the overall value of the market. Bain & Company analysed 2,000 leading global companies and estimated that the VCM could offer up to 2.6 gigatons of carbon credits by 2030, which would be 13X larger than the market in 2021.

Market Growth

13X

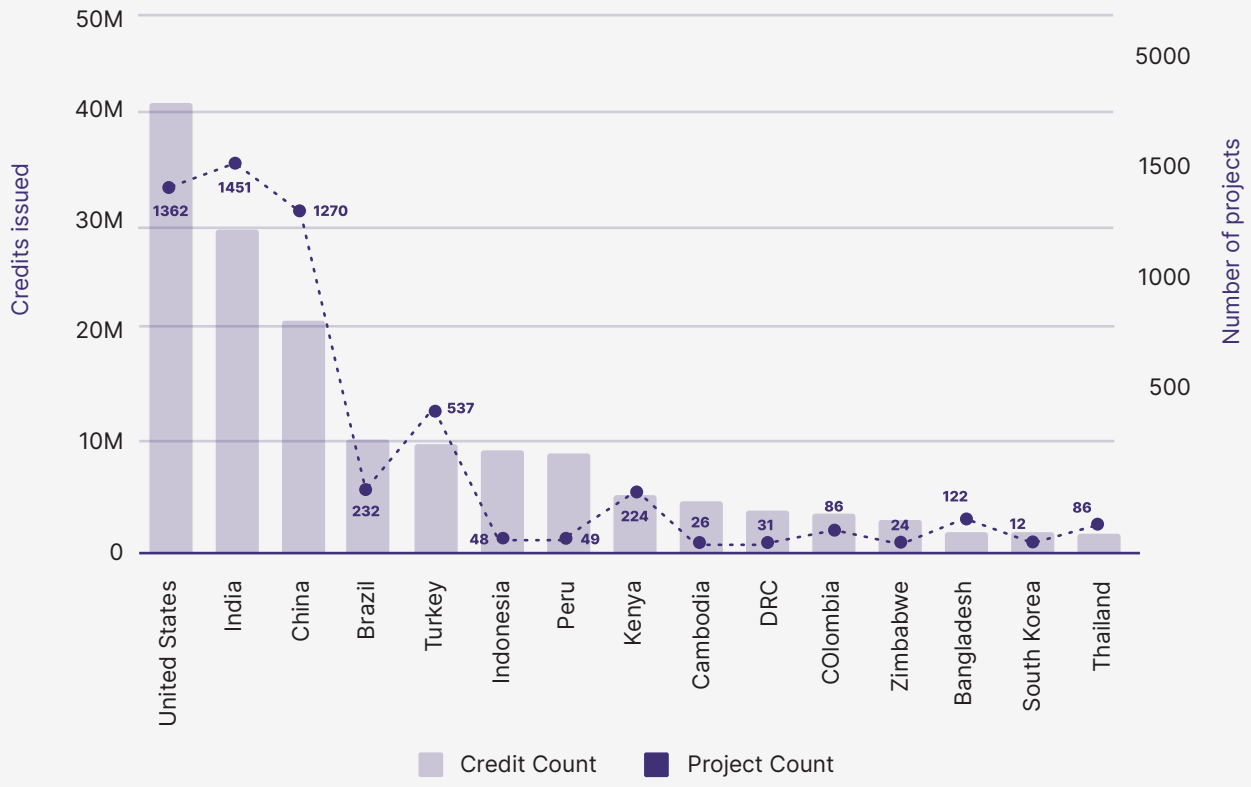
increase by 2030

Project Credits

2.6 GT

by 2030

Number of credits issued and projects, leading countries



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

02

Regulatory landscapes for VCMs: Introduction

Carbon markets have the potential to help us reach climate goals in the more immediate future by facilitating funding and incentivizing climate action through carbon credit trading. According to an article published by the World Bank, carbon credit trading could potentially reduce the cost of implementing Nationally Determined Contributions (NDCs) for countries by more than half (equivalent to US$250 billion in 2030).[10]

2.1 Article 6

Article 6 of the Paris Agreement plays a key role in the carbon market. It allows countries to voluntarily cooperate with each other to achieve emission reduction targets set in their NDCs. Article 6 is to replace the Clean Development Mechanism (CDM) under the Kyoto Protocol with the Sustainable Development Mechanism (SDM). Two mechanisms under Article 6 are market-based.

Climate Impact

Cost reduction potential for NDCs:>50%

US$250B

in 2030

Article 6.2

is a trading mechanism whereby countries that have exceeded their own climate mitigation goals can transfer credits earned to other countries to help meet their climate goals.

Article 6.4

establishes the mechanism for trading of emissions reductions that are created anywhere by either the public or private sector.

Some aspects of Article 6 are already in place in different stages across different parts of the world. Internationally Transferred Mitigation Outcomes can be traded now under Article 6.2 but implementing them can involve a lengthy process of hashing out bilateral agreements between countries. Credits trading under Article 6.4 may not be ready till a global regulatory body and centralized registry are in place. In the meanwhile, private VCMs have the potential to fill the gap.

We have detailed regulations across geographic regions in the following sections, broken down into established and emerging markets.

03

Regulatory landscapes: Established Markets

European Union

The EU Proposal for Regulation on Carbon Removal Certification Framework highlight the way forward to achieve net zero by 2050.

United Kingdom

There are two standards for VCMs operating in the UK: The UK Woodland Carbon Code and The Peatland Code.

United States of America

The CFTC and the SEC have been showing interest in carbon markets, but discussions are still in the early stages.

3.1 European Union

European Union (EU) has committed to reaching net zero by 2050. In November 2022, the European Commission (EC) released the EU Proposal for Regulation on Carbon Removal Certification Framework (CRCF), which highlights the way forward to achieving this target. The CRCF is the first regulation globally that addresses the need for removals in climate policy and for stringent, transparent regulatory oversight on certification of removal activities.[11]

US$28 Trillion

is the estimated cost, according to McKinsey & Company, for Europe's path to climate neutrality by 2050

3.1.1 QU.A.L.ITY criteria for certification

The proposed EU certification framework for carbon removals is based on four criteria – called QU.A.L.ITY – covered in Articles 4 to 7 of the CRCF.

Article 4: QUantification

A carbon removal activity needs to be measured precisely and transparently compared to a standard baseline that is regularly updated.

Article 5: Additionality

The removal activity will need to meet two criteria:
1. It goes beyond Union and national statutory requirements.
2. It takes place due to the incentive effect of the certification.

Article 6: Long-Term Storage

Carbon storage duration must be specified for each activity. The activity must also be regularly monitored to ensure storage, long-term or temporary.

Article 7: SustainabilITY

A carbon removal activity must have a neutral impact on or generate co-benefits for climate change mitigation and adaptation, protection of natural resources, and pollution control.

Operators of carbon removal activities must apply to a public or private certification scheme that has been recognized or approved by the European Commission. The activities will be independently verified, after which certificates of compliance will be issued and carbon removal units will be recorded in public registries to ensure transparency and traceability. The certificates could be traded or used in VCMs to finance carbon removal projects.

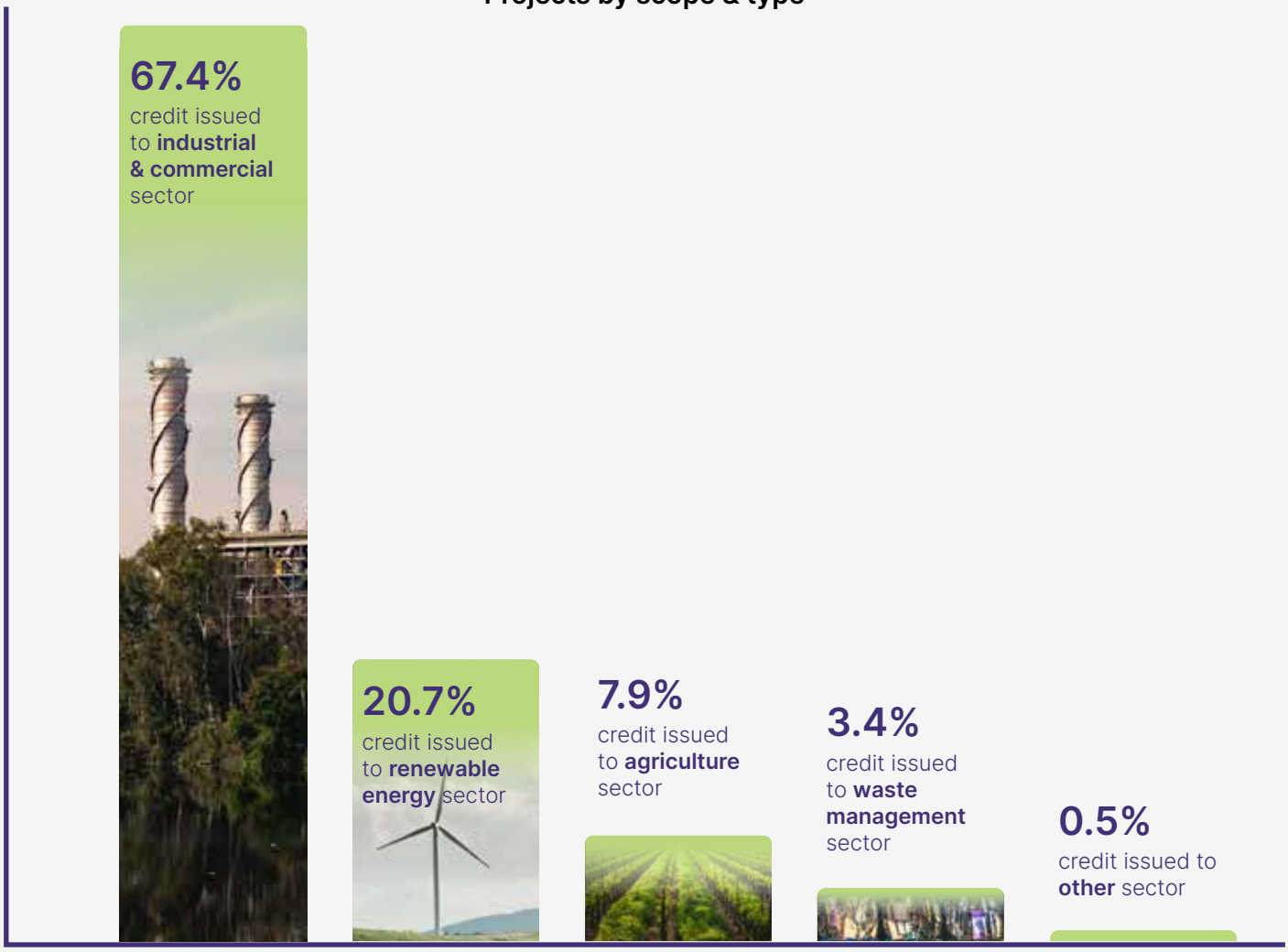
Europe had a total of

15 Million

carbon credits issued on the voluntary markets as of May 2023, according to the Berkeley Carbon Trading Project.

Breakdown of types of credits issued in Europe, as of May 2023

Projects by scope & type



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

3.2 United Kingdom

In 2021, the UK announced its intention to establish London as a global trading hub for voluntary carbon offsets. In its 2023 Green Finance Strategy report, the UK government was keen on implementing specific steps and interventions needed to support the growth of high integrity voluntary markets and protect against greenwashing.

The UK government has set a goal to increase the amount of private investment in nature recovery to

>GBP 500 Million
a year by 2027

>GBP 1 Billion
by 2030

3.2.1 Standards for VCMs operating in the UK

There are two standards for VCMs operating in the UK at present.

- **The UK Woodland Carbon Code (WCC)** is the quality assurance standard for woodland creation projects in the UK, though it does not include offsetting emissions from overseas, international travel, or shipping. WCC is said to have sequestered around 8 million tons of CO2e cumulatively.

- **The Peatland Code** is a voluntary certification standard for peatland restoration projects in the UK; the standard requires a minimum 30-year commitment.

3.2.2 LSE launches VCM

In October 2022, the London Stock Exchange (LSE) launched its Voluntary Carbon Market to "facilitate financing at scale into projects that mitigate climate change." The LSE is the first exchange in the world to apply a public market framework to promote funding of climate projects.

The LSE's VCM is a new market designation that will enable qualifying funds and operating companies admitted to the Main Market or AIM to raise capital to use on climate change mitigation projects that are expected to generate carbon credits. [13, 14, 15]

In December 2022, the LSE issued it's first VCM designation to Foresight Sustainable Forestry (FSF), a london-listed investment trust that invests in UK forestry and afforestation assets. FSF follows the UK WCC certification.

The UK had a total of

104,131

voluntary credits issued as of May 2023, according to the Berkeley Carbon Trading Project of which

99.7%

were from mine methane capture (industrial and commercial credits).

3.3 United States of America

3.3 United States of America

In the US, there is no centralized VCM or any direct government or regulatory oversight on this market. Voluntary carbon credits are issued by multiple private players following different methodologies and standards for certification.

The Commodity Futures Trading Commission (CFTC) and the Securities and Exchange Commission (SEC) have been showing interest in carbon markets, but discussions are still in the early stages. Both the SEC and CFTC consider carbon credits to be "environmental commodities". This means they are neither derivatives nor securities, so neither body has issued rules related to trading of credit through VCMs.

3.3.1 Commodity Futures Trading Commission (CFTC)

The CFTC in June 2022 issued a Request for Information (RFI) on climate-related financial risk spanning several topics, including VCMs. In response to the CFTC's RFI, one major issue that has been brought up is whether the CFTC should establish a broader regulatory framework for the voluntary carbon markets.[17]

In July 2023, the commission convened to discuss VCMs and highlighted a growing interest in spot voluntary carbon credit markets. At the hearing, there was a consensus that the main issue to be addressed by the CFTC is the lack of quality transparency in the carbon market.

3.3.2 Securities and Exchange Commission (SEC)

In March 2022, the SEC proposed rule changes to climate risk-related disclosure and reporting that would make climate-related disclosures standardized and comparable. If implemented, registration statements and periodic reports would need to include governance of climate-related risks and relevant risk management processes as well as various impacts.

The SEC's proposed rules also would require registrants to disclose information about their Scope 1, Scope 2, and Scope 3 GHG emissions. The SEC's proposal has yet to be finalized due to the high volume of comments and feedback. [18, 19]

3.3.3 American Carbon Registry (ACR)

The American Carbon Registry, which has now become ACR, is the first private voluntary GHG registry in the US and operates both in compliance and voluntary carbon markets. It is the third largest carbon registry after Verra and Gold Standard. The ACR sets eligibility criteria for the registration of project-based carbon offsets from around the world, including methodology approval, project validation and verification, and regulating credits.[20]

Offsets from plugging abandoned oil wells

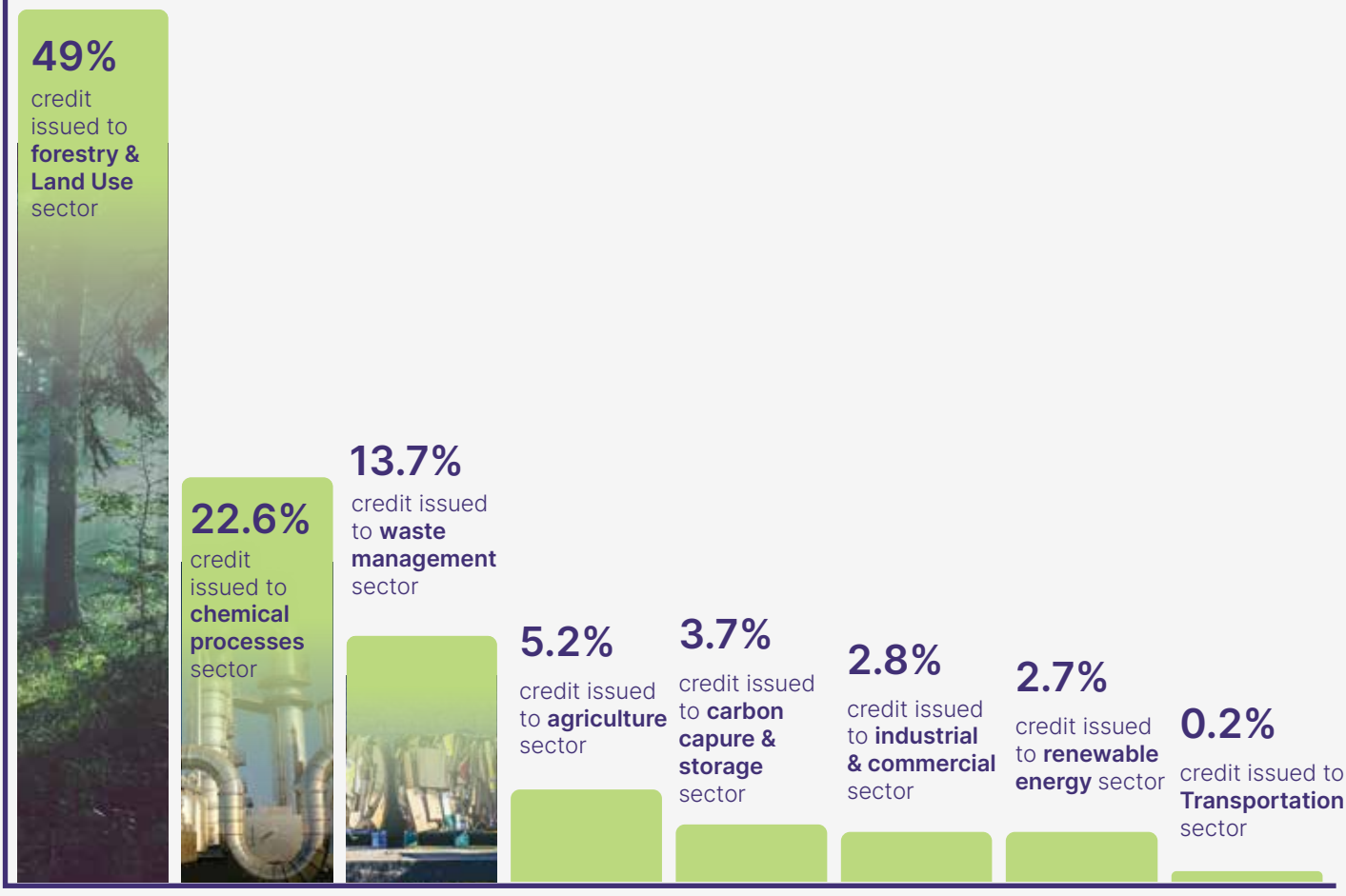
In May 2023, ACR introduced a methodology to trade offsets generated by plugging abandoned or orphaned oil and gas wells. These credits are the first of their kind to be issued by a major VCM registry. There are an **estimated 4 million abandoned oil and gas wells** in the US, which emit several GHGs and hazardous gases. [21, 22, 23]

According to the Berkeley Carbon Trading Project, the US had the highest number of voluntary credits issued as of May 2023 at

415.5 Million

In June 2023, Rebellion Energy Solutions offered the **first project** to plug an Orphan Oil and Gas Well **to be listed by the ACR**.

Breakdown of the types of credit issued, US, as of May 2023



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

04

Regulatory landscapes: Emerging Markets

Brazil

Brazil has an active voluntary carbon market. Verra and Gold Standard are the main certifying organizations.

Indonesia

Indonesia has launched its first carbon credit trading bourse as part of its goal to achieve net zero by 2060.

India

India has launched two policy frameworks that are part of creating carbon markets for the country.

Gulf Cooperation Council

The GCC is looking to leverage VCMs to meet its emissions offsets. It has also taken steps to tailor the VCM to regional needs and specifications.

4.1 Brazil

Around 60% of the Amazon rainforests are in Brazil, making the country crucial to containing global warming. While the country's government is in the process of finalizing a new bill to put in place a cap-and-trade carbon market, Brazil has an active voluntary carbon market. Verra and Gold Standard are the main certifying organizations that guide standards and validate offsets for Brazil's VCM.[24, 25, 26]

A study by the Brazilian division of the International Chamber of Commerce and local carbon consulting firm WayCarbon estimates that the country's revenues from carbon credits could reach US$120 billion by 2030. The country could also meet up to 49% of the global demand for credits in the voluntary market – an estimated 1.5-2 GtCO2e – by the end of the decade. [27, 28]

US$120 Billion
Projected Revenues

49%
of Global Demand for Credits

1.5-2 GtCO2e
of Global Demand Covered

4.1.1 SINARE

In May 2022, the Federal Government of Brazil issued Federal Decree No. 11,075/2022, establishing the National System for Reduction of Greenhouse Gas Emissions or SINARE and the procedure for developing the Sectoral Plans for Climate Change Mitigation.[29]

This decree includes various definitions that will better help with the country's decarbonization plans through the use of certified carbon credits.

SINARE's main function will be to serve as a single registry to record emissions, removals, reductions, and offsetting greenhouse gases and trade acts, transfers, transactions, and the retirement of certified carbon reduction credits.

4.1.2 Brazilian Initiative for the Voluntary Carbon Market

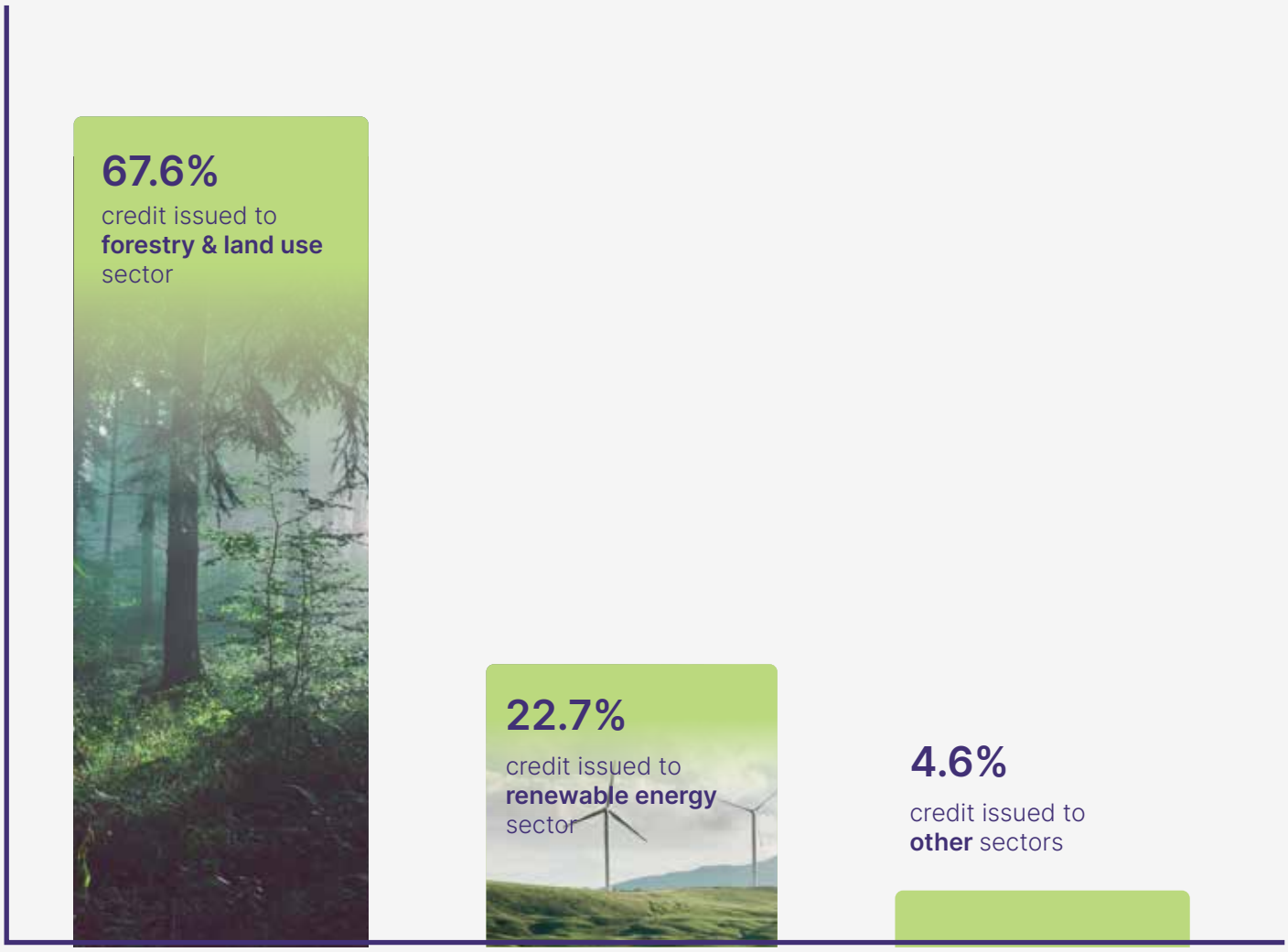
The Brazilian Initiative for the Voluntary Carbon Market is a non-profit established in 2022 to set standards to develop the VCM in the country and contribute to the global high-integrity carbon market. This initiative is a collaboration between a number of institutions and companies across sectors.[30]

4.1.3 Petrobras buys carbon credits for the first time

In September 2023, Brazil's state-owned oil giant Petrobras bought carbon credits from the VCM for the first time ever as part of its net-zero efforts. The carbon offsets bought are from projects for protecting the Amazon rainforest, verified by Verra's Verified Carbon Standard.[31]

Within the global VCM, Brazil ranks fourth in terms of total volume of carbon credits generated, as per latest data from the Berkeley Carbon Trading Project. But Brazil accounts for just 5.8% of the carbon credits generated in the global VCM.

Breakdown of types of credits issued, Brazil, as of May 2023



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

4.2 Indonesia

Indonesia is home to the world's third largest rainforest cover and holds significant potential in offsetting carbon emissions, especially through nature-based solutions.

4.2.1 Indonesia starts carbon credit market

In September 2023, the Indonesian government launched its first carbon credit trading bourse as part of its goal to achieve net zero by 2060. This is expected to help the country fund GHG emission cuts as well as participate in the global carbon trade. The Indonesia Stock Exchange (IDX) is the exchange for trading carbon credits.[32, 33]

At present, trading is voluntary, but the Indonesian government is working on national regulations on pollution, including a carbon tax. Indonesia has said that it will regulate most carbon projects in the long term, with exceptions being Just Transition projects, renewable energy, green industry, and forest-based energy projects.

4.2.2 Indonesia opens up to international investors

In the past, Indonesia has limited the export of carbon credits generated within the country primarily to control sales and focus on domestic goals. However, the country has decided to open up the carbon market, making way for foreign companies and organizations to participate in the country's trading opportunities.[34]

In the first batch, 13 carbon credits covering nearly 460,000 metric tons of CO2e were traded from PT Pertamina Geothermal Energy's Lahendong power plant in Sulawesi Island by 16 registered users.

13 Credits Traded

460,000 Metric Tons CO_2e

16 Registered Users

The new emission trading system is using block chain technology to record its carbon credit transactions.

As of May 2023, Indonesia accounted for

5.2%

of carbon credits generated for the global voluntary carbon market, according to data from the Berkeley Carbon Trading Project.

Breakdown of types of credits issued, Indonesia, as of May 2023

80.9%
credit issued to **forestry & land use** sector

17.7%
credit issued to **renewable energy** sector

1.4%
credit issued to **other** sectors

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

4.3 India

Carbon credits generated by Indian entities have been available to be traded on global markets in the past through the Clean Development Mechanism and the private sector-driven voluntary carbon market. But in August 2022, the government revised its carbon credit policies to ban the export of carbon credits. A year later, it was indicated that the government would allow the export of carbon credits, but only those generated through the National Green Hydrogen Mission.[35, 36, 37]

The National Stock Exchange (NSE) has been looking into new ways of expanding its product portfolio, including venturing into VCM derivatives. The country has significant potential in this space, with an estimated 26 million voluntary carbon credits worth US$150 million, cited the NSE.

26 Million
Voluntary Carbon Credits

US$150 Million
Estimated Value

India has also launched two policy frameworks that are part of creating carbon markets for the country.

4.3.1 Carbon Credit Trading Scheme 2023 (CCTS)

In June 2023, India launched the Carbon Credit Trading Scheme (CCTS) to provide a structured framework for the country's carbon market. This scheme is intended to function as a cap-and-trade mechanism that will regulate select industries that account for significant GHG emissions and set carbon targets for them to reach. Based on their performance, carbon credit certificates will be issued or will need to be bought. [38]

The CCTS is expected to cover around 72% of India's total carbon emissions. This scheme will also look at tackling the issue of an over-abundance of certificates to increase quality and integrity of the credits generated.

4.3.2 Green Credits Programme

Also in June 2023, the Indian government proposed the **Draft Green Credit Programme Implementation Rules, 2023**. This supports a market-based approach through the voluntary adoption of green technologies and activities, including tree plantation, water conservation, regenerative agricultural practices, waste management, and others.[39]

Green Credits will be trade-able for a range of sectors and entities, and will be made available for trading on a proposed domestic market platform.

India has the second largest volume of total historical credits (after the US), as per the Berkeley Carbon Trading Project. The country also has the highest number of projects under various stages of verification with the world's top certification programs for carbon credits, Verra and Gold Standard. Indian entities account for nearly a fifth of the carbon credits issued by these two bodies.

Breakdown of types of credits issued, India, as of May 2023

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

4.4 Gulf Cooperation Council

Since 2021, there has been a flurry of activity in the Middle East as the region looks to leverage VCMs to meet its emissions offsets. The Gulf Cooperation Council has put in place a mix of decarbonization initiatives, including setting up the infrastructure to participate in VCMs. It has also taken steps to tailor the VCM to regional needs and specifications while also being in line with international requirements.

With COP28 being hosted in the UAE in November 2023 and carbon markets being a key part of the agenda, the MENA region has a significant opportunity to be more involved in carbon markets.

4.4.1 United Arab Emirates

The UAE is investing about US$165 billion in clean and renewable energy to reach net zero emissions by 2050, making it the first country in the Middle East to have a net zero pledge. A number of initiatives to support this have been launched in the country, with voluntary carbon markets playing a significant role.[40]

US$165 Billion

Investment in Clean and Renewable Energy to achieve net-zero emissions **by 2050**.

4.4.1.1 ACX

In 2022, Abu Dhabi Global Market (ADGM), the international financial center in Abu Dhabi, announced the formation of the first fully regulated voluntary carbon trading exchange and clearing house. This exchange is based in Abu Dhabi and has been set up by AirCarbon Exchange (ACX). In November 2022, Abu Dhabi sovereign wealth fund Mubadala acquired a stake in ACX. [41, 42, 43]

ADGM will become the world's first jurisdiction to regulate carbon credits and offsets as emission instruments as well as to issue licenses for exchanges to operate both spot and derivative markets. Unlike other voluntary carbon exchanges, the ADGM-ACX exchange is regulated.

Initially, ACX plans to use its distributed ledger technology to produce digital tokens for carbon credits which will be used for spot market trading. ACX also plans to offer carbon credit futures as commodity derivatives for trading at a later date.

4.4.1.2 UAE SCA

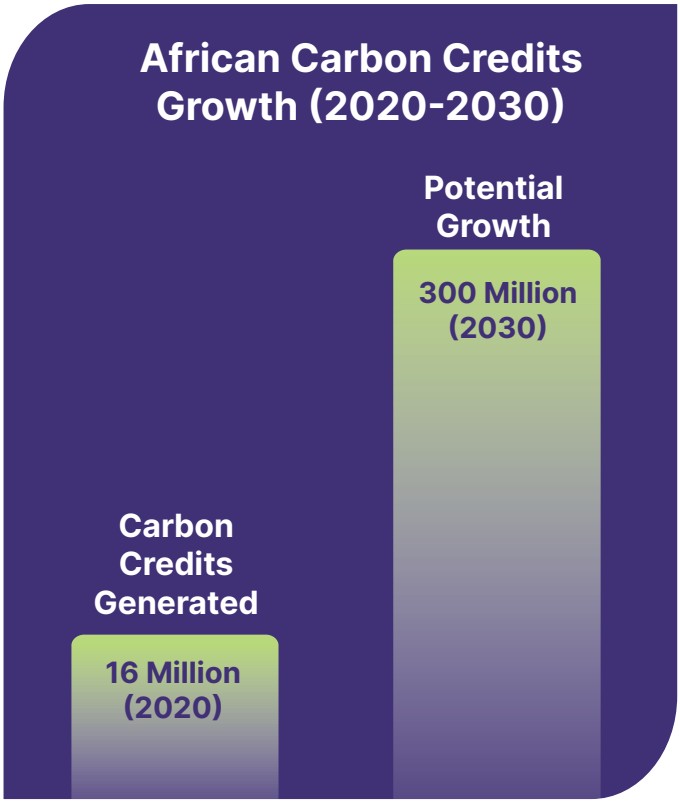
In January 2023, the UAE's Security and Commodities Authority (SCA) announced that it would be developing its own separate carbon trading platform. The SCA is in talks with the Ministry of Climate Change and Environment and other stakeholders with regard to implementing this. As of October 2023, this has not yet been implemented.[44]

4.4.1.3 Mubadala Investment Company

In January 2023, South Korean conglomerate SK Group and the Mubadala Investment Company signed a memorandum of understanding to create a voluntary carbon credit market in Asia. This market will be open to businesses and organizations in different Asian countries.[45]

4.4.1.4 UAE Carbon Alliance

In April 2023, a coalition of major UAE energy and financial companies – the UAE Carbon Alliance – announced plans to buy US$450 million worth of carbon credits generated in Africa by 2030 from the African Carbon Markets Initiative (ACMI). This will help open up Africa's carbon credit generation potential and support the UAE's net zero pledge. [46]



Source: McKinsey & Company

4.4.2 The Kingdom of Saudi Arabia

4.4.2.1 Regional Voluntary Carbon Market Company (RVCMC)

The Saudi Arabia-based Regional Voluntary Carbon Market Company (RVCMC) was founded by the Kingdom's Public Investment Fund (PIF), with an 80% stake, and the Saudi Tadawul Group Holding Company, with a 20% stake.

In October 2022, RVCMC facilitated the sale of over 1.4 million tons of high-quality carbon credits, including CORSIA-compliant and Verra registered certificates. In June 2023, RVCMC held a voluntary carbon credit auction in Nairobi, where more than 2 million tons worth of carbon credits were sold.

The RVCMC also plans to launch a carbon credit trading exchange in early 2024 as well as start a fund to invest in climate projects.[47, 48, 49, 50]

4.4.2.2 Greenhouse Gas Crediting and Offsetting Mechanism (GCOM)

Saudi Arabia plans to launch the Greenhouse Gas Crediting and Offsetting Mechanism (GCOM) in early 2024. According to the website, GCOM "aims to increase cooperation among national entities seeking to fulfil their climate ambitions by helping to mobilize finance in all sectors for a variety of projects and activities." This is meant to be a domestic mechanism, though it could also be opened up in the future for international transfers if the country chooses.[51]

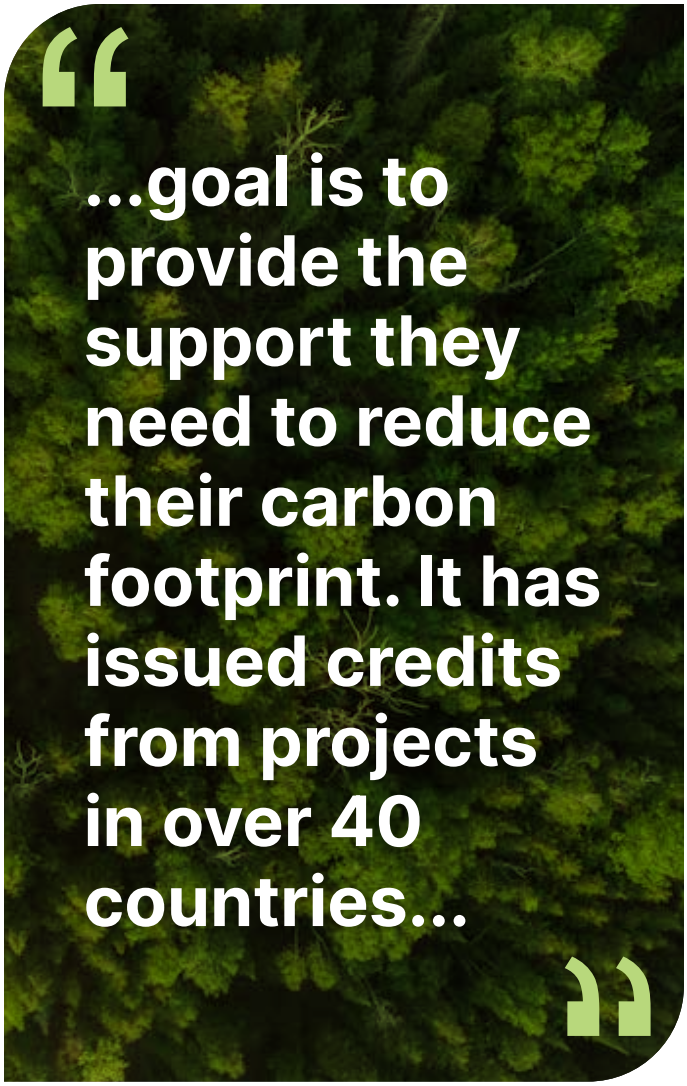
4.4.3 Qatar

The Doha-based Global Carbon Council is the MENA region's first voluntary carbon offsetting program, launched by the Gulf Organisation for Research and Development. Its goal is to provide organizations with the support they need to reduce their carbon footprint. It has issued credits from projects in over 40 countries and is focusing on scaling up projects originating in the MENA region, including Egypt, Jordan, KSA, and UAE. [52, 53]

The Global Carbon Council does not plan to have its own exchange, but instead be a regulator with its primary goal of bringing high quality assets in the market.

In early 2021, Global Carbon Council was fully approved by the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) of United Nations' International Civil Aviation Organization (ICAO).

In August 2023, the Global Carbon Council announced that it was in talks to list its credits on carbon exchanges in the MENA region, including Egypt, Saudi Arabia, and the UAE. The carbon credits the Council is looking to list are those issued by it to clean energy projects from 45 countries.



05

Regulatory landscapes for VCMs in Key Industries

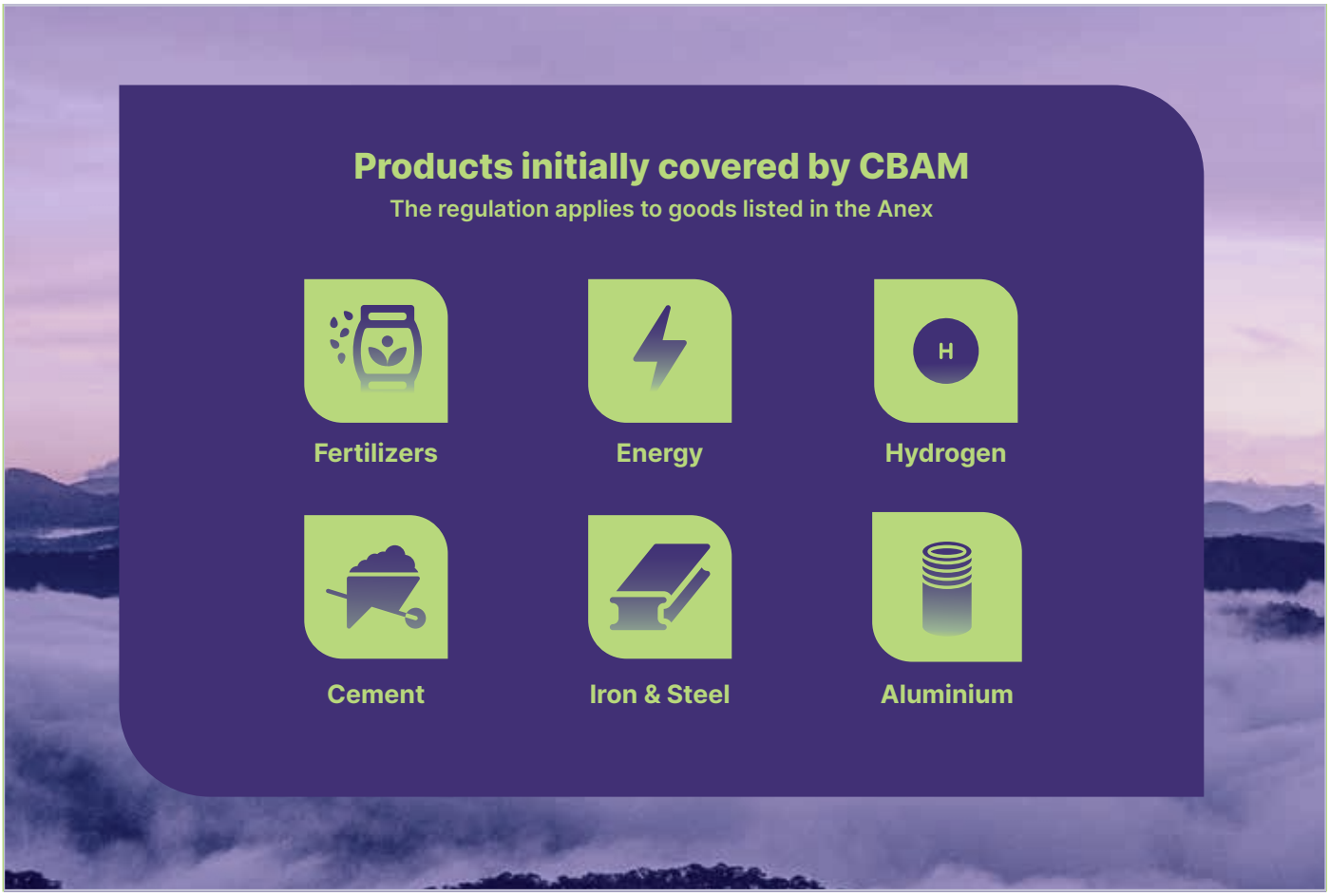
5.1 Carbon Border Adjustment Mechanism

The EU Carbon Border Adjustment Mechanism (CBAM) is a climate policy intended to address the issue of "carbon leakage". Specifically, this mechanism is to clamp down on companies based in the EU shifting their carbon-intensive production to countries with less stringent climate policies compared to the EU or when EU products get replaced by more carbon-intensive imports, according to the EU's Taxation and Customs Union. [54]

CBAM is part of the "Fit for 55" package, whose goal is to cut GHG emissions in the EU by at least **55% by 2030.**

CBAM will help put a fair price on the carbon emitted during the production of carbon-intensive goods imported into the EU as well as to encourage cleaner industrial production in non-EU countries. The carbon price of imports will be made equivalent to the carbon price of domestic production to ensure the EU's climate objectives are met. This is expected to have a significant impact on imports into the EU.

The regulation on CBAM came into force in May 2023 and the CBAM transitional period started on 1 October 2023. By 2030, the EU Commission plans to extend the scope of CBAM to all sectors subject to EU emissions trading by 2030.



5.2 Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

In 2016, CORSIA was adopted by the International Civil Aviation Organization (ICAO) to address carbon emissions from international aviation. This was the first time a single industry agreed to a global market-based measure to tackle climate change. Aviation and shipping were the only two industries not covered by the Paris Agreement. [55,56]

CORSIA has been in force for international aviation since 2019, and since the start of 2021, international flights also have offsetting obligations. Even with offsetting, CORSIA members will need to work towards the emissions reductions through measures that include technology, sustainable aviation fuel, and operations and infrastructure options. At present, around 80% of carbon emissions growth over 2020 levels will be covered by the CORSIA.

2.5 Billion Tons

CORSIA's expected CO2 mitigation (2021-2035)

164 Million Tons/Year

Average CO2 reduction

80%

Coverage of carbon emissions growth over 2020

CORSIA is expected to mitigate around 2.5 billion tons of CO2 between 2021 and 2035, an annual average of 164 million tons of CO2. The aviation industry has committed to reach net zero by 2050. CORSIA does not apply to domestic aviation; these particular emissions are regulated by the UNFCCC and are covered by the Paris Agreement.

Source: International Air Transport Association

- CORSIA participating States in 2023
- States participating in CORSIA from 2027
- States that are exempted under CORSIA and haven't attempted

5.3 Maritime Legislation

The shipping industry is vital for global trade, but it also accounts for around 3% of GHGs emissions annually. To align with the goals of the Paris Agreement, the global shipping industry's regulator International Maritime Organization (IMO) has agreed to reduce its emissions by at least 50% of 2008 levels by 2050, according to an article by the World Bank, but is not on track to meeting this goal. [57]

The IMO is looking at a number of ways to tackle emissions, including improving energy efficiency through better construction and operational standards in the short term. The IMO is also considering policies that incentivize emissions reductions, such as through a carbon price or tax. While these regulations have not been finalized everywhere yet, they are imminent.

In December 2022, shipping emissions were brought under the cap-and-trade market by the European Council which will come into effect in 2024.

To align with upcoming regulations, shipping companies could also look at participating in the voluntary carbon market. Companies can buy verified carbon credits from carbon mitigation projects to offset the emissions from carbon-intensive marine fuels rather than biofuel.

3% of annual GHG emissions from shipping

>50% reduction in emissions by 2050

06

Survey Findings

Respondent Profile

Demographic Snapshot

The respondent pool reflects a diverse cross-section of leadership roles, with 35% hailing from the Board of Directors or C-suite, and 45% representing senior management. This blend of high-level executives provides a nuanced understanding of the challenges faced at various organizational echelons.

Executive Perspective

There is a robust representation of leadership levels, with over 80% of respondents hailing from the upper echelons of their organizations. This ensures that the insights garnered are not only comprehensive but also reflective of strategic decision-makers who are pivotal in shaping the future trajectory of their companies.

UAE at the Forefront

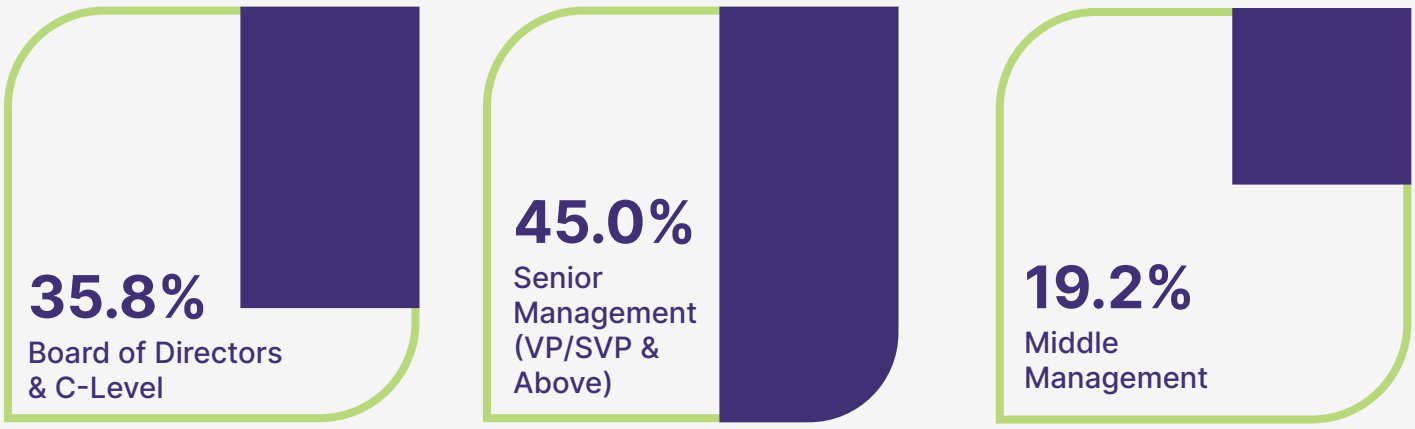
The United Arab Emirates emerges as a focal point in our survey, constituting 35% of the total responses. This emphasis reflects the dynamic economic landscape of the region and underscores the relevance of understanding business sentiments in this thriving market.

Multi-Jurisdictional Insights

A striking feature of our survey is the prevalence of multi-jurisdictional respondents. Nearly 80% of participants operate in environments spanning two continents or two distinct geographies. This global perspective adds depth to our findings, illustrating the interconnectedness of challenges and solutions across diverse business landscapes.

78% respondent companies had transnational presence.

Designations



Nature of Business

49.3%
Manufacturing

27.9%
Service

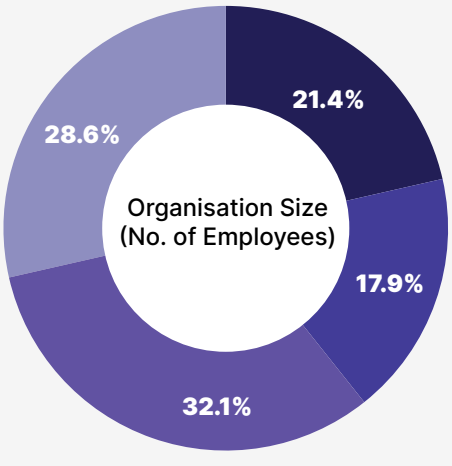
15%
Energy

7.9%
Technology

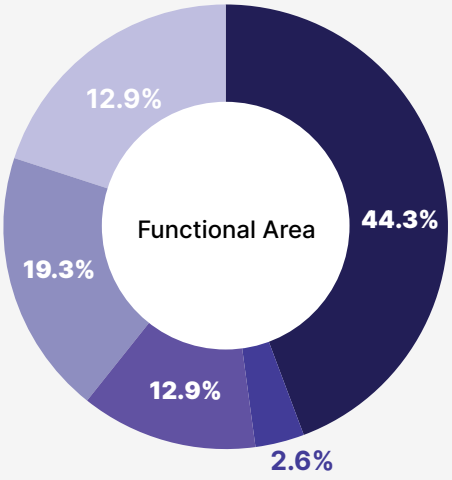
Small and Mid-Sized Companies

A noteworthy aspect of our survey is the significant attention directed towards small and mid-sized enterprises (SMEs). These businesses, often the backbone of emerging markets, are more acutely affected by the challenges outlined in our study. By shedding light on the experiences of these entities, our survey seeks to provide actionable insights for navigating hurdles and fostering resilience.

- >500
- 100-500
- 10-100
- <10



- >2.500
- 500-2500
- 100-499
- <99



- Corporate Management
- Finance
- Marketing & Sales
- Strategy
- Others

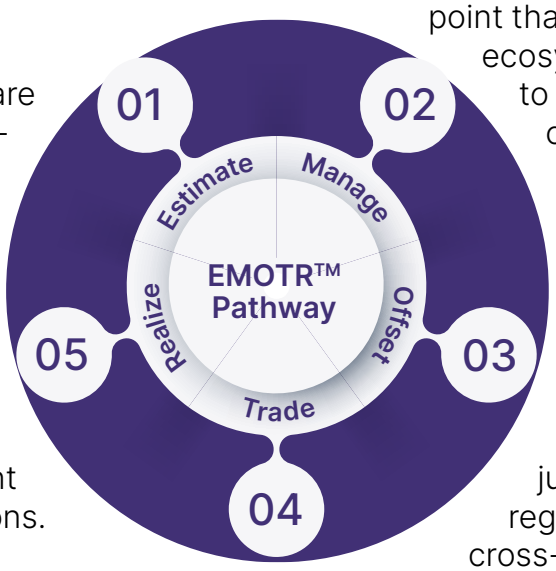
A Five Stage Evolution Towards Net Zero Emission

Envex Technologies, along with its partners ACX and CEBC and knowledge partner Frost & Sullivan, sponsored a survey to better understand the state of organizational readiness for achieving net zero. This cross-comparative study collected detailed information by sharing an online survey for key decision makers across 11 countries, with varying levels of regulatory and economic conditions spread over multiple geographies covering mature and regulated markets, emerging markets and markets where legislation is being formalized.

The finding shared as part of this report are based on the analysis of responses from 140 decision makers across multiple types and sizes of organizations, across multiple functions and hierarchies. We define the state of readiness of an organization as a position along the evolutionary path with five primary milestones. Accordingly, we named the stages as Estimation, Management, Offset, Trade, and Realize (EMOTR™ Pathway).

Stage 1: Estimate
The first stage in this evolutionary path is when an organization takes steps to achieve a conscious awareness of its carbon footprint. Typically, the organization will translate this awareness into a 'estimation', which may or may not be in a planned manner, using methodologies that themselves are evolving into being more refined and accurate.

Stage 2: Manage
Some organizations are evolving further and pro-actively getting involved in creating a response to the awareness that it has generated. Usually, this results in a 'management' or an informed intervention, typically driven by an intent to offset or to actively reduce its footprint to achieve net zero ambitions.



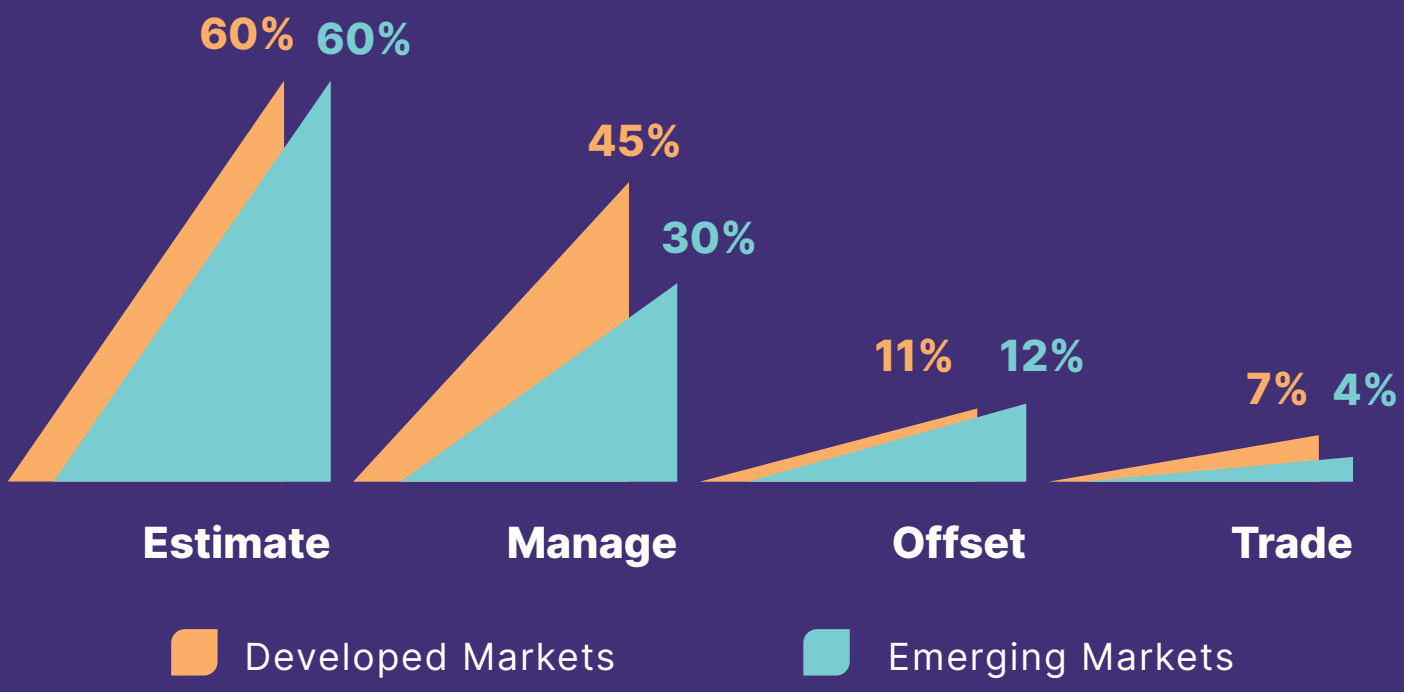
Stage 3: Offset
The next stage of evolution is to act on the preceding stages and to pro-actively engage in the process of reducing the carbon footprint, specifically 'offsetting'. We believe this stage is important as it is agnostic to any limitations that an organization may have (technological or otherwise) and is now available and can be exercised by even small and medium-sized organizations.

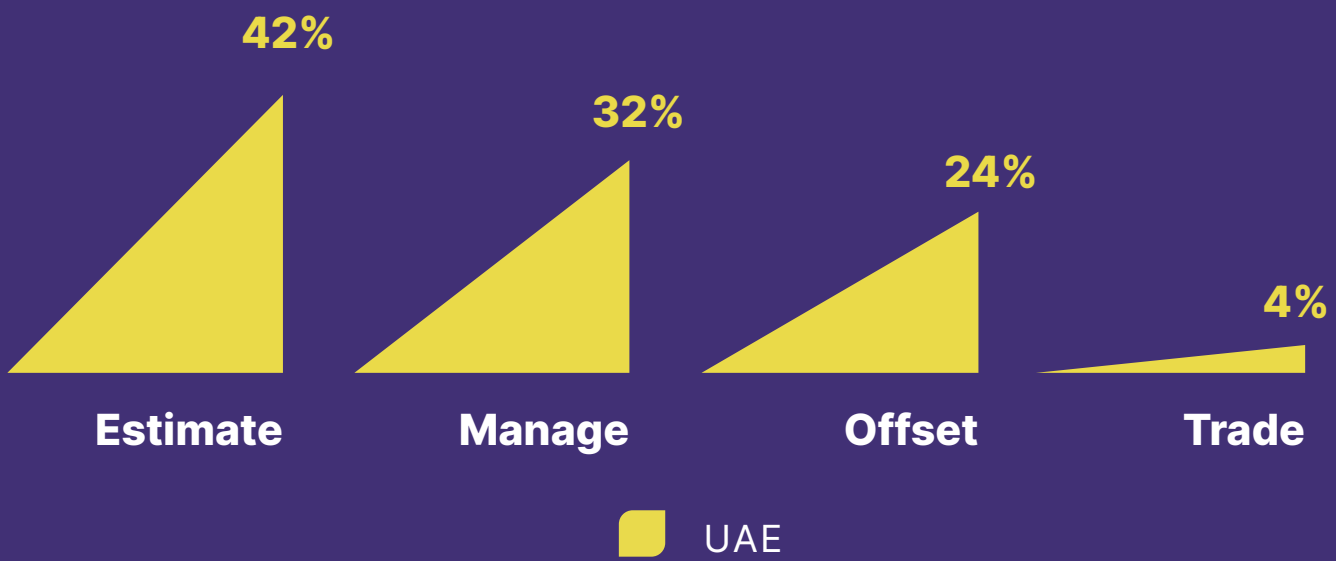
Stage 4: Trade
The penultimate stage, which is a target zone in which most organizations want to be, is where an organization evolves to a point that it behaves as a part of the ecosystem and chooses wilfully to engage with the large collection of organizations, with a primary motive to 'trade' its carbon credits. In doing so, the organization is able to evolve a strategy over a longer term so as to address the risk around legislation that is being defined currently, not just by specific countries or regions, but which is impacting cross-border trade as well.

Stage 5: Realize
The final stage, is realization of the goals we have set to make our planet and its environment something we can be proud to leave for future generations.

VCC FOR ACHIEVING NET ZERO

A trickle before the deluge





STAGE 01

Estimate

We looked at the efforts of 122 of the surveyed companies in estimating their carbon footprint, shedding light on the current landscape of sustainability initiatives. Our findings present a comprehensive view of global practices, highlighting both commonalities and unique trends across emerging and developed markets.

Estimation Initiatives

60% of the surveyed companies actively engage in estimating their carbon footprint, signalling a growing commitment to environmental sustainability. This proactive stance reflects a collective recognition of the need to address the impact of business operations on the environment.

Regional Disparities

Our survey identifies significant disparities between regions when it comes to estimating the carbon footprint of companies. In the UAE, while actively participating, companies currently lag behind their counterparts in emerging and global markets. This finding serves as a call to action for businesses in the region to accelerate their efforts in aligning with global sustainability standards. We expect to see significant activity here as the country has launched a number of initiatives recently to play a more active part in voluntary carbon markets and is the host nation for COP28.

Voluntary Initiatives

Our survey identifies the current state of preparedness at respondent organizations for voluntary initiatives towards offsetting their carbon footprint. Regional disparities across Developed and Emerging markets are showcased, with a special emphasis on organizations based in UAE and GCC.

Preparedness Disparities in the UAE

While UAE companies mirror their global peers in moving beyond an ad-hoc approach to estimation initiatives, there is a notable gap in the state of preparedness. UAE companies currently lag behind their peers in emerging markets, suggesting a need for accelerated efforts and strategic planning in the region. At the same time, UAE companies mirror developed markets in that a higher percentage is preparing their plans and not following an ad hoc approach.

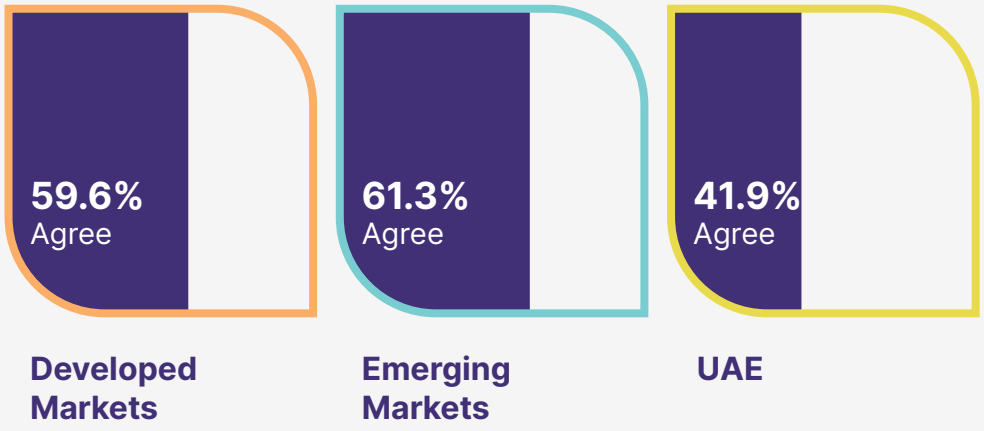
Guidance from External Agencies

Business consulting firms emerge as the external agency of choice globally for guidance on estimating carbon footprint. This trend is consistent across both developed and emerging markets. However, in developed markets, individual subject matter experts (SMEs) also play a significant role, showcasing a reliance on diverse expertise, also linked to the fact that their relationship with sustainability initiatives may be more evolved than their peers in emerging markets.

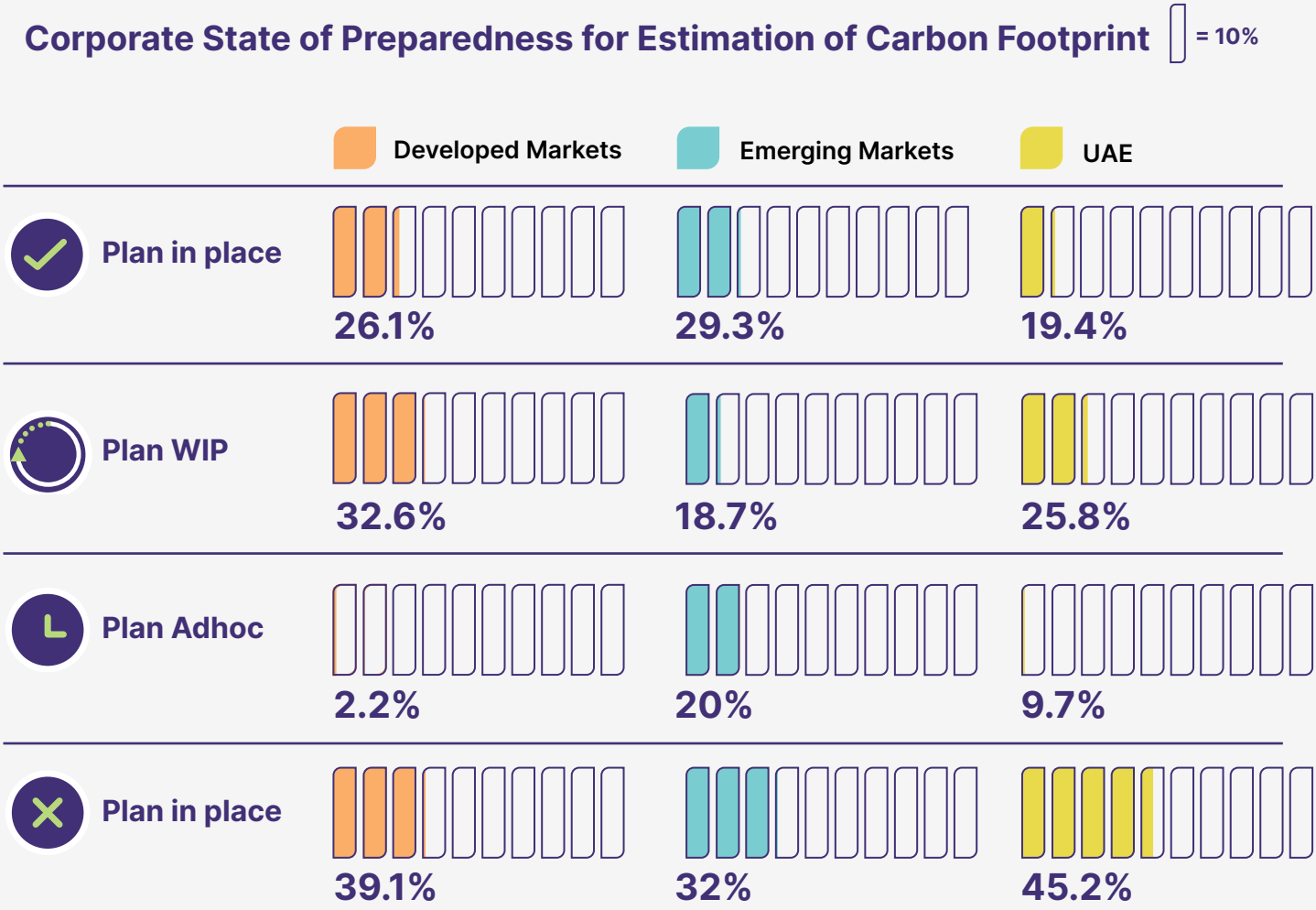
Regional Nuances

UAE companies mirror their peers in emerging markets in their preference for business consulting firms as the primary source of guidance. This reflects a convergence of strategies among emerging markets in seeking expert advice to navigate the complexities of sustainability initiatives.

Currently Estimating Carbon Footprint



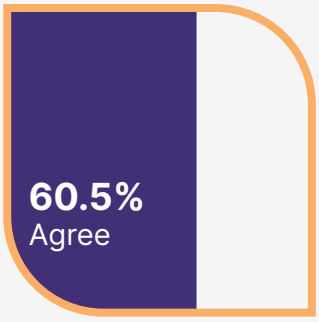
Corporate State of Preparedness for Estimation of Carbon Footprint



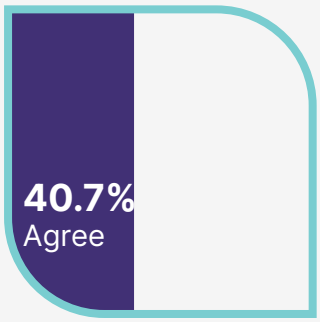
Corporate Perception of Estimation Methodologies

	ACCURATE	FUNCTIONAL	INACCURATE
Developed Markets	17.2%	82.8%	0%
Emerging Markets	15.6%	73.3%	11.1%
UAE	19%	66.7%	14.3%

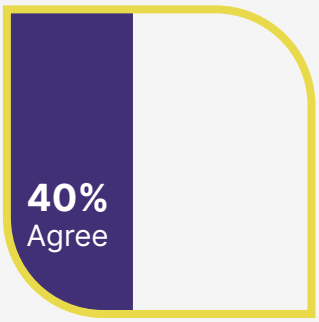
Currently seeking external help to Estimate their Carbon Footprint



Developed Markets

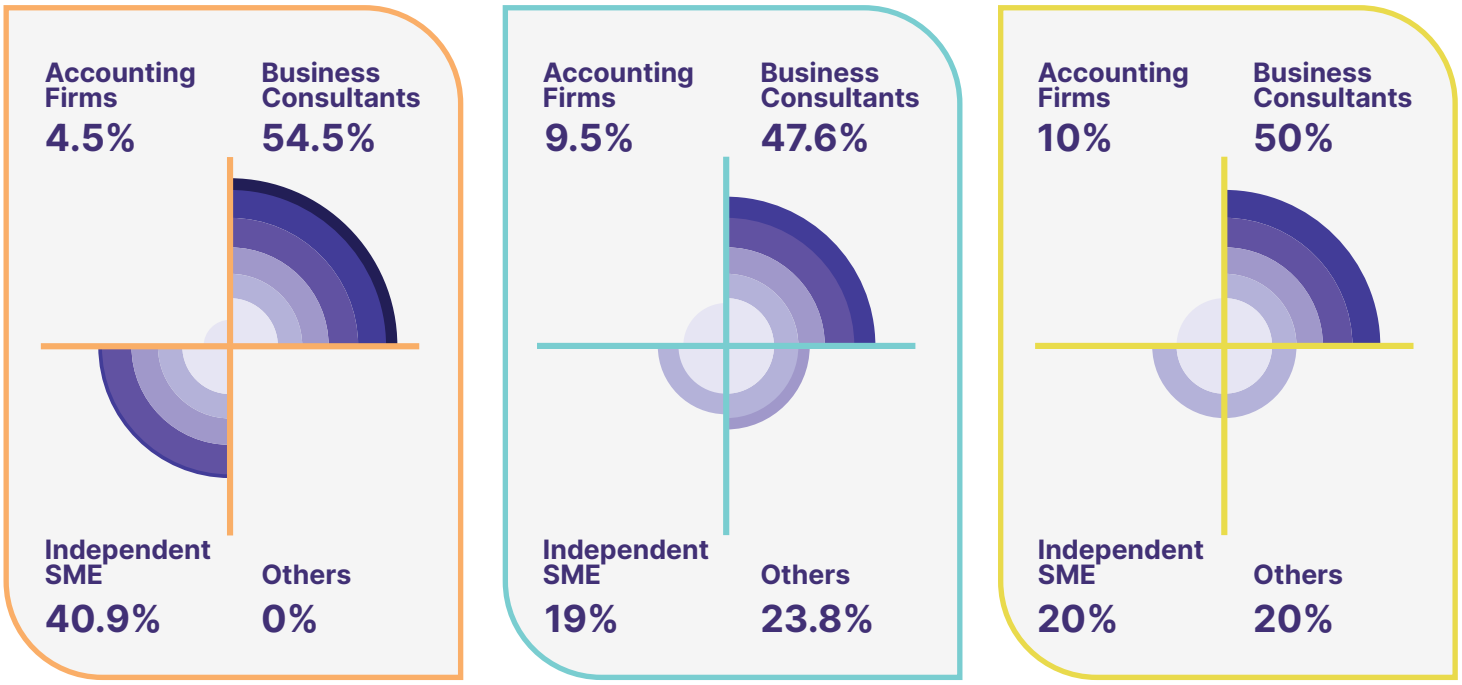


Emerging Markets



UAE

External Agencies providing guidance on estimation of Carbon Footprint



Developed Markets | Emerging Markets | UAE

Source of emission in the current Estimation process considered

	DEVELOPED MARKETS	EMERGING MARKETS	UAE
Electrical	100%	87%	74%
Utilities	97%	68%	47%
Gasoline (Travel)	10%	47%	42%
Corporate Air Travel	24%	55%	58%
Product Related Logistics	76%	62%	42%

STAGE 02

Manage

Next, we looked into the strategies employed by companies in managing their carbon emissions, shedding light on the proactive steps taken toward environmental sustainability. The results are specifically from those who are estimating their carbon footprint. With a focus on both developed and emerging markets, the findings provide an understanding of the current landscape of carbon emission management practices.

The survey results underscore the global commitment to managing carbon emissions, with an increasing number of companies recognizing the importance of active strategies following estimation efforts. While regional disparities exist, the overall trend is positive, showcasing a collective effort to contribute to environmental sustainability.

Follow-up on Estimation

A trend observed in the survey is the correlation between estimation and active management of carbon emissions. Companies that engage in estimation initiatives are more likely to follow up with active management strategies. This integrated approach signifies a growing commitment to not only understanding but actively addressing the environmental impact of business operations.

Global Disparities

While the majority of companies globally demonstrate a commitment to managing their carbon emissions, there are noticeable disparities between regions. UAE companies currently lag behind their global and emerging market counterparts in the active management of emissions. This finding emphasizes the need for increased efforts in the region to bridge the gap and align with global sustainability benchmarks. Once again, as the Middle East region shows significant activity in terms of achieving their net zero goals, we expect to see significant movement forward towards managing emissions in the UAE in the near future.

Primary Drivers

Our survey highlights that the primary driver for the active management of carbon emissions, at this time, is footprint reduction. Companies worldwide are recognizing the imperative to reduce their environmental impact, aligning with broader global sustainability goals.

The survey results underscore the global commitment to managing carbon emissions, with an increasing number of companies recognizing the importance of active strategies following estimation efforts.

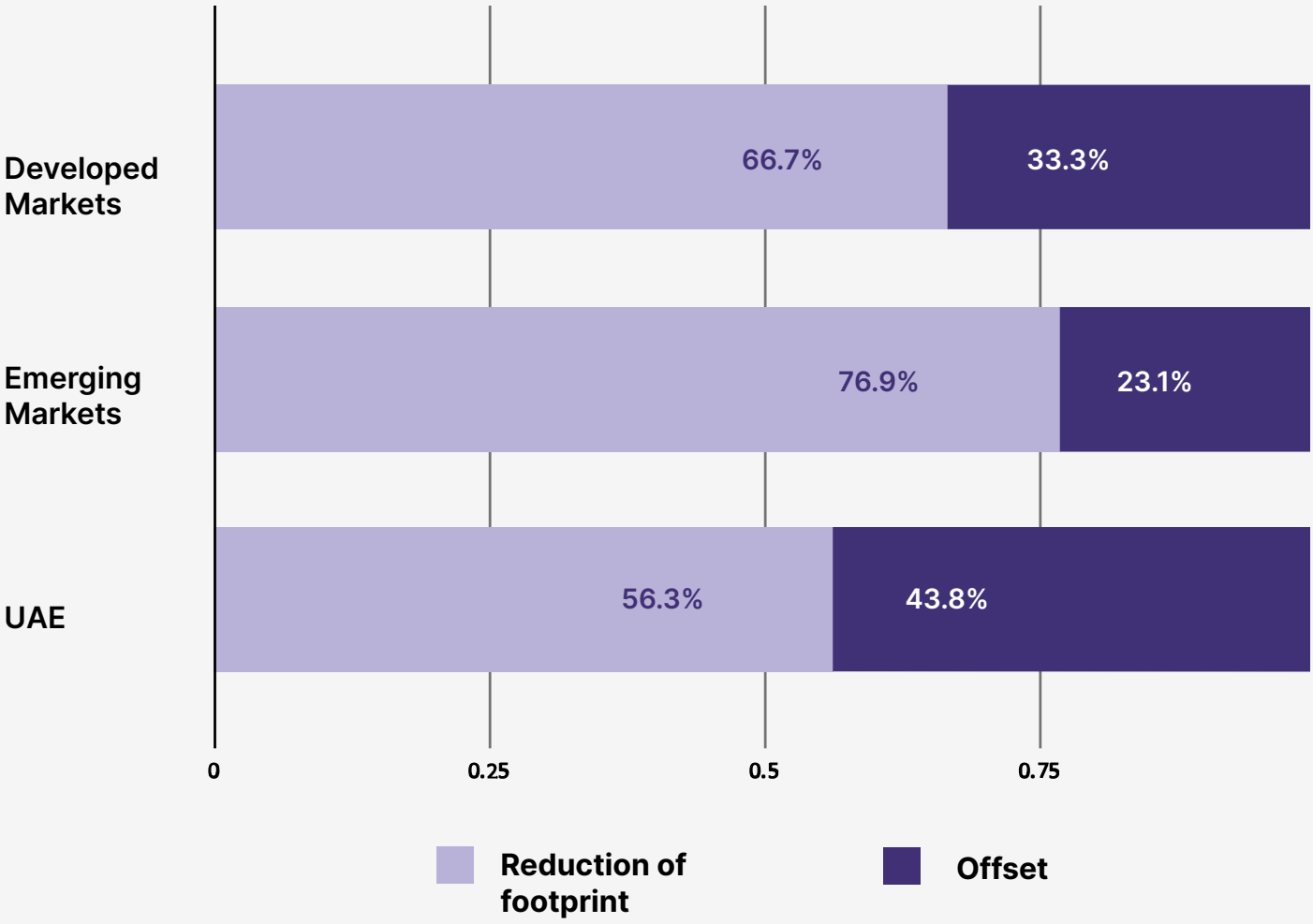
Offsetting Strategies

A noteworthy distinction arises when examining offsetting strategies between developed and emerging markets. In developed markets, 1 in 3 companies express an interest in managing emissions to offset, whereas, in emerging markets, this ratio reduces to 1 in 4. This divergence suggests differing priorities and approaches, with developed markets placing a slightly higher emphasis on offsetting as part of their overall carbon management strategy.

UAE's Unique Landscape

Despite working off a lower base, our survey reveals a compelling trend in the UAE. A larger proportion of companies in the region actively manage their emissions and express a commitment to offsetting. This suggests a proactive stance among UAE companies, indicating a potential for accelerated progress in the near future.

Objectives driving management of carbon emissions



STAGE 03

Offsetting

Offsetting Practices

A notable revelation from our survey is that a significant number of companies are actively offsetting their carbon emissions. This proactive approach indicates a growing awareness of the need to not only estimate and manage emissions but also take tangible steps to neutralize the environmental impact of business operations.

Voluntary Drivers

Across both developed and emerging markets, the primary driver for companies engaging in carbon emission offsetting is voluntary rather than regulatory pressure. This suggests that businesses are pro-actively adopting offsetting strategies, motivated by a sense of corporate responsibility and a commitment to environmental sustainability.

Unique Drivers in the UAE

In the UAE, respondents deviate from the global trend, highlighting regulatory factors as significant drivers for offsetting practices. This suggests a potential influence of government policies and pressures in the region, signalling a distinctive landscape where external factors play a crucial role in shaping corporate environmental initiatives.

Future Outlook in Developed Markets

Looking ahead, our survey indicates a marginal increase in the proportionate contribution of offsetting from voluntary carbon credits in developed markets. This suggests a continued but gradual shift towards voluntary initiatives as a driving force behind carbon offsetting strategies in these regions.

Future Outlook in Emerging Markets

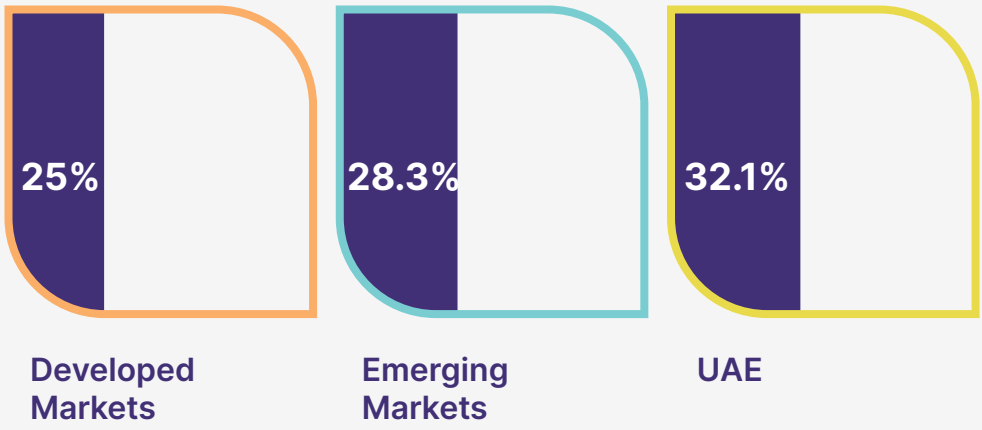
Conversely, in emerging markets, our findings project a significant increase in the relative contribution of offsetting based on voluntary carbon credits. This signals a pronounced shift towards voluntary initiatives as a dominant force shaping the future of carbon offsetting practices in emerging economies.

Anticipated Trends in the UAE

Respondents in the UAE foresee a balanced future, expecting both voluntary and regulatory contributions to offsetting practices to increase proportionately. This indicates a unique scenario where companies in the UAE anticipate a dual approach, incorporating both voluntary initiatives and regulatory compliance into their carbon offsetting strategies.

Share of respondents currently offsetting carbon emissions

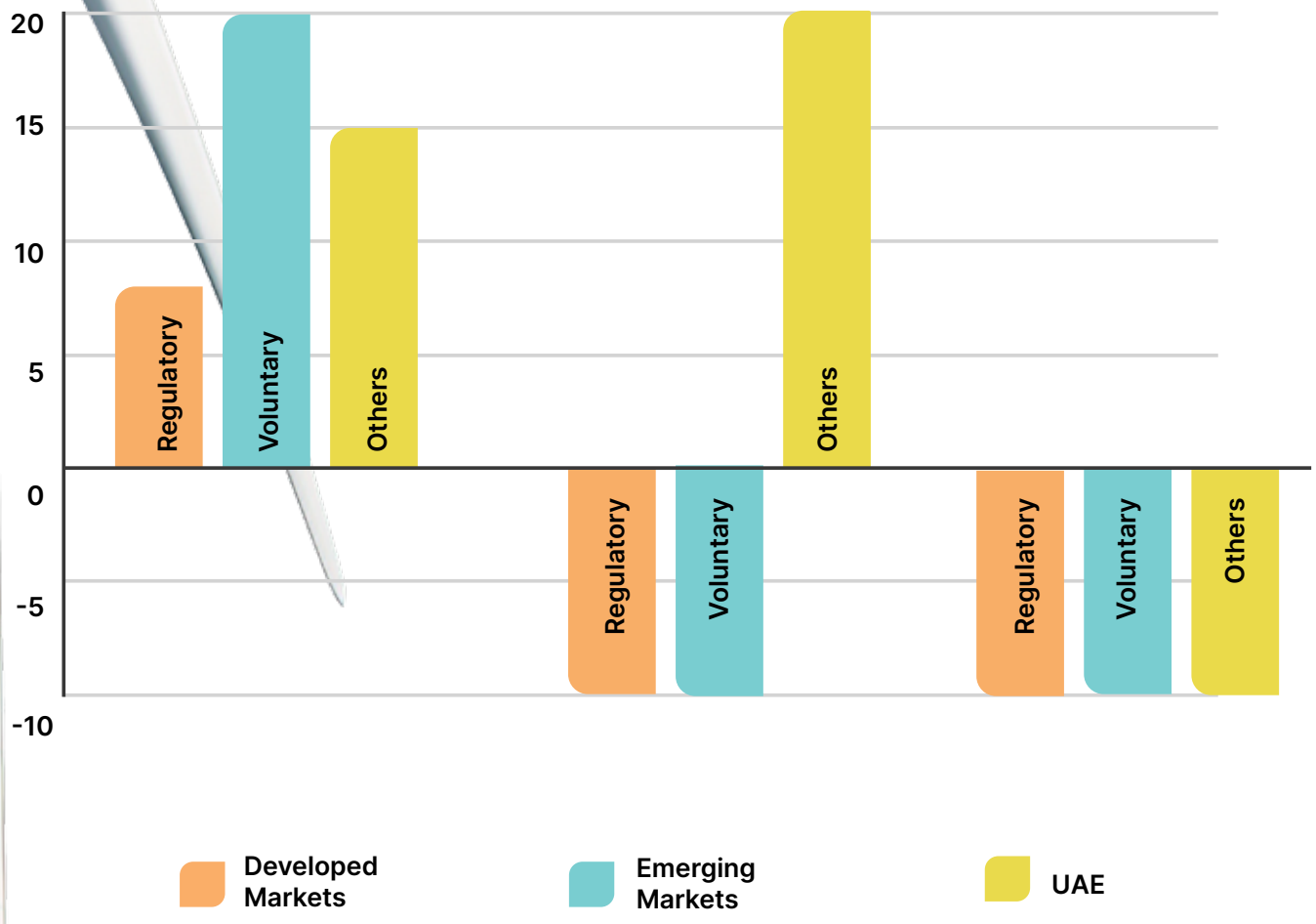
% Respondents currently offsetting carbon emissions



Key drivers for offsetting carbon emissions

Expected change in driver to offsetting carbon emissions (2023 vs. 2030)

Difference in Average % Allocated to alternative in 2030 vs 2023



STAGE 04

Trade

Participation Levels

The survey results highlight that a majority of firms, especially those in emerging markets, are not actively trading in carbon credits. This observation underscores the current state of the market, revealing that participation is not yet widespread, particularly among businesses in emerging economies.

Decision-Making Authority

An intriguing pattern emerged regarding decision-making authority for carbon credit trading. In developed markets, the decision is often irregular and indicates a degree of illiquidity in trading. Contrastingly, in emerging markets, the decision-making process is typically driven by CEOs, suggesting a more centralized and perhaps strategic approach to trading.

Market Maturity and Trading Patterns

The data suggests that trading patterns vary between developed and emerging markets, reflecting the maturity of these markets in the carbon credit trade. In developed markets, irregular trading decisions may signify challenges in liquidity, whereas the more balanced approach in emerging markets could indicate a more nascent stage of trading with room for growth and exploration.

Key Considerations for Trading

Transparency, particularly in avoiding double counting, emerges as a leading consideration at an overall level for companies deciding whether to engage in carbon credit trading. This reflects a commitment to maintaining the integrity and credibility of emissions reduction efforts. Following closely is the quality of the underlying assets, emphasizing the importance of robust and reliable credits in the decision-making process.

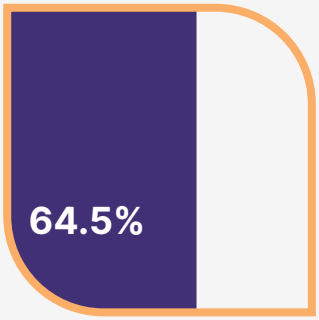
Emerging Market Dynamics

In emerging markets, the primary factors influencing the decision to trade are the quality of the underlying asset and the ease of trade. This nuanced perspective aligns with the evolving nature of carbon credit trading in these markets, where considerations such as asset quality and trade simplicity play a pivotal role in decision-making.

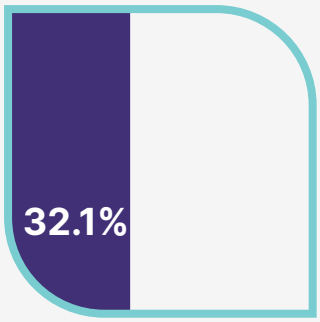
Internal Teams for Trading

At this juncture, the survey indicates that most companies, irrespective of market type, rely on internal teams for handling carbon credit trading. This internal approach reflects a hands-on strategy adopted by companies, indicating a level of expertise and commitment within organizations to navigate the intricacies of carbon credit markets.

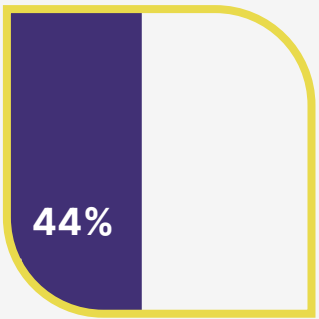
Currently Trading in carbon credits



Developed Markets



Emerging Markets

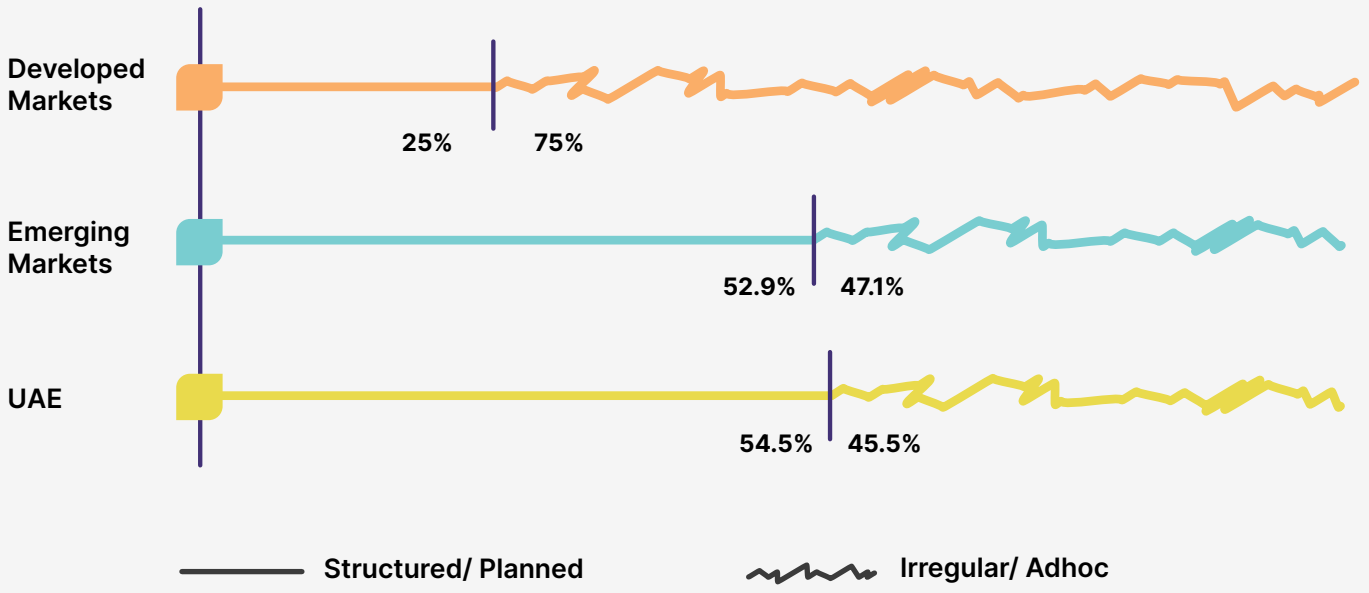


UAE

Primary decision maker for trading in carbon credits

	Board of Directors	CEO	CFO	Functional Team
Developed Markets	55%	20%	20%	5%
Emerging Markets	29.4%	47.1%	0%	23.5%
UAE	45.5%	45.5%	0%	9.1%

Nature of decision making to trade in carbon credits

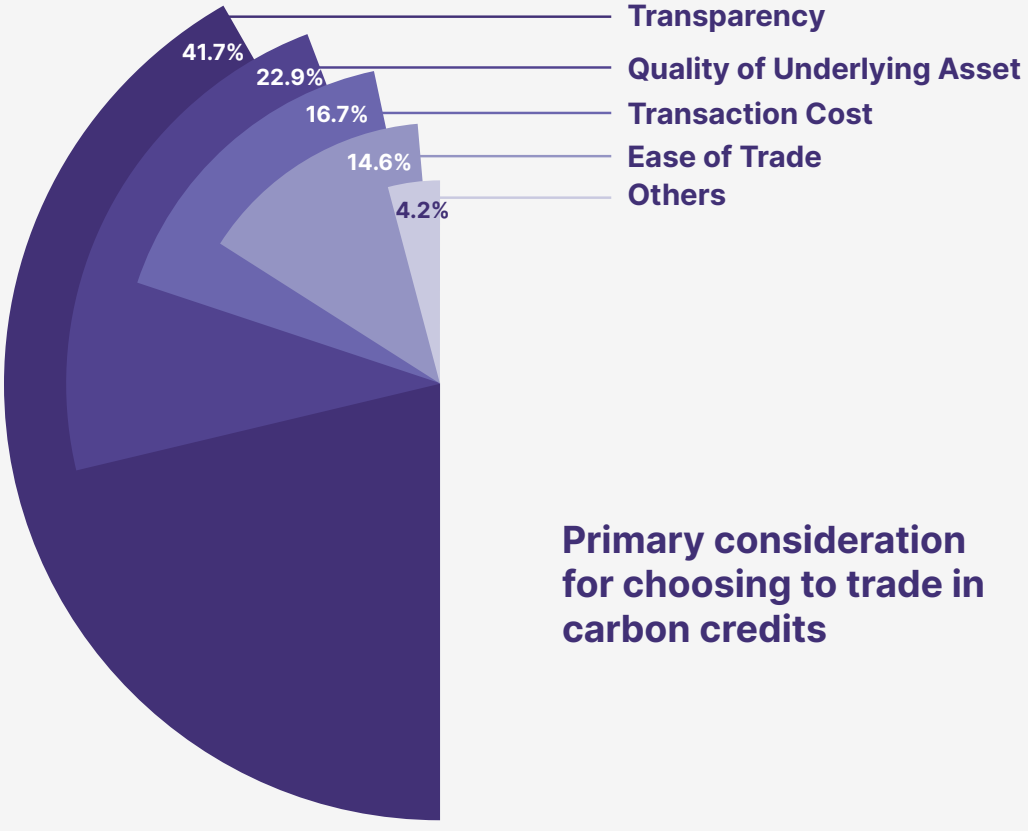


Primary consideration for trading in carbon credits

	DEVELOPED MARKETS	EMERGING MARKETS	UAE
Transparency	80%	17.6%	9.1%
Transaction Cost	15%	17.6%	18.2%
Quality of Underlying Asset	5%	35.3%	36.4%
Ease of Trade	0%	23.5%	27.3%
Others	0%	5.9%	9.1%

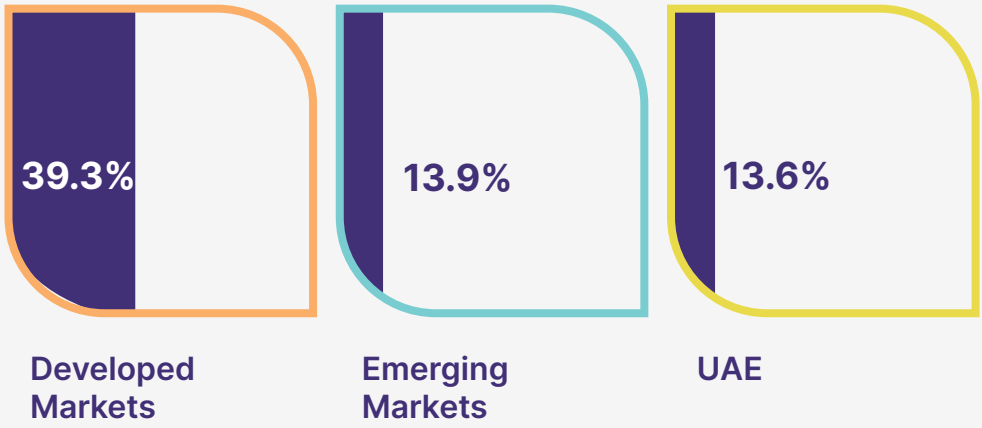
Split between supporting agencies used for trading carbon credits

	DEVELOPED MARKETS	EMERGING MARKETS	UAE
Business Consultants	4%	50%	0%
Individual SME	4%	0%	6.7%
Adhoc Team	28%	0%	26.7%
In-house Team	52%	50%	53.3%
Hybrid (In-house & Business Consultants)	12%	0%	13.3%



Primary consideration for choosing to trade in carbon credits

Currently seeking external help to trade in Carbon Credits



Heat map for ranking of primary considerations

	To trade in carbon credits				To choose an independent platform to trade in carbon credits			
	1	2	3	4	1	2	3	4
Transparency								
Developed Markets	80%	10%	0%	10%	29%	33%	13%	25%
Emerging Markets	21%	12%	35%	32%	19%	22%	28%	31%
UAE	20%	15%	35%	30%	10%	19%	33%	38%
Transaction Cost								
Developed Markets	20%	30%	30%	20%	8%	21%	42%	29%
Emerging Markets	25%	26%	24%	26%	22%	31%	25%	22%
UAE	25%	25%	25%	25%	29%	38%	10%	24%
Quality of Underlying Asset								
Developed Markets	0%	25%	20%	55%	50%	33%	8%	8%
Emerging Markets	32%	32%	15%	21%	44%	19%	14%	22%
UAE	30%	30%	15%	25%	48%	14%	19%	19%
Ease of Trade								
Developed Markets	0%	35%	50%	15%	13%	13%	38%	38%
Emerging Markets	24%	29%	26%	21%	14%	28%	33%	25%
UAE	25%	30%	25%	20%	14%	29%	38%	19%

(% split across Ranking (1-4 with 1 being most important))

STAGE 05

Realize – Employee Involvement

Employee Awareness Spectrum

The survey reveals a spectrum of employee awareness levels, ranging from high to low, indicating the diverse landscape of corporate sustainability communication. This suggests that companies face varied challenges in conveying their carbon footprint and offsetting status to their workforce.

Market Dynamics: Emerging vs. Developed Markets

An interesting trend emerges when comparing employee awareness levels between emerging and developed markets. Respondents from emerging markets expressed a belief that their employees were more aware compared to their peers in developed markets. This disparity may reflect the relatively nascent stage of sustainability awareness in emerging markets, where even a moderate level of awareness could be perceived as higher due to the evolving nature of these markets.

Employee Activism as a Driver

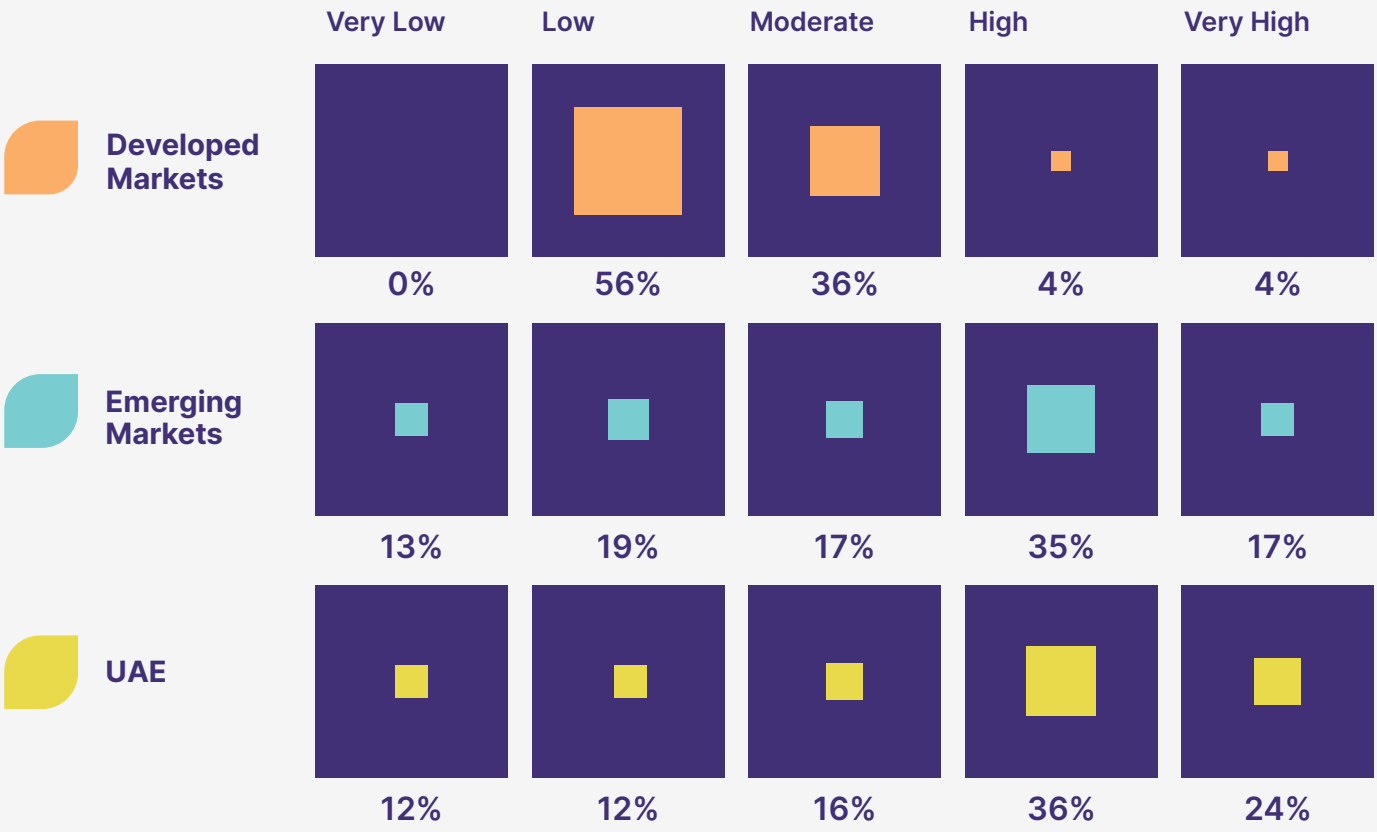
Contrary to expectations, the survey indicates that employee activism is not a key driver for action, especially in developed markets where the impact is currently low. This suggests that, in these regions, employee engagement in sustainability practices is not yet a primary catalyst for corporate action. However, the outlook remains moderate for the medium and long term, indicating a potential shift in the role of employee activism over time.

“This projection underscores the evolving landscape of sustainability governance and the potential for regulatory frameworks to play a more prominent role in shaping employee awareness and engagement strategies.”

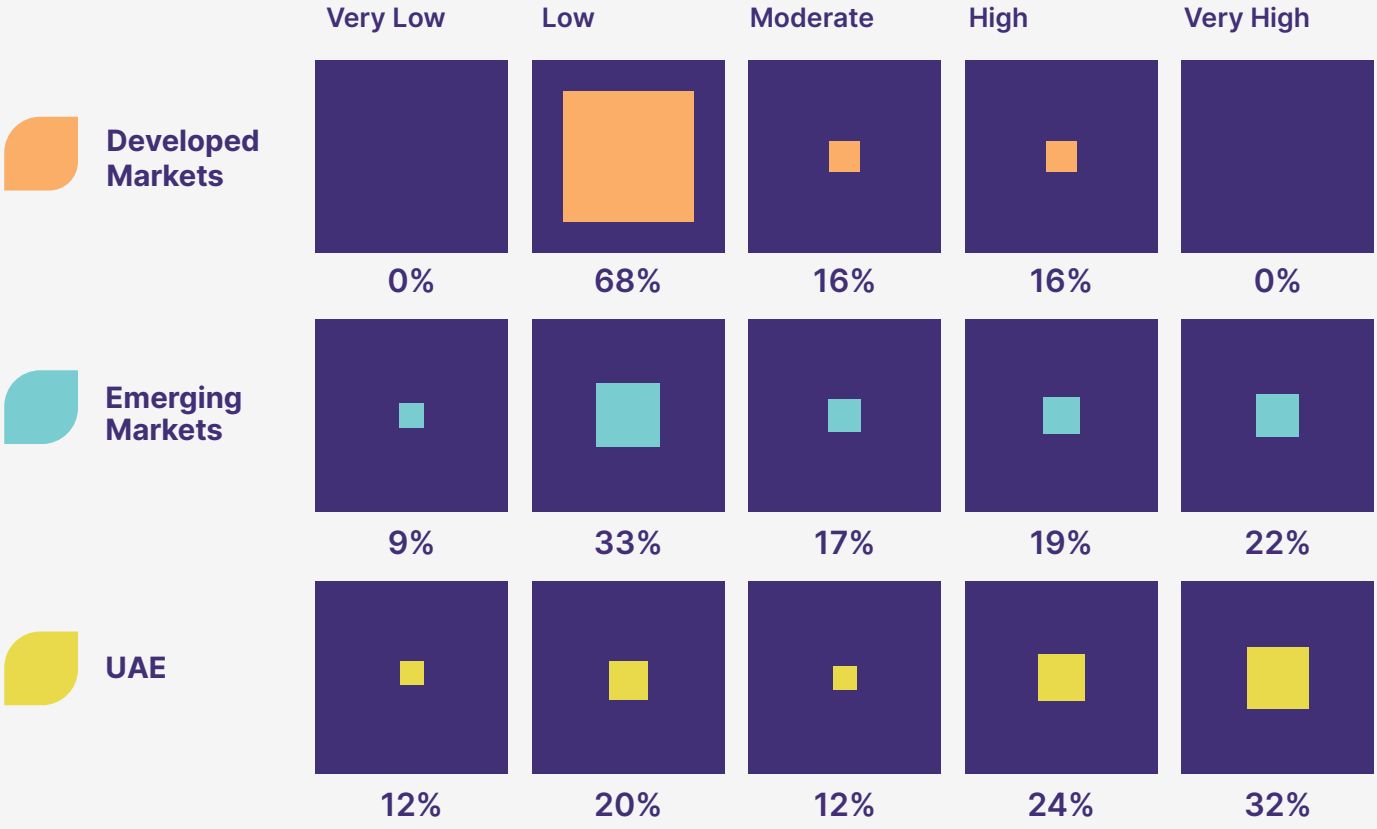
Regulatory Impact and Long-Term Expectations

A notable finding is the expectation of an increased impact of regulations on employee engagement in the longer term. Respondents foresee more regulated regimes by 2030, suggesting an anticipation of stricter environmental standards and regulations. This projection underscores the evolving landscape of sustainability governance and the potential for regulatory frameworks to play a more prominent role in shaping employee awareness and engagement strategies.

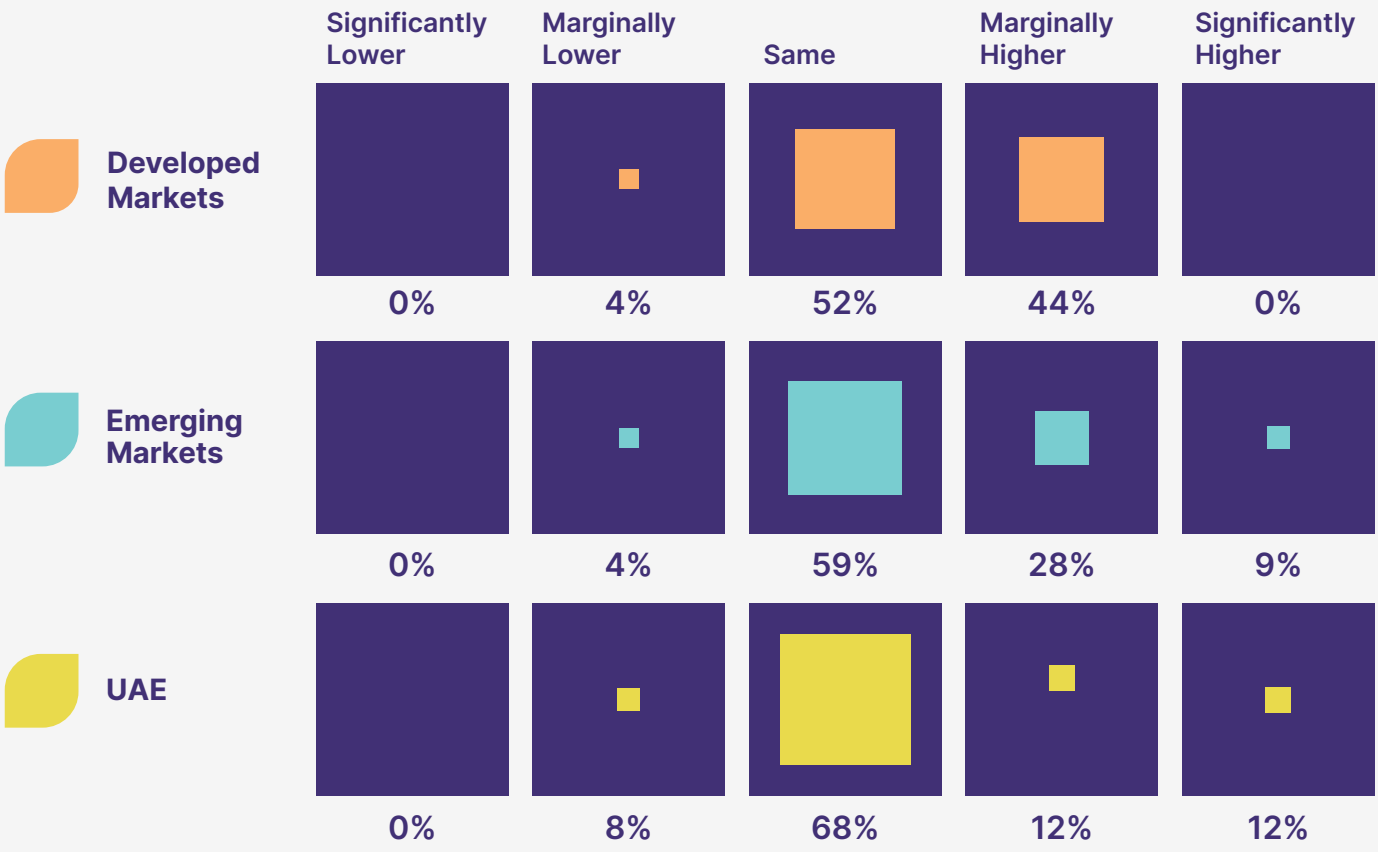
Employee awareness levels about carbon footprint



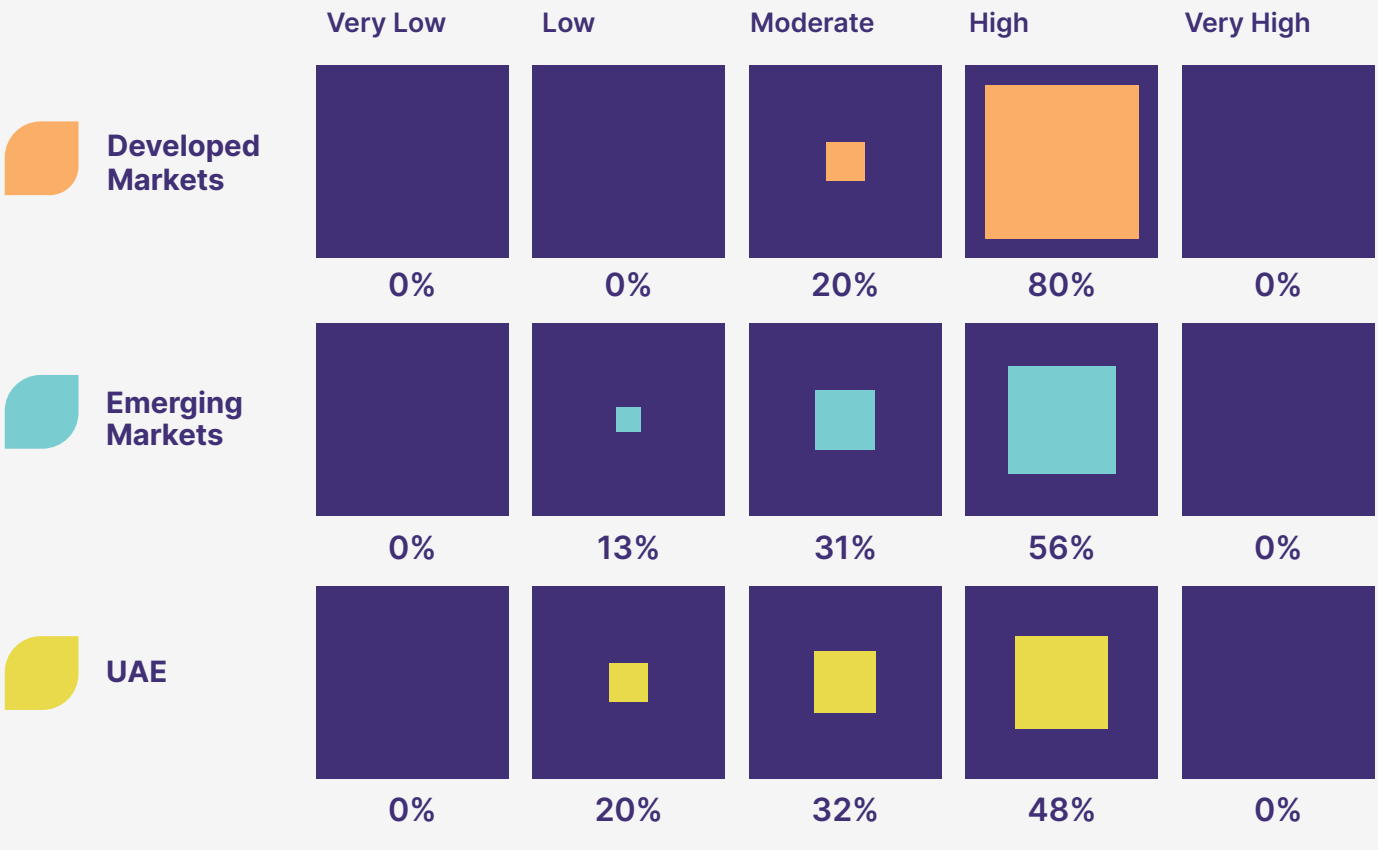
Impact of employee activism on organization's decision to offset



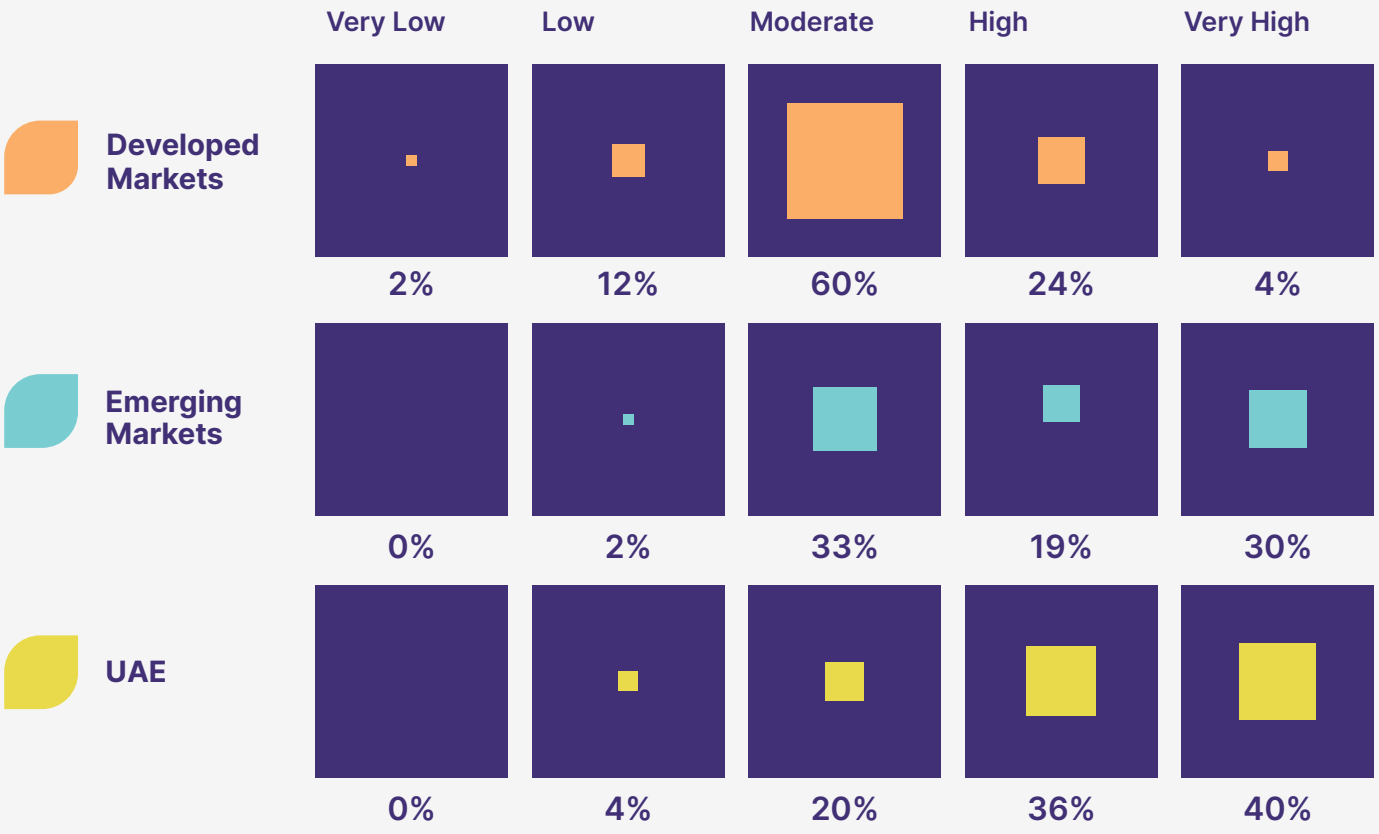
Perceived difference in the role of regulations on an organization's decision to offset (2030 vs. 2023)



Impact of regulations on an organization's decision to offset in the long term (2030)



Impact of employee activism on decision to offset in the long term (2030)



07

Challenges & Opportunities

As we've seen, voluntary carbon markets can complement the compliance markets in helping companies reduce their carbon emissions through offsetting mechanisms, especially when reductions may not be feasible. However, VCMs are not without their challenges.

An investigation found that the vast majority of rainforest carbon credits issued by a leading certifier were "phantom credits" and that they did not actually do what they were meant to.
This has led to a slowdown in the market, with entities exercising an over-abundance of caution or completely stopping their purchases of credits.

VCMs are also accused of being fragmented, illiquid, and opaque, which limits their effectiveness as a solution for global emissions reduction. Addressing these issues will be paramount to boosting the growth of VCMs.

6.1 Challenges

6.1.1 Varying quality

According to environmentalists, only high-quality carbon offsets are considered to be effective in terms of reducing emissions. Carbon credits need to have certain features to be seen as high-quality.

Permanence

Carbon reduction or removal is not reversed.

Avoid leakage

An increase in emissions should not occur anywhere else.

Verification

Monitored, reported, and verified by a credible third party.

Additionality

Projects are unable to exist without revenue from the sale of carbon credits.

Measurability

Calculated based on scientific date through a recognized methodology.

At present, many of the credits available in the market are seen to be of poor quality as they do not satisfy these criteria. But in some cases, it is quite hard to establish that credits do offer additionality and that the reduction is permanent (e.g., planted trees being cut or being destroyed in a forest fire). Then there is the issue of carbon leakage, which happens when emissions reductions in one area unintentionally increases emissions in another.

The quality of credits is also linked to monitoring and reporting of projects, which can be complex and inconsistent across markets and project types. Data collection is difficult and can often account for a significant portion of the market value of the VCM project, which can deter investments and implementation.

6.1.2 Lack of Standardization and Governance

As a largely self-regulated space, different VCMs and certifying bodies have developed their own methodologies, standards, and even nomenclature to evaluate projects. The lack of governance and universally accepted standards has made it difficult for market participants to verify the quality of a carbon credit and compare with other credits. This is despite the presence of credible certifying bodies.

Studies have also found inconsistencies between actual and reported carbon sequestration from carbon credit markets, which has impacted confidence in the market, reduced investments, and slowed down the adoption of sustainability projects.

Without Standardization

Difficult to verify

quality of carbon credit and compare with others

Double counting

could occur

Part of the problem in such cases is that calculating the amount of carbon actually reduced by offset projects is difficult as establishing baseline emissions is complex (baseline represents the emissions in the absence of the project).

The lack of consistent standards also opens the doors for double counting, which is when two or more entities claim the same credit.

6.1.3 Lack of Transparency

The concerns over the quality and governance of carbon credits has led to a lot of questions about overall effectiveness. The lack of standards means that companies buying credits cannot know if they are helping reduce emissions. In fact, VCMs are often accused of paving the way for a right-to-pollute system.

This has led to growing concerns of green washing, where organizations make it appear that they are doing more than they actually are. Some companies buy credits without making any efforts to reduce emissions in their own operations because usually, the price of the carbon credit is significantly lower than investing in any new technology.

However, transparency isn't just at the VCM level, it must be for all players. From suppliers of carbon credits, certifiers, and project developers to companies that buy carbon credits and financiers and investors, there needs to be transparency regarding their actions.

The functioning of carbon credits is a bit of a black box, leading to growing concerns of greenwashing

6.2 Opportunities

6.2.1 Using Technology for Greater Transparency

However, transparency isn't just at the VCM level, it must be for all players. From suppliers of carbon credits, certifiers, and project developers to companies that buy carbon credits and financiers and investors, there needs to be transparency regarding their actions.

Technologies to improve costs & transparency of carbon projects

1. Satellite imagery
2. Drones
3. LiDAR
4. In-situ devices
5. Block chain

Satellite imagery, drones, laser-detecting devices (LiDAR), in-situ devices that use machine learning and artificial intelligence to record and analyse various parameters of a project can go a long way in terms of improving the quality and accuracy of data collected. They also allow for remote monitoring which could significantly bring down costs associated with developing carbon offset projects while also ensuring verifiable impacts.

Block chain technology can also help keep various stakeholders – from project developers and certifying bodies to companies – updated on the state of climate projects and offer greater visibility on carbon offsetting or reduction efforts. It can also help avoid double counting of credits.[58]

According to a research paper published in Frontiers, these technologies over time would be able to help smaller and more diverse projects to participate and benefit from carbon markets, while also increasing climate change mitigation activities. This would in turn bring in best practices and standardization, thus creating more trusted voluntary carbon markets.[59]

Putting in place technology-backed infrastructure to collect and disseminate data will help improve transparency in these markets while making it easier for investments, management, and regulations.

6.2.2 Small and Mid-sized Business Orientation

Large corporations are considered to be the largest emitters of GHGs, but studies indicate that around 80% of their emissions are linked to their supply chains. Global supply chains mostly consist of small and mid-sized businesses that produce essential goods and services for larger companies.

80%

of large corporations' emissions are linked to their supply chains, mostly comprising SMEs

90%

of global businesses are SMEs

Individually, SMEs may not have a large carbon footprint, but they collectively account for 90% of the businesses globally – and this means collectively, they are a significant contributor to GHG emissions.[60]

There are significant benefits for SMEs to get involved in decarbonization efforts, but there are also significant challenges.

The top deterrent for SMEs to participate in sustainable business practices efforts is the lack of capital. Costs tend to be relatively higher for smaller businesses and this makes them more risk-averse in terms of investing in anything they deem unnecessary. This also means they are less likely to be concerned about climate events or improving efficiencies in their production.

However, it is becoming more vital for smaller enterprises to start considering their environmental impact as larger companies up the chain start to look at ways to reduce their emissions faster. This could very well include cutting suppliers without sustainable practices out of the chain.

The voluntary carbon market gives these smaller enterprises the opportunity to participate in eco-friendly offsetting projects at price points that are more likely to fit their budgets rather than more highly priced technologies or equipment. In addition, highlighting environmentally responsible credentials is likely to appeal to both consumers showing greater interest in the sustainability goals of brands as well as to brands these companies supply to.

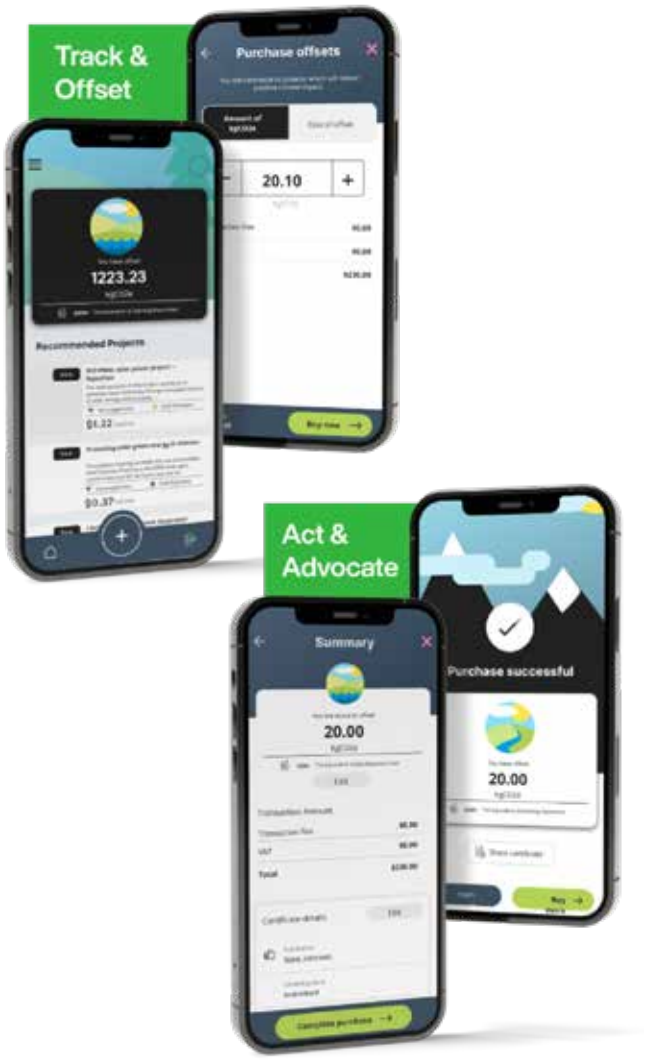
Envex has partnered with UAE-based Air Carbon Exchange (ACX) to help Indian participants connect with global buyers.

Despite having access to VCMs, many SMEs may also face the issue of just not having enough carbon to offset from their operations to buy credits measured in tons.

What keeps SMEs from sustainable practices?

- **Higher operating costs**
- **More risk-averse to invest in "non-essentials"**
- **Less likely to be concerned about climate events**

The products and services offered by Envex through its CONIL solution are tailored for the requirements of mid-sized enterprises who can choose to participate in the carbon markets by buying credits measured in kilograms, thus fitting the requirements of smaller enterprises.



08 Way Forward

As the global community is faced with the challenges of climate change and environmental sustainability, voluntary carbon markets have emerged as powerful instruments that could hold the key to significant progress. VCMs have seen remarkable growth, but their full potential is yet to be realized. Encouraging further growth in these markets is essential, and incentivizing voluntary emissions reductions is a way forward. This will stimulate innovation, create economic opportunities, and enhance the quality and credibility of offset projects.

7.1 Ensure transparency and standardization

Transparency in offset projects is vital, as is standardization of measurements. The market must set and uphold high standards, ensuring the integrity and effectiveness of carbon credits. Third-party verification and robust monitoring mechanisms should become standard practice. Moreover, the development of clear guidelines for consumers and businesses on how to engage with carbon offsets is essential to maintain trust and credibility.

7.2 Collaboration and Synergy

Collaboration will be the key to success of VCMs and in turn tackling emissions reductions effectively. Various stakeholders will need to work together to harmonize the VCMs with regulatory compliance markets. Such a synergy can create a broader and more efficient carbon reduction ecosystem. Additionally, partnerships with industries, like renewable energy, reforestation, and agriculture, should be explored to expand offset opportunities.

7.3 Spread Awareness

Raising awareness is fundamental as this helps clarify the distinction between voluntary carbon markets and regulatory mechanisms and empower participants to make informed choices. Public awareness campaigns can highlight the environmental and societal benefits of carbon offsets. This in turn can drive greater participation in voluntary markets and encourage more organizations to commit to carbon neutrality.

7.4 Technological Innovation

Various technologies can now be used to track, monitor, and optimize offset projects. Utilizing block chain for transparency and satellite imaging for monitoring can enhance efficiency of VCM. Investing in R&D can lead to pioneering solutions for climate change mitigation. Technology also plays a role in emissions reduction or sequestration, but they are still new and costly. With investments from organizations, there will be greater advancements in this space, which also can shift the focus from offsets to avoidance projects.

7.5 Green Financing Opportunities

As we delve into the world of VCMs, it has become hard to overlook one vital aspect:

US$32 Trillion

According to the UN, an investment to the scale of US$32 trillion is needed this decade alone to ensure the world is on the path to net zero.

for the world to transition to a low-carbon economy, an enormous level of financing is required to support activities that cut GHG emissions and help entities better adapt to the effects of climate change.

Technologies to transition to clean energy and decarbonize existing carbon-intensive infrastructure require significant capital to scale up at pace.

This is where green financing comes in. Green finance is a loan or investment that promotes environmentally friendly activities. It covers loans, debt mechanisms, bonds, and various investments that support the development of green projects or activities that minimize the impact on the planet.

Green finance is a way to help everyone contribute to this goal. It expands access to eco-friendly goods and services for individuals and enterprises, democratizing the transition to a low-carbon society.

7.5.1 VCMs are a valuable source of private funding

Given how much capital is needed for climate change mitigation activities, funding needs to come from public and private players as well as large and small investors.

One of the primary goals of the voluntary carbon market in this context is to make funding available to carbon offsetting and avoidance projects. Voluntary carbon credits and the marketplaces for them can create the bridge between private investment sources and carbon mitigation projects that would otherwise not get funding. Capital from VCMs can be applied to a wide variety of climate challenges, making them an incredibly versatile financial tool. The source of this capital also comes primarily from private parties.

According to the UN Framework Convention on Climate Change (UNFCCC), private investors will play a major part when it comes to funding, through direct investments or by enabling other parties' net zero efforts. They have the potential to provide around 70% of decarbonization funding globally. [61]

Financial intermediaries include commercial FIs, institutional investors, infrastructure funds, and private equity/venture capital. They can offer direct investments of around US$120 billion annually from 2021 to 2025 and can also facilitate investments by others worth US$960 billion annually from 2021 to 2025.

However, this level of private investment is contingent on improvements in financial market development, increases in market maturity in emerging markets, and public implementation of required policy action to achieve net zero by 2050 and a focus on blended finance tools that better enable private investment.

Corporates are the largest direct investors into decarbonization projects or assets, accounting for around 40% or US$960 billion annually during 2021-2025

Commercial financial intermediaries (FIs) account for around 20% or US$460 billion annually during 2021-2025

Households and individuals account for around 10% or US$300 billion annually during 2021-2025

Private finance could provide over two-thirds of the $2.6 trillion in investment needed every year to 2025 to put the world on a path to net zero by 2050

Recent annual investment 2016-2020

US$900 Billion

Annual investment needed now 2021-2025

US$2,600 Billion

Average annual investment beyond 2025 (2026-2050)

US$4,500 Billion

The private sector could provide 70% of this investment globally, ranging from 50% to 95% across regions with different levels of market maturity.

However, increased and well-targeted public support will be needed to support increased private ambition, including policy and regulations targeting net zero, market building, direct investment and blended finance.

09

Appendix, Sources & Sponsor Profiles

Appendix

Carbon Markets Framework

Policies are the backbone in implementing initiatives and effecting change. Carbon taxes are a part of the policies to reduce emissions and they have led to verification standards to ensure adequate, efficient offsetting practices. Other factors that aim to offer sustainable solutions are captured as the “6P Framework” detailed below:

The 6P Framework by Frost & Sullivan for the Future of the Sustainability and Circular Economy - More with Less

Platform

Envex’s CONIL platform is one that helps in offsetting even low volumes of emissions. This report discusses how different exchanges are working with technology-based platforms to achieve this goal.

Products

Voluntary and mandatory carbon markets are discussed as well as the role of voluntary carbon market across different geographic regions.

Partnerships

This report highlights how multiple countries are forming partnerships with different entities to implement practices that help them achieve emissions goals.

People

The role of people and industries are captured to identify how countries are laying out practices for people and for industries. Offsetting carbon emissions suitable for people and suitable for industries are captured separately in this report.

Policies

Policies influencing carbon market such as the Paris Climate Agreement, Sustainable Development Goals, and Verification Standards.

Processes

Processes involved in implementing VCM are captured in this report, across multiple countries with active offsetting practices.

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- India's Evolving Carbon Credit Market; https://www.investindia.gov.in/team-india-blogs/indias-evolvingcarbon-credit-market

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- Energy System Models Can Inform the Design of India's Carbon Emission Trading Scheme; https://www.ceew.in/blogs/how-energy-system-modelling-tools-can-informdesign-of-indian-carbon-emission-trading-scheme

- Carbon revenues from shipping: A game changer for the energy transition; https://blogs.worldbank.org/transport/carbon-revenues-shipping-game-changer-energytransition

- Block chain Technology Adds Transparency and Integrity to Carbon Markets; https://www.environmentenergyleader.com/2023/08/blockchaintechnology-adds-transparency-and-integrity-to-carbonmarkets-2/

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- Net Zero Financing Roadmaps; https://assets.bbhub.io/company/sites/63/2021/10/NZFRs-Key-Messages.pdf

Sponsor Profile

Envex
www.envex.co

Envex Technologies is dedicated to guiding clients on the path to carbon neutrality, aiding them in fulfilling environmental commitments, advancing ESG goals, and reaching net zero targets. Envex aims to be a technology-driven catalyst to a healthier and greener earth, one informed and transparent transaction at a time.

The CONIL platform, developed by Envex, serves as a driver for change by simplifying offsetting solutions with a simple swipe. It enables users to track, offset, and advocate, ensuring complete trust and transparency throughout the process.

In collaboration with ACX, our strategic partner, Envex establishes local environmental product trading platforms. These platforms leverage ACX's global liquidity pool through a unified order book, contributing to India's journey towards a net-zero economy.

ACX Group
www.acx.net

ACX (AirCarbon Exchange) Group, which includes ACX Abu Dhabi (ACX Ltd) and AirCarbon Pte. Ltd., operates environmental trading platforms in Abu Dhabi and Singapore. It serves corporates, financial traders, carbon project developers, and other industry stakeholders, offering an efficient, transparent, and cost-effective trading platform that leverages distributed ledger technology to foster the growth of environmental product markets in line with global net zero goals.

ACX Group is proud to be a member of the International Emissions Trading Association (IETA) and the International Sustainability and Carbon Certification (ISCC), reinforcing its commitment to sustainable and responsible carbon and environmental product trading. It has been recognized as the Best Global Carbon Exchange by Environmental Finance's prestigious Voluntary Carbon Market Rankings for three consecutive years (2021, 2022, 2023), establishing itself as an industry leader.

Clean Energy Business Council (CEBC)
www.cebcmena.com

The Clean Energy Business Council (CEBC) is a non-governmental, non-profit membership organization founded in 2012 that comprises leading local, regional, and international organizations committed to accelerating the development and deployment of clean energy in the Middle East and North Africa (MENA) region.

The CEBC serves as a comprehensive clean energy platform aiming to foster a more coordinated, inclusive, and sustainable clean energy sector and to facilitate the development of forward-looking policies that reflect the needs and perspectives of the private sector and industry.

The CEBC vision is to become the leading force in advancing and harmonizing the clean energy transition in the MENA region. Its aim is to leverage unique insights and broad network to serve as thought leaders, facilitators, and consultants, effectively bridging the gap between academia, industry, and regulators and enhance energy security in the region and foster a landscape of prosperous clean energy businesses, thereby promoting an economically vibrant and sustainable MENA region.

Frost & Sullivan
www.frost.com

For over six decades, Frost & Sullivan has guided the world's top companies toward transformational growth journeys that result in a stream of innovative growth opportunities. Frost's Growth Pipeline as a Service (GPaaS) value proposition allows customers to maximize their economic potential, navigate emerging mega trends, and shape a future based on sustainable growth.

With over 1200 experts, growth advisors, and visionaries in 45 global offices, Frost & Sullivan provides the following critical services to our "partners" supporting their growth strategies: Growth Opportunity Analytics, Growth Advisory & Growth Coaching.

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