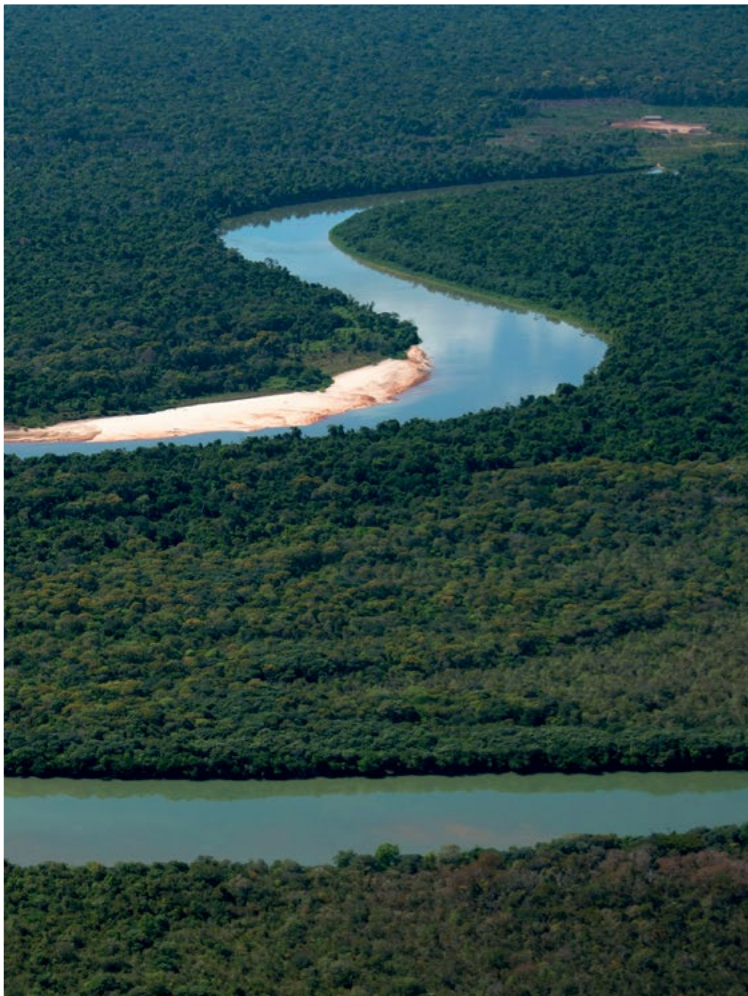




STUDY:

CHINA'S INTEREST AND DEMAND FOR THE CARBON MARKET IN LATIN AMERICA AND THE CARIBBEAN



EDITORIAL COMMITTEE:

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Juan Odriozola - Principal Economist CAF
Boris Olivas - Principal Economist CAF
Hernan Vidal - Principal lawyer

CONSULTOR:

Gina Caballero

DESIGN:

Tundra Taller Creativo | Tundra.pe

PHOTOGRAPHY:

Adobe Stock, Unsplash

PUNTOS FOCALES ILACC:

Paola Cleri	BICE
Pablo Mazzino	BICE
Soledad Ovando	Banco del Estado
Solange Encina	Banco del Estado
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Claudia Marcela Gutiérrez	Bancoldex
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Navin Dookeran y	Eximbank
Yoganan Dipchan	Eximbank
Lorena Sánchez Campella	BROU
Ashwin Haresh Harpalani	ICO (Instituto de Crédito Oficial)

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CAF - development bank of Latin America and the Caribbean

Av. Enrique Canaval y Moreyra N° 380. Edificio Torre Siglo XXI, piso 13.
 San Isidro, Lima - Perú

For more information: info@caf.com

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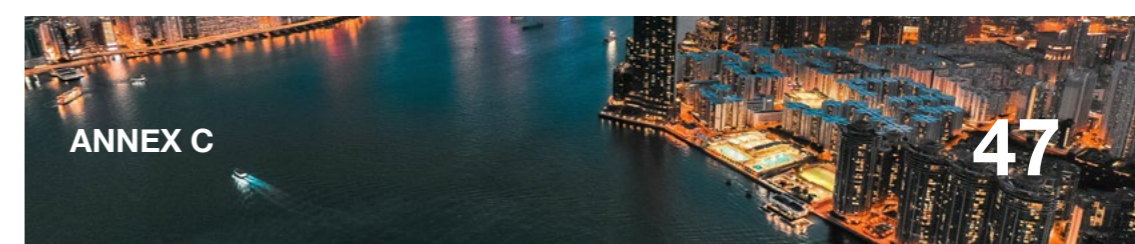
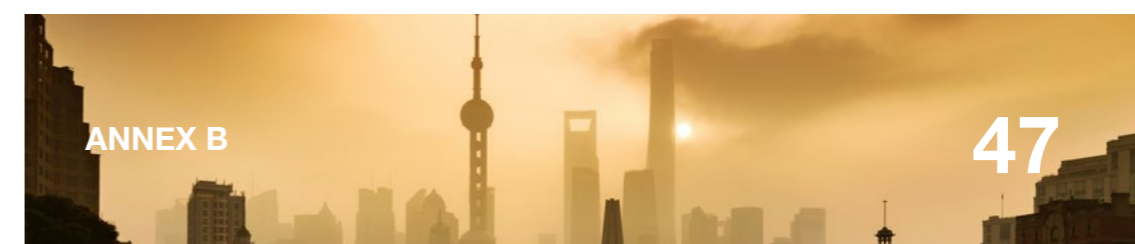
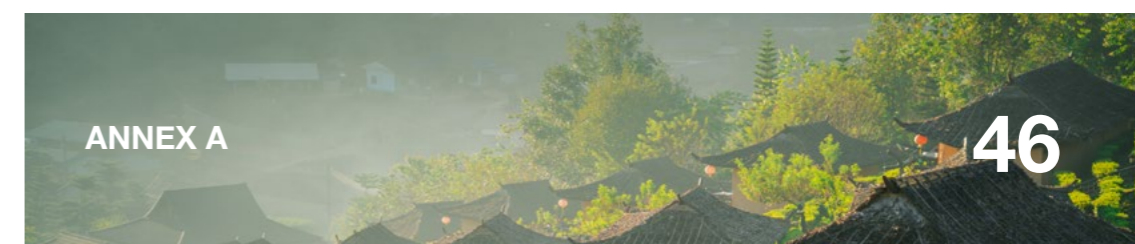
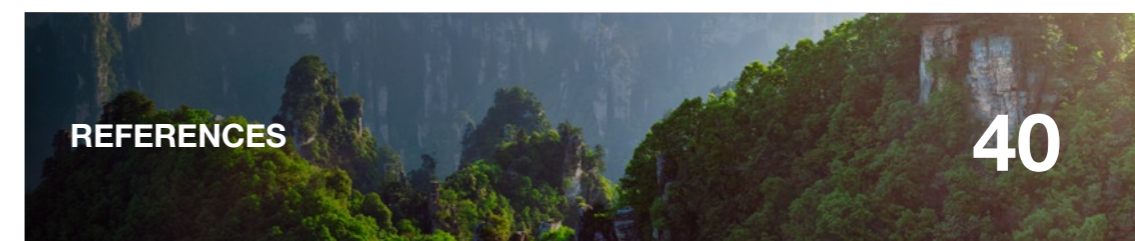
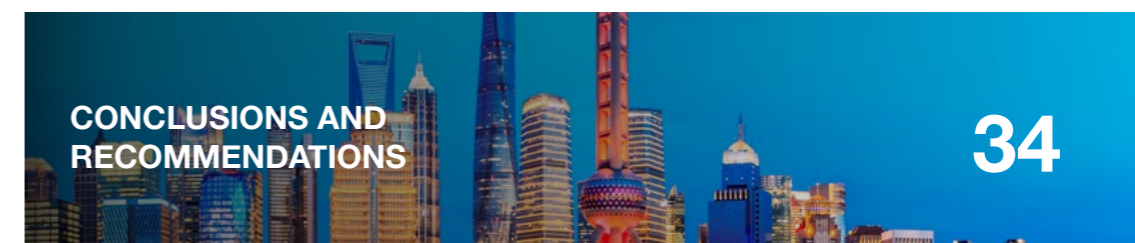
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INTRODUCTION

China is the world's leading emitter of greenhouse gases, responsible for 30% of CO2 emissions. Almost half of its emissions come from the electricity generation sector, followed by its industries (37.9%), transportation and logistics (9%), and those of the agricultural, construction, and residential sectors (6%). The country already suffers from several environmental problems, such as global warming, pollution, deforestation, etc. Its authorities are aware of the need to move towards a green and low-carbon development model, and have pledged to reach China's emissions peak before 2030, and achieve carbon neutrality before 2060. However, they seek a gradual transformation without strong impacts on the economy. Thus, in the balance between emissions reduction and economic growth, China's national Emissions Trading Scheme (ETS) operates, just as the eight pilot markets in different provinces that preceded it have done. But without turning back, the national ETS will continue to mature and become more sophisticated, serving as an instrument to face the challenges of climate change, and finance the transition to a green economy.

The advances that China makes in carbon markets are also important for its relations with the rest of the world, including Latin America and the Caribbean. With international negotiations, under Article 6 of the Paris Agreement, opportunities could be opened to voluntarily cooperate in the implementation of nationally determined contributions. Likewise, China now has a more ambitious foreign policy, and experts have called for the creation of a voluntary market along the One Belt One Road, an initiative to which 20 countries in the region have joined. However, neither the progress of these mechanisms nor the development of China's national ETS should condition cooperation with the region on

climate change, in general, nor carbon markets, in particular. Bearing in mind that the region holds many of the critical minerals that China needs for the development of its green industry, the trade pattern with the Asian country risks intensifying. This means that Latin America continues to sell raw materials, in exchange for products with increasing technological content. Given this, it is essential that the region use the room for maneuver provided by its abundant and diverse high-quality mineral resources to negotiate a greener agenda with China.

With this consideration, the following study evaluates China's interest and demand for the carbon market in Latin America and the Caribbean. The report consists of four sections. The first presents the current state of the national ETS and its design based on the experience of 8 pilot markets, which were born as a result of China's participation in the Clean Development Mechanism. The second section compares the participation of China and Latin America in the global voluntary market, specifically their registrations in the Verra's VCS Program. The third section shows the relations between Latin America and China, and how they would be mature enough to open new spaces for cooperation on more complex issues such as carbon markets. It is debated, however, that the cooperation should start with climate change so that, with a broader spectrum, influential Chinese entities can be added and address a topic (such as carbon markets) that is not so familiar to the relationship. Meanwhile, the fourth section evaluates different opportunities for collaboration and business between China and the region in carbon markets, which include the sale of credits in voluntary carbon markets, investment in carbon assets, and technology transfers. It ends with conclusions and recommendations.

SECTION 1

WHAT IS THE STATE OF THE CARBON MARKET IN CHINA?

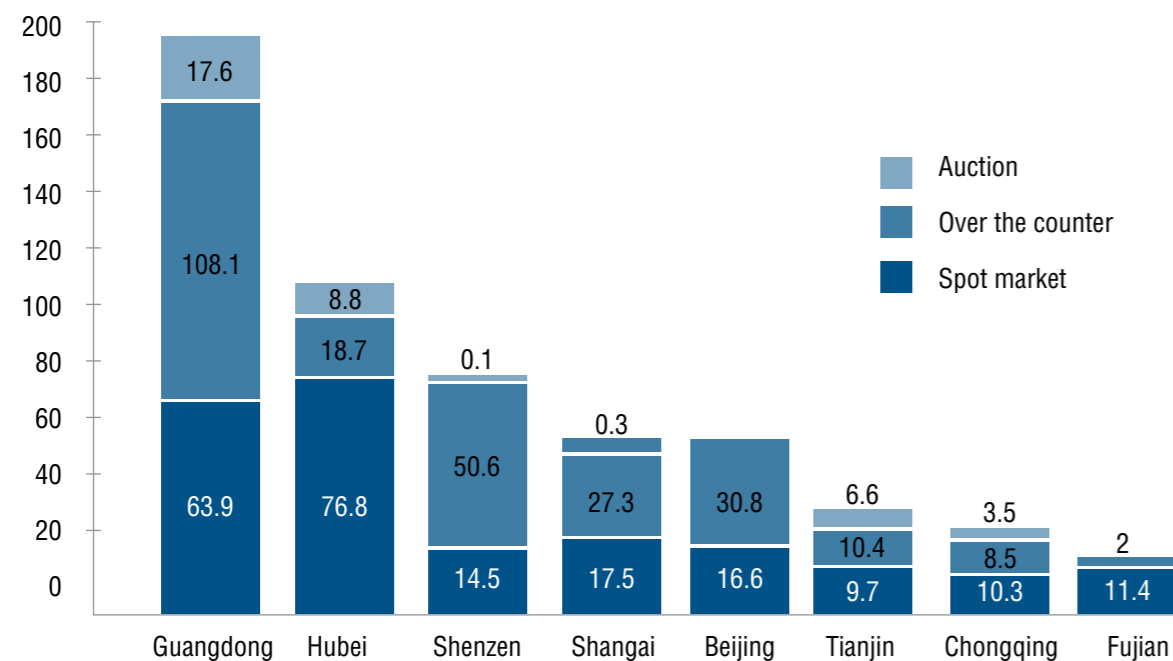
The national carbon market in China was established on July 16, 2021 with trading on the Shanghai Environmental and Energy Exchange. In its first cycle, it covered emissions of approximately 4.5 billion tons of CO₂-e per year, which represents 40% of the country's total emissions. Measured by volume of emissions, China's Emissions Trading Scheme (ETS) is the largest in the world. Although to date the Chinese ETS only covers the electricity generation sector, it is expected that by 2025 it will incorporate the other 7 most polluting industries in the country (petrochemicals, chemicals, construction materials, steel, non-ferrous metals, paper and aviation). By then, it will cover more than 8,000 companies with annual emissions of more than 8 billion tons of CO₂-e.

The goal of the Chinese ETS, like others around the world, is to reduce greenhouse gas (GHG) emissions and promote green and low-carbon development. In addition, carbon markets in China are also part of the industrial policy to advance the structural transformation of the economy. Thus, the first Provisional Measures for the Management of Carbon Emissions Trading, issued by the National Development and Reform Commission (NDRC) (People's Republic of China) in 2014, are framed with the purpose of accelerating the transformation of the development model economy, promoting innovation processes, and strengthening the control and management of emissions. Although in 2018 responsibility for climate change changed hands, from the NDRC to the Ministry of Ecology and Environment (MEE), and carbon markets were integrated into the ecological and environmental protection agenda, the ETS remains subject to economic and environmental considerations and industrial policy. For example, to determine and assign carbon emission quotas, the MEE must take into account factors

such as economic growth, industrial transformation, optimization of the energy structure, and control of air pollutant emissions (Administrative Measures, 2020). As will be seen in a moment, these considerations influence China's national ETS design and evolution.

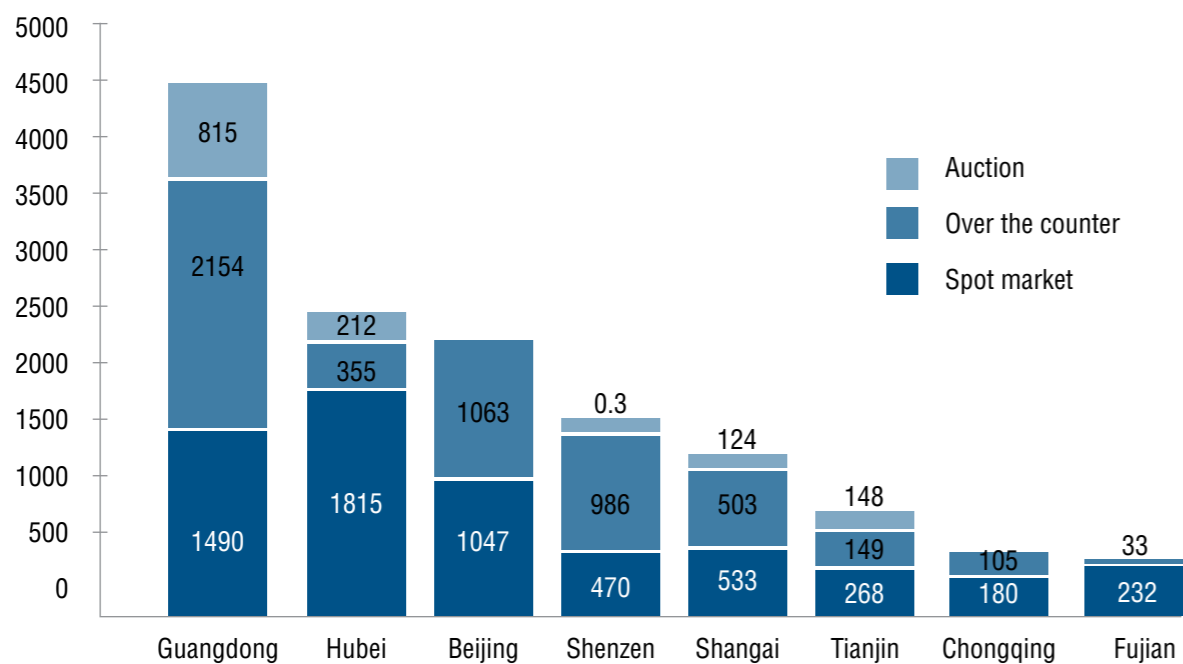
But first, the role that the 8 carbon market pilots (Beijing, Tianjin, Shanghai, Guangdong, Shenzhen, Hubei, Chongqing and Fujian) have had in the construction of the national ETS must be highlighted. These pilots were created between 2013-2014 to test and experiment with carbon trading schemes, as well as familiarize companies with carbon measurement processes. Each pilot reflects the GHG emissions of the area in which they are located, their endowment of resources, and their industrial and economic structure. Therefore, the coverage of each one varies; while before the national ETS all covered the electricity generation sectors, most now cover the chemical and steel industries. Additionally, Beijing and Shenzhen comprise the transportation sector, and Shanghai and Fujian incorporate the aviation sector. On the other hand, 3 pilots cover non-industrial sectors: Beijing for emissions from manufacturing, public institutions and universities, and Shanghai and Guangdong for the textile sector. Likewise, given the heterogeneity of the pilots' measurements, there are differences in their results. As can be seen in Image 1, the cumulative volume of emissions transactions at the end of 2021 is highest in the Guangdong pilot with 189.6 million tCO₂-e, followed by Hubei and Shenzhen, each with 104.3 million and 65.2 million tCO₂-e, respectively. By cumulative value, as Image 2 points out, Guangdong again leads the list with 4.5 billion yuan, followed by Hubei and Beijing with RMB 2.4 billion and RMB 2.1 billion, respectively. Transactions on the Chongqing and Tianjin pilots have been low.

Image 1: Accumulated volume of transactions in the pilot markets as of December 31, 2021 (million tons)



Source: 2021 China Carbon Pricing Survey (2022: 8)

Image 2: Accumulated value of transactions in the pilot markets as of December 31, 2021 (million RMB)



Source: 2021 China Carbon Pricing Survey (2022: 8)

On the other hand, if the effectiveness of these markets is evaluated, some discrepancies are found. But in general, the Beijing driver is the one who always stands out. In one of the studies, this market, along with Shanghai and Hubei, are the ones with the greatest reductions in CO₂ emissions since they began operating in 2014 (Yi et al., 2019). In Beijing, this effect is attributed to the increased coverage and strict monitoring, verification, and reporting (MRV) control of the pilot. To Hubei for the innovative allocation of carbon quotas, in which 8% of total allocations are reserved for market stabilization. While that of Shanghai is for the strong support of green financing that the city provides to companies participating in the market. In another study, the Beijing

pilot also stands out among the most efficient, and its high carbon price (which is the highest among the pilots) is highlighted as an incentive for companies to adopt effective reduction measures (Zhou et al., 2020). The MRV system is applauded as it requires companies to choose a new independent verification agency every 3 years to verify their carbon emissions, thus limiting repeat interactions with any one agency (Liu et al., 2022). At the same time, random and independent verifications are carried out on the third-party verification results. The Shanghai pilot is also no slouch in MRV, which not only includes accounting and reporting guidance for 9 industries, but also methodologies for accounting for emissions from each industry included.

CHINA NATIONAL ETS DESIGN

The experience of the 8 pilot markets has informed the design of the Shanghai-based national ETS, which governs the market as follows:

Governance Structure: it has 3 levels headed by the MEE, which is the competent authority for the establishment of rules, management, and supervision of the national ETS. Cooperates with other regulators to oversee the business activities of the ETS. The MEE eco-environmental bureaus in the provinces are in charge of the implementation of the MEE directives, such as the allocation and payment of carbon emission quotas, and the verification of GHG emission reports. While the eco-environmental departments at the city level assume some local management functions (ICAP, 2021).

System coverage: as previously mentioned, the national ETS currently covers only the electricity generation sector, and it is expected that other industries will be incorporated in the following years. The coverage threshold is 26,000 tons of CO₂ per year per company, including indirect emissions. In this way, 2,245 entities are covered..

Assignment of emission rights: Pursuant to the MEE Allocation Plan, its counterparts in the provinces allocate annual carbon emission quotas within their administrative regions. The determination of this fee is done from the bottom up; that is, the eco-environmental bureaus at the province level approve the number of quotas for each issuer, and the sum of each one in their administrative region becomes the total amount for their province. Then the quota of each province is added to finally determine the

national quota. Thus, the national ETS does not have a limit or “cap”, but adopts a system that regulates the intensity of emissions according to the economic activity of each issuer. Thus, the initial allocations are calculated according to the CO₂ emission rates of different technologies. The benchmark for the electric power sector is divided into 4 categories: conventional coal plants under 300 megawatts (MW); conventional coal plants over 300 MW; unconventional coal; and natural gas. The allocation is free, but a gradual transition to an auction system is planned in the future, although no specific date has been set to do so.

Registration and exchange: Two administrative agencies were established. One is the National Agency for the Registration of Carbon Emission Rights, which is in charge of registering values, modifications, payments and withdrawals of emission rights. It also provides settlement services. The second is the National Carbon Emissions Trading Agency, which oversees the trading of emission allowances between market participants. Both agencies report regularly to the MEE.

MRV: applies the “double luck and one public” approach, which means that companies and verifiers of emission reports are chosen at random, and the verification results are made public. More than 400 emission report verifiers are approved to provide their services to companies that are part of the national ETS.

Compliance: To date, the national ETS is governed by the Provisional Measures (People’s Republic of China, 2014), which stipulate a fine of RMB 10,000 to 30,000 for falsely declaring or concealing the emission result. Another fine of between RMB 20,000 to 30,000

if the issuance fees are not released in full and on time. The penalties are not high compared to the profits made by the covered companies (Karplus, 2021). Notwithstanding the entry into operation of the Provisional Regulation for the Management of Carbon Emission Allowance Trading (MEE, 2021), the fines would increase to RMB 50,000-200,000 for concealing

or falsely declaring emissions, and to RMB 100,000-500,000 for not releasing emissions allowances on time.

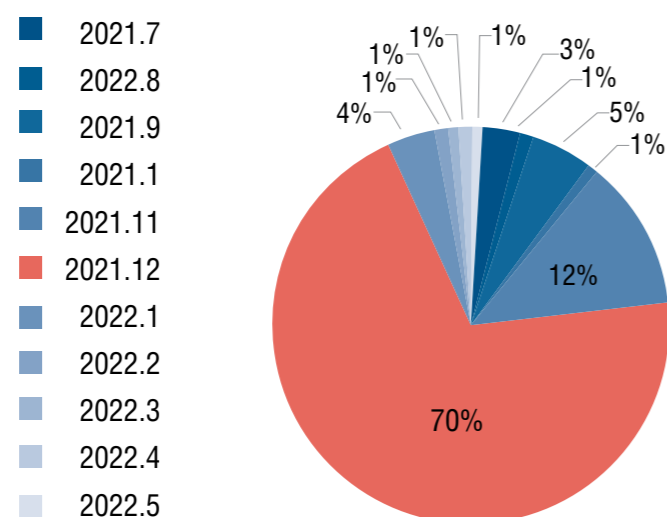
Compensations: It allows offsetting 5% of verified emissions through China Certified Emission Reductions (CCERs).

EVALUATION OF INITIAL RESULTS

The first compliance cycle ended in December 2021 with 99.5% compliance. The price of China Emissions Allowances (CEAs) has fluctuated between RMB 58-60 (8-9 Euros), which represents a 20% increase since the national ETS went live (Tan, 2022). However, this price is much lower than the price managed by the ETS of the European Union, which is around 80 euros/tCO₂. The discrepancy points to the challenges the national ETS faces in discovering effective carbon pricing, and is reflected in the fact that most transactions occur late in the compliance cycle. As can be seen in Image 3, 70% of the total traded in the first 11 months of operation of the national ETS was carried out in December 2021. This behavior could be explained

by the trade of a single product (CEA) and the way in which quotas are determined, which gives local authorities broad decision-making power, and leads to an oversupply of allocations in the market (Hao and Xue, 2022). But another factor that could influence this was the adjustment of allocations that took place between October and November of that year, when the number of allocations for each covered company was formally confirmed. Therefore, companies only had two months to complete their compliance processes and complete transactions (ICAP, 2022). In any case, these adjustments reduce regulatory pressure and produce low carbon prices and transactions that are distinguished by their infrequent occurrence (Cui et al., 2021).

Image 3: Percentage of CEA monthly transaction volume (tons)



Source: Hao y Xue (2022: 5)

Likewise, commercial activity in the national ETS was lower than that in the pilot markets. The accumulated commercial volume of emission rights in the national ETS was 179 million t/CO₂-e. Considering that for the two-year compliance cycle, 9 billion emission allowances were issued, turnover in the national ETS was 2%, lower than the average turnover of pilots of 5% (ICAP, 2022).

While these conditions would be detrimental to the achievement of China's emissions reduction targets, studies show that despite low carbon prices and infrequent trade in pilot markets, companies still manage to reduce by 16.7 % the total of their emissions and 9.7% the emission intensity (Cui et al., 2021). On the other hand, given economic growth considerations, low carbon prices are tolerated so as not to harm consumption and economic development. In the initial stage of the national ETS, participating companies are expected to learn how to navigate

emissions trading and set long-term emission reduction targets (Liu et al., 2022). Therefore, these results could be indicating a carbon market that is beginning to function but, as it is still at an early stage, requires time to mature (ICAP, 2022).

In any case, there is a consensus among Chinese experts in the field that a system that regulates the intensity of emissions should eventually move to one that imposes a global quantitative limit ("cap") on them. They recommend that China introduce auctioned allocations, more carbon finance products, and allow different players to participate in the market in the future. At the same time, they propose that the quality of data and MRV should be improved (ICAP, 2022; Tan, 2022), and the fines for non-compliance should be raised, since now the purchase of additional allocations or the exploration of emission reduction technologies are more expensive than the penalty (Hao and Xue, 2022).

COMPENSATION IN THE NATIONAL ETS

The carbon markets in China arise as a result of its participation in the Clean Development Mechanism (CDM), a procedure created under Article twelve of the Kyoto Protocol, that allows projects to mitigate greenhouse gas emissions to be financed by developed countries within developing countries, in exchange for applicable Certified Emission Reductions (CERs) to meet their reduction commitments. In fact, China was one of the most active countries in the CDM and at the time, it became the largest exporter of CER in the world, mainly from hydroelectric and wind projects. In addition, the implementation of the CDM, through the entry into force of the Measures for the Operation and Management of CDM Projects formulated by NDRC (People's Republic of China, 2005), was refined to support the national sustainable development strategy and encourage, especially, energy efficiency and renewable energy. To that end, it was required that at least 51% of CDM projects be owned by Chinese hands. In this way, and supported by other public policies, such as the local content requirement of up to 70% for wind farms, the CDM projects ended up helping China achieve its national goal of building its own industrial windmill for manufacturing turbines (Marconi and Sanna-Randaccio, 2012).

Another important point of the CDM Measures (2005) was the establishment of tariffs for CDM projects. The highest of 65% was applied to Hydrofluorocarbon (HFC) projects, to prevent industries from producing more of this GHG and benefiting from credits by destroying it. Followed by 30% for nitrous oxide (N₂O) projects related to the production of adipic acid, and the lowest

of 2% for other projects, including renewables. The collection of these income taxes from CER transfers went to the China Clean Development Mechanism Fund (CCDMF), whose purpose is to support national efforts to combat climate change and promote sustainable economic and social development. To this collection were added donations from international and national organizations, tax allocations, and income from the fund.

CCDMF revenues are directed to investment projects that support industrial activities that mitigate climate change. Tools such as concessional financing and the creation of specialized investment funds are used to mobilize additional resources and expand the funds available for projects. It also provides financial guarantees and capital investments. In 2011, it used the latter figure to invest RMB 50 million and become one of the main shareholders of the Shanghai Environment and Energy Exchange, which today houses the National ETS (China CDM Fund, 2016). Along with the investment returns, the CCDMF provides non-reimbursable funds to the ministries and their affiliated institutions for technical studies, research, and climate change campaigns. Thanks to these technical resources, studies were conducted and capacities were strengthened to facilitate the development of the domestic carbon market, including pilot schemes (Irawan et al., 2012).

The deterioration in CER prices since 2010 and the uncertainty of transfers led to the creation of China Certified Emission Reductions (CCERs), whose methodologies were largely adopted or modified from the CDM (Lo and Cong, 2017). CCERs are among the

eligible emission units of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSlA). With the launch of the national registry for Voluntary Carbon Emissions Reductions in January 2015, the Voluntary GHG Emissions Reduction Program was inaugurated in China, and thus CCERs began to be used in local carbon markets. By 2020, 2,856 CCER projects and 1,047 registered projects were validated, whose emission reduction is estimated at 139.57 million tCO₂-e per year. 81% of the registered projects correspond to wind energy, photovoltaic energy, hydroelectricity, and biogas use in rural households (EDF and SinoCarbon, 2020).

However, in March 2017, the NDRC announced the suspension of CCER due to the low volume of transactions and the lack of standardization in carbon audits. According to the communication, the NDRC would review the measures with which the CCERs came into operation, to improve and standardize the Voluntary Reduction Program. After the institutional restructuring of 2018, the MEE was in charge of the review and eventual implementation of the new measures. In this paper, the MEE notified in October 2021 that companies in the National ETS could offset up to 5% of their verified emissions with CCER, and released the remaining stock of CCER from the national registry. By the end of that year, almost all the existing supply of CCER had been depleted, and its decline is putting pressure to accelerate the relaunch of these credits (Trove Research, 2023).

In that direction, on February 8, 2023, the China Beijing Green Exchange (CBGEX) reported that the registration and trade systems for the relaunch of CCER have been completed, and after inspection, operations can be resumed. Thus, the CBGEX becomes the new national

platform for the management of CCER. From now on, we will have to follow the next steps of this green bag. In addition to any regulations, the government makes to allow foreign-generated carbon credits to participate in domestic trading systems, and credit them toward China's emissions reduction target. This possibility shall also be influenced by the evolution of credit trade under Article 6 of the Paris Agreement. But considering that its implementation is not yet ready, it is unlikely, according to analysts, that China will open its carbon market to international credits in 2023 (Ivy, 2023).

To close this section, it is worth remembering that the progress of the carbon market in China is subject to the balance that the authorities make between the reduction of emissions with economic growth (Liu et al., 2022). Apparently, this year, after the negative impact of the restrictions of the "zero COVID" policy on the labor market and business activity, the economic recovery will top the list of government priorities. Consequently, the MEE changed its priorities for 2023; the promotion of green and low-carbon development gave up its first place (maintained in 2021 and 2022) to the promotion of regional strategies for the protection of the environment (MEE, 2023). Likewise, the MEE changed the focus to promote a green and low-carbon development, concentrating on the support of investment projects and infrastructure that respects the environment. In 2022, their attention had been had been on restricting projects with high energy consumption and emissions (Trivium, 2023). Despite this order of priorities, China's climate change agenda will remain in place, as shown by the new "1+N" framework for peaking emissions and carbon neutrality presented by China at COP15 in Kunming, from which it derives its Action Plan for the Peak of Carbon Dioxide before 2030, and which will be seen later.



SECTION 2

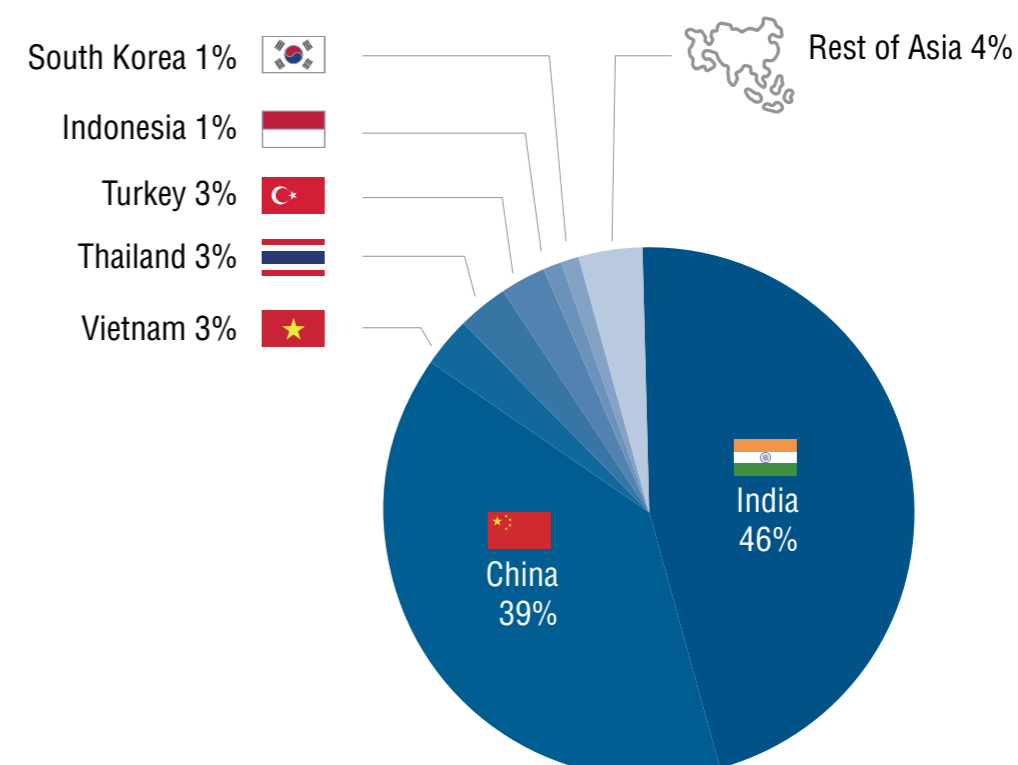
HOW IS THE VOLUNTARY MARKET DEVELOPING IN CHINA?

For experts in the sector in China, the size of the market for compensation in the national ETS opaque and conditions the development of the voluntary market in the country. Bearing in mind that to date the compliance market covers 4.5 billion tCO₂-e per year from the electricity generation sector, and that when the CCER system fully resumes, these credits can be used to offset up to 5% of verified emissions from each plant, we would be talking about a market for offsets of 225 million tCO₂-e per year. Once the national ETS begins to cover all sectors (7 additional) and their 8-9 billion tCO₂-e per year of emissions, the market for CCER would go to more than 400 million tCO₂-e per year. To put these figures in perspective, the 474 projects that China has registered with the Verra's VCS Program have annual emission reductions of approximately 78.5 million tCO₂-e.

Although, in the future for China, the global voluntary market would not have the same attractiveness as the CCERs in the national ETS, at present it continues to be a relevant player on the international scene. According to

figures from Trove Research (2023) since the suspension of CCERs in 2017, 10% of the total supply of credits globally has come from projects in China. For Latin America, a study found that between 2020 and 2021, projects from the region contributed slightly less than 20% of voluntary credits in the world market (Sullivan et al., 2021). In order to make comparisons between Latin America and China, their participation in Verra's VCS Program, which is the most widely used voluntary emission reduction standard in the world, is analyzed. At the end of 2021, the program had registered 1,775 projects with more than 835 million credit issues and more than 439 million withdrawals. By region, Asia has 69% of the projects, followed by South America and Central America with 14%, Africa with 7%, North America 6%, Europe 3% and Oceania with less than 1% (Verra, 2021). Paying attention to Asia, it is found, as shown in Image 4, which India and China host 85% of the projects registered in that region, with a participation of 46% and 39% respectively. Although India records more projects, those in China remove more emissions per year (see Exhibit A).

Image 4: Distribution by country of projects registered by Asia in the VCS Program (%)



Source: from the author based on Verra's record

As for China specifically, as Table 2 shows, the majority of projects (56%) are in renewable energy, followed by agriculture, forestry, and other land uses (17%), and waste management and waste disposal (10%). Going into detail in the second category, agriculture, forestry, and other land uses (AFOLU), 46% are from agricultural land management (ALM), 33% from afforestation, reforestation, and revegetation (ARR), and 13% improved forest management (IFM) (Annex B). As Image 5 indicates, in 2020, the projects registered by China reached a historical maximum (193), and despite their decrease

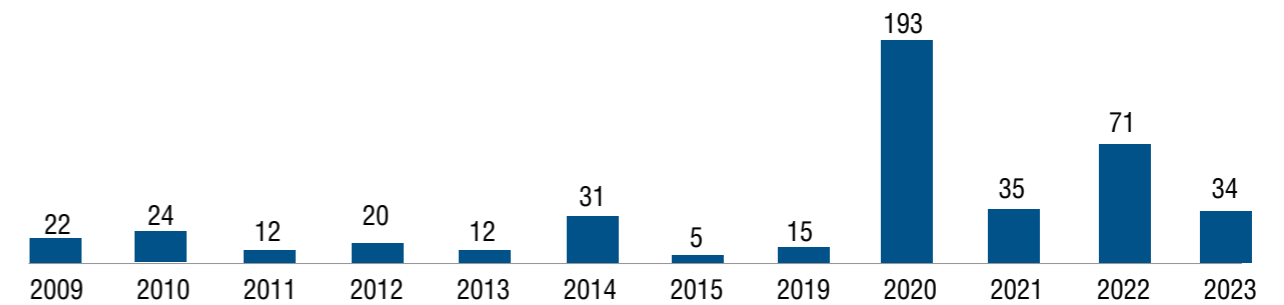
in the following years, the registration of new projects between 2021-2023 was almost the same as that of the decade from 2009 to 2019. In just the first months of 2023, China has already registered 34 projects. The growing activity of China in VCS in the last 4 years can be explained by the opportunity that market players see in the face of the growing global demand for credits, influenced by the carbon neutrality commitments of the business sector, and the inability to generate credits for the domestic market due to the suspension of the CCER system.

Table 2: Categories of projects registered by China in the VCS Program

Category	Total projects by category
Agriculture, Forestry and Other Land Use (AFLOU)	82
AFLOU; Energy industry (renewable/non-renewable sources); Waste management and disposal	1
Chemical industry	1
Chemical industry; Energy industry (renewable/non-renewable sources);	2
Power demand; Energy industry (renewable/non-renewable sources)	1
Energy Distribution	1
Energy industry (renewable/non-renewable sources)	282
Energy industry (renewable/non-renewable sources); Livestock, enteric fermentation and manure management; Waste management and disposal	11
Energy industry (renewable/non-renewable sources); Manufacturing industries	10
Energy industry (renewable/non-renewable sources); Mining/mineral production	7
Energy industry (renewable/non-renewable sources); Waste management and disposal	46
Fugitive emissions from fuels (solids, oil and gas)	1
Fugitive emissions from fuels (solids, oil and gas); Mining/mineral production	5
Livestock, enteric fermentation and manure management; Waste management and disposal	8
Mining/mineral production	1
Waste management and disposal	15
Gran Total	474

Source: from the author based on Verra's record

Image 5: Registration by year of Chinese projects in the VCS Program



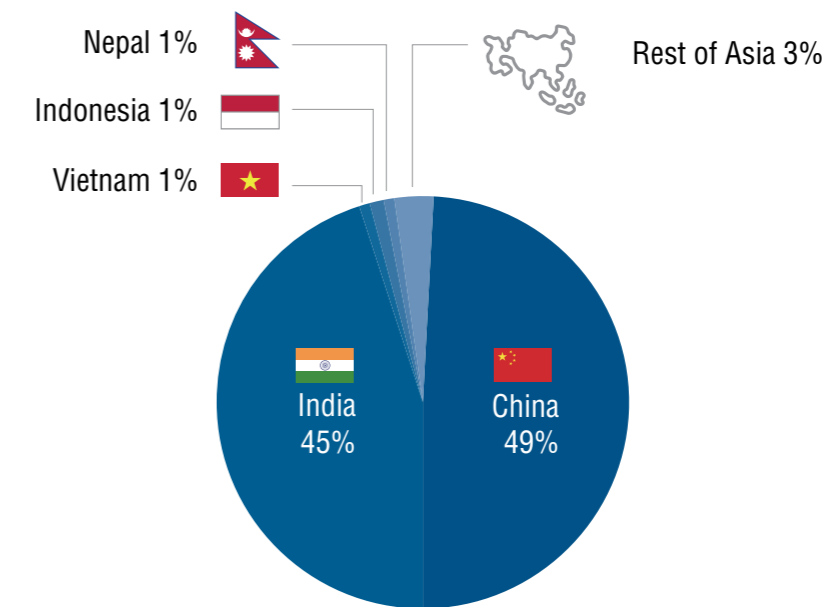
Source: from the author based on Verra's record

In Latin America, the projects registered with the VCS Program also reached a historical record (175) in 2020, and although the registrations have not had the same dynamism as in China, the region with around half of the projects generates 72% equivalent of emission reductions achieved by Chinese projects per year. By projects, 42% correspond to agriculture, forestry, and other land uses, and 44% to renewable energy. In the first category, 55% belong to REDD and 46% to ARR (see Annex C).

Verra Registration and Issuance Process consists of the projects classified as "in development" and "under validation" in its registry. The former is understood as those projects that are in an early stage of development, and the latter as projects that are ready to begin the validation process (Verra, 2022). As Image 6 shows, China and India again account for the majority of projects in Asia, with 49% and 45% respectively. For China, 80% of the 258 projects in the pipeline are focused on activities related to AFOLU, and of these, 84% correspond to agricultural land management, 10% to afforestation, reforestation and revegetation, and 5% to improved forest management (see Image 7). Methane reduction projects through irrigation management strategies in rice crops are the ones that predominate in the first category (ALM).

Considering that large-scale renewable energy projects are no longer accepted on the Verra and Gold Standard records, the pipeline of projects under the VCS Program is studied to identify trends in the global voluntary market in both China and Latin America. The pipeline under the

Image 6: Distribution by country of Asian projects in the VCS pipeline (%)

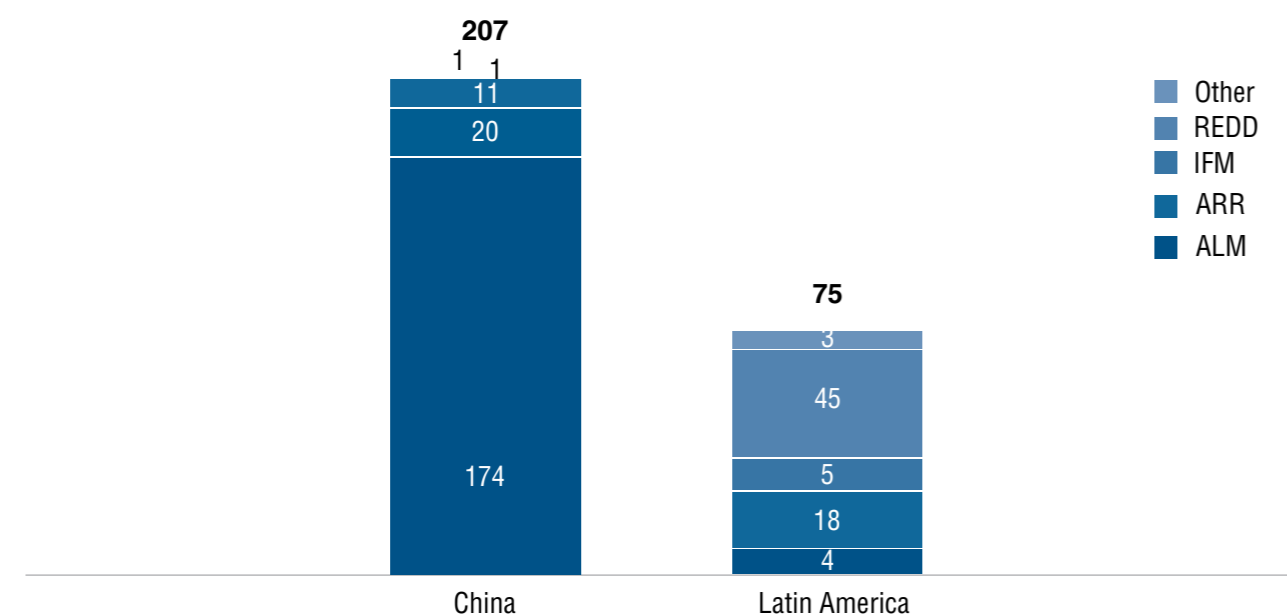


Source: from the author based on Verra's record

Once again, in Latin America, the offer of nature-based solutions means that with fewer projects (90) its pipeline reduces more than 30% of emissions compared to all the projects considered in China. 83% of the pipeline

projects also come from AFOLU, but unlike the Asian country, as can be seen from Image 7, the majority are REDD followed by natural environment restoration projects.

Image 7: Comparison of AFOLU project types in Latin America and China



Source: from the author based on Verra's record

What are the implications of these comparisons for the participation of Latin America and China in the global voluntary market? First, China at this time would not be a competitor in the market since it does not have the same supply of carbon credits as the region. In China, the supply is greater than the demand for projects without NBS, and it is difficult for them to find buyers for this type of credit (personal communication, 2023). On the contrary, the appetite for loans with NBS and those in which the region specializes continues to grow. For this reason, the prices of credits in the region have a Premium compared to the global market; USD 9.1/tCO₂-e vs USD 8.8/tCO₂-e (Trove Research, 2023). According to calculations by the same company specializing in climate change data and advice, the average price in 2022 of South American credits from natural environment restoration projects is USD 12.7/tCO₂-e and for REDD+ USD 12.5/tCO₂-e. China's conservation credits are paid above USD 10/tCO₂-e when they are also under the Climate, Community and Biodiversity (VCS+CCB) standard (personal communication, 2023). However, these are not the projects that currently stand out in the loan portfolio of the Asian country.

Second, the presence of Latin America and China in the global market could be affected by both internal and

external factors. On China's part, and depending on how eligibility for registration of new CCERs is established, incentives for participation in international standards could be reduced. One of the reasons would be the difference in prices between the domestic and global markets, since, for example, CCER's prices are expected to be higher than VCS's and be between RMB 40-50, following the path of the CEA price, which, as seen in the first section, is between RMB 58-60. At the same time, according to Chinese carbon market experts, the government is concerned about the leakage of offsets into the global market because they could be seen as the efforts of its international buyers rather than China itself. Therefore, it could take measures so that the offsets are oriented more towards the internal market. Meanwhile, for Latin America, one of the challenges that would affect the supply of its credits in the voluntary market would be the quality and monitoring processes of its projects. Especially after the investigation carried out by the British newspaper *The Guardian*, the German weekly magazine *Die Zeit* and the NGO SourceMaterial, in which it is argued that 94% of the carbon credits of the Verra REDD projects do not really have an impact on the climate, and that the reference scenarios of forest loss of the projects studied are overestimated by 400% (Greenfield, 2023). Therefore,



in order to avoid credit credibility problems in the region, it would be essential to strengthen emission reduction projections, monitoring systems, and project co-benefits.

Finally, one of the uncertainties that arises is whether China could achieve its carbon neutrality goals on its own, especially if the offsets generated in the country would be sufficient to cover the demand of its compliance market. On the one hand, the provision of existing CCERs is very low at the moment. On the other hand, the degree of eligibility that renewable energy projects will have to meet to participate in the new compensation scheme is not yet known. If all new renewable projects are included, with reductions of at least 100 million tCO₂-e per year, the supply of offsets would be significant (see calculation in Annex D). Otherwise, if the methodologies only apply to small-scale or experimental renewable energy projects, the offer of offsets would decrease. For now, methodologies for NBS are expected to be one of the most important axes of the new CCER system, and the Chinese government has already announced that methane use and forestry will be key sectors (Trove Research, 2023). The inclusion of forest carbon sinks is also expected, perhaps given the anticipation at the end of last year when Sichuan province announced plans

to develop 30 carbon sink projects that by 2025 will cover 640 thousand hectares of forest (Wang, 2022). As could be seen from the Latin American projects in the VCS Program, nature-based projects tend to achieve greater emission reductions, so if China turns more towards NBS, its offer of offsets will also be affected.

In addition to the offer, another factor that shall determine whether China goes to the global market for compensation shall be the will and interest of its government, and if it does so through a scheme to validate credits originating in other countries with the CCER system, or if it would accept credits under international standards. Its vision shall also influence the decision-making of Chinese companies and institutions when buying credits generated outside the country. Likewise, Chinese specialists have suggested the possibility of creating a carbon market in the One Belt One Road (BRI), an initiative to which 20 Latin American and Caribbean countries have joined. As can be seen from the Green Investment Principles (GIP) of the same initiative, there is growing interest in promoting a green footprint in BRI interactions. Given the possibilities, it is important that cooperation on climate change, in general, and carbon markets, in particular, begin to be discussed and put on the table with China.

SECTION 3

HOW COULD CHINA'S INTEREST IN THE LATIN AMERICAN AND CARIBBEAN CARBON MARKET BE AROUSED?

As relations between Latin America and the Caribbean strengthen, new spaces for collaboration are opening up that, as in the area of climate change, could contribute to more balanced and sustainable interactions. The dynamism of the relationship has been propelled by the rapid growth of trade, which between 2000 and 2020 multiplied 26 times from USD 12 billion to USD 310 billion (UN Comtrade, 2022). Despite the pandemic, trade in 2021 reached an all-time high of USD 450 billion. By 2022, China is the second trading partner of the region but the first for South America.

On the other hand, diversification processes are observed in the relationship. First, foreign direct investment (OFDI) from China has expanded to a greater number of countries in the region and to other sectors. For example, natural resources in the region no longer account for most of China's OFDI; between 2005-2009, it received 95% of the total, but between 2015-2021, it fell to 46% (Dussel, 2022). Meanwhile, Chinese OFDI in the Latin American energy sector is now dedicated to renewable energy generation. Second, there is a tendency to increase Chinese infrastructure projects in different countries in the region, in other sectors (such as renewable energy and transport), and from private companies (Dussel, 2022). Finally, today's relationship between China and the region is much deeper and more diverse, which could lead to more sophisticated interactions.

Given this evolution of the relationship between Latin America and China, the conditions could be favorable to develop cooperation in areas such as climate change in general, and carbon markets, in particular. Therefore, the Latin American and Caribbean Initiative for the Development of the Carbon Market (ILACC) could converge around the interest that both parties have in making their cooperation more inclusive and balanced. The latest China-CELAC Joint Action Plan for Cooperation in Key Areas (2022-2024) mentions, under the sustainable development section, cooperation and the exchange of policies to deal with climate change. Similarly, the organization of policy exchanges and training in environmental management, conservation, and sustainable use of biodiversity stands out. It also points out cooperation in the protection, conservation, and restoration of the marine ecosystem. Without having to be directly anchored to this Plan and China's dialogue with CELAC, ILACC can rely on these guidelines to frame cooperation in carbon markets.

In addition, China is increasingly active in promoting its vision for international development cooperation, as shown by the Global Development Initiative (GDI), which was launched by China in 2021 during the 76th session of the UN General Assembly. GDI prioritizes development, its inclusiveness, and harmony with the environment, and emphasizes international cooperation to implement the 2030 Agenda. The GDI seeks to become an international common good and a platform for cooperation in areas that it considers fundamental, such as the promotion of green and low-carbon development (Global Development Report, 2022). As such, ILACC could also find sustenance and support in the efforts of the GDI. For example, the exchange of knowledge and practices of nature-based solutions (NBS) could be a turning point, since it is not only relevant for the competitive advantage that the region holds due to its rich green capital, but it is also a subject, as seen in Section 2, to which China begins to give more attention. The NBS concept began to be used in China in 2019, when the MEE and the Ministry of Natural Resources included it in their documents. However, there is not yet a broad understanding of the concept, quantitative research and policy incentives for the use of NBS are lacking (Zeng et al., 2021).

NBS sharing could then become a common interest, laying the foundation for cooperation with China on carbon markets. Especially considering that the NBS are considered essential for achieving the goals that China has set to reach the peak of its emissions before 2030, and achieve carbon neutrality before 2060. One of the tasks proposed by the Action Plan for the Carbon Dioxide Peak before 2030, issued by the State Council of China (2021), is the consolidation and strengthening of carbon sinks. Among the ambitions are expanding forests to cover around 25% of China's territory and increasing the forest stock to 19 billion cubic meters by 2030. It also proposes the establishment of rules so that carbon sequestration projects can be included in the national ETS (Plan of Action, 2021).

On the other hand, China's transition to a low-carbon economy that is resilient to climate change could affect trade with Latin America. In the first place, it can alter the products demanded by the Asian country, for example, inputs for electrification, electric mobility and digitization; such as lithium and nickel for rechargeable batteries. In the future, hydrogen could even be added. The Action Plan already stipulates that the commercial



structure shall be optimized, and the import and export of energy saving and environmental protection products and services shall be promoted (2021). Latin America, with its abundant and diverse high-quality mineral resources, could benefit from the green transition in China, as long as it supports its decarbonization processes. Second, in the field of investments and projects, the participation of Chinese companies in the renewable energy sector in the region could continue to increase, as could their participation in the extraction of minerals for China's green industry. In this sense, Latin American countries could be more proactive and encourage technological alliances that allow them, based on their minerals, to create new industries, better jobs, and more favorable conditions to move towards greener and more sustainable economies. Given that the region's trade pattern with China could intensify, i.e., continue the sale of raw materials in exchange for products with increasing technological content, it is essential that Latin America establish its strategic priorities with the Asian country without further delay.

Only Latin America and its organizations can define and present those priorities. Especially now, as China worries about future access to critical minerals for its green industry. It fears that it will be left at a disadvantage in the face of competition from the United States and the European Union, which could offer the region more sustainable agendas for the extraction of these minerals (Personal Communication, 2023).

Chinese companies are also concerned about growing resistance from popular and left-wing governments in Latin America to intensive resource extraction. Faced with these trends, the European Union, for example, understands that its competitive advantage would be precisely to offer cooperation and technology transfers that contribute, through increased productivity and industrial transformation, to achieving an inclusive green transition in the region. In a report commissioned by the International Trade Commission of the European Parliament (INTA), it is proposed, that unlike Chinese mining projects in the region, the European Union should offer technological alliances, which are accompanied by a strong human rights component and in the sustainable and environmental extraction of minerals. In this way, it is concluded that the EU could ensure access to the minerals necessary for its green transition (Raza and Grohs, 2023). Therefore, China's interest in maintaining a good relationship with Latin America and accessing its high-quality minerals would give the region enough room to maneuver to negotiate a greener agenda.

In this sense, when discussing trade in minerals with China, cooperation in carbon markets should be articulated at the same time. For this, it shall be key to identify the correct counterparts with whom this cooperation could be developed. However, it has its challenges since it is not a very familiar topic in the relationship. On the one hand, the Chinese companies and entities that have a relationship with Latin America

do not have much experience in these issues (Personal Communication, 2023), and on the other hand, those that manage the portfolio of carbon markets, such as the MEE, still do not have great relationship and knowledge of the region. Thus, it would be more feasible to start dialogues on more general issues, such as climate change, that allow for the creation of a common base to cover more specific areas, such as carbon markets.

It would also be key to involve entities such as the NDRC, which not only have the global perspective on China's relations, but also have capacity and influence at the highest level. However, one of the challenges is to find the appropriate way for an ILACC agenda with China to be complemented with the issues that the Commission takes and passes through. Therefore, it is also important to first cover broader issues such as climate change and green development, and within that theme, include carbon markets and NBS. Likewise, in this articulation, the Ministry of Finance should be included from the beginning or at some opportune moment, which, in recent years has had a greater say in China's international affairs, and with its support, resources could be allocated for cooperation.

It could then start with the organization of a seminar or conference on climate change and green development to bring relevant stakeholders to the table, and generate commitment to move towards a joint agenda. For this, there would be two options: The first is to include the

topic in the China-Latin America High-Level Investment and Cooperation Forum, which CAF established with the Chinese Ministry of Finance in 2017, and which was reflected in the latest China-CELAC Action Plan. The second option, which could perhaps focus more on ILACC, could be to carry out this type of activity with the Asian Infrastructure Investment Bank (AIIB), which, through triangular cooperation, could facilitate exchanges and understanding between the region and China.

In addition to the "goodwill" or good faith that these dialogues would generate for cooperation in carbon markets, it would also be important to have commercial intelligence, such as reports and notes, on the opportunities of the voluntary market in Latin America. This intelligence, for example, could highlight the business opportunities that exist in the region for new information technologies, drones, and satellite services for project monitoring and thus attract new companies not only from China but also from other countries in the Pacific Asia region.

At the same time, you can find physical spaces for the dissemination of information, such as seminars, summits and exhibitions that are organized for Latin America and China, or by themes related to climate change. This agenda could be anchored to Component 3 - Knowledge Management of the ILACC agenda, especially the indicator of the number of international conferences for the positioning of the regional offer in the international market.

SECTION 4

HOW COULD CHINESE INSTITUTIONS PARTICIPATE IN THE LATIN AMERICAN AND CARIBBEAN CARBON MARKET?

Political dialogue is essential to establish the frameworks and principles of cooperation with China in carbon markets. In climate change policy, China is still perceived as a developing country, and continues to emphasize in international negotiations, such as the United Nations Conferences on Climate Change, the principles of equity, common responsibilities, but differentiated according to respective capacities. Therefore, the dialogue must be built in a subtle and delicate way, without assigning responsibilities, and rather towards one more wing of South-South cooperation with Latin America. It is also important that China understand that it must have a greener agenda with the region, which will help it to be more in

tune with the growing interest of the governments of the region to move towards sustainable economic models, with stronger environmental bases. Thus, creating for itself a competitive field of action to access the critical minerals that the region has for the development of green technologies.

Bearing this approach in mind, there would be 3 main areas for the development of business opportunities between Latin America and China in carbon markets. The first is the sale of carbon credits generated in the region, China's second green investment in carbon assets in Latin America, and the third is technology transfers for monitoring nature-based projects. Each opportunity is detailed below.

SALE OF CARBON CREDITS GENERATED IN LATIN AMERICA

Sale of loans to Chinese companies in the region

The fragmentation of carbon markets, according to Chinese specialists, would make it more difficult for actors in China to purchase carbon credits generated in Latin America, without any relationship with the region (Personal Communication, 2023). According to this argument, most Chinese entities would not be motivated by this purchase because it would not bring them greater benefits, for example, they would not be able to credit these credits for their emission reductions at home. However, Chinese companies with operations in the region might be interested in giving visibility to their corporate social responsibility (CSR) agendas in these countries. To date, no Chinese companies are known to buy credits in the region, since most are unfamiliar with the issue, and do not have much understanding of the actions they could take. But there is a case of the Chinese wind company Envision, which is issuing international renewable energy certificates (I-RECs), from its projects in Mexico and with plans to do the same in Argentina and Chile (Envision, Personal Communication, 2022).

To promote this type of activity, as well as the purchase of carbon credits originating in Latin America, it is necessary for Chinese companies to have more environmental awareness. For the region, it would be important to motivate this turn since, in this way, it would be indicating that it expects greater impacts from its interaction with

China. The ILACC platform could facilitate activities to promote this awareness, and it could do so hand in hand with Chinese partners to increase the call's effectiveness. The format could be a cycle of workshops organized in one or more Latin American countries, explaining how carbon markets work and the virtues of credits as a tool to help companies meet their sustainability and emissions reduction goals. The goal would be for Chinese companies in the region to understand that purchasing carbon credits would support and strengthen their CSR activities.

As for the partner for the organization of these workshops, it could be the Bank of China (BOC), which has offices in Mexico, Panama, Peru, Chile, Argentina, and Brazil. Unlike the state banks, China Exim Bank and China Development Bank (CDB), which have stopped lending to the region in the last two years, BOC continued to lend not only to Chinese companies but also to local clients. The Chinese bank also has a broad portfolio of green finance, and, in 2022, was named by Global Finance as a global winner of "Leadership in Environmental, Social and Governance (ESG) Lending" (BOC Press Release, 2022). In China, the bank, in collaboration with Shanghai United Assets and the Shanghai Environmental and Energy Exchange, launched a new service to make use of emission rights as financial collateral. It has also provided loans to support national forest reserve

development and ecological security (BOC CSR, 2021). While in Latin America, BOC has financed renewable energy projects, and recently in Argentina, it made a loan for the development and expansion of lithium production. At the same time, a syndicated loan for one billion dollars was coordinated for a Peruvian company in the mining sector, whose rate was linked to the

performance of ESG indicators. Therefore, BOC would be one of the most relevant allies for the organization of activities that make Chinese companies aware of the importance of implementing green actions in the region. In addition, BOC is interested in closer collaboration with CAF, and would be willing to evaluate the possibility of this type of activity (Personal communication, 2023).

Sale of credits in Core Climate

Another option for selling carbon credits originating in the region is the Hong Kong Stock Exchange's (HKEX) new voluntary carbon market, Core Climate, which was established in October 2022. The aim is to develop an international carbon market for climate change-related products and opportunities, thereby strengthening Hong Kong's position in global green finance. In this way, Core Climate will facilitate the efficient and transparent trading of carbon credits and instruments, and its participants shall be able to obtain, trade, settle, and withdraw voluntary carbon credits through its platform (Core Climate, 2023). Likewise, in the future, it has the ambition to create a Unified Carbon Market in the Guangdong-Hong Kong-Macao Greater Bay Area, and, in this way, explore international participation in that market and in the national ETS (CASG, 2022).

In its first year, Core Climate is working on creating a client portfolio, after which the focus will be on adding more global voluntary market standards, such as the Gold Standard, and they do not rule out including I-REC for scope 2 and 3 emissions. The last step in the schedule is to improve the infrastructure of the platform so that the user experience is increasingly fluid (Personal Communication, 2023). For now, most of the clients are Chinese companies, which would be interested in buying credits to comply with carbon neutrality requirements in different countries. To that end, Chinese companies listed on the Hong Kong Stock Exchange are particularly interested in REDD+ projects. The voluntary carbon market is receiving projects under the Verra standard and already has more than

30 registered projects, including a REDD project from Argentina and another from Brazil.

Regarding the process for registering carbon credits, a form must be filled out with basic information about the projects, such as their name and supplier, geographic location, credit standard, additional certificates, vintage, quantity, and indicative price of credits, and your currency (HKD/RMB/USD). While the eligibility criteria include the quality of the projects (quantified, monitored, and verified), vintage as of 2016, additionality, permanence, protocols to mitigate emissions leakage elsewhere, and that they do no net harm. Co-benefits are not required, and they prefer projects not located in countries with US sanctions. On the other hand, if the prices of the credits are very high, and therefore do not attract buyers, it is a matter of adjusting them until the appropriate price is found, which is also guided by the price reference of similar projects (Personal Communication, 2023). The digital platform is open only to Core Climate users, who receive notifications every time a new project is registered. The purchase of credits can be done directly on the digital platform.

At Core Climate, they are interested in listing more carbon credits from Latin America, and they would be open to exploring forms of cooperation with ILACC to do so. They are also interested in finding out if there will be a regional certification in the future and what guarantee CAF could give for the credits generated in the region. If there is a regional certification and if it is somehow supported by CAF, it would give these credits more weight and credibility.

Sale of credits at the Hainan International Carbon Emissions Trading Center (Hainan Carbon Center)

The Hainan Carbon Center, located in the smallest and most southern province of China, went into operation in July 2022 with the goal of becoming an intersection point between the domestic and international carbon markets. Based on the institutional advantages provided by the Hainan Free Trade Port, this voluntary market seeks to internationalize the carbon market in the Asian country. The tone of the objectives is more political. Its ambition is to promote its blue carbon methodology and its recognition as an international standard. In addition, and according to a Sanya government official responsible for the operation of the Hainan Carbon Center, the idea of this market is to be able to influence the formulation of global voluntary market rules that take into account the industrial characteristics of China, and that allow, among other things, the introduction of a wide range of emission reduction products to influence pricing. On the other hand, the official explains that they want to "go outside 走出去" and export China's standards, technologies, rules, and research and development capabilities for emission reduction products to countries along the One Belt One Road (Zhan, 2022). The use of "go outside 走出去", the same slogan launched during the Jiang Zemin administration to encourage Chinese companies to invest abroad, indicates the strategic value of this market in increasing China's bargaining power in governance international climate change (Zhan, 2022).

By Hainan, blue carbon methodology mainly refers to the formation of a suitable method for species and ecosystems found on the island based on national and international parameters. In this sense, it seeks to promote methodologies for coral reefs, fisheries, and Hainan's microbial carbon sink, as well as the formation of a blue

carbon accounting system, monitoring indicators, and evaluation methods. In this way, it is planned to request international certification of its methodology, and proceed to support the construction of a national blue carbon standard. In this work, the Hainan Carbon Center joins forces with the Hainan International Blue Carbon Research Center to formulate international standards and promote blue carbon research and cooperation with One Belt One Road countries. The idea is also to provide a platform for them to participate in emissions trading (Zhan, 2022).

In January this year, the first cross-border carbon emission transaction of the Hainan Carbon Center was completed. The transaction comes from a project in India, which is one of the countries of the One Belt One Road, registered in Verra's VCS Program, and focused on fuel switching, process improvement, and energy efficiency in the manufacture of bricks. The company from Singapore Bitgreen Carbon Asset Management Pte. Ltd. sold the 10,185 tCO₂-e to the Chinese company Timing Asset Management Co. Ltd (HICN, 2023). As you can see, the market in Hainan is also open to other projects, not just those dedicated to blue carbon. However, keeping in mind its focus on this kind of credit, blue carbon projects from Latin America and the Caribbean could be presented in order to tie and maximize the chances of success in this market. In this way, cooperation activities could be anchored with the exchange agenda that is managed by the Hainan International Blue Carbon Research Center, and thus elevate the region on the agenda of the Hainan Carbon Center. Clearly, the countries of Latin America and the Caribbean that are part of the One Belt One Road would have a better chance in this new voluntary market in China.

Sale of credits in Climate Impact X (CIX)

Although it is not located in China, the Climate Impact X green bag in Singapore should not be ruled out, as the island nation has interesting business activity around carbon markets, with traders and brokers, project developers, and blockchain systems for trading credits, among others. Likewise, in accessing new markets for carbon credits from Latin America and the Caribbean, one should not only depend on China in the Asia Pacific region for their sale but also explore other markets that could be receptive to these credits. In this way, collaboration and business opportunities can be expanded, which contributes to the development of a regional voluntary market.

The CIX Voluntary Market was established by DBS Bank, Singapore Exchange, Standard Chartered and Temasek, and stems from the Stronger Singapore Task Force Sustainability Action Alliance, which aims to position Singapore as a service hub for carbon and NBS. CIX receives carbon credits from a wide range of nature-based projects: forest protection and preservation (REDD+); blue carbon; and clean stoves (which reduce smoke pollution and wood burning). Due diligence and transparency measures are strict to ensure that NBS projects are of the highest quality and integrity. The selection criteria consist of 4 steps, the first one requires that the projects meet internationally recognized carbon verification standards. The second is the evaluation of the projects according to an internal list

of scores, which includes the attributes of the credits, biodiversity, social impact, and risk management of the project. The third is the qualification of the projects by third parties. CIX works with carbon credit rating and analysis company Sylvera to assess and monitor forestry projects that generate credits. Finally, the fourth step is for projects in which there is no unanimous internal decision to move forward with their registration (“marginal decision”), in which case they are presented to the CIX International Advisory Council for review (CIX, 2023). This Council is made up of more than 20 global opinion leaders who represent NGOs, project development companies, standard-setting agencies, and other industry players.

CIX’s marketplace platform provides diverse information on each project to better inform purchasing decisions and the sustainability goals its clients are seeking. The information available, as can be seen from the project example in Image 8, includes the details of the project, the indicative price of the credits by vintage, the registration standard, the sustainable development objectives that it meets, and a rating by Sylvera, among others. At the same time, CIX has another digital platform for auctioning project credits with special attributes, new emissions, and new classes of carbon credits. This platform is ideal for providers who have new, unique, or large-scale credits, and who want to know the competitive value of their projects (CIX, 2023).

Image 8: Example of a project registered on the CIX platform

Source: CIX (2023)

Meanwhile, in mid-2023, CIX will add another platform, CIX Exchange, for spot trading. It shall launch a standardized contract for nature-based carbon credits, to be called CIX Nature X (commercial code CNX), which is designed to address concerns in the market about the risk of NBS projects. It also seeks to standardize and simplify carbon trading procedures for buyers, improve market liquidity, and facilitate the price discovery process. The Nature X contract will offer a basket of credits for 11 REDD+ projects located in Latin America, Asia, and Africa, which together represent almost two-thirds of the total volumes of the global REDD+ market (CIX Press Release, 2023). There are 3 projects in the region: one in

Brazil, one in Peru, and the other in Guatemala. Nature X will come in 4 contracts, each representing different vintages of credits over a fixed period of four years, between 2016 and 2022. The minimum purchase of CNX contracts shall be one lot, which is equivalent to 1,000 carbon credits (CIX Press Release, 2023).

Given the dynamism of CIX and the market in Singapore, it would be important to explore in detail the different opportunities that could exist both for projects with high-quality NBS in the region and for companies with capabilities and technologies that could contribute to the development of a regional voluntary market.



Green finance in carbon assets in Latin America

In addition to the sale of carbon credits generated in the region, another business possibility with China would be the investment in carbon assets, which directly generate carbon credits. In the local context, they are called ESG investments. State investment companies and those in the environmental protection industry would be interested in it. The private sector, both companies and investment institutions, could also have an interest in carbon assets. While this interest is motivated by their corporate social responsibility agendas, what seems to appeal most to them is that these investments provide them with an opportunity to participate in the international voluntary market for emission reductions (Shanghai Treasure Carbon New Energy Environmental Protection Technology, Personal Communication, March 2023). This shows that there is a sector of companies that recognize the importance for their businesses of learning to offset and reduce their carbon footprints. They typically invest in these projects without the intention of buying the carbon credits that are generated. They prefer projects that will be under Verra's VCS Program, but they could evaluate projects under other international standards.

Projects based on nature are the focus of investment, especially in forestry. They look for projects that have co-benefits and are aligned with the objectives of sustainable development. At the same time, the integrity and quality of the projects add points to the investment evaluations. The factors that influence an investment decision in a given country are its macroeconomic stability, the quality of its environmental policies, and the relationship that its

government maintains with China. For the presentation of projects, the following information is required:

1. General introduction of the project: location, coverage area, satellite map of the forest, nature of the terrain, type of forest land, different types of trees and their area, ages of the trees, historical felling and planting conditions
2. Description of land ownership and parcel rights certificate
3. The felling plan for the forest land of the project approved by the competent authority, and the proportion that the project developer avoids deforesting (if applicable)
4. Reforestation plan per year, including species and number of trees required per hectare (if applicable)
5. Approval of the design and planning of reforestation activities by the competent local authority (if applicable)
6. The most recent report on forest resources in the project area
7. Metodologia para contabilização do estoque de espécies arbóreas, e estimativa do sequestro de carbono na biomassa florestal
8. Local laws and regulations related to forestry

Technology transfers

The last identified opportunity is the transfer of technologies for the monitoring of nature-based projects. Among which are the solution

Huawei's "Nature Guardian" to protect the natural environment and prevent deforestation and biodiversity loss. The solution consists of solar-powered devices equipped with antennas and microphones that collect sound data and transmit it via wireless networks to the cloud. Data is studied by AI-powered analytics. Each Guardian is placed in the forest canopy and can operate 24 hours a day for two years, collecting ambient sound data over an area of 3 square kilometers. When the sound of a threat, such as a chainsaw or a gunshot, occurs, the device generates an alarm and sends the location of the incident to local rangers for action. Likewise, these guardians can provide data on the biodiversity of the area (Huawei, Press Release, 2021).

The devices have already been used in Latin America, in countries such as Chile, Colombia, Costa Rica, Ecuador, and Mexico. In Costa Rica, for example, rangers are

studying the spider monkeys on the Osa Peninsula to better understand their habitats, as they are in danger of extinction. In Chile, they are collecting biodiversity data from the Naverbuta National Park to protect the Chilote foxes (Huawei, Press Release, 2021). The devices are used in collaboration with the US NGO Rainforest Connection, dedicated to preventing deforestation, and are part of Huawei's TECH4ALL digital inclusion initiative.

This technology could then be used to monitor NBS projects and ensure the quality and integrity of the carbon credits that are generated. It could also work as an incentive for companies like Huawei to buy credits from projects that use them. In addition to Huawei, other Chinese companies could be seen with solutions that help strengthen the monitoring of projects, such as drone and satellite services. Although the scope of this report does not allow for an exhaustive list of technologies, it does serve to highlight the importance of adding new Chinese companies to exchanges with Latin America and the Caribbean. One way to get a broader picture of the technologies available would be to include the topic in one of the seminars or forums mentioned above.

CONCLUSIONS AND RECOMMENDATIONS



China is the world's largest emitter of CO₂, responsible for a third of total emissions. The country, like others in the world, faces the consequences of global warming and already frequently experiences extreme weather events. To address the challenges, the government of the People's Republic of China has set a goal of peaking its emissions by 2030, and achieving carbon neutrality by 2060. To that end, as the "1+N" Framework, presented by President Xi Jinping at COP15 in Kunming, shows, work is underway on measures to move the country towards achieving these two goals. The Action Plan for the CO₂ Peak before 2030 is one of the first plans to emerge from the formula, with specific actions so that compliance with this peak of emissions is present in every process and aspect of China's socio-economic development.

Likewise, the carbon markets that have been established are considered part of the solution to climate change as well as an instrument to finance the transition towards a green economy. China's participation in the CDM prepared it for the development of emissions trading schemes, and it was so successful that it eventually became the world's largest exporter of certified emission reductions, mainly from hydroelectric and wind projects. From this experience, Chinese entities, such as the NDRC, acquired the expertise to manage carbon projects and apply different policies, which led to the creation of their own turbine manufacturing industry. The CCER compensation mechanism and the China Fund of the Green Development Mechanism were also born from this experience, which invested in the development of the Shanghai Environment and Energy Stock Exchange, which today houses the national ETS. Through this fund, capacity was also strengthened for the creation of eight pilot markets.

The pilot markets in Beijing, Tianjin, Shanghai, Guangdong, Shenzhen, Hubei, Chongqing, and Fujian were formed between 2013-2014, and since their measurements are not uniform, each one has different results. In general, the most effective in reducing emissions have been the pilots in Beijing, Hubei and Shanghai, as the first has a strict MRV system, the second has an innovative allocation of emission allowances, and the third has a strong green financing support for companies participating in the market. Guangdong, which leads in the volume and accumulated value of pilot emissions transactions, is, according to a study, the least effective since it has an auction policy that is not consistent.

The experience from these pilot schemes informed the design of the national ETS, which was established in July 2021 in Shanghai. At its inception, the national ETS only covered the electricity generation sector and annual emissions of around 4.5 billion tCO₂-e, which represents 40% of the country's total emissions. Measured by volume of emissions, the Chinese ETS is the largest in the world. It is expected that by 2025, the other 7 most polluting industries in the country will be incorporated, and when they do, they will cover annual emissions of more than 8 billion tCO₂-e. To date, the initial results of the national ETS show a market that is still maturing, as despite a high compliance rate, it has not yet managed to find effective carbon pricing, and most transactions are done at the end of the compliance cycle. To have a comparison, China's Emission Allocations fluctuate between 8-9 euros, while those of the European system are around 80 euros.

However, the effectiveness of the market is also affected by economic considerations, as the Chinese government is always trying to strike a balance between reducing emissions and economic growth. Therefore, low carbon prices are tolerated so as not to affect consumption and business activity. Significant progress is not expected this year either, since, after the removal of the restrictions of the "Zero Covid" policy, economic recovery tops the list of priorities of the Chinese government. Still, there is consensus among experts in China that the national ETS must move from a system that regulates emissions intensity to one of "cap and trade", with auctioned allocations, more carbon products, and more participants. At the same time, they recommend that the data quality and the MRV system be improved, as well as the complete relaunch of the CCERs after their suspension in 2017.

On the side of the voluntary market, in China, it is believed that the size of its compensation market could overshadow it. Once the CCERs are summarized and used to offset up to 5% of verified emissions, the offset market in the national ETS as designed today would be 225 million tCO₂-e per year. Once all sectors are covered, the market would increase to 8-9 billion tCO₂-e per year. Although the global voluntary market would not have the same appeal as the domestic one for offsets, China is currently a relevant player on the international scene. Since the suspension of CCERs in 2017, 10% of the supply of carbon credits globally has come from China.



Studying Verra's VCS Program records also found that China and India dominate the VCS carbon credit portfolio in Asia, each with 39% and 46% of registered projects respectively. Likewise, there has been an acceleration of registrations by China in recent years, which can be explained by the inability to register new CCERs, and the opportunity given the growing global demand for loans by the business sector.

While Latin America's registrations in the VCS Program have not had the same dynamism, the region with almost half of the registered projects generates the equivalent of 72% of the emission reductions achieved by Chinese projects each year. The difference is made by the NBS, which dominates the records in the region, mostly for REDD and natural environment restoration projects. When the pipeline of VCS projects is observed, which no longer includes large-scale renewable energy projects, it is found that the region continues its specialization in NBS, with 83% of projects coming from AFOLU; most REDD followed by ARR projects. Although 80% of China's pipeline is also concentrated in AFOLU-related activities, most of the projects pertain to agricultural land management.

Taking into account the different portfolios of projects in Latin America and China, at this time, the Asian country would not be a competitor for the region. Meanwhile, their collaboration and participation in the global voluntary market could be affected by internal and external factors. In the case of China, once the CCER operation is resumed, the compliance market

could be more attractive than the international one since the credits that Chinese actors are generating would be better paid in the national ETS. Meanwhile, the government is concerned that offsets sold abroad are not being recognized as part of China's emissions reduction efforts. On the region's side, the quality and integrity of carbon credits could affect its positioning as a NBS provider. Regarding the opportunities for collaboration, specifically the future purchase of offsets from China in the international market, it will depend on international negotiations under Article 6 of the Paris Agreement, the will of its government, and whether CCER's offer is sufficient for your compliance marketplace offsets.

Beyond these limitations, the relationship between Latin America and China is mature enough to open new spaces for cooperation on issues such as carbon markets. On the one hand, its economic relations present various diversification processes, with investment from China expanding to more countries and more sectors and the participation of more private Chinese companies in infrastructure projects in the region. On the other hand, China's international cooperation architecture is increasingly ambitious, as glimpsed by its Global Development Initiative and the One Belt and One Road initiative. At the same time, its policy towards Latin America also seeks to show cooperation in different areas so that the relationship is deeper and more robust. For example, in the last China-CELAC Action Plan, under the area of sustainable development, there is a call for cooperation and the exchange of policies to face climate change.

However, more importantly, given that Latin America stores many of the minerals critical to the development of green technologies, China's transition to a low-carbon economy has the potential to intensify the pattern of trade the region has with this country. In other words, shipments of raw materials continue in exchange for products with increasing technological content. Therefore, it is extremely important for the region that strategic and development priorities be established on the agenda with China. Given that China is concerned about the future access it could have to these minerals for its green industry, especially in the face of competition from the United States and the European Union, Latin America could take advantage of its rich minerals to strengthen its room for maneuver in the negotiation towards a greener agenda.

Cooperation on climate change, in general, and carbon markets, in particular, could begin to advance in this direction. It would be more feasible to start in that order, since the entities and companies in China that maintain the relationship do not have much experience in carbon markets. While those that manage them, such as the MEE, which is the competent authority for carbon markets, have not yet had much exposure to Latin America. On the other hand, it would be better to frame cooperation under climate change to be able to involve entities, such as the NDRC, that handle more macro issues and have not only the global perspective of China's relations but also the ability to influence them. In order to establish this cooperation and bring the relevant actors together, a seminar could be organized under this

theme with the MOF through the China-Latin America High-Level Investment and Cooperation Forum that CAF organizes with the ministry, which would bring visibility to the issue due to the inclusion of this Forum in the China-CELAC Action Plan. Nevertheless, it could also be done with AIIB and be more focused on ILACC.

Given that China is still perceived as a developing country and that in international climate change negotiations, it emphasizes the principle of common but differentiated responsibilities, it is important that the dialogue be carried out subtly and under the wing of South-South cooperation. In this way, China can also get in tune with the growing interest that governments in the region have in advancing towards more sustainable economic models with stronger environmental bases. With this approach, business opportunities could be explored in 3 main areas: sale of carbon credits generated in the region; investments in carbon assets, especially nature-based projects; and technology transfers for project monitoring with NBS.

To take action around these collaboration and business opportunities, the following recommendations are made:

- 1. Organization of a seminar on climate change and green development:** As mentioned, it is important that the region include the issue on the cooperation agenda with China. In this way, the frameworks and principles of this cooperation can be established, in addition to involving key Chinese actors, such as the NDRC, so that the exchanges have a greater impact.

The format of such an activity could be organized in different discussion panels, including topics such as carbon markets and NBS. The latter, as could be seen, are increasingly important for China and could lay the groundwork for collaboration on carbon markets. It could also have a panel presenting different technologies and solutions for monitoring nature-based projects, thus inviting another range of Chinese companies to interact with the region. The seminar could be organized with the AIIB as it is an influential entity, which could facilitate triangular cooperation. In addition, it could focus more on ILACC. However, the inclusion of the topic in the China-Latin America High-Level Investment and Cooperation Forum, which CAF organizes with MOF, should not be ruled out.

2. Organization of ILACC-BOC workshops in Latin America:

As could be seen, one of the options for the sale of credits generated in the region would be Chinese companies with operations in the region, since they would have more incentives to include their purchase in their CSR agendas. However, since Chinese companies do not have much knowledge about carbon markets, awareness-raising activities would have to be carried out. Among these could be workshops with the Bank of China in select countries in the region. BOC would be an interesting partner as it not only lends to both Chinese and local clients in the region, but also has a broad portfolio of green finance.

3. ILACC webinars with the new voluntary markets:

Other sales channels for carbon credits generated in the region would be the Hong Kong green exchange, Core Climate (which already has two REDD projects in the region listed), and the Hainan Carbon Center. The latter is more politically oriented, as it seeks to position itself as one of the centers of the voluntary market for the One Belt One Road and to influence the rules of the global blue carbon market. It would be important

for Latin America to learn more about these two voluntary markets and the possibilities and advantages that each one could offer. Therefore, webinars could be scheduled within the series organized by ILACC.

4. Exploration of opportunities in Singapore:

As could be seen in the report, there is interesting business activity around carbon markets in Singapore, with traders and brokers, project developers, and blockchain systems for trading credits, among others, which would be interesting to know in more detail to evaluate the collaboration and business opportunities for Latin America. Likewise, the Climate Impact X voluntary market is located in the island nation, which promises to be very attractive for high-quality, nature-based carbon credits. The 3 platforms that he has designed for the sale of credits, including one for auctions and another for spot trading, have the potential to influence how transactions involving these credits are conducted in the global market. Therefore, it would be important to hold face-to-face meetings with key stakeholders in Singapore to develop relationships and explore various opportunities. This approach also broadens the spectrum for carbon credits in the Asia Pacific region without relying solely on Chinese markets.

5. Investment in carbon assets:

In order to really know the desire Chinese investors would have for carbon assets in the region, a project could be presented with the characteristics and documents requested. Ideally, CAF is involved in any project for purposes of credibility and institutional support. The experience of a project would provide valuable lessons for making nature-based projects bankable. At the same time, it could lead to the formation of an ILACC Fund for financing and investment in projects that generate carbon credits in the region. Such Fund could be open to investors from different regions and have a high-quality pipeline.



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ANNEX A

Estimated reduction of annual emissions from projects registered by Asia in the VCS Program

Country	Number of projects	Estimated sum of annual emission reductions
Bangladesh	8	8 114 549
Cambodia	5	6 718 866
China	474	78 464 086
Ecuador	1	33 237
Georgia	1	423 245
India	549	76 970 851
Indonesia	13	11 607 433
Kazakhstan	2	344 986
Lao	4	519 938
Malaysia	8	232 628
Mongolia	1	175 767
Myanmar	1	184 006
Nepal	3	135 246
Pakistan	3	2 591 228
Philippines	3	137 706
Russia	1	50 734
Singapore	4	75 715
South Korea	10	6 980 507
Taiwan	1	1 574
Tajikistan	1	50 667
Thailand	34	4 056 911
Turkey	33	1 991 051
Vietnam	37	3 412 770
Gran total	1197	203 273 701

ANNEX B

AFOLU activity of China projects registered in the VCS Program

AFOLU Activities	Number of projects
ALM	38
ARR	27
ARR; IFM	1
ARR; IFM; REDD	4
IFM	11
IFM; REDD	1
Gran total	82

ANNEX C

Latin American projects in the Verra VCS Program

Image C1: Registration by year of Latin American projects before the VCS Program

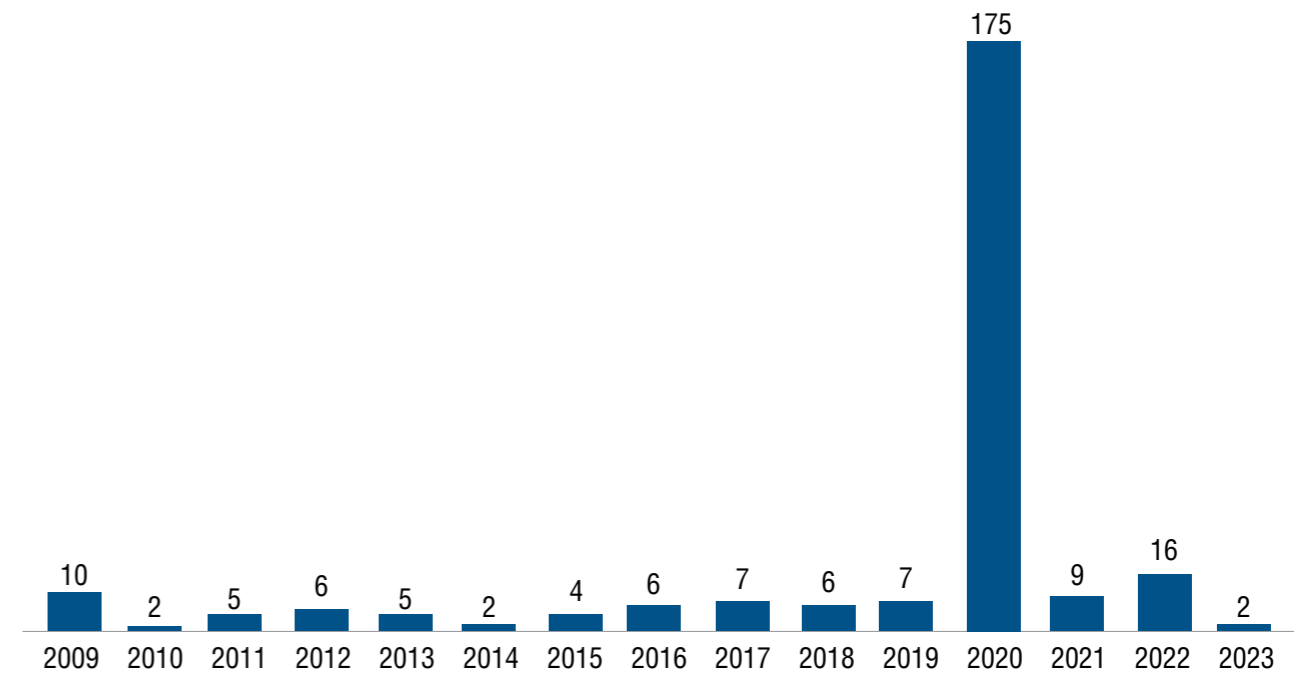


Image C2: AFOLU activity of Latin America projects registered in the VCS Program

Country	ACoGS	ARR	IFM	IFM; REDD	REDD	Total
Argentina		1				1
Belize					3	3
Bolivia					1	1
Brazil	1	6		1	23	31
Chile		2			1	3
Colombia		9		1	13	23
Costa Rica						
Dominican Republic						
El Salvador						
Guatemala		3			3	6
Honduras						
Mexico		3				3
Nicaragua		3				3
Panama		1				1
Paraguay		4			2	6
Peru		7	1		13	21
Uruguay		7			1	8
Gran total	1	46	1	2	60	110

ANNEX D

Emission reduction calculation for new renewable energy projects in China

Calculation made with Hanson Liu, a Chinese expert in carbon markets, based on data from the China Energy Administration (NEA). According to NEA, the wind farms that have just been built in China have around 37,630 MW, and those of the solar parks with around 87,410 MW.

To calculate the newly generated power generation, an estimate of the hours of annual use of these solar and wind farms can be made. Taking into account that this utilization varies throughout the different provinces of China, a conservative estimate of 1,300 hours can be made for solar farms and 2,000 hours for wind farms. Therefore, the newly generated power generation would be:

Wind farms: $37,630 \times 2000 = 75,260,000$ Mwh

Solar Park: $87,410 \times 1300 = 113,633,000$ Mwh

Total = 188,893,000 Mwh

The emission factor for the regional network is between 0.65-0.87 tCO₂/MWh. If an emission factor of 0.5 tCO₂/MWh is taken, a reduction in emissions of around 100 million tCO₂-e could be considered.



