United Nations

Transfer Pricing of Carbon Offsets and Carbon Credits

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Background and Acknowledgements

About the Committee

The United Nations Committee of Experts on International Cooperation in Tax Matters (the "Committee") comprises twenty-five members appointed by the Secretary-General, after notifying the Economic and Social Council, to serve in their personal capacity for a four-year term. Selected for their expertise in tax policy and administration, the members reflect diverse geographical regions and tax systems. The Committee is globally recognized for its normative and policy-shaping work and for the practical guidance it provides in tax policy and administration.

Committee Mission

The Committee develops tools and resources for governments, tax administrators, and taxpayers to help strengthen tax systems and mobilize financing for sustainable development, as well as strengthen international tax cooperation. The work aims to prevent double taxation and non-taxation while helping countries broaden their tax base, strengthen administration, and combat tax evasion and avoidance. The Committee places special emphasis on addressing the needs of least developed countries, small island developing States, and landlocked developing countries.

Committee Working Methods

The Committee meets twice annually—in spring (New York) and fall (Geneva). Between these sessions, Subcommittees work on specific topics under the Committee's oversight. These Subcommittees, whose participants also serve in their personal capacity, prepare proposals and draft guidance for review and approval by the Committee. This collaborative approach ensures thorough, multi-disciplinary and multi-stakeholder examination of complex tax issues, while maintaining the Committee's ultimate responsibility for all published guidance.

Transfer Pricing and the Sustainable Development Goals

At its Twenty-third Session in 2021, the Committee's 2021–2025 membership decided to establish a Subcommittee on Transfer Pricing, with a mandate to consider, report on and propose guidance on transfer pricing issues that:

- Reflects Article 9 of the United Nations Model Convention and the arm's length principle embodied in it, and is consistent with relevant commentaries of the Convention

- Identifies and considers transfer pricing topics where guidance from the Committees is most useful
- Reflects the realities and needs of developing countries at relevant stages of capacity development
- Gives due consideration to relevant work in other forums, such as the Inclusive Framework on Base Erosion and Profit Sharing (BEPS), including through broad consultation.

During its Twenty-fourth Session, the Committee approved the Subcommittee's ambitious workplan, consisting of guidance on the following topics:

- Transfer Pricing during the COVID-19 Economic Downturn
- Transfer Pricing Compliance Assurance—An End-to-End Toolkit
- Transfer Pricing of Carbon Offsets and Carbon Credits
- Transfer Pricing of Agricultural Products
- Transfer Pricing in the Pharmaceutical Industry
- Bilateral Advance Pricing Agreement/Arrangement Programmes—Frequently Asked Questions

This initiative served to develop guidance products to address priority challenges faced by developing countries in implementing effective transfer pricing regimes and make capacity development activities as practical, targeted and effective as possible. By strengthening their approach to transfer pricing, countries can reduce the risk of double taxation, thereby facilitating cross-border trade, fostering a more attractive investment climate, and increasing tax revenues. In turn, this can support greater domestic resource mobilization, enabling increased investment in achieving the Sustainable Development Goals (SDGs). The Subcommittee comprises a number of Committee members and other participants from tax administrations and policymakers with wide and varied experiences related to transfer pricing, as well as people from academia, international and regional organizations, and the private sector.

This Publication

This publication, "*Transfer Pricing of Carbon Offsets and Carbon Credits*", is part of a series of guidance products developed to strengthen transfer pricing capacities in developing countries. It provides insights into the value chain that leads to carbon offsets and credits in order to consider transfer pricing aspects. This publication, reviewed, refined, and approved by the Committee during its Twenty-sixth and Twenty-seventh Session in March 2023 and October 2023 provides countries with guidance on what a transfer pricing analysis looks like and factors to consider when carbon credits and carbon offsets are involved.

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Disclaimer

Information on uniform resource locators and links to websites contained in the present publication are provided for the convenience of the reader and are correct at the time of issuance. The United Nations takes no responsibility for the continued accuracy of that information or for the content of any external website.

Contents

Abbreviations

CCUS	Carbon Capture Usage and Storage
CDM	Clean Development Mechanism
CER	Certificate of Emission Reduction
CO2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COP	Conference of the Parties (decision-making body of the UNFCCC)
CSR	Corporate Social Responsibility
CUP Method	Comparable Uncontrolled Price Method (a transfer pricing method)
DAEMPE	Development, Acquisition, Enhancement, Maintenance, Protection, and Exploitation
DOE	Designated Operational Entity
DNA	Designated National Authority
ESG	Environmental, Social and Governance
ETS	Emission Trading Scheme
EU ETS	European Emissions Trading System
GAAP	Generally Accepted Accounting Principles
GHG	Greenhouse Gas
IFRS	International Financial Reporting Standards
ITMO	Internationally Transferred Mitigation Outcomes
LOA	Letter of Approval
LPG	Liquified Petroleum Gas
MNE	Multinational Enterprise
MRV	Monitoring, Reporting and Verification
Net-zero	Removing an equal amount of CO_2 from the atmosphere as is released into it being
NDCs	Nationally Determined Contributions
NGO	Non-Governmental Organization
UN TP Manual	UN Practical Manual on Transfer Pricing for Developing Countries
PDD	Project Design Document
REDD+	Reducing Emissions from Deforestation and Forest Degradation mechanism

SDGs	Sustainable Development Goals
TNMM	Transactional Net Margin Method (a transfer pricing method)
UNFCCC	United Nations Framework Convention on Climate Change
VCC	Voluntary Carbon Credit
VCM	Voluntary Carbon Markets
VER	Voluntary Emission Reduction unit

1. Purpose

This guidance from the United Nations Committee of Experts on International Cooperation in Tax Matters (UN Tax Committee) elaborates the value chain of carbon emissions abatement activities that produce carbon credits or carbon offsets, and considers how to apply transfer pricing rules to the generation, transfer and sale of carbon credits. The guidance is intended to aid in accurately delineating the actual transactions among associated enterprises, which requires analysis of economically relevant characteristics of the transaction. Applying the arm's length principle depends on determining the conditions that independent parties would have agreed on in comparable transactions under comparable circumstances.

Carbon credits have a market value. They can be considered a form of "in-kind" business profit resulting from the activities that generate them. Understanding the functions performed, assets used and risks assumed by each party to a transaction will assist in accurately delineating relevant transactions for transfer pricing purposes.

This guidance focuses on the interaction between carbon taxes and carbon offset programmes and raises awareness of the framework provided by Article 6 of the Paris Agreement.[1] It provides some insights into:

- Different ways in which carbon credits may be generated
- A still evolving regulatory landscape for the creation, use and trade of carbon credits, including monitoring, reporting and verification systems
- The intercompany transfer of carbon credits.

1 United Nations (2025). Chapter 3, The Interaction Between Carbon Taxes and Carbon Offset Programmes. In United Nations, Emerging Issues in Environment Taxation: A Supplement to the 2021 UN Handbook on Carbon Taxation. New York, NY: United Nations.

2. Introduction

Slowing the pace of climate change depends on cutting carbon emissions. Yet reducing emissions to zero may not be possible, especially in sectors where they are more difficult to abate. Tackling the carbon footprint has come to mean eliminating emissions as much as possible and offsetting the rest through carbon credits. This guidance provides insights into the value chain that leads to carbon offsets and credits in order to consider transfer pricing aspects.

The terms "carbon offsets" and "carbon credits" are frequently used interchangeably, although technically, they operate based on different mechanisms.[2] Together, they cover a wide array of units, certificates, quotas and allowances.[3] Both carbon credits and offsets typically represent one ton of carbon dioxide (CO_2) reduced, avoided or sequestered as certified or verified by an internationally recognized carbon accounting standard.

A carbon credit usually refers to a tradable certificate or permit that shows a company, industry or country has removed or paid to remove a certain amount of carbon dioxide from the atmosphere.[4] The credit is certified or verified in line with an internationally recognized carbon accounting standard.[5] Carbon credits essentially are accounting units tracked and recorded in designated greenhouse gas (GHG) registries, but they can also be traded and transferred among entities. They were introduced to serve as market mechanisms that help reduce carbon emissions.[6] The

2 A carbon offset removes or sequesters greenhouse gas emissions that are already in the atmosphere. A carbon credit is a reduction in the release of emissions to the atmosphere. See more at: https://carboncredits.com/carbon-credits-vs-carbon-offsets-whats-the-difference/.

3 For more details, see section 2 of United Nations, Chapter 3, The Interaction Between Carbon Taxes and Carbon Offset Programmes, in United Nations, Emerging Issues in Environmental Taxation: A Supplement to the 2021 UN Handbook on Carbon Taxation.

4 Importantly, once a carbon credit is effectively used and offset against carbon dioxide that has been emitted, that credit is declared used and "retired," and cannot be sold or used again. If credits are used once, they can be applied by the private company to offset its emissions and potentially also by the host country as a tool to meet its climate goals under a nationally determined contribution. Forbidding host countries to use credits produced on their territory and used by private companies as offsets would otherwise slow the deployment of carbon projects. Please also see the supplementary guidance to the UN Handbook on Carbon Taxation issued by the United Nations Committee of Experts on International Cooperation in Tax Matters.

5 IETA (International Emissions Trading Association) and ICROA (International Carbon Reduction and Offset Alliance) (2016). Enlisting Government Support for Voluntary Carbon Management and Offsetting to Scale and Accelerate Climate Action. White paper.

6 Although some carbon credits may be attached or used only by the company generating them.

United Nations Handbook on Carbon Taxation elaborates how carbon taxes can also provide an incentive to shift to lower emissions and achieve positive climate results.[7]

Carbon offsets can arise from any activity that compensates for carbon dioxide or other greenhouse gas emissions measured in carbon dioxide equivalent (CO2e) by providing an emissions reduction elsewhere. Because greenhouse gas emissions are widespread in the Earth's atmosphere, the climate benefits from reductions regardless of where they occur.[8]

Projects where a business invests in actions to reduce greenhouse gas emissions ancillary to their everyday operations — such as by capturing methane gas at a landfill, planting or preserving forests, or storing carbon, generate carbon offsets. The United Nations Handbook on Carbon Taxation refers to an example of a power plant in Canada paying a farmer in Zambia to plant trees to offset power plant emissions. This might be cheaper than paying an applicable carbon tax or making a significant investment in switching fuels. It can have substantial co-benefits, such as better livelihoods.

When one company removes a unit of carbon from the atmosphere as part of its business activity, it may generate a carbon credit. Other companies (including associated enterprises) can then purchase that carbon credit to reduce their own carbon footprint or to trade it. For tax purposes, to properly determine and allocate the income resulting from purchases and sales among associated enterprises requires determining the functions performed, assets used and risks assumed by each enterprise with respect to activities that lead to carbon credits.

Transactions among associated enterprises that involve carbon credits that are bought and sold must be conducted at arm's length, just like any other intercompany transaction. The United Nations Practical Manual on Transfer Pricing for Developing Countries (UN TP Manual)[9] provides guidance on how to analyse intercompany transactions and which pricing methods can be used. This current guidance examines what a transfer pricing analysis looks like and aspects to consider when carbon credits are involved. It presents three different carbon credit project examples.

In applying transfer pricing methods, depending on the facts and circumstances of the particular transaction under review, the use of the Comparable Uncontrolled Price (CUP) Method may be appropriate, as might be a cost-of-funding or cost-plus approach that applies an appropriate mark-up to the purchase price. In other cases, for example, where intercompany transactions are highly integrated or both parties contribute valuable intangibles, a profit split may be appropriate. Carbon credit projects tend to be capital intensive and involve significant costs that may qualify for cost

7 United Nations (2021). United Nations Handbook on Carbon Taxation for Developing Countries. New York, NY: United Nations.

8 Britannica (2011). Definition of a Carbon Offset. Available at: https://www.britannica.com/technology/carbon-offset.

9 United Nations (2021). The United Nations Practical Manual on Transfer Pricing for Developing Countries. New York, NY: United Nations

allocations among members of an multinational enterprise (MNE). How costs are allocated and whether such allocations are appropriate will depend on the facts and circumstances. The UN TP Manual offers relevant guidance in this respect.

A corollary of transfer pricing is that if income resulting from the generation and sale of carbon credits is considered wrongfully allocated among associated enterprises, and tax authorities make corrective adjustments, this will likely lead to double taxation. Usually, business income is already reported as taxable income in the country of one of the associated enterprises. The tax adjustment in the other country, therefore, leads to double taxation.

Unresolved double taxation of carbon credits would constitute an unforeseen added cost, and thus, ultimately, a disincentive to generating carbon credits. Understanding the value chain in generating carbon credits assists in accurately delineating relevant transactions among associated enterprises and assessing the arm's length income allocation of carbon credit-related costs and income.

3. Regulatory Framework

To understand the relevant functions, assets and risks in intercompany carbon credit transactions, it is important to know the regulatory framework. Historically, carbon credits have been regulated and issued by national and international government organizations. The first international carbon markets were the result of the 1997 Kyoto Protocol. The 2015 Paris Agreement further regulated carbon credits.

The Kyoto Protocol stemmed from the 1992 United Nations Framework Convention on Climate Change (UNFCCC), providing legally binding ceilings on future greenhouse gas emissions by advanced industrialized countries. It allowed flexibility on which emissions to control, where to implement controls and which domestic policy measures to use. The protocol also introduced the Clean Development Mechanism (CDM) to implement emissions-reduction projects in developing countries. Projects produced certificates of emissions reduction (CERs) for every ton of carbon absorbed or captured from the atmosphere.

The Kyoto Protocol covered the years from 2008 to 2020, divided into two commitment periods. In 2015, the Paris Agreement was adopted to regulate the period beyond 2020. It seeks to cap the rise of global temperature well below 2 degrees Celsius above pre-industrial levels.[10] To limit global warming to 1.5 degrees Celsius, emissions need to be reduced by 45% by 2030 and reach net-zero by 2050.[11] The Paris Agreement allows countries to voluntarily cooperate with each other to achieve emissions reduction targets in their nationally determined contributions (NDCs). Under Article 6 of the Paris Agreement, carbon credits from reducing emissions in one country can be transferred to help one or more other countries to meet climate targets. Article 6.2 establishes the basis for trading emissions reductions (also referred to as internationally traded mitigation outcomes, or ITMOs) across countries. It provides a framework for countries to create trading systems in ways that are consistent with United Nations rules and comparable to each other.[12] Three uses of internationally

10 J. Sachs et al. (2019). Ensuring Economic Viability and Sustainability of Coffee Production. Columbia Center on Sustainable Investment Staff Publications.

11 United Nations (n.d.). For a livable climate: Net-zero commitments must be backed by credible action. New York, NY: United Nations.

12 Article 6.2 of the Paris Agreement states: "Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement." While Article 6 allows one country wanting to purchase emissions reductions from another one to use them towards its own targets, it agrees that entities other than governments can use the emissions reductions as well. The host country will have to make an adjustment for those against its nationally

traded mitigation outcomes are: a) for nationally determined contributions, b) for other international regimes outside the Paris Agreement, such as the International Civil Aviation Organization and the International Maritime Organization, and c) for other purposes, meaning the voluntary carbon market (VCM). Article 6.4 establishes a mechanism for trading emissions reductions among countries. It is supervised by the Conference of Parties (COP), the intergovernmental decision-making body under the UNFCCC.

To purchase and sell carbon credits, there are two significant, separate markets. One is the regulated or compliance market, set by "cap-and-trade" regulations at regional and national levels. The other is the voluntary market, where businesses and individuals buy credits to offset their carbon emissions. Voluntary emissions reductions may not be eligible to be used as carbon credits in the compliance market. They have smaller demand and less liquid trading markets.

Both the compliance and voluntary markets incentivize the private sector to implement emissions mitigation in a range of sectors and technologies, such as energy, transport and reforestation. Amid growing demand to invest in environmental projects, funds are increasingly being established to invest in green assets or finance carbon projects. Such funds usually finance companies, such as through bonds or loans, or buy shares in companies that engage in climate or environmental projects and generate carbon offsets registered in a recognized carbon registry.

The Paris Agreement unlocked the so-called voluntary market to allow the optional exchange and trade of carbon offsets. It is open to individuals, companies and other organizations that want to reduce or eliminate their carbon footprint but are not required to do so by law. Organizations with operations that reduce carbon already in the atmosphere (for example, by planting more trees or investing in renewable energy) can issue carbon offset credits, provided they meet certain metrics and verification regulations.[13]

The nature of carbon credits is heterogeneous, however, and there is significant inconsistency among them.[14] Companies seeking to reach net-zero, where they remove as

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determined contribution. Article 6 envisages that a government can agree that emissions reductions achieved in its territory can be used by a company against its company target. The host government will then not count those emissions reductions towards its nationally determined contribution. The resulting credits are entirely the company's own to use and to claim. The guidance on the role of the Paris Agreement issued by the United Nations Committee of Experts on International Cooperation in Tax Matters provides details on the interaction between carbon taxes and carbon offset programmes.

13 Carbon credit verification is a highly scrutinized process. The two most common verification schemes are the Gold Standard and the Verified Carbon Standard. Generally, they consider four aspects: additionality, permanence/durability, a buffer pool (the extra credits that a company purchases as insurance against a possible event, such as a wildfire or flood, that would destroy the carbon offsets the company is buying), and leakage (i.e., an unintended increase in emissions or the shifting of emissions from one place to another due to a carbon credit project based on shifting demand from a protected to an unprotected place).

14 See section 4 of United Nations, Chapter 3, The Interaction Between Carbon Taxes

much carbon dioxide from the atmosphere as they release into it, may invest heavily in renewable energy or support reforestation projects to use the carbon offsets. For voluntary carbon offsets, every ton of CO_2 that a verified project manages to absorb, avoid or otherwise reduce can lead to the issuance of a carbon credit. The role of the Paris Agreement is discussed in more detail in the supplementary guidance to the UN Handbook on Carbon Taxation issued by the United Nations Committee of Experts on International Cooperation in Tax Matters.[15]

Greenhouse gas emissions removed by projects in the voluntary carbon market that are not intended to be surrendered into a regulated carbon market are usually referred to as voluntary emissions reduction unit (or Verified Emission Reduction Unit, VER). VERs are carbon credits originating from the voluntary market, and must be verified by an independent third party. Currently, they are mostly used by companies looking to voluntarily offset emissions generated by business activities to show social responsibility and estabilsh a green corporate image. Even so, an increasing number of companies are investing in VER projects to measurably reduce their carbon footprint and reach a net-zero emissions status. These projects do not have to be entered into a national inventory because they are not created to meet a legal requirement. A host country can apply a corresponding adjustment to VERs that leave its border, but this is not required.[16]

In a voluntary carbon market, private entities or entitled standard setters are responsible for project certification. Developers of projects can apply to these entities to certify the amount of carbon emissions avoided, decreased or removed. Based on this certification, the developer can obtain voluntary carbon credits (also referenced as VCCs). One credit represents one ton of CO2 emissions reduced. VCCs are stored in a personalized account in a registry owned or retained by the entity that certified the project. The developer can either retire or annul the credits to claim the reductions they represent or sell them to another entity with an account at the registry. Credits can be traded in various ways, and diverse institutions are involved, including brokers, exchanges, retail traders and advisers. Credits issued by an entity and stored in a registry that it manages or retains cannot be transferred to a registry of a different certifying entity.

In comparison, in compliance markets, such as emissions trading schemes (ETS), covered entities may be required to obtain carbon credits to offset their emissions and meet emissions targets. Such systems are based on tradeable pollution rights, which for practical purposes are either carbon allowances that provide the right to emit a certain quantity of greenhouse gas emission or carbon credits that can be offset against a business-as-usual baseline carbon impact.[17]

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and Carbon Offset Programmes. In Emerging Issues in Environmental Taxation: A Supplement to the 2021 UN Handbook on Carbon Taxation.

15 Ibid., Chapter 3.

16 The classical approach of the voluntary market consists of the purchase and cancellation of credits generated by baseline and crediting programmes.

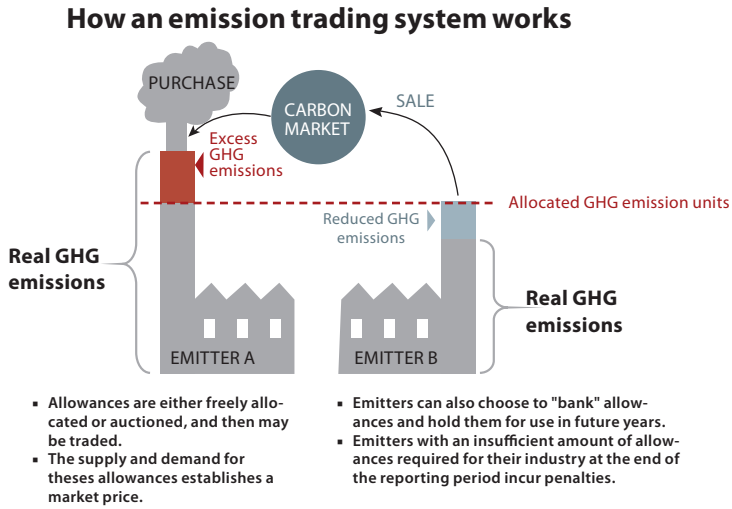
17 For an overview of different offset rights and systems, see M. A. Grau Ruiz (2022). Taxing Carbon Offset Credits. Kluwer International Tax Blog.

An ETS involves placing a limit or cap on total greenhouse gas emissions in one or more sectors of the economy (figure 1). A government then auctions or distributes tradeable emissions allowances[18] to entities covered by the cap, where each allowance represents the right to emit a certain volume of emissions (typically, a metric ton of carbon dioxide equivalent), and the allowances in total equal the emissions cap. Covered entities are required to surrender allowances for their emissions during a compliance period. They can choose to buy additional allowances if necessary or sell surplus ones. This is known as a cap-and-trade system.

3.1. Cap-and-Trade Schemes

Assume the government instituted a total cap of 10,000 tons of carbon annually and 10 polluting factories were responsible for all greenhouse gas emissions. The government could then create 10,000 one-ton carbon credits and either allocate a certain quantity for free to each factory or auction them off, where each factory bids for the amount it needs. Each factory would be required to hold the number of allowances equal to its emissions. If a factory needs more than the amount received through an allocation or auction, it would have to purchase additional credits in the marketplace. If a factory produced fewer emissions than its allowances, it could sell the excess credits in the marketplace.

Figure 1: How an emissions trading system works



Source: Carbon Markets 101. The Ultimate Guide to Understanding Carbon Credits. Available at: https://carboncredits.com/the-ultimate-guide-to-understanding-carbon-credits/.

18 Carbon allowances require a permit to release a certain quantity of greenhouse gas emissions into the atmosphere.

3.2. Baseline and Credit Schemes

An alternative to the cap-and-trade schemes are baseline and credit schemes. Each source participating in baseline and credit schemes is assigned a specific emissions limit or baseline for a given period. After this period has ended, each source's actual emissions are compared to its limit. If the source has emitted less than its limit, it may receive emissions credits based on the difference. If a source has emitted more than its limit, it must buy credits from sources that were below their limits to offset the excess emissions.

In some schemes, emissions credits expire if they are unused; in others, they may be banked for use in future years. Some schemes allow participants flexibility, such as through engaging in projects to reduce emissions or paying into an environmental fund to make up for a shortfall in credits.

To recap, there are several types of carbon credits or offset rights exist concurrently. They may be based on international, national or even subnational law.

To avoid selling offsets multiple times and to help ensure that emissions reductions in one place do not lead to increased emissions somewhere else, carbon offsets need to meet certain standards and are subject to validation. Several accredited organizations offer certification following proper verification.[19] Each organization has different standards and requirements.[20] All systems that grant emissions rights or generate offset rights, whether they are carbon allowances or credits, require certain steps, including monitoring, reporting and verification (MRV), before providing certification. These steps are broadly described as follows.

Project design and application

Carbon projects must be designed to meet requirements set in the relevant organization's standards and approved methodology. Methodologies enable the quantification of emissions reductions achieved by projects and impose eligibility requirements. The reduction in emissions from a given project must be an improvement or additional compared to a business-as-usual situation. Generally, specialized and qualified engineers and technical consultants are needed to ensure that a proposed activity is designed to meet the requirements of a specific methodology. This area is relatively dynamic, since new methodologies may be added and existing ones updated or retired over time.

Project specifications can differ depending on which organization's standards apply and the project type. For applying and qualifying for credits, the project must be described and all eligibility criteria met. The following documents may be needed in the application:

19 See also footnote 11.

20 See section 2.4 of United Nations, Chapter 3, The Interaction Between Carbon Taxes and Carbon Offset Programmes. In Emerging Issues in Environmental Taxation: A Supplement to the 2021 UN Handbook on Carbon Taxation.

- Identification of the party initiating the project (and any other involved parties)
- Description of the project, including how it satisfies the applicable rules and the applied methodology, its location, a certification of relevant legal rights to the land or property used for the project, a demonstration of additionality and the proposed crediting period
- Description of the monitoring system to be applied
- Estimated carbon reductions

The application generally requires specialized engineers and technical experts to prepare relevant documentation and data.

Approval

Depending on the nature of the project and its location, regulatory and environmental approvals may be required from several different government bodies. The project should not violate any applicable laws or human rights. Any resulting carbon credits may require authorization before they can be transferred internationally. Some governments will not include carbon credits in their nationally determined contributions to avoid double counting. They can authorize credits for use outside Article 6 of the Paris Agreement.[21]

If the project design meets the methodology requirements and all other relevant approvals, the application may be approved by designated national authorities (DNAs) for the regulatory compliance market or by designated operational entities (DOEs) for the voluntary market.

Validation

Some documentation required for approval must be verified by a third-party prior to submission. The party initiating the project is often required to use an independent auditor to prepare a validation report. To assure the quality of credits, applicable project standards may require third-party validation of project plans before implementation and third-party verification of realized emissions reductions after implementation. This process can take several years, during which there is no certainty that carbon credits will be approved and issued for registration.

Registration

In both the mandatory compliance and voluntary markets, the project and its offsets and credits will need to be approved and validated by the DOEs before the actual emissions reduction and resulting carbon credits can be registered. The verification will cover the calculation and measurement of the carbon emission reduction.

A carbon registry allows organizations to track, manage and trade greenhouse gas emissions. They require measuring, reporting and verifying carbon credits. Registered carbon offsets provide transparency and accountability and are subject to

21 See also footnote 12.

rigorous verification to ensure that reductions are reliable. Only registered verifiers are approved to validate reductions and audit projects to ensure that they are legitimate and meet the requirements of the carbon registry. Carbon offset registries that track projects and issue offset credits assign a serial number to each verified credit. When a credit is sold, the serial number is transferred from the account of the seller to the account of the buyer. If the buyer "uses" the credit by claiming it as an offset against its own emissions, the registry retires the serial number so that the credit cannot be resold.

The Clean Development Mechanism registry ensures the accurate accounting of the issuance, holding, transfer and acquisition of certificates of emissions reductions. Each has a unique serial number that is cancelled once the certificate has been used for demonstrating compliance with emissions standards.

4. Relevance for Developing Countries

As climate change affects the entire world, limiting pollution and introducing carbon pricing instruments is relevant for all countries. Emissions allowances or carbon credits provide economic instruments that make it possible for actors other than governments to take part in mitigation, and ease the way for private companies to support national efforts to reduce emissions.

The Clean Development Mechanism, by allowing a country with an emissions reduction or limitation commitment to implement projects to cut emissions in a range of sectors and technologies, was designed for activities in developing countries. It created a regulatory market in which governments, private companies and other entities can purchase carbon offsets to comply with mandatory caps on emissions. The mechanism assists developing countries in achieving sustainable development by promoting environmentally friendly investments from capital-exporting countries and businesses. Developing countries benefit from the carbon market through an extra revenue stream for forest preservation, infrastructure improvements or projects that reduce emissions and contribute to achieving the Sustainable Development Goals (SDGs).

While carbon credit projects can be located anywhere, many involve nature-based solutions that provide credits resulting from agricultural or reforestation projects, or initiatives in coastal or marine environments. Developing countries tend to be rich in the necessary resources for such projects.

With pressure to act on emissions mitigation increasing, generating and trading carbon credits to establish offsets is becoming a major business with its own unique value chain. Many transactions involve projects in Africa, Asia and Latin America.[22]

22 Ecosystem Marketplace (2021). The State of the Voluntary Carbon Markets 2021.

5. Importance of Transfer Pricing

The monitoring, reporting and verification process does not necessarily determine who is legally entitled to carbon credits. As credits carry an economic value that can be monetized, the determination of "who owns what" is a relevant question, especially when associated enterprises are involved in performing different functions and taking on risks in the relevant value chain. Ownership needs to be carefully reviewed. Multiple claims of entitlement or ownership constitute a risk for both countries and companies that wish to trade authorized credits, since accounting adjustments are required to accurately reflect credits applied against a country's nationally determined contribution under Article 6.2 of the Paris Agreement. Carbon projects are often implemented based on the initiative of one or several parties, which can include the private sector (owners, operators, investors, corporate finance and consultants), not-for-profit organizations, non-governmental organizations (NGOs) or the public sector.[23] While carbon credit entitlement or ownership is normally determined based on contractual agreements, elaborate project structures and the involvement of multiple parties may challenge tax authorities in determining which party should claim ownership.

In general, emissions reduction credits are administratively awarded to the party that files for them and submits the relevant substantiation of abatement, based on monitoring, reporting and verification, to designated authorities. In energy and industry projects, the owner of machinery or a technical installation, the installation's operator or an investor can claim the right to emissions reductions. Among them, the benefits from what is usually a highly capital-intensive investment in technology and assets are allocated according to contractual agreements. The holder of the carbon credit or emissions right may not in every case be the party entitled to the economic value that the carbon credit represents. All parties to the transaction or taking part in the project ought to be reviewed in relation to their involvement in order to adequately attribute the profit from the carbon credit or offset.

Without explicit domestic laws, the most suitable format to clearly determine carbon credit-related claims and representation rights, rights to compensation and legal protection is a contract or chains of contracts.[24] To the extent those are third-party contracts, it is generally assumed that they will be at arm's length. For transfer pricing purposes, contracts and the resulting income allocation among associated enterprises should also be at arm's length. Transfer pricing rules provide a detailed framework for how to determine this.

23 C. Streck and M. von Unger (2016). Creating, Regulating and Allocating Rights to Offset and Pollute: Carbon Rights in Practice. Carbon and Climate Law Review 3.

24 Ibid.

Emissions allowances provide an authorization to pollute, based on the number of allowances allocated by a government entity or otherwise obtained, but lack physical substance. Emissions reduction credits are not tangible. They are generally not considered financial assets because cash is not delivered when they are used; instead, the allowance demonstrates compliance with established regulations. As a result, allowances meet the definition of an intangible asset. Contracts for the purchase or sale of emissions allowances (e.g., forwards, futures or options) may meet the definition of a derivative.

The Generally Accepted Accounting Principles (GAAP)/International Financial Reporting Standards (IFRS) classify emissions reduction units as intangible assets.[25] They are accounted for under International Accounting Standard (IAS) 38 — intangible assets, unless they are treated as inventories under IAS 2 — inventories, and held for sale in the ordinary course of business. Government intervention in carbon reduction may drive the accounting treatment under IAS 20 — government assistance. These determinations are case specific, however. If associated enterprises are involved, value chain and functional analyses will be required to assist in determining where relevant contributions need to be rewarded at arm's length. For intangibles, this includes a functional analysis covering which entity performs development, acquisition, enhancement, maintenance and exploitation (DAEMPE) functions.[26]

Carbon emissions mitigation projects require specific actions and capital investments that, within an MNE setting, can involve several associated enterprises in different countries making use of internal financing or third-party investors. They are likely to engage expert technicians, engineers and advisers in-house or recruited externally.

Carbon finance has emerged as an attractive option to help fund initiatives to generate carbon credits. It offers a type of payment for environmental services in which emissions reductions from an activity are certified and then purchased by governments, companies and individuals who wish to invest in a global effort to reduce

25 The International Financial Reporting Standards Interpretation Committee published guidance on emissions rights in December 2004. It was withdrawn in 2005 due to an undesirable impact on the statutory income statement, the introduction of volatility in balances revalued based on prevailing market prices or allowances, and a mismatch between movements in the asset and liability as recognized through the income statement. The withdrawal of the guidance did not invalidate its application, however. The plan is for the International Accounting Standards Board to conduct a wider assessment on accounting for emissions schemes. No new guidance has yet been issued. The Financial Accounting Standards Board has previously expressed its belief that the classification of emissions allowances as intangible assets is preferable. In practice, utilities and power companies typically classify allowances as inventory (held for use or sale) or intangible assets (held for use). IAS 38 permits a choice between the historical cost model and a revaluation method. Purchased allowances are recorded at cost. Allowances received from a government body at no cost or for less than fair market value are reported at fair market value when received.

26 See the UN TP Manual, chapter 6.

emissions. This flow of investment allows projects that would not normally be economically viable to take place while stimulating technology development and uptake by providing incentives to reduce emissions. Where associated enterprises are involved in an abatement project supported by carbon finance, there will be a party involved with the obligation to deliver carbon emissions to carbon finance investors.

Transfer pricing rules serve to ensure that associated enterprises price their intercompany transactions fairly and consistently with how unrelated companies would price their transactions. That way, income from business activities is properly taxed. Unlike unrelated companies, associated enterprises can arbitrarily shift income to group entities located in jurisdictions where profit is taxed at a low or zero rate. To prevent that from happening, transfer pricing rules require associated enterprises to apply the arm's length principle. The applicable rules prescribe that intercompany transactions must be accurately delineated and subsequently, that the profit of respective group entities is determined based on a comparability analysis. This considers the functions performed, assets used, risks assumed by involved parties and other economically relevant characteristics. It also involves particularities such as the geography/location of activities performed. A functional analysis considers these factors in indicating an appropriate transfer pricing method to determine an arm's length result.

The UN TP Manual provides guidance on how to apply the arm's length principle once relevant functions, assets and risks have been accurately delineated. This guidance also applies to MNEs engaged in generating and selling carbon credits or offsets.

For historical reasons, many carbon credit-generating projects operate in developing countries. Developing countries may provide additional benefits and optimal conditions for abatement activities, such as the right climate conditions or geographic location, or an environment conducive for projects to succeed. They may also serve as relatively cost-efficient locations given lower costs for labour and natural resources, the greater availability of such resources, and less regulation of industrial activities compared to developed countries.

Developing countries have an interest in ensuring that enterprises doing business in their jurisdictions and engaging in emissions reduction report their taxable income consistent with the arm's length principle. This will contribute to domestic revenue mobilization and avoid tax base erosion. It will also assist in avoiding the double taxation of MNEs and the need to seek resolutions under double taxation treaties to avoid it.

The expected increase in mitigation activities makes it relevant for developing country revenue authorities to fully understand the value chain of projects in their countries to tackle carbon emissions. These projects generally involve the use of intellectual property, significant upfront financing and ongoing investments, risks, risk management and other activities that may be conducted or initiated within or outside countries where the actual project is located. Sizeable operational activities may take place where the carbon abatement is occurring.

Revenue authorities will likely have a better understanding of the full value chain of emissions reduction projects when robust transfer pricing documentation is in place. It should cover aspects such as:

- Functions performed by all relevant group entities and their economic significance
- Relevant risks assumed
- Assets used
- An analysis of relevant transfer pricing considerations, including methods used

With this information, revenue authorities may be better prepared to assess local activities and contributions related to emissions reduction projects, and ask relevant questions during audits.

6. Project Value Chain Analysis

The value chain analysis of projects to generate carbon offsets and credits will invariably depend on a specific project. For transfer pricing purposes, each case requires accurate delineation to determine assets, functions and risks for associated enterprises.

To gain a better understanding of what that may entail, this section presents three sample emissions reduction projects involving reforestation, clean cooking and industry.

Many companies engage in projects that may not necessarily be as fully fledged as the ones discussed here. They may not qualify for carbon credits. Some may involve only buying carbon credits or offsets, or investing in technology to operate in a more environmentally friendly fashion. To assess whether activities are properly compensated for at arm's length (or costs are correctly allocated) requires a functional analysis to elaborate functions performed, assets used and risks assumed. For any relevant emissions-reducing technology being developed, licensed and used, the functional analysis considers DAEMPE functions.[27] Further, financing carbon credits may be considered a financial service subject to licensing requirements, and carbon credit units may be treated as financial products.

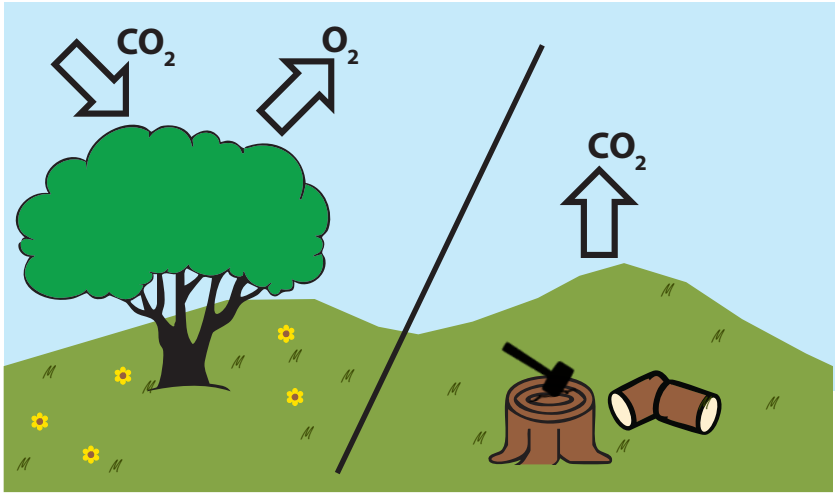
6.1. Example 1: A Reforestation Project

Carbon sequestration involves capturing, securing and storing carbon dioxide from the atmosphere. Carbon dioxide can be naturally captured through biological processes. Planting trees captures carbon, for instance, and there is increasing interest in investing in appropriate carbon offset projects that use the natural growth process of trees to hold (or sequester) carbon dioxide in living wood, roots and forest soils (figure 2).

There are different ways to capture or "biosequester" atmospheric carbon and lock it into living and dead biomass in the ecosystem. Reforestation involves replanting trees on forest land. Afforestation entails planting trees on land with a different original ecosystem, such as a former desert. Forest maintenance projects, such as those under the Reducing Emissions from Deforestation and Forest Degradation in Developing Countries mechanism (REDD+) established under the United Nations Framework Convention on Climate Change, produce sovereign credits. REDD+ enables companies, conservation groups and countries to invest in forests as offsets for carbon emissions, providing financial incentives to encourage developing nations to conserve their forests and reverse deforestation. Strict requirements must be met before sovereign credits can be issued, however.

27 See the UN TP Manual, chapter 6.

Figure 2: Emissions from deforestation



Source: Adapted from Samoa Conservation Society (2022). Carbon Offset Programme.

Reforestation projects involve upfront capital investments for which carbon credits are expected to be granted in return. These projects require specific knowledge to inform decisions on which land to invest in and in which countries; land acquisition; financing; operational activities (e.g., animal control, site preparation, herbaceous release, reforestation, and road and ditch maintenance); carbon management; certification; marketing and sales; and general and administrative activities (including legal and insurance). The key source of revenue comes from carbon sequestration. Reforestation projects go through the monitoring, reporting and verification process described above to qualify for and generate carbon offsets.[28]

Project design

The project design stage considers the eligibility of a proposed activity. Project developers need to make sure that the initiative can meet specific requirements to qualify for carbon credits. For example, only certain lands may be eligible for reforestation projects. Some countries may require a letter of approval for the project, which should be secured in a timely fashion to avoid finding out later that the project was not viable. Site and soil conditions should be assessed along with the costs of site preparation.

Once the planned project activity meets required criteria, developers may acquire necessary data, evaluate them and formulate a project design document (PDD). The PDD describes the project background, objectives, benefits, and impacts other than

28 A detailed overview of the process based on a Clean Development Mechanism project is provided in United Nations Framework Convention on Climate Change (2013). Afforestation and Reforestation Projects under the Clean Development Mechanism. New York, NY: United Nations.

emissions reduction, particularly socioeconomic and environmental benefits. It also explains how the project aims to contribute to sustainable development in the country where it will take place. It should include technologies and measures to afforest or reforest land (e.g., assisted natural regeneration, planting of seedlings or aerial sowing of seeds). Information on the species and varieties of trees to be planted, nursery and planting techniques, and planting machines and equipment should be provided. If genetically improved trees will be used, this should be noted along with a description of any adverse ecological effects and how these would be managed or contained.

Issues to be considered and documented include the legal title to land to be afforested or reforested (e.g., ownership and the nature and type of tenurial rights) and an authorization to undertake the project and exercise rights necessary to access and monitor carbon pools. Preparation of the PDD is one of the most important steps in a reforestation project and requires specific expertise.

Approval

A letter of approval from the designated national authority confirming voluntary participation is a prerequisite to register a project activity. The letter should confirm the project's contribution to sustainable development. The scope of this administrative phase may depend on arrangements within the organization acting as the designated national authority.

Validation

Validation is critical. It entails reviewing whether it is possible to verify the amount of carbon that can be removed and that will remain removed by a forest in a given year, and whether all project requirements to ultimately qualify for carbon credits are met. The designated operational entity assesses the project design documents against the project qualification requirements, and may ask for further information and evidence to justify and confirm the adequacy of the project. This phase may also involve a public stakeholder consultation or requests for input or comments from stakeholders to determine if the proposed project activity should be validated. After this, the project may be registered.

Registration

Once a registered project has been implemented by project participants and sufficient emissions reductions and removals have been achieved, participants can prepare a monitoring report in accordance with the monitoring plan contained in the registered programme design document. The monitoring report is based on actual data on performance. It provides necessary evidence of emissions reductions or removals achieved, and as such, directly impacts the number of carbon credits awarded.

The monitoring report is submitted to a designated operating entity contracted by project participants for verification and certification. The entity makes the monitoring report publicly available on an official website and undertakes a review and assessment of it to ensure that the report accords with requirements in the registered project design document. The entity can conduct on-site inspections, as appropriate, and test data underlying the monitoring report.

Once it is satisfied with the adequacy of the monitoring report and the emissions reductions or removals claimed by project participants, the entity prepares a verification and certification report that is made publicly available on an official website.[29] It can take several years before a reforestation project leads to sufficient emissions reductions to qualify for carbon credits.

Functions, assets and risks

For transfer pricing purposes, it should be determined what associated parties contribute to the reforestation project. Functions performed may range from developing the appropriate strategy, conducting proper due diligence, project design and development with the help of independent experts, investment in land acquisition or a land lease, the performance of operational activities, obtaining financing, and the provision of intercompany loans, monitoring and risk management.

Some specific examples are:

- Feasibility studies to assess project viability, including the sourcing of terrain and investigating legal requirements and restrictions.
- Funding capital investments to acquire or lease land suitable for the project.
- Obtaining requisite licenses and approvals, which may require agreements with long-term obligations and involve different (unrelated) parties, including those linked to Indigenous rights or water-related rights.
- Sourcing and performance of relevant services crucial to operating a project, which can include running a tree nursery, conducting field work (planting, animal control, site preparation, herbaceous release, reforestation) and field maintenance (boundary line maintenance, waste pyrolysis, fertilization, road and ditch maintenance and control). This includes specific knowledge to manage a reforestation project and mitigate major errors in carbon accounting that could occur, for example, if the time needed for trees to reach their carbon capture potential is not considered; emissions involved in setting up a plot are not minimized; carbon capture potential is calculated on a per tree planted basis without factoring in limitations at the forest ecosystem level; and there is no allowance for tree losses due to inevitable human and climatic disturbances.
- Legal and administrative services, which may comprise interacting with the regulator that verifies and certifies the emissions offsets, which in turn, results in eligibility for (a certain number of) carbon credits.
- The sale of carbon credits to third-party buyers.

Relevant functions generally require specific expertise. For example, determining land ownership and obtaining rights to property may present challenges, including

29 Ibid.

where Indigenous populations have historical rights to forest land that may not have been demarcated.

Strict monitoring is required so that reforestation does not negatively affect other property and lead to the deforestation of other forests.[30] Monitoring may also be required to make sure that reforestation has no negative consequences for forest ecosystems, such as through monoculture practices. It should meet all monitoring, reporting and verification requirements.

To qualify for credits, there may be requirements such as additionality, which includes providing evidence that the emissions reduction resulting from the project is beyond what would have occurred in a business-as-usual situation. Generally, this requires technical consultants to design the proposed activity to meet the requirements of a specific methodology.

Assets used in a reforestation project may include tangible assets (land), intangibles (e.g., trademarks, specific agriculture software solutions and technology), know-how to design and monitor a project, financial assets and the generated carbon credits.

A reforestation project involves assuming business risks, regulatory risks (rules on qualifying for carbon credits are still in flux and subject to changes), market risks (the demand for certain quality carbon credits can fluctuate and impact related prices), foreign exchange risks (carbon credits may be sold in a variety of currencies), risks that customers do not pay for carbon credits, input price risks (the cost of relevant services to maintain the project may fluctuate), liquidity risks (e.g., a reforestation project will only generate carbon credits after several years) and project risks (the carbon capture potential may be less than anticipated). There is also the risk of exposure to claims that a project does not have tenure security or land conflicts may compromise the ownership of carbon credits.[31] The destruction of forests through wildfires or otherwise is another risk as it would impair emissions reduction and result in fewer carbon credits. Further, the value of carbon offsets fluctuates in the market depending on supply and demand, making price risk another relevant concern.

Any loss of forest would reduce access to credits and could present liabilities for buyers in a mature carbon trading system. There are also limits to the potential of reforestation to combat climate change. As forest ecosystems reach maturity, the amount of carbon dioxide they absorb becomes balanced with the amount they release through tree death and decay. At this point, the forest does not operate as a carbon sink; it just maintains carbon storage.

From a transfer pricing perspective, it needs to be clear which associated enterprise carries the ultimate liability for risks that materialize, as that entity is likely to be eligible to receive related profits or be allocated materialized losses.

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30 This is referred to as "leakage". For example, farmers who used the land before the reforestation project may move their activities to neighbouring forests and may need to be compensated to ensure that trees are not cut down elsewhere.

31 Leakage is another risk that is challenging to contain, as neighbouring property is often not owned or under the control of the project investors and developers.

For appropriate transfer pricing methods, reference is made to the UN TP Manual.

Accurate delineation helps determine the functions performed by all relevant group entities as well as the risks assumed and assets used. An analysis of relevant transfer pricing considerations is also required. For example, if insurance is taken out against the loss of a forest due to fire, it is relevant to understand which party took out the insurance and if they are remunerated at arm's length. This is followed by defining which transfer pricing methods are most suitable to determine an arm's length return for the respective functions performed, assets used and risks assumed. Can traditional transaction methods (Comparable Uncontrolled Price Method, Cost Plus Method or Resale Price Method) be applied or are transactional profit methods (Transactional Net Margin Method or Profit Split Method) warranted?

As mentioned above, the eventual holder of the certificate awarding the carbon credit or emissions right may not be the party entitled to the economic value the carbon credit represents. All parties to the transaction ought to be reviewed in relation to their involvement to adequately address the profit attribution of the carbon credit or offset. It is by no means a given that the economic value of carbon credits must be allocated to a party in the jurisdiction where reforestation efforts take place. Some countries, however, might require applying a certain number of voluntary carbon credits from private buyers against their nationally determined contributions.

Transfer pricing documentation should reflect the economically relevant roles of associated enterprises and how they are remunerated in terms of functions, assets and risks.

6.2. Example 2: A Cookstove Project

Nearly 3 billion people worldwide use harmful fuels for cooking in their homes.[32] They rely on traditional biomass fuels such as wood, crop residues and dung, using open fires and traditional stoves. This imposes significant health, environmental, economic and social costs on households in developing countries and contributes to global climate change by emitting carbon dioxide, methane and short-lived climate pollutants such as black carbon.

Clean cooking stoves offer an alternative. They come in all shapes, sizes and designs. The type used depends on factors such as materials readily available, the climate, and the supply chain in a given location. Stoves may be solar cookers or use electricity or biofuel. Cookstove projects fall into two categories: improved efficiency and fuel switches. Improved efficiency stoves are more common. They replace traditional cooking equipment, which typically consists of an open or partially covered flame fed by biomass such as wood or dung cakes, with technology that is more efficient but still relies on traditional fuels. Fuel-switch projects replace traditional equipment with stoves that burn cleaner liquid fuel, such as liquified petroleum gas (LPG). Since the highest number of solid fuel users is in Africa, more than 50 per cent of improved cookstove activities are located there (followed by Asia and Latin America).

32 Gold Standard (2016). Gold Standard Improved Cookstove Methodologies Guidebook.

Using clean cookstoves can reduce carbon emissions and lead to carbon credits, making projects attractive to companies with an integrated climate and environmental, social and governance (ESG) agenda. Carbon finance is emerging as an attractive option for upscaling cookstove initiatives.

The same monitoring, reporting and verification process described above applies before a cookstove project qualifies for and generates carbon offsets.

Project design

A project design document laying out the sectoral scope (energy industries/energy demand) and why it qualifies for carbon credits is required. The document should describe the project background, methodology, objectives and benefits beyond emissions reduction. It should indicate the expected emissions reduction compared to the use of kerosene, LPG or coal. It should also detail the physical site for devices expected to reduce emissions, envisaged market penetration and how the project will demonstrate additionality. The methodology should include standardized baselines and a monitoring plan.[33]

Approval

A written letter of agreement from the designated national authority confirming voluntary participation may be required to register a project activity. The letter should affirm that the project contributes to sustainable development. This phase may depend on national arrangements within the designated national authority.

Validation

Validation reviews how much carbon was removed and remained removed by cookstove use in a given year, and whether all project requirements to qualify for carbon credits have been met. The designated operating entity will assess the project design documents against project qualification requirements and may ask for further information to assure the project's adequacy and rational. After this, the project may be registered.

Registration

Once a registered project has been implemented and sufficient emissions reductions and removals are achieved, project participants can prepare a monitoring report based on actual performance data. It provides evidence of emissions reductions or removals achieved by the project. The monitoring report is submitted to a designating operating entity contracted by project participants for verification and certification. The entity makes the monitoring report publicly available on an official website, and reviews and assesses it to ensure alignment with requirements in the registered project design document. It can take several years before a cookstove project generates sufficient emissions reductions to qualify for carbon credits.

33 An example is available at: https://cdm.unfccc.int/UserManagement/FileStorage/6TOUCX21D0BHNVIRZFWMEKALY94GS7

Functions, assets and risks

For transfer pricing purposes, determining what each party involved in the project contributed requires looking at several functions. These may comprise developing the appropriate strategy; conducting proper due diligence to source the right raw materials and devices, including stove manufacturers; performing research and software development activities; project design and development with the help of independent experts and stove salespeople, as creating demand is vital for uptake and a sustainable business model; marketing, selling and distributing the cookstoves; and monetizing issued carbon credits.

Some specific examples are:

- The sale of cookstoves by a related party manufacturer to a related party distributor, which resells the cookstoves to local consumers
- Head office services (e.g., for information technology, finance and accounting, legal and human resources) provided by a related party or shared service entity
- The licensing of technology intangibles and trademarks
- Contract software development services
- The sale of carbon credits to third-party buyers
- Intercompany financing

For appropriate transfer pricing methods, reference is made to the UN TP Manual.

Innovative distribution models should be explored, such as rural sales initiatives, work with self-help groups and women-run businesses, partnerships with local village savings and loan associations to build awareness of clean cookstove business opportunities, cooperation with microfinance organizations and inclusive supply chains.

Table 1 presents some widely accepted distribution channels for clean cookstove projects.

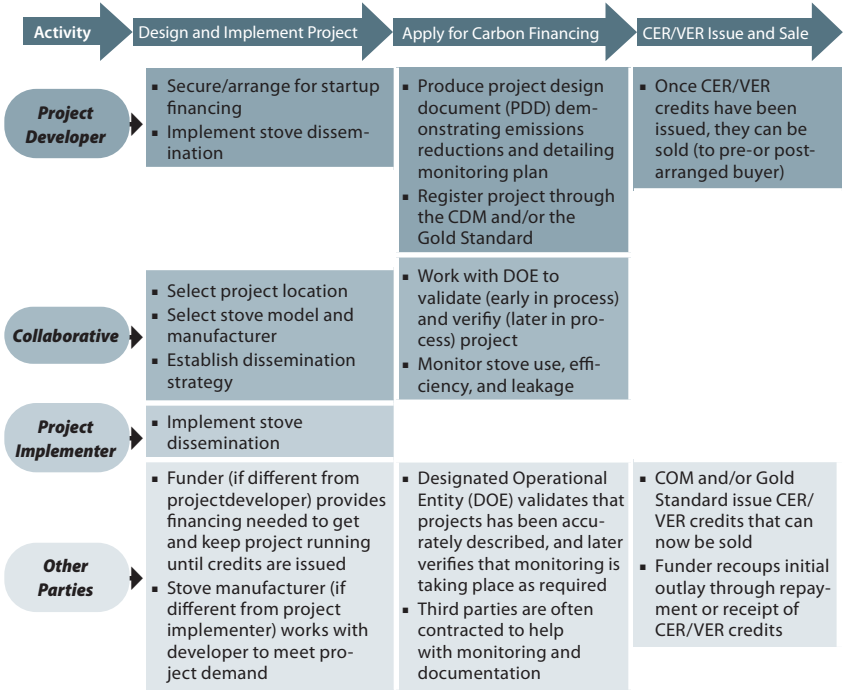
User training and after-sales services are necessary functions, as are monitoring and risk management. A carbon-financed cookstove program can be broken up into several steps as shown in figure 3.

Organizing and operating a qualifying cookstove project requires upfront investment in design and implementation. This may include building a factory and training workers, making investments to scale up manufacturing and distribution, and performing operational activities. Available infrastructure is important, as finished stoves need to be transported to rural villages. Cost may be a barrier, requiring outreach and long-term support for households. Long-term use is very important to emissions reductions and future carbon credits. This may require regular follow-up visits to users to monitor use and verify carbon outcomes as part of navigating the rigorous credit verification process.

Table 1: Distribution channels for cookstoves

Channel type	Direct sales	Private retailers/dealers	Social enterprises	Other
Description	Direct sales to consumers via sales staff, disclosed/brand commission agents or a proprietary branded store network	Indirect sales to third-party consumer goods distributor networks or to retailers and dealers	Sales and order fulfilment through non-governmental organizations, cooperatives or social microfranchise networks	Distribution by institutional parties, including relief agencies, government programmes, etc.

Figure 3: A cookstove project



Source: P. Cox (2011). Analysis of Cookstove Change-Out Projects Seeking Carbon Credits. University of Minnesota Law School, 15 May.

To fund such projects, carbon finance may complement other flows such as donor funds, private investment and intercompany loans. Outside donor contributions, however, investments usually come with an expectation for a return.

Business risks in a cookstove project may include market risks (such as consumer demand being lower than expected or needed to reach the required economies of scale, regulatory risks (rules to qualify for carbon credits are still in flux and subject to changes), foreign exchange risks (carbon credits may be sold in a variety of currencies), credit risks that customers do not pay for carbon credits, input price risks (the price of biofuel fluctuates), carbon credit price risk and liquidity risks (a cookstove project will only generate carbon credits after several years so annual costs will need to be financed).

Assets used in a cookstove project may comprise intangibles (e.g., trademarks, software, and technology), know-how, financial assets and generated carbon credits.

6.3. Example 3: An Extractive Industry Emissions Reduction Project

Several technologies can address oil and gas industry emissions (figure 4).[34] Options depend on whether operators are upstream or downstream. Qualifying for carbon credits again requires certification following proper verification. Mandatory or compliance credits involve Clean Development Mechanism projects while voluntary credits could entail any existing programmes.[35] While technologies exist, many emissions reduction programmes in the extractives industry are still in a pilot phase and have not undergone a full monitoring, reporting and verification process or been awarded carbon credits.

One option to offset emissions is by tapping into natural carbon sinks, including oceans, plants, forests and soil. Plants and trees sequester around 2.4 billion tons of carbon dioxide a year, for example.[36] Carbon capture, usage and storage (CCUS) projects are considered promising, with companies announcing programmes to plant up to 20 million acres of forests in Africa to serve as a carbon sink.[37] The following project offers an example.

CCUS projects capture carbon dioxide and use or store it to prevent its release into the atmosphere (figure 5). In some cases, the captured carbon dioxide can be used to create products such as cement or synthetic fuels. Many industrial processes

34 McKinsey & Company (2020). The Future Is Now; How Oil and Gas Companies Can Decarbonize.

35 See section 2 of United Nations, Chapter 3, The Interaction Between Carbon Taxes and Carbon Offset Programmes. In Emerging Issues in Environmental Taxation: A Supplement to the 2021 UN Handbook on Carbon Taxation.

36 G. Popkin (2015). The Hunt for the World's Missing Carbon. Nature 523 (20-22).

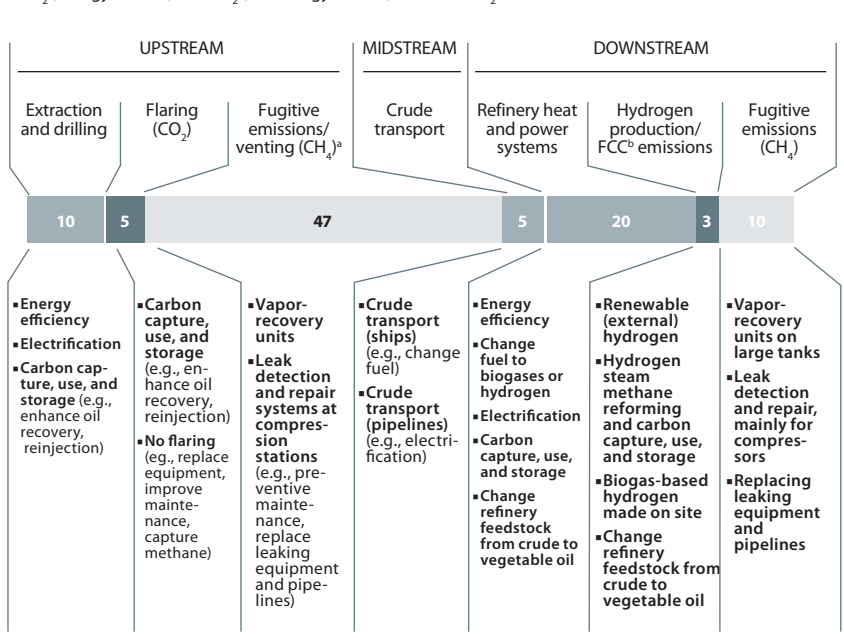
37 See, for example, Edie (2019). Oil Giant Eni Targets Net-Zero Carbon Emissions by 2030 Press release.

generate carbon dioxide, most prominently when hydrocarbons are burned for power. Emissions can be captured at the source, such as at power plants or refineries, or from the air itself. Capture technologies include some using membranes and others applying solvents. Once captured, concentrated carbon dioxide can be transported via pipelines, vessels or trucks to places where it can be used or simply stored underground.

Figure 4: Technologies that address oil and gas industry emissions

Current technologies can address most of the oil and gas industry's emissions

Emissions by source, share, and possible solutions, %



a Fugitive emissions from midstream are included in upstream (~20% of total and gas emissions, mainly methane) to be consistent with IEA World energy outlook 2018 classification.

b Fluid catalytic converter.

Source: OECD and IEA (2018). World 2018 CO_2 and SF_6 Emissions from Fuel Combustion; OEDC and IEA (2018). World 2018 Emissions of CO_2, CH_4, N_2O, Hydroflurocarbons, and Perfluorinated Compounds; European Commission Joint Research Centre (2017). Global Greenhouse Gases Emissions EDGAR v4.3.2. Available at: edgar.jrc.ec.europa.eu; IEA (2018). World Energy Outlook 2018. Available at: iea.org. Taken from McKinsey & Company (2020). The Future is Now; How Oil and Gas Companies Can Decarbonize.

Functions, assets and risks

A CCUS project involves removing carbon dioxide from process gas streams.[38] Carbon storage (without use) is largely a cost, and thus attracts relatively little project investment and innovation, particularly without regulatory support or incentives. Complex legal issues are involved, such as liability for potential leaks, and there are jurisdictional complexities associated with underground property ownership and use.[39]

In this example, typical transactions for a transfer pricing analysis include:

- The provision of a storage facility
- The licensing of CCUS technology intangibles and trademarks
- Transportation services to deliver gas at the production facility
- Services at the production facility
- Operational services (pipeline transportation, storage, monitoring, maintenance and repairs) to store carbon dioxide in depleted reservoirs
- Determination of who runs the risk of leaks or other issues with the storage facility and appropriate remuneration
- Head office services (e.g., information technology, finance and accounting, legal and human resources) by a related party shared service entity
- Contract software development services
- The sale of carbon credits by the emitter to an internal trade desk and subsequently to third-party buyers
- Intercompany financing

For appropriate transfer pricing methods, reference is made to the UN TP Manual.

Setting up a CCUS project requires a facility at or near a production plant to separate, capture and store the carbon dioxide. It also requires know-how and technology. This requires specific technology (amine technology) to dehydrate and compress the captured carbon dioxide to a dense-phase state for efficient pipeline transportation to a sequestration area obtained by the company. The technology must be developed or licensed, and people will need to be trained on operation and maintenance.

Risks include leakage from the storage (in which external integrity reviews are conducted) and geological risks (such as those related to wells drilled near the storage location). Functions include facility operations (storage, monitoring, maintenance and repairs), pipeline management (operating temperature, fluid composition and

38 A similar real-life example is the Shell Canada Energy Quest Project. See more at: https://www.nrcan.gc.ca/science-and-data/funding-partnerships/funding-opportunities/current-investments/shell-canada-energy-quest-project/18168.

39 McKinsey (2020). Driving CO_2 Emissions to Zero (and Beyond) with Carbon Capture, Use, and Storage.

operation pressure), and handling regulatory, reporting and filing requirements, among others.[40]

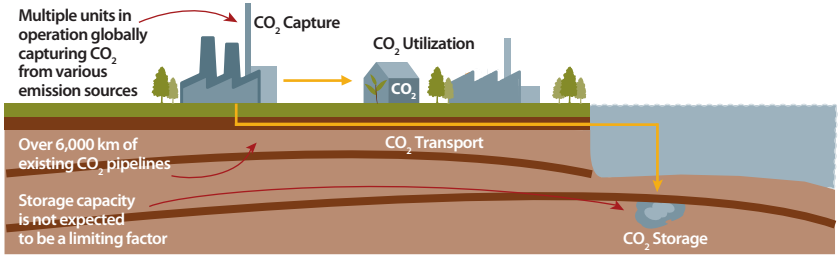
Examples of costs that may be directly attributable to the generation of project-based certificates include:

- Materials and services used or consumed in generating the certificates
- Employee benefits
- Fees to register a legal right
- Amortization of patents and licenses
- Associated borrowing costs to meet capitalization criteria

For corporate income tax and transfer pricing purposes, the functions, assets and risks of associated enterprises need to be accurately delineated to ascertain if cost and income allocations are at arm's length.

Figure 5: CCUS based on proven technologies

CCUS is based on proven technologies that have been in operation for decades



Source: Data from GCCSI (2017), IPCC (2018)

40 For example, see Shell (2015). Quest Carbon Capture and Storage Project. Annual Summary Report.

7. Transfers of Carbon Credits

Carbon credits are among the newest commodities traded on global markets. As non-tangible energy credits, they would not have been developed without the Kyoto Protocol and the subsequent Paris Agreement.

7.1. Buying Carbon Credits

Businesses and other organizations typically buy carbon credits for several reasons. These include:

- To comply with a regulated carbon market, such as the existing European Emissions Trading System (EU ETS)
- To meet shareholder or consumer demand for compliance with environmental, social and governance standards and an improved sustainability footprint, or for overall improved branding purposes
- For speculative purposes, with the intention of trading them later for a profit
- To offset a carbon footprint voluntarily due to a desire to become carbon neutral

If a company intends to use carbon credits to help offset its carbon footprint, it will need to retire them after they are purchased. This should be done on an independent register within a given carbon market. Retiring a credit shows that it has been used or spent. Until that point, it is still a fully tradable credit that no one has used. Retirement is, therefore, an important step towards becoming carbon neutral.

7.2. Trading Carbon Allowances

While anyone can get involved in carbon trading,[41] the main groups are typically:

- Compliance installations (e.g., steel, cement, paper, chemicals and aluminium plants located in jurisdictions with cap-and-trade schemes)
- Trading firms such as hedge funds
- Electricity, gas and other utility companies
- A small number of banks
- Carbon brokers, either as introducers or intermediaries

41 For example, Europe currently has no restrictions on who can operate a registry account.

In the most liquid carbon markets, trading takes place all day long, all year round. Many installations covered by carbon trading systems, however, concentrate their activity close to compliance deadlines. In the European Union, compliance purchasing under the Emissions Trading System is concentrated in the three months leading up to the 30 April compliance deadline. This can cause some price aberrations depending on the supply/demand balance at the time. Those with larger exposure, such as electricity and utilities companies, trade more regularly and purchase in bigger numbers. In the early stages of compliance, free allowances given to industry may provide an effective price signal to everyone. Over time, the proportion of allowances auctioned by governments increases. This tends to spread the timing of trades out over the year and is a natural progression for a maturing market.

7.3. The Transfer Price of Carbon Credits

The variables in pricing carbon are complex. A carbon crediting mechanism is one of several mechanisms available to tie the negative results of greenhouse gases to a price on those emitted. Carbon credits come in all shapes and sizes and can vary greatly due to several factors. From the end users' point of view, certificates of emissions have typically ranged from 9 to 25 United States dollars, while voluntary emissions reductions have traded between $5 and $15, although it may be possible to find cheaper options.

Generally speaking, as with any emerging market, the better the product, in this case the credits, the more they tend to cost, subject to supply and demand. While all carbon credits are theoretically equal in value to one metric ton of greenhouse gas emissions, they can have different outcomes on the environment. Their prices vary depending on the type and quality, particularly in the voluntary market. For example, market prices in the voluntary market can diverge depending on: a) the type of credit — such as wind, solar, hydro or forestry, b) the standard to which they have been certified — such as Kyoto compared to the Verified Carbon Standard or some other standard, c) the country of origin, d) the auditor that certified the original carbon project and that auditor's credentials, and e) the story attached to a project, such as whether it is generating additional social and community benefits.

Market prices within the compliance market are somewhat more consistent and can be found on various exchanges around the world, typically within 10 per cent of each other. Prices fluctuate depending on general market conditions and external events. The pricing of compliance credits relates mainly to supply and demand and the risk of fines if a liable business fails to comply with a particular carbon-trading scheme.

Carbon credit prices may also vary based on the seller or an intermediary. The carbon market essentially consists of three sectors: project developers and originators, brokers and traders, and retailers and resellers. If buyers go directly to the originators and project developers, they usually receive a cheaper price but would also need to buy in much larger quantities — such as 100,000 or more tons. They must also know whom to contact. This is likely to become harder as the market becomes more regulated and structured in the coming years. Originators may increasingly prefer to deal through brokers and traders, who will then, in turn, deal with the retail market.

This analysis does not discuss carbon pricing systems such as internal carbon pricing (a tool used by organizations to guide their decision-making on climate change impacts, risks and opportunities), the detailed functioning of an emissions trading system, or the implementation and impact of carbon taxes as a mechanism to price the external cost of emissions that the public pays for, such as damage to crops, healthcare costs from heat waves or droughts, and the loss of property from flooding and sea level. Carbon taxes are addressed in the United Nations Handbook on Carbon Taxation[42] and in the supplementary guidance to the UN Handbook on Carbon Taxation[43] issued by the United Nations Committee of Experts on International Cooperation in Tax Matters.

7.4. Trading and Retiring Carbon Credits

Buying and selling carbon credits is a relatively straightforward process. It can be compared to buying and selling shares in a stock market. No physical asset changes hands, and as such, transactions are relatively uncomplicated. The tricky part for newcomers to the industry is finding the right intermediary and then deciding at what price to buy or sell. It is also important to be aware of different types of credits and how they compare with each other.

In most cases, carbon credits can be bought and sold internationally; minimal restrictions are currently in place.[44] Buyers and sellers need to be careful in understanding if specific markets will recognize credits, however, as requirements may differ. For example, Europe currently has some regulations that prohibit the retirement of certain types of carbon credits.

Carbon credits purchased to help offset carbon footprints need to be retired to count towards carbon neutrality. Carbon credits that are going to be retired should first be listed or registered on a recognized carbon register so that they can be traced. Once they've been registered, they can then also be retired. Most reputable registries will retire carbon credits for a small fee. If credits are bought from a carbon broker or third party, they should also be able to arrange this service.

42 United Nations, United Nations Handbook on Carbon Taxation for Developing Countries.

43 United Nations, Chapter 3, The interaction between carbon taxes and carbon offset programmes in United Nations, Emerging Issues in Environmental Taxation: A Supplement to the 2021 UN Handbook on Carbon Taxation.

44 The introduction of a carbon border adjustment mechanism in 2023 in the European Union means that imports of certain goods with carbon-intensive production (cement, iron, steel, aluminum, fertilizers, electricity and hydrogen) will become subject to additional costs as of 2026.

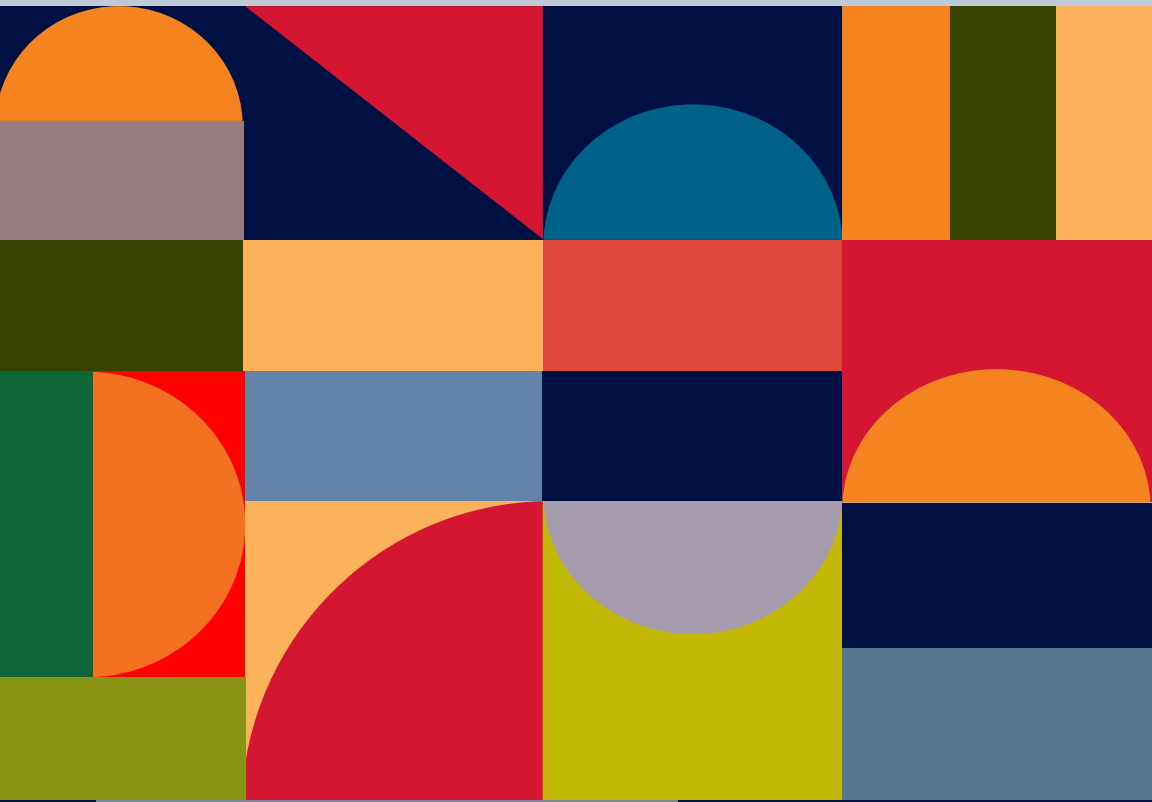
8. Conclusion

Understanding processes to generate carbon credits and the value chain of carbon emissions abatement activities will help in considering how to apply transfer pricing rules to the generation, transfer and sale of carbon credits where associated enterprises are involved. Such insights guide the accurate delineation of the actual transactions based on economically relevant conditions and circumstances.

If income resulting from the generation and sale of carbon credits is considered wrongfully allocated between associated enterprises, and tax authorities make corrective adjustments, this will likely lead to double taxation. Since unresolved double taxation will ultimately become a disincentive to generate carbon credits, it is important to avoid this scenario.

The carbon credit business does not necessarily require transfer pricing considerations different from those that already exist. It does, however, call for awareness of the complexity of carbon credits, including their intangible and fungible nature. Other issues entail a regulatory system with both compliance and voluntary markets, the capital-intensive nature of carbon credit generation, the price volatility of credits and the use of carbon financing. Significant political sensitivity surrounds carbon credits as a mechanism to combat climate change that is market-driven and subject to fast-changing international and domestic rules and regulations.

Developing countries setting themselves up to participate in international carbon markets and accommodate climate change projects that produce carbon credits may want to consider providing additional clarification on whether they will consider carbon credits as intangibles for transfer pricing purposes, consistent with the Generally Accepted Accounting Principles/International Financial Reporting Standards; how subsidies for carbon projects will be treated in the value chain; and whether costs incurred for mandatory and voluntary projects will be treated consistently and follow a regular business cost analysis for corporate income tax purposes.



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