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Paper for first consideration from the Transfer Pricing Subcommittee

Transfer Pricing of Carbon Offsets and Carbon Credits

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Abbreviations

CCUS	Carbon Capture Usage and Storage
CDM	Clean Development Mechanism
CER	Certificate of Emission Reduction
COP	Conference of the Parties (decision-making body of the UNFCCC)
CSR	Corporate Social Responsibility
CUP	Comparable Uncontrolled Price (a transfer pricing method)
DOE	Designated Operational Entity
DNA	Designated national Authority
ETS	Emission Trading Scheme
GHG	Greenhouse gases
Handbook	The UN Handbook on Carbon Taxation
ITMO	Internationally Transferred Mitigation Outcomes
LOA	Letter of Approval
MNE	Multinational Enterprise
MRV	Monitoring, Reporting and Verification
Net- zero	Removing an equal amount of CO_2 from the atmosphere as is being released into it
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
PDD	Project Design Document
SDG	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

Purpose

The purpose of this workstream is to elaborate on the value chain of carbon emission abatement activities that serve to generate carbon credits (or carbon offsets. For definitions, see Introduction hereafter). The underlying reason is to consider how transfer pricing rules apply to the generation, transfer, and sale of carbon credits. If the carbon credit value chain includes transactions between associated enterprises, understanding that value chain is relevant for transfer pricing purposes, as it will aid with properly delineating the actual transactions between the associated enterprises. Accurate delineation of the actual transactions requires analysis of the economically relevant characteristics of the transaction which consist of the conditions and the economically relevant circumstances of the transaction. The application of the arm's length principle depends on determining conditions that independent parties would have agreed in comparable transactions in comparable circumstances.

Carbon credits have a market value and can be considered a form of "in-kind" business profit resulting from the relevant integrated activities that lead to generating the carbon credits. Understanding the functions performed, assets used, and risks assumed by each of the parties with respect to the activities performed and transactions involved will assist with accurately delineating the relevant transactions for transfer pricing purposes. This paper at times cross-references a paper from the UN Tax Committee's Environmental Tax Subcommittee dealing with carbon offsets. That paper raises awareness of the Framework provided by Article 6 of the Paris Agreement and addresses carbon taxation opportunities.[1]

The (high level) overview presented in this paper aims to provide some insights as to:

1. Different ways in which carbon credits may be generated.
2. The (still evolving) regulatory system that allows for the creation, use and trade of these credits (including mention of the monitoring, reporting and verification systems material for the functioning of the relevant systems), which may serve to better understand what steps and actions are required to comply.
3. The (intercompany) transfer of carbon credits.

[1] References are made to the version of the paper dated 26 February 2023.

Introduction

Everyone aiming to minimize their contribution to climate change should first aim to cut their carbon emissions. This may not be enough to remove an equal amount of CO_2 from the atmosphere as is being released into it, however. Therefore, a common saying among sustainability professionals is that if you want to tackle your carbon footprint, you should reduce what you can and offset what you can't. That means that carbon credits serve an important function to help reduce global warming.

A carbon credit is a tradable, intangible instrument representing a unit of carbon dioxide equivalent (CO_2) (typically one tonne that is reduced, avoided, or sequestered by a project), and is certified/verified to an internationally recognized carbon accounting standard.[2] Carbon offsets can arise from any activity that compensates for the emission of carbon dioxide (CO_2) or other greenhouse gases (**GHG**) (measured in carbon dioxide equivalents [CO_2e]) by providing for an emission reduction elsewhere. Because GHG are widespread in the Earth's atmosphere, the climate benefits from emission reductions, regardless of where such cutbacks occur.[3] Carbon credits are designed to serve as market-mechanisms that help reduce overall carbon emissions.[4] Companies, in weighing up the costs and benefits of their options, may either adjust the way they do business to reduce their own carbon emissions (which may require significant investments but may be cost effective over the long run), or purchase carbon offsets. The UN Handbook on Carbon Taxation (**Handbook**) references an example of a power plant in Canada paying a farmer in Zambia to plant a quantity of trees sufficient to offset the power plant emissions. This might be cheaper than paying the applicable carbon tax or making the significant investment required to switch fuels and it can have substantial co-benefits (for example, on the livelihoods of people in developing countries).

This paper serves to provide insights into the value chain that leads to carbon offsets and carbon credits for purposes of considering relevant related transfer pricing aspects. The terms carbon offsets and carbon credits are frequently used interchangeably although technically, they operate based on different mechanisms. A carbon offset removes GHG that is already in the atmosphere (sequesters the carbon) and a carbon credit is a reduction in release of GHG to the atmosphere. Together they cover a wide array of units, certificates, quotas, and allowances.[5] The term 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.[6]

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[2] IETA & ICROA (2016). White Paper: Enlisting government support for voluntary carbon management and offsetting to scale and accelerate climate action. Available from Position and Discussion Papers (ieta.org)

[3] Britannica (2011). Definition of carbon offset. Available from https://www.britannica.com/technology/carbon-offset.

[4] Although some carbon credits may be attached/used only by the company generating them.

[5] For more detail see chapter 1.2 of the paper on carbon offsets prepared by the Subcommittee on Environmental Taxation.

[6] Importantly, once a carbon credit is effectively used, and offset against CO2 is emitted, that credit is declared used and "retired," and cannot be sold or used again. If credits are to be used once, they can

Carbon credits essentially are accounting units that are tracked and recorded in designated GHG registries but can also be traded and transferred among entities. While technically different, the terms carbon offsets and carbon credits are often used interchangeably and both typically represent one tonne of CO_2 reduced, avoided, or sequestered as certified/verified to an internationally recognized carbon accounting standard.

Projects where a business decides to invest in actions that reduce GHG emissions ancillary to their everyday operations, like capturing methane gas at a landfill, planting, or preserving forests or storing carbon, generate carbon offsets. These projects typically (but not always) may involve building wind turbines, supporting solar farms, or investing in forest preservation and reforestation efforts.

When one company removes a unit of carbon from the atmosphere as part of its normal business activity, it may be able to 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. To properly determine and allocate the income for tax purposes resulting from the purchase and sale between associated enterprises it is relevant to determine that the functions performed, the assets used, and risks assumed by each of the associated enterprises with respect to activities that lead to carbon credits are remunerated at arm's length.

Carbon credits were introduced as financial incentive to change behaviour towards reducing GHG emissions and reduce climate change. The Handbook elaborates on how carbon taxes can also serve as incentive (since they function as a form of penalty) to induce a change in behaviour to a less GHG emitting mode of operation with resulting positive change for climate change.

A corollary of transfer pricing is that if income resulting from the generation and sale of carbon credits is considered allocated wrongfully between associated enterprises and tax adjustments to correct for this are proposed by tax authorities, that will likely lead to double taxation. Usually, the (now adjusted) business income is already reported as taxable income in the country of one of the associated enterprises, and the tax adjustment in the other country therefore leads to double taxation. Unresolved double (corporate income) taxation of carbon credits will constitute an unforeseen added cost (and a disincentive) to generating carbon credits. It is important that this is avoided. Understanding the value chain involved with generating carbon credits will assist in accurately delineating the relevant transactions between associated enterprises and assessing the arm's length income allocation of carbon credit-related (cost and) income between associated enterprises consistent with applicable transfer pricing rules.

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be used by the private company to offset its emissions, and potentially also by the host country as a tool to meet its NDCs. A counterargument to this is that forbidding host countries to use credits produced on their territory and used by private companies as offsets would slow down the deployment of carbon projects. Please also see chapter 1.1 of the paper on carbon offsets prepared by the Subcommittee on Environmental Taxation.

Regulatory Framework

To understand for transfer pricing purposes what the relevant functions, assets and risks are when engaging in intercompany carbon credit transactions, it is beneficial to understand the regulatory regime applicable to carbon credits. Historically, carbon credits have been regulated and issued by national or international government organizations. The first international carbon markets were the result of the 1997 Kyoto Protocol. More recently, the 2015 Paris Agreement further regulated the operation of carbon credits.

The Kyoto protocol is a product of the 1992 United Nations Framework Convention on Climate Change (**UNFCCC**), that provided legally binding ceilings on future GHG emissions by advanced industrialized countries. It provided flexibility as to what GHG was to be controlled, where control can be implemented, and what domestic policy measures would be used. It introduced a Clean Development Mechanism (**CDM**) designed to implement emission-reduction projects in developing countries. The Kyoto protocol covered the years 2008-2020, divided into two commitment periods. CDM projects produced Certificates of Emission Reduction (**CERs**) for every tonne of carbon absorbed or captured from the atmosphere.

In 2015, the Paris Agreement was adopted, that looks to the period beyond 2020. The Paris Agreement is a universal environment accord that has as goal to cap the rise of global temperature well below 2degrees Celsius above pre-industrial levels.[7] To keep global warming to no more than 1.5 degrees Celsius – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050. The Paris Agreement allows countries to voluntarily cooperate with each other to achieve emission reduction targets set out in their Nationally Determined Contribution plans (**NDCs**). Under Article 6 of the Paris Agreement, carbon credits resulting from the reduction of GHG emission activities in one country can be transferred to help one or more (other) countries to meet climate targets. Article 6.2 creates the basis for trading in GHG emission reductions (also referenced as "internationally traded mitigation outcomes" (**ITMOs**)) across countries. Article 6.2 provides a framework within which countries can create their own systems in ways that are consistent with UN rules and comparable to each other.[8] It considers three types of use of ITMOs: a) for NDCs, b)

[7] Article 2(a) of the Paris Agreement in relevant part provides that the Agreement aims to "Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;"

[8] Article 6.2 of the Paris Agreement provides: "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 of the Paris Agreement allows one country wanting to purchase emission reductions from another one to use them towards its own target, it agrees that entities other than governments can use the emission reductions as well. The host country will have to make an adjustment for those against its NDC. It

for other international purposes (meaning international regimes outside the Paris Agreement, such as the International Civil Aviation Organization for aviation and the International Maritime Organization for shipping), and c) for other purposes, meaning the voluntary carbon market (**VCM**). Article 6.4 establishes a mechanism for trading GHG emission reductions between countries. It is supervised by the Conference of Parties (**COP**) – the decision-making body of the UN Framework Convention on Climate Change.

The Paris Agreement unlocked a so-called voluntary market where it is optional to exchange or trade carbon offsets. The voluntary market is open to individuals, companies, and other organizations that want to reduce or eliminate their carbon footprint but are not necessarily required to do so by law. Organizations with operations that reduce the amount of carbon already in the atmosphere (for example by planting more trees or investing in renewable energy) can issue carbon offsets provided they meet certain metrics and verification regulations.[9] Companies that seek to reach net-zero (meaning that they remove an equal amount of CO2 from the atmosphere as is being released into it by them) may be seen investing heavily in renewable energy, for example reducing emissions in the car manufacturing process, or supporting reforestation projects to use the carbon offsets. When dealing with voluntary carbon offsets, every tonne of CO_2 that a verified project manages to absorb, avoid, or otherwise reduce, can lead to the issuance of a carbon credit.

GHG removed under voluntary projects in the VCM that are not intended to be surrendered into an active regulated carbon market are usually referenced as a Voluntary Emission Reduction Unit (or Verified Emission Reduction Unit) (**VER**). VERs are carbon credits originating from the voluntary CO_2 market. All VERs must be verified by an independent third party. Currently, VERs are mostly used by companies who are looking to voluntarily offset the emissions generated during their business activities to show social responsibility and establish a healthy and green corporate image. An increasing number of companies are investing in VER projects to reduce their carbon footprint and to reach a net zero emission status. They don't have to be entered into a national inventory because they aren't created to meet a legal

envisages that a government can agree that emission reductions achieved in its country can be used by a company towards its company target. The host government won't count those emissions reductions towards its NDC. The company then has a unique claim, and the reductions are not counted towards the host government's NDC. The resulting credits are entirely the company's own to use and to claim.

[9] Carbon credit verification is a highly scrutinized process. Two verification schemes are the most common ones for offset projects, namely The Gold Standard and the Verified Carbon Standard. Generally, they consider four key aspects: (1) Additionality (i.e. the project leads to additional GHG reduction than otherwise would have happened without the project); (2) Permanence/Durability of the project; (3) 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 (4) Leakage (Leakage refers to an unintended increase in GHG emissions or the shifting of emissions from one place to another due to a carbon credits project because of shifting demand from a protected place to an unprotected one).

requirement. A host country can, if they choose, apply a corresponding adjustment to VERs that leave its border, but this is not required.[10]

In a VCM, private entities or entitled standard setters, are responsible for the project certification. Developers of projects resulting in the avoidance, decrease or removal of carbon emissions can apply to these entities to certify and prove the amount of carbon emissions avoided, decreased, or removed. As a result of certification, the developer can obtain voluntary carbon credits (also referenced as **VCC**). One carbon credit represents one tonne of CO_2 emission reduction. Such VCCs are stored at a personalized account in a registry owned or retained by the entity that certified the project. The developer can either retire the credits, i.e., annul them to claim the reductions they represent, or sell them to another entity owning an account at the registry. There are various ways in which VCCs can be traded and various institutions are involved in the process: brokers, exchanges, retail traders, advisors. VCCs issued by a given entity and stored in a registry managed or retained by this entity cannot be transferred to a registry of a different certifying entity.

In comparison, in the compliance markets (i.e., Emission Trading Schemes (**ETS**)) covered entities may be required to obtain carbon credits to offset their emissions to stay within their emission targets. The emission trading system is based on the notion of tradeable pollution rights, which for practical purposes are either carbon allowances as they provide the right to emit a certain quantity of GHG emission, or a carbon credit to be offset against a business-as-usual baseline carbon impact.[11]

An ETS involves placing a limit or cap on the total volume of GHG emissions in one or more sectors of the economy. A government then auctions or distributes tradeable emission allowances[12] to entities covered by the cap, where each allowance represents the right to emit a certain volume of emissions (typically a metric tonne of carbon dioxide equivalent) and the total volume of allowances equals 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 allowances. This policy type is known as a "cap and trade" system.

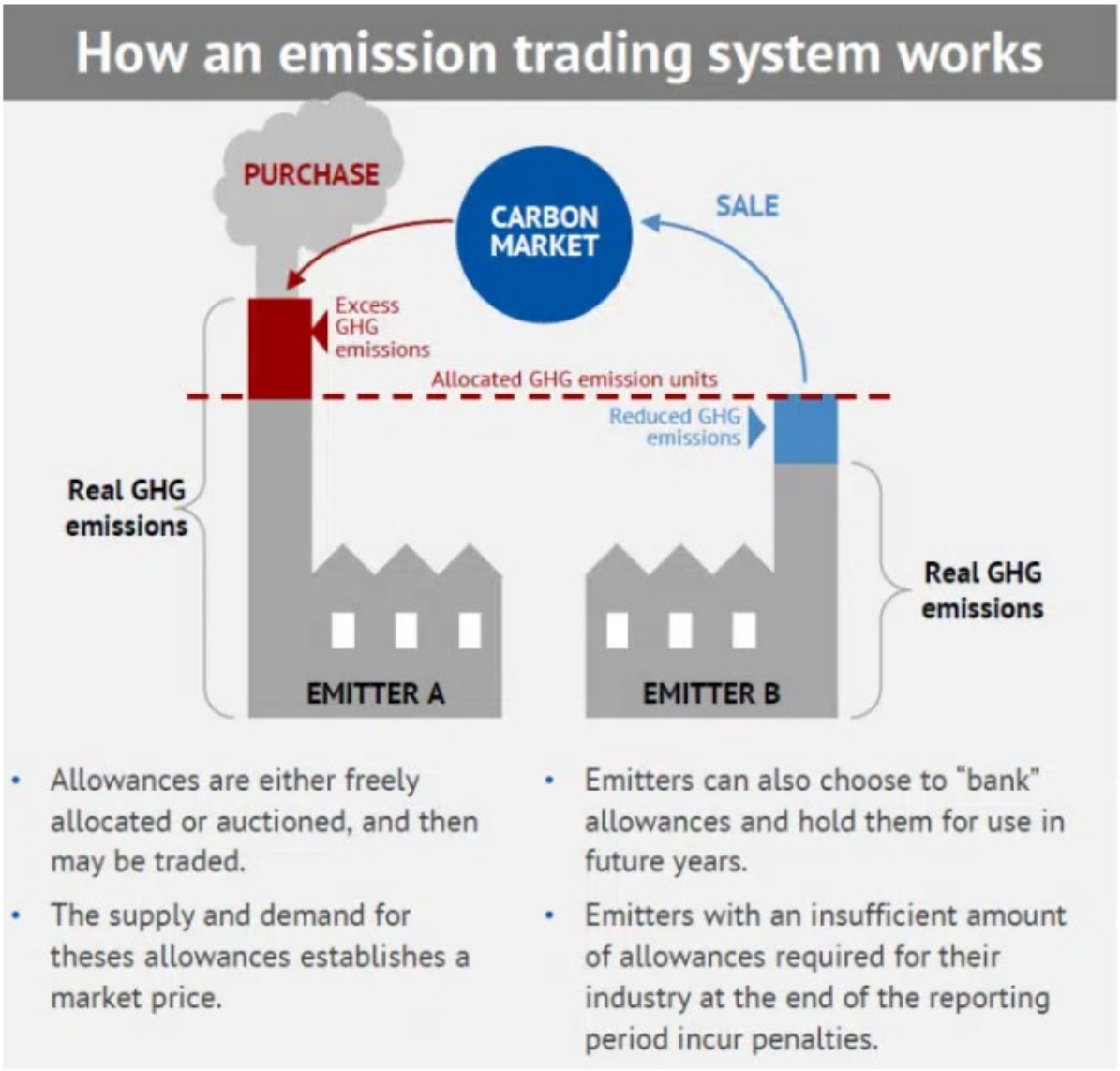
Cap and Trade Scheme

Assume the government instituted a total cap of 10,000 tonnes of carbon annually and ten pollution-creating factories were responsible for all the GHG. The government could then create 10,000 one-tonne carbon credits and either allocate them (give a certain quantity for free to each factory) or auction them (have each factory bid for the amount it needs). Each factory would be required to hold the number of allowances equal to its level of GHG emissions. If a factory needs more than the amount it received through allocation or auction, it needs to purchase additional credits in the marketplace.

[10] The classical approach of the voluntary market consists of the purchase and cancellation of credits generated by baseline-and-crediting programs.
[11] For an overview of different offset rights and systems, reference is made to Ruiz, M.A. (2022). Taxing carbon offset credits. Available from Kluwer International Tax Blog (kluwertaxblog.com).
[12] Carbon allowances require a permit to release a certain quantity of GHG into the atmosphere.

If a factory produced fewer GHGs than the amount it received, it could sell the excess credits in the marketplace.

Figure 1: How an emission trading system works[13]



Baseline and Credit Schemes

Each source participating in the scheme is assigned a specific emissions limit (baseline) for a period. After the relevant 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 in the amount of the difference. If a source has emitted more than its limit, it must buy emissions credits from sources that were below their limit to offset the excess emissions.

In some schemes, emissions credits expire if unused; in others, they may be banked for use in future years. Some schemes allow participants flexibility, for example, by

[13] Carbon Markets 101 (nd). The Ultimate Guide to Understanding Carbon Credits. Available from The Ultimate Guide to Understanding Carbon Credits • Carbon Credits

engaging in project-based activities or by paying into an environmental fund to make up for a shortfall in remitted emissions credits (like a penalty payment).

Both the compliance market and the voluntary market incentivize the private sector to implement emission mitigation activities across the world, in a range of sectors and technologies such as energy efficiency, transport and reforestation. These mitigation activities allow for the development of carbon credits that may be transferred internationally and used in other countries towards meeting the aims of country NDCs or corporate use.

To recap, there are several types of carbon credit/offset rights that exist concurrently. They may be based on international law, national law, or even subnational law (such as individual State law in the United States of America – not described in this paper).

To make sure offsets are not sold twice and the reduction in emissions is not causing an increase in emissions somewhere else, carbon offsets need to meet certain standards and are subject to validation. There are several accredited program organizations offering certification following proper verification.[14] Each of these program organizations have different standards, each with their own focus and project requirements.[15] Under all systems that grant emission rights or generate offset rights, whether they are carbon allowances or carbon credits, certain steps are required to be taken that include monitoring, reporting and verification (**MRV**) before certification of the volume of emission reduction that is reflected in the offset rights and credits are provided. The relevant MRV steps can broadly be described as follows:

a. Project Design and Application

Carbon projects must be designed such that they meet the requirements set out under the relevant program organization's applicable standard and approved methodology. The methodologies serve to enable quantification of emission reductions achieved by eligible projects and impose eligibility requirements. The reduction in carbon emission resulting from the project must be an improvement as compared to what would have occurred in a business-as-usual situation if the carbon project had not been carried out (this is referenced as "additionality"). Generally, this requires the involvement of specialized and qualified engineers and technical consultants that can ensure that the proposed activity is designed to qualify and meet the requirements of the specific methodology. This area is relatively dynamic, in that new methodologies may be added, and existing methodologies may be updated or retired over time.

The project specifications can differ depending on what organization's standard apply and what project type is involved. For purposes of applying and qualifying for credits, the project must be described, the location of the project must be provided, and all

[14] See also footnote 8 supra.

[15] See chapter 3 of the paper on carbon offsets prepared by the Subcommittee on Environmental Taxation for a list of program organizations.

eligibility criteria must be met. The following documents may be involved for the application:

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

The application generally requires the involvement of specialized engineers and technical experts to prepare the relevant documentation or data provided.

b. Approval

Depending on the nature of the project and country, regulatory and environmental approvals may be required from several different government bodies to conduct the project. The carbon project should not violate any applicable laws, human rights, and any resulting carbon credits may require authorization before they can be transferred internationally. Some country governments want to ensure that the carbon credits are not included in their NDCs and as a result, not double counted. They can authorize credits for use outside of Article 6 of the Paris Agreement.[16]

If the project design meets the methodology requirements and all other relevant approvals, the application may be approved by the Designated National Authorities (**DNAs**), in case of credits for the regulatory compliance market, or by the Designated Operational Entities (**DOEs**), in case of credits under the voluntary market.

c. Validation

Some of the documentation required for approval must be validated (verified) through a third-party validation process prior to submission. The party who sets forth the project is often required to use an independent (expert) auditor to prepare a validation report. To assure the quality of the credits, the applicable project standards not only require third-party validation of project plans before implementation, but also third-party verification of the realized emission reductions after implementation. The above process can take several years during which there is no certainty that there will be approval and issuance of carbon credits that can be registered in the end.

d. Registration

Registration of carbon credits results from the monitoring of the project and consists of verification and certification by the DOEs.

Regardless of whether one is operating in the mandatory compliance market or in the voluntary market, the project, offsets, and credits will need to be approved and validated

[16] Please see footnote 7 above.

(namely: Who calculates the tonnes of carbon locked away in each program? Who measures the carbon emission reductions?) before the actual emission reduction and resulting carbon credits can be registered.

A carbon registry is a platform that allows organizations to track, manage and trade GHG emissions. They require that carbon credits are measured, reported, and verified. Registered carbon offsets provide for transparency and accountability and are subject to a rigorous verification process. This serves to ensure that emission reductions are real and not fraudulent. Only registered verifiers can verify a carbon credit. These are organizations that are approved to verify emission reductions, and audit projects to ensure that they are legitimate and meet the requirements of the carbon registry. There are carbon offset registries that track offset projects and issue offset credits. They assign a serial number to each verified offset credit. When a credit is sold, the serial number for the reduction is transferred from the account of the seller to an account for 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 CDM registry ensures the accurate accounting of the issuance, holding, transfer and acquisition of CERs. This is a standardized electronic database which contains, inter alia, common data elements relevant to the issuance, holding, transfer and acquisition of CERs. Also here, each CER has a unique serial number and once used, the CER is registered as cancelled and can no longer be used for demonstrating compliance with emission standards.

Relevance for Developing Countries

As climate change affects the entire world, the imposition of limits on pollution and the introduction of different carbon pricing instruments are relevant for all countries. The granting of emission allowances or carbon credits present economic instruments that make it possible for actors other than governments to take part in GHG emission mitigation. The role of private sector financing in this respect is not to be underestimated and makes it easier for companies to support national efforts to reduce GHG emissions.

The CDM mechanism that allows a country with an emission-reduction or emission-limitation commitment to implement an emission-reduction project in a range of sectors and technologies was designed for activities that take place in developing countries. It creates a regulatory market, in which governments, private companies, and other entities can purchase carbon offsets to comply with mandatory caps on the amount of GHG they are allowed to emit. The CDM aims to assist developing countries in achieving sustainable development by promoting environmentally friendly investment from advanced country governments and business. Developing countries benefit from the carbon market through the provision of an extra revenue stream for forest preservation and infrastructure improvements or projects that reduce GHG emissions and contribute to sustainable development and the achievement of the United Nations' Sustainable Development Goals (**SDGs**) for their countries.

In the voluntary carbon market resulting from the Paris Agreement, carbon credits are purchased by companies or individuals to help reduce their impact on climate change. These are popularly supported by private finance, and companies may purchase carbon credits to become "carbon neutral" or "green" companies. Individuals may also purchase offsets to balance their emissions from GHG emitting activities such as flying. The largest category of buyers comprises private firms that purchase carbon offsets for resale or investment. Voluntary offset buyers are often driven by certain considerations such as safeguarding their reputation, ethics, and corporate social responsibility (**CSR**). Projects set up in developing countries to cater to the demand for carbon credits may also contribute to progress towards the SDGs.

Carbon credits have become an in-demand commodity that play an important role towards cutting annual GHG emissions. With the pressure on emission reduction increasing, generation and trading of carbon credits for purposes of establishing offsets is becoming a major business with its own unique value chain. Many carbon credit transactions involve projects based in Asia, Latin America, and Africa.[17]

Importance of Transfer Pricing

The MRV process (discussed above) does not necessarily determine who is legally entitled to the carbon credits. However, as carbon credits represent economic value that can be monetized, the determination of who "owns" what is a relevant question, especially when associated enterprises make up the relevant value chain by performing different functions and taking on different risks. Therefore, this needs to be carefully reviewed. Multiple claims of entitlement or ownership will constitute a risk for both countries and companies that wish to trade authorized credits, also since accounting adjustments are required for purposes of accurately reflecting credits applied against a country's NDC 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, consultants), not for profit organizations, Non-Governmental Organizations (**NGOs**) or the public sector.[18] While carbon credit entitlement or ownership is normally determined based on contractual agreements, the sometimes elaborate project structures and multiple party involvement may present a challenge to tax authorities as to which party should be the one to claim ownership.

In energy and industry projects, the owner of the machinery or technical installation that effectuates the emission reduction, the installation's operator or an investor can claim the right to emission reductions. Between them, the benefits from the (usually highly capital intensive) investment in technology and assets is allocated according to

[17] Ecosystem Marketplace (2021). The State of the Voluntary Carbon Markets 2021. Available from https://www.ecosystemmarketplace.com/carbon-markets
Streck, C. & von Unger, M. (2016). Creating, Regulating and Allocating Rights to Offset and Pollute: Carbon Rights in Practice. In Carbon and Climate Law Review, 3/2016.

contractual agreements. It should be noted that the holder of the carbon credit/emission right may not in every case be the party entitled to the economic value the carbon credit represents. All the parties to the transaction/involved in the project ought to be reviewed in relation to their involvement to adequately address the profit attribution of the carbon credit or offset. Domestic law plays an important role as well, but without that, private law tends to govern this matter. Without explicit domestic laws, the most suitable format to clearly determine carbon credit related claims and representation rights, rights to compensation and legal protection are contracts, or chains of contracts. [19] To the extent those are third party contracts, it is generally assumed that they will be arm's length. For transfer pricing purposes, it is important that contracts and the resulting income allocation between associated enterprises is also arm's length.

Emission allowances evidence the authorization to pollute, based on the number of allowances that are allocated by a government entity or otherwise obtained. In addition, emission allowances lack physical substance. They are generally not considered financial assets because cash is not delivered when they are used; instead, the emission allowance itself is delivered to demonstrate compliance with established regulations. As a result, they meet the definition of an intangible asset. Contracts for the purchase or sale of emission allowances (e.g., forwards, futures, or options) may meet the definition of a derivative. For GAAP/IFRS purposes, emission reduction units have been classified as an intangible asset to be accounted for under IAS 38 - Intangible Assets[20] unless they are to be 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 fact specific, however. In the case associated enterprises are involved, for transfer pricing purposes a value chain analysis will be required to assist in determining where relevant contributions were made that need to be rewarded at arm's length. This is discussed in chapter 5 hereafter.

Carbon emission mitigating projects require specific actions and capital investments that, within a Multinational Enterprise (**MNE**) setting, can involve several associated enterprises in different countries making use of internal financing or through third party

[19] Ibid.

[20] The IFRS Interpretation Committee (IFRIC) published guidance on Emission Rights in December 2004, which was withdrawn in 2005. The reason for the withdrawal was the undesirable impact of its adoption on the statutory income statement, introducing volatility for balances re-valued 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 article did not invalidate its application, however. The plan is for the International Accounting Standard Board (IASB) to conduct a wider assessment on accounting for emission schemes. No new guidance has yet been issued as of yet. The Financial Accounting Standard Board has previously expressed its belief that the classification of emission allowances as intangible assets is preferable. In practice, utilities and power companies typically classify allowances as inventory (whether held for use or sale) or intangible assets (held for use). International Accounting Standard 38 permits a choice between the historical cost model and a re-valuation 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.

investors, and are likely to involve expert technicians, engineers and advisers that may be available inhouse or recruited externally.

As regards financing, it is also relevant to mention that carbon finance has emerged as an attractive option to help fund initiatives to generate carbon credits. Carbon finance is a type of payment for environmental services in which the GHG emission reductions from an activity are certified as having taken place and then purchased by governments, companies, and individuals who wish to invest in a global effort to reduce GHG 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 GHG emissions. It may very well be that associated enterprises are involved in a GHG abatement project that is supported by carbon finance. In that case, that there will be a party involved that carries the obligation to deliver carbon emissions to the carbon finance investors.

Transfer pricing rules serve to assure that associated enterprises price their intercompany transactions fairly and consistent with how unrelated companies would price their transactions. That way, income resulting from business activities conducted are 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, because of group control mechanisms. To prevent that from happening, the 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 recognized and subsequently that profit of the respective group entities is determined based on a comparability analysis (including the functions performed, assets used, risks assumed by the involved parties and other economically relevant characteristics). The functional analysis will direct to an appropriate transfer pricing method to determine an arm's length result.

The UN Practical Manual on Transfer Pricing for Developing Countries[21] provides guidance on how the arm's length principle is applied in practice once the relevant functions, assets and risks have been accurately delineated. This guidance also applies to MNEs engaged in the business of generating and selling carbon credits or offsets.

As indicated, for historic reasons, many carbon credit generating projects have operating activities in developing countries. Developing countries may provide additional benefits and optimal conditions for conducting abatement activities: they may possess requirements such as the right climate conditions, geographic location and an environment that is conducive for projects to succeed. They may also serve as relatively cost-efficient locations for emission abatement projects that qualify for generating carbon credits. This may be because labour costs and the cost of (natural) resources are lower than they would have been in developed countries, because labour and (natural) resources may be more widely available in developing countries or that the industrial activities are less regulated than they are in developed countries.

[21] United Nations (2021). Practical Manual on Transfer Pricing for Developing Countries. Available from Financing for Sustainable Development Office

Emission reduction credits essentially are neither tangible nor does the CO_2 abated have a defined source. GHG that is abated in one place simply contributes to an overall improvement of air quality and the environment. In general, emission reduction credits are administratively awarded to the party that files for them and submits the relevant substantiation of the MRV conducted and the GHG abated to the designated authorities.

Considering the above, developing countries have an interest in ensuring that associated enterprises doing business in their jurisdictions that engage in activities related to GHG emission reduction report their taxable income consistent with the arm's length principle, to contribute to domestic revenue mobilization and avoid tax base erosion. This will also assist in avoiding double taxation of MNEs and the need to seek resolution of double taxation under (bilateral) treaties for the avoidance of double taxation.

As the pressure to limit global warming to 1.5 degrees Celsius requires cutting GHG emissions nearly in half by 2030[22], the expected increase in GHG emission mitigation activities makes it relevant for developing country revenue authorities to fully understand the value chain of projects in their countries that serve to tackle carbon emissions. These projects, which may range from reforestation to applying decarbonization technologies in energy projects, generally involve intangibles, significant up-front financing and ongoing investments, risks, risk management and other activities that may be conducted or initiated within or outside of the countries where the actual project is geographically located while there may be sizeable operational activities taking place on the ground where the carbon abatement is occurring.

Revenue authorities are likely to have a better understanding of the full value chain of emission reduction projects when there is robust transfer pricing documentation in place that sets forth aspects such as:

a. the functions performed by all the relevant group entities,
b. the relevant risks assumed,
c. the assets used, and
d. an analysis of the relevant transfer pricing considerations (including methods used).

With this information, revenue authorities in developing countries may be better prepared to assess the local activities and contributions regarding emission reduction projects and ask relevant questions upon audit, that way not spending unnecessary time and resources during those audits.

[22] A report in 2018 by the Intergovernmental Panel on Climate Change determined that meeting the 1.5 degrees Celsius goal would require cutting carbon dioxide emissions by 50% globally by 2030 – plus significant negative emissions from both technology and natural sources by 2050 up to about half of present-day emissions.

Project Value Chain Analysis

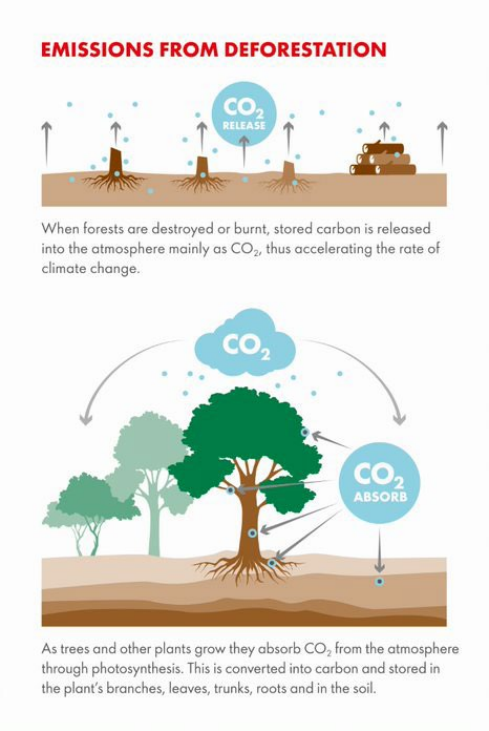
The value chain analysis of projects that lead to carbon offsets and carbon credits will invariably depend on the specific project, and a wide array of projects exists in this field. That said, for transfer pricing purposes, in each case it will need to be determined what assets, functions and risks are involved by which associated enterprise through the process of accurate delineation. For purposes of getting a better understanding of what that may entail, the following three example projects are described from a high-level perspective. The first one being a reforestation project, the second being a project that serves to replace traditional (coal-based) cooking equipment with stoves that burn using clean fuel and the third one being an industry emission reduction project. Please note that many companies engage in GHG emission reduction-related activities, which may not necessarily include a full project like the ones discussed here and those projects may very well not qualify for the issuance of carbon credits. They may (only) consist of buying carbon credits or offsets or may regard investments in technology to have their machinery and equipment operate in a more environmentally friendly fashion and lead to less carbon emissions. To properly assess whether these activities are properly compensated at arm's length (or costs are properly allocated) a functional analysis is required that elaborates on the functions performed, assets used, and risks assumed. For any relevant emission-reducing technology that is being developed, licensed, and used, the functional analysis should include who performs the development, enhancement, maintenance, protection, acquisition and exploitation (DEMPAE) functions.[23] Also noteworthy is that financing carbon credits may be considered a financial service subject to licensing requirements (requiring investment in having a license application) and carbon credit units may be treated as financial products.

Example 1: A Reforestation Project

Carbon sequestration is the process of capturing, securing, and storing carbon dioxide from the atmosphere. Carbon dioxide can be naturally captured from the atmosphere through amongst others biological processes. Planting trees is considered as an effective way to capture carbon and as a result there is an increasing interest in investing in developing appropriate carbon offset projects that use the natural growth process of trees to hold (or sequester) CO_2 in the living wood, roots, and forest soils, thus preventing its escape to the atmosphere. See the picture below:

[23] Reference is made to Part B, Chapter 6 of the UN Practical Manual on Transfer Pricing for Developing Countries in this respect.

Figure 2: Emissions from deforestation



There are different ways to generate carbon emission reduction by making sure of capturing ('bio-sequestering') the atmospheric carbon and locking it into the living and dead biomass in the ecosystem. Reforestation consists of re-planting trees on forest land. There is also a process called afforestation that entails the planting trees on land which had a different original ecosystem, such as planting forests in areas that used to be deserts. In addition, there are also forest maintenance projects such as the REDD+ mechanism established by the UNFCCC, which produces sovereign credits. The aim is to incentivize developing nations to conserve their forests and reverse deforestation. It essentially is a system of financial incentives designed to counter the destruction of forests or their degradation through environmental stresses. The basic goal is to preserve trees that would otherwise be cut down and thus release carbon dioxide into the atmosphere. The way to ensure that they are not cut down is to make them more valuable standing. REDD+ enables companies, conservation groups, and countries to invest in forests as offsets for carbon emissions. Please note that strict requirements must be met before anyone can be issued with sovereign credits, however.

Reforestation projects involve up front capital investment for which, in return, carbon credits are (expected to be) granted. These projects involve activities for which specific knowledge is required, such as making decisions to invest in which land and in which countries (including conducting feasibility studies), acquiring the land, obtaining the financing needed to invest in the land, performing operational activities to grow the land (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 of these projects is revenue from carbon sequestration. Reforestation projects essentially go through the same MRV process listed above, before they qualify for and generate carbon offsets.[24]

Project Design

During the project design stage, eligibility of a proposed project will be considered. Project developers will have to make sure that the specific requirements for qualification for carbon credits can be met. For example, only certain lands may be eligible for reforestation project activities or certain countries may require the issuance of a Letter of Approval (**LOA**) for the project, which should be done timely, to avoid finding out later that the project is not viable, and investments are essentially lost. Furthermore, the site and soil conditions need to be considered (and the costs of site preparation) early on.

Once the planned project activity meets the required criteria, the developers will proceed with acquisition of the necessary data, evaluation of the data, and formulation of a project design document (**PDD**). The PDD describes the project background, its objectives, and its benefits and impacts other than emission reduction benefits, particularly the socioeconomic and environmental benefits. It also explains how the project aims to contribute to the sustainable development objective of the country where the project will take place. It will include the technologies and measures (actions) that will be undertaken to afforest or reforest the lands (e.g., assisted natural regeneration, planting of seedlings, aerial sowing of seeds). Information on the species and varieties of trees to be planted, the nursery techniques and planting techniques to be employed and planting machines and equipment to be used should be provided. If genetically improved breeds of trees are to be used, this should be mentioned while describing how any adverse ecological effects of these would be managed or contained. A brief description of what technologies and know-how will be used is required as well.

Issues to be considered (and documented) include (information on) the legal title to the lands to be afforested or reforested under the project activity (e.g., ownership, nature, and type of tenurial rights) and authorization of the project participants to undertake the project activity, to act, and exercise rights necessary for control of, and access to, the carbon pools in the lands for the purpose of monitoring of those pools. In short, preparation of the PDD is one of the most important steps in undertaking a reforestation project, and its preparation requires specific expertise.

Approval

A LOA, confirming voluntary participation, from the DNA of the parties involved is a pre-requisite for registration of a project activity. The same letter should confirm that the project contributes to sustainable development in the country. This administrative

[24] A detailed overview of the process based on a CDM project, is provided at https://unfccc.int/resource/docs/publications/cdm_afforestation_bro_web.pdf

phase may be dependent upon the national arrangements within the organization or the authority acting as the DNA.

Validation

Validation is a critical phase and regards the review of whether it can be verified how much carbon was removed – and remained removed – by that forest in that year, and whether all project requirements to ultimately qualify for carbon credits are met. The DOE assesses the PDD documents against the project qualification requirements and may ask for further information to satisfy itself that the contents of the PDD are adequate and are supported by justificatory evidence. It may also involve a (public) stakeholder consultation request for input or comments from stakeholders, only after which it is determined whether the proposed project activity should be validated. After this, the project may be registered.

Registration

Once a registered project has been implemented by the project participants and sufficient emission reductions and removals have been achieved, the project participants can choose to prepare a monitoring report in accordance with the monitoring plan contained in the registered PDD. The monitoring report is based on actual data relating to the performance of the project. It provides the necessary evidence of the emission reductions or removals achieved by the project, and as such, directly impacts the number of carbon credits to be awarded. The monitoring report is submitted to a DOE contracted by the project participants for the purpose of its verification and certification. The DOE makes the monitoring report publicly available on the official website and undertakes a review and assessment of the monitoring report to ensure that the report is in accordance with the requirements contained in the registered PDD. The DOE can conduct on-site inspections, as appropriate, and test-checks the data underlying the monitoring report. Having satisfied itself of the adequacy of the monitoring report, the emission reductions or removals claimed by the project participants, the DOE prepares a verification and certification report which is made publicly available on the official website. It should be noted that it can take several years before a reforestation project leads to the generation of sufficient emission reductions to qualify for the issuance of carbon credits.

There is an increasing demand from investors to invest in environmental projects and increasingly funds are being established to invest in green assets or finance carbon projects. These funds usually finance (e.g., through bonds or loans) companies or buy shares in companies that engage in climate or environmental projects and generate carbon offsets that are registered in a recognized carbon registry.

For transfer pricing purposes, it should be determined what the respective associated parties involved in the reforestation project contribute to the project. Functions performed may range from developing the appropriate strategy, conducting proper due diligence to source the right projects, project design and development with the help of independent experts, to investment in land acquisition or a land lease for the envisaged

time of the project, the performance of operational activities, obtaining financing and the provision of intercompany loans, monitoring, and risk management.

The relevant functions generally require specific expertise. For example, determining land ownership and obtaining rights to property may present challenges, as indigenous populations may have historical rights to forest land, which may not have been demarcated and may not have titles to establish ownership. When land titles are established, they often vary from country to country.

In reforestation projects, strict monitoring is required to ensure that the reforestation does not negatively affect other property and leads to deforestation of other forests.[25] Monitoring may also be required to make sure that the reforestation itself has no negative consequences for forest ecosystems (i.e., via monoculture). It will need to be conducted in a reliable manner that meets the respective MRV requirements.

As regards relevant risks, any loss of the forest would reduce the access to credits and could mean liability to the buyer in a mature carbon trading system. In addition, there are limits to the potential of reforestation to combat climate change. As forest ecosystems reach maturity, the amount of carbon dioxide it absorbs becomes balanced with the amount it releases through tree death and decay. At this point, the forest does not operate as a carbon sink anymore but is just maintaining the storage of carbon.

To qualify for credits, there may be requirements such as additionality, which include providing evidence that the reduction in carbon emission resulting from the project are an improvement as compared to what would have occurred in a business-as-usual situation if the carbon project had not been carried out. Generally, this requires the involvement of technical consultants that can make sure that the proposed activity is designed to qualify and meet the requirements of the specific methodology. This area is relatively dynamic, in that new methodologies may be added, and existing methodologies may be updated or retired over time.

From the above, it should be clear that there are assets involved, ranging from land tenure to know-how and technology used to design a project and monitor it, and risks involved, such as exposure to claims that a project does not have tenure security or land conflicts, which may compromise the ownership of carbon credits.[26] From a transfer pricing perspective, it needs to be clear what 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. Loss of forest through wildfires or otherwise is also a risk as that would impair the carbon emission reduction and resulting carbon credits over time. The above activities will need to be financed as well, and often there are parties involved that invest in these projects but not without an expectation of a

[25] This is referenced as "leakage." For example, farmers that used the land before the reforestation project was put in place may move their activities to neighbouring forests and may need to be compensated to keep them from cutting down trees elsewhere.

[26] 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.

return on investment. While it also needs to be determined who gets or owns (the cash value of) the resulting carbon credits, it is important to note that the value of the carbon offsets achieved from the above activities fluctuates in the market depending on supply and demand so market risk that includes price risk is also relevant.

For transfer pricing purposes the functions performed by all the relevant group entities, risks assumed, assets used, and an analysis of the relevant transfer pricing considerations in this respect is required. Accurate delineation will serve to determine this. For example, if any insurance is taken out against loss of forest through fire, it should be considered what party does so. Next a determination of what transfer pricing methods may best qualify to determine an arm's length return for the respective functions performed, assets used, and risks assumed is required. Can the traditional transaction methods be applied (**CUP**, Cost Plus or Resale Price) or do the transactional profit methods (**TNMM**, Profit Split) apply? As mentioned above, the eventual holder of the carbon credit/emission right may not in every case be the party entitled to the economic value the carbon credit represents. All the parties to the transaction/involved in the project ought to be reviewed in relation to their involvement to adequately address the profit attribution of the carbon credit or offset. So, it is not a given that the (economic value of) resulting carbon credits must be allocated to a party in the jurisdiction where the reforestation efforts *de facto* takes place (although it should be considered that some countries might want to require that a certain number of (voluntary) carbon credits from private buyers are applied against their NDCs under domestic law). Transfer pricing documentation should reflect what the economically relevant roles are of the respective associated enterprises and how they are remunerated for their functions performed, assets used, and risks assumed.

Example 2: A Cookstove Project

Reportedly, nearly three billion people worldwide are using harmful fuels for cooking on open fires within their home.[27] This means that they rely on traditional biomass fuels such as wood, crop residues and dung for their primary cooking needs using open fires and traditional stoves. Solid-fuel cooking imposes significant health, environmental, economic, and social costs on households in developing countries. In addition, burning solid fuels contributes to global climate change by emitting GHGs such as carbon dioxide, methane, and short-lived climate pollutants such as black carbon.

Clean cooking presents an opportunity for addressing climate change. Clean cooking stoves (or "cookstoves") can be used as an alternative to inefficient and polluting cooking sources, and they come in all shapes, sizes, and designs. The type (or style) of clean cooking stove depends on many factors, such as the materials readily available, the climate, and the supply chain in the region. The clean cooking stoves may be solar cookers or electricity or electricity-based cooking (making use of hydroelectric generation) or cookers using biofuel. Cookstove projects are divided into two categories: improved efficiency projects and fuel-switch projects. Improved efficiency

[27] Goldstandard (2016). Gold Standard Improved Cookstove Methodologies Guidebook. Available from http://www.goldstandard.org/sites/default/files/documents/ics_methodology_guidebook_v1.pdf

stoves are more common. They replace traditional cooking equipment, which typically consist of an open or partially covered flame fed by biomass in the form of 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 reside in Africa, more than 50% of the improved cookstove activities are located there (followed by Asia and Latin America).

The use of cookstoves lead to carbon emission reduction and can be awarded carbon credits for each tonne of GHG emissions reduced, making the projects attractive to companies with an integrated climate and ESG agenda. Carbon finance is emerging as an attractive option for upscaling cookstove initiatives.

The same MRV process listed above applies, before a cookstove process qualifies for and generates carbon offsets:

Project Design

A project design that lays out the project activity's sectoral scope (energy industries/energy demand) and why it qualifies for carbon credits will be required. The PDD should describe the project background, the methodology, its objectives, and its benefits and impacts other than emission reduction benefits. For example, that it regards a cookstove project making use of high efficiency biomass fired project devices. It will also mention what the expected emission reduction is as compared to the use of for example kerosene, LPG)or coal. The methodology used is to be set forth together with the physical, geographical site of the devices that will contribute to the reduction of GHG emissions and the envisaged market penetration (scaling) of the project, and how additionality is to be demonstrated. Furthermore, the applied methodology is to be accommodated with standardized baselines and a monitoring plan.[28]

Approval

A written LOA, confirming voluntary participation, from the DNA of the parties involved may be required as a pre-requisite for registration of a project activity. This should also confirm that the project contributes to sustainable development in the country. This phase may be dependent upon the national arrangements within the organization or the authority acting as the DNA, however.

Validation

Validation will follow next to review how much carbon was removed (and remained removed) by cookstove use in that year, and whether all project requirements to ultimately qualify for carbon credits are met. The DOE will assess the PDD documents against the project qualification requirements and may ask for further information to satisfy itself that the contents of the PDD are adequate and are supported by justificatory evidence. After this, the project may be registered.

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

Registration

Once a registered project has been implemented by the project participants and sufficient emission reductions and removals have been achieved, the project participants can prepare a monitoring report that is based on actual data relating to the performance of the project. It provides evidence of the emission reductions or removals achieved by the project. The monitoring report is submitted to a DOE contracted by the project participants for the purpose of its verification and certification. The DOE makes the monitoring report publicly available on the official website and undertakes a review and assessment of the monitoring report to ensure that the report is in accordance with the requirements contained in the registered PDD. It can take several years before a cookstove project leads to the generation of sufficient emission reductions to qualify for the issuance of carbon credits.

For transfer pricing purposes, it should be determined what the (associated) parties involved in the cookstove project contribute to the project. Functions performed may range from developing the appropriate strategy, conducting proper due diligence to source the right raw materials and devices, include stove manufacturers, project design and development with the help of independent experts and stove salespeople (creating demand for the cookstoves is vital for increasing uptake and ensuring a sustainable business model) and monetizing the issued carbon credits. Innovative distribution models such as rural sales initiatives, working with self-help groups and women-run businesses, partnering with local village savings and loan associations to build awareness of clean cookstove business opportunities, bringing microfinance players into the mix, and stimulating inclusive supply chain models should be built upon. Some widely accepted distribution channels for these projects are presented in the table below.

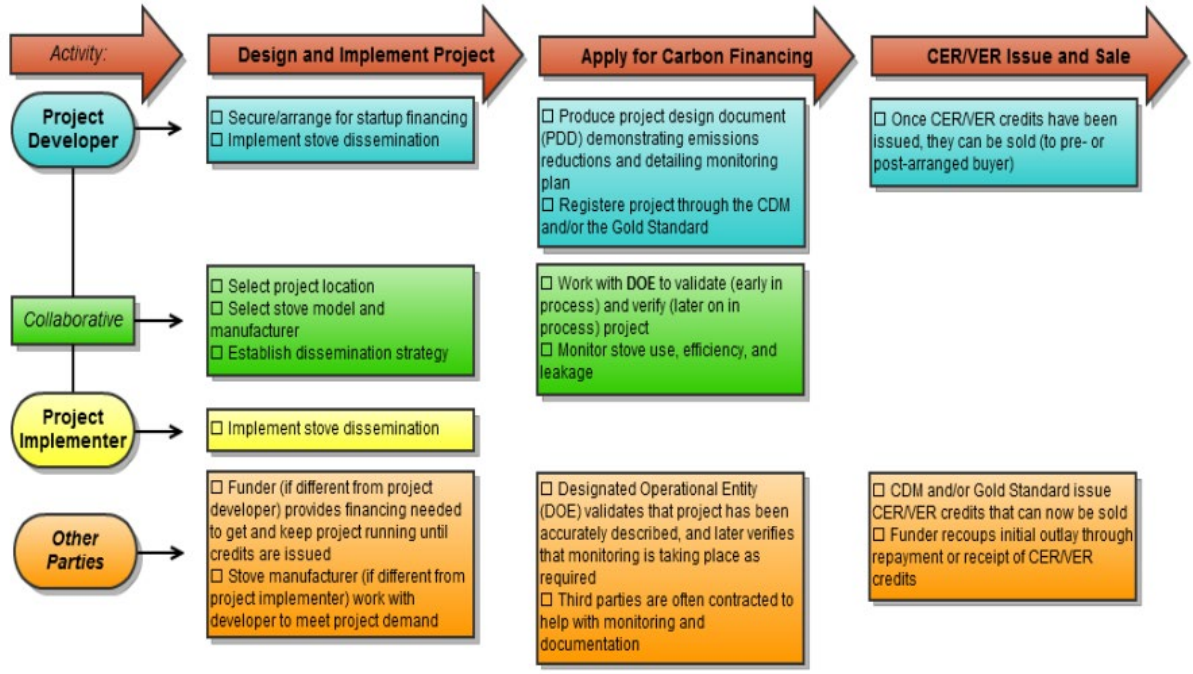
Figure 3: Distribution channels

Channel Type	Direct Sales	Private Dealers and Retailers	Social Enterprises	Institutional Bulk Sales
Details	Sell direct to consumer via sales staff, branded commission based agents, or proprietary store network	Sell to third-party (e.g., fast-moving consumer goods) distributor networks or direct to dealers and retailers (large or small format)	Run sales and order fulfilment via microfinance institution (MFI)/ NGO workforces, government extension agents, or social micro-franchise networks (e.g., Living Goods)	Bulk purchases and redistribution by institutional clients, such as relief agencies, schools, and government programs

Furthermore, user training and after sales service are necessary functions, as are monitoring, and risk management.

A carbon-financed cookstove program can be broken up in the following steps:

Figure 4: Cookstove project[29]



In sum, organizing and operating a qualifying cookstove project requires up-front investment into design and implementation. This may include the building of a factory (likely in a developing country) and training workers, to investments to accommodate scaling and the performance of operational activities. The role of available infrastructure is important, as finished stoves need to be transported by truck or boat to their intended destinations, such as small ports or cities in a(nother) developing country where they must be sold and distributed by a network of local contractors into rural villages. The (perceived) cost of the stoves may be a barrier to adoption thereof. Usually, outreach and education are required and long-term support to households that have switched and engage in the cookstove project. Long-term use is very important to the emission reductions (and future carbon credits) realized by cookstove projects, and it may be that someone needs to go back to these villages regularly, if not every few months, to make sure the stoves are in good repair and in use to be able to prove (verify) the carbon outcome and then navigate the rigorous credit verification process.

The above activities will need to be financed. Carbon finance may complement other financing options like donor funds, private funding, and (intercompany) loans. However, other than donor funds, investments will usually be accompanied by an expectation of a return on investment.

[29] Cox, P. (2011). Analysis of Cookstove Change-Out Projects Seeking Carbon Credits. Available at http://dx.doi.org/10.2139/ssrn.1839765

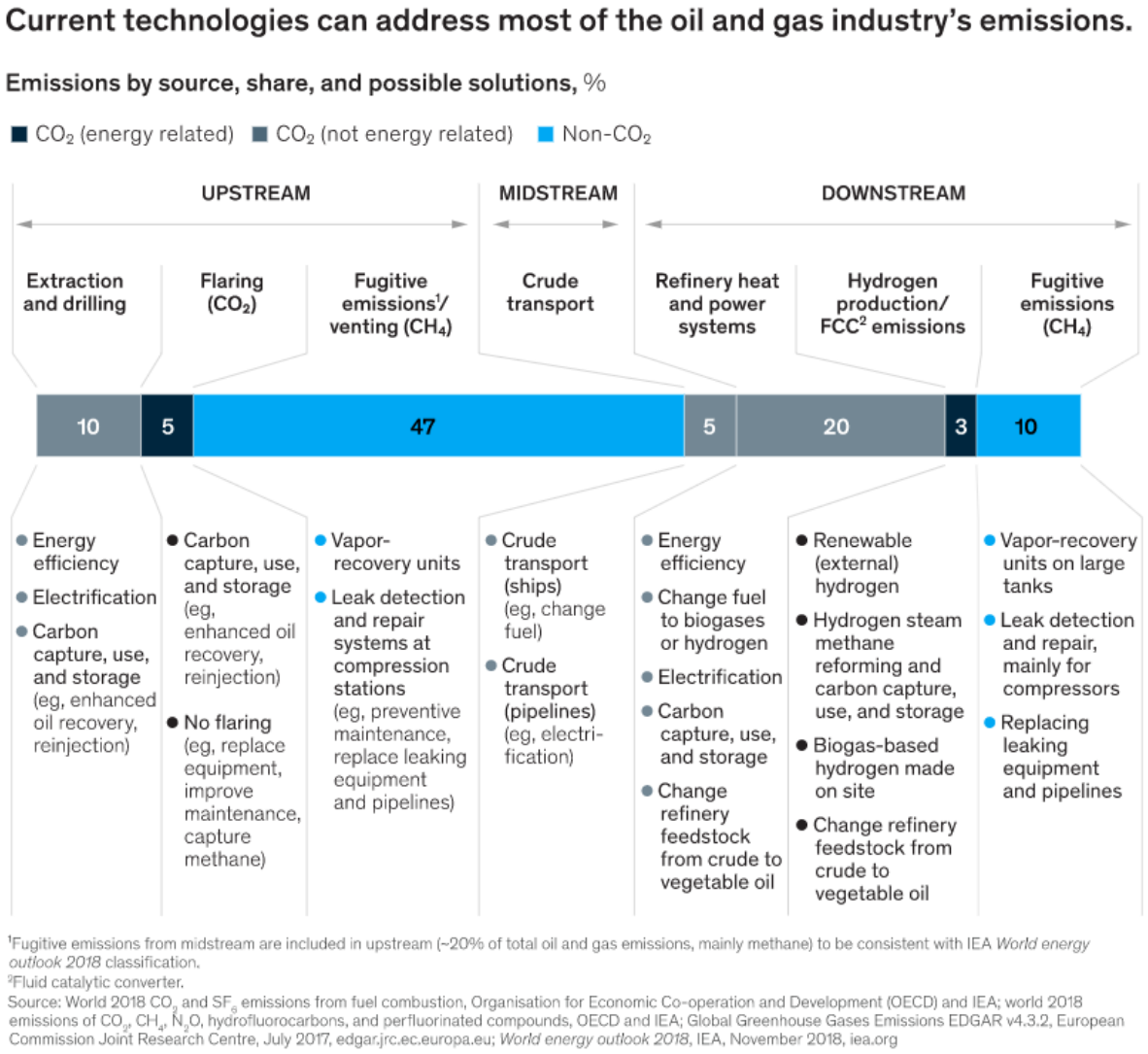
Example 3: An (Extractive) Industry Emission Reduction Project

There are several technologies in place that can address most of the oil and gas industry's emissions.[30] What options are likely to be chosen will depend on whether the operators are upstream or downstream. Again, it should be noted that not all emission reduction programs qualify for a grant of carbon credits, however. To do so, the program needs to be submitted to a program organization offering certification of credits following proper verification, essentially the MRV process. For mandatory (compliance) credits this would be a CDM project and for voluntary credits this could be any of the existing program organizations.[31]

[30] McKinsey & Company (2020). The future is now; how oil and gas companies can decarbonize. Available from https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-future-is-now-how-oil-and-gas-companies-can-decarbonize.

[31] See chapter 3 of the paper on carbon offsets prepared by the Subcommittee on Environmental Taxation for a list of program organizations.

Figure 5: Technologies that address oil and gas industry's emissions[32]



[1]Fugitive emissions from midstream are included in upstream (~20% of total oil and gas emissions, mainly methane) to be consistent with IEA *World energy outlook 2018* classification.
[2]Fluid catalytic converter.
Source: World 2018 CO_2 and SF_6 emissions from fuel combustion, Organisation for Economic Co-operation and Development (OECD) and IEA; world 2018 emissions of CO_2, CH_4, N_2O, hydrofluorocarbons, and perfluorinated compounds, OECD and IEA; Global Greenhouse Gases Emissions EDGAR v4.3.2, European Commission Joint Research Centre, July 2017, edgar.jrc.ec.europa.eu; *World energy outlook 2018*, IEA, November 2018, iea.org

While technologies exist, many emission reduction programs in place in the extractives/oil & gas industry are still in pilot phase, meaning that they have not undergone a full MRV process or been awarded carbon credits.

One option to offset emissions is by tapping into natural carbon sinks, including oceans, plants, forests, and soil; these remove GHGs from the atmosphere and reduce their concentration in the air. Plants and trees sequester around 2.4 billion tonnes of CO_2 a year.[33] That carbon capture, usage, and storage (**CCU/S**) projects are considered promising, can be deduced from the fact that companies are announcing programs to

[32] McKinsey & Company (2020). The future is now; how oil and gas companies can decarbonize. Available from https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-future-is-now-how-oil-and-gas-companies-can-decarbonize.
[33] Popkin, G. (2015). The hunt for the world's missing carbon. In Nature, 523 (20-22).

plant up to 20 million acres of forest in Africa to serve as a carbon sink.[34] Following, a CCU/S project is described as example.

CCU/S projects capture CO_2 and use or store it to prevent its release into the atmosphere. In some cases, the captured CO_2 can be used to create products ranging from cement to synthetic fuels. Many industrial processes generate CO_2, most prominently when hydrocarbons are burned to generate power. Carbon dioxide can be captured at the source of the emissions, such as at power plants or refineries, or even from the air itself. A range of technologies—some using membranes, others using solvents—can perform the capture step of the process. Once captured, concentrated CO_2 can be transported (most economically by pipeline) to places where it can be used as an input—for example, cured in concrete or as a feedstock to make synthetic jet fuel—or simply stored underground.

To set up a CCU/S project, a facility will be needed near or at a production plant where the CO_2 will be separated, captured, and stored. The technology to do so is required to be developed or licensed and people will need to be trained for operation and maintenance. Transportation of the captured CO_2 may be done by pipelines, vessels, or trucks. Carbon storage (without use) is largely a cost, and thus attracts relatively little project investment and innovation, particularly in the absence of regulatory support or incentives. Moreover, there are also complex legal issues involved such as liability for potential leaks, as well as the jurisdictional complexities associated with underground property ownership and use.[35]

In the following, a project in Northern Alberta, Canada will be analyzed. [36] The design concept for that project is to remove CO_2 from the process gas streams of three hydrogen-manufacturing units, which are a part of a bitumen upgrader that converts oil sands bitumen into finished marketable products. To do so, specific technology is used (amine technology), and captured CO_2 is dehydrated and compressed to a dense-phase state for efficient pipeline transportation to the subsurface storage area, a sequestration lease area that was obtained by the company. Risks involved include, inter alia, the risk of leakage from the storage (for which external integrity reviews are conducted) and geological risks, such as those related to wells that are drilled in the vicinity of the storage location. Functions include facility operations (storage and monitoring, maintenance, and repairs), pipeline management (operating temperature, fluid composition and operation pressure) handling regulatory, reporting, and filing requirements, amongst others.[37]

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[34] See for example Edie (2019). Press release on carbon emissions. Available from https://www.edie.net/oil-giant-eni-targets-net-zero-carbon-emissions-by-2030

[35] McKinsey (2020). Driving CO2 emissions to zero (and beyond) with carbon capture, use, and storage. Available from https://www.mckinsey.com/capabilities/sustainability/our-insights/driving-co2-emissions-to-zero-and-beyond-with-carbon-capture-use-and-storage

[36] For more information please refer to https://www.nrcan.gc.ca/science-and-data/funding-partnerships/funding-opportunities/current-investments/shell-canada-energy-quest-project/18168.

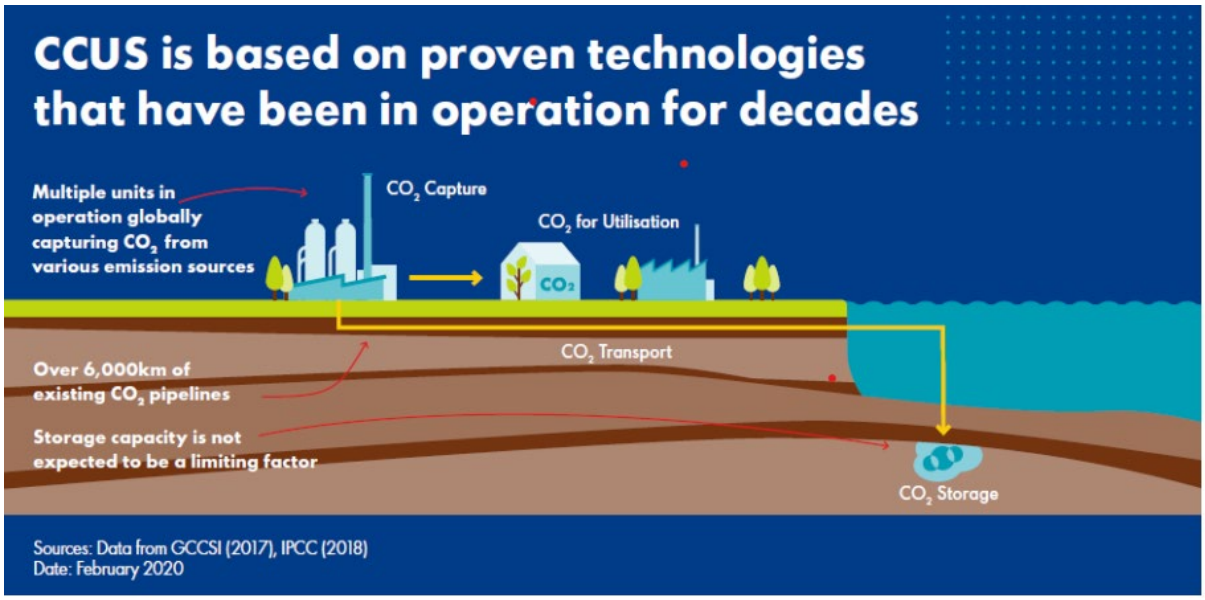
[37] Shell (2015). Quest Carbon Capture and Storage Project. Annual Summary Report. Available from Quest Carbon Capture and Storage Project 2014 (alberta.ca)

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

- costs of materials and services used or consumed in generating the certificates;
- employee benefits costs arising in the generation of the certificates;
- fees to register a legal right;
- amortization of patents and licences that are used to generate the certificates; and
- associated borrowing costs that meet the capitalization criteria.

For corporate income tax and transfer pricing purposes, it will need to be accurately delineated what the functions, assets and risks are of associated enterprises involved in projects like these, to ascertain that (cost and) income allocations are arm's length.

Figure 6: CCUs based on proven technologies



Transfers of Carbon Credits

Carbon credits are one of the newest categories of commodities traded on global markets. Carbon credits are a class of commodities that take the form of non-tangible energy credits. They would not have developed without the Kyoto protocol and the subsequent Paris Agreement.

When it comes to the purchase and sale of carbon credits within the carbon marketplace, as indicated above, there are two significant, separate markets to choose from. One is the regulated market, set by "cap-and-trade" regulations at regional and state levels (i.e. the mandatory or compliance market) Reference is made to the ETS mechanism described above. The other is a voluntary market where businesses and individuals buy credits (optional, of their own account) to offset their carbon emissions. Voluntary Emission Reductions may not be eligible to be used as carbon credits in the compliance market and therefore have smaller demand and therefore less liquid trading markets (also described above).

Buying Carbon Credits

Businesses and other organizations typically buy carbon credits for one of three reasons. These are:

- to comply with a regulated carbon market, such as the existing European ETS,
- for speculative purposes, such as by buying them now with the intention of trading them later for a profit, or
- to offset a carbon footprint voluntarily, such as due to a desire to become carbon neutral.

It should be noted that if a company intends to use the carbon credits itself to help offset its own carbon footprint, it will need to retire them after they are purchased. To make this official it needs to be done on an independent register within that carbon market. The purpose of retiring a credit is to show that it has been used or spent. Up until that point it is still a fully tradable carbon credit that no one has used. Retirement is therefore an important step towards becoming carbon neutral.

Trading Carbon Allowances

While essentially anyone can get involved in carbon trading[38], the main groups involved in carbon trading are typically:

- compliance installations (e.g., steel, cement, paper, chemicals, and aluminium plants located in jurisdictions that have implemented cap and trade schemes),
- trading firms such as hedge funds,
- electricity, gas, and other utility companies,
- a small number of banks, and
- carbon brokers, either as introducers or as intermediaries.

In the most liquid carbon markets trading takes place all day long, all year round. However, many installations covered by carbon trading systems concentrate their activity close to the compliance deadlines. In the EU ETS compliance purchasing is concentrated in the 3 months leading up to the 30th of 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 size. Many allowances are given out to industry for free in the early stages of compliance schemes to 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.

The Price of Carbon Credits

The variables in pricing carbon are complex. Carbon credits come in all shapes and sizes and can vary greatly due to several factors. From the end users' point of view, CERs have typically ranged from €8 to €22 in the past, while VERs have traded between US$5 and US$15 although it may be possible to find cheaper VERs around. Generally speaking, and as with any other emerging market, the better the product, in this case credits, the more they tend to cost, subject to supply and demand. While all carbon

[38] For example, in Europe there are no restrictions on who can operate a registry account.

credits are theoretically equal in value to one metric tonne of GHG emissions, they can have different outcomes on the environment, so their prices vary depending on the type and quality of credit, particularly in the voluntary market. For example, prices in the voluntary market can vary depending on a) the type of credit – such as wind, solar, hydro, or forestry, b) the standard to which they've been certified – such as Kyoto vs. the Voluntary Carbon Standard or some other, c) the country of origin, d) the auditor who certified the original carbon project – and that auditor's credentials, and e) the story attached to them – such as whether the project generating them has additional social and community benefits.

In contrast to this, prices within the compliance market are somewhat more consistent and can be found on the various exchanges around the world, typically within 10% of each other. They do still fluctuate within the various carbon markets, though, depending on what's happening at the time and general market conditions. Pricing in relation to compliance credits relates more to supply and demand and the risk of fines that may be payable if a liable business fails to comply with a particular carbon-trading scheme. Carbon credit prices may also vary with from whom someone buys them or through which intermediary. The carbon market essentially consists of the three main sectors being the project developers and originators – or the creators of the credits, the brokers, and traders – or the middlemen, and the retailers and resellers – or those who need or sell them. Obviously, if buyers go directly to the originators and project developers, they're usually likely to receive a cheaper price, but they would also need to buy in much larger quantities – such as 100,000 or more tonnes – and must know who to contact. This is likely to become harder to do as the market becomes more regulated and structured over the coming years and the originators become increasingly likely to prefer to deal through brokers and traders, who will then in turn deal with the retail market. Whoever is buying carbon credits should take care to make sure that they're comparing apples with apples.

Trading and Retiring Carbon Credits

Buying and selling carbon credits is a relatively straightforward process and can be compared to buying and selling shares in a stock market, as it is paper based. No physical asset changes hands, and as such the 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 them. It's also important to be aware of the different types of credits that are available on the market and how they compare with each other, as detailed earlier. In most cases carbon credits can be bought and sold internationally, and minimal restrictions are currently in place.[39] The point about which buyers and sellers need to be careful when buying and selling carbon credits internationally is whether the specific market in which they are buying or selling them will recognize them, as its requirements may differ. For example, Europe currently has some regulations in place that prohibit the retirement of certain

[39] Although the introduction of a carbon border adjustment mechanism (CBAM) in 2023 in the European Union means that imports in the European market of certain goods whose production is carbon intensive (cement, iron, steel, aluminum, fertilizers, electricity and hydrogen) may become subject to additional costs as of 2026.

types of carbon credits in its market. It is therefore required to be careful in selecting when buying or selling different types of credits internationally.

Carbon credits purchased to help offset carbon footprint need to be retired to make a claim regarding 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 so that a claim can be made. Completing the process of retirement effectively renders them as used. This means they will no longer have any commercial value, as they have been spent, and therefore cannot be used again or resold to someone else. This is an important step that also addresses the issue of double counting in the industry. Most reputable registries will be able to do the actual retiring of carbon credits for a small fee, or if they are bought from a carbon broker or third party, they should also be able to arrange this service.

Conclusion

Understanding the processes in place to generate carbon credits and the value chain of carbon emission abatement activities that serve to generate carbon credits will help with considering how transfer pricing rules apply to generation, transfer, and sale of carbon credits in the event associated enterprises are involved.

Understanding the value chain is relevant to help accurately delineate the actual transactions based on the economically relevant characteristics of the transactions. These consist of the conditions of the transactions and the economically relevant circumstances in which the transactions take place.

If income resulting from the generation and sale of carbon credits is considered allocated wrongfully between associated enterprises and tax adjustments to correct for this are proposed by tax authorities, that will likely lead to double taxation. Unresolved double (corporate income) taxation of carbon credits will constitute an unforeseen added cost (and a disincentive) to generating carbon credits. It is important that this is avoided.

The carbon credit business as such does not necessarily require any transfer pricing considerations different from those that already exist, but it does require awareness of the industry and of the aspects that make the carbon credit business complex. These aspects include the intangible fungible nature of carbon credits, the regulatory system that includes both compliance and voluntary markets for carbon credits, the capital-intensive nature of carbon credit generation, the price volatility of carbon credits, the use of carbon financing and a great political sensitivity, namely that they are one of the mechanisms available to assist with combatting climate change, market driven and subject to fast changing (international and domestic) rules and regulations.