MINTZ

CARBON CREDIT AND CARBON OFFSET FUNDAMENTALS

Areta A. Jez, Brad D. Alexander,
and Ayaz R. Shaikh

TABLE OF CONTENTS

ABOUT THE AUTHORS

Areta A. Jez, *Associate*, Energy & Sustainability and Projects & Infrastructure Practices
AAJez@mintz.com | +1.212.692.6788

Areta is an Associate in the Projects & Infrastructure practice and the Energy & Sustainability group at Mintz. She focuses her practice on the development, financing, and acquisition of renewable energy and sustainable infrastructure projects. Her experience includes projects in the solar, offshore wind, geothermal, biofuels, waste, and wastewater treatment sectors. Prior to joining Mintz, Areta was a projects associate at an international law firm. Areta has worked at the US Department of State and the International Development Law Organization in Rome.

Brad D. Alexander, *Associate*, Energy & Sustainability and Projects & Infrastructure Practices
BDAlexander@mintz.com | +1.415.696.5256

Brad is an attorney in the Projects & Infrastructure practice and the Energy & Sustainability group at Mintz. He advises sponsors and developers on a range of energy and infrastructure projects. Brad currently advises on renewable energy, storage, biofuels, and sustainable infrastructure projects, as well as cleantech companies and investors in connection with financings, M&A, and commercial agreements. Brad has experience globally with a focus on developing markets. Before joining Mintz, Brad was a senior associate at a global law firm and, prior to that, was based in Southeast Asia as a projects associate for another global law firm.

Ayaz R. Shaikh, *Chair*, Projects & Infrastructure Practice
Member, Energy & Sustainability Practice
AShaikh@mintz.com | +1.202.434.7318

Ayaz is the Chair of the Projects & Infrastructure practice at Mintz and a Member in the firm's Energy & Sustainability group. A widely recognized projects lawyer with experience in over 40 countries spanning five continents, Ayaz's practice encompasses Project Finance and M&A representations across a spectrum of energy and infrastructure sectors. He advised on some of the first independent power projects (IPPs) in Asia, the Middle East, and Latin America, and helped to establish the framework, concession structure, or model agreements for projects in a country. Today, Ayaz's practice focuses entirely on renewable energy, sustainable infrastructure, and climate-related mandates. He is a frequent panelist and has published extensively, including a book on Project Finance Fundamentals and the chapter on "International Project Finance" in PLI's International Corporate Practice treatise.

Relevant to this paper, Ayaz advised the World Bank in a pioneering transaction in 2001 aimed at operationalizing the carbon market–based frameworks under the Kyoto Protocol. In that capacity, he helped to structure and craft the first Emission Reduction Purchase Agreement or "ERPA" for use in the maiden investment by the World Bank's Prototype Carbon Fund for a waste management project in Latvia. Widely used, the ERPA set the precedent and formed the foundational basis for the creation and sale of renewable attributes, including present-day Renewable Energy Certificates or RECs.

GLOSSARY OF KEY MARKET TERMS

Term	Meaning
Additionality	A reduction in GHG Emissions is deemed "additional" only if the reduction would not have taken place in the absence of the incentive created by the voluntary carbon offset market. Achieving "additionality" increases the value of the carbon offset.
Avoidance Projects	One of the two main types of projects that produce carbon credits or offsets. Avoidance projects avoid the release of GHG Emissions into the atmosphere by reducing activities that tend to emit large numbers of GHG Emissions or by protecting natural resources.
Carbon Credits	Tradeable permits that each represent the right to emit one metric ton of carbon dioxide or other greenhouse gases.
Carbon Offsets	Measures of the amount of carbon avoided or permanently removed from the atmosphere. A carbon offset represents one metric ton of carbon dioxide or equivalent greenhouse gases avoided or removed.
Certified Emissions Reduction (CER) Credit	Relating to the Kyoto Protocol, a marketable carbon credit generated by the Clean Development Mechanism (CDM) that represents the equivalent of offsetting one metric ton of carbon dioxide. A CER can be traded or sold to count towards meeting an industrialized country's GHG Emissions–reduction targets under the Kyoto Protocol.
The Clean Development Mechanism (CDM)	One of three market-based mechanisms introduced by the Kyoto Protocol to assist countries in finding ways to meet their GHG Emissions reductions targets. The CDM allowed industrialized countries to implement an emissions reduction project in a developing country and, in doing so, generate a marketable Certified Emissions Reduction (CER) credit.
Climate Reserve Tons (CRTs)	Tradeable carbon offsets issued by the Climate Action Reserve in the voluntary carbon market.
Compliance Carbon Markets	One of two categories of carbon markets that allows participants to buy and sell carbon credits or carbon offsets to comply with rules or regulations imposed by regulatory or governance organizations.

GLOSSARY OF KEY MARKET TERMS *contd.*

Term	Meaning
Core Carbon Principles	A framework and assessment procedure for identifying and issuing carbon offsets released by the Integrity Council for the Voluntary Market in 2022.
Corresponding Adjustments	An accounting mechanism that requires a host country to deduct (or "un-count") a sold carbon offset from its own NDCs so that the buyer country can count the offset against its NDCs. This mechanism was established at Glasgow with the ratification of Article 6 of the Paris Agreement and seeks to address double-counting.
Double Counting	The idea that multiple entities are claiming benefits from the same carbon offset.
Emissions Reduction Purchase Agreement (ERPA)	A legally binding contract between buyers and sellers of carbon offsets.
Environmental, Social and Governance (ESG) Objectives	Objectives set within a company in order to manage the organization's impact on social and environmental sustainability directly. The trading of carbon offsets in the voluntary market can help companies meet their ESG objectives.
Glasgow Climate Change Conference	A 2021 climate conference that ratified Article 6 of the Paris Agreement.
Greenhouse Gas (GHG) Emissions	The release of gases that contribute to the greenhouse effect via human activity. Both carbon credits and carbon offsets aim to reduce GHG Emissions.
The International Emissions Trading (IET) Mechanism	One of three market-based mechanisms introduced by the Kyoto Protocol to assist countries in finding ways to meet their targets. The IET mechanism allowed industrialized countries with unused, excess carbon allowances to sell these excess allowances to other industrialized countries that exceeded their targets.

GLOSSARY OF KEY MARKET TERMS *contd.*

Term	Meaning
Internationally Transferred Mitigation Outcomes (ITMOs)	One of two market-based approaches provided under Article 6 of the Paris Agreement that allows countries to meet their NDC obligations by trading for and acquiring carbon offsets earned from the reduction of GHG Emissions. ITMOs are the new unit of carbon reduction established by the Paris Agreement for international carbon markets that will replace CERs established under the Kyoto Protocol.
Joint Implementation (JI)	One of three market-based mechanisms introduced by the Kyoto Protocol to assist countries in finding ways to meet their targets. The JI allows industrialized countries to collaborate jointly with each other in pursuing and implementing emissions reduction projects in order to meet their Kyoto targets.
Kyoto Protocol	An international treaty that came into effect in 2005, setting legally binding targets for 37 industrialized countries to limit or reduce their overall greenhouse gas emissions.
Nationally Determined Contributions (NDCs)	National plans highlighting climate change mitigation, including climate-related targets for greenhouse gas emission reductions. The Paris Agreement requires each country to create and submit NDCs on a five-year cycle.
Removal Projects	One of two main types of projects that produce carbon credits or offsets. Removal projects are aimed at removing GHG Emissions already released into the atmosphere by using nature-based and or technology-based methods.
Retirement	The process whereby a carbon offset is used and removed, meaning that the carbon offset can no longer be sold or traded on any exchange. Retirement occurs after the reduction in GHG Emissions has been deducted from the final owner's carbon footprint.
Paris Agreement	A legally binding, international treaty on climate change adopted in 2015 that effectively replaced the Kyoto Protocol. The Paris Agreement called on both industrialized and developing countries to set and meet emissions goals.

GLOSSARY OF KEY MARKET TERMS *contd.*

Term	Meaning
Sustainable Development Mechanism (the SDM)	One of two market-based approaches provided under Article 6 of the Paris Agreement that allows countries to meet their NDC obligations by trading for and acquiring carbon offsets earned from the reduction of GHG Emissions. The SDM aims to reduce overall global GHG Emissions.
Validation and Verification Body (VVB)	An independent third party pre-approved by the carbon offset registry that conducts an audit of the project design during the auditing stage of the carbon offset certification process.
Verified Carbon Units (VCUs)	Tradeable carbon offsets issued by Verra in the voluntary market.
Verified Emission Reductions (VERs)	Tradeable carbon offsets issued by the American Carbon Registry in the voluntary market.
Vintage of a Carbon Offset	The year GHG Emissions reductions for an issued offset were deemed to have occurred. The vintage of a carbon offset can be indicative of the quality of the carbon offset and its underlying project, and thus is a principal factor in determining the carbon offset's value.
Voluntary Carbon Markets	One of two categories of carbon markets. Voluntary carbon markets allow for the trading of carbon offsets that are not bought or sold on the compulsory carbon markets to meet GHG Emissions requirements imposed by regulatory bodies. Most carbon offsets are traded in voluntary markets and cannot be used to achieve GHG Emissions reduction targets under an applicable compliance regime. Certain carbon offsets, however, are permitted to be used to achieve compliance with a compulsory regime.

I. INTRODUCTION

As the need to reduce the emission of greenhouse gases has grown more urgent over the last quarter century, key stakeholders across the globe have sought to forge effective paths to make a measurable difference in the health of the planet. Starting in the 1990s with the Kyoto Protocol, governments and multilateral organizations led the way by creating avenues for countries to participate in carbon reduction efforts through the use of carbon credits and carbon offsets. The mechanisms introduced by the Kyoto Protocol led to the creation of global and regional compulsory compliance regimes requiring both countries and corporate entities to limit their carbon emissions. Beyond these mandatory regimes, the sharp rise in public concern over the climate has increasingly catalyzed companies to take steps to reduce their carbon emissions on a voluntary basis. In order to reach their goals, companies are turning to voluntary carbon markets, where they are able to invest in renewable energy projects that generate carbon offsets, as well as purchase and sell carbon offsets, as a means of contributing to the removal of carbon from the atmosphere. Activity surrounding voluntary carbon markets has expanded steadily since their introduction, with current estimates projecting that the market for carbon offsets may be worth over US$50 billion by 2050.[i]

Despite the growing importance of both carbon credits and offsets, the fundamentals of these tradeable units and their associated markets are still not well understood by most. This article seeks to provide a broad overview of carbon credits and carbon offsets in order to facilitate a better awareness of the growth and practical workings of these markets. It commences by surveying the establishment and evolution of carbon markets stemming from the entry into the Kyoto Protocol in the late 1990s. It then delves into the distinctions between carbon credits and carbon offsets, as well as the difference between compulsory and voluntary carbon markets. The article includes a brief journey through the typical lifecycle of a carbon offset, from creation to retirement. It concludes with a few broad observations regarding the opportunities and risks presented by the carbon markets.

II. CREATION OF CARBON CREDITS AND THE ESTABLISHMENT OF CARBON MARKETS

The focus on carbon credits as a means of combating climate change is relatively new. The concept of an international carbon market was first established by the Kyoto Protocol in 1997. Initially signed by 180 countries, the Kyoto Protocol came into effect in 2005, setting legally binding targets for 37 industrialized countries to limit or reduce their overall greenhouse gas emissions ("**GHG Emissions**") by an average of at least 5% below their respective 1990 levels during the period of 2008-2012.[1]

The Kyoto Protocol imposed these binding targets only on industrialized countries in express recognition of the responsibility they bear for the state of the climate as a result of their GHG Emissions over the course of a century-and-a-half of robust industrialization. Conversely, the Kyoto Protocol provided developing countries with voluntary targets or, in the case of China and India, exemptions from targets altogether.

While industrialized countries were directed to meet their targets principally through national measures orchestrated by governmental fiat, the Kyoto Protocol also introduced three market-based mechanisms to assist countries in finding ways to meet their targets. These mechanisms also aimed to encourage participation in emission reduction efforts by the private sector and by developing countries exempted from Kyoto's binding targets.

These market-based mechanisms were:

- The Clean Development Mechanism ("**CDM**")
- Joint Implementation ("**JI**")
- The International Emissions Trading ("**IET**") mechanism.

1 The Kyoto Protocol's compliance mechanism is considered among the most robust ever adopted for a multilateral agreement. The compliance mechanism consists of a facilitative branch that provides advice and assistance to parties to encourage compliance, and an enforcement branch empowered to take hard actions. The enforcement branch determines three different forms of non-compliance: (1) with the emission targets, (2) the methodological and reporting requirements, and (3) the eligibility requirements for participation in the Kyoto Protocol's flexibility mechanisms. The Kyoto Protocol also requires a non-complying country to take specific actions depending on the nature of non-compliance. For example, in the case of non-compliance with emission targets, the Kyoto Protocol requires the offending country to make up the difference between its actual emissions and its target obligations, plus an additional 30% deduction, in the next compliance period. Meaning that, for every metric ton of emissions by which a country exceeds its Kyoto Protocol target, its allocation of emissions for the subsequent compliance period would be lowered by an additional 1.3 metric tons as a penalty. Whether this penalty has had any effect in deterring non-compliance is questionable, however, as it is unclear how a country could be forced to meet its obligations under a subsequent period if it has already failed to meet its commitments under a prior one. Additionally, since countries negotiate their own commitments under the Kyoto Protocol, a non-complying country could negotiate a less-stringent target for the next commitment period to accommodate for the penalty, negating the impact that the enforcement mechanism would have on the country's compliance.

The creation of these market-based mechanisms introduced and established what ultimately became known as the international carbon market.

Article 12 of the Kyoto Protocol created the framework for the CDM. The CDM allows any of the 37 industrialized countries bound by the Kyoto targets to implement an emissions reduction project in a developing country and, in doing so, generate a marketable Certified Emissions Reduction ("**CER**") credit. Each CER represents the equivalent of offsetting one metric ton of carbon dioxide and can be traded or sold to count towards meeting an industrialized country's GHG Emissions reduction targets under Kyoto.

Article 7 of the Kyoto Protocol established the JI, a mechanism similar to the CDM. Under the JI, industrialized countries could jointly collaborate with other industrialized countries in pursuing and implementing emissions reduction projects in order to meet their Kyoto targets.

The IET, an international trading program, sprung from Article 17 of the Kyoto Protocol. The IET allowed industrialized countries with unused, excess carbon allowances to sell these excess allowances to other industrialized countries that had otherwise exceeded their targets.

In order to operationalize the market-based frameworks constituted by the Kyoto Protocol, and specifically the CDM, and to spark the development of the international carbon market, a model Emissions Reduction Purchase Agreement ("**ERPA**") was crafted in 2001 under the aegis of the World Bank.[2] The advent of the ERPA marked a seminal event in the evolution of carbon markets as it allowed buyers and sellers of CERs to memorialize the transaction in a legally binding contract. While each ERPA is uniquely tailored to the requirements of the project with which it is associated, most ERPAs contain provisions that:

- Specify the quantity and price of CERs to be delivered to the buyer and related payment schedules;
- Provide for risk allocation and management between the parties;
- Delineate the consequences of non-delivery and default; and
- Specify the other obligations of the buyer and the seller with regard to both the transaction for the sale and purchase of CERs and the underlying project giving rise to the emission reduction credits.

Initially conceived to create a process for the sale of CERs under the CDM, the ERPA grew in use and importance globally over the years, and ultimately came to form the basis for the sale of other renewable attributes, including the sale of Renewable Energy Certificates or RECs.[ii]

The second phase of carbon trading kicked off in 2015 when 114 countries ratified the Paris Agreement. The Paris Agreement effectively replaced the Kyoto Protocol, whose binding targets were set to expire in December 2020.[iii]

2 One of the authors of this article, Mintz partner Ayaz Shaikh, advised the World Bank in conceiving, structuring, and drafting the model ERPA, and in its usage in the first investment of the World Bank's Prototype Carbon Fund (PCF). That investment was for the Liepaja Solid Waste Management Project in the Republic of Latvia in 2001.

II. CREATION OF CARBON CREDITS AND THE ESTABLISHMENT OF CARBON MARKETS *contd.*

Whereas the Kyoto Protocol had set emission-reduction targets for industrialized countries only, the Paris Agreement called on both industrialized and developing countries to establish and meet emissions goals. The Paris Agreement reflected the growing urgency of the climate crisis and the broad recognition that in order to be effective, measures to combat climate change must be pursued by all carbon emitters, regardless of their varying culpability in creating the present exigency. The Paris Agreement aimed to set an outside limit for global warming to a point below 2 °C above pre-industrial levels, with the stated aspiration of limiting the temperature increase to a threshold of 1.5 °C above pre-industrial levels. These limits were to be achieved by having each country create and submit its plans for climate action – known as Nationally Determined Contributions ("**NDCs**") – on a five year cycle.

One of the key elements of the Paris Agreement can be found in the all-important Article 6, the provisions of which established two new market-based mechanisms for creating and trading carbon offsets: the Sustainable Development Mechanism (the "**SDM**") and the internationally transferred mitigation outcomes ("**ITMOs**"). These market-based approaches provided under Article 6 allowed countries to meet their NDC obligations by trading for and acquiring carbon offsets earned from the reduction of GHG Emissions produced by qualifying projects.[iv]

Article 6.4 established the SDM, a centralized carbon market that allows trading of carbon offsets created by specific projects implemented jointly by countries party to the Paris Agreement. Article 6.4 aimed to replace the offsetting mechanism provided under Kyoto's CDM, as well as the collaboration mechanism provided under Kyoto's JI. The most notable difference between the SDM and its predecessor mechanisms is that the SDM seeks to reduce overall global GHG Emissions, while the CDM and JI had essentially shifted the location of GHG Emissions without necessitating an overall reduction in GHG Emissions. Under the CDM and JI, each metric ton of carbon reduction achieved by a developing country and measured by the creation of a CER – the credits issued by the CDM under the Kyoto Protocol – allowed an industrialized country to emit one additional metric ton of carbon. Any offsets created by projects traded on the SDM, on the other hand, must result in an overall reduction of global GHG Emissions without allowing for a corresponding increase in GHG Emissions elsewhere. In addition, the offsets traded pursuant to the SDM must be over and beyond what a country has committed under its NDCs.

Article 6.2 of the Paris Agreement provided for the international trading of ITMOs, which are the new unit of carbon reduction for international carbon markets intended to replace the CERs established under the Kyoto Protocol. ITMOs are used by countries to meet their respective NDCs: countries that have met or exceeded their NDC goals can trade their excess ITMOs with countries

that lag behind in meeting their commitments, with the caveat that the selling country must make a corresponding adjustment in its NDCs to "uncount" the ITMO it is trading. In order to ease the transition to the new trading mechanisms created under Article 6.2, certain CERs generated between 2013 and 2020 were to be eligible for conversion into ITMOs and to count towards a country's NDC commitments.[v]

As is now well-known, however, the effectuation of these Paris Agreement standards proved difficult.[3] While broad guidelines as to the implementation of Article 6 of the Paris Agreement were adopted during the initial UN Conference of the Parties in 2015, these guidelines failed to establish how the implementation of Article 6 would be handled in practice. It was not until delegates convened at the Glasgow Climate Change Conference in 2021 that the rulebook for the official implementation of Article 6 was finally ratified.

The Glasgow Conference sought to bolster the integrity of carbon offsets and inspire confidence in the carbon markets by proposing new rules covering both the procedures and benchmarks governing the creation, trading, and tracking of carbon offsets. Prior to the introduction of Article 6 of the Paris Agreement and its ratification at the Glasgow Conference, no clear standards existed delineating how carbon offsets would be tracked. The absence of any cognizable standards led to a risk of double counting the same carbon offset towards the satisfaction of NDCs in two separate countries – once by the seller country that hosted and generated the carbon offset, and once by a buyer country that purchased the carbon offset. One of the primary achievements of the Article 6 rulebook is that it addressed this issue through an accounting mechanism called corresponding adjustments. Under this accounting mechanism, if a host country authorizes the sale of a carbon offset from a qualifying project to a buyer country, then the host country must deduct (or "un-count") the carbon offset from its own NDCs so that the buyer country can then count the offset against its NDCs. The rulebook for Article 6 also introduced new standards to verify the quantity and quality of GHG Emission reductions produced by a project in order to ensure that projects that generate offsets actually lead to a measurable reduction in global GHG Emissions. These rules aimed to add transparency to the overall process of trading in carbon offsets.[vi]

3 The abrupt withdrawal of the United States from the Paris Agreement baffled other signatories and dealt a crippling blow to efforts at implementing its aims.

III. CARBON CREDITS VERSUS CARBON OFFSETS

The term "carbon credit" is often used interchangeably to refer to both carbon credits and carbon offsets. While carbon credits and carbon offsets both refer to a transferrable instrument that represents a certain amount of GHG Emissions (generally one metric ton), carbon credits and carbon offsets are not the same. In the simplest terms, carbon credits represent the right to emit a certain amount of GHG Emissions, whereas carbon offsets represent the removal of a certain amount of GHG Emissions from the atmosphere.[4] The summary descriptions below identify the main characteristics of carbon credits and carbon offsets, highlighting the key distinctions between them.

A. Carbon Credits

A carbon credit is a tradeable permit, much like a permission slip, that represents an entity's right to emit one metric ton of carbon dioxide or other greenhouse gases into the atmosphere. Carbon credits are created and issued by a regulatory body in charge of implementing and overseeing a compliance market in a particular jurisdiction, such as a cap-and-trade system. Under a compliance market, certain entities that emit carbon dioxide or other greenhouse gases are legally mandated to participate and meet the market's emissions limits. These entities are awarded carbon credits that allow them to continue to emit carbon dioxide up to a certain limit, which is typically reduced periodically. If an entity maintains its GHG Emissions below the specified limit, it may not need all of the carbon credits it has been issued. In that case, the entity may sell any excess credits to another entity that needs them.[vii] Carbon credits are generally traded in compliance markets.

B. Carbon Offsets

Like a carbon credit, a carbon offset represents one metric ton of carbon dioxide or equivalent greenhouse gases. Unlike carbon credits, however, carbon offsets measure the amount of carbon that has been avoided or permanently removed from the atmosphere. Carbon offsets can be created by either:

- Avoidance or reduction projects such as renewable energy, methane capture, or other such facilities; or
- Removal or sequestration projects such as reforestation, direct carbon capture, or similar enterprises.

Most of the demand for carbon offsets comes from entities that have voluntarily set GHG Emissions reduction targets that can be met either by reducing their own GHG Emissions directly or by effectively paying someone else to implement

4 The phrase "offset credits" or simply "credits" is often used when discussing carbon offsets in the voluntary market. For purposes of this paper, we will continue to use the term "offset" to refer to those units generated by the removal of carbon emissions.

measures that reduce GHG Emissions.[viii] While carbon offsets are generally traded in voluntary markets, certain carbon offsets can serve as an alternative mechanism to meet GHG Emissions caps in compliance markets if such carbon offsets are approved by the compliance market.

Notably, many regulatory schemes permit carbon offsets to be used to satisfy the requirements of the compliance regime. In the California Carbon Market, for example, companies can invest in qualifying projects and use the resulting offsets towards a portion of their predetermined compliance obligations for the year. Similarly, under the Paris Agreement, ITMOs (which represent offsets from a qualifying project) can be applied against a country's NDC targets. Hence, even in compliance markets, the tradeable unit may sometimes represent a carbon offset.

The table below summarizes the key distinctions between carbon credits and carbon offsets.

Key Distinctions Between Carbon Credits and Carbon Offsets

	Carbon Credits	Carbon Offsets
What do they represent?	The right to emit a certain amount of GHG Emissions (generally one metric ton). Carbon credits function like a permission slip that allows carbon emitters to continue to emit carbon dioxide up to a certain limit, which is typically reduced periodically under the mandates of the compliance regime.	Carbon offsets represent the removal of a certain amount of GHG Emissions from the atmosphere (generally one metric ton).
How are they created?	Carbon credits are issued to carbon emitters (countries and corporations) by a regulatory body with oversight over a particular compliance market.	The underlying emissions reductions giving rise to a carbon offset are created by projects that avoid, reduce, remove, or sequester carbon from the atmosphere. The offsets themselves are issued by organizations that certify and track such emission reductions.
Are they transferable?	Yes.	Yes.
How are they used or traded?	Credits are used by carbon emitters mandated by regulatory bodies to cap their emissions. Carbon emitters with emissions lower than their prescribed cap can sell or trade their credits to carbon emitters whose carbon emissions exceed their prescribed limits.	Corporations, governments, and individuals who seek to reduce their carbon footprint can purchase, trade, and sell carbon offsets.
Where can they be used and traded?	Carbon credits can only be traded in compliance markets (discussed in Part IV below).	Carbon offsets are most often traded in voluntary markets (discussed in Part IV below), but certain carbon offsets can serve as an alternative mechanism to meet GHG Emissions caps in compliance markets.

IV. CARBON MARKETS

The carbon markets consist of two entirely distinct types of markets:

- Compliance (or compulsory) markets; and
- Voluntary markets

The summary descriptions below identify the main characteristics of each of these markets and highlight the key distinctions between them.

A. Compliance Markets

As their name suggests, compliance markets, which are also referred to as mandatory or regulatory markets, allow participants to buy and sell carbon credits or carbon offsets in order to comply with certain rules or regulations pertaining to their emissions (e.g., the GHG Emissions targets agreed to in the Kyoto Protocol). In compliance markets, governments or multilateral institutions set requirements that compel certain entities (private entities or governments) to participate in complying with the market's constraints. These constraints typically include a "cap" on the allowable amount of GHG Emissions produced by the market participants, requiring those entities that exceed the imposed limits to purchase additional carbon credits from entities with excess allowances.[ix] Compulsory markets are often referred to as "cap-and-trade" markets.

The compliance market is regulated through international, regional, or sub-national carbon reduction schemes, such as the ITMO-trading mechanism created pursuant to Article 6.2 of the Paris Agreement, the European Union Emissions Trading Scheme (EU-ETS), and the California Carbon Market.[x] Note that in the United States, no national carbon market exists: the California Carbon Market is the country's only formal cap-and-trade program.[xi]

As previously noted, compulsory markets allow the use of certain offsets under carbon reduction schemes in order to achieve compliance with the regime's requirements. Accordingly, each carbon reduction scheme under the compliance market specifies a unit (e.g., CERs under the Kyoto Protocol, ITMOs under the Paris Agreement, etc.) that can be transferred between parties subject to the regulations under that scheme. Each unit generally represents one metric ton of carbon dioxide. These units are generated in the implementation phase of a project and are issued once the reduction has been validated and credited. For example, under the CDM (which is now being phased out), projects wishing to offer CERs in the market were required to have their GHG Emissions reductions validated by designated operational entities (validators and verifiers) and registered by the CDM Executive Board to ensure that real and measurable GHG Emissions reductions are achieved.[xii]

Under the Paris Agreement, projects can create ITMOs when GHG Emissions are reduced or removed in one country, logged in such country's national greenhouse gas inventory,

and the reduction is then transferred to another country's national greenhouse gas inventory after a corresponding adjustment removing the reduction from the selling country's greenhouse gas inventory. These transfers can happen either at the governmental or corporate level, and the process must be overseen by a supervisory body tasked with reviewing recognized credits. The details of actualizing such processes are expected to emerge in the coming years.

B. Voluntary Markets

Voluntary markets operate outside of but in parallel with compulsory markets, allowing the trading of carbon offsets that are not bought or sold on the compulsory markets to meet GHG Emissions requirements imposed by regulatory bodies.[xiii] Unlike CERs or ITMOs, carbon offsets traded in voluntary markets cannot be used to achieve NDCs or other GHG Emissions reduction targets under an applicable compliance regime such as the Paris Agreement. However, carbon offsets that are traded in the voluntary market can be used to support corporate or individual environmental commitments, and are valuable as they help companies supplement their GHG Emissions reduction efforts and achieve their climate change goals or other Environmental, Social and Governance ("**ESG**") objectives.[xiv]

Companies and individuals can acquire or purchase carbon offsets traded in the voluntary market directly from projects, companies, or carbon funds. As in the compulsory market, all carbon offsets that are traded in the voluntary market must be verified by an independent third party and must be developed and calculated according to one of the existing standards.[xv]

Before a project can sell carbon offsets in the voluntary market, the project must first enroll and be registered with a voluntary carbon offset program, often also referred to as a registry. There are several voluntary carbon offset programs that register projects in the United States, including the American Carbon Registry, Verified Carbon Standard (Verra), the Gold Standard Impact Registry, and the Climate Action Reserve.[5] Each program has its own criteria, methodologies, and protocol for quantifying the GHG Emissions reductions of a project, but programs often look to international sustainability programs as well as domestic certification standards for registration standards and requirements.[xvi]

5 The American Carbon Registry was founded in 1996 and was the first private, voluntary carbon offset registry in the United States. The American Carbon Registry has since grown to oversee the registration of offset projects around the globe. Separately, the American Carbon Registry also oversees California's compliance carbon market.

Verra was established in 2005 and is the world's most used voluntary carbon offset program, having registered over 1,800 GHG Emissions reduction projects.

The Gold Standard, founded in 2003, verifies GHG Emissions reduction projects based on standards in the Paris Agreement and in the United Nations Sustainable Development Goals.

The Climate Action Reserve, which started in 2008 in California, has since grown to focus on ensuring transparency in the voluntary carbon offset market in North America.

Once a project is certified and registered by such a program, the program issues carbon offsets to the project. Each program uses different terminology for the tradeable carbon offsets it issues. For example, the American Carbon Registry calls its carbon offsets Verified Emission Reductions ("**VERs**"), while the carbon offsets issued by the Climate Action Reserve are called Climate Reserve Tons ("**CRTs**"). CRTs can be converted into Verified Carbon Units ("**VCUs**") and transferred to a VCU registry run by Verra. After carbon offsets are issued, they can then be traded on various trading platforms, which work similarly to stock and commodity exchanges. The main voluntary carbon offset trading platforms include the American Carbon Registry and Verra (each of which runs its own trading platform), APX Inc., and Markit. Trading on the American Carbon Registry and Verra is limited to carbon offsets verified and issued under these programs, while carbon offsets traded on Markit and APX can be sourced from various programs that register and verify carbon offsets.[xvii]

The table below highlights the key distinctions between compulsory and voluntary markets.

Compliance Markets Versus Voluntary Markets: Key Distinctions		
	Compliance Markets	**Voluntary Markets**
Is participation mandatory or optional?	Mandatory. Carbon emitters (both countries and corporations) are legally required to participate.	Optional. Corporations, governments, and individuals who voluntarily seek to reduce their carbon footprint over and beyond the requirements imposed in compulsory markets can participate.
How is it regulated?	Compliance markets are regulated through international, regional, or sub-national carbon reduction schemes, such as the ITMO-trading mechanism created pursuant to Article 6.2 of the Paris Agreement, the European Union Emissions Trading Scheme (EU-ETS), and the California Carbon Market.	Voluntary markets are administered through voluntary carbon offset registries, such as the American Carbon Registry, Verified Carbon Standard (Verra), Gold Standard Impact Registry, and Climate Action Reserve.
What types of units can be traded?	Mostly carbon credits, but carbon offsets are sometimes permitted.	Carbon offsets only.

V. VALUING CARBON OFFSETS

All carbon offsets are not valued equally. The value of a carbon offset depends on multiple factors, including, among others, the carbon offset's vintage, the type of project that produced the carbon offset, and whether the carbon offset can be certified.[xviii]

A carbon offset's vintage, meaning the year GHG Emissions for the issued offset were avoided, can be indicative of the quality of the carbon offset as well as the underlying project giving rise to the offset, and thus is a principal factor in determining the carbon offset's value. Older vintages are often less expensive than more recent vintages. A few reasons account for this difference in value, including principally the concerns that (i) older vintages are still on the market because the project that produced the carbon offset is of a lower quality, or (ii) the older projects giving rise to the offset did not truly achieve the aim of "additionality," meaning that such projects did not result in reductions of GHG Emissions that were "additional" to those that would have occurred anyway in the absence of a market for carbon offsets.[xix]

The concept of additionality bears further explanation. A reduction of GHG Emissions is deemed "additional" only if the reduction would not have taken place in the absence of the incentive created by the voluntary carbon offset market. These additional reductions can be contrasted to measures that would have taken place anyway due to other factors driving the decision of the entity or project undertaking the emissions reduction action. For example, the following measures would not be deemed to achieve additionality:

- Measures undertaken due to compliance requirements in the compulsory market, such as under a mandated cap-and-trade program;
- Measures mandated due to another law, such as the requirements for landfill operators in California to install carbon capture equipment; or
- Measures pursued due to profitability or other rational commercial reasons, such as making an investment in energy-saving solar panels.[xx]

In practice, however, it is difficult to evaluate whether reductions of GHG Emissions are truly additional, given that such reductions are commonly undertaken in pursuit of other opportunities. For example, if an offshore wind project is cost-competitive without the need to garner revenue from carbon offset sales, that project is not strictly deemed to be "additional" because the project may have been pursued regardless of the potential revenue from the offsets. If the decision to pursue the project or the reductions of GHG Emissions was not decisively influenced by the opportunity to sell carbon

offsets, the project or reduction remains at risk of being deemed not to achieve additionality.

The type of project also affects the value of a carbon offset. The two main types of projects that produce carbon offsets are removal projects and avoidance projects. Removal projects focus on removing GHG Emissions that have already been released into the atmosphere, by using nature-based methods like reforestation or technology-based methods such as carbon capture. Avoidance projects, on the other hand, focus on avoiding the release of new GHG Emissions into the atmosphere by reducing activities that tend to emit large amounts of GHG Emissions or by protecting natural resources, such as carbon sinks, that naturally sequester GHG Emissions. Other examples of avoidance projects include renewable energy projects that displace fossil-fuel emissions from conventional power plants, such as wind, solar, hydroelectric, geothermal, and similar types of renewable facilities. Carbon offsets generated by removal projects are typically more expensive than those generated by avoidance projects.[xxi]

The verification standards used by the applicable registry issuing a carbon offset can also impact an offset's value. For example, a carbon offset issued by a registry whose requirements meet or exceed the then-applicable international standards would be more valuable than one issued by a registry with more lenient standards. To counter such differences in value and to regiment the standards implemented by registries, the Integrity Council for the Voluntary Market, an independent governance organization for the voluntary market, released its draft Core Carbon Principles in July 2022, a framework and assessment procedure for identifying and issuing carbon offsets. According to the Integrity Council, this framework is intended to "provide a credible, rigorous, and readily accessible means of identifying high-quality carbon credits that create real, additional, and verifiable climate impact with high environmental and social integrity."[xxii] The public consultation period for the Core Carbon Principles ended in September 2022, and the framework is expected to become effective in the beginning of 2023.

VI. LIFECYCLE OF A CARBON OFFSET

The end value of a carbon offset arises when the offset is retired, meaning that the offset has been purchased and the reduction in GHG Emissions has been deducted from the final buyer's carbon footprint. Since carbon offsets can be traded (as discussed in Section IV above and further in this section below), a single carbon offset can be owned by multiple parties over the course of its existence. A carbon offset, however, can only be retired once. After a carbon offset is retired, it can no longer be sold or traded, thus preventing double counting. Notably, just holding a carbon offset does not entitle a party to claim it has contributed to any environmental benefit. Only the final owner that retires the carbon offset is entitled to make the claim that its offset has reduced GHG Emissions.

Once a project developer decides to embark on a project that will produce carbon offsets, but before a carbon offset is retired and its benefit is realized, a carbon offset goes through many stages in its lifecycle. While this lifecycle can vary (often marginally) depending on the carbon offset registry that certifies and ultimately issues the carbon offset, certain facets of a carbon offset's lifecycle are common to most registries. This basic lifecycle of a carbon offset is summarized below and explained in more detail in this Section VI.

Typical Stages in a Carbon Offset's Lifecycle

A. ***Design and Screening:*** A project sponsor conceives, structures, and designs a carbon offset project and submits the design to a carbon offset registry, such as the American Carbon Registry or Verra, for initial screening.

B. ***Initial Compliance Audit:*** Once the project design passes the initial screening stage, the project design is audited by a third-party verifier to confirm compliance with registry requirements.

C. ***Project Development, Financing, and Implementation:*** After confirmation of compliance with registry requirements by the third-party verifier, the project sponsor develops, finances, constructs, and commences commercial operations of the project.

D. ***Operations Audit:*** After a certain period of commercial operations, the project is audited by a third-party verifier to ensure that GHG Emissions reductions are proceeding according to the verified and approved project design. The third-party verifier prepares a report for review by the registry that summarizes the verifier's findings.

E. ***Certification and Issuance:*** The registry reviews the report prepared by the third-

party verifier. If GHG Emissions reductions are occurring as planned, as stated in the third-party verifier's report, the registry issues an impact statement, which is essentially a certification that GHG Emissions reductions have occurred, which in turn leads to the issuance of carbon offsets to the project sponsor / owner.

F. ***Offset Trading Phase:*** The project sponsor / owner sells the carbon offset into the market. Such a sale can often happen through a wholesaler, but the carbon offset remains listed on the relevant registry, which continues to track its ownership. The carbon offset may subsequently be further sold or traded, until the time it is ultimately retired.

G. ***Retirement:*** An end consumer purchases and "retires" the carbon offset, and the retirement is then noted on the relevant registry.

During the certification process with a carbon offset registry, project sponsors must demonstrate that their project displays the following six features:

1. The project will produce measurable results.

2. The project will prevent leakage, meaning that GHG Emissions are actually reduced rather than re-allocated elsewhere.

3. The project's GHG Emissions reductions are additional (meaning, as noted above, that the emissions occurred because of the incentive provided by the voluntary carbon market and would not have occurred in the absence of the voluntary carbon market).

4. The reductions in GHG Emissions are permanent and will be kept out of the atmosphere for a reasonable length of time.

5. The development of the project is consistent with the chosen registry's methodologies, protocols, and procedures.

6. The project has been independently verified by a third party to confirm compliance with the registry's requirements.[xxiii]

As a first step of the certification process, a project sponsor must design a carbon offset project and ensure that its design complies with the certification methodology and standards established by the sponsor's chosen carbon offset registry, such as the American Carbon Registry, Verra, or the Climate Action Reserve, for the type of project being developed. For example, certification methodology for carbon capture projects will vary from the certification methodology established for reforestation projects.

Once a project is designed, but before development of the project commences, the project sponsor must present the design to undergo screening at the chosen carbon offset registry in the form of a report outlining how the project will meet all of the registry's certification requirements. The report must also specify the geographical boundaries of the project and the project's duration. Once the registry concludes its screening process, the process then advances to the audit stage. In this stage, the project sponsor selects an independent third party pre-approved by the registry — referred to as a validation and verification body ("**VVB**") — to conduct an

audit of the project design in order to confirm compliance with the registry requirements and to verify that the reductions in GHG Emissions will be real and measurable. During this process, the VVB conducts a site visit and a desktop review of the sponsor's project design.[xxiv]

If the VVB confirms that the project meets the registry's requirements, the registry approves the project, and the sponsor is able to proceed with project development, financing, and construction. Once the project has reached the commercial operations stage and has been operating for a certain period of time (which time period may vary depending on the type of project involved), the project undergoes another round of validation and verification by the VVB to ensure the project is performing as expected. If the project is operating as designed, the VVB will issue a report to the registry that summarizes the findings of its audit. The registry then reviews the VVB's report, and if it agrees that GHG Emissions reductions have actually occurred pursuant to the methodologies applied and requirements imposed, the registry will issue an impact statement, which is essentially a certification that GHG Emissions reductions have occurred. This leads to the issuance of a carbon offset to the project sponsor's account on the relevant registry. The project sponsor can then hold, sell, or retire the offset at its discretion. Each carbon offset is issued a unique serial number to promote ease in tracking and to prevent double counting once a carbon offset is retired.[xxv]

If the holder of a carbon offset chooses to sell the issued offset, the holder can do so in several ways. While most sales occur through a wholesaler after an offset has been created and certified, offsets can also be sold before they are even officially certified as offsets. In some cases, potential offsets are sold to purchasers that invest directly into the underlying project giving rise to the GHG Emissions reductions in return for the rights to all or a portion of the carbon offsets generated and eventually certified by the project. Such a transaction allows the purchaser to acquire the carbon offsets "at cost" and more fundamentally ties the purchaser to the project from its inception. Because of the many phases that a project must undergo before credits can be issued and delivered – including project design, screening, development, financing, construction, and operation – this type of strategy also has a longer lead time (often about three to five years).[xxvi]

In other cases, investors who choose not to invest directly into a project from its inception or during its development stage can enter directly into offset purchase contracts with project sponsors. These contracts generally take the form of ERPAs, as originally introduced pursuant

to the Kyoto Protocol and discussed in Section II above. The structure of an ERPA can vary greatly. For example, ERPAs can be structured as options contracts that specify either that the buyer has the right, but not the obligation, to buy offsets for a fixed price at a certain time in the future, or that the seller (i.e., the project owner) has the right, but not the obligation, to sell offsets for a fixed price at a certain time in the future. Regardless of their structure, ERPAs provide project sponsors with the assurance that they will be able to sell a certain number of carbon offsets. Buyers can also lock in below-market prices and avoid the transaction costs associated with direct investment into a project (since negotiating a single ERPA is less involved than negotiating an equity interest in a project and the associated diligence over an entire suite of project documentation), as well as avoid the substantial risk exposure from early-stage project participation. However, the lead time involved in such transactions can still be long, averaging two to three years before credits are delivered.[xxvii]

For purchasers looking to purchase only a small number of carbon offsets, an easier option may be to go through a retailer or an environmental commodity exchange. This process is fairly quick and straightforward, as it provides purchasers with immediate access to a variety of projects and offsets. Retail traders purchase carbon offsets in bulk directly from sellers and bundle those offsets into portfolios for sale to end-buyers. Most retail traders maintain accounts with registries that certify projects and create offsets, as well as "retire" the purchased offsets on behalf of the end buyer on such registries. Environmental commodity exchanges also work with carbon offset registries to list offsets for sale and enable their transfers. Some exchanges even facilitate trades of carbon offsets via carbon tokens enabled by blockchain technologies. Purchasing through a retailer or exchange does come with downsides, however, as it can be difficult to obtain the information needed to assess carbon credit quality accurately, given that retailers and exchanges generally do not screen for an offset's quality.[xxviii]

Regardless of how a carbon offset is acquired, once the end consumer purchases the carbon offset and elects to retire it, a transaction record is generated, and the unique serial number associated with a carbon offset is marked as "retired" on the relevant registry. This removes the carbon offset from the voluntary market, meaning that the carbon offset can no longer be sold or traded on any exchange. This process bolsters the integrity of carbon markets, as it ensures that the benefits produced by carbon offsets are not double counted and that the ultimate purchaser is the only one that can claim a reduction in its carbon footprint.

VII. OPPORTUNITIES AND RISKS FOR STAKEHOLDERS

Carbon credits and offsets have catapulted to the forefront of the global efforts to address climate change. Programs and mechanisms for the issuance and trading of carbon offsets abound, and the carbon markets appear poised to grow exponentially over the next few decades. Yet, concerns relating to the quality of carbon offsets, their impact on the environment, and the integrity of the carbon-trading mechanisms continue to linger.

Some critics argue that projects generating carbon offsets fail to make any measurable difference in the health of the environment because many of these projects fail to produce permanent benefits. For example, hundreds of thousands of acres of trees planted in California that were meant to sequester carbon were destroyed during the 2021 wildfires in the area, releasing the very carbon they had sequestered. Others raise concerns over "additionality" predicated on the practical difficulties in discerning whether the voluntary carbon markets actually incentivized the investment into a particular emissions reduction project, or whether other factors actually drove the decision to invest (such as the potential cost savings arising from the installation of solar panels). Others still emphasize the prospect of double counting credits, uncertain that the mechanisms described in this paper can prevent multiple parties from claiming benefits stemming from the same carbon offset. And yet others voice frustration that the standards imposed by the various platforms for trading carbon offsets on the voluntary market lack uniformity, leading to questions about the quality of certain offsets.

These concerns highlight the inherent risks that project sponsors and investors assume when investing substantial capital, time, and effort into emission reduction projects. The lengthy span between the initial design phase of a project and the issuance of carbon offsets can discourage both project sponsors and investors in light of the potential risk that a project could ultimately lead to low-value offsets being produced, or no offsets being issued at all. Questions around the stability of the voluntary carbon market, opaque pricing dynamics, and a changing regulatory and governance landscape can also discourage potential participants seeking to invest in projects with more stability.

Acknowledging these concerns and recognizing that the growing demand for carbon offsets requires immediate attention, both governance and private organizations are racing to set standards to improve the quality, transparency, and integrity of offsets, as well as the platforms on which offsets are traded. As regulators and governance organizations work to set standards for carbon credits and carbon offsets, stakeholders across the spectrum stand to benefit from the anticipated boom in the ever-changing de-carbonization industry.

All potential stakeholders would indeed benefit from better-defined carbon markets. Companies

may find it easier to meet their ESG goals with greater certainty, even in the face of increasing scrutiny over reporting requirements as the number of carbon offsets in the market increases and as participants gain greater confidence in the programs and mechanisms that comprise the market. Increased confidence in these markets would also encourage the type of development that could lead to the protection of biodiversity, a reduction in pollution, and gains in other public health benefits, as well as create employment opportunities and channel funding into developing countries where renewable energy projects are increasingly located. With the heightened attention on sustainability, project sponsors and investors may have greater access to lower-cost and more stable financing arrangements, making carbon offset projects more feasible and more attractive. The sooner any lingering issues are fully addressed, the greater the prospect that the carbon markets will inspire the substantial investments in climate-related projects required to achieve the global targets essential to achieve sustainability.

ENDNOTES

i Graham J. Stuart, "COP26 – Prospects for Carbon Offsets and Markets," Baker McKenzie publication, September 30, 2021, https://www.bakermckenzie.com/en/insight/publications/2021/09/cop26-prospects-for-carbon-offsets-and-markets.

ii James Chen and Caitlin Clarke, "Emissions Reduction Purchase Agreement (ERPA)," Investopedia, April 27, 2022, https://www.investopedia.com/terms/e/erpa.asp.

iii Gold Standard.

iv Nicolas J.S. Lockhart, Maureen M. Crough, Dominic Coppens, Katherine Connolly, and Jason J. Lawler, "The Opportunities and Risks of Carbon Credits on the Pathway to Net Zero," Sidley, March 2022, https://www.sidley.com/en/insights/publications/2022/03/the-opportunities-and-risks-of-carbon-credits-on-the-pathway-to-net-zero.

v Cristina Brooks and Kevin Adler, "COP26: Article 6 rulebook updated, but remains work in progress," HIS Markit publication, November 15, 2021, https://cleanenergynews.ihsmarkit.com/research-analysis/cop26-article-6-rulebook-update-but-remains-work-in-progress.html.

vi Nicolas J.S. Lockhart, et al.

vii Will Kenton, "Carbon Credits and How They Can Offset Your Carbon Footprint," Investopedia, November 19, 2021, https://www.investopedia.com/terms/c/carbon_credit.asp.

viii Christy Rivera and Adrienne Sebring, "Carbon offsets as a potential source of revenue," Norton Rose Fulbright publication, February 28, 2022, https://www.projectfinance.law/publications/2022/february/carbon-offsets-as-a-potential-source-of-revenue/.

ix Graham J. Stuart.

x Voluntary v. mandatory carbon credit market, Climate Trade, https://climatetrade.com/voluntary-market-and-mandatory-carbon-credit-market/.

xi The Ultimate Guide to Understanding Carbon Credits, CarbonCredits.com, https://carboncredits.com/the-ultimate-guide-to-understanding-carbon-credits/.

xii Voluntary v. mandatory carbon credit market.

xiii Graham J. Stuart.

xiv Voluntary v. mandatory carbon credit market.

xv Voluntary v. mandatory carbon credit market.

xvi Christy Rivera and Adrienne Sebring.

xvii Christy Rivera and Adrienne Sebring.

xviii Christy Rivera and Adrienne Sebring.

xix Christy Rivera and Adrienne Sebring.

xx Dee Lawrence, "The Concept Of Additionality In The Voluntary Carbon Market, Explained," Forbes, October 1, 202, https://www.forbes.com/sites/forbesnonprofitcouncil/2021/10/01/the-concept-of-additionality-in-the-voluntary-carbon-market-explained/?sh=7f55f17a78ec.

xxi Christy Rivera and Adrienne Sebring.

xxii The Integrity Council for the Voluntary Carbon Market, Core Carbon Principles, Assessment Framework and Assessment Procedure, July 2022, https://icvcm.org/wp-content/uploads/2022/07/ICVCM-Public-Consultation-FINAL-Part-1.pdf.

xxiii Thomas Herry, "Lifecycle of a carbon offset," Fenix Carbon, https://www.fenixcarbon.com/learn/lifecycle-of-a-carbon-offset.

xxiv Requirements and Specifications for the Quantification, Monitoring, Reporting, Verification, and Registration of Project-Based GHG Emissions Reductions and Removals, The American Carbon Registry Standard, November 2021, https://americancarbonregistry.org/carbon-accounting/standards-methodologies/american-carbon-registry-standard/acr-standard-v7-0_final_dec2020.pdf.

xxv Understanding Carbon Offsets, How to Acquire Carbon Offset Credits, The Carbon Offset Research and Education program, https://www.offsetguide.org/understanding-carbon-offsets/how-to-acquire-carbon-offset-credits/.

xxvi Understanding Carbon Offsets, How to Acquire Carbon Offset Credits.

xxvii Understanding Carbon Offsets, How to Acquire Carbon Offset Credits.

xxviii Understanding Carbon Offsets, How to Acquire Carbon Offset Credits.

MINTZ

mintz.com

Boston | London | Los Angeles | New York | San Diego | San Francisco | Washington