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Voluntary Carbon Markets: Outlooks and Trends

January to March 2018

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Voluntary Carbon Markets: Outlooks and Trends January to March 2018

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Foreword

The carbon markets landscape is changing fast. Countries have begun to enact their emissions reduction goals under the Paris Agreement. Many plan to implement domestic carbon pricing schemes and/or trade emissions reductions across borders—if they have not done so already. Yet the Paris Agreement contains few hard-and-fast rules about international trading, so negotiators are working hard to develop this structure and guidelines before 2020 (see page 11). On top of that, the international aviation industry is preparing to launch what may become the largest cap-and-trade program in the world (see page 15).

How these compliance markets affect existing voluntary carbon projects depends on how they are rolled out. Will they allow offsets from voluntary projects? If so, which ones? Will there be restrictions on the type of project or when offsets are produced? With government and industry representatives around the world making critical decisions in the remaining half of 2018 or 2019, now is a crucial time to track these market developments.

In the meantime, voluntary carbon market actors are continuing to explore and innovate. They are finding new ways of generating and selling emissions reductions, integrating their projects' activities with broader sustainable development goals, and collaborating with policymakers and industry groups about how to ensure compliance markets incorporate the best practices from voluntary carbon markets. Overall, these activities have resulted over **430 million tonnes** of emissions reductions generated since 2005 – that's the equivalent of running over 100 coal-fired power plants for a year.

To reflect the rapidly changing carbon markets landscape this year, we are piloting a new mini-report, *Voluntary Carbon Markets: Outlooks and Trends*, that examines the key trends that have emerged in the first quarter (Q1) of 2018. In this report, we present an overview of the voluntary carbon markets—what they are and how they work—along with the latest first-quarter data on offset issuances, transactions, and retirements to bring our readers up to date. We also provide an in-depth outlook of the voluntary carbon markets, examining some of the major upcoming policy decisions that might radically change the voluntary carbon markets—or not.

Our full *State of the Voluntary Carbon Markets* report will return in 2019, but before then, we believe the above developments are significant enough to track as they happen. We welcome your feedback and input, even more so in these evolving times.

- *Michael Jenkins and the Ecosystem Marketplace team*

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What Are Voluntary Carbon Offsets?

The health of our planet depends on every person, government, and company to minimize their greenhouse gas emissions. Many are making major strides by transitioning to cleaner energy, reducing waste, and finding creative solutions to cut their emissions. But these activities aren't enough to eliminate a carbon footprint completely. When reducing one's own emissions becomes physically impossible or financially unfeasible, many emitters turn to **carbon offsets** – measurable, quantifiable, and trackable units of **greenhouse gas (GHG)** emissions reductions.

Carbon offsets are produced by **projects** that carry out on-the-ground emissions reduction activities, and are typically measured in metric tonnes of carbon dioxide equivalents, or tCO₂e.¹ They can either be traded on the **voluntary markets**, where buyers and sellers trade on their own volition, or as part of a **compliance market**, where government regulations require emitters to either reduce their GHG emissions or purchase offsets.

On the voluntary market, many of these projects follow rules and procedures set out by a voluntary carbon **standard**. If the project meets these criteria, the standard will **issue** offsets equivalent to the emissions reductions. **Project developers** can then **transact** these offsets directly to **end buyers** who **retire** the reductions against their own emissions. In other cases, project developers sell to **retailers** or **brokers**, who then resell or charge a fee for finding end buyers (see Annex III).

Projects can employ a variety of activities to produce offsets, from installing renewable energy infrastructure like wind turbines or solar panels, to planting trees that store carbon from the atmosphere. The different methods for producing offsets are characterized as **project types**. Forest Trends' Ecosystem Marketplace groups project types into eight **categories**, listed below (see Annex II for which project types are in each category).

Table 1. Categories of Voluntary Carbon Projects, 2008-2018

Project Categories	Projects with Issued Offsets	Volume of Offsets Issued (2005- present) ²	New Projects ³
Agriculture —modifying agricultural practices to reduce emissions by switching to no-till farming, reducing chemical fertilizer use, etc.	87	6.7 MtCO ₂ e	1
Chemical Processes and Industrial Manufacturing —modifying industrial processes to emit fewer greenhouse gases.	72	63.5 MtCO ₂ e	0
Energy Efficiency and Fuel Switching —improving energy efficiency or switching to cleaner fuel sources.	633	127.9 MtCO ₂ e	8
Forestry and Land Use —managing forests, soil, grasslands, and other land types to avoid releasing carbon and/or increasing the amount of carbon the land absorbs.	170	95.3 MtCO ₂ e	3
Household Devices —distributing cleaner-burning stoves or water purification devices to reduce or eliminate the need to burn wood (or other inefficient types of energy).	161	23.4 MtCO ₂ e	0
Renewable Energy —installing solar, wind, and other forms of renewable energy production.	611	61.9 MtCO ₂ e	2
Transportation —increasing access to public and/or alternative transportation (like bicycling) and reducing emissions from private transportation like cars and trucks.	43	1.1 MtCO ₂ e	0
Waste Disposal —reducing methane emissions from landfills or wastewater, often by collecting converting it to usable fuel.	238	57.5 MtCO ₂ e	0

¹ Throughout this report, we measure offsets in the thousand (KtCO₂e) or million (MtCO₂e).

² All data in this table are based on information from five standards: the American Carbon Registry (ACR), the Climate Action Reserve, the Gold Standard, Plan Vivo, and Verra's Verified Carbon Standard (VCS).

³ Here we are defining "new projects" as projects that issued their first offsets in Q1 of 2018.

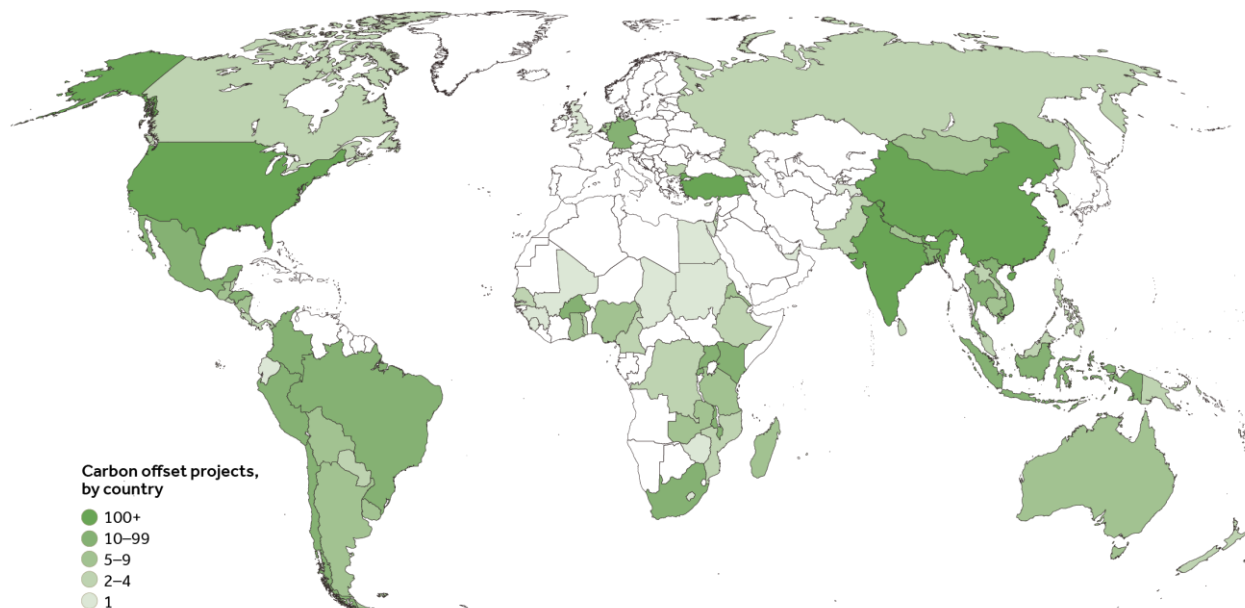
Where Are Voluntary Carbon Offsets Produced?

Voluntary carbon projects exist in 83 countries around the world, and, for the most part, can be traded freely between buyers and sellers in different countries. Some countries, like the United Kingdom and South Korea, have government-operated domestic markets where businesses and individuals can buy offsets produced within the country.

Figure 1 shows how many projects in each country have issued offsets using voluntary carbon markets standards since 2008.⁴ A total of 2,008 projects have issued offsets during this time, mainly in Asia (51%) and North America (18%).⁵ Another 11% of projects are based in Latin America and the Caribbean, 11% in Europe,⁶ and 11% in Africa. Oceania is home to the fewest projects, with only 14 projects (1%) that have issued voluntary offsets.

The top five countries hosting voluntary carbon projects are: India (442), China (426), the United States (US) (351), Turkey (124), and Brazil (97). Together, they are home to almost three quarters (72%) of all projects. Projects in Asia and North America have also generated the largest share of the 435.4MtCO₂e issued to date (39% and 26%, respectively), followed by Africa (13%), Latin America and the Caribbean (12%), Europe (9%), and Oceania (1%).

Figure 1. Locations of Voluntary Carbon Offset Projects, 2008-2018



Notes: The map shows only projects that have issued offsets through the following voluntary carbon standards from 2008 to Q1 2018: American Carbon Registry (ACR), Climate Action Reserve (CAR), Gold Standard, Plan Vivo, and Verra's Verified Carbon Standard (VCS) as of April 2018. Although projects were issued by voluntary standards, some projects' offsets may eventually be sold on compliance markets, such as California's Cap and Trade or Colombia's Fuel Tax. Based on data from 2004 projects in 82 countries.

⁴ It is important to note that not all offsets issued by voluntary standards are ultimately used on the voluntary market. Some may be used for compliance purposes.

⁵ "North America" here refers to the United States and Canada only. Voluntary carbon projects and offsets from Mexico are included in our "Latin America and the Caribbean" region.

⁶ "Europe" here refers to all European countries, whether or not they are within the European Union (EU), as well as Turkey. There are few voluntary carbon projects within the EU because, historically, many EU member states have already committed to emissions reductions under the Kyoto Protocol. Thus, there are few instances where voluntary carbon projects could make additional emissions reductions beyond those included in the state emissions reductions accounting.

What Is the Climate Benefit of Voluntary Carbon Projects?

The volumes of offsets issued, transacted, and retired are important metrics for market size, but none of them is a comprehensive indicator of the overall emissions reductions achieved as a result of the voluntary market.

- Issuances are the measure of emissions reductions verified by a standard (referred to in this report as offsets). Yet, the volume of offsets issued does not necessarily equate to the volume of the emissions reduced, especially since many projects only pay to issue offsets when they have a willing buyer.
- Transactions are the measure of market activity around the buying and selling of offsets. These volumes are not equivalent to total emissions reductions, since not all offsets are transacted and some offsets may be transacted more than once.
- Retirements are a measure of the offsets that are no longer tradable and are therefore permanently “removed” from the atmosphere. Retirements volumes are also not equivalent to total emissions reductions, since not all offsets are purchased by end buyers.

In order to track the exact volume of greenhouse gas emissions avoided or absorbed because of voluntary carbon markets, we would need to look at the volume of offsets *generated* (but not necessarily *issued*) by carbon projects. Undoubtedly, that volume exceeds the volume of offsets issued, transacted, or retired.

That said, voluntary offset issuances are the closest proxy to the voluntary markets’ environmental impact. **Since 2005, projects have helped to reduce, sequester, or avoid over 437.1 MtCO₂e.** This is more than all of **Australia’s energy-related emissions in 2016.⁷** **Last year alone, projects issued 62.9 MtCO₂e: a record high for the market.** That is the equivalent of *not* consuming almost 150 million barrels of oil.⁸



Box 1: Sustainable Development and Carbon Offset Projects

While offsets are traded based on their emissions reduction impacts, many projects also have a host of additional impacts, known as “**co-benefits**.” These co-benefits are often in line with other aspects of sustainable development, such as supporting the local economy through job training and creation, preserving watershed areas that supply clean water, or safeguarding biodiversity. In many cases, co-benefits are integral to the project and often one of the main reasons that suppliers and many buyers are engaged in voluntary carbon markets.

Several standards either incorporate co-benefits in their requirements or offer add-on certifications to measure co-benefits. Recently, many project developers and standards have begun aligning their co-benefits metrics with the United Nations’ Sustainable Development Goals, which include everything from ending hunger to providing energy access, to conserving marine life.

While there is still no set of universally used metrics to measure many of these co-benefits, and may never be, it is fair to say that many of the 437.1 MtCO₂e of offsets issued since 2005 have brought additional economic and conservation impacts to the communities and ecosystems in which they operate.

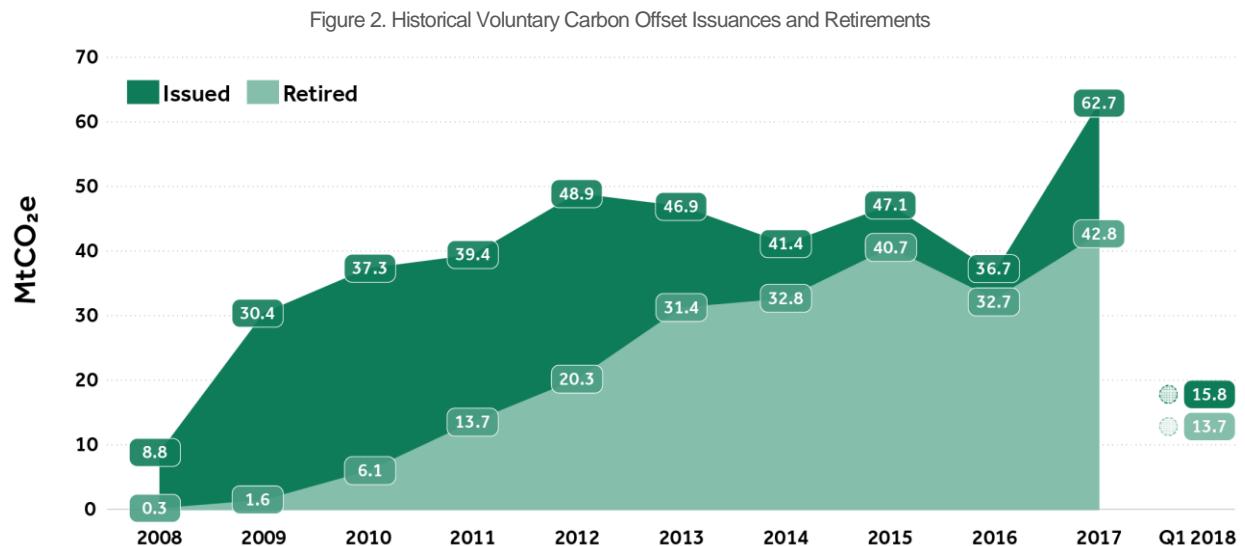
⁷ “National Greenhouse Gas Inventory,” Australian Government Department of Environment and Energy, accessed May 2018, <http://ageis.climatechange.gov.au/>.

⁸ “Greenhouse Gas Equivalencies Calculator,” United States Environmental Protection Agency, last updated September 2017, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

What Is the Total Supply and Demand of Voluntary Offsets?

While demand for offsets drives the creation and continuation of projects on the voluntary carbon markets, projects can take years before producing a single offset. Because of this, the supply (issuance) of offsets has historically outpaced demand (retirements) of offsets.⁹

Overall, since the voluntary carbon markets picked up in the late 2000's, offset issuances and retirements have both increased dramatically. In 2017, offset issuances (62.9 MtCO₂e) and retirements (42.8 MtCO₂e) reached record-highs.



Notes: Data is based on project registries from the following carbon standards: American Carbon Registry (ACR), Climate Action Reserve (CAR), Gold Standard, Plan Vivo, and Verra's Verified Carbon Standard (VCS) as of April 2018. Based on 401.5 MtCO₂e offsets issued and 212.4 MtCO₂e offsets retired between 2008 and 2017. Although there was some pre-2008 market activity, it is not included in this figure due to a lack of consistent, publicly available information.

The total amount of issuances and retirements has increased almost every year since 2008, but a particularly large uptick occurred last year. While many factors contribute to the volume of offsets issued and retired in a given year, one reason for this uptick may have been the **Paris Agreement**,¹⁰ as more awareness of climate change may have led businesses to make new commitments to reduce emissions. Likewise, the United States' decision to pull out of the Paris Agreement may have also sparked an uptick in demand, as more businesses and individuals were motivated to take climate action into their own hands.

Another factor in the historic year-over-year variation is compliance market activity. For example, many companies regulated under California's compliance market decided to purchase voluntary offsets in 2012—before the program's launch in 2013. After 2013, several voluntary standards gained accreditation by California's Air Resources Board to provide preliminary oversight of compliance project development. Since then, the American Carbon Registry and Climate Action Reserve have issued more California-eligible offsets than voluntary offsets.

⁹ Since issuances represent offsets available for sale, and retirements represent offsets that can no longer be resold, we use the volume of offsets issued and retired for as proxies for supply and demand, respectively.

¹⁰ For more information, see the "On the Horizon" section starting on page 11.

Q1 Trends: Issuances

Offsets are issued to a project once the following criteria are met: the project has implemented its emissions reductions activities, demonstrated that it has achieved quantifiable emissions reductions, *and* met all necessary requirements set by the relevant standard. Such standards typically require that projects undergo third-party **validation** (to approve project activities and plans) and **verification** (to ensure the project's activities have been implemented), as well as other processes to guarantee the project's beneficial impact on the climate.

When an offset is issued, it is assigned a unique serial number and listed on a **registry** that traces the offset from issuance through transaction(s) to retirement. This is a critical step in providing transparency around offset ownership and to prevent double claiming.

A project's total volume of offsets issued does not always equate to the project's total volume of emissions reduced. This is because project developers must pay for both third-party verification and the issuance of offsets. Some project developers, then, will only pay for these services if they have a committed buyer. Hence, issuance volumes represent a *minimum* amount of emissions reductions and available offset supply (see page 3 for more information about the environmental impact of offsetting).

Box 2. Voluntary Carbon Market Standards

During the early stages of the voluntary carbon markets, many project developers used internal methodologies to calculate their project's emissions reductions. Today, most projects adhere to methodologies set out by one of several voluntary standards. These standards require projects to submit to third-party validation and verification to ensure projects have achieved their stated emissions reductions. Standards can differ by which project activities and types are allowed, where projects may be located, and what regulations projects must adhere to.

However, all voluntary standards require that offsets be:

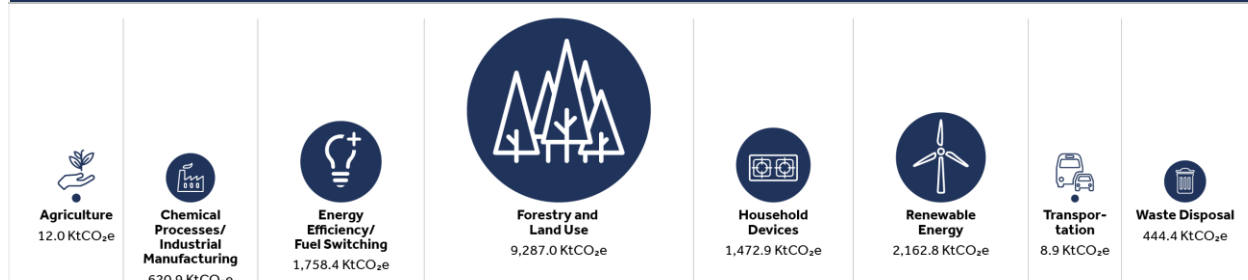
- **Real:** there will be evidence that the project actually removes or prevents emissions;
- **Additional:** the emissions reductions would not occur without those project activities;
- **Measurable:** the volume of emissions reductions can be accurately measured; and
- **Verifiable:** a neutral, third-party auditor has verified the emissions reductions.

Some standards also incorporate co-benefits impacts, requiring projects to not only reduce emissions, but also address other sustainable development-related impacts like employing or training a certain number of local residents or protecting species' habitats (see Box 1 for more detail).

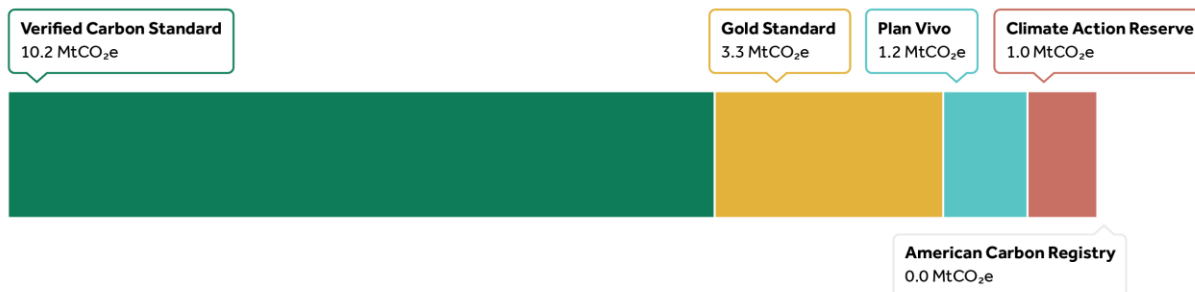
Figure 3. Q1 Issuances by Project Category, Standard and Country

160 projects issued 15.8 MtCO₂e offsets January-March 2018.
7.0 MtCO₂e in January | 5.2 MtCO₂e in February | 3.5 MtCO₂e in March

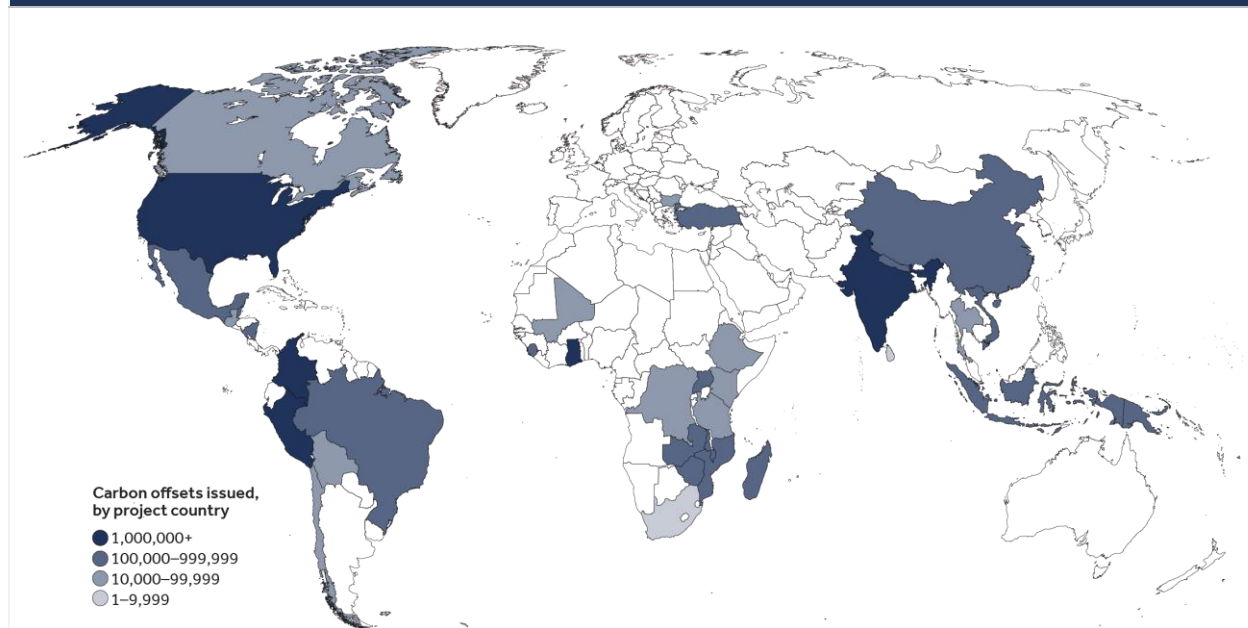
By Project Category



By Standard



By Country



Notes: The data is based on project registries from the following carbon standards: American Carbon Registry (ACR), Climate Action Reserve (CAR), Gold Standard, Plan Vivo, and Verra's Verified Carbon Standard (VCS) as of April 2018. Based on 14.7 MtCO₂e offsets issued. Some category totals do not add up to 14.7 MtCO₂e due to rounding conventions.

Q1 Trends: Transactions

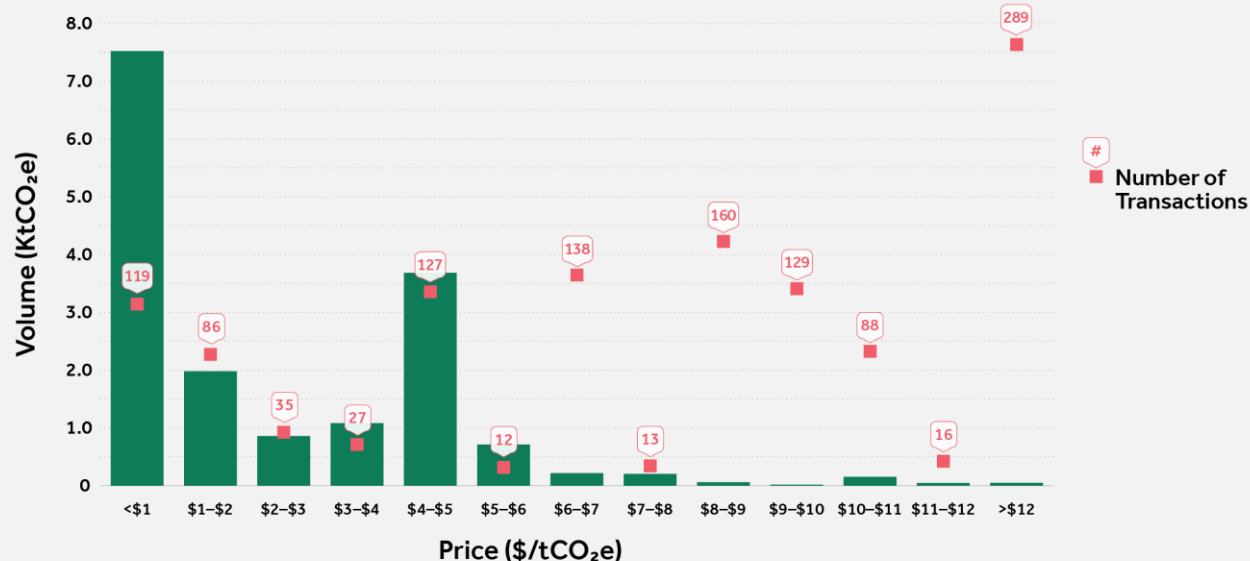
After issuance, project developers can sell their offsets to intermediaries (like a retailer, broker or exchange) or directly to an end buyer. While an offset is only issued and retired once, it may be transacted multiple times before retirement. Because of this, there are a few critical differences between the transaction data presented here than the issuance and retirement data presented elsewhere in the report.¹¹

First, we include the volume of offsets recorded for each transaction—even if the same offset was transacted multiple times (for example, from project developer to retailer to end buyer). Second, because there is no public source of transaction data, Ecosystem Marketplace conducted a survey¹² to gather data directly market participants: this data should be viewed as conservative, as we only report on survey respondents' data. Third, because it is survey-based information, the responses include offsets that were certified by additional standards.

Box 3: What's in a Price?

In contrast to compliance markets, where offsets typically sell at a relatively consistent price, prices for offsets on the voluntary carbon markets can range dramatically. While Ecosystem Marketplace has tracked *average* prices ranging between \$3-\$6/tCO₂e, *actual* prices might be as little as \$0.5/tCO₂e or more than \$50/tCO₂e.¹³ Figure 4 below depicts the volume and number of transactions by price reported in Q1 of 2018.¹⁴

Figure 4. Volume of Offsets Sold and Number of Transactions by Price, January-March 2018



Notes: The data is based on results from Ecosystem Marketplace's survey of project developers, retailers, and brokers conducted in Spring 2018. Based on 1206 transactions totaling 11.4 MtCO₂e offsets reported between January to March 2018. See the methodology for more information.

This range in prices reflects several factors, including: project costs (which can differ based on the project's location and type of activity), buyer's preferences (as limited projects might need to meet specific location, project type, co-benefits, or other buyer criteria), and the deal itself (typically, offsets bought in bulk tend to sell at lower prices than offsets bought in smaller quantities).

¹¹ While most of the market activity data in this report comes directly from five voluntary standards (ACR, CAR, the Gold Standard, Plan Vivo, and VCS), transaction data comes from an Ecosystem Marketplace survey conducted to carbon project developers, retailers, and brokers. See the methodology section for more information.

¹² Our latest survey builds on our experience collecting voluntary carbon market data over the last twelve years.

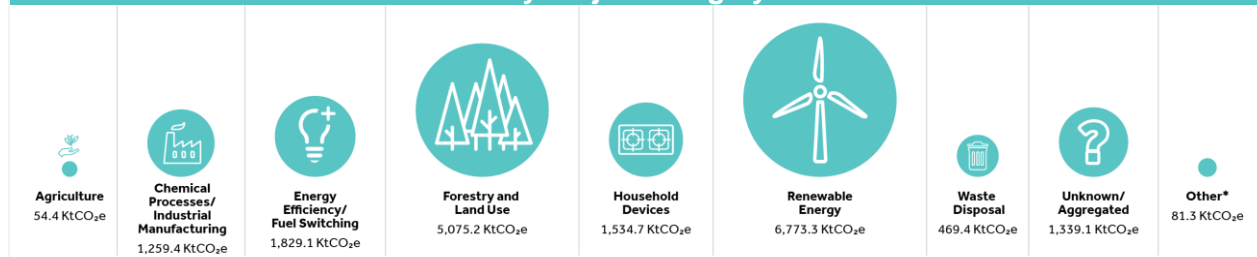
¹³ Kelley Hamrick and Melissa Gallant, *Unlocking Potential: State of the Voluntary Carbon Markets 2017* (Forest Trends' Ecosystem Marketplace, 2017), <https://www.forest-trends.org/publications/unlocking-potential/>.

¹⁴ Transaction data could be presented in aggregate or individual transactions. As a result, the number of transactions in this figure is underestimated.

Figure 5. Q1 Transactions by Project Category, Standard and Country

18.7 MtCO₂e offsets transacted January-March 2018 at an average price of \$2.4/tCO₂e.

By Project Category



By Standard

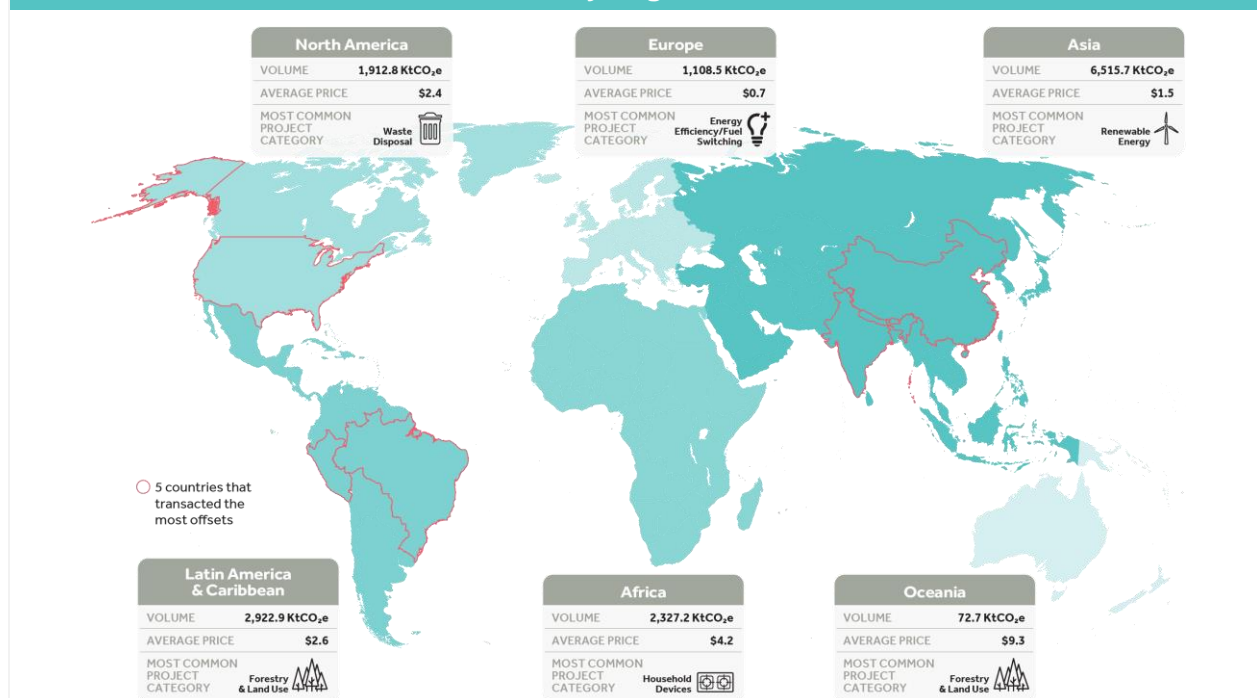
Volume



Value

Verified Carbon Standard 12,287.1 KtCO ₂ e \$22,565.3 K	Gold Standard 3,728.5 KtCO ₂ e \$11,667.8 K	Multi/Aggregated 1,284.3 KtCO ₂ e \$4,142.4 K	Climate Action Reserve 600.7 KtCO ₂ e \$869.9 K
Clean Development Mechanism 313.0 KtCO ₂ e \$319.9 K	American Carbon Registry 292.9 KtCO ₂ e \$1,425.8 K	Plan Vivo 98.4 KtCO ₂ e \$787.7 K	Other/None 23.6 KtCO ₂ e \$228.2 K

By Region



* Other includes transportation and other project types.

Notes: Data is based on results from Ecosystem Marketplace's survey of project developers, retailers, and brokers conducted in Spring 2018. See the methodology for more information. Based on 9.4 MtCO₂e offsets transacted. Some category totals do not add up to 9.4 MtCO₂e due to rounding conventions.

Q1 Trends: Retirements

Retirement is the final stage in an offset's life cycle, after which offsets are no longer able to be traded. An offset is retired when an end buyer claims the quantity of emission reductions associated with that offset against their own emissions.

When this happens, the registry tracking that offset permanently removes the offset's unique serial number from circulation. This ensures the offset cannot be resold, and the emissions reductions represented by that offset are considered permanently "removed" from the atmosphere.

While it is best practice to retire an offset before claiming it against emissions, in reality that does not always happen. Even if an end buyer does retire the offset, there may also be a lag in the time between when the offset is "used" in emissions calculations, and when it is officially retired through a registry. Hence, the retirement volumes noted throughout this periodical represent a *minimum* amount of end-demand for offsets.

Box 4. Who Buys Offsets?

Many kinds of people, companies, and organizations voluntarily offset their emissions. A traveler might offset their air travel emissions. A major company may choose to offset a portion of their emissions as part of their sustainability strategy. Earlier this year, the rock band Pearl Jam offset the emissions associated with their tour in Brazil.¹⁵

In the surveys for our *State of the Voluntary Carbon Markets* reports, Ecosystem Marketplace asks respondents about their end buyers. [Last year's report](#) supported trends we have seen over the last decade, namely that:

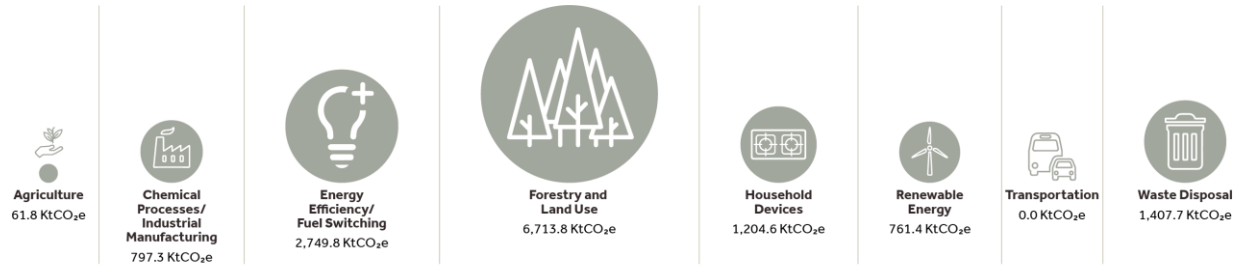
- The bulk of voluntary offset purchases by volume are made by multi-national, private, for-profit companies.
- Returning buyers tend to purchase higher volumes, while new buyers, perhaps dipping their toes in the market, often purchase fewer offsets at a time.
- There are many different reasons an end buyer may choose to purchase offsets, but often offsetting is part of a broader environmental sustainability strategy and/or specific goal to reduce emissions.
- When choosing which offsets to buy, end buyers looking for "charismatic" offsets emphasize co-benefits like economic growth or biodiversity preservation and often pay higher prices.

¹⁵ "Pearl Jam invests in Amazonian reforestation to offset emissions from current Brazil tour," Mongabay, published March 20, 2018, <https://news.mongabay.com/2018/03/pearl-jam-invests-in-amazonian-reforestation-to-offset-emissions-from-current-brazil-tour/>.

Figure 6. Q1 Transactions by Project Category, Standard and Country

213 projects retired 13.7 MtCO₂e offsets, January-March 2018.
5.2 MtCO₂e in January | 5.1 MtCO₂e in February | 3.3 MtCO₂e in March

By Project Category



By Standard



By Country



Notes: The data is based on project registries from the following carbon standards: American Carbon Registry (ACR), Climate Action Reserve (CAR), Gold Standard, Plan Vivo, and Verra's Verified Carbon Standard (VCS) as of April 2018. Based on 13.5 MtCO₂e offsets retired in 58 countries. Some category totals do not add up to 13.5 MtCO₂e due to rounding conventions.

On the Horizon: Regulated Markets

Under the 2015 Paris Agreement, all signatory countries made a commitment to reduce greenhouse gas emissions.¹⁶ This is great news for the planet, but what will it mean for the voluntary carbon markets?

As countries determine how to meet their carbon reduction commitments under the Paris Agreement, more and more plan to implement domestic carbon pricing schemes and/or trade emissions reductions across their borders. This will undoubtedly have an impact on the voluntary carbon markets. *How* these markets are affected depends on which domestic and international regulations are enacted, and how they are implemented.

How voluntary carbon markets could be integrated into compliance systems:

Allow voluntary offsets to transition into a domestic compliance market: Some governments already allow regulated emitters to use offsets certified by voluntary standards as a way to comply with emissions regulations. Colombia's carbon fuel tax, for example, allows regulated businesses to purchase offsets developed by voluntary standards instead of paying the tax. In California's cap-and-trade program, the state adapted many of its protocols from existing voluntary standards and allowed eligible voluntary carbon projects to transfer into the program via its "Early Action" initiative in order to ensure there was some supply available at the program's start.

Allow voluntary offsets to transition into an international, decentralized compliance market (Paris Agreement, Article 6.2): Article 6 of the Paris Agreement lays out a few options for encouraging offset trading. In Article 6.2, countries agreed to establish a tradable unit of emissions reductions (called Internationally Transferable Mitigation Outcomes, ITMOs) that could be traded between countries. The criteria for ITMOs are still being debated: they might represent allowances, offsets or some new unit of measurement. In May 2018, negotiators met in Bonn, Germany to discuss and propose eligibility rules. They agreed on an informal 54-page document that recorded many contradictory views; negotiators plan to meet again in Bangkok, Thailand before the upcoming Conference of the Parties in December to agree on some of the informal notes.

Allow voluntary offsets to transition into an international, centralized compliance market (Paris Agreement, Article 6.4): Article 6.4 proposes the creation of a centralized, global mechanism to trade ITMOs. Such a mechanism would be supervised by an international governing organization, like the Clean Development Mechanism (CDM). Countries currently participating in the Kyoto Protocol can trade the globally-recognized CDM-approved offsets. A new Article 6.4 mechanism might transfer all CDM offsets, duplicate parts of the CDM, or create an entirely new mechanism. Alternatively, countries may choose to forgo a centralized market, and instead favor multi- or bi-lateral trading with countries enacting similar policies or markets.

Allow voluntary offsets to transition into the CORSIA market: International aviation is not covered by countries' national Paris Agreement commitments. Instead, countries have agreed to launch the first-ever sector-wide cap-and-trade program, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), coordinated by the International Civil Aviation Organization (ICAO). This cap-and-trade program could rely heavily on carbon offsetting to meet the industry's emissions reductions targets. Representatives to ICAO are currently in the process of negotiating the program specifics, including offset eligibility rules. Decisions about which project types and vintages are accepted will have major implications across the voluntary carbon markets (see page 15).

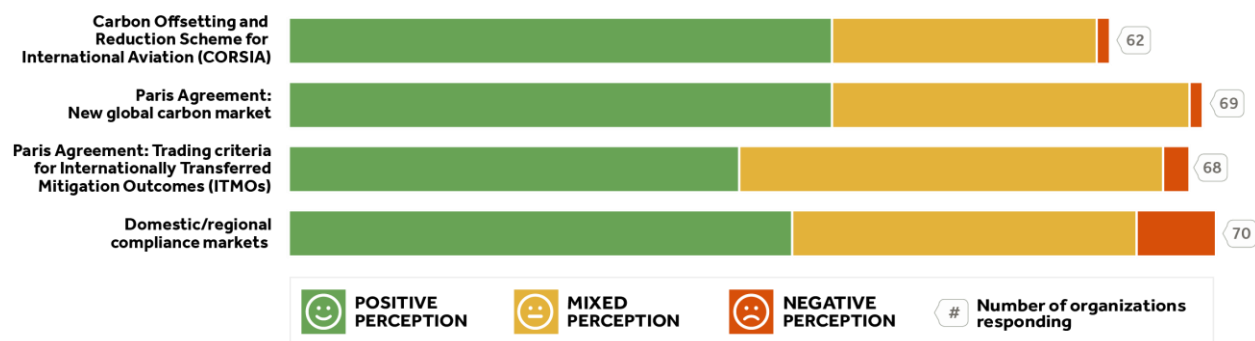
¹⁶ While the United States signed and adopted the Paris Agreement, it plans to withdraw from the Agreement by 2020.

From the Experts: Regulated Markets

Clearly, many changes are afoot in the world of carbon markets. While we acknowledge that predicting the future is an inevitably risky endeavor, we nevertheless wanted to find out how these changes may affect the voluntary carbon markets. We conducted a survey to ask current market participants and experts what they view as the markets' biggest challenges and opportunities, and how they expect the aforementioned potential compliance markets to impact their work.

Most respondents viewed upcoming CORSIA, Paris Agreement, or domestic markets as positive new opportunities (see Figure 7). These markets may result in both a new source of demand for projects that transition to selling offsets in compliance markets and a reduction in the supply of voluntary offsets. Regardless of whether or not upcoming compliance markets allow for voluntary offsets, many agreed that raising overall awareness of offsetting is a good thing for the voluntary carbon markets.

Figure 7. How Voluntary Market Actors Perceive Potential Upcoming Compliance Markets



Notes: Data is based on results from Ecosystem Marketplace's survey of project developers, retailers, and brokers conducted in Spring 2018. See the methodology for more information.

Despite the generally sunny outlook, nearly all respondents reiterated the same word when describing the future of voluntary carbon markets: uncertainty. This was especially true for the Paris Agreement's Article 6.2 decisions around trading criteria.

While few respondents expected to be negatively impacted by a new international market, several were wary of the effect domestic programs might have on their projects. Several respondents commented that they had gotten frustrated when interacting with country officials and feel that their governments don't understand or incentivize private action on climate change. This skepticism is particularly felt with regards to **Reducing Emissions from Deforestation and forest Degradation (REDD+)** national programs and policies, where many REDD+ project developers struggle to get their governments to learn from their experiences and consider including them in future jurisdictional, sub-national and/or nation-wide programs for addressing deforestation.

On the Horizon: Voluntary Markets

Given that many potential paths for future voluntary offset activity involve transitioning segments of the voluntary market into compliance programs, what does that mean for the existing voluntary market?

The International Carbon Reduction and Offset Alliance (ICROA) has been convening expert roundtables to discuss ways voluntary offsetting can fit into this new and uncertain future. In November 2017, ICROA released guidance¹⁷ for voluntary offsets in a post-2020 world, which identified potential ways that voluntary carbon projects could co-exist with countries' climate commitments. These solutions, along with other potential solutions collected from Ecosystem Marketplace's survey of market experts are presented below.

How Voluntary Offsets May Remain Voluntary:

Countries create domestic voluntary markets: Many voluntary offset suppliers have historically sold to international end buyers.¹⁸ However, a growing number of countries and regions are creating regulated domestic voluntary markets to boost demand for local offsets. Many of these programs are quite small and operate alongside an active compliance market. They include: France's Voluntary Carbon Land Certification initiative, the United Kingdom's Woodland Carbon Code, Colombia's voluntary carbon market, and Korea's Forest Carbon Offset Scheme.

Countries agree to subtract voluntary offsets from their reporting: Voluntary offsets may continue to be generated in sectors covered by the host country's climate goal, as long as that country is willing to remove those emissions reductions from their reporting. Whether any countries would be willing to give up claims to these emissions reductions remains to be seen.

Voluntary carbon projects exist outside of regulated sectors: As the Paris Agreement provides flexibility for how each country will regulate their economies, there may be room for voluntary offsets generated from non-covered sectors within those countries. If the host country does not calculate emissions from that sector, the offsets might be sellable to international buyers; if the emissions are counted but unregulated, the offsets might be sellable to domestic buyers.

Voluntary carbon projects sell non-carbon certificates to buyers: Instead of purchasing emissions reductions, voluntary end buyers could receive a claim or other certificate that recognizes their financial contribution to a voluntary carbon project. The offsets, however, would be claimed by the host country's government.

Voluntary offsets can sell to voluntary buyers through Article 6.4: If the Paris Agreement's Article 6.4 allows voluntary offsets into its proposed global mechanism, the mechanism may allow non-state participants like companies or individuals to purchase and retire offsets. This would, in effect, ensure that emissions reductions occur above and beyond what countries have promised.

Voluntary carbon markets remain as-is... in the US: Since the US has withdrawn from the Paris Agreement, most of what has been discussed above does not apply to the US voluntary offset market. With no nationwide compliance market either, US-based voluntary carbon projects can continue to operate and sell offsets without the risk of double claiming.

¹⁷ International Carbon Reduction and Offset Alliance. *Guidance Report: Pathways to increased voluntary action by non-state actors* (International Carbon Reduction and Offset Alliance, 2017), https://icroa.org/resources/Documents/ICROA_Pathways%20to%20increased%20voluntary%20action.pdf.

¹⁸ With a notable exception being the US, where most US-based projects sell offsets to US-based end buyers.

From the Experts: Voluntary Markets

A number of challenges—some new, some old—exist for active voluntary market participants. Many respondents to the Ecosystem Marketplace survey reiterated their frustration from previous years about low pricing and lack of demand. Meanwhile, depending on how new markets like CORSIA and the Paris Agreement are designed, market participants could see a rapid rise in demand for voluntary offsets—or not. Therefore, the market is seen as high-risk for new project investment and (due to associated costs) they are also less inclined to issue new offsets from existing projects.

Encouragingly, other respondents said voluntary demand has never been better, citing more corporates making serious commitments to fight climate change or increasing the ambition of existing emissions reduction goals (especially by reducing emissions outside of their direct activities).

Despite these new and ambitious goals, many companies are not recognized nor rewarded for their offsetting investments and activities. One of the primary reasons is that the most commonly-used standard for quantifying corporate GHG emissions, the Greenhouse Gas Protocol, does not allow offsets as a means to reduce net emissions. In addition, while a plethora of new initiatives seek to encourage climate-smart corporate behaviors, including CDP's Climate Change Program (which is structured in alignment with the GHG Protocol), the Science-based Targets Initiative, and the RE100 Initiative, they offer little or no acknowledgement to corporations that go beyond internal emissions reductions activities to fund external emissions reductions through offsetting.



Seedlings being grown at a community tree nursery for a smallholder reforestation program in San Juan de Limay, Nicaragua. Photo credit: Taking Root, CommuniTree Project

Up in the Air: CORSIA's Potential Impact on Voluntary Offsets

The 2015 Paris Agreement was a landmark event in the global effort to reduce the impact of climate change. Nearly every country in the world agreed to limit its greenhouse gas emissions at the national level; however, these domestic goals do not cover emissions occurring across borders, namely from international aviation and shipping.

Instead, countries agreed to collaborate on reducing these emissions through two United Nations (UN) sector-specific agencies: International Civil Aviation Organization and International Maritime Organization. While negotiations for industry-wide regulations to reduce emissions from international shipping are ongoing, the 192-member states of ICAO already set an aspirational emissions reduction goal back in 2013: to achieve carbon neutral growth beginning in 2020.

There are several potential pathways to achieve this goal: improving aircraft fuel efficiency, transitioning to cleaner-burning fuels (e.g. biofuels), and implementing market-based mechanisms (e.g. offsetting). With international aviation expected to grow rapidly in the coming years, improving fuel efficiency and using cleaner fuels will likely be insufficient to achieve this goal. That's why, in 2016, ICAO adopted the Carbon Offsetting and Reduction Scheme for International Aviation. CORSIA is the first sector-wide carbon offsetting scheme and will be implemented in phases:

1. The pilot phase (2021-2023), where countries can participate on a voluntary basis.¹⁹
2. The first phase (2024-2026), where countries can participate on a voluntary basis.²⁰
3. The second phase (2027-2035), where all countries must participate.²¹

Depending on the growth in international aviation and development of other emissions reductions activities (namely fuel efficiency and cleaner-burning fuels), CORSIA could generate anywhere from 1.6-3.7 billion tonnes in demand for emissions reductions²² during its three phases of implementation (from 2021-2035).²³ This would dwarf any other operational or planned market, including the European Union's Emissions Trading Scheme and China's cap-and-trade program.

Table 2. Key Timelines of CORSIA Decisions and Activities

Date	Parties	Outcome
2018, June (expected)	ICAO	Standards and Recommended Practices (SARPs) to be adopted by the ICAO Council.
2019, January	All States	Countries must start monitoring, reporting and verifying airlines' international emissions.
2021-2023	Voluntary States	Pilot Phase begins
2022	ICAO	Review of CORSIA
2023-2026	Voluntary States	First Phase begins
2025	ICAO	Review of CORSIA
2027-2035	All States (except exempted States)	Second Phase begins
2028	ICAO	Review of CORSIA

¹⁹ As of 1 July 2018, 72 States, representing 76% of international aviation activity (2014 RTK data), intend to voluntarily participate in the CORSIA from its outset.

²⁰ The difference between the pilot and first phases is the baseline from which airlines will calculate their emissions reduction requirements; in the pilot phase, airlines will have the option to choose 2020 or the current year, whereas beginning in the first phase airlines must use the current year.

²¹ Exceptions include countries that have very few international flights (determined by ICAO analysis of international revenue tonne-kilometers), and countries categorized as least developed countries, small island developing states, and landlocked developing countries. Any of these countries may still decide to voluntarily participate.

²² Sean Healy, CORSIA: Quantification of the Offset Demand (Öko-institut e.V., June 2017), https://www.carbon-mechanisms.de/fileadmin/media/dokumente/sonstige_downloads/CTI_Workshop_2017/5_Healy_170623_CORSIA_CT1_Presentation.pdf.

²³ CORSIA's baseline emissions are determined as the average emissions of 2019 and 2020. ICAO is now hard at work to develop Standards and Recommended Practices (SARPs) as well as guidance for countries to monitor, report and verify emissions as well as how to comply with offsetting requirements.

CORSIA and the Voluntary Markets

The expected demand from CORSIA will have major implications for the voluntary markets. Who benefits will be largely determined by ICAO's decisions about how the market is structured and which offsets are eligible. Here are a few of the big decisions at play:

Standards: The ICAO Council, consisting of 36 ICAO Member States, adopted Standards and Recommended Practices (SARPs) in late June 2018. These SARPs will be added to the legally binding Chicago Convention on International Civil Aviation and lay out the criteria for essential design elements of CORSIA. Decisions around offset eligibility will occur in a separate process led by the ICAO Council and a Technical Advisory Body.

Emissions Units: A Technical Advisory Body will screen and recommend eligible standards and offsets for approval by the ICAO Council. These standards might include voluntary standards, compliance standards, and/or REDD+ programs. They might also include specify that certain methodologies or project types with a standard or program are eligible. At the moment, few details are known about which standards, project types, or other criteria might be allowed for use in CORSIA. Until a final decision in this regard is taken by the ICAO Council, voluntary carbon project developers still won't have a clear idea of whether they are eligible to provide emissions units to be used in the CORSIA.²⁴

Vintage: Another key question is how new offsets must be (an offset's age is called "**vintage**"). Countries home to many historical carbon offset projects typically prefer to keep vintages unrestricted, as this could help funnel more finance into their existing offset projects. Yet other many countries, especially those in the European Union, prefer stricter restrictions on offset age. Vintage restrictions are also under consideration for the CORSIA.²⁵

The ICAO Council and Governing Body are currently negotiating these aspects of CORSIA. With the first compliance cycle scheduled to begin in 2021, decisions are expected soon. That said, the CORSIA is subject to a periodic review every three years beginning in 2022, and many of these decisions may change in the future. ICAO will take into account relevant negotiations in the United Nations Framework Convention on Climate Change (UNFCCC) and Article 6 of the Paris Agreement and promote compatibility with those decisions.²⁶ Given that these negotiations are still ongoing, the eligibility of standards, project types, and emissions units under CORSIA may change in the future.

Current Airlines that Offset

While many airlines will offset for the first time under the CORSIA, others have already been offsetting for voluntary or compliance purposes. Figure 8 shows which countries already measure and reduce emissions from domestic flights; all flights within the European Union, for example, already have to meet the EU's emissions reduction goals for the sector and usually do so by purchasing compliance offsets.

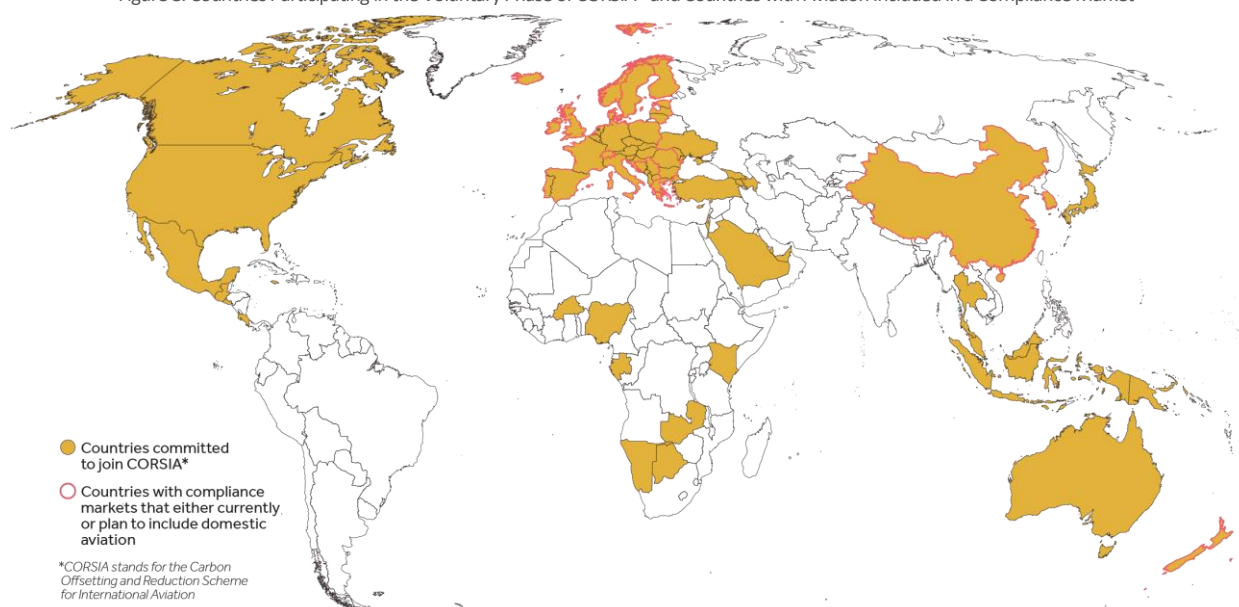
Many airlines also voluntarily offset some of their domestic and international emissions and/or offer the opportunity for customers to offset their flights. We analyzed 129 of the largest airlines around the world, and recorded if they voluntarily offset or offered customers the option to voluntarily offset the emissions associated with their flight.

²⁴ According to Assembly Resolution A39-3, paragraph 20 d), the ICAO Council will establish a standing technical advisory body to make recommendations to the Council on the eligible emissions units for use by the CORSIA.

²⁵ Outside of ICAO negotiations, countries have proposed a variety of vintage restrictions. These proposed dates align with a date of key decisions within ICAO: such as when ICAO agreed to consider market-based measures to meet their 2020 carbon neutrality goal (2013), set up CORSIA (2016) or launch CORSIA (2019).

²⁶ According to Assembly Resolution A39-3, paragraph 20 e)

Figure 8. Countries Participating in the Voluntary Phase of CORSIA* and Countries with Aviation Included in a Compliance Market



*As of June 29, 2018, China no longer plans to participate in the voluntary pilot phase of CORSIA.

Notes: The data about countries participating in the voluntary pilot phase of CORSIA can be found on the ICAO website: <https://www.icao.int/environmental-protection/Pages/market-based-measures.aspx>. The data about countries with aviation emissions reductions come from: ICAP, Emissions Trading Worldwide: Status Report 2018 (Berlin: ICAP, 2018). These programs only cover domestic (or in the case of the EU, intra-regional) aviation, not international. Voluntary offsetting activity by airlines collected directly by Evan Yoshimoto, contributing researcher to this report.

A total of 29 airlines offer offsetting to their customers, while 15 airlines voluntarily offset their own emissions in some capacity (11 of these airlines offset their own emissions and offered offsetting to their customers). These airlines were headquartered countries around the globe. In general, airlines headquartered in Oceania (38%) were most likely to have carbon offsetting programs for customers, followed by airlines based in North America (29%) and Asia (29%).

Airlines aren't the only actors in the aviation sector concerned about the climate. The Airport Carbon Accreditation program encourages airports around the world to measure their footprint, reduce their own emissions, reduce third-party emissions at the airport, and finally offset remaining emissions. Currently, 237 airports participate in the program and 39 (primarily European airports) have reached the fourth level of accreditation by offsetting to become carbon neutral.

Table 3. Number of Airlines Offering Voluntary Offsetting to Passengers, by Airline Headquarter Region

Regions	# of Airline Headquarters	# of Airlines Offering Voluntary Offsetting
Asia	31	9
Europe	34	7
Africa	10	2
Oceania	8	3
Latin America & Caribbean	21	3
North America	14	4
Non-EU Europe	11	1

Notes: Voluntary offsetting activity by airlines collected directly by Evan Yoshimoto, contributing researcher to this report.

Conclusion

Since trading of voluntary carbon offsets first took off in the late 2000's, voluntary carbon projects have helped to reduce, sequester, or avoid over 437.1 MtCO₂e—equivalent to *not* consuming over one billion barrels of oil. These emissions reductions have been driven by the companies, individuals and governments who have taken a proactive approach towards combatting climate change: who, after measuring and reducing emissions internally, decided to offset the additional emissions that are too costly or impossible to avoid. As a result, the demand for voluntary carbon offsets has grown from just 0.3 MtCO₂e in 2008 to 42.8 MtCO₂e in 2018.

However, the future of voluntary carbon offsets is unclear. New compliance markets, in the form of domestic carbon pricing schemes, international trading through the Paris Agreement, or the international airline industry's CORSIA program, may generate unprecedented levels of demand for carbon offsets. Yet *how* those markets are designed and implemented will determine whether voluntary carbon markets thrive, adapt, or diminish. Furthermore, compliance markets are subject to the ever-shifting sands of politics—as demonstrated by Ontario's and China's recent withdrawal from the Western Climate Initiative and CORSIA's voluntary phases, respectively.

There has never been a more urgent time to act on climate change. Atmospheric greenhouse gas levels are over 400 parts per million, well above what scientists consider safe. Seventeen of the 18 hottest years on record have occurred since 2001. While countries around the world have committed to combat climate change, these pledges are currently insufficient to keep the world below a two-degree Celsius rise in average global temperature – the UNFCCC's agreed-upon limit. The world needs voluntary action to mitigate emissions.



A class from Southern Oregon University on a sustainability and energy tour looking at a new solar installation. Photo credit: BP Target Neutral, Green Campus energy project

Annex I: Methodology

Where Did the Data Come From?

We obtained issuance and retirement data in April of 2018 from five voluntary standards: American Carbon Registry, Climate Action Reserve, Gold Standard, Plan Vivo, and Verra's Verified Carbon Standard. Where up-to-date public information was available, we downloaded records from standards' websites. Where it was not, we obtained records through email correspondence.

There is no comprehensive online data available for voluntary transactions of carbon offsets. In order to obtain information about the volume, price, project type, and standards for offsets traded in the voluntary market, Ecosystem Marketplace conducted a survey of carbon project developers, retailers and brokers. In March and April 2018, we sent 607 requests for data. We received 131 responses in total, 37 of whom did not conduct transactions in Q1, and 63 of whom had conducted transactions and shared that information confidentially for this report.

How Do You Protect the Confidentiality of Survey Responses?

This report presents only aggregated data. All supplier-specific information is treated as confidential. Any supplier-specific transaction data mentioned in the text is already public information or approved by the supplier. Additionally, we do not identify prices or volumes from any country, project type, standard, or vintage for which we have fewer than three data points.

What Is Not Included in Our Findings and Figures?

While we have done our best to ensure that the data in this periodical is as complete as possible, due to limited time and data availability, there are some elements of the market that are not included. As such, all findings and figures should be regarded as conservative.

Our issuance and retirements data is based on data from 5 major voluntary standards (listed above), but does not include offsets used voluntarily from the United Nations Framework Convention on Climate Change's Clean Development Mechanism, or offsets issued under voluntary government-mediated programs with their own standards, like the United Kingdom's Woodland Carbon Code.

Our data on carbon offset transactions is based on a survey of project developers, retailers and brokers. Not all companies and organizations active in this space responded to our request for data, and we did not send requests to every active company and organization. The carbon offset industry is an ever-evolving world. While we do our utmost to ensure that we reach out to any carbon project developers, retailers, and brokers actively involved in the market, inevitably there are some we miss. If you are in the carbon space and would like to be included in future surveys, please email info@ecosystemmarketplace.com.

Annex II: Project Categories

Project Category	Project Type
Agriculture	Fertilizer - N2O
	Grassland/rangeland management
	Livestock methane
	No-till/low-till agriculture
	Rice cultivation/management
	Sustainable agricultural land management
	Other - Agriculture
Chemical Processes/Industrial Manufacturing	Nitric Acid
	Ozone-depleting substances (Article 5)
	Ozone-depleting substances (US based)
	Carbon capture and storage
	Coal mine methane
Energy Efficiency/Fuel Switching	Other - Chemical Processes/Industrial Manufacturing
	Energy efficiency - community-focused (targeting individuals, communities, etc.)
	Energy efficiency - industrial-focused (targeting corporations)
	Fuel switching
	Waste heat recovery
Forestry and Land Use	Other - Energy Efficiency/Fuel Switching
	Afforestation/reforestation
	Agro-forestry
	Avoided conversion
	Improved forest management
	REDD - Avoided planned deforestation
	REDD - Avoided unplanned deforestation
	Soil carbon
	Urban forestry
	Wetland restoration/management
Household Devices	Other - Forestry and land use
	Clean cookstove distribution
	Water purification device distribution
Renewable Energy	Other - Household Devices
	Biogas
	Biomass/biochar
	Geothermal
	Large hydro
	Run-of-river hydro
	Solar
	Wind
Transportation	Other - Renewable Energy
	Transportation - private (cars/trucks)
	Transportation - public (bikes/public transit)
Waste Disposal	Other - Transportation
	Landfill methane
	Waste water methane
	Other - Waste Disposal

Annex III: Producing and Selling a Voluntary Carbon Offset

Producing a Voluntary Offset

In order to generate offsets, a project developer must complete a rigorous process in order to ensure that real, quantifiable emissions reductions have been achieved. Although the process can vary, most follow a similar series of steps (Figure 9).

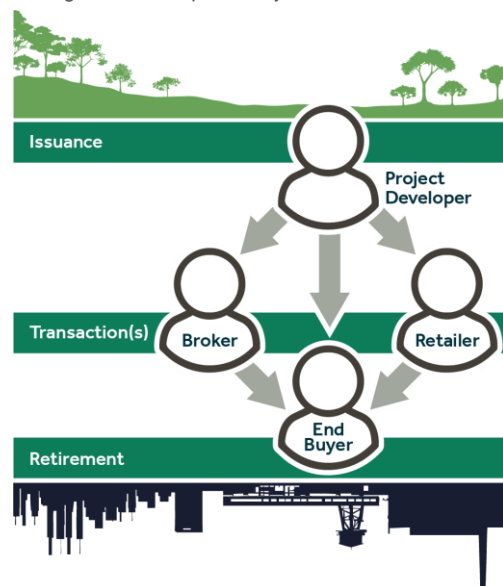
Figure 9. Project Development Process for Carbon Offset Projects



Once the project developer has decided on their project activities, they begin to work on a **Project Idea Note**. This first step focuses on early-stage preparations, like generating a project plan, assessing the project’s feasibility, impacts, and risks, and/or engaging with local stakeholders.

Next, the project developer makes more concrete plans in a **Project Design Document**. The developer provides information about the project’s anticipated emissions reductions, plans for quantifying and monitoring the delivery of climate and other social and environmental benefits, and a demonstration that the project’s activities exceed “business-as-usual” reductions and avoids emissions leakage.²⁷

Figure 10. Example Life Cycle of a Carbon Offset



These plans and assumptions are then “validated” by a third-party auditor. After the project has been implemented and monitored over a period of time, another audit process called “verification” assesses the delivery of greenhouse gas mitigation. Only after the project has successfully passed each of these steps can the project developer begin to issue tradeable offsets.

Selling a Voluntary Offset

Once a project developer issues offsets, s/he can sell them. But with no centralized voluntary marketplace, finding a buyer can be a multi-step, challenging process. Some project developers sell their offsets directly to end buyers. Others sell their offsets through a broker or an exchange, which provide platforms for buyers and sellers to meet; still others may sell to a retailer, who then resells offsets to an end buyer.²⁸

The transaction phase includes any time an offset is sold. Yet once an end buyer is ready to claim that offset against their own emissions, s/he should retire it. Retired offsets are no longer able to be traded in the market, and represent emissions that are permanently “removed” from the atmosphere.

²⁷ Leakage means that emissions are simply displaced to a different location, instead of avoided altogether. For instance, if a forestry project claimed to avoid emissions by preventing deforestation, but resulted in other forests being felled.

²⁸ We define brokers/exchanges and retailers by offset ownership; retailers take temporary ownership of an offset, while brokers and exchanges do not. However, there are many other differences as well. Retailers are more likely to walk companies through the process of offsetting and provide more tailored, customized advice.

Annex IV: Acronyms and Glossary

Acronyms:

ACR – American Carbon Registry
CAR – Climate Action Reserve
CDM – Clean Development Mechanism
CORSIA - Carbon Offsetting and Reduction Scheme for International Aviation
EU – European Union
GHG – Greenhouse Gas
ICAO – International Civil Aviation Organization
ICROA – International Carbon Reduction and Offset Alliance
ITMO – Internationally Transferable Mitigation Outcomes
Q1 – First quarter of 2018 (January – March)
REDD+ – Reducing Emissions from Deforestation and forest Degradation
SARPs – Standards and Recommended Practices
tCO₂e – metric tonnes of carbon dioxide or equivalent (typically measured in millions, M, or thousands, K)
UN – United Nations
UNFCCC - United Nations Framework Convention on Climate Change
US – United States
VCS – Verified Carbon Standard

Glossary:

Broker: Brokers are intermediaries who do not take ownership of offsets, but facilitate transactions for a fee between project developers and end users, between project developers and retailers, and/or between retailers. When given the opportunity, some retailers will also perform this role, but generally not at significant volumes.

Carbon Market: Carbon markets are where carbon offsets are bought and sold. They may be either voluntary or compliance.

Voluntary markets refer to the collective voluntary transactions tracked worldwide. There is no centralized single marketplace for voluntary transactions but rather many discrete transactions and, in some cases, country or program-related markets (such as the United Kingdom's Woodland Carbon Code).

Compliance markets are the result of government regulation to reduce greenhouse gas emissions, and allow regulated entities to obtain and surrender emissions permits (allowances) or offsets in order to meet predetermined regulatory targets.

Carbon Offset: A carbon offset is a quantified environmental benefit that is designed to compensate for impacts to habitat, environmental functions, or ecosystem services. Offsets may be regulatory or voluntary. Within carbon and greenhouse gas markets, offsets specifically refer to one metric tonne of carbon dioxide equivalent reduced, avoided or sequestered by an entity to compensate for emitting that tonne elsewhere.

Co-Benefit: Co-benefits are additional environmental, social, or other benefits arising from a carbon project that are quantified based on metrics or indicators defined by the project developer, a co-benefits certification program, or third-party carbon project standard that accounts for both

climate and co-benefits. Some registries and standards enable co-benefits certification to be “tagged” onto issued carbon offsets, if quantification and verification of co-benefits are not already embedded in a carbon project standard.

End Buyer: End-buyers are buyers who purchase offsets with the intention to retire them. Offsets will no longer be sold after transferring to an end-buyer. This is in contrast to retailers, who purchase offsets with the intention to resell them. End buyers are also referred to in this report as “end-users.”

Greenhouse Gas: a gas that contributes to the climate change by absorbing the sun’s infrared radiation when in the earth’s atmosphere.

Issuance: Issuance is the final project stage which occurs after third-party auditors have guaranteed a project has avoided or sequestered carbon dioxide or its equivalent. Once a project has met all requirements by its voluntary standard, the developer can apply to a standards body to issue eligible offsets. Any offsets issued to the project owner come with a unique serial number and are listed in a registry that monitors any ownership transfers or offset retirement. Issuance takes place once a carbon offset project has been validated, verified, and undergone other required processes.

Paris Agreement: The Paris Agreement was a landmark decision negotiated by 196 countries participating at the United Nations Framework on Climate Change’s Conference of the Parties in December 2015. The Agreement states that countries should set national emissions reductions goals in order to keep the global average temperature rise below 2 degrees Celsius, and attempt to keep temperature rise below 1.5 degrees Celsius. As of June 2018, 195 countries signed the agreement and 178 countries are party to the agreement. The United States, while party to the agreement, has announced its intention to withdraw; the earliest this withdrawal can happen is November 2020.

Project: A project is a site, or suite of sites, where restoration, sequestration, or other activities are implemented for the purposes of marketing the resulting ecosystem service assets or outcomes to buyers. Carbon offset projects quantify their avoided or reduced emissions to produce tradable climate reduction certificates, called offsets.

Project Category: Project categories represent similar groups of project types of carbon offset projects.

Project Design Document: The Project Design Document is the project stage that follows the Project Idea Note, once a methodology is selected. A Project Design Document details project design, anticipated emissions reductions, plans for quantifying and monitoring the delivery of climate and other social and environmental benefits, demonstrates that the project activity exceeds “business-as-usual” reductions and avoids emissions leakage, and addresses other technical issues.

Project Developer: A project developer is a catch-all phrase to describe organizations that create carbon offset projects, beginning with the initial Project Design Document all the way to offset issuance. Project developers include organizations that are the project owner, partner organizations involved in project implementation, project financiers/investors, or others.

Project Idea Note: The Project Idea Note is the first stage in project development. The Project Idea Note is a preparatory step before creating a carbon offset project that is often required by project methodologies. A Project Idea Note may include project plans; project feasibility, impact,

and risk assessments; findings from stakeholder input sessions; and other early-stage preparations.

Project Type: Projects may implement a variety of activities to reduce, sequester or avoid emissions from greenhouse gases. Forest Trends' Ecosystem Marketplace Initiative has designated "project types" to denote similar types of activities occurring by projects; however, projects may utilize multiple activities to achieve emissions reductions.

Reduced Emissions from Deforestation and Forest Degradation (REDD+): REDD+ projects are project types in areas where existing forests are at risk of land-use change or reduced carbon storage. The projects focus on conserving these forests before they are degraded or deforested, resulting in the avoidance of a business-as-usual scenario that would have produced higher emissions. Emissions reductions occur primarily through avoided emissions.

Registry: A registry issues, holds, and transfers carbon offsets, which are given unique serial numbers to track them throughout their lifetime. Registries can also retire offsets. In compliance markets, each market has its own designated registry. In the voluntary market, independent registries exist.

Retailer: Retailers do not traditionally manage project development and documentation. Instead, they contract with project developers to take ownership of a portfolio of offsets that they then offer to end-buyers. Retailers typically offer other corporate carbon management services to end-buyers, such as advising on internal emissions reductions strategies.

Retirement: The final project development stage, retirement is the point at which an organization permanently sets aside a carbon offset in a designated registry, effectively taking the carbon offset's unique serial number out of circulation. Retiring offsets through a registry ensures that they cannot be resold. This is of particular importance if the buyer's intent is to claim the offset's emissions reductions against a carbon reduction or neutrality target.

Standard: A standard is a set of project design, monitoring, and reporting criteria against which carbon offsetting activities and/or projects' environmental and social co-benefits can be certified or verified. In the voluntary markets, a number of competing standard organizations have emerged with the intent to increase credibility in the marketplace. More recently, national and sub-national regulated markets have also designed standards specific to regional needs for voluntary use.

Transaction: The point at which a buyer signs a contract to purchase offsets, regardless of whether suppliers agree to deliver offsets immediately or in the future.

Validation: The project development stage that follows the Project Design Document. Validation is the approval of carbon offset projects during planning stages. To achieve validation, projects must submit information on project design for third-party approval. Project design information generally includes baseline scenarios, monitoring plans, and methodologies for calculating emissions reductions.

Verification: The project development stage that follows validation. Verification may take place up to several years after validation. It refers to the process of verifying emissions reductions generated by an offset project to a particular standard, which quantifies actual emissions reductions to ensure that the appropriate number of offsets are issued to the project.

Vintage: The year in which emissions reductions occur. The vintage of the offsets may not necessarily match the year in which the offsets are transacted—and the vintage year may be in the future.

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[add descriptions]