

Fertile Ground

State of Forest Carbon Finance 2017

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Foreword

The 2015 Paris Agreement has been heralded as a landmark achievement in the global fight against climate change. After decades of scientific research and political negotiations, 197 countries agreed to a set of broad goals and principles to limit the impacts of man-made climate change and committed to their own individually-determined commitments to limit greenhouse gas emissions. Yet these negotiations represent the beginning, not the end, of our journey towards a cooler world.

The Paris Agreement set the goalposts for creating an environmentally, socially, and economically sustainable future. Now it is up to politicians, lawmakers, scientists, business leaders, and individuals to get there. The Agreement goes into force in 2020, and negotiators from each ratifying country are racing against the clock to flesh out its mandates into discrete rules and regulations by the end of 2018. Meanwhile, national, regional, and local politicians and policymakers are figuring out how to turn the blueprints laid out in their countries' individually-determined commitments into concrete plans to limit emissions.

The results of these international negotiations and domestic policies will have major implications for how we will address climate change, including the role that forests, soil, wetlands, and other natural areas will play in removing greenhouse gases from our atmosphere. In the meantime, many citizens, companies, and sub-national leaders have continued to forge ahead and protect their forests, in part, by valuing the carbon stored within forests and natural landscapes. Ecosystem Marketplace first began reporting on payments to improve, maintain, or restore forests' ability to store carbon since 2009, and have tracked a cumulative \$2.8B in financing. These payments take a variety of forms: from an individual purchasing voluntary forest carbon offsets before traveling by plane, to a corporation purchasing offsets to meet government regulations, to governments paying to preserve forests in tropical countries with emerging economies.

On the receiving end, these payments go towards keeping trees standing, replanting previously deforested areas, and adjusting farming and land management techniques to increase the land's ability to remove carbon from the atmosphere. Besides storing carbon, many forest carbon projects also play critical roles in protecting biodiversity, preserving clean watersheds, and employing people from nearby communities in a way that promotes, not destroys, healthy forests.

In 2016, we tracked over half a billion dollars (\$662.1M) that went towards purchasing carbon offsets produced by projects that are restoring or protecting forests and other natural landscapes. These forest carbon projects cover 12 million hectares of land, almost the size of the entire country of Nicaragua (which recently ratified the Paris Agreement). Despite commendable progress, the fact remains that many more forests and landscapes remain under threat of conversion and deforestation.

Forest carbon finance is poised to make a meaningful impact. Voluntary carbon markets have laid the foundation, as carbon accounting methodologies and projects have come online all around the world. New and emerging compliance carbon markets are including forestry and land-use offsets, which have the potential to drive larger-scale, more stable demand in the future. Meanwhile, developing countries are continuing to expand their capacity to measure and carry out deforestation prevention programs under REDD+, and many are advancing from preparation to implementation. These developments have created fertile ground for expanding and scaling up forest carbon finance. Cultivating this ground will depend on swift, decisive action from policymakers, business leaders, and civil society worldwide.



Michael Jenkins

Founding President and CEO
Forest Trends

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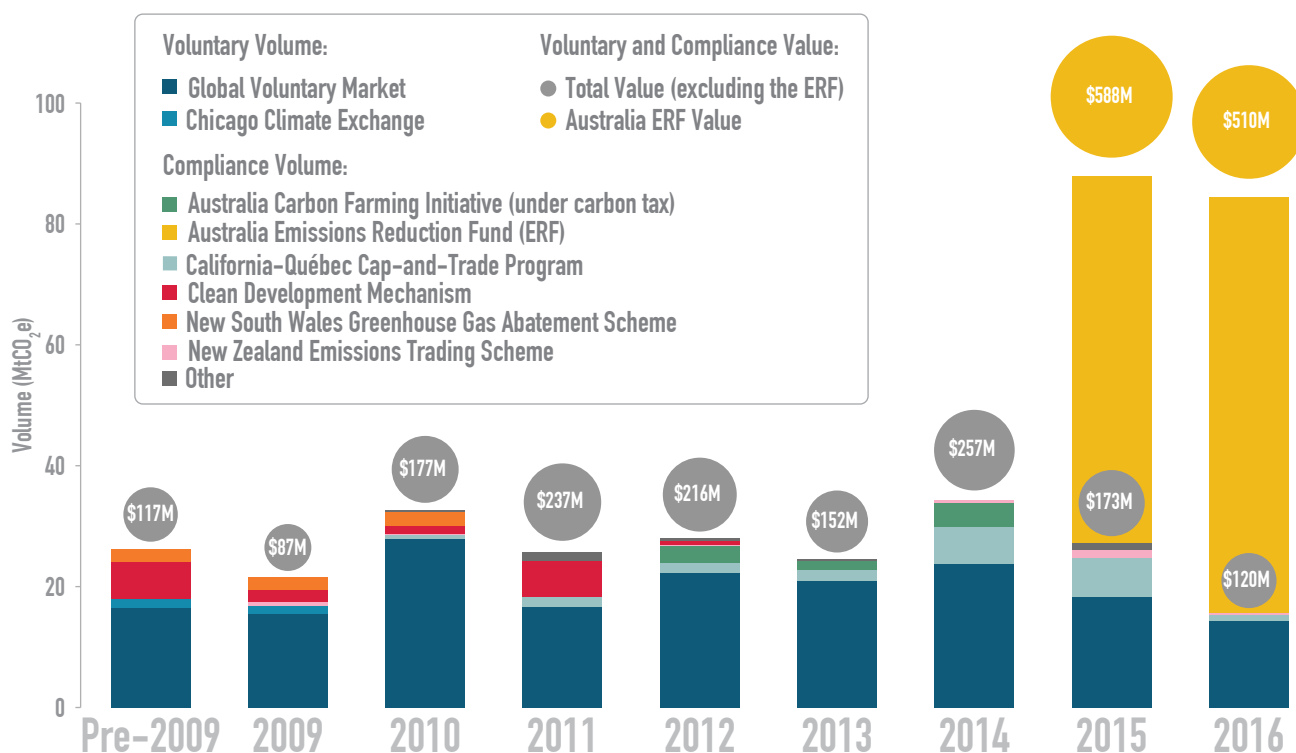
Forest Carbon Finance Overview

If tropical deforestation was a country, its emissions would be the third-largest in the world—behind only China and the United States (US).¹ Halting this deforestation and encouraging replanting practices could potentially contribute over one-third of the total emissions reductions needed by 2030.²

Policymakers around the world recognize the potential for natural land area to combat climate change: a total of 97 countries mentioned specific plans to reduce emissions from deforestation or increase forest cover in their Paris Agreement commitments. As the international community and domestic lawmakers figure out how to meet their emissions reductions targets in a cost-effective way, many are looking to innovative mechanisms that channel finance towards enhancing the ability of forests and other natural land areas to absorb carbon from our atmosphere.

Our report details this finance. In particular, we share the latest data and trends for three forest carbon finance mechanisms: **voluntary carbon markets**, **compliance carbon markets**, and **payments for emissions reductions under Reducing Emissions from Deforestation and Forest Degradation (REDD+)** programs. For each of these mechanisms, the report covers the volumes and values of **offsets** transacted, key market actors, and relevant trends and policy developments. We also include information about the **projects** that receive these payments, how they operate, and how they are influencing the communities and ecosystems around them.

Figure 1. Historical Compliance and Voluntary Market Payments for Forest-Based Emissions Reductions: Transaction Volumes and Values



Notes: Based on 365.3 MtCO₂e in market-based transaction volume over time.

Bars represent volume and bubbles represent value.

Figure includes voluntary and compliance market data.

¹ "Infographics: Why Forests? Why Now?" Center for Global Development, accessed October 14, 2017, <https://www.cgdev.org/page/infographics-why-forests-why-now>.

² International Union for Conservation of Nature (IUCN), *Issues Brief: Forests and Climate Change* (IUCN, 2015), https://www.iucn.org/downloads/forests_and_climate_change_issues_brief_cop21_011215.pdf.

Voluntary carbon markets are the markets for carbon offsets from forestry and land-use activities in which buyers and sellers are not motivated by regulatory requirements. Since first reporting on this data in 2009, Ecosystem Marketplace has tracked nearly \$1 billion (B)³ worth of forest carbon offsets **transacted** on the voluntary carbon markets.⁴ In 2016, voluntary **buyers** purchased fewer offsets than in previous years, and the total 2016 volume of forest carbon offsets transacted on the voluntary markets contracted 21% from 2015. Yet the value only dipped 16%, thanks to buoyant average prices paid for these offsets (see Voluntary Markets section beginning on page 26 for more details).

In the early years of the market, most offsets from **forestry and land-use carbon** projects were sold on the voluntary market; however, that pattern is shifting as more compliance carbon markets⁵ have emerged, and many have begun to accept forest carbon offsets (see page 5). We define compliance markets as government-mandated taxes on emissions or cap-and-trade programs that allow trading of carbon offsets. These initiatives aim to encourage companies to reduce their in-house emissions, for example by installing scrubbers or switching to renewable energy. In an effort to keep costs affordable for companies, many also allow the purchase of emissions permits (allowances) and/or the purchase of emissions reduced outside of the program (offsets).

Many markets that allow regulated organizations to purchase offsets from forestry and land-use projects are relatively recent; for example, California's and Australia's⁶ compliance markets began in 2013. Despite these markets' shorter history, demand spurred from regulatory obligations has resulted in over \$1.5B paid for forest carbon offsets since we started tracking such data in the early 2000s. The majority of this finance stems from Australia's Emissions Reduction Fund (ERF), for which the government has already spent \$1.2B on forestry and land-use offsets since the fund began in late 2014.

Table 1. Summary of Types of Forest Carbon Finance, 2016 and All Years*

Type of Finance	Name of Finance	2016	All Years*
Market	Voluntary forest carbon offset transactions	\$74.2M	\$996.6M
	Compliance forest carbon offset transactions**	\$551.4M	\$1,573.9M
Non-Market	Payments for REDD+ programs	\$36.5M	\$218.0M
Total		\$662.1M	\$2,788.5M

* Ecosystem Marketplace has been tracking forest carbon finance annually since 2009 but our data goes back as far as the early 2000s, when payments for forest-based emissions reductions were just beginning. "All years" refers to the total finance that we know of to date.

** This compliance market value includes Australia's Emissions Reduction Fund's payments for land-use offsets, worth an estimated \$1.2B across all years, and \$509.5M in 2016. We counted this finance as market-based because contracts are awarded through a competitive auction; however, there is currently only one buyer: the government. Without the Australia value, compliance market payments in 2016 were \$41.9M.

Payments for REDD+ Programs are payments for nation- or jurisdiction-wide government programs that achieve emissions reductions through forestry and land-use activities. REDD+ programs only occur in developing countries, and are meant to incentivize those countries into keeping their forests standing. Payments for emissions reductions under these programs are not done on either the voluntary *or* compliance markets, since the resulting offsets are

³ In this report, all monetary values are in US\$ (\$), unless otherwise noted.

⁴ We launched our first forest carbon offset survey in 2008. In that survey, we collected 2008 data along with historical transactional data dating back to before 2002.

⁵ In this report, we also include select carbon taxes under our definition of compliance markets, if the tax allows regulated organizations to either pay the flat carbon price or purchase offsets instead. As of 2016, we do not include any forest carbon offset transactions from carbon taxes; however, that will likely change in 2017 as new taxes that allow offsets have appeared.

⁶ While Australia's compliance market began in 2013, it quickly ended by 2015 under a change of the ruling government party. The country then switched to using a reverse auction, where the government—not regulated companies—purchases offsets from project developers, starting at the lowest bids and working its way up.

typically not tradable and do not appear in a “marketplace” with multiple sellers and buyers. However, the payments are similar to voluntary and compliance markets in that they are based on *results*: that is, the programs must have **verified** their program’s emissions reductions in order to receive payment.⁷ While the potential for REDD+ offsets from national or jurisdictional programs is huge, limited finance was offered in 2016 as most programs were still finalizing their technical or methodological approaches (see pages 37–38 for more details of finance pledged and disbursed to REDD+ programs).

Between these three finance streams, we’ve tracked just over a cumulative \$2.8B in finance for forest carbon offsets through 2016. The majority of 2016 finance came from just one source: the Australian government’s Emissions Reduction Fund, which supplied \$509.5 million (M) in finance (see page 17 for more details). While the New Zealand forest carbon volumes remain low, new changes in the country’s **emissions trading system** have led to higher prices this past year for forest carbon offsets (see page 23 for more details). In California, we tracked a 38% decline in transactions in 2016, likely the result of missing a large forest **project developer’s** information and not representative of market activity (see page 19 for more details). However, that is only part of the story in California: we also found the supply of offsets hit a record high in 2016, and demand for forest carbon offsets likely remains strong (though the California cap-and-trade program will not release that data until 2018).

The challenge now is how to scale up forest carbon finance. Both the voluntary and compliance market volumes could potentially ramp up to a much greater scale if demand similarly increased. We include a list of potential demand developments on page 58. Finance for national or jurisdictional REDD+ programs has the potential to dwarf both voluntary and compliance market values. However, most finance to date has remained focused on building capacity and technical capabilities for countries to participate in REDD+ (**REDD+ readiness**), instead of payments for achieved emissions reductions.

Box 1. Scope and Methodology

This report aims to provide information about the current state of global finance for **sequestering** carbon or avoiding greenhouse gas (GHG) emissions through forestry and land-use activities. **Within this report, “forestry” and “forestry and land-use” are used interchangeably; if we refer to “forest carbon,” that also refers to broader land-use carbon.**

Forestry and land-use carbon projects includes both forestry projects (such as tree-planting, avoided deforestation, improved forest management) and other land-use projects that increase carbon sequestration in non-forest landscapes including wetlands, grasslands, agriculture, and more. Specifically, we tracked the following types of projects and programs: **afforestation/reforestation, agro-forestry**, grassland/rangeland management, **improved forest management**, no-till/low-till agriculture, REDD+ (both **avoided planned deforestation** and **avoided unplanned deforestation**), rice cultivation/management, soil carbon, sustainable agricultural land management, urban forestry, and wetland restoration/management.

Our data and information was collected through a combination of desk research, interviews with professionals in this field, and a survey to forest carbon project developers and intermediary organizations that buy and sell forest carbon offsets. For more information about our scope and methodology, please refer to Appendix 2.

⁷ All of the financing streams we track focus on payments for achieved emissions reductions. Most forestry and land-use projects and programs that achieve these reductions require significant up-front investment to develop the infrastructure and capacity to measure and produce certified carbon offsets. However, any payments that are not directly tied to quantified emissions reductions are outside the scope of this report. For projects that sell offsets on voluntary and compliance markets, we do not include loans and/or grants that finance establishing these projects. For public REDD+ payments, we do not include so-called “REDD+ readiness” payments, which are focused on building capacity and technical capabilities.

Key Findings

Compliance Carbon Markets:

- National and regional-level governments around the world are incorporating forest carbon into their carbon pricing programs, with 13 countries (representing nearly every region of the world) having some form of government-facilitated program for trading forestry and land-use carbon offsets.
- Three of the biggest programs have undergone major changes in 2016:
 - The Australian government's Emissions Reduction Fund, which is the successor to the now-rescinded cap-and-trade program, contracted 68.8 million tonnes of carbon dioxide equivalent (MtCO₂e) of forestry and land-use carbon offsets to occur over the next 10 years, the highest of any program we tracked. However, with \$1.63B of the fund's available \$1.67B already contracted to project developers, future finance for the fund remains uncertain.
 - California's cap-and-trade program has been extended through 2030, with major changes in how companies can use offsets to meet their required reductions. While demand data will not be available until after the program's second compliance period ends in 2017, supply hit a record high in 2016: approved offset **registries issued** 31.0 MtCO₂e of eligible forest offsets, of which 16.0 MtCO₂e were officially reissued by the Air Resources Board to become available for sale to compliance buyers.
 - **Retirements** of domestic forest carbon offsets have picked up dramatically in New Zealand, reaching a record high in 2016. This is because the country's carbon market no longer accepts international offsets, and buyers have turned to purchasing domestic forest carbon offsets.

Voluntary Carbon Markets:

- Voluntary **suppliers** have reported transacting nearly \$1B worth of forest carbon offsets since we first started collecting this data in 2008.
- The volume of voluntary offsets transacted in 2016 contracted 21% from the previous year, yet the average price paid for these forest carbon offsets rose slightly—from \$4.9/tCO₂e in 2015 to \$5.2/tCO₂e in 2016.
- Voluntary **end buyers** retired 7.9 MtCO₂e, the second-highest volume of offsets ever retired according to voluntary carbon offset registries.
- Most offsets were sold from projects based in Peru, Brazil, Indonesia, and the United States; most buyers are based in the United States, Netherlands, United Kingdom, France, and Germany.

Payments for REDD+ Programs:

- International donors have pledged a cumulative \$2.9B in payments for REDD+, of which \$218M has been disbursed. This does not include "REDD+ readiness" pledges and disbursements.
- The biggest pledge in recent years occurred in October 2017, when the Green Climate Fund pledged \$500M to pay for REDD+ offsets. The fund is now seeking applications from countries that have active REDD+ programs and have successfully avoided deforestation between 2014 and 2019.
- While the World Bank's Forest Carbon Partnership Facility has not formally contracted offsets from its member supply countries, the fund is moving closer to that date. The fund has officially selected Chile, the Democratic Republic of Congo and Ghana into its portfolio and provisionally selected Costa Rica, Mexico and the Republic of Congo.

Forest Carbon Projects:

- Nearly all forest carbon projects reported providing benefits besides emissions reductions; the most-cited **co-benefits** revolved around employing and training local people, providing community services, and protecting biodiversity.
- Over half of projects reporting on their funding sources received their entire revenue from the sale of forest carbon offsets.

Overview of Compliance and Voluntary Markets in 2016

Forests and land-use management play a critical role in absorbing and storing carbon. By some estimates, protecting forests could result in as much as 6.2 BtCO₂e removed from the atmosphere between now and 2050,⁸ which is the equivalent of taking 1.3B cars off the road for one year.⁹

But achieving that will require significant financial investment. Markets for carbon offsets are a growing way to channel funding towards projects that restore, protect, and manage forests and natural landscapes and boost their ability to store carbon. **This section looks at both voluntary and compliance carbon markets that incorporate forestry and land-use offsets.**

In the early days of carbon markets, forest carbon offset sales only occurred in **voluntary markets**, where companies seeking to meet their internal emissions reductions goals purchased carbon offsets from projects that use forests or other natural areas to store carbon. Today, this global voluntary market consists of many discrete unregulated transactions between buyers and sellers: there is no centralized marketplace with rules about allowed offset types, locations, or other restrictions. More recently, several governments have created national or regional markets for carbon offsets through the use of carbon pricing systems. Some are on a voluntary basis, where a national, state, or local government organizes (and sometimes regulates) a carbon pricing system but leaves it up to companies, organizations, and individuals to decide to participate. **Compliance markets**, on the other hand, are those markets that require certain companies to participate, to ensure that the regulated organizations reduce their emissions to a government-determined amount.

There is no one size fits all for carbon pricing systems; the scope and structure varies from program to program. **Not all carbon pricing systems include offsets at all, and those that do typically limit the amount, types, and project locations of offsets that can be used.** For instance, in South Korea's emissions trading scheme (ETS), offsets may be used for up to 10% of an entity's total required emissions reductions. There are several reasons regulators could decide to restrict the share of emissions reductions that can be accomplished through offsets, for example, to ensure that emissions reductions activities take place within that country or region instead of elsewhere.

Even the carbon pricing systems that allow offsets to be used do not always allow offsets from forestry and land-use projects. Each offset-inclusive carbon pricing system uses a specific set of **methodologies** (or protocols), such as installing rooftop solar panels or capturing landfill methane or tree-planting (also called "afforestation/reforestation"), under which offsets must be certified. Not all carbon pricing systems include methodologies for forestry and land-use carbon projects. For example, the European Union's ETS (EU ETS), the largest operational and first international carbon market in the world, does not allow regulated companies to purchase forestry-based carbon offsets to meet their obligations, because of doubts about trees' ability to sequester carbon **permanently**, as well as the potential for over-supply if forest carbon credits were allowed.¹⁰ **More recent compliance and voluntary markets have found solutions to these early challenges; for example, California's compliance market allows forest carbon offsets but requires some be held in a central buffer reserve to be used in event of a forest fire or other unplanned forest loss.**¹¹

Programs also designate where offsets can be produced. Some programs use offsets in their carbon pricing systems as a way to generate demand for local projects by requiring that offsets be produced within that region or country. Others, sometimes to ensure sufficient offset supply or to keep prices low, accept offsets from other

⁸ Paul Hawken, *Drawdown* (New York: Penguin, 2017), 109.

⁹ "Greenhouse Gas Equivalencies Calculator," United States Environmental Protection Agency, last modified September 2017, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

¹⁰ Commission of the European Communities, *Commission staff working document—Accompanying document to the Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system—Impact assessment*, (Commission of the European Communities, January 23, 2008), <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008SC0052>.

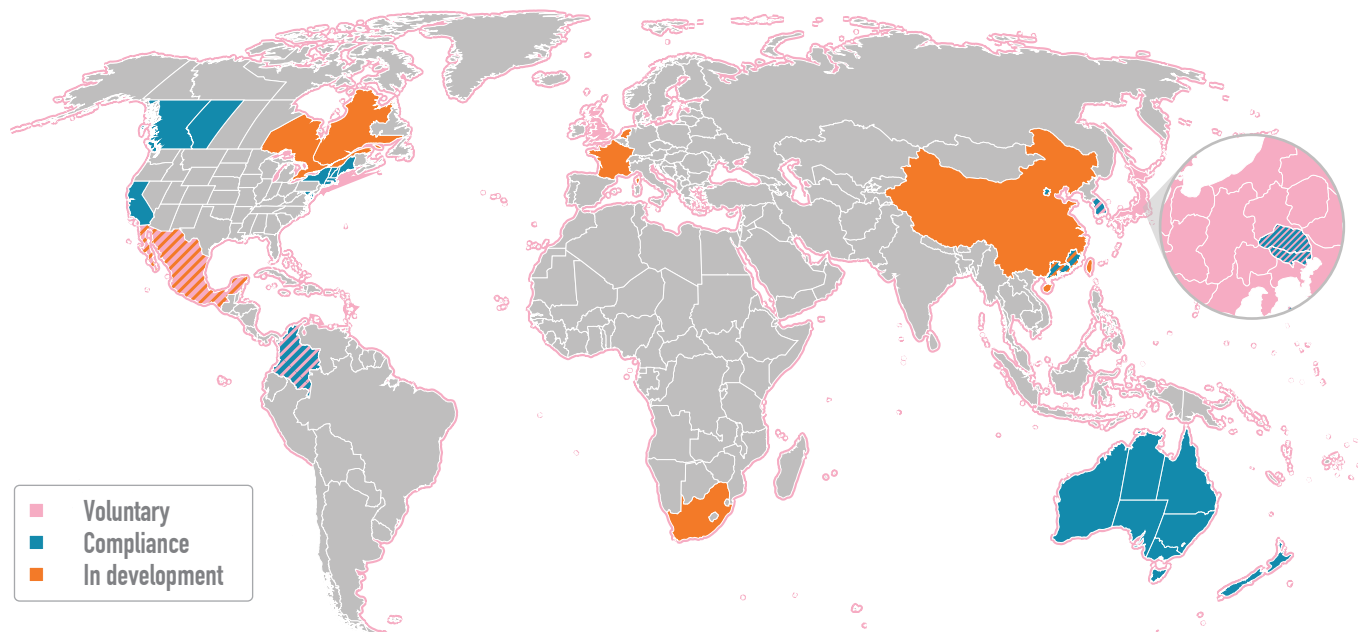
¹¹ "Use of international credits," European Commission, accessed October 11, 2017, https://ec.europa.eu/clima/policies/ets/credits_en.

regions or countries. Korea's ETS currently only uses Korean-produced offsets, but plans to allow international offsets beginning in 2020. Meanwhile, California's cap-and-trade program currently accepts credits produced out-of-state, but starting in 2020¹² plans to limit the use of out-of-state offsets.

Some countries have several different carbon pricing programs. The United Kingdom (UK) is currently part of the EU ETS, which does not include forestry offsets, but also has its domestic Woodland Carbon Code to generate funding for UK-based forestry projects. Japan has its voluntary J-Credit system for carbon offset trading, the Joint Crediting Mechanism where the Japanese government works in collaboration with low- or middle-income country partners to produce offsets, and the Tokyo-Saitama ETS, which is a compliance program, that operates only within the Tokyo and Saitama prefectures. Having these multiple systems can give countries space to experiment and flexibility to reduce emissions in the way that makes sense for each particular sector or region.

The following pages include more information about compliance and voluntary markets that include forestry and land-use carbon offsets. Below, Figure 2 shows these compliance and voluntary carbon pricing systems that allow for the use of carbon offsets from forestry and land-use projects.

Figure 2. Map of Policy Programs that Include Forestry and/or Land-Use Offsets



Notes: Programs marked "In development" may either be countries/provinces/states with carbon pricing schemes in development that have indicated a plan to include forest carbon OR those with active carbon pricing schemes that are developing ways to include forest carbon.

¹² "Korea Emissions Trading Scheme," International Carbon Action Partnership, last updated October 11, 2017, [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=47](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=47).

Global

Unregulated Voluntary Market



Most voluntary buyers purchase offsets outside of any government-run program. These organizations and individuals choose to buy offsets based on their own criteria, which could include a preference for an offset's location, project type, associated **standard**, and more. These preferences are discussed in more detail from pages 25–34. In 2016, for example, we tracked voluntary buyers purchasing offsets from projects in 45 countries (primarily from countries home to tropical rainforests).

Africa

South Africa

Carbon Tax

In Development



South Africa has been in the process of developing¹³ a carbon pricing mechanism, in the form of a carbon tax, for several years. South Africa's Ministry of Finance released a draft piece of legislation in early 2015. Although the mechanism is not yet finalized, the tax is expected to be approximately \$9/tCO₂e¹⁴ of GHGs emitted. Offsets will be allowed but limited to either 5 or 10% of a company's total emissions reductions requirement, depending on its sector.¹⁵ In June 2016, the South African government released a draft regulation of carbon offsets. According to that draft, offsets certified by the Verified Carbon Standard (VCS), the Clean Development Mechanism (CDM), and Gold Standard will be accepted, as well as other potential government-approved standards.¹⁶

Asia

China

National Emissions Trading System

In Development



In the lead-up to the 2015 climate negotiations in Paris, China committed to peak its GHG emissions no later than 2030, and reduce its GHG emissions per unit of gross domestic product by 60–65% below 2005 levels.¹⁷ To meet these goals, the world's largest GHG emitter plans to launch the world's largest cap-and-trade program before the end of this decade. The nation-wide cap-and-trade program was previously expected to launch in 2017, but recent reports indicate that the program

¹³ This section is not intended to be a comprehensive list of all carbon pricing schemes that are currently in development. For this report, in-development programs are limited to those carbon pricing schemes that have made some indication that they intend to include offsets from forestry and/or land-use projects. Some are programs that are already operational, but their policies on including forestry and/or land-use offsets are under development.

¹⁴ The tax is expected to be 120 South African Rand; we converted that into US\$.

¹⁵ Minister of Finance, *Draft Carbon Tax Bill* (Republic of South Africa, 2017), <http://www.treasury.gov.za/public%20comments/CarbonTaxBill2015/Carbon%20Tax%20Bill%20final%20for%20release%20for%20comment.pdf>.

¹⁶ National Treasury, *Draft Regulations: Carbon Offsets* (Republic of South Africa National Treasury, June 20, 2016), <http://www.treasury.gov.za/public%20comments/CarbonTaxBill2016/Carbon%20offset%20Regulations.pdf>.

¹⁷ Department of Climate Change, *Enhanced Actions on Climate Change—China's Individually Determined Contribution* (People's Republic of China, National Development and Reform Commission, June 30, 2015) <http://www4.unfccc.int/Submissions/INDC/Published%20Documents/China/1/China's%20INDC%20-%20on%2030%20June%202015.pdf>.

will instead launch with two years of simulated trading, followed by a fully functional market beginning in 2019 or 2020.¹⁸ Although details of the program have not yet been released, there are some indications that offsets from forestry and land-use activities will play a role.

As part of its commitment under the Paris Agreement, China committed to adding roughly 4.5B cubic meters of forest stock by 2030.¹⁹ It has also committed to raising the national forest coverage from 21.7% in 2015 to 23% in 2020, which would store an estimated 9.5 BtCO₂e. The State Forestry Administration said in its 2016 action plan that the national cap-and-trade program could play a key role in funding forestry projects that would help meet that goal.²⁰

In preparation for the national compliance system, China's National Development and Reform Commission launched a national registry for carbon offsets, known as Chinese Certified Emissions Reductions, or CCERs.²¹ New methodologies have continuously been added, including forestry and land-use methodologies like improved forest management, bamboo forest management, grassland management, and low carbon farming/tillage reduction.²²

Province-Level Pilot Cap-and-Trade

Compliance

In addition to the national-level cap-and-trade program, China has eight operational cap-and-trade programs at the municipal and provincial level, in Beijing, Shanghai, Guangdong, Shenzhen, Tianjin, Hubei, Fujian, and Chongqing. All of these programs accept forestry and land-use CCERs as a way for companies to meet their emissions reduction requirements under the program.²³ Several provinces, including Hunan, Jilin, and Shanxi, have announced plans to sell their forest carbon offsets on the national market.²⁴ Three provinces also have their own methodologies for forestry offsets.



Beijing has had an active ETS since 2013. Under the ETS, offsets may be used for up to 5% of companies' total emissions reductions, including forestry offsets produced within the city of Beijing.²⁵

Launched in 2016, **Fujian's** cap-and-trade program is the newest of China's pilot programs. It also has deep links with the forestry sector; Fujian's Provincial Forestry Department is directly involved in managing its forestry offsets. Companies are allowed to meet up to 10% of their emissions reductions through forestry offsets (known as Fujian Forestry Certified Emission Reductions, or FFCERs), but only 5% if they purchase CCERs.²⁶ There have already been transactions of FFCERs, including 237 KtCO₂e that sold for approximately \$732,000 in August of 2017, at roughly \$3.1/tCO₂e.²⁷ Several more forestry projects are still in the pilot phase.



¹⁸ Kathy Chen and Stian Reklef, "China expected to have fully functional \$11/t carbon market by 2020 -survey," *CarbonPulse*, November 22, 2017, <http://carbon-pulse.com/43744/>.

¹⁹ Kathy Chen and Stian Reklef, "Guangdong adopts first forestry methodologies as China's provinces see the CO2 through the trees," *CarbonPulse*, June 5, 2017, <http://carbon-pulse.com/35351/>.

²⁰ Kathy Chen and Stian Reklef, "China govt agency eyes ETS for forestry carbon goal," *CarbonPulse*, September 18, 2017, http://carbon-pulse.com/40447/?utm_source=CP+Daily&utm_campaign=fc31c4f317-CPdaily18092017&utm_medium=email&utm_term=0_a9d8834f72-fc31c4f317-110269953.

²¹ IETA, *China: An Emissions Trading Case Study* (International Emissions Trading Association (IETA), September 2017), <http://www.ieta.org/resources/2016%20Case%20Studies/China%20case%20study.pdf>.

²² "China Certified Emissions Reduction Exchange Platform," Republic of China National Development and Reform Commission, accessed September 2017, <http://cdm.ccchina.gov.cn/zylist.aspx?clmId=162>. [In Mandarin]

²³ Kathy Chen and Stian Reklef, "China foresters to harvest ETS offsets through 2-min hectare planting push," *CarbonPulse*, October 17, <http://carbon-pulse.com/25479/>.

²⁴ Kathy Chen and Stian Reklef, "China's Fujian closes in on 2017 target for forest carbon offsets," *CarbonPulse*, August 25, <https://carbon-pulse.com/39374/>.

²⁵ ICAP, China—*Beijing pilot system* (International Carbon Action Partnership (ICAP), last updated October 10, 2017), [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=53](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=53).

²⁶ ICAP, China—*Fujian pilot system* (ICAP, last updated October 10, 2017), [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=87](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=87).

²⁷ "Fujian multi forestry carbon sequestration project to complete the transaction," *ChinaCarbon.net*, September 20, 2017, <http://chinacarbon.net.cn/fujian-multi-forestry-carbon-sequestration-project-complete-transaction/>.

According to a Fujian government notice, pilot projects located in 20 counties within the province are expected to sequester approximately 920 KtCO₂e combined over the projects' lifetimes.²⁸



The southern province of **Guangdong** has the country's largest ETS, which has been operational since 2013. The province approved its first two methodologies for forest offsets in mid-2017. Under its five-year energy saving plan, the Guangdong government committed to increasing the province's forest coverage, much of which will be used to generate carbon offsets.²⁹

Japan

J-Credit

Voluntary



In 2013, Japan consolidated its previous carbon offsetting programs into the J-Credit system, a government-managed voluntary program to connect Japanese offset producers with companies seeking to meet GHG reduction targets or to invest in corporate social responsibility. The Ministry of Economy, Trade, and Industry certifies emissions reductions credits produced by Japanese firms through switching to renewable energy, energy savings programs, or through forest management activities. There are two forest carbon methodologies: afforestation and forest management.³⁰

Joint Credit Mechanism

Voluntary

Japan's Joint Crediting Mechanism (JCM) is a government-administered program that partners with developing countries to invest in carbon offset projects. Under the JCM, the Japanese government works with private sector companies in Japan and the host country to implement some form of low-carbon development activities, like generating renewable energy or improving energy efficiency. The resulting emissions reductions are then split between the governments and companies involved.³¹ So far the program has produced less than 1 KtCO₂e in reduced emissions, but the government expects it to produce as much as 100 MtCO₂e by 2030. None of the JCM's projects have so far been related to forestry or land-use; however, in June 2017, JCM announced plans to pilot its first forestry-based methodology with a Laotian REDD+ project aiming to reduce agricultural emissions.³²

Tokyo-Saitama Cap-and-Trade

Compliance



Japan is home to several carbon pricing tools, but the only compliance-based ETS is in the neighboring mainly-urban prefectures of Tokyo and Saitama. Both prefectures have set overall emissions reduction goals: Tokyo to reduce 25% and 30% below 2000 levels by 2020 and 2030, respectively, and Saitama to reduce 21% below 2005 levels by 2020. The ETS covers all commercial and industrial facilities that consume over 1,500 kiloliters of crude oil equivalent per year, which amounts to about 2,000 facilities in the two prefectures combined: 1,400 in Tokyo and 568 in Saitama. Both allow for the use of offsets, which may

²⁸ "Notice of the General Office of the People's Government of Fujian Province on Printing and Distributing the Pilot Scheme of Forestry Carbon Sequestration in Fujian Province," Fujian Provincial People's Government, May 25, 2017, http://www.fujian.gov.cn/zc/zxwj/szfbgtwj/201705/t20170525_1526745.htm. [in Mandarin]

²⁹ Chen and Rekev, "Guangdong."

³⁰ "J-Credit Scheme: Methodologies," Japan Ministry of Economy, Trade and Industry, accessed September 2017, <https://japancredit.go.jp/english/methodologies/>.

³¹ "Joint Crediting Mechanism," Ministry of Foreign Affairs of Japan, accessed September 2017, http://www.mofa.go.jp/ic/ch/page1we_000105.html.

³² Stian Rekev, "Japan picks REDD+ model project under JCM," *CarbonPulse*, June 26, 2017, <https://carbon-pulse.com/36341/>.

be traded between the two markets.^{33,34} Saitama's ETS includes a forestry methodology, and companies covered under the program are allowed to use these "forest absorption credits" for compliance without limit.³⁵

Republic of Korea

Korea, Emissions Trading System (K-ETS)

Compliance



South Korea has set an overall goal to reduce emissions by 37% below the country's business-as-usual emissions levels by 2030. Its ETS (K-ETS) is one way it plans to meet that goal. Any company that emits over 125 KtCO₂e/year, or which has individual places of business that emit over 25 KtCO₂e/year, are regulated under the K-ETS. That includes approximately 530 businesses in the industrial, energy and power generation, transportation, building, and waste sectors.³⁶

Under the K-ETS, companies are allowed to offset up to 10% of their total emissions reductions. K-ETS uses offsets certified under the CDM, including afforestation/reforestation methodologies. That said, no CDM-certified forestry offsets have yet been generated in Korea for use in the K-ETS—most offsets have come from projects in the energy, chemical, or waste sectors.³⁷ Currently only CDM-certified domestic offsets are allowed, but starting in 2021 companies will be allowed to purchase up to 50% of their offsets from projects outside of Korea.³⁸

Forest Carbon Offset Scheme

Voluntary

Alongside its compliance-based ETS, the Korea Forest Service operates a Forest Carbon Offset Scheme where companies, organizations, and individuals may buy offsets on a voluntary basis from forestry projects located across the country. Many different project types are eligible, including: forest management (which is the same as the CDM's afforestation/reforestation methodology), revegetation, wood product use, forest biomass energy use, forest area maintenance or expansion, and multi-purpose projects that combine multiple project types.³⁹ Currently over 100 projects are in various stages of development under the program, and they are expected to sequester a combined 1.5 MtCO₂e over their lifetimes.⁴⁰

Taiwan

Emissions Trading System

In Development



In 2015, the government of Taiwan passed the Greenhouse Gas Reduction and Management Act, which, among other things, set an island-wide goal to reduce GHG emissions 50% below 2005 levels by 2050, with an interim target of 20% by 2030. In 2017, Taiwan's Environmental Protection Agency officially launched its "National Program of Action toward Climate Change,"

³³ IGES, EDF, and IETA, *Japan: Market-Based Climate Policy Case Study* (Institute for Global Environmental Strategies (IGES), Environmental Defense Fund (EDF), IETA, last updated August 2016), http://www.ieta.org/resources/2016%20Case%20Studies/Japan_Case_Study_2016.pdf.

³⁴ ICAP, *Japan—Tokyo Cap-and-Trade Program* (ICAP, last updated October 10, 2017), [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=51](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=51).

³⁵ ICAP, *Japan—Saitama Target Setting Emissions Trading System* (ICAP, last updated October 10, 2017), [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=84](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=84).

³⁶ ICAP, *Korea Emissions Trading Scheme* (ICAP, last updated October 10, 2017), [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=47](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=47).

³⁷ "CERs cancelled to date in the CDM Registry," UNFCCC, accessed October 2017, https://cdm.unfccc.int/Registry/vc_attest/index.html.

³⁸ ICAP, *Korea*.

³⁹ "FAQ," Korea Forest Service, accessed September 2017, https://www.forest.go.kr/newkfsweb/html/HtmlPage.do?pg=fcme/UI_FCS_191000.html&mn=KFS_35_19_10&orgId=fcme.

⁴⁰ "Forest Carbon Registry," Korea Forest Service, accessed September 25, 2017, http://carbonregistry.forest.go.kr/fcr_web/fco/main/intro/index.do;jsessionid=vXPpK5w1H9RZ4nluqqWU1Wh1bY8e2UNW51z8RLC081DDVf9BjMejzky7duDdN.carbonweb_servlet_engine1.

which details the island's approaches to reducing emissions and adapting to climate change, including an ETS. Although the full ETS is still in development, the early action period is already under way. Early action offsets may be certified under domestic certifications or CDM, which includes two forestry-related methodologies. As of August 2016, 68 million early action credits had been issued.⁴¹

Europe

The European Union is currently home to the largest active emissions trading system in the world. The EU ETS was established in 2005, and in its first ten years helped the EU reduce its emissions 22% below 1990 levels.⁴² The EU ETS covers approximately 45% of the EU's total GHG emissions, from power stations, industrial plants, and airlines.⁴³ CDM-certified offsets are permitted, but forestry and land-use methodologies are excluded under the EU ETS, due to concerns that offsets from forestry projects do not result in permanent carbon sequestration.⁴⁴

In addition to participating in the EU ETS, several European countries have voluntary domestic offsetting programs to include sectors not regulated under the EU ETS and to channel funding towards local emissions reductions activities. The United Kingdom's Forestry Commission administers the Woodland Carbon Code, a standard and offset registry for forest carbon projects across the UK. France and the Netherlands are developing programs to invest in local projects, and France's VOLuntary CARbon Land Certification program is specifically targeting domestic forestry and land-use carbon. Austria also has a nation-wide program aimed at increasing soil carbon absorption. In Austria's "Humusaufbau-Programm," or Humus Building Program, run by the Austrian non-profit ÖkoregionKaindorf, companies pay farmers for each tCO₂e they absorb into their soil by modifying their land management practices.⁴⁵

France

Voluntary Carbon Land Certification (VOCAL)

In Development



France has announced plans to launch a national carbon certification program aimed at forestry and agricultural projects. The VOCAL program plans to issue carbon offsets certified by the French Ministry of Ecology, Sustainable Development and Energy to drive investment in low-carbon development while adding an additional income stream for project developers. The program is expected to launch sometime in late 2017, and organizers are currently developing methodologies and investigating potential demand for local carbon offsets.⁴⁶

Netherlands

GreenDeal

In Development



In May 2017, the Dutch government signed the "GreenDeal Pilot National Carbon Market." This nation-wide system is designed to enable organizations in sectors not covered by the EU ETS to buy and sell offsets produced in the Netherlands on a voluntary basis. The program may

⁴¹ YC Consultants Ltd., EDF, and IETA, *Taiwan: An Emissions Trading Case Study* (YC Consultants Ltd., EDF, and IETA, last updated August 2016), http://www.ieta.org/resources/2016%20Case%20Studies/Taiwan_Case_Study_2016.pdf.

⁴² "Progress made in cutting emissions," European Commission, accessed September 2017, https://ec.europa.eu/clima/policies/strategies/progress_en.

⁴³ "The EU Emissions Trading System," European Commission, accessed September 2017, https://ec.europa.eu/clima/policies/ets_en.

⁴⁴ Commission of the European Communities, *Commission*.

⁴⁵ "More than € 70,000 for humus farmers," ÖkoregionKaindorf, accessed October 2017, https://www.oekoregion-kaindorf.at/70000_fuer_humusbauern.106.html.

⁴⁶ "Launch of the project VOLuntary CARbon Land Certification," Institute for Climate Economics, December 9, 2015, <https://www.i4ce.org/launch-of-the-project-voluntary-carbon-land-certification-vocal-heading-towards-a-national-certification-framework-for-agricultural-and-forestry-projects/>.

eventually produce up to 500 KtCO₂e per year. While the program is still being developed, projects in the forestry, agriculture, and land-use sectors may be included.⁴⁷

United Kingdom

Woodland Carbon Code

Voluntary



The United Kingdom's Forestry Commission launched the Woodland Carbon Code (WCC) in 2011 as a domestic voluntary program to incentivize local action on forestry. The WCC is the standard for woodland creation projects in the UK that generate verifiable Woodland Carbon Units—which are equivalent to tonnes of CO₂e sequestered. Under the program, companies can establish woodlands on their own land or buy the rights to the carbon sequestered in woodlands established by others. The WCC currently has 242 total projects (not all have been **validated** yet), spanning over 16K hectares (ha), that are projected to sequester a total of 6 MtCO₂e over the course of their lifetime.⁴⁸

Latin America and the Caribbean

Colombia

Carbon Tax

Compliance



In December of 2016, Colombia announced a \$5/tCO₂e tax on GHG emissions from fossil fuels, with an important caveat: all carbon neutral businesses would be exempt from the tax. In June 2017 (in fact, on the same day that US President Trump announced the United States' withdrawal from the Paris Accord), the government explained that in order to qualify as carbon neutral, businesses must purchase offsets that have been issued by a standard with a public registry. CDM offsets are eligible, as are offsets issued by several voluntary standards such as the Verified Carbon Standard, Gold Standard, and American Carbon Registry, as well as those issued by Colombia's National Accreditation Body.⁴⁹ This includes many different forestry and

land-use methodologies, including afforestation, improved forest management, agriculture, grasslands, and others. Notably, REDD+ is one of the methodologies eligible under Colombia's carbon tax,⁵⁰ making it the only currently operational compliance carbon market to allow the sale of REDD+ offsets. Beginning after 2017, all offsets must be produced in Colombia.⁵¹

Voluntary Mitigation Mechanism for Greenhouse Gas Emissions

Voluntary

After years of preparation, Colombia launched a voluntary emissions trading platform in August of 2016. The platform is jointly managed by the Colombian Environment Ministry and Stock Exchange, with support from the environmental non-profit Fundación Natura. All credits must be certified and produced within Colombia. There is also a heavy focus on forestry; six of the seven initial projects were forestry-related (three afforestation, two forest conservation, and one mangrove protection program).⁵²

⁴⁷ "Testing a Dutch non-ETS CO₂ market mechanism," [emissierechten.nl](http://www.emissierechten.nl), accessed September 2017, <http://www.emissierechten.nl/column/testing-a-dutch-non-ets-market-mechanism-for-co2-abatement/>.

⁴⁸ "UK Woodland Carbon Code," UK Forestry Commission, accessed September 2017, <https://www.forestry.gov.uk/carboncode>.

⁴⁹ "Colombia Drives Innovation and Carbon Markets: Updated," Voluntary Carbon Standard, June 15, 2017, <http://www.v-c-s.org/colombia-drives-innovation-and-carbon-markets/>. <http://es.presidencia.gov.co/normativa/normativa/DECRETO%20926%20DEL%201%20DE%20JUNIO%20DE%202017.pdf>

⁵⁰ Ministerio de Hacienda y Crédito Público, *Decreto 926*

⁵¹ Sophie Yeo, "Colombia to allow emitters to use offsets to cover CO₂ tax obligations," *CarbonPulse*, August 1, 2017, <https://carbon-pulse.com/35998/>.

⁵² Ben Garside, "Colombia launches voluntary carbon market platform," *CarbonPulse*, August 19, 2016, <http://carbon-pulse.com/23450/>.

Mexico**MexiCO2****Voluntary**

MexiCO2 is a voluntary domestic carbon trading platform in Mexico that was founded in 2014. It is part of the country's overall carbon reduction strategy, which also includes a tax on fossil fuels and a compliance market that is still under development. MexiCO2 is run by the Mexican Stock Exchange, with support from the Ministry of the Environment and Natural Resources (SEMARNAT) and various international groups. Buyers can buy offsets from 14 projects certified by different international standards and located across Mexico. Two of these projects are forestry-related: one reforestation and one improved forest management.

Emissions Trading System**In Development**

As part of its overall emissions reduction plan, Mexico is expected to launch a compliance-based ETS in 2018.⁵³ Rules about the use of offsets and approved methodologies have not yet been released, but there have been indications that Mexico may eventually link with the Western Climate Initiative market (which currently includes California, Québec, and Ontario), and does allow for the use of forestry and land-use offsets. In the fall of 2016, Québec and Ontario jointly signed an agreement with the Mexican government to share best practices of their collective carbon markets and to promote the expansion of carbon markets in North America.



Photo credit: Basel/AMBIO, 2012

Jeronimo Gómez Pérez was a participant of AMBIO's reforestation and forest management Scole'te Program in Mexico. Now, he is a community technician that works for the program. This picture was taken in a plot of Samaria Ca'ntajal (Chilón Municipality, Chiapas, México).

⁵³ ICAP, *Mexico* (ICAP, last updated October 10, 2017), [https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems\[\]=59](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=59).

North America

Canada

In late 2016, Canadian Prime Minister Justin Trudeau announced that all provinces and territories in Canada would be required to adopt a carbon pricing system by 2018, or the federal government would institute its own carbon price. Furthermore, each province's pricing system would need to have a price floor of at least \$8/tCO₂e in 2018, rising to \$16/tCO₂e in 2019, and so on until reaching \$40/tCO₂e in 2022.⁵⁴ As a result, many Canadian provinces and territories are designing or implementing carbon pricing systems, many of which involve the use of offsets from forestry and/or land-use projects.

Alberta Offset Credit System

Compliance



The province of Alberta first instituted a "Specified Gas Emitters Regulation" in 2007. Under that regulation, any entity that emits over 100 KtCO₂e per year must reduce its emissions by a certain amount each compliance period. In order to achieve these reductions, entities are allowed to use emissions offsets generated under approved quantification protocols.⁵⁵ Alberta currently has forestry and land-use-related protocols that focus on conservation cropping, tillage system management, sustainable forest harvest practices, and afforestation. Of these, conservation cropping is the only fully active protocol. The other two are undergoing revisions⁵⁶ as the Alberta government is exploring a more comprehensive forestry and land-use quantification protocol. As of mid-2017, over 43.7 MtCO₂e in offsets have been issued. Of these, 14.9 MtCO₂e (34%) are from forestry and land-use activities, the vast majority of which are from agriculture projects, conservation cropping, and tillage system management. Of those forestry and land-use offsets, 9.0 MtCO₂e are either retired or pending retirement.⁵⁷

British Columbia Climate Action Plan

Compliance



In 2008, the western Canadian province of British Columbia became the first jurisdiction in North America to institute an economy-wide tax on carbon.⁵⁸ Today, its GHG mitigation efforts have expanded. Since 2010, the Government of British Columbia has been carbon neutral through purchasing offsets from carbon projects within the province. In 2016, British Columbia's Greenhouse Gas Industrial Reporting and Control Act went into effect, which includes an ETS that will cover large industrial emitters and liquid natural gas facilities. Other companies and organizations have voluntarily decided to offset their emissions. The government as well as compliance and voluntary buyers can purchase offsets on the newly-established British Columbia Offset Registry.⁵⁹ There are four forestry project types under the British Columbia Forest Carbon Offset Protocol: afforestation, reforestation, improved forest management, and conservation/avoided deforestation.⁶⁰ The government also has other plans to expand and improve the ability of British Columbia's forests to absorb carbon dioxide, as outlined in the Ministry of Forests, Lands and Natural Resource Operations' Forest Carbon Strategy 2016–2020. Part of this strategy is to

⁵⁴ Kathleen Harris, "Justin Trudeau gives provinces until 2018 to adopt carbon price plan," *CBC News*, October 3, 2016, <http://www.cbc.ca/news/politics/canada-trudeau-climate-change-1.3788825>.

⁵⁵ "Carbon and Greenhouse Gas Legislation in Alberta," Osler, December 29, 2016, <https://www.osler.com/en/resources/regulations/2015/carbon-ghg/carbon-and-greenhouse-gas-legislation-in-alberta>.

⁵⁶ "Offset Credit System Protocols," Alberta Environment and Parks, accessed October 2017, <http://aep.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/offset-credit-system-protocols.aspx>.

⁵⁷ "Alberta Emissions Offset Registry Listings," CSA Group, accessed August 29, 2017, https://www.csaregistries.ca/albertacarbonregistries/eor_listing.cfm.

⁵⁸ Diana Toomey, "How British Columbia Gained By Putting a Price on Carbon," *Yale Environment 360*, April 30, 2015, http://e360.yale.edu/features/how_british_columbia_gained_by_putting_a_price_on_carbon.

⁵⁹ "Climate Action Legislation," Government of British Columbia, accessed October, 2017, <http://www2.gov.bc.ca/gov/content/environment/climate-change/planning-and-action/legislation>.

⁶⁰ "Forest Carbon Emission Offsets," Government of British Columbia, accessed October, 2017, <http://pacificcarbontrust.com/assets/Uploads/Protocols/Forest-Carbon-Offset-Protocol.pdf>.

facilitate investment opportunities in forest carbon offsetting and to continue to develop policies that enable forest carbon offsets.⁶¹

Québec Cap-and-Trade—Linked with California and Ontario

Compliance



Québec's cap-and-trade program covers about 85% of the province's total GHG emissions, including companies in the industrial and electricity sectors that emit 25 KtCO₂e or more annually, as well as fossil fuel distributors. Although Québec currently does not have any forest or land-use protocols, it is working with Ontario and the Climate Action Reserve (CAR) to adapt several voluntary protocols, including potentially a forest protocol, afforestation protocol, urban forest project protocol, grassland protocol, conservation cropping protocol.⁶² See page 22 for more information.

Ontario Cap-and-Trade—Linked with California and Québec

In Development



Ontario launched its cap-and-trade program in January of 2017. While details regarding the program's use of offsets are not yet finalized, the proposed legislation does allow regulated emitters to use offsets to meet a certain portion of their obligation.⁶³ Offset protocols are still being finalized. The government of Ontario is working with the Climate Action Reserve to adapt thirteen existing voluntary protocols for use in the cap-and-trade program,⁶⁴ which is likely to include methodologies for forests and land-based sectors, including an afforestation protocol, urban forest project protocol, a grassland protocol, and a conservation cropping protocol.⁶⁵

United States

California Cap-and-Trade—Linked with Ontario and Québec

Compliance



California is the only US state with an economy-wide cap-and-trade program. Entities covered under the cap-and-trade are currently allowed to use offsets for up to 8% of their compliance obligation, although that will fall to 4% in 2021–2025, then increase to 6% in 2026–2030. California has three operational forestry and land-use carbon methodologies: US forestry, urban forestry, and rice cultivation, although no credits have yet been issued under rice cultivation or urban forestry protocols.⁶⁶ See page 19 for more information.

Regional Greenhouse Gas Initiative

Compliance



The Regional Greenhouse Gas Initiative (RGGI) was the first compliance-based market for reducing GHG emissions in the United States. The program limits emissions from fossil fuel power plants 25 megawatts and larger within nine northeastern US states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. RGGI only allows the use of offsets if allowance prices exceed a certain level, which happened for the first time in September 2017, when a landfill gas project in Maryland sold 16

⁶¹ British Columbia Ministry of Forests, *Forest Carbon Strategy 2016–2020*, British Columbia Ministry of Forests, 2015, http://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nrs-climate-change/mitigation/bc_forest_carbon_strategy_09092016_sept_21.pdf.

⁶² "Adapting offset credit protocols for Québec and Ontario," Gouvernement du Québec, accessed October 2017, <http://www.mddelcc.gouv.qc.ca/changements/carbone/credits-compensatoires/adaptation-protocole-qc-ontario-en.htm>.

⁶³ Government of Ontario, *Compliance Offset Credits Regulatory Proposal* (Government of Ontario, 2016), http://www.downloads.ene.gov.on.ca/envision/env_reg/er/documents/2016/012-9078.pdf.

⁶⁴ "Cap and trade: compliance offset credits and protocols," Government of Ontario, accessed October 2017, <https://www.ontario.ca/page/cap-and-trade-offset-credits-and-protocols>.

⁶⁵ Gouvernement du Québec, "Adapting."

⁶⁶ "Compliance Offset Program," California Air Resources Board, accessed October 3, 2017, <https://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm>.

KtCO₂e in offsets.⁶⁷ However, if prices were to rise enough for offsets to be allowed, offsets would need to be generated within the nine-state region. RGGI permits several types of offsets, including offsets from US forest projects (reforestation, improved forest management, avoided conversion). Afforestation would only be allowed in Connecticut and New York.⁶⁸



Photo credit: Paul Picone/Shutterstock

The City of Astoria, Oregon, United States, has reduced harvesting of timber from the Bear Creek Watershed in exchange for carbon offsets. The city sold these offsets to The Climate Trust, who retired the offsets on behalf Portland General Electric under the state's Oregon Carbon Dioxide Standard.

Oceania

Australia

Emissions Reduction Fund

Compliance



Australia's Emissions Reduction Fund was first established in 2014 as a replacement for the repealed carbon tax program. ERF funding is used to contract domestically-produced offsets through a reverse auction, where least expensive offsets are purchased first.

As of mid-2017, forestry and land-use projects had won the bulk of auction financing under the fund, securing almost \$1.17B of the \$1.63B spent. The Fund allows ten vegetation management methodologies and two soil-based "agriculture" methodologies. "Plantation forestry" was the latest approved methodology, in an effort to increase commercial plantation forests, which have declined in recent years. The ERF is also drafting a review and potential expansion of its soil carbon methodology, which has not generated any offsets to date. See page 17 for more detail.

New Zealand

Emissions Trading System

Compliance



Forests are New Zealand's largest potential carbon sink, and the New Zealand ETS was the first in the world to regulate the forestry sector. Under the ETS, owners of forests established after 1989 can earn New Zealand emission units (NZUs) by planting and/or conserving their forests. Owners of forests established before 1990 are automatically ETS participants. They are awarded a small one-time allocation of NZUs for their land, but must pay for allowances or offsets if they deforest more than two hectares of their forests.

Between 2010 and 2015, New Zealand accepted offsets produced internationally, but as of 2015 all offset projects must be based in New Zealand. See page 23 for more detail.

⁶⁷ Ben Garside and Mike Szabo, "RGGI issues first ever offsets as states narrow opportunities," *CarbonPulse*, September 26, 2017, <https://carbon-pulse.com/40802/>.

⁶⁸ "U.S. Forest Projects (Reforestation, Improved Forest Management, Avoided Conversion) or Afforestation (CT and NY only)," Regional Greenhouse Gas Initiative, accessed October 2017, <https://www.rggi.org/market/offsets/categories/forestry-afforestation>.

Australia Compliance Market in 2016

Australia's system for pricing carbon is unique from most other compliance markets, and it is continuing to evolve. Australia's Emissions Reduction Fund was created in December 2014 as a replacement for the country's carbon tax, which had been repealed earlier that year. Through the ERF, the Australian Government purchases offsets through a reverse auction, where the lowest-priced offsets are purchased first. Most (\$1.63B) of the fund's original \$1.67B⁶⁹ has been spent in the past five auctions (to purchase offsets from all available project types). So far, 2017 budget proposals have not included any additional financing for the ERF, leaving the future of the program in doubt.

The government also introduced a Safeguard Mechanism to the ERF in July 2016, which could potentially shift the fund into a cap-and-trade program in the future. The mechanism limits emissions from Australia's most-polluting organizations (those that emit more than 100 KtCO₂e annually) by setting individual caps based on their highest annual emissions between 2009 and 2014. The mechanism requires polluters exceeding this "baseline" to purchase domestic offsets.⁷⁰ While enacted in 2016, it is unlikely that companies will purchase offsets for exceeding emissions in 2017. That is thanks to a provision that allows companies to adjust their baselines in the first year of the program to 2016–2017 emissions rather than face penalties. However, once companies are no longer allowed to adjust their baselines, this could drive new demand for offsets.

Australia ERF Activity: Issuances, Transactions, and Retirements

Forestry and land-use projects have won the bulk of auction financing through the ERF, securing almost \$1.17B of the \$1.63B spent (including 2017's first auction). In 2016 alone, the government paid \$509.5M for 68.8 MtCO₂e in contracted offsets from either vegetation or savannah burning⁷¹ projects. While the contracted⁷² volume is slightly more than 2015's 60.7 MtCO₂e, the value was lower than 2015's \$588.5M, due to lower average prices in 2016. In the April 2016 and November 2016 auctions, average prices of offsets were \$7.3/tCO₂e and \$7.6/tCO₂e respectively.

In 2015 and 2016, Australia's ERF spent the largest amount of finance contracting forestry and land-use carbon offsets of any compliance or voluntary market we tracked. Yet, the amount contracted—68.8MtCO₂e in 2016 and 60.7MtCO₂e in 2015—does not represent already-*achieved* emissions reductions: in many cases, project developers plan to deliver their promised offsets in the future.

As of October 2017, Australian forestry and land-use projects had issued 19.6 MtCO₂e in achieved emissions reductions since 2012 and had sold 17.5 MtCO₂e to the Australian government as part of their contracts during this time. A further 1.1 MtCO₂e of forestry and land-use offsets contracted by the government are supposed to come from projects that have lapsed or been terminated, for unknown reasons. It is unclear how, or if, the government will receive these offsets.

The Australian government's approach differs widely from most compliance markets, including California's, where all contracts are for already-achieved emissions reductions and result in the immediate transfer of carbon offsets. In the latter, offset sales are limited by the available supply. Forestry and land-use projects participating in the

⁶⁹ The fund has \$2.25B Australian dollars allotted to it. The above value is converted to US\$ based on the 2015 yearly average currency exchange rate, provided by the US Internal Revenue Service. The actual exchange rate varies depending on when the Emissions Reduction Fund pays Australian projects for emissions reductions. Since the first payments occurred in 2015, all ERF prices are converted to US\$ using the 2015 exchange rate.

⁷⁰ Rebecca Enright, "Initial calculated-emissions baseline: the safeguard mechanism's get-out-of-jail-free card for facilities with a reported-emissions baseline," CO₂ Australia, accessed October 31, 2017, <https://www.co2australia.com.au/safeguard-mechanism-calculated-baseline/>.

⁷¹ Savanna-burning projects involve controlled burns early in the fire season to mitigate larger, carbon-releasing burns later.

⁷² It is important to remember that ERF contracts are "payment on delivery"—this means the government is contracting for future offsets that have not yet been generated. This could lead to increased secondary market activity if landowners contracted with the government experience natural disasters or other problems that impact the amount of carbon offsets they can generate, and must contract offsets elsewhere.

California compliance market have issued 43.7 MtCO₂e (since 2008) and buyers retired 5.9 MtCO₂e at the end of the program's first compliance period in 2014. Thus, while the Australian ERF has provided more finance to fund forestry and land-use offsets, the California market has generated more actual forestry and land-use emissions reductions, to date.

At a Glance: Forestry and Land Use Offsets in the Emissions Reduction Fund

Forestry and land-use project types: The Emissions Reduction Fund allows ten vegetation management methodologies and two soil-based “agriculture” methodologies. “Plantation Forestry” was the latest approved methodology, in an effort to increase commercial plantation forests, which have declined in recent years. The ERF is also drafting a review and potential expansion of its soil carbon methodology, which has not generated any offsets to date.

Standard: All offsets must be approved by the ERF and are called Australian Carbon Credit Units.

Location: All offset projects must be based in Australia.

Table 2. Overview of Australia Compliance Market Activity in 2014, 2015, and 2016

	Contracted Volume (MtCO ₂ e)			Value (\$M)			Average Price (\$/tCO ₂ e)		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Australia carbon tax/ERF*	4.0	60.7	68.8	\$70.6	\$588.5	\$509.5	\$17.7	\$9.7	\$7.4

* In 2013 and 2014, Australia's carbon tax created a compliance market for land-use-based emissions reductions. The 2014 values in this table represent activity under this carbon tax. The tax was repealed in 2014 and replaced with an Emissions Reduction Fund through which a single buyer (the Australian government) contracted emissions reductions through a reverse auction. The ERF is not like most compliance carbon markets—it is a government-sponsored fund—but is included here for comparison. The 2015 and 2016 values in this table represent activity under the ERF.

California Compliance Market in 2016

Within the United States, California is widely regarded as the leader in environmental and climate change policy. The state has pledged to reduce its greenhouse gas emissions to 1990 levels by 2020, and to 40% below 1990 levels by 2030. In order to achieve these goals, the state government is implementing a suite of measures, from cleaner fuel standards to addressing methane emissions from livestock and dairy production. Perhaps the hallmark of California's climate change mitigation policies is its cap-and-trade program.

The cap-and-trade program is managed by the California Air Resources Board (ARB), which gives pollution permits (called "allowances") to companies, oversees allowance auctions, and regulates and approves carbon offset methodologies.

California's cap-and-trade legislation has been in effect since 2011,⁷³ and the program has been active since 2013. Shortly after it started, it was engaged in a protracted legal battle with the California Chamber of Commerce over the legality of the program itself.⁷⁴ In May 2017, after multiple rounds of appeals, California's Third District Court of Appeal ruled two to one in favor of the ARB, giving current market participants certainty that the cap-and-trade program will continue.

California's cap-and-trade program had also been plagued with another concern: the original state law governing the cap-and-trade program (AB 32) was set to expire in 2020. In July of 2017, the state legislature passed a new law (AB 398) with a two-thirds "supermajority" in both the Assembly and the Senate. This bill extended the cap-and-trade program through 2030, resolving the other battle with the Chamber of Commerce over the program's legality.⁷⁵

The new law, which goes into effect in 2021, makes several key changes, one of which is a modification to the use of offsets. Under the current system, companies regulated under the cap-and-trade program can purchase offsets to account for up to 8% of their emissions reductions. Under the program's extension to 2030, this number will drop to 4% from 2021–2025 and then rise to 6% from 2026–2030. The state also added rules restricting out-of-state offset purchases,⁷⁶ effective throughout the 2021–2030 period. This anticipated drop in out-of-state offset demand could affect the development of future forest carbon projects in areas outside of California.

California Market Activity: Issuances, Transactions, and Retirements

The supply of forestry and land-use offsets reached a record high in 2016, as the standard bodies the American Carbon Registry (ACR) and CAR issued 31.0 MtCO₂e in California-eligible offsets. While ACR and CAR issue offsets on the voluntary markets, both standard bodies play an even larger role in the California compliance

⁷³ The cap-and-trade program was one of the solutions created in response to California's Assembly Bill 32, the Global Warming Solutions Act of 2006.

⁷⁴ In 2012, the California Chamber of Commerce, which is the state's largest broad-based business advocacy group, filed a lawsuit against the California Air Resources Board, claiming that the cap-and-trade program's auctions were a tax on businesses meant to generate revenue for the government. Under California law, tax bills require a two-thirds majority in the state legislature, and AB 32 had passed with a simple majority. ARB, on the other hand, argued that the program revenue should be considered fees, which are for regulation as opposed to revenue, and require only a majority of votes in the state Assembly and Senate.

⁷⁵ While the two-thirds supermajority insulates the cap-and-trade program from similar legal challenges to that of the Chamber of Commerce's, the new bill is not completely immune to future legal challenges. Additional lawsuits might appear in the future challenging other aspects of the bill.

⁷⁶ The stipulation still needs clarification. Several interpretations include:

The stipulation requires compliance buyers to purchase one California-based offset for every non-California-based offset. The stipulation requires that 2% of offsets may be purchased from California-based offsets (out of the 4% of offsets available for companies to purchase from 2021–2025), while the remaining 2% of offsets may be purchased by offsets produced out-of-state.

The stipulation requires that projects directly benefitting the state be based in California. However, another interpretation might allow for projects based in adjacent states that also benefit, in part, land in California.

market as approved Offset Project Registries.⁷⁷ This designation means that the standard bodies oversee the **verification** and issuance of California-eligible offsets called Registry Offset Credits (ROCs). California's ARB has final regulatory say over which offsets may convert into its cap-and-trade program. Once approved, ROCs must be cancelled on the ACR and CAR registries in order to be re-issued as ARB offset credits (ARBOCs) that can be sold to California compliance entities.

In 2016, ACR issued a record 23.5 MtCO₂e forestry and land-use offsets eligible for the California market, while CAR issued another 7.5 MtCO₂e. Of those eligible offsets, 9.7 MtCO₂e (41%) of ACR offsets and 6.3 MtCO₂e (85%) of CAR offsets were cancelled on their respective registries and re-issued on the ARB registry.

Demand for forestry and land-use carbon offsets remains active, as regulated entities purchase offsets in an effort to meet their emissions reductions before the end of the second compliance period, from 2015–2017. We tracked 4.1 MtCO₂e offsets transacted in 2016, a contraction from 2015 volumes.⁷⁸ We did not track the retirement of any offsets (technically called “surrendered offsets” in the California market) for the California compliance market—retirement data will not be available until after the end of California's next compliance period, in 2018.

This model for sourcing offsets means that California's compliance market is intertwined with the voluntary market, and relies on a large and healthy market for voluntary carbon offsets from forestry and land-use projects. The United States is one of the largest buyers and suppliers of forestry and land-use voluntary offsets; Figure 3 shows the geographic range of forest carbon projects across the United States.

At a Glance: Forestry and Land Use Offsets in the California Market

Forestry and land-use project types: California's Air Resources Board has approved reforestation, improved forest management, avoided conversion (all encompassed in its US forest methodologies), along with urban forestry and rice cultivation methodologies. As of October 2017, no offsets have yet been issued for sale in the California market under the urban forestry or rice cultivation methodologies. Overall, 65% of all offsets issued by the ARB are from forestry and land-use projects.⁷⁹

The ARB has also considered including REDD+ offsets in the market. In 2015, the ARB REDD+ Offset Working Group made a series of recommendations about how and when to include REDD+.⁸⁰ No final decision has yet been reached.

Standard: All ARB Offset Credits must be listed with an approved Offset Project Registry, use an ARB Compliance Offset Protocol, and be verified by an ARB-accredited verification body.

Location: All offset projects must be based in the continental United States. Some Alaskan forest projects (in certain restricted geographic areas identified by the ARB) are allowed by the ARB, while no forestry projects in Hawaii are currently eligible due to lack of region-specific data.

⁷⁷ VCS is also an approved offset registry, but no projects have currently created forestry and land-use projects through VCS for use in the California program.

⁷⁸ While the total volume of offsets transacted in 2016 declined in comparison to 2015, that is because we are missing a major market participant. We do not believe this reflects an actual drop in total transaction volumes for the year.

⁷⁹ “Compliance Offset Program.” California Environmental Protection Agency Air Resources Board, accessed October 31, 2017, <https://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm>.

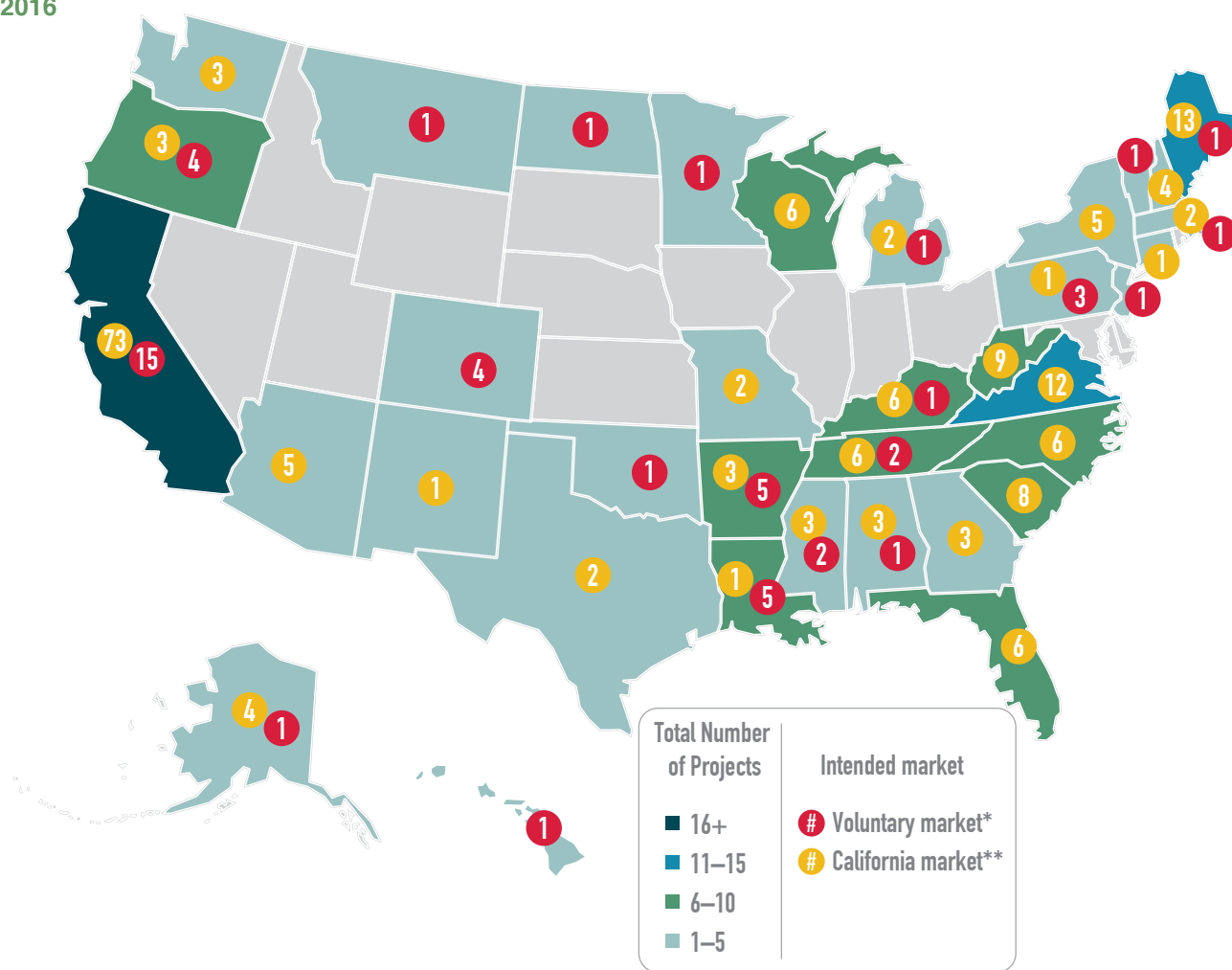
⁸⁰ The REDD Offset Working Group, *California, Acre and Chiapas: Partnering to Reduce Emissions from Tropical Deforestation* (The REDD Offset Working Group, 2013), <https://www.arb.ca.gov/cc/capandtrade/sectorbasedoffsets/row-final-recommendations.pdf>.

Table 3. Overview of California-Québec Compliance Market Activity in 2014, 2015, and 2016

	Volume (MtCO ₂ e)			Value (\$M)			Average Price (\$/tCO ₂ e)		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
California-Québec cap-and-trade program	6.1	6.5	4.1	\$54.7	\$63.2	Can't disclose*	\$8.9	\$9.7	Can't disclose

* To ensure confidentiality of responses, we only present data if at least three organizations have reported on any single data point.

Figure 3. Location of Voluntary and Compliance Forest Carbon Projects in the United States by Market, 2016



Compliance Markets

* Voluntary projects include projects developed under the ACR, CAR, Gold Standard, and VCS standards.

** California market-eligible projects include Early Action, Active ARB, Proposed, and Active Registry Projects from ACR and CAR.

Notes: Based on 246 projects found on the ACR, CAR, Gold Standard, and VCS websites in 2016.

Figure includes US compliance and voluntary forest carbon project data (California has a compliance market, but projects are not limited to California).

Box 2. The California-Canada Connection

The Western Climate Initiative (WCI) is a not-for-profit organization that was established in 2007 to promote a market-based approach to reducing greenhouse gases. It was first signed by five US states, but today is comprised of just one US state (California) and three Canadian provinces (British Columbia, Ontario, and Québec).

The California and Québec cap-and-trade programs launched separately in 2013, and officially linked in 2014. As members of the WCI, both governments had already agreed to link any potential carbon markets they developed. While other WCI members dropped out of the program, or put their carbon pricing plans on hold, California and Québec forged ahead to create the region's first linked cap-and-trade program. This means that offsets approved by California's ARB program were also eligible for purchase by regulated Québécoise companies, and vice versa.

Since then, Ontario has joined WCI's cap-and-trade program. Ontario developed a compatible cap-and-trade program that launched in early 2017, and in September 2017, government officials officially linked Ontario with the California-Québec program.⁸¹ At the moment, Ontario's program does not allow carbon offsets—the province is currently working with Québec and the Climate Action Reserve (a voluntary standard and an approved offset registry in the California market) to choose up to 13 existing offset protocols from voluntary or compliance markets for use in their own program. Ontario is expected to choose and implement all of its offset protocols by 2018.⁸²

Ontario and Québec also are looking further south to potentially collaborate on carbon market activity. Both provinces signed a three-way agreement with the government of **Mexico** in fall 2016,⁸³ to share best practices of their collective carbon markets and to promote the expansion of carbon markets in North America.

While another Canadian province, **Manitoba**, announced it would develop a compatible cap-and-trade program for potential Québec and California linkages in late 2015, the provincial government reversed this promise in late 2016. As of October 2017, the province announced a flat \$19/tCO₂e tax, fixed at that rate for at least the next five years.⁸⁴ The only problem? Canadian Prime Minister Trudeau announced that all provinces have until 2018 to create a cap-and-trade program or set a carbon price of at least \$8/tCO₂e in 2018 which must ramp up to \$38/tCO₂e by 2022 (see pages 5–26 for more details about current and upcoming compliance programs).

⁸¹ "Ontario to link with California and Québec cap-and-trade programs," International Carbon Action Partnership, accessed October 31, 2017, <https://icapcarbonaction.com/en/news-archive/489-ontario-links-with-california-and-quebec-cap-and-trade-programs>.

⁸² "Cap and trade: compliance offset credits and protocols," Ontario, accessed October 31, 2017, <https://www.ontario.ca/page/cap-and-trade-offset-credits-and-protocols#section-0>.

⁸³ Shawn MaCarthy, "Ontario, Québec sign climate policy deal with Mexico," The Global and Mail, accessed October 31, 2017, <https://beta.theglobeandmail.com/report-on-business/international-business/latin-american-business/ontario-quebec-sign-climate-policy-deal-with-mexico/article31637425/?ref=http://www.theglobeandmail.com&>.

⁸⁴ Steve Lambert, "Manitoba sets carbon tax at \$25 a tonne as Trudeau warns feds will impose price," Canadian Business, accessed October 31, 2017, <http://www.canadianbusiness.com/business-news/manitoba-sets-carbon-tax-at-25-a-tonne-as-trudeau-warns-feds-will-impose-price/>.

New Zealand Compliance Market in 2016

New Zealand is home to the first carbon market in the world to account for forestry emissions and sequestration. However, while the forestry sector was largely credited with helping the country meet its 2008–2012 emissions reductions commitment under the Kyoto Protocol, domestic forest carbon sales dropped off precipitously when the program allowed buyers to purchase international offsets in 2010. The use of international offsets caused prices of New Zealand offsets to fall from as much as \$13.4/tCO₂e to a low of \$0.8/tCO₂e.⁸⁵

However, as New Zealand isn't part of the Kyoto Protocol's second compliance period, the country banned the use of international offsets beginning in 2015. Since then, domestic offset prices have risen and now hover around \$14.3/tCO₂e. Market optimism has also risen—cautiously. The New Zealand government published a cap-and-trade review paper in late 2015 that candidly spoke of the program's problems with allowing regulated organizations to purchase only half of their needed offsets, the use of foreign offsets, the lack of a price floor and more. In early 2016, the government took its first action towards addressing one of those issues by beginning to phase out its “one for two” measure that allowed businesses to pay one emissions unit, either an offset or an allowance (which are permits to pollute given by the government), for every two tonnes of pollution. The measure will be phased out from 2017–2020, giving rise to more market demand.

It remains to be seen if—or how—the government will address other longstanding market concerns. The country's new incoming coalition government plans to establish an independent climate commission, which will shape the future of the ETS.⁸⁶ Future elections and decisions around price stability, forest accounting, and the use of international offsets once the Paris Agreement enters into force in 2020 could positively or negatively affect forest carbon offset demand. In the meantime, some sellers are holding onto their offsets in the hopes of selling at an even higher price—even as many refrain from planting more trees, viewing the future of the program (post-2020) with uncertainty.

New Zealand Market Activity: Issuances, Transactions, and Retirements

The New Zealand emissions trading scheme was the first in the world to regulate the forestry sector. Any landowners with forests established *before* 1990 must participate in the compliance program and pay for allowances or offsets if they deforest more than two hectares of their forests. Conversely, any landowners with forests established *after* 1989 are not automatically part of the compliance market, but can choose to either:

- Become part of the compliance market. In return, they receive New Zealand Units (NZUs) for the carbon stored in their forests, which they can trade in the compliance market—but the forest owners also have to purchase offsets or allowances in the event the trees are harvested or carbon is lost through an adverse event such as fire; or
- Become part of the Permanent Forest Sink Initiative (PFSI). Forests registered under the PFSI must commit to long-term sustainable management, and forest owners agree to keep continuous canopy forests for 99 years and remove only select trees. In return, they receive PFSI NZUs, which are recognized as distinct from general forestry NZUs due to the longevity of the forest projects (until 2013, PFSI forests received internationally-tradable Assigned Amount Units instead of domestic NZUs).

Despite the influx of international offsets in 2010, which resulted in domestic New Zealand offset prices plummeting, issuances of domestic forest carbon offsets have remained relatively steady over the years. In 2016, the New Zealand government issued 8.5 MtCO₂e forestry NZUs (out of a total of 95.2 MtCO₂e NZUs issued since 2010) and 0.2 MtCO₂e forestry PFSI NZUs (out of a total of 0.7 PFSI NZUs issued since 2013).

⁸⁵ NZ\$20 to NZ\$1.5. Prices are converted using 2016 exchange rates from <http://www.irs.gov/individuals/international-taxpayers/yearly-average-currency-exchange-rates>.

⁸⁶ Karl Mathiesen, “Jacinda Ardern commits New Zealand to zero carbon by 2050,” Climate Home News, accessed October 31, 2017, <http://www.climatechangenews.com/2017/10/20/jacinda-ardern-commits-new-zealand-zero-carbon-2050/>.

In contrast to issuances, retirements of forest offsets were affected by the sale of cheap international offsets. Retirements of forestry NZUs reached a low of 0.1 MtCO₂e in 2013. This increased dramatically in 2015 to 10.2 MtCO₂e, and continued to expand in 2016 to a record 15.5 MtCO₂e.

The value of forestry offsets has also risen with the increase in retirements, as the exclusion of international offsets from the New Zealand market has caused the available supply to shrink. In 2014, the average price paid for forest NZUs was \$3.1/tCO₂e, compared to an average of \$10.2/tCO₂e paid in 2016.

Table 4. Overview of New Zealand Compliance Market Activity in 2014, 2015, and 2016

	Volume (MtCO ₂ e)			Value (\$M)			Average Price (\$/tCO ₂ e)		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
New Zealand ETS Transactions	0.4	1.3	Can't disclose*	\$2.1	\$10.4	Can't disclose	\$5.0	\$7.9	Can't disclose
New Zealand ETS Retirements**	0.8	10.2	15.5	\$2.1	\$45.6	\$188.1	\$3.1	\$4.5	\$10.2

* To ensure confidentiality of responses, we only present data if at least three organizations have reported on any single data point.

** All prices have been converted to US\$. Prices are converted using yearly exchange rates from <http://www.irs.gov/individuals/international-taxpayers/yearly-average-currency-exchange-rates>.

Average pricing for forestry NZUs obtained Carbon Forest Services Limited.

At a Glance: Forestry and Land Use Offsets in the New Zealand Market

Forestry and land-use project types: Landowners with forests established *before* 1990 are part of the compliance market and pay for any emissions caused by deforestation. In contrast, landowners with forests established *after* 1989 are not part of the compliance market and can elect to receive either NZUs or PFSI NZUs.

Standard: The New Zealand government approves three types of forestry credits:

Forest Allocation Plan (FAP) New Zealand Units:

1. NZUs gifted to foresters of pre-1990 forests to compensate for the introduction of deforestation liabilities.
2. Forest Entitlement New Zealand Units: NZUs issued to foresters of post-1989 ETS forests for removal activities.
3. Permanent Forest Sink Initiative New Zealand Units: NZUs issued to foresters of post-1989 PFSI forests for removal activities.

**Assigned Amount Units (AAUs): Either ETS forestry NZUs that have been converted into AAUs or AAUs that have been granted PFSI foresters (AAUs ceased being issued at the end of 2012 but remain eligible for use to meet NZ ETS obligations).*

Location: All offset projects must be based in New Zealand, as of 2015.

Overview of Voluntary Markets in 2016

Although some governments support a market for voluntary offsets, most voluntary offsetting occurs in the absence of government regulation. As a result, the global, unregulated voluntary market is often more flexible than compliance markets—there are no limitations on what types of offsets buyers can purchase, where offsets are produced, or if and how offsets are certified.

Buyers in voluntary markets are not mandated to purchase offsets—they do so for many different reasons, from branding to employee engagement to meeting their own GHG reduction targets. Some buyers are less concerned with the GHG emissions reductions; if a project has strong co-benefits, buyers often view carbon offsets as a vehicle for investing in the other benefits the project provides, like public health improvements, biodiversity preservation, or improving access to clean water.

As a result, voluntary markets tend to be more varied than a typical compliance market, with more project types, more varied prices, and a wider range in offset quality. They are also traditionally more innovative than compliance markets. Oftentimes, innovations like new standards and methodologies are born in the voluntary market, then adopted or adapted to compliance markets. Offsets from forestry and land-use projects tend to be among the higher-priced offsets on the voluntary market. This section examines forestry and land-use offsets on the voluntary market from several angles: prices, standards, locations, project types, and buyers.



Photo Credit: Francois D'Elbee / Conservation Lower Zambezi

In 2016, BioCarbon Partners, project developer of the Lower Zambezi REDD+ Project, Zambia, partnered with Conservation Lower Zambezi and the Department of National Parks and Wildlife under the USAID-funded Community Forests Program to create a Dog Detection and Tracking Unit.

Pictured, the German Shepard Bar leads the Dog Unit team through the Lower Zambezi National Park. The unit is highly trained to combat wildlife crime in the park. Since 2016, Bar and another German Shepard, Lego, have sniffed out 23 suspects.

Voluntary Markets: Price

In compliance markets, offsets typically sell at similar prices, regardless of the offset's location, project type, or other attributes.

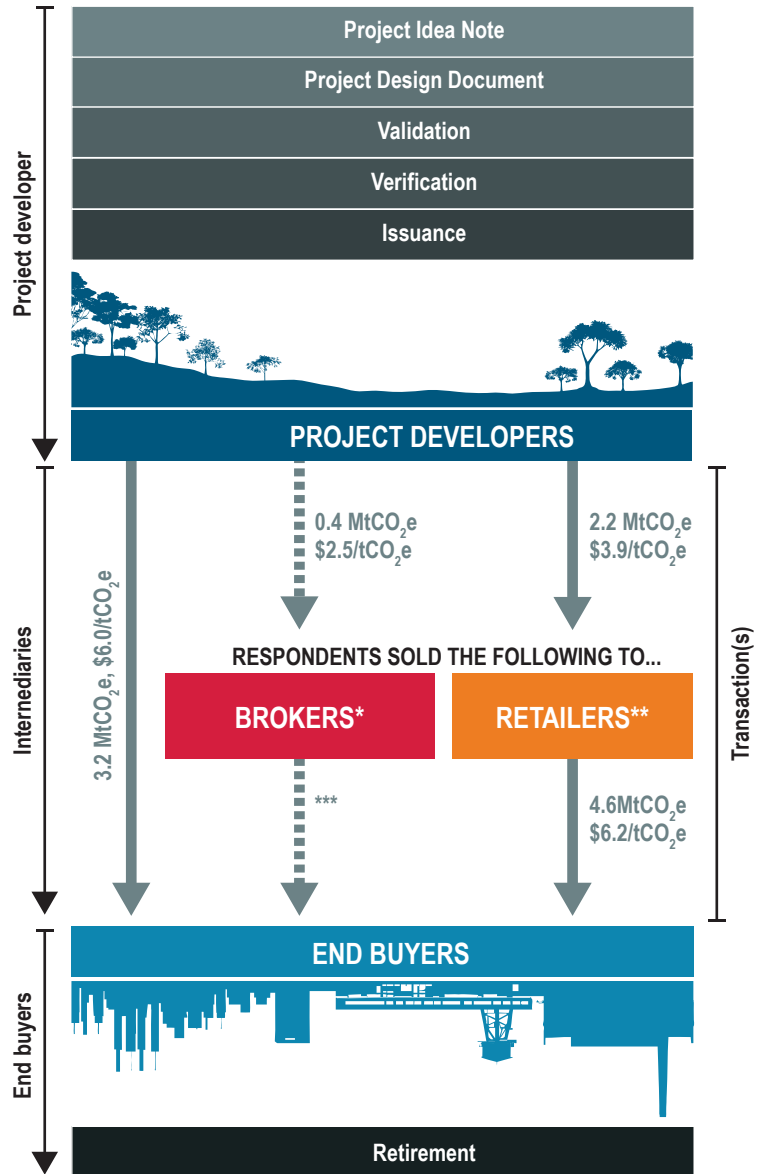
In contrast, prices of offsets sold on the voluntary market vary greatly, based on factors that include buyer preferences, co-benefits associated with the project, the type of seller, or the size of the transaction.

One key factor is the variety of buyers in the voluntary market. Voluntary buyers purchase offsets for a number of reasons. Some want to engage with their consumers and may prefer offset project types that have interesting stories. Other voluntary buyers may want to be seen as a climate leader in their community, and purchase offsets from projects close to home. Still other buyers value offsets more for the non-carbon co-benefits associated with the project than the actual offset produced by the project. Disney, for example, often purchases forest carbon offsets from tropical rainforests, because they are home to many woodland creatures so iconic to the studio's movies.

This leads to buyers valuing offsets based on the project location, methodology, project type, and other attributes in addition to the asking price. Some buyers are willing to pay more to support projects with higher operating costs (and prices) because of additional features like co-benefits.

Because voluntary buyers have various motivations and different budgets, prices for voluntary forest carbon offsets ranged from less than \$0.7/tCO₂e to more than \$70.0/tCO₂e. In general, however, prices tended to fall in the middle-range (\$3–7/tCO₂e), with clusters around the low (\$1–2/tCO₂e) and high (\$9/tCO₂e) ends (Figure 5). In upcoming pages, we examine transactions for forest carbon offsets based on project type, location, and standard. Of course, these are only a few of the offset attributes that can affect price: buyers might be motivated by more specific or additional offset attributes not collected in our reports or by a combination of these factors.

Figure 4. The Offset Cycle and Associated Transaction Volumes and Average Prices from Project Development to Retirement, 2016



* Brokers do not take ownership of offsets. We remove double counting in instances where project developers and brokers respond on behalf of the same offset transaction.

** Retailers do take ownership of offsets.

*** We do not have enough information to disclose this data.

Notes: Based on 166 transactions, representing 10.3 MtCO₂e in 2016.

Figure includes voluntary market data only.

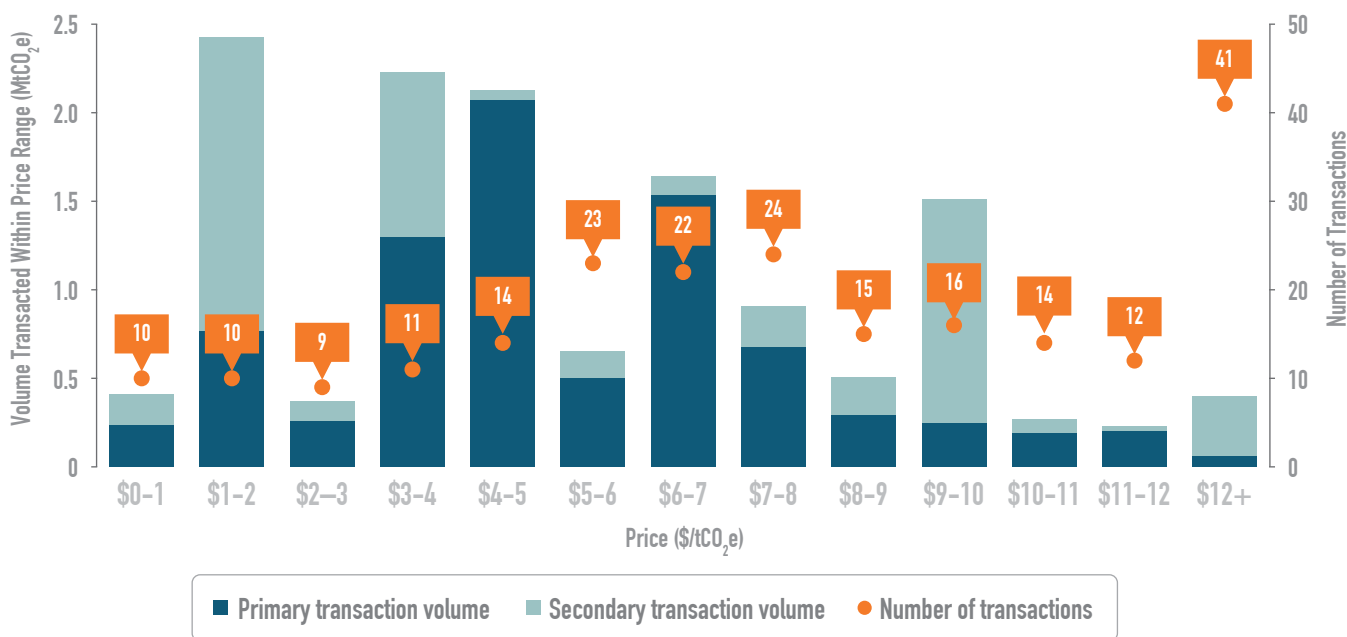
Table 5. Overview of Voluntary Markets for Forestry and Land-use Offsets in 2014, 2015, and 2016

	Volume (MtCO ₂ e)			Value (\$M)			Average Price (\$/tCO ₂ e)		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Voluntary markets	23.7	18.2	14.3	\$128.1	\$88.4	\$74.2	\$5.4	\$4.9	\$5.2

Besides offset attributes, the type of seller and the size of the transaction can also affect an offset’s price. Because there is no centralized, single marketplace for voluntary sellers to connect with buyers, marketing a voluntary offset can be just as important as creating an offset. In some cases, project developers market their offsets directly to end buyers; yet it is also common for project developers to sell or contract their offsets with an intermediary **retailer** or **broker** (see Figure 4 for more information about the voluntary carbon offset lifecycle). These intermediary organizations focus on finding buyers, leaving project developers to focus on their projects.

In 2016, project developers sold 8.6 MtCO₂e at an average price of \$5.0/tCO₂e on the **primary markets**, while intermediary organizations sold another 5.7 MtCO₂e at an average price of \$5.5/tCO₂e on the **secondary markets**. In general, project developers sold the bulk of their offsets between \$3-\$8/tCO₂e, while intermediary organizations typically sold offsets between \$1–2/tCO₂e or between \$9–10/tCO₂e. It is likely that intermediary organizations targeted two distinct types of buyers: those interested in high volumes of inexpensive offsets, and those interested in a specific location, project type or other attribute. The latter buyer type is often willing to pay more per offset, but buys lower volumes.

Figure 5. Voluntary Forest Carbon Offsets: Volume Transacted and Number of Transactions by Price and Market, 2016



Notes: Based on 221 transactions representing 13.7 MtCO₂e in 2016. Figure includes voluntary market data only.

Voluntary Markets: Standards

Voluntary carbon offset standards fill the role that compliance market regulators play: they provide certainty to buyers that the emissions reductions they paid for actually happened. Unlike most compliance standards, voluntary carbon standards face competition among each other. In cases where voluntary standards have recognized similar methodologies, or project blueprints, project developers might choose to go with one standard over another based on the standard's reputation, price, or other factors. In other cases, standards have differentiated themselves by developing or approving unique methodologies.

There are several types of forestry and land-use methodologies available to potential project developers, from agro-forestry to grasslands management. Though these methodologies were initially developed for the voluntary market, some have been adopted or adapted by compliance markets.

The use of different standards varies among different regions. This happens for a number of reasons. Especially in a standard's early years, its use may be concentrated in the geographic region in which the standard originated, and where its headquarters is located. Perhaps the biggest reason, though, is that different standards are used for different project types.

The project type, size, and location, also help to shape the price of a project's offsets. This geographic differentiation contributes to price variation among standards. Offsets produced in high-income countries tend to sell at higher prices, presumably due to more expensive labor and materials. As a result, offsets issued from standard bodies used exclusively (or mainly) in developed countries typically sold at higher prices than offsets issued from more globally-used standards.

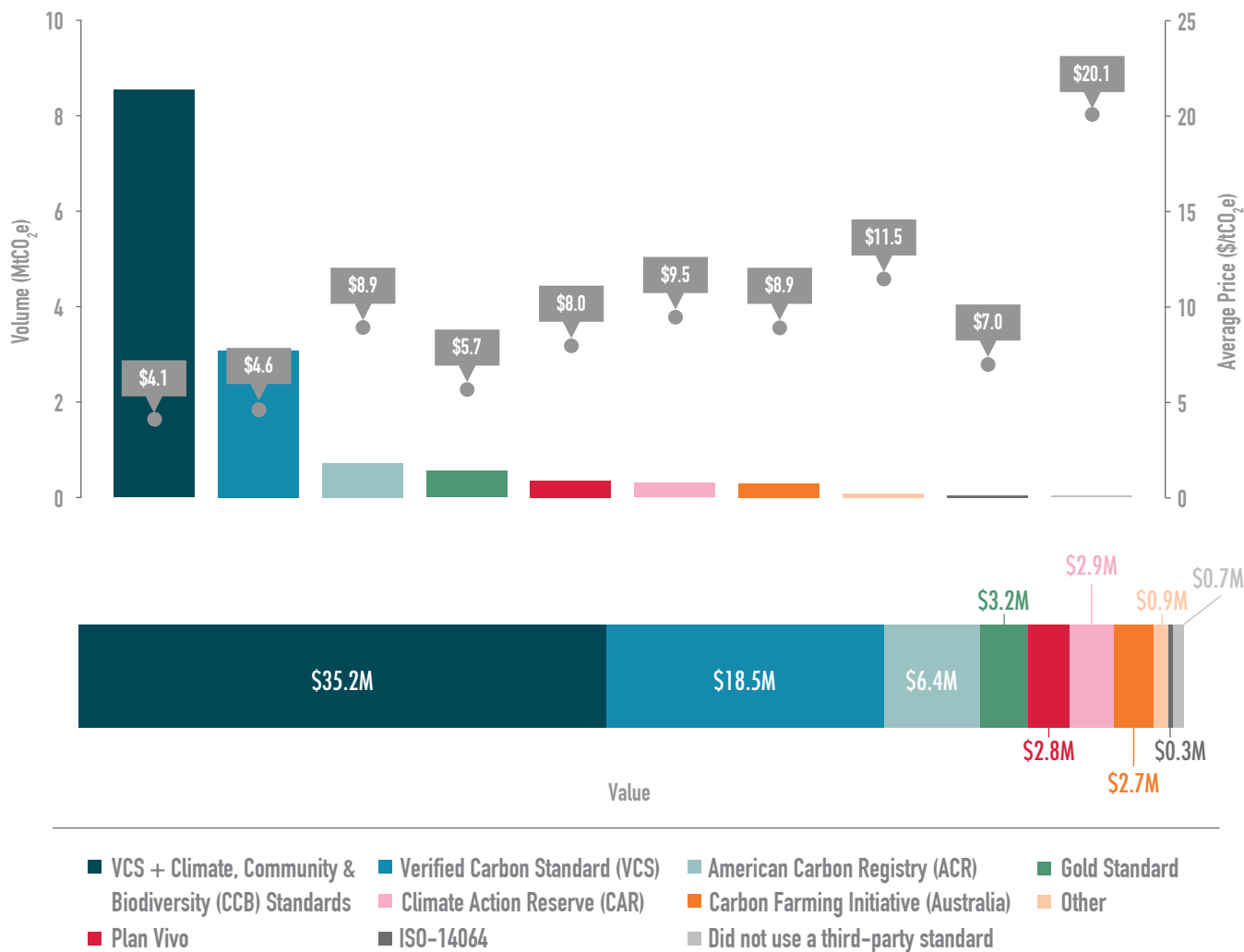
The Verified Carbon Standard certified the majority of forestry and land-use projects on the voluntary market (82%). Several different project types were certified under VCS, including tree-planting, agro-forestry, and improved forest management, but the most common was REDD+. Of VCS-certified offsets, 73% were also certified by the Climate, Community, and Biodiversity (CCB) Standards. CCB is a non-carbon co-benefit standard typically added on to VCS forest carbon projects. While historically, offsets certified by both VCS and CCB sold at higher prices than those only certified by VCS, that was not the case in 2016. VCS-only certified offsets sold at an average of \$4.6/tCO₂e, while VCS+CCB offsets sold for \$4.1/tCO₂e. This is likely due to the locations of these projects; VCS+CCB offsets tended to be produced in low-income countries, where offset prices are typically lower.

Offsets certified under the ACR made up the next largest share of the market in 2016, by both volume (5%) and value (6%). The majority of transacted ACR-issued offsets came from either improved forest management or tree-planting projects, which typically are much smaller than REDD+ projects (in particular, while improved forest management projects may cover large tracks of land, most tree-planting projects work with individual landowners). ACR offsets also had higher than average prices, at \$8.9/tCO₂e, partly because ACR-certified projects are mostly located in the United States (though the standard does issue forestry offsets internationally as well).

The Gold Standard and Plan Vivo both place a strong emphasis on co-benefits, and although neither has geographic restrictions, both standards most often certify forestry and land-use projects in small, rural communities in low- or middle-income countries. The Gold Standard certified approximately 4% of the market volume, and those offsets transacted at an average price of \$5.7/tCO₂e. Tree-planting was the main project type, and projects tended to be small, with an average transaction size of 16 KtCO₂e, compared with 62 KtCO₂e overall (for projects that reported a standard). Plan Vivo certified 2% of the market volume, and those offsets transacted at an average price of \$8/tCO₂e. Plan Vivo certifies a mixture of forest project types—tree-planting, agro-forestry, mangrove restoration, REDD+, and improved land and forest management. Plan Vivo-certified projects also tended to transact even smaller transactions than the Gold Standard; the average transaction size was 12 KtCO₂e. Not all offsets transacted have been issued by the Gold Standard or Plan Vivo; in some cases, project developers sell before issuances have occurred (see Box 6: Project Additionality and Upfront Finance for more detail).

In 2016, transactions from projects that did not use a third party verification standard sold at the highest average price (\$20.1/tCO₂e). However, these offsets accounted for just 0.3% of the market volume, and average price was skewed by a handful of large, high-priced European projects. Offsets in the “other” category had the next highest price (\$11.5/tCO₂e), but these accounted for less than 1% of total forestry and land-use offsets, and all of these projects were located in North America, where prices tend to be higher. Similarly, offsets issued by Australia’s Carbon Farming Initiative had high average prices (\$8.9/tCO₂e), but made up a very small portion of the market (2%) and were used exclusively in Australia.

Figure 6. Voluntary Forest Carbon Offsets: Market Volume and Value by Standard, 2016



Voluntary Markets

Notes: Based on 229 transactions representing 14.2 MtCO₂e in 2016.

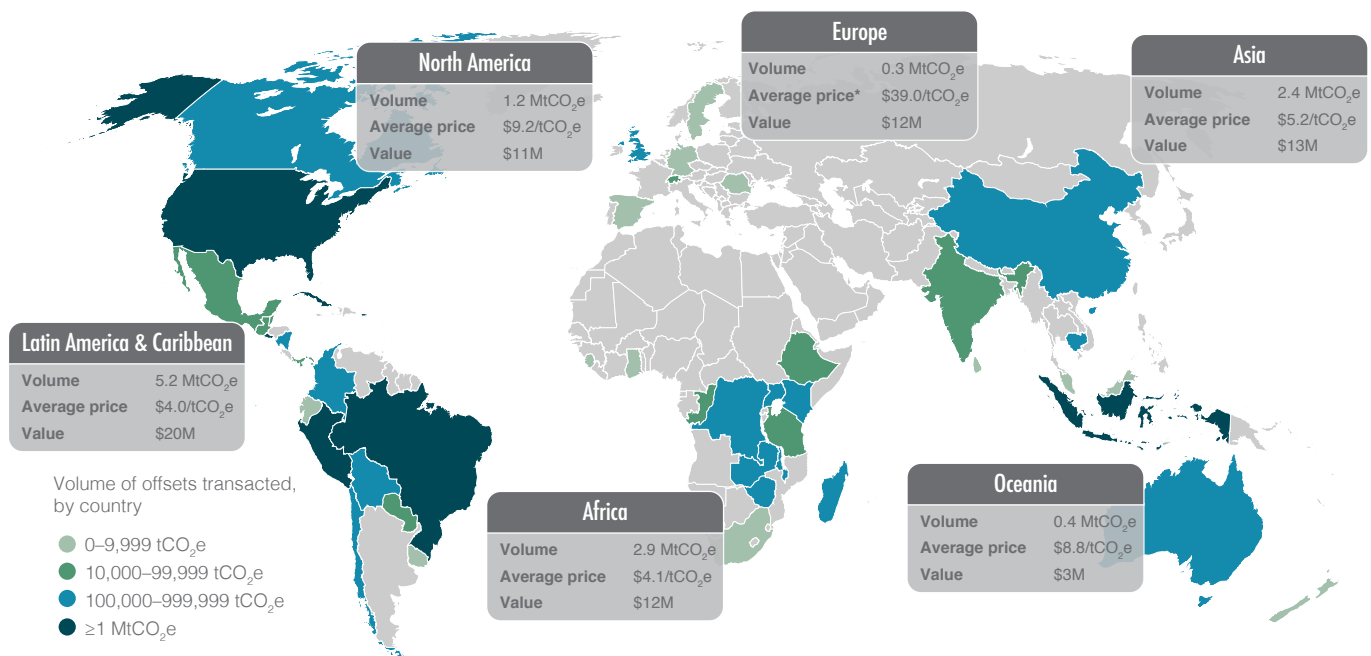
Figure includes voluntary market data only. The small amount of transacted offsets issued by Australia’s Carbon Farming Initiative were not those purchased by the government’s Emissions Reduction Fund.

Voluntary Markets: Location

Voluntary forestry and land-use offsets are produced in every inhabited region of the world, most commonly in countries and regions with high amounts of at-risk forests. We tracked forest carbon offsets produced in 45 countries in 2016, but the most came from a few countries with tropical rainforests at risk of deforestation.

A bit less than half (42%) of all forestry and land-use offsets sold came from projects based in Latin America and the Caribbean. These offsets primarily came from projects in Peru (2,247 KtCO₂e) and Brazil (2,122 KtCO₂e), which are also home to the largest tracts of the Amazon rainforest. Other offset-producing countries in this region include Bolivia (213 KtCO₂e), Colombia (106 KtCO₂e), Chile (195 KtCO₂e), and Mexico (64 KtCO₂e). These high volumes were accompanied by lower prices; Latin America had the lowest average price of any region, with offsets selling for an average of \$4.0/tCO₂e, compared with the global average of \$5.2/tCO₂e.

Figure 7. Voluntary Forest Carbon Offsets: Market Size by Project Location (Region and Country), 2016



* We only tracked five organizations responding with transaction pricing information for projects based in Europe. The average price should be viewed with caution, since it is based on so few data points.

Notes: Based on 229 transactions representing 12.4 MtCO₂e in 2016.

Figure includes voluntary market data only

Africa and Asia also produced high volumes of offsets. In Africa, offsets were produced in several countries across West, Central, and East Africa, including: Kenya (858 KtCO₂e), Zimbabwe (856 KtCO₂e), Uganda (322 KtCO₂e), and Malawi (272 KtCO₂e). In Asia, most projects were in Indonesia (1,717 KtCO₂e), Cambodia (366 KtCO₂e), and India (39 KtCO₂e), with lots of tropical rainforests. Prices in both Africa (\$4.1/tCO₂e) and Asia (\$5.2/tCO₂e) were higher than those in Latin America, but still at or below the global average (\$5.2/tCO₂e).

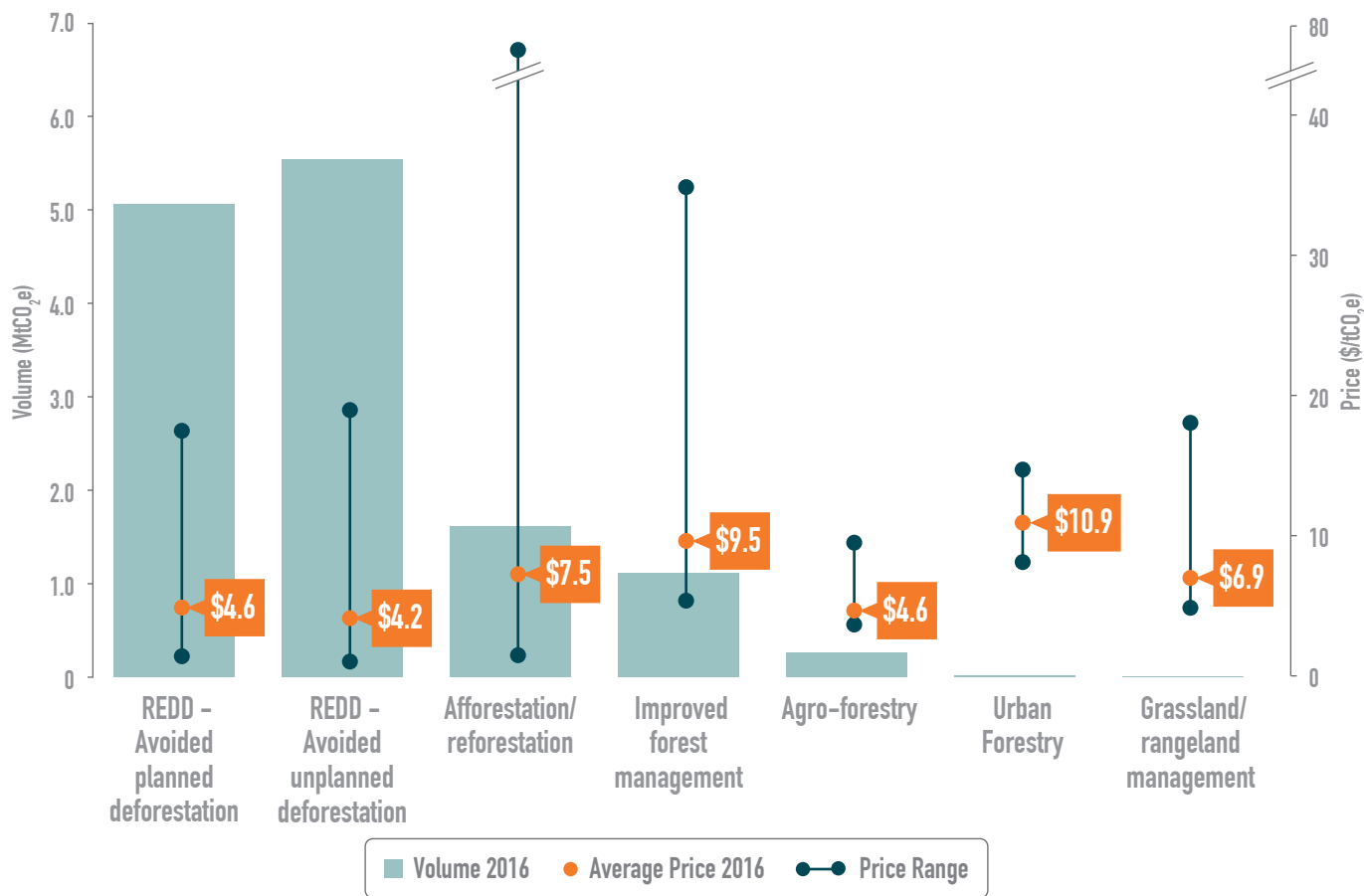
Projects in North America, Europe, and Oceania sold lower volumes; each region accounted for less than 10% of the market. In these regions, where project costs like land, labor, and materials tend to be higher than in low- or middle-income countries, offsets tended to sell at higher prices. In North America and Oceania, prices tracked just below those of their regions' compliance markets. Not all of the offsets on the voluntary market are eligible for compliance markets, but for those that are, project developers would likely not be willing to sell for much less than compliance prices. In Europe, demand is probably driven by companies and organizations wanting to support local projects for which buyers are willing to pay more. There are also some national programs to help drive demand for forest carbon offsets, such as the United Kingdom's Woodland Carbon Code.

Voluntary Markets: Project Type

In 1988, one of the first-ever carbon offset sales took place when a global power company decided to pay €2.2M for 2 MtCO₂e of emissions reductions achieved by a tree-planting project in Guatemala.⁸⁷ Ever since then, forestry and land-use project developers have continued to innovate, finding new ways to protect forests, grasslands, farms and more while sequestering carbon or avoiding emissions. Buyers have responded positively to these projects; forestry and land-use offsets are typically the largest or second largest category of offsets we track yearly in our annual *State of the Voluntary Carbon Markets* reports.⁸⁸

The largest category of voluntary forestry and land use offsets sold in 2016 came from REDD+ projects (10.6 MtCO₂e), many of which began well before any government-run REDD+ programs became operational. Many REDD+ project developers hope their projects will eventually be included in a compliance market or integrated into national or jurisdictional REDD+ programs, and the majority are currently working to ensure that happens (for more information about REDD+ projects' efforts to integrate into jurisdictional or national programs, see Box 5).

Figure 8. Voluntary Forest Carbon Offsets: Market Transacted Volume and Average Price by Project Type, 2016



Notes: Based on 219 transactions representing 14.1 MtCO₂e in 2016.

Figure includes voluntary market data only.

⁸⁷ Kelley Hamrick and Lucio Brotto, *State of the European Markets: Voluntary Carbon*, (Washington, DC: Forest Trends, 2017), http://www.forest-trends.org/documents/files/doc_5631.pdf#.

⁸⁸ We collect additional voluntary forest carbon offset transaction data after the launch of our State of the Voluntary Carbon Markets reports every year. This means that voluntary forest carbon offset transaction data presented here may not match the forest carbon offset transaction data presented in the State of the Voluntary Carbon Markets reports.

There are two types of REDD+ projects, those that avoid *planned* causes of deforestation or forest degradation and those that avoid *unplanned* causes. The former offsets come from projects that protect forests that have been legally authorized to convert to non-forest land (typically for plantations or livestock), whereas the latter offsets come from projects that avoid deforestation stemming from subsistence agriculture, livestock agriculture, fuelwood collection or other activities.

In 2016, we tracked similar volumes of offsets from avoided planned REDD+ projects (5.1 MtCO₂e) and from avoided unplanned REDD+ projects (5.5 MtCO₂e). Offsets from avoided planned projects sold at an average price of \$4.6/tCO₂e and offsets from avoided unplanned projects sold at a slightly lower average price of \$4.2/tCO₂e. This is different from the previous two years of data collection (2014 and 2015), where avoided planned REDD+ offsets typically sold at half (or less) the price of avoided unplanned REDD+ offsets.

Looking at reported transactions of avoided planned REDD+ offsets more closely, a wider price difference emerges between offsets sold on the primary and secondary markets. We tracked six project developers selling avoided planned REDD+ offsets at an average of \$3.6/tCO₂e, while five retailers sold such offsets at an average of \$6.4/tCO₂e. In contrast, eighteen project developers sold unplanned REDD+ offsets at an average price of \$4.4/tCO₂e and another thirteen retailers sold unplanned offsets at an average price of \$3.5/tCO₂e.

After REDD+ offsets, suppliers sold the most offsets from tree-planting and improved forest management projects: 1.6 MtCO₂e from tree-planting offsets at an average of \$7.5/tCO₂e and 1.1 MtCO₂e from improved forest management offsets at an average of \$9.5/tCO₂e. Tree-planting offsets came from projects across the globe, and the price tended to differ based on whether the offsets came from Europe, North America, or Oceania (selling at an average of \$9.1/tCO₂e) or from Asia, Africa, or Latin America (selling at an average of \$6.8/tCO₂e). Meanwhile, all but one transaction of improved forest management offsets came from projects in Europe, North America, or Oceania.

The remaining forestry and land-use offsets sold in 2016 came from smaller or newer project types, which included agro-forestry, urban forestry, and grassland management projects. This is the first time we were able to report on the latter two project types, since historically there have not been at least three organizations reporting sales from these project types. There are additional projects that have not yet reached a stage to generate carbon offsets for sale, and even newer projects in the process of being developed. In 2017, new methodologies were released typically relating to “blue” carbon—that is, carbon offsets related to sequestration or avoiding emissions from wetlands, peat lands, or other aquatic environments (see Box 3).

Box 3. New Methodologies in 2017

Voluntary carbon standards are constantly looking for new methodologies to develop, and project developers with new ideas often approach specific voluntary carbon standards with their ideas for a new project. Three voluntary carbon standards announced their approval or pending approval for new forestry and land-use methodologies in 2017. Specifically:

The **American Carbon Registry** is currently reviewing, or seeking external feedback, for three proposed methodologies around *Avoided Planned Land-Use Conversion in Peat Swamp Forests*, *Changes in Fertilizer Management*, and *Southwestern Forest Restoration: Decreased Wildfire Severity and Forest Conversion*. The standard also approved a new methodology in early 2017 for the *Restoration of California Deltaic and Coastal Wetlands* and in late 2017 for *Pocosin Wetland Restoration*.

The **Climate Action Reserve** made revisions to its *Grassland Project Protocol*, *US Forest Protocol*, and *Mexico Forest Protocol* in 2017. The US Forest Protocol revisions include a number of changes, including expanding the protocol to include Hawaii. The latest Mexico Forest Protocol includes guidelines to aggregate smaller forest projects in an effort to make them more cost-effective.

The **Verified Carbon Standard** approved a new methodology in 2017 for *Rewetting Drained Temperate Peatlands*.

Both VCS and the Gold Standard have also made revisions around quantifying and reporting on co-benefits associated with forestry and land-use carbon projects. More details about those updates can be found in Box 9.

Voluntary Markets: Buyers

Most buyers of carbon offsets on the voluntary market were concentrated in a few countries. Buyers in the United States, Netherlands, United Kingdom, France, and Germany accounted for a combined 79% of the total volume and 76% of the total value of the market.

While buyers can include both intermediaries and end buyers (organizations that ultimately intend to retire the offsets they purchase), 70% of forest carbon offsets were purchased by end buyers last year. In contrast, end users purchased just 55% of all forestry and non-forestry voluntary offsets in the overall voluntary market.⁸⁹ This means that more end buyers purchased voluntary forestry carbon offsets directly from project developers than end buyers who purchased voluntary non-forestry offsets. One result of this arrangement is that forest carbon developers received more for their offsets, as end users paid, on average, higher prices than intermediaries (\$6.0/tCO₂e instead of \$3.9/tCO₂e) for their offsets.

Most forestry and land-use offset end buyers had previous experience in the voluntary carbon market. The majority of transactions (78%) were conducted with returning buyers, and those buyers purchased almost all (93%) of the total volume of forestry and land-use offsets sold in 2016. New buyers tended to purchase smaller volumes, but still comprised a significant portion of the total transactions (23%). Latin America and the Caribbean saw the highest proportion of new buyers; 28% of the transactions by buyers in Latin America and the Caribbean were from buyers with no previous experience in the voluntary carbon market.

As was true in the overall carbon market, private sector companies purchased the vast majority of forestry and land-use offsets (92%) by volume. Private and public sector buyers tended to purchase in bulk, with an average transaction size of 62 KtCO₂e and 58 KtCO₂e respectively, whereas non-profit (8 KtCO₂e), and other (mainly individuals; 14 KtCO₂e)⁹⁰ buyers bought in smaller volumes. The biggest sectors were energy, events and entertainment, finance and insurance, and transportation. End buyers in those sectors purchased a combined 71% of forestry offsets in 2016.

Why are they buying offsets?

There are many reasons a company or organization might decide to buy carbon offsets—they may want to stand out among their peers for their commitment to the environment; maybe going “carbon neutral” will appeal to customers, clients, and employees; or perhaps offsets will help achieve their goal for reducing greenhouse gas emissions. The decision to enter the carbon market is different for every buyer, and most of the time, it is based on a combination of factors.

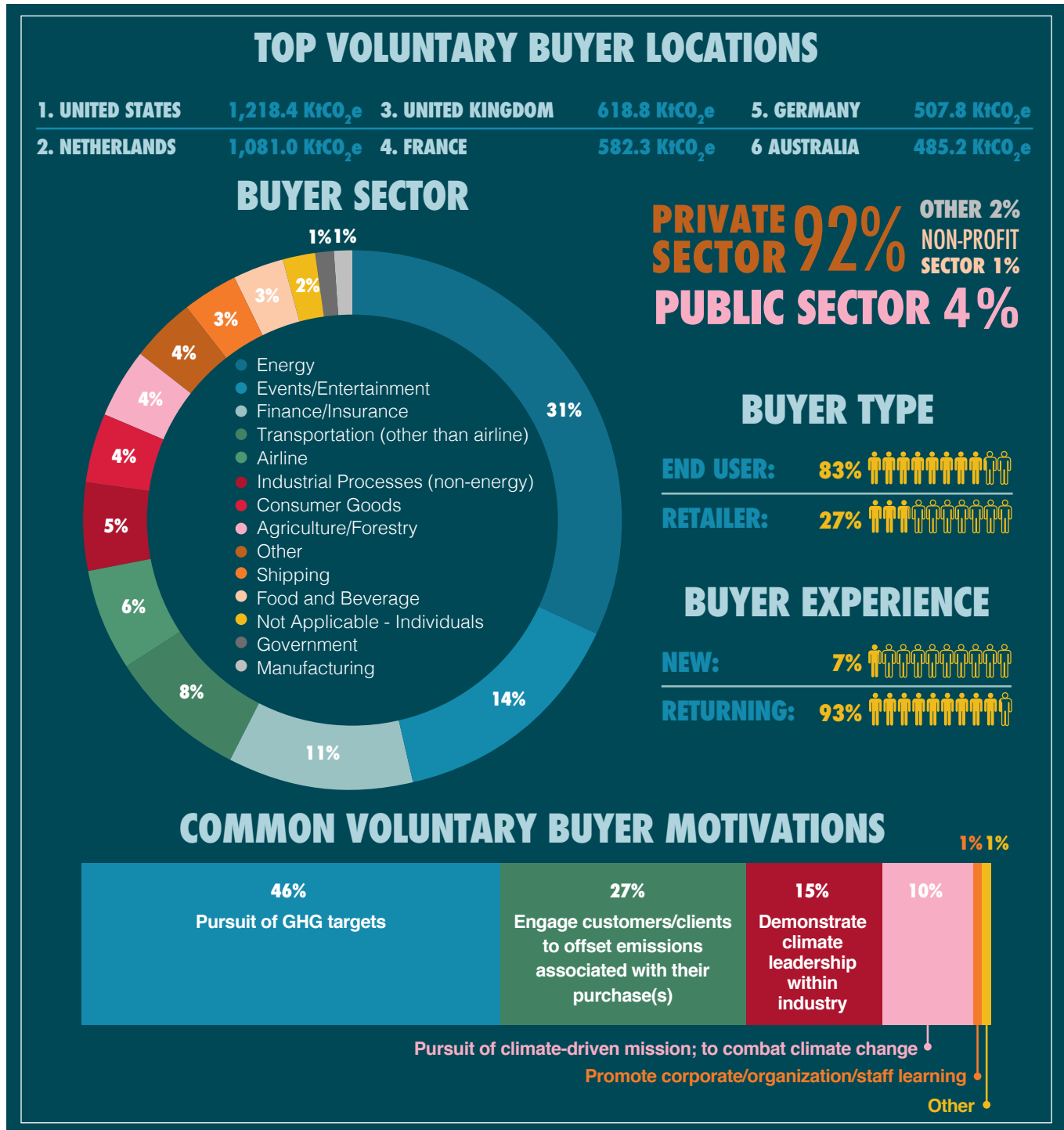
It is almost impossible to capture the nuance and complexity of these decisions in a short survey, but we distilled the decision-making process down to a few top reasons, and asked survey respondents what makes buyers purchase their offsets.

The most common reason was to meet GHG targets (46%). Thousands and thousands of companies around the world are taking a closer look at their GHG emissions, and setting targets to reduce them in the future. Some of those reductions can be done in-house, through switching to cleaner fuel sources or finding ways to reduce energy consumption. But when internal emissions reductions measures become either impractical or cost-prohibitive, many companies and organizations turn to carbon offsets to meet the remainder of their goal.

⁸⁹ Kelley Hamrick and Melissa Gallant, *Unlocking Potential: State of the Voluntary Carbon Markets 2017 Buyers Analysis*, (Washington, DC: Forest Trends, 2017), http://www.forest-trends.org/documents/files/doc_5677.pdf.

⁹⁰ Respondents had the opportunity to aggregate buyer sales, if there were many buyers of a similar type. It is likely that individuals did not buy, on average, 17 KtCO₂e; this is more likely to reflect the average amount of offsets sold to individuals, by seller instead of by buyer.

Figure 9. Voluntary Forest Carbon Offsets, by Volume or % Volume: Buyer Analysis by Profit Status, Location, Type, Experience, and Motivation, 2016



Notes: Based on 70 transactions representing 4.5 MtCO₂e associated with top buyer locations, 174 transactions representing 9.1 MtCO₂e associated with known buyer type, 120 transactions representing 5.3 MtCO₂e associated with known buyer experience, 81 transactions representing 4.3 MtCO₂e associated with known buyer profit status, 77 transactions representing 4.1 MtCO₂e associated with known buyer sectors, and 86 transactions representing 4.5 MtCO₂e associated with known buyer motivations in 2016.

Figure includes voluntary market data only.

Voluntary Markets

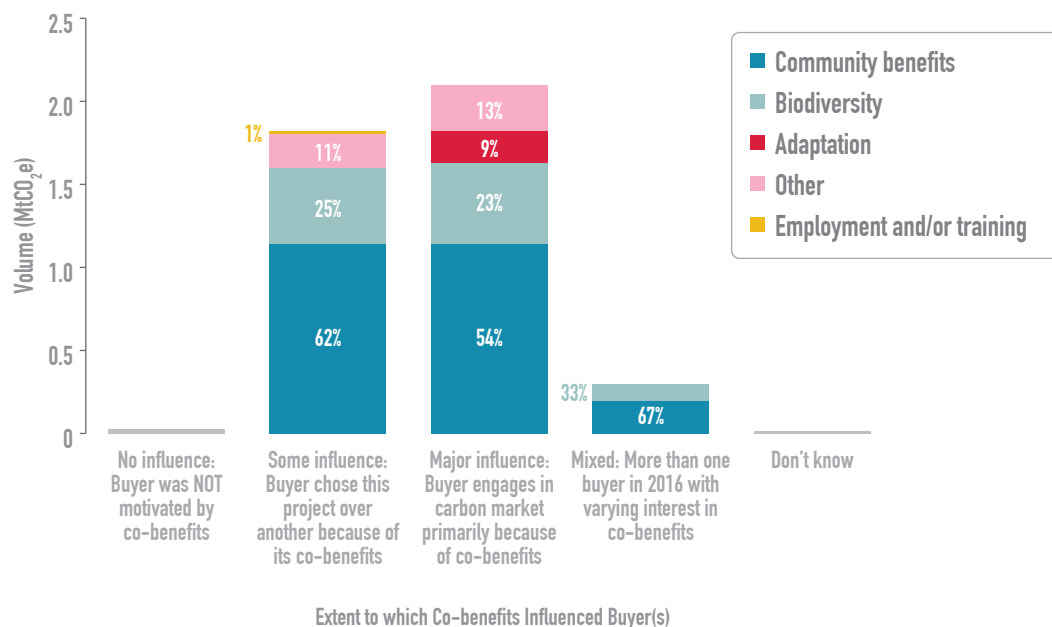
Many consumers are becoming more aware of the environmental impacts of what they buy. In response, some companies are offering their customers the option to offset the emissions associated with their purchases. This kind of engagement with customers and clients was the second most common reason (27%) for buying offsets. Demonstrating climate leadership within their industry and pursuing a mission to combat climate change were other common reasons, accounting for 15% and 10% of transactions, respectively.

Many buyers focused not only on the climate impact of their offsets, but also on the non-carbon benefits. These so-called co-benefits may be contributing to the local economy, protecting key watershed areas, or preserving biodiversity habitat. Co-benefits are often interrelated and embedded in forest carbon project operations. Many project developers say they could not deliver climate results without also addressing issues such as local economic development, poverty alleviation, and land tenure.

These co-benefits matter to buyers. According to survey respondents, forest carbon offset end buyers for whom co-benefits had “some” or “major” influence over their decision to enter the market purchased 92% of offsets sold in 2016. Once buyers had decided to enter the market, co-benefits were also the primary factor in how they selected which offsets to buy. When asked about buyers’ main concerns when choosing offsets, 42% said that co-benefits was the most important consideration. Those 42% accounted for 72% of the volume of offsets purchased in 2016. Other common considerations were cost, “fit” with the organization’s mission, and project location.

Despite the fact that many buyers claim to value co-benefits, there is mixed evidence as to how that stated value translates to dollar value. Offsets certified with standards that emphasize co-benefits, or even with separate standards for co-benefits, do not necessarily transact at higher prices than those certified only for their emissions reductions. As mentioned previously, in 2016, offsets certified with both VCS and the co-benefits standard CCB were transacted at a lower average price than those certified with only VCS. The fact remains that the strength of a project’s co-benefits is just one of many factors, like the project and transaction size, project type, and project location, which all contribute to the final price.

Figure 10. Voluntary Forest Carbon Offsets: Primary Co-Benefits that Motivated Buyers by Level of Motivation, 2016



Notes: Based on 36 transactions representing 4.2 MtCO₂e in 2016.

Figure includes voluntary market data only.

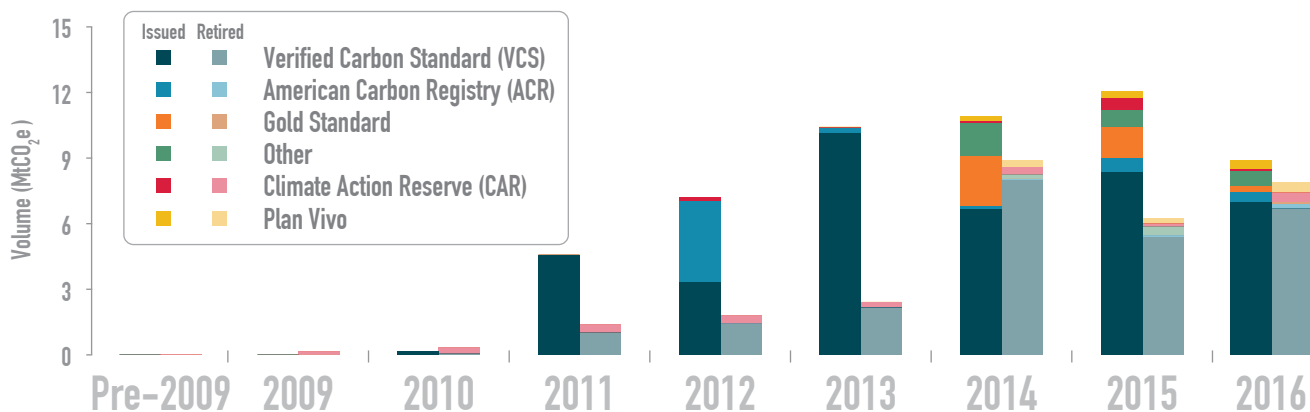
Voluntary Issuances and Retirements in 2016

Up until now, this report has focused on transactional data—the buying and selling of forest carbon offsets or the committing and disbursing of payments for REDD+ programs. But transactional data only captures one stage in the market: when an offset is sold. It does not capture when offsets are issued or when end users have finished using them (retired). As such, it is also important to view transactional data in the broader supply and demand context.

After developing a forest carbon project, either a voluntary or compliance standard will **issue** offsets to a project developer that is equivalent to the project's avoided or sequestered emissions. Each issued offset has a unique serial number, which appears on a registry. Registries track the buying and selling of carbon offsets (which we call “transactions”) and keep track of when an offset is **retired**, or permanently removed from trading. Organizations should not claim emissions reductions from their purchased offsets until those offsets are retired—otherwise, they could conceivably resell that offset to be claimed by another organization.

Offsets can change hands a number of times from issuance to retirement. Sometimes, a project developer sells their offsets directly to an end buyer, who retires the offset. Other times, a project developer may lack resources, staff, or time to find a buyer: they might approach an intermediary organization, either a retailer or broker, to connect them with potential buyers. Retailers may purchase those offsets for sale at a later date to an end buyer, or wait until an end buyer has already been found before buying and reselling those offsets. In contrast, brokers do not take ownership of the offsets, but rather provide a platform (for a fee) for buyers and sellers to connect directly.

Figure 11. Historical Issued and Retired Offset Volumes, pre-2009 to 2016



Notes: This figure tracks land-use project registry data reported from ACR, CAR, Gold Standard/CarbonFix, ISO 14064/65, the Pacific Carbon Standard, Plan Vivo, VCS, and the WCC from pre-2009 to 2016.

Figure includes voluntary market data only.

After a record year of issuances in 2015, the volume of issuances ebbed in 2016 by 26%. This has little impact on the overall supply of forestry and land-use offsets available: out of the 54.2 MtCO₂e issued since 2010, about half (54%) have been retired, meaning many more offsets remain available for sale. The bulk (78%) of issued offsets in 2016 come from offsets certified under the VCS standard, which also matches historical issuance activity. Another 10% of total issued offsets were certified by the American Carbon Registry and Plan Vivo. These volumes represented the third highest year of issuance and the highest year of issuance for each standard body, respectively, in contrast to the lower volumes issued by the Climate Action Reserve and the Gold Standard.

Demand for voluntary forestry and land-use offsets remains strong, as registries tracked the second-largest retirement volumes in 2016 of all time. In direct contrast to 2016 issuances, forestry and land-use offset retirements rose 26% to total 7.9 MtCO₂e. Once again, the majority (85%) of retired offsets had been certified by VCS, followed by Plan Vivo (6%) and CAR (5%).

Payments for REDD+ Programs in 2016

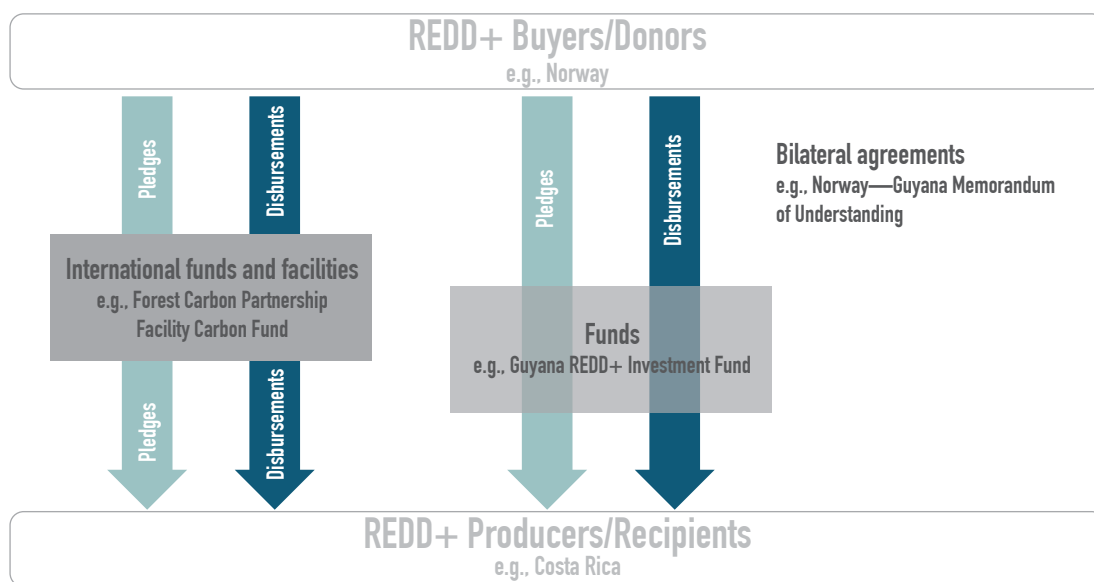
Nearly all governments recognize that forests are critical to achieving our goal to keep man-made climate change below 2 degrees Celsius. Forests even received a special mention in the Paris Agreement, a document that is the result of years of international negotiations. In the Agreement, Article 5 recognized the need to protect standing forests before they are felled—particularly in low-income or middle-income countries, which are home to nearly all the world’s tropical forests at-risk for deforestation. The United Nations’ (UN) mechanism to protect these forests is known as “Reducing Emissions from Deforestation and Forest Degradation” or REDD+.

The concept of paying countries to avoid deforestation was first raised at the COP 11 negotiations in 2005. However, it took until COP 21 in Paris in 2015 for the UN to finalize the REDD+ framework, in which REDD+ payments would be tied to countries’ performance, or achieved emissions reductions from avoided forest degradation or deforestation. In order to be eligible to receive these so-called **results-based payments**, countries must be able to monitor their emissions from forestry, establish baselines of such emissions, consult stakeholders affected by any future REDD+ programs, identify new and current threats to forests, and more.

That’s a lot to do before getting paid for emissions reductions. Recognizing this, many industrialized countries have provided grants to help countries get REDD+ “ready.” This finance, called “REDD+ Readiness,” precedes payments for actual emissions reductions from avoiding deforestation. In this report, we track pledged and disbursed finance for *achieved* emissions reductions through REDD+ programs, but not REDD+ Readiness.⁹¹

Payments for REDD+ programs typically take place in one of two ways (see Figure 12): either the donor contributes to a fund (often managed by a multilateral or donor agency like the World Bank, which then distributes money to recipients), or the donor contributes finance directly to a recipient country through bilateral agreements. So far, most REDD+ buyers or donors have been governments, including Norway, Germany, Australia, the United States, and the UK. A few private or public organizations have also been donors, namely BP Technology Ventures and the non-profit The Nature Conservancy, which have both contributed to the World Bank-managed Forest Carbon Partnership Facility’s Carbon Fund.

Figure 12. Types of REDD+ Program Payments



⁹¹ The 2015 and 2016 *State of the Forest Carbon Finance* reports did report on REDD+ Readiness finance, based on data collected and published by another Forest Trends’ program called REDDX. The most recent data tracks REDD+ Readiness finance through the end of 2014, so we have not reported again on it in this report.

Donors and fund managers will often first announce a pledge to finance forest-based emissions reductions before issuing a detailed agreement and disbursing funds. We track a pledge when finance is designated through a Letter of Intent (LOI), Memorandum of Understanding (MOU), or similar document to pay for a specific result.⁹² Pledged finance becomes “disbursed” after a formal agreement is reached and when money changes hands, either from a donor to a recipient (as in the case of bilateral agreements), a donor to a fund, or a fund to a recipient (as will happen with World Bank contracts for emissions reduction payments). Because many recipient countries are still in the process of becoming REDD+ ready, far more funding has been pledged than disbursed. **As of mid-2017, donors have pledged \$2.9B in funding for REDD+ programs, and have *disbursed* only a fraction of that, \$218M, to pay for achieved emissions reductions.**⁹³

One unique feature of these REDD+ results-based payments is that, unlike in compliance and voluntary offset markets, the “buyer” does not always receive offsets in return for their payment. The government of Norway, for example, has paid for avoided emissions through the REDD+ Early Movers program,⁹⁴ but has so far chosen not to debit any resulting offsets against its own emissions reductions obligation. This may change in the future, as more funds disburse money for achieved emissions reductions by REDD+ programs; unlike Norway, other donors may choose to count their REDD+ offsets purchase against their own emissions reductions.

Box 4. The Amazon Fund: Pioneer of REDD+ Payments

While many REDD+ program-focused funds—including the BioCarbon Fund and the Forest Carbon Partnership Facility—are still helping countries and jurisdictions set up their REDD+ programs, they have not shifted to paying for the results of those programs.

Brazil’s Amazon Fund is one exception: starting in 2008, the Amazon Fund was the earliest instance of results-based payments for avoided deforestation. Brazil created the fund as a means of reducing deforestation in the country 71% by 2017 (based on the average rate of deforestation between 1996–2005).

In a mixture of REDD+ Readiness and REDD+ results-based payments, the fund raises voluntary donations for preventing, monitoring, and combating deforestation—contingent on the annual deforestation rate achieved the year before. This is unlike other funds, which base results payments on emissions reduced by the program (instead of the annual deforestation rate). The Amazon Fund does not produce tradable offsets; instead, donors receive a diploma estimating how many emissions (tCO₂e) their money has avoided.

Norway has contributed the bulk of finance to the Amazon Fund; in 2008, the country pledged up to \$1B for the fund through 2015, and has continued to make additional pledges as Brazil successfully reduced deforestation. In 2016, Norway announced a second pledge for the Amazon Fund in the amount of \$600M. However, 2016 was the first year since the start of the Fund that Brazil’s annual rate of deforestation increased. As a result, Norway has threatened that it will reduce its second-pledge payments based on these lackluster results.⁹⁵

We have removed pledges and disbursements to the Amazon Fund from our overall tables of results-based finance for REDD+ in this report (see Appendix 4). This is because, while donor disbursements to the fund are results-based, payments from the Fund to projects are not results-based. Instead, project investments are non-reimbursable regardless of whether or not the projects meet their targets.

⁹² Sometimes countries or multilateral organizations have announced their intention to pledge money but have not made an official document publicly available. We capture announcements in our table below, but do not count them as pledges until more details have been made available.

⁹³ This is finance tracked since the inception of each of the REDD+ funds. Some funds, like the Forest Carbon Partnership Facility, have been around for a decade, while others began more recently (like the REDD+ Early Movers).

⁹⁴ The REDD+ Early Movers is one of several REDD+ funds. It is the only fund to have disbursed payments for achieved emissions reductions from REDD+ recipient countries to date.

⁹⁵ Carrington, Damian. “Norway issues \$1bn threat to Brazil over rising Amazon destruction.” *The Guardian*, June 22, 2017. Accessed October 30, 2017. <https://www.theguardian.com/environment/2017/jun/22/norway-issues-1bn-threat-brazil-rising-amazon-destruction>.

Recent development include:

The UN's Green Climate Fund (GCF) announced \$500M to pay for REDD+ results. In October 2017, the GCF approved a pilot program that will pay up to \$500M for REDD+ program offsets. The fund has pledged to pay \$5/tCO₂e, with potential bonus payments given to countries whose programs incorporate additional non-carbon benefits. Eligible results are limited to those generated between December 31, 2013 to December 31, 2018, which allows payments to go towards future results as well as rewarding those programs that have already avoided emissions from deforestation and forest degradation.

Who owns the emissions reductions? New questions arise post-Paris Agreement. So far, REDD+ results-based payments have transferred finance to the programs, but the buyers have not claimed the emissions reductions as their own. If that changes in the future, suppliers may balk at giving up their own forest sequestration and deforestation avoidance gains. The government of Indonesia recently raised this issue with the World Bank's Forest Carbon Partnership Facility (FCPF), arguing that they should be allowed to use most of the emissions reductions generated by their REDD+ program against their own emissions reductions goals (instead of selling those emissions reductions to one of the donor countries).⁹⁶

Public funders look to increase private sector participation. The FCPF Carbon Fund meeting in June 2017 discussed ways to increase private sector engagement with the program. Similarly, the BioCarbon Fund's Initiative for Sustainable Forest Landscapes (ISFL) can leverage private sector finance by directly partnering with private sector collaborators through the International Finance Corporation (IFC). For example, in 2016 the Fund partnered with Nespresso and TechnoServe to provide a \$3M grant in support to farmers to increase the uptake of sustainable coffee production in Ethiopia and Kenya; this was then combined with an *additional* \$3M loan from the IFC for investments in Ethiopia and Kenya. Also in 2016, the IFC launched the world's first REDD+-linked bond. The \$152M bond, listed on the London Stock Exchange, invests in the Kasigau Corridor REDD+ project in Kenya. At the end of the bond's five-year term, investors have the option to be repaid in either forest carbon credits, cash, or a combination of both.

The World Bank-managed FCPF is still moving towards contracting REDD+ offsets. Chile, the Democratic Republic of Congo (DRC), and Ghana have been officially selected into the FCPF Carbon Fund's portfolio, meaning that they will be among the first countries to be eligible to receive REDD+ payments for their emission reductions through the Carbon Fund. Meanwhile, Costa Rica, Mexico, and the Republic of Congo have been provisionally accepted, meaning that they must meet a few additional requirements before full acceptance into the Carbon Fund.⁹⁷

REDD+ offsets remain outside of most active compliance markets, but some compliance markets remain interested in including REDD+ in the future. How (and if) REDD+ fits into any potential international carbon market(s) under the Paris Agreement, or into existing compliance markets, remains to be seen. Currently, Colombia's offset-inclusive carbon tax is the only active compliance market to allow for the sale of REDD+ offsets,⁹⁸ though California, South Korea, and the upcoming aviation carbon markets have indicated they may allow such offsets in the future.

Few countries or jurisdictions have reached the disbursement stage for emissions reductions results within national or jurisdictional REDD+ programs, and relatively little new funding was paid in 2016. Governments and multilateral organizations only disbursed \$36.5M for emissions reductions in 2016 through the REDD+ Early Movers (for more information about the Amazon Fund and REDD+ Early Movers, see Table 1, Appendix 4.).

⁹⁶ Nur Masripatin and Henri Bastaman, *Indonesia LOI Context And East Kalimantan Progress Post CF14th Meeting* (Forest Carbon Partnership Facility 2017), https://www.forestcarbonpartnership.org/sites/fcp/files/2017/June/3a.%20Indonesia_LOI-CF16.pdf.

⁹⁷ Forest Carbon Partnership Facility, *Forest Carbon Partnership Facility 2017 Annual Report* (FCPF, 2017), https://www.forestcarbonpartnership.org/sites/fcp/files/2017/Sep/FCPF_Annual2017_web.pdf.

⁹⁸ Ministerio de Hacienda y Crédito Público, *Decreto 926* (República de Colombia Ministerio de Hacienda y Crédito Público, 2017), <http://es.presidencia.gov.co/normativa/normativa/DECRETO%20926%20DEL%2001%20DE%20JUNIO%20DE%202017.pdf>.

For more info about finance pledged and disbursed for REDD+ payments, by fund or bilateral agreement, see Appendix 4.

Box 5. The Relationship Between REDD+ Programs and Projects

Throughout this report, we talk about two categories of REDD+: projects and programs. Like other types of forestry and land-use carbon offset projects, **REDD+ projects** are typically created by for-profit or not-for-profit organizations and carry out activities like agro-forestry and tree-planting on discrete parcels of land. In contrast, **REDD+ programs** are created by governments. They are designed to encourage large-scale land-use planning and often encompass entire jurisdictions or nations.

Finalizing REDD+ programs requires a huge amount of negotiation and coordination between different government groups and other stakeholders. As a result, most REDD+ programs are still under development. In the meantime, many REDD+ projects have already begun operating. As REDD+ programs become active, some plan to integrate, or “nest,” the existing REDD+ projects within their jurisdiction.

Projects and programs face very different challenges and play to different strengths. Because REDD+ projects are smaller than programs, project developers need to have higher accounting standards to address the concept of “leakage.” Basically, project developers need to prove that their activities are reducing deforestation in the project area while also ensuring that the deforestation drivers aren’t simply moving outside the project boundaries leading to increased deforestation elsewhere. REDD+ projects generally have more rigorous carbon accounting than state or national forest carbon inventories, which by nature are larger-scale and less accurate. National or jurisdictional REDD+ programs, in contrast to REDD+ projects, have less concern about leakage due to the sheer size and scope of the programs.

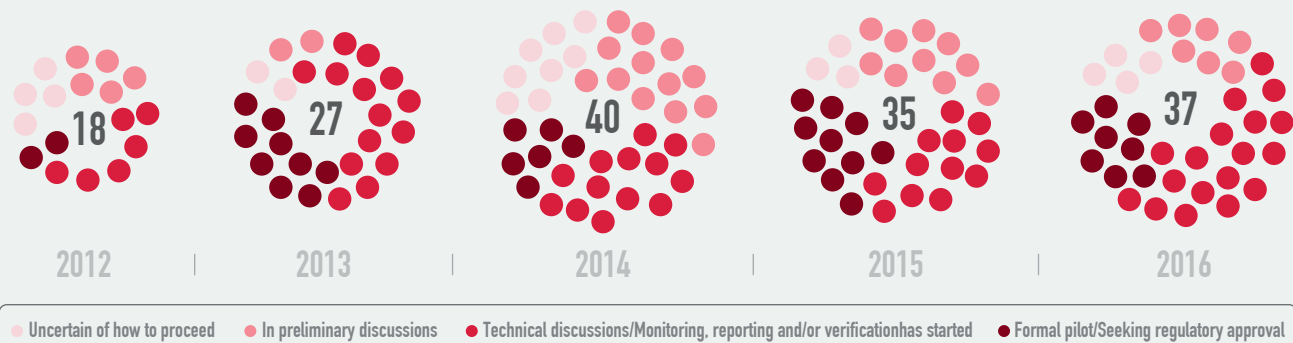
Despite the differences between projects and programs, project developers view integration with their governments’ REDD+ programs as an eventual certainty or risk losing their project altogether due to the issue of double claiming offsets. That is because many REDD+ projects sit within an upcoming national or jurisdictional REDD+ program area. Historically, this has not been a problem: while project developers have successfully developed REDD+ projects around the world, few governments have created operational national or jurisdictional REDD+ programs yet. The only disbursements to pay for achieved emissions reductions, to date, have gone to the governments of Acre, Brazil, and Colombia.

Project developers argue that their real-world experiences have much to offer to nascent REDD+ programs, and many hope to tie their projects into a program through a process called “nesting.” Of the 38 REDD+ project developers who responded to our survey, only one said that they did not consider compatibility with a regional or national REDD+ accounting framework, citing that their project was too small for consideration. An additional four project developers believed that they should work with government officials but were unsure how to engage or proceed. The remaining 33 project developers had already reached out in some capacity, with eight projects already designated as a formal pilot project or seeking regulatory approval to have the project formally nested. See Figure 13 for more information.

One of the biggest hurdles in nesting REDD+ projects within REDD+ programs is eliminating *double claiming* of emissions reductions. Double claiming occurs when two entities (governments, companies, or anyone else involved in offsetting) claim the same emissions reduction. There are many ways to avoid this double claiming—company A could agree to finance the project, but not receive carbon offsets in exchange; the government of country B could require that domestically-produced forest carbon offsets are only sold to domestic buyers; or country B could allow the sale (or partial sale) of voluntary carbon offsets but then subtract those emissions reductions from its national inventories. While this issue applies to REDD+ projects trying to nest within REDD+ programs right now, the issue of double claiming may arise for *all* voluntary forest carbon projects, especially once countries begin implement their Paris Agreement goals.

Box 5 (continued). The Relationship Between REDD+ Programs and Projects

Figure 13. REDD+ Projects Reporting Progress Nesting with Public REDD+ Programs, 2012–2016



Notes: Based on 37 REDD+ projects that reported nesting progress in 2016, 35 in 2015, 40 in 2014, 27 in 2013 and 18 in 2012.

Figure uses voluntary market data only.

In many cases, projects are forging ahead without clear carbon ownership rules in the country—perhaps hoping to pave the way by doing instead of waiting. In many cases, projects have worked to clarify land tenure rights in the absence of governmental policy or implementation. As a result, some project activities may not ultimately align with the official government position (or they may set the standard for it). For many project developers, these are issues they deem too important to wait on guidance—and it’s a risk they willingly took when they first began these projects.



Photo credit: Roshni Lodhia/Carbon Tanzania.

A Hadza Community Scout records activities within the Yaeda Valley REDD+ project area in Tanzania using a GPS device. Unregulated shifting agriculture and pasture-seeking cattle herders are the immediate threats to the Hadza’s ancestral forest home.

Overview of Forest Carbon Projects in 2016

Behind every issued offset is a project that created on-the-ground changes to ensure a more sustainable future for the forest or landscape. While we found over 1,500 forestry and land-use carbon projects⁹⁹ in the world listed on standard body and government market registries, many are in early stages of development or did not answer our survey. We had 150 projects respond and provide at least some data regarding their project finances and co-benefits. These projects covered 12 million hectares of forest, and often employed a mix of financing strategies to keep their project running.

Combating deforestation is a complex issue and the solutions don't limit themselves to one revenue source. In many cases, projects also aim to improve not just vegetation within the project boundaries, but also the livelihoods of people in nearby communities, the animals living in or around the project, the watersheds for nearby wells and more. In subsequent pages, we will look more closely at how those projects manage their finances, and co-benefits and land- and carbon-rights.



Photo Credit: John Fleetwood/The Cochabamba Project

The following photos represent different project sites of ArBolivia's reforestation Cochabamba project in Bolivia:

Top left: One of the vast range of birds on the river Beni near Rurrenabaque, which makes Madidi National Park in Bolivia a honey-pot for tourists.

Top right: ArBolivia's nursery in San Carlos, with Bolivia's Amoro National Park in the background.

Bottom left: Justo Tarapa's three year old tejeyeque trees, in El Carmen, Buena Vista, in Bolivia. Farmers receive practical training on maintenance and are provided with specialist tools to reduce the workload.

Bottom right: The average family participating in the ArBolivia project has six children. It is these children who stand to benefit most when the trees mature.

⁹⁹ Not all projects have issued offsets; many are still in the process of designing a project idea, seeking third-party validation of that idea, or verifying that their activities actually avoided emissions or sequestered carbon.

Forest Carbon Projects: Location

Based on information collected from standards and registries around the world, we know there are many more forestry and land-use offset projects that exist in the world than the 150 projects reported in our survey. We have identified over 1,500 projects that either currently produce forest carbon offsets or plan to in the future.

The comprehensive map below (Figure 14) displays compliance and voluntary forestry and land-use projects including both pipeline and operational projects. Countries with the most carbon projects are home to compliance or government-sponsored voluntary carbon programs. The role that public policies or recognition can play is quite clear; even the country with the highest number of voluntary carbon offset projects has fewer projects than nearly all of the countries home to more formalized government-sponsored carbon markets. Compliance markets and government-sponsored voluntary markets include:

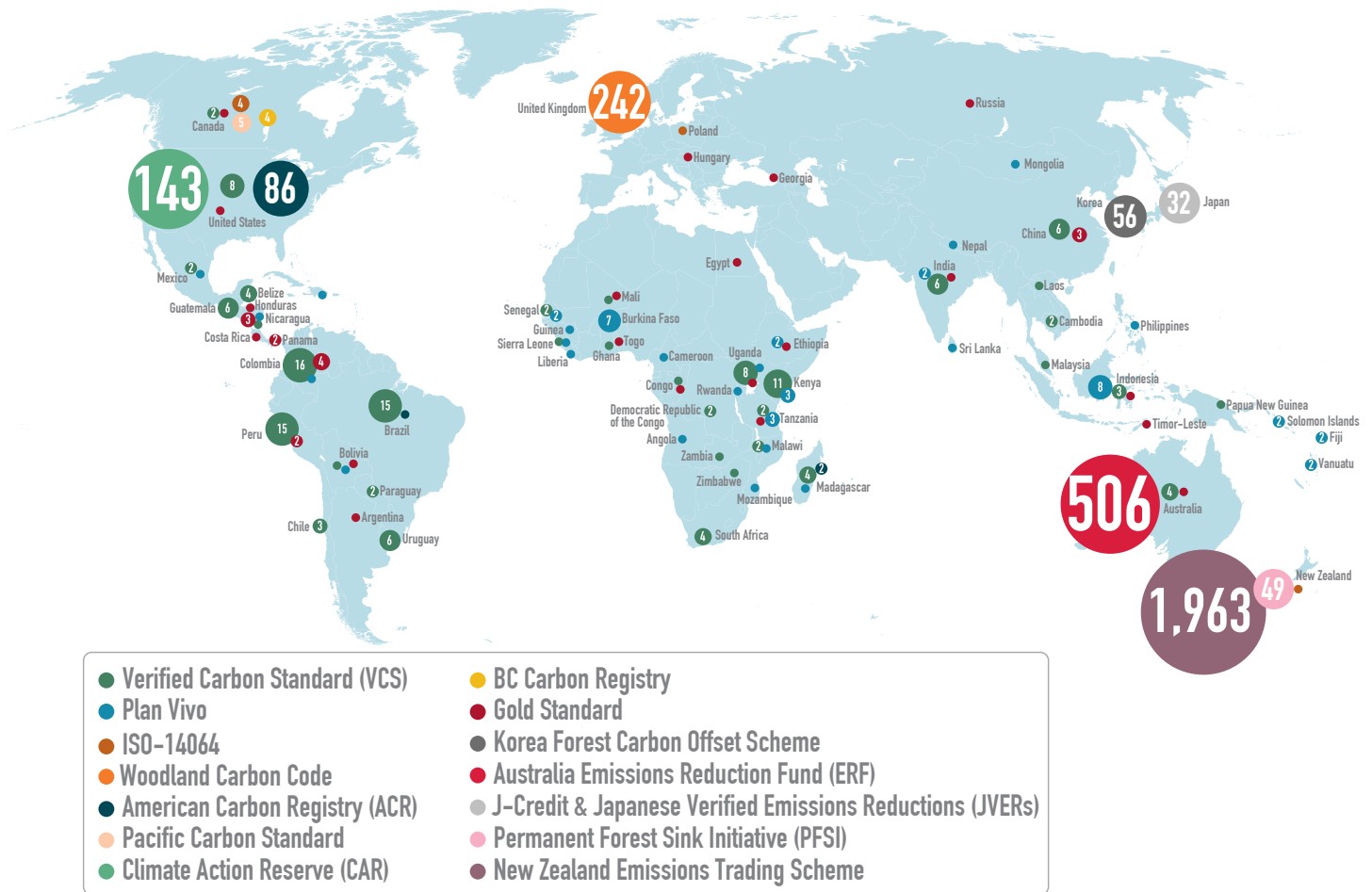
- **511** projects in **Australia**, mostly generated under Australia's Carbon Farming Initiative, trying to sell offsets into the government's Emissions Reduction Fund;
- **242** projects in **the United Kingdom**, mostly created under the government-sponsored Woodland Carbon Code that seeks UK buyers to support local forest carbon sequestration;
- **238** projects in **the United States**, mostly developed to sell to either (or both) the California compliance program or voluntary buyers;
- **56** projects in **South Korea**, mostly developing in response to the country's voluntary Forest Carbon Offset Scheme (most are not yet operational);
- **50** projects in **New Zealand**, mostly created in response to the country's Permanent Forest Sink Initiative;
- **32** projects in **Japan**, mostly created in response to the country's voluntary J-Credit program; and
- **16** projects in **Canada**, mostly created in response to the British Columbia's carbon tax.

In countries without any official compliance or government-sponsored voluntary carbon market, the most forestry and land-use projects appear in countries facing the biggest risk of deforestation—including Colombia¹⁰⁰ (21), Peru (17), Brazil (16), Kenya (14), Indonesia (12) and Uganda (10). **That said, project count is only one indicator of carbon market activity: in many cases, purely voluntary REDD+ projects operate on a much larger scale than the domestic tree-planting or forest management projects typically allowed in compliance or government-sponsored voluntary markets.**

Furthermore, while many tropical countries lack a compliance or government-sponsored voluntary market, they have been hard at work developing government-sponsored REDD+ programs. As these countries transition from receiving REDD+ readiness funding to developing operational REDD+ programs that produce offsets, they could receive greater amounts of finance for their REDD+ programs than currently seen on existing compliance or voluntary markets. Currently, most compliance markets do not accept REDD+ offsets from projects or government-run programs. However, should more sources of compliance demand appear, it seems likely that new projects would increase substantially.

¹⁰⁰ Colombia recently started both a domestic voluntary carbon market (in 2016) and instigated a compliance carbon tax (in 2017), with the ability for regulated organizations to offset some of their emissions. Since both of these developments are quite recent, however, many of the Colombian-based forestry and land-use projects were developed prior to these enabling conditions. Thus we include Colombia in the second grouping of purely voluntary projects this year. Starting in 2018, Colombian organizations wishing to offset via the carbon tax must purchase from domestic projects only.

Figure 14. Number of Projects Currently Operational or under Development by Location and Standard



Notes: Based on 1,505 projects found on the ACR, Australian ERF, CAR, Gold Standard, J-Credit, Korean Forest Agency, Markit, New Zealand government, Ökoregion Kaindorf, Plan Vivo VCS, and WCC websites in 2017. Figure includes voluntary and compliance market data.

Forest Carbon Projects: Finance

This report focuses on payments for actual emissions reductions achieved. But for many projects, this is only one of several funding sources they will rely on over the project's lifetime. Forest carbon offset projects involve significant up-front investment: to design the project, rent or buy property, hire workers, get certified, and more. As a result, many project developers and coordinators cannot rely exclusively on sales from carbon offsets for their revenue.

Of the 69 projects that completed our survey section about their 2016 revenue sources, just over half (36 projects) get 100% of their revenue from the sale of carbon offsets. Another seven projects receive 100% of their revenue from a single non-carbon finance source. These are most likely projects that are still in the development phase, and that have not yet started producing and selling offsets.

The remaining 26 projects do not rely on any one stream of funding, but rather employ a mixture of strategies. Most mixed-finance projects received revenue from two sources; only three projects received finance from three or more funding sources. Finance from carbon-offset sales was *one* of the finance sources for 93% of these projects. Loans or grants provided a finance source for 38% of mixed-finance projects; followed by private investment (35%), non-profit or foundation funding (23%), and eco-tourism or agro-forestry products (19%).

The most notable development in project finance between 2015 and 2016 has been the rise in private investment. In 2015, private investments comprised the smallest share of revenue, whereas in 2016, private investment, was the second-largest finance category after the sale of carbon offsets.

Yet the sale of carbon offsets can present a challenge in itself. According to our 2017 survey, 35 organizations (both voluntary and compliance market participants) did not sell all their available offsets—and told us why. Nearly half (43%) said that they tried but simply could not find a buyer by the end of the year, and 14% were waiting for more favorable offset prices. Not all responses were gloomy, however. Another 20% did not sell all their offsets because they did not have to—they had already received enough revenue that selling additional offsets became unnecessary.

When asked what the ideal offset price would be, most project developers listed a price higher than they received. The median ideal offset price for forestry and land-use offsets was \$10/tCO₂e, almost twice the actual average price (\$5.2/tCO₂e). The median remained the same when looking at the data by project type, for tree-planting and forest management projects. REDD+ project developers were split in what they considered to be an ideal price; project developers of avoided unplanned deforestation projects placed their ideal offset price at \$7/tCO₂e while project developers of avoided planned deforestation projects placed their ideal price at \$15/tCO₂e.¹⁰¹

Where is revenue earned from carbon offsets spent?

Forestry and land-use projects require a lot of upkeep: the land needs to be improved, protected, or maintained; staff need to be compensated; third-party verifiers must be paid; and a host of other costs arise. Outside of the direct costs of running the project, many also invest in training new staff or work closely with communities to target the root causes of deforestation in the area.

¹⁰¹ This last ideal should be viewed with caution, as this response was given in association with only five avoided planned REDD+ projects, compared to the twenty avoided unplanned REDD+ projects that responded with an ideal price.

Box 6. Project Additionality and Upfront Finance

A key component of forest carbon projects is the concept of “**additionality**.” If a project would have happened without carbon finance, then any emissions sequestered or avoided do not qualify as offsets; offsets should only be issued to projects where activities could only happen with additional carbon-specific payments. This begs the question—are the seven projects that do not rely on carbon finance lacking in additionality? The short answer is: probably not.

The bulk (five) of these seven projects receive the entirety of their revenue from private investment, while a single project earns all finance from the sale of agro-forestry products or eco-tourism and another from loans or grants.

In other cases, projects may start off reliant on carbon offset revenue but then grow self-sufficient over time, for example, through the sale of agro-forestry products. For some projects, this weaning off of carbon offset revenue is part of its long-term financial strategy, to eliminate dependencies on external aid in the form of carbon finance. This means that offsets initially verified did rely on additionality, but projects may fail subsequent re-verifications if they are no longer reliant on carbon finance in the future.

In other instances, project developers reliant on upfront financing (be it private investment, grants, or loans) will later use revenue from carbon offsets to repay their upfront funders. This means that carbon finance is essential to the project, but the revenue generated goes to the investor rather than project developer.

The need for upfront project finance can vary by project type: for example, improved forest management projects typically can access revenue within a short timespan because their trees are already in the ground sequestering carbon. These projects can calculate the carbon offsets immediately after switching management practices and can sell limited timber for added revenue. In contrast, tree-planting projects must wait, and wait some more, for trees to grow.

Under some certification schemes, these projects must wait for trees to start sequestering carbon before they can receive offsets to sell (nearly all offsets for project types other than tree-planting require that emissions avoidance or carbon sequestration occur before offsets can be generated). Recognizing the financial challenges of waiting for trees to bear offsets, a few standard bodies have made an exception for tree-planting projects by allowing projects to earn sellable expected GHG emissions reduction units before trees have sequestered carbon, based on the ex-ante (before the actual carbon sequestration takes place) calculations which are based on conservative models to quantify projected carbon sequestration.

In the case of Plan Vivo, certain tree-planting projects generate “ex ante” offsets; the Gold Standard calls these “Planned Emissions Reductions” instead of offsets; and the Woodland Carbon Code calls them “Pending Issuance Units.” Each standard has its own rules about how or when buyers can claim these emissions reductions as their own; in some cases, buyers pay for the offset immediately but cannot claim the emissions reductions until after the sequestration takes place.

Not all projects have the same costs, but the majority spend their carbon offset revenue on some combination of the five expense types we identified in our survey: project developers, landowners, community or local stakeholders, implementation of project activities, and third-parties. Of our 53 responses, only seven projects reported spending 100% of their revenue on a single expense type. The rest spent their revenue on multiple expense types. Here’s how those numbers play out:

- The majority (79%) of projects reported spending at least a portion of their sales revenue on **project developer staff or other project overhead**. This amount varied from less than 25% of total revenue (most common) to 76–99% of all revenue (least common).
- A similarly high percentage of projects (70%) reported spending on **implementing project activities**—things such as materials and equipment and tasks such as planting trees. Some projects spent less than 25% of

total revenue on such activities, while three reported they spent all (100%) revenue on implementing project activities.

- Just over half (55%) of projects directed at least a portion of their revenue back to the **landowner(s)**. Projects reported spending anywhere from 0–100% of revenue on landowners, with 26–50% being the most common. Four projects reported that all revenue went to the landowner.
- Half (51%) of projects spent some carbon offset sales revenue on fees paid to a **third-party**. These fees can include verification costs associated with a project, the cost of issuing offsets (determined by the standard body and the registry operator) or other external costs. Less than a quarter of nearly all projects' revenue went to pay third-party fees. Only one project reported paying 26–50% of all revenue to a third-party.
- The smallest share of projects (26%) spent their offset revenue to pay **local stakeholders or communities** associated with the project. This finance ranged from 0–75% of total revenue. Some projects include direct payments to local communities into their project's financial model. Oftentimes, these payments are to small-scale farmers, who may adopt new agricultural techniques or plant different crops to sequester more carbon and are therefore critical to the success of the project.

Box 7. What are Projects Currently Seeking?

In our survey, we asked project developers what their project currently needs, in terms of monetary or technical support. Project developers could select as many answers as they deemed relevant to each of their projects.

The majority of project developers are looking for potential offset buyers—this was listed as a request for 50 out of 62 projects. But not all respondents care about selling offsets; some (26 projects) focus on receiving donations, of which the majority are run by not-for-profit organizations.

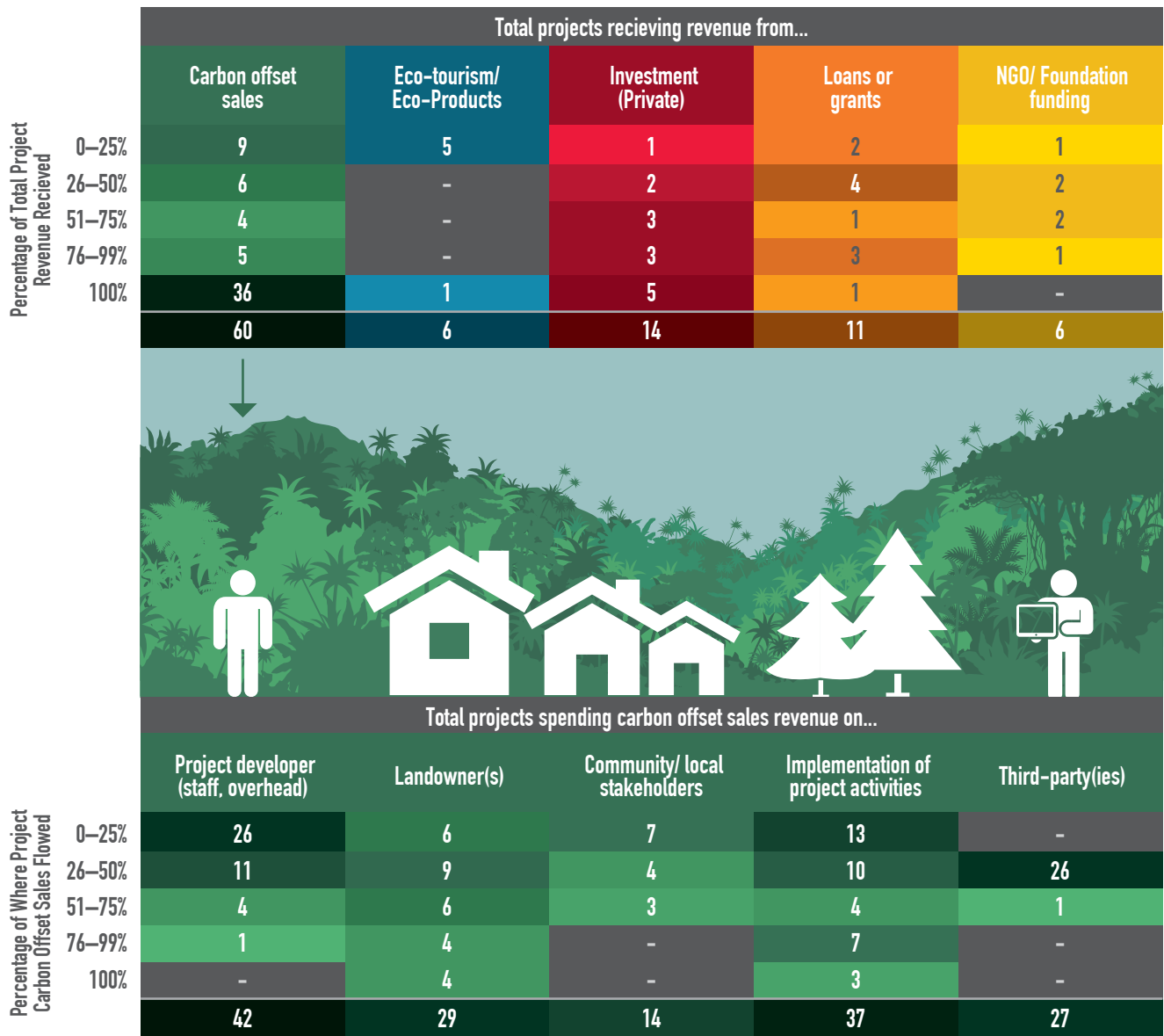
Project developers are also seeking private investors for 26 projects. The majority sought investment for projects (11) they consider to be in the growth stage. Four projects in the angel/seed stage are seeking investment, followed by another four projects in the early stage, and three projects in a mature stage.



Photo Credit: GreenTrees, LLC

Steve Burgess, lead forester of GreenTrees, hands over another check to one of the program's 500 landowners. GreenTrees, focusing on true ecosystem scale, aims to reforest one million acres in the Mississippi Alluvial Valley in the United States.

Figure 15. Sources of Project Revenue and Where Revenue from Carbon Offset Sales Flows, 2016



Notes: Based on 69 forest carbon projects that reported sources of project revenue, and 53 forest carbon projects that reported where revenue from carbon offsets sales went to in 2016.

Figure includes voluntary and compliance market data.

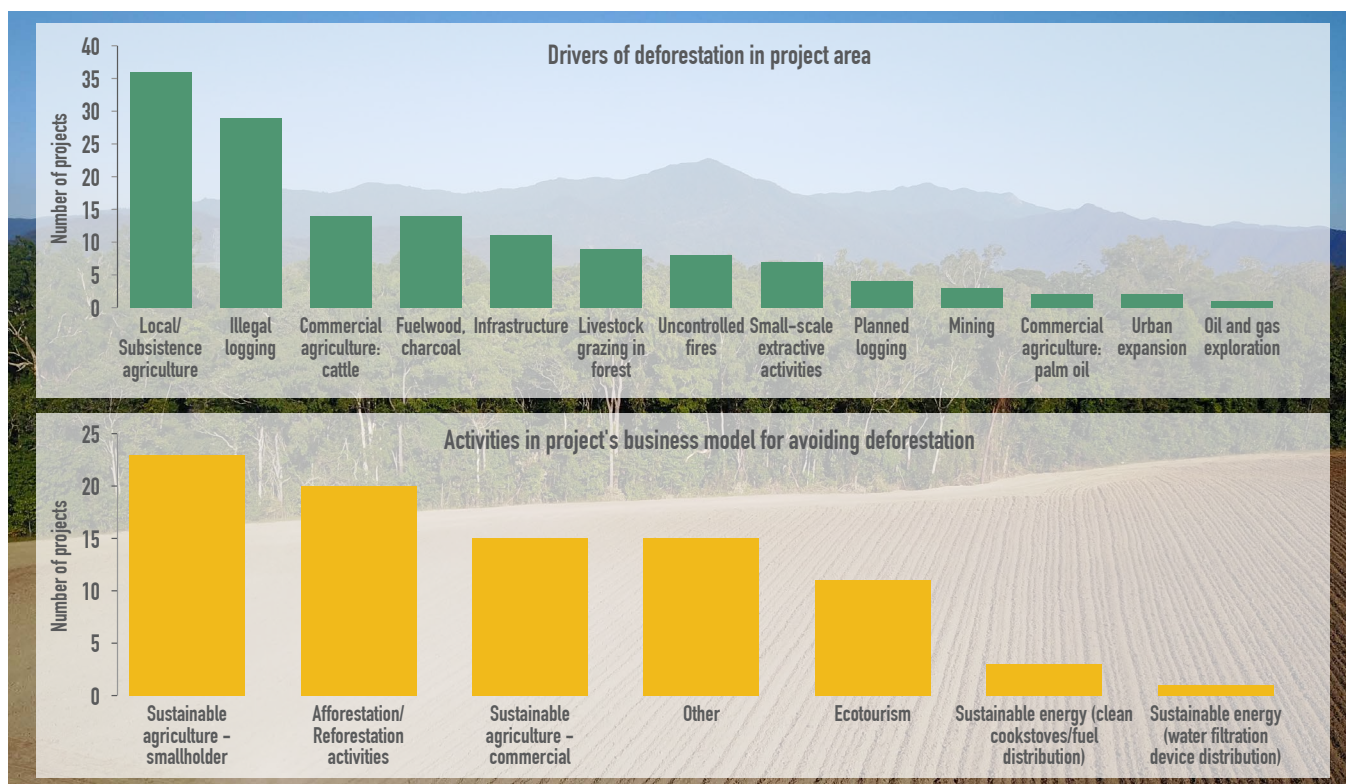
Box 8. REDD+ Drivers of Deforestation

The idea behind REDD+ is simple: keep forests standing by providing payments for current and future carbon storage. Yet these payments must compete with many other uses for the land. In many cases, cutting trees and clearing land is much more lucrative than getting paid for carbon.

According to research from the Global Canopy Programme, the main drivers of global deforestation are commercial agriculture, local and subsistence agriculture, mining, infrastructure development, and urban expansion. Forest degradation is an issue as well, and logging, fuelwood charcoal, uncontrolled fires, and livestock grazing in forests, are the main drivers, although each of these threats varies by region.¹⁰² Some of these activities are legal, and easy to identify: for example, if a commercial organization or landowner receives permission to clear-cut forests in order to provide grazing land for cattle. Others, like livestock grazing, subsistence agriculture, illegal logging are much more nebulous.

Among the REDD+ project developers responding to our survey, local or subsistence agriculture and illegal logging are the main threats. Project developers reported facing an average of three different drivers of deforestation in their project areas, yet one project developer reported trying to address as many as nine drivers. They employ a variety of means to combat this deforestation, from engaging local communities in sustainable agriculture practices to trying to bring new revenues and jobs through ecotourism activities. Project developers employed on average two activities, though two projects reported utilizing five activities. The most commonly-proposed solutions involved smallholder sustainable agriculture activities or tree-planting activities.

Figure 16. REDD+ Project Profile—Drivers of Deforestation and Activities Reducing Deforestation



Notes: Based on 37 REDD+ projects that reported addressing drivers of deforestation and 34 REDD+ projects that reported solutions used in addressing deforestation in 2016. Projects could select multiple drivers and activities to reduce deforestation. Figure includes voluntary market data only.

¹⁰² Mario Rautner, Matt Leggett, and Frances Davis, *The Little Book of Big Deforestation Drivers*, (Oxford: Global Canopy Programme, 2013), <https://globalcanopy.org/publications/little-book-of-big-deforestation-drivers-24-catalysts-to-reduce-tropical-deforestation>.

Forest Carbon Projects: Co-Benefits

The Sustainable Development Goals (SDGs) are a set of 17 broad, ambitious goals for human development. The United Nations' 193 member states negotiated and agreed to the goals just before the Paris Agreement in 2015. They include everything from "gender equality" to "life below water" to "peace, justice, and strong institutions." Carbon offsets are one way to achieve goal number 13: "climate action." But forest carbon projects also help achieve many other SDGs, like "life on land" (#15), "clean water and sanitation" (#6), and "sustainable cities and communities" (#11). As the world recognizes how interrelated development goals are, forest carbon projects and their so-called co-benefits may have an even greater role to play.

Co-benefits are the beyond-carbon impacts of reducing carbon. Particularly with forest carbon projects, co-benefits are integral to the project and often one of the main reasons why suppliers and many buyers are engaged in voluntary carbon markets.

Box 9. Measuring Co-Benefits

Measuring a carbon project's climate impact is relatively straightforward—each project produces a certain amount of reduced or avoided emissions per year. Of course, measuring carbon sequestration is complex, but those measurements produce the same results: offsets that represent one metric tonne of carbon dioxide or equivalent reduced. That is not the case for co-benefits. Many are very difficult, costly, and/or time intensive to measure, and a lack of standardized metrics can make it difficult to compare the true impacts of different projects.

Several standards and certification bodies have developed metrics and requirements for co-benefits alongside their methodologies for calculating and measuring carbon. Some, including the Gold Standard and Plan Vivo, measure co-benefits like economic growth and ecosystem restoration in addition to carbon. Others, like the Climate, Community, & Biodiversity Standards and SOCIALCARBON standards measure only co-benefits. While land-use projects can use the CCB standards by themselves, the majority use the CCB Standards in tandem with the VCS carbon standard.

Of the projects in our survey, 61% were certified by a co-benefits standard. Those tended to be the larger projects, and those co-benefits-certified projects accounted for 78% of the volume of offsets transacted. Of those, projects certified by both the Verified Carbon Standard and CCB were the most common (57% of transactions), followed by Plan Vivo (18%) and Gold Standard (12%). Other standards were SOCIALCARBON, a co-benefits add-on standard originating in Brazil that typically is paired with VCS,¹⁰³ and the Fairtrade Climate Standard, which uses the Gold Standard as its core standard but adds additional requirements around small-scale rural communities in low-income countries.¹⁰⁴

These standards are always updating and evolving. While many standards have been measuring and reporting co-benefits as add-ons to carbon offsets for years, some are trying to create universal metrics to measure those benefits across projects (similar to carbon offsets). More recently, though, some organizations have adapted the carbon model of quantifying units to try and sell co-benefits in a similar way.

For example, the Gold Standard now has four different certifications that quantify sustainable development benefits with their **Water Benefit Certificates**, **Renewable Energy Product Labels**, **Health Impacts/Averted Disability Adjusted Life Years (ADALYs)**, and **Emissions Reductions for Black Carbon and Short-Lived**

¹⁰³ "Why SOCIALCARBON?," SOCIALCARBON, accessed October 31, 2017, <http://www.socialcarbon.org/developers/why-socialcarbon/>.

¹⁰⁴ "Fairtrade Carbon Credits," Fairtrade International, accessed October 31, 2017, <https://www.fairtrade.net/products/carbon-credits.html>.

Box 9 (continued). Measuring Co-Benefits

Climate Pollutants.¹⁰⁵ Both the ADALYs and Black Carbon certifications can be earned in addition to carbon offsets—potentially creating a new revenue stream for qualified projects to access. The Gold Standard is also developing a **Gender Impacts Certification** for use with carbon projects.

Other organizations have also begun quantifying co-benefits. The African Development Bank is developing the **Adaptation Benefit Mechanism** and the Higher Ground Foundation is developing **Vulnerability Reduction Credits**, both of which plan to promote results-based financing for climate change adaptation.^{106, 107} The non-profit Women Organizing for Change in Agriculture and Natural Resource Management recently partnered with VCS to introduce a new version of the **W+ standard for women's empowerment**, which can be used to issue W+ units. Through a partnership with VCS, W+ certification of a VCS project will result in a W+-labeled carbon offset.¹⁰⁸

Some standard bodies have looked beyond creating new methodologies into overhauling their standard requirements (applicable to all methodologies and projects that follow them).

In mid-2017, the Gold Standard released its new overhauled standard, the **Gold Standard for the Global Goals**. This new standard integrates and allows for the monitoring of SDGs, and quantifies and certifies co-benefits beyond carbon. Because climate benefits are inextricably linked with other development goals, each project must make a positive contribution to at least three of the 17 SDGs, one of which must be a climate impact. The standard also features strengthened safeguards, including gender-sensitive project design, and requirements to manage trade-offs as and when they exist. Furthermore, although projects must make a measurable climate impact, projects will no longer be required to produce carbon offsets.¹⁰⁹

Meanwhile, VCS also announced its plans to develop a new standard, with an as-yet undetermined launch date. The **Sustainable Development Verified Impact Standard (SD VISTa)** will be a standalone standard distinct from VCS' existing standards (the Verified Carbon Standard, which certifies carbon offsets and the Climate, Community, & Biodiversity Standards, which certify net positive impacts of land-use based projects). SD VISTa-certified projects must meet requirements in three categories: human needs, natural capital and ecosystem services, and project fundamentals (i.e., how the project is governed). Projects can then define their own sustainable development claims (linked with specific SDGs).¹¹⁰ Projects certified under SD VISTa may produce verified emissions reductions, but it is not a requirement.

In our survey, we asked retailers, brokers, and forest carbon project developers about the co-benefits associated with their projects. We break co-benefits into six categories: climate change adaptation, biodiversity, community benefits, employment and/or training, land tenure, and water. These categories are inherently interrelated. For instance, protecting key watershed areas secures clean water sources and prevents erosion and landslides during heavy rainfall events, all of which benefit communities and are critical for climate change adaptation. But breaking out these categories gives us a clearer picture of how forest carbon projects are benefitting people and natural environments in and around the project area. In the discussion below, we also visually associate the reported co-benefits with related SDGs. The data and figures are based on responses from 148 projects, though the number

¹⁰⁵ "New certification solutions," Gold Standard, accessed October 31, 2017, <https://www.goldstandard.org/our-standard/new-certification-solutions>.

¹⁰⁶ Gareth Philips, "Concept Note: Adaptation Benefit Mechanism," African Development Bank Group, accessed October 31, 2017, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/ABM_Concept_Note.pdf.

¹⁰⁷ "Vulnerability Reduction Credits," The Higher Ground Foundation, accessed October 31, 2017, http://www.thehighergroundfoundation.org/vulnerability_reduction_credits.html.

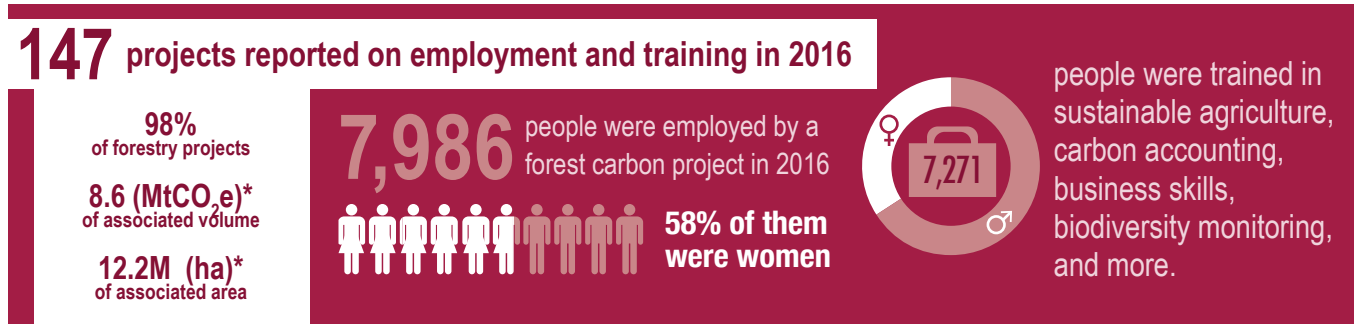
¹⁰⁸ "What is the W+ Standard?," W+ Standard, accessed October 31, 2017, <http://www.wplus.org/about-wplus>.

¹⁰⁹ "Gold Standard for the Global Goals," Gold Standard, accessed October 31, 2017, <https://www.goldstandard.org/our-standard/about-our-standard>.

¹¹⁰ "Sustainable Development Verified Impact Standard," Verified Carbon Standard, accessed October 31, 2017, <http://www.v-c-s.org/wp-content/uploads/2017/09/SD-VISTa-concept-note-24-Aug-2017.pdf>.

of responses for each figure varies based on the content of the question and quality of the responses. Hence, the number of respondents for each question is noted under the figure.

Almost all forest carbon projects (99%) reported at least one type of co-benefit in 2016.¹¹¹ The most common were employment and/or training (98%), followed by community benefits (50%) and biodiversity (47%). Water (30%), climate change adaptation (27%), and land tenure (16%) were less common. Many projects reported many kinds of co-benefits; 60% reported at least two, 33% reported at least four, and 8% reported all six.



*This is representative of all tonnes sequestered or avoided by the project. The co-benefit activity(s) may correspond 100% or less with the tonnes and hectares represented by the project.



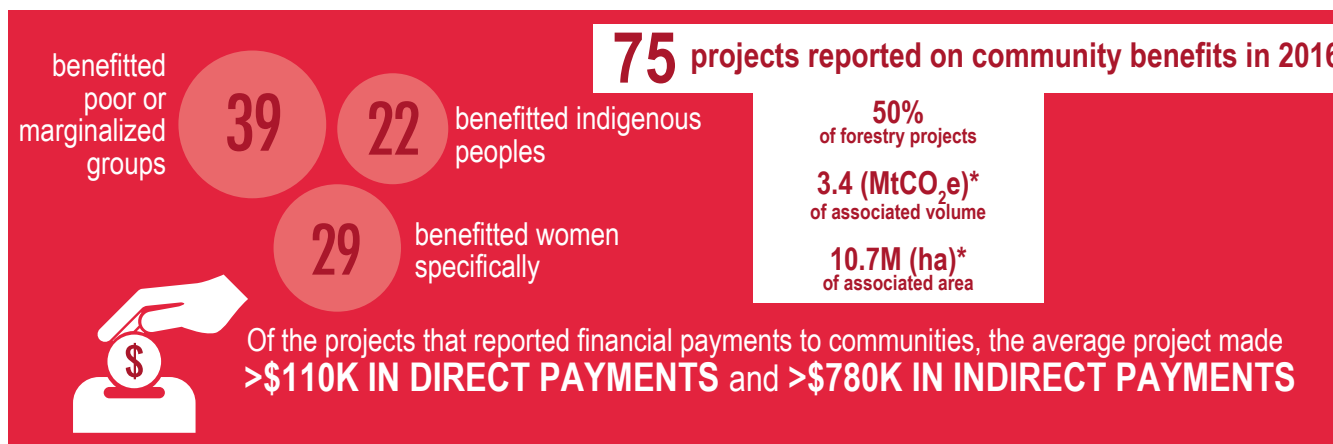
It takes many hands to make a forestry or land-use project run, and oftentimes these projects train and employ local community members to take part in the project. **Employment and/or training** was the most common co-benefit among the projects in our survey; the 98% of projects that reported employing and training co-benefits employed a total of almost 8,000 people. Of these employees, 31% were full time and 69% were seasonal or part time; 58% were female. The same projects reported training over 7,000 people, 76% male and 34% female. Some received training in areas directly related to forest carbon, like sustainable agriculture techniques, carbon accounting, climate change, or tree nursery management. Some received training in related or more general areas, like business skills, legal rights, biodiversity monitoring, or public health.

Employment provides direct income for communities. Oftentimes people living in or near the forest have limited means of earning income, and many look to the forest for things like firewood or timber, or they fell trees to make way for agriculture, small-scale mining, or grazing lands, all of which result in deforestation. When forest carbon projects employ people, people can provide for themselves and their families in a way that contributes to the sustainable use of their natural resources. Training gives people skills and tools they need to make the project effective and efficient, and equips trainees with something they can take into their future lives and careers. Employing and training women is especially important, especially as some research shows that gender equity in natural resource management is not only a matter of justice but also a means to improve conservation outcomes.^{112,113}

¹¹¹ Project developers self-reported on their project's co-benefits. The stringency of measuring co-benefits (and their additionality) can differ by standard body and by project.

¹¹² Agarwal, Bina. "Gender and Forest Conservation: The Impact of Women's Participation in Community Forest Governance." *Ecological Economics* 63, no 11, 2009: 2785–2799.

¹¹³ Westermann, Olaf, Jacqueline Ashby, and Jules Pretty. "Gender and social capital: The importance of gender differences for the maturity and effectiveness of natural resource management groups." *World Development* 33, no. 11, 2005: 1783–1799.



How are communities benefitting?

Training and education	18	Direct income	3
Employment	15	Capacity building	3
Food and agriculture	10	Land ownership	3
Health	10	Water	3
Conservation and ecosystem services	3	Enhancing cultural/Recreational land area	3
		Other	15

*This is representative of all tonnes sequestered or avoided by the project. The co-benefit activity(s) may correspond 100% or less with the tonnes and hectares represented by the project.



Community Benefits was the second-most common category of co-benefits offset providers reported. Benefits tended to focus on communities or groups within communities that are traditionally marginalized. Poor and/or marginalized groups were the most common group type that projects reported benefitting, followed by women, indigenous peoples, and others, like youth and smallholder farmers.

Projects reported contributing a wide range of benefits, from direct income through sale of carbon offsets to employment, improved healthcare, business start-up support, conflict mediation, and general quality of life improvements. Training and improved access to education were the most common benefits, followed by food and agriculture-related benefits, through everything from providing supplies, such as tree seeds, to improving agricultural practices to establishing community gardens. Ten projects also reported health benefits from projects such as investing in health clinics or establishing targeted health funds.

Valuing these benefits in terms of dollars and cents can be challenging, but the 17 projects that reported on direct payments to communities contributed a combined \$1.9M in 2016, or an average of \$112K per project. The 16 projects that reported the value of the goods and services communities received, or indirect payments, contributed an estimated \$12.5M combined, or an average of \$783K per project.

70 projects reported on biodiversity in 2016

47%
of forestry projects

2.9 (MtCO₂e)*
of associated volume

3.5M (ha)*
of associated area



44 PROJECTS
PROTECTED
at least one

HIGH CONSERVATION
VALUE AREA

PROTECTED hundreds of species,
including threatened species like:



*This is representative of all tonnes sequestered or avoided by the project. The co-benefit activity(s) may correspond 100% or less with the tonnes and hectares represented by the project.

15 LIFE
ON LAND

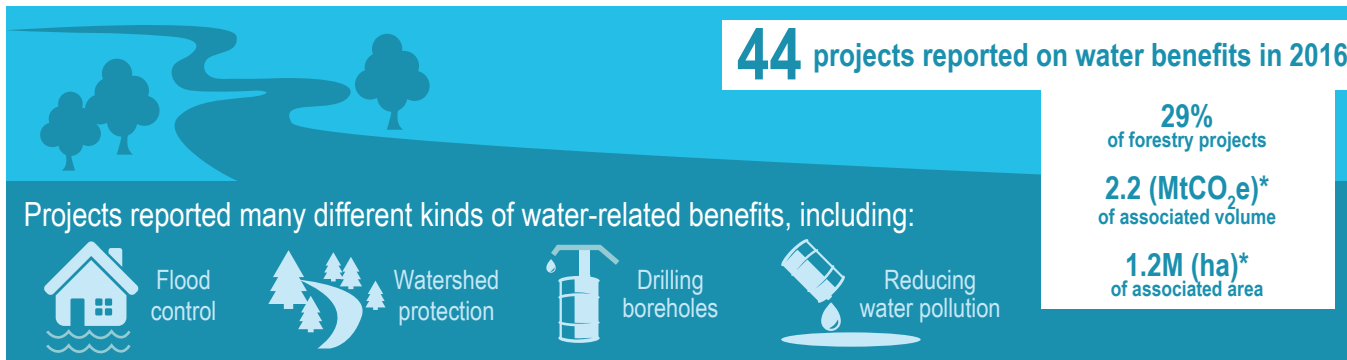


Almost half of all forestry projects (47%) reported **biodiversity benefits**. Of those, 63% protected areas that are designated as having a high conservation value (HCV). HCV is a designation from the Forest Stewardship Council, meaning that the area has high concentrations of rare, threatened, or endangered species, and/or provides valuable ecosystem services like watershed protection. Several protect iconic species, like chimpanzees, jaguars, macaws, tortoises, and other flora and fauna.



Photo credit: Miguel Pedrono

A Blue Helmeted Vanga caught on camera in the Makira Forest managed by the Wildlife Conservation Society (WCS) under the Makira REDD+ project in Madagascar.



*This is representative of all tonnes sequestered or avoided by the project. The co-benefit activity(s) may correspond 100% or less with the tonnes and hectares represented by the project.

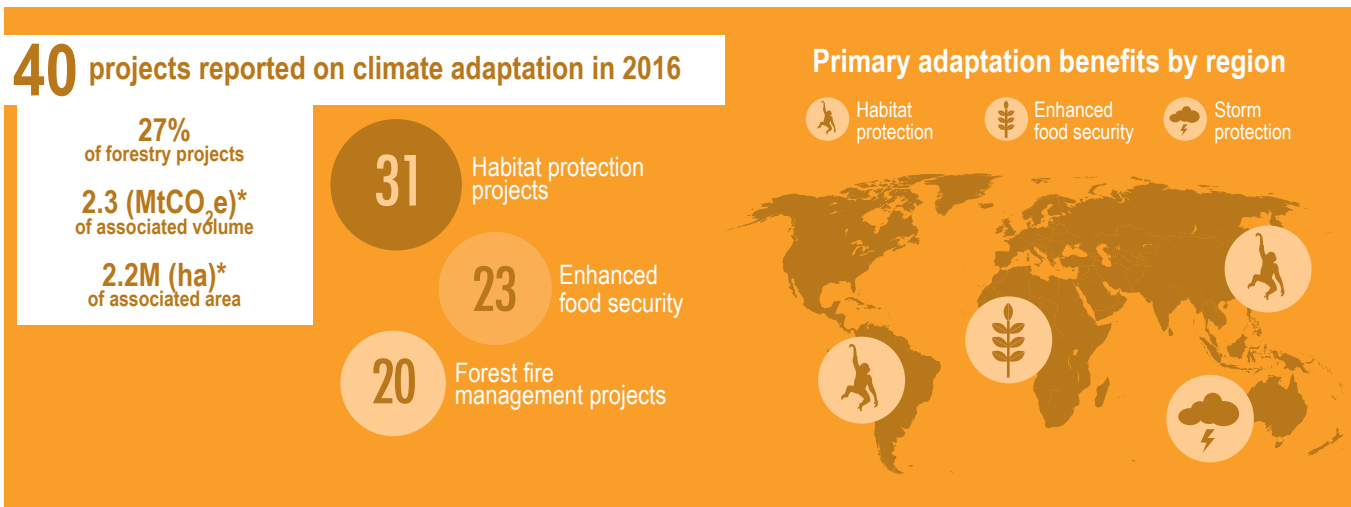
6 CLEAN WATER AND SANITATION

Some projects (29%) reported providing **water-related benefits** by improving water quality, providing access to clean water, and restoring ecosystem services to reduce the risk of water-related natural disasters like flooding and fires. Projects undertook a variety of measures, including protecting key watershed areas, creating or improving buffer zones by planting trees and other plants around waterways and springs, and taking measures to control for forest fires. As a result, communities saw cleaner water in their rivers and streams and were safer from risks of flooding and fires.



Photo Credit: Anne Wanjiru/ Mikoko Pamoja

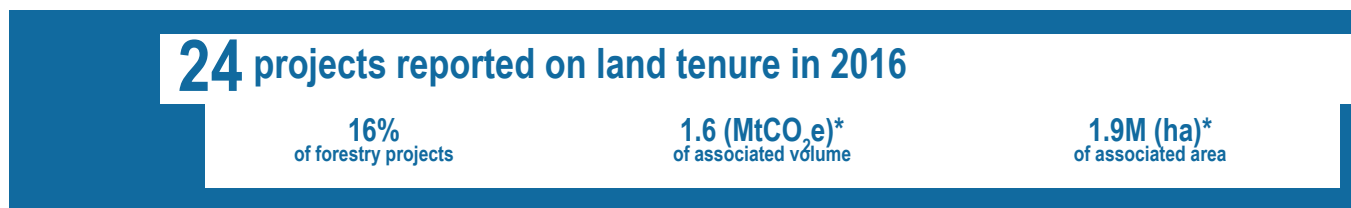
Local people have chosen to invest funds from the sale of carbon credits into the provision of clean water. The mangrove conservation and restoration Mikoko Pamoja project in Kenya now supplies 70% of the local population with water.



*This is representative of all tonnes sequestered or avoided by the project. The co-benefit activity(s) may correspond 100% or less with the tonnes and hectares represented by the project.

11 SUSTAINABLE CITIES AND COMMUNITIES

Forests provide valuable protection from the impacts of climate change. Besides removing carbon dioxide from the atmosphere, they also regulate local temperatures and absorb water slowly during extreme rainfall events, which improves water quality and reduces erosion and the risk of landslides. Many projects (27%) reported **adaptation** benefits. The most common ways were through: protecting habitat areas for species threatened by climate change; providing income to local communities, making them more resilient to economic challenges; enhancing food security; improving forest fire management; improving flood/erosion control; and regulating the climate within a project area. These benefits differed somewhat by region. In Africa, the most common adaptation benefits were enhancing food security and providing earned income to communities. In Asia and Latin America, habitat protection was most common.



*This is representative of all tonnes sequestered or avoided by the project. The co-benefit activity(s) may correspond 100% or less with the tonnes and hectares represented by the project.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

One challenge that communities often face is a lack of clarified **land tenure rights**. Without official, government-recognized ownership, communities risk losing their land, and the investments they have made in it. In 2016, 24 projects (16%) helped to clarify land tenure in the project area.

Notes: Based on 147 forest carbon projects that reported on employment and training co-benefits; 75 projects on community benefits; 70 projects on biodiversity benefits; 44 projects on water benefits; 40 projects on climate adaptation benefits; and 24 projects on land tenure benefits in 2016.

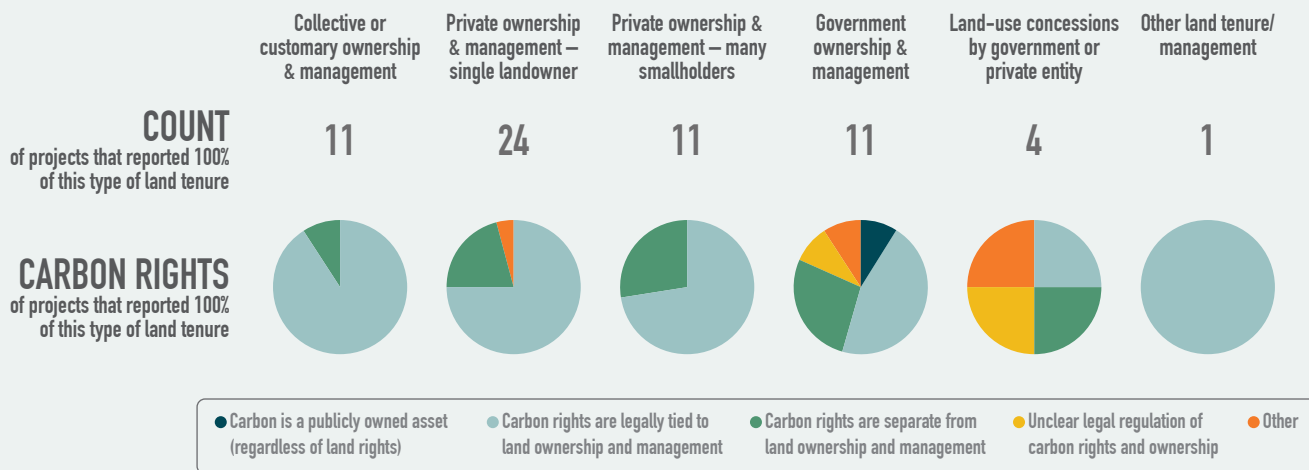
Figures include voluntary and compliance market data.

Box 10: Who Owns the Land and the Carbon?

Forestry and land-use projects operate on landscapes with many different land tenure and carbon rights. Some projects work on private lands, with carbon owned by the landowner; others work on customary land that may not have legally-recognized ownership, with similarly unclear carbon rights.

All but 6 of 93 projects reported working with a single land tenure type. Most projects reported working only with a single private landowner (26), with lands collectively or customarily owned (21), with many private smallholders (20), or with government-owned lands (13). However, government-owned land comprised 48% of all hectares; lands collectively or customarily owned comprised 40%; and privately owned lands (either by a single landowner or many smallholders) comprised only 12%.

Figure 17. Number of Projects Associated with Different Carbon and Land Tenure Rights



Notes: Based on 93 forest carbon projects that reported on land tenure (8 of which have multiple land tenure types within the project area). Based on 62 forest carbon projects that reported on carbon rights associated with projects that had one land tenure type. Based on 10.4M hectares reported with an associated land tenure type in 2016.

Figure includes voluntary and compliance market data.

Land ownership is only one legal concern to project developers; the other is defining who owns the carbon assets. The majority of projects (48) operate in countries or provinces where carbon rights are legally tied to land ownership. However, an additional 16 projects are carried out in areas where carbon rights are separate from land ownership. In these cases, project developers may own carbon in areas where they do not own the land. Finally, two projects work in areas where carbon is publicly-owned; and an additional two enterprising projects have forged ahead to work in areas with unclear carbon rights regulation.

Looking Ahead: Current and Future Trends for Forest Carbon Offsets

Throughout this report, we have analyzed historic market trends on both the voluntary and compliance markets and mapped out current and upcoming markets in our policy section (beginning on page 5). **Yet the Paris Agreement has the most potential to impact future forest carbon finance—and we have included little data on these implications in previous pages of the report simply because decisions have yet to be made.**

So far, no clear answers have been given around a potential global carbon offset market, nor for the role of REDD+ in such a market—though both were mentioned in the final Paris Agreement. A few considerations that could affect forest carbon finance include:

1. The scope of international carbon trade: Right now, it is unclear if there will be a global carbon market, many markets that interact globally, or clusters of multi- or bi-lateral market linkages across groups of countries, industries, or other actors (called “carbon clubs”).
2. The types of offsets recognized in international carbon trade: Before the Paris Agreement, there was the Kyoto Protocol, in which developed countries pledged to reduce their emissions by set dates. Compliant countries could trade offsets approved by the United Nations Framework Convention on Climate Change’s Clean Development Mechanism, and this allowed for trade of a globally-recognized unit. Few forest carbon offsets were allowed in this program, raising the question of: *if* there are global rules about trading offsets, which types of offsets will be allowed?

One key difference that sets the Paris Agreement apart from previous climate change commitments is that *all* kinds of countries have committed to reducing emissions, not just developed countries. Now that governments of all ratifying countries must submit climate change mitigation plans under the Paris Agreement, current supplier countries may not be as keen to give up their forest carbon emissions reductions. **This raises an important question: will supplier countries allow the sale of forest offsets internationally?**

For example, if project developers in Brazil sell voluntary forest carbon offsets, then the offset buyer counts those emissions reductions against their own target. That might mean a company like Microsoft counts the offsets purchased against its own internal targets—and that Brazil would not be able to claim offsets achieved by a voluntary forest carbon project against its national emissions reduction goals. Brazil has given early indications that it will not allow the sale of forest carbon offsets for this reason (though given the uncertainty of Brazilian politics at the moment, that position may change in the future).

Another country that has started to broach this issue is Indonesia. In a June 2017 meeting of the Forest Carbon Partnership Facility, Indonesia brought up the question of who will own any REDD+ offsets produced under its government program. The country proposed that it be able to use “at least 94% of the volume of contracted emissions reductions to be contracted and paid for” to meet its future climate goals promised under the Paris Agreement.

Regardless of whether supplier countries want to keep their emissions reductions to themselves, demand for forest carbon could still exist in domestic carbon markets. Upcoming markets that will likely allow forest carbon offsets include China (which is expected to launch the world’s largest carbon cap-and-trade program in 2017) and Mexico (which is expected to launch its compliance ETS in 2018). **The largest potential source of future demand lies with the aviation industry group.**¹¹⁴ Aviation and maritime sectors were not covered in the Paris Agreement due to the international nature of flying and shipping. In response, the International Civil Aviation Organization

¹¹⁴ While the Chinese compliance market is expected to be the largest compliance market worldwide, the CORSIA market remains the largest upcoming market for forest carbon offset sellers. This is because only Chinese projects can produce offsets to sell in the Chinese market; while details around eligible offsets in CORSIA are still forthcoming, it is likely that projects from around the world can produce offsets for use in CORSIA.

will launch its Carbon Offset Reduction Scheme for International Aviation (CORSIA) in 2021. CORSIA has not yet decided if forest carbon offsets will be allowed within the program.

At the moment, many carbon markets allow only some—if any—forest carbon offsets, and right now, only the Colombian carbon tax accepts REDD+ offsets. This could potentially change in the future: **California, South Korea, and the upcoming aviation market have expressed interest in including REDD+ offsets from national or jurisdictional programs in the future**, while the GCF recently approved up to \$500M available to purchase REDD+ offsets from government programs.

Currently, nearly all payments for public REDD+ programs come from other governments. But agencies with public funds are increasingly looking to engage the private sector—either as a potential buyer of REDD+ offsets or to provide technical assistance with the development of jurisdictional or national programs. Both the World Bank’s FCPF Carbon Fund and BioCarbon Fund’s ISFL have explicitly written about their desire to increase private sector support.

Private sector support will also be necessary to bridge the gap between country commitments and the Paris Agreement’s goal to keep global temperature from rising above 2 degrees Celsius—and ideally, for it to remain below a 1.5 degree Celsius rise. At the moment, country climate change goals are not sufficient to meet *either* Paris Agreement goals. Significant voluntary climate action is needed throughout the world, including the United States (where the White House announced its intention to withdraw from the Paris Agreement in June 2017). While US state, county, and local governments, colleges and universities, and private sector companies signed the “We are still in” declaration, signatories need to make good on their pledges to maintain US goals set by the Paris Agreement.

Finally, in addition to acting to reduce climate change, it is also important to keep in mind the many other benefits forests and landscape provide. **Many carbon offset standards are already developing ways to integrate their co-benefits reporting with the Sustainable Development Goals.** The Gold Standard, for example, has launched a new standard focused on quantifying, certifying, and maximizing impact toward SDGs. VCS has similarly announced an intention to do so, while other organizations have started certifying projects based on their contributions to other goals like gender equality. In this case, voluntary forest carbon markets may once again take the lead in figuring out how to measure progress towards achieving the SDGs—just as the first carbon offset projects years ago rose out of a desire to find new funding to protect forests, well before the first compliance markets ever took shape.

Appendix 1: Glossary

Additionality: The requirement that emissions reductions claimed as offsets must go above and beyond emissions reductions that could have been achieved under a business-as-usual scenario.

Afforestation/Reforestation: Afforestation/reforestation is a project type involving establishment of forests on areas without forest cover, in order to capture additional carbon in new tree biomass and other carbon pools. Emissions reductions occur primarily through additional carbon sequestration.

Agro-forestry: In this project type, land is managed using intermingled agricultural and forestry strategies, sequestering additional carbon in trees and/or soil and reducing carbon emissions compared to business-as-usual agricultural practices. Emissions reductions may occur through additional sequestration and/or avoided emissions.

Brokers: Brokers are intermediaries who do not take ownership of offsets, but facilitate transactions for a fee between project developers and end buyers, 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.

Buyers: Buyers purchase offsets either for their own internal use (called “end buyers”) or for re-sale to another buyer (called “intermediaries”). Intermediaries, such as retailers, purchase offsets with the intention to resell. In contrast, end buyers purchase offsets to count against their emissions and typically retire any purchased offsets to signal that those offsets are no longer available for sale.

Co-benefits: 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.

Compliance markets: 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.

Emissions Trading System (ETS): A market-based regulatory approach to limiting greenhouse gas emissions, whereby overall emissions are limited and individual polluters are allowed to trade pollution permits, and in some cases carbon offsets, to meet their individual emissions reductions. The most common form of an ETS is known as cap-and-trade.

End buyers: 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, rather, they will be retired. This is in contrast to retailers, who purchase offsets with the intention to resell them.

Forestry and land-use carbon: Carbon emissions that are either avoided or stored (or “sequestered”) through forestry and land-use activities.

Improved Forest Management: Existing forest areas are managed to increase carbon storage and/or to reduce carbon losses from harvesting or other silvicultural treatments. Emissions reductions may occur through additional sequestration and/or avoided emissions.

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.

Leakage: In order to become validated, forest carbon projects must prove that their activities are reducing deforestation in the project area while also ensuring that the deforestation drivers don't simply move outside the project boundaries, leading to deforestation elsewhere.

Methodology: A methodology lays out requirements for carbon offset projects for calculating emissions reductions. Project developers can either use pre-existing methodologies or develop new ones. Voluntary offset standards each have a list of approved methodologies that they accept.

Offset: This term refers to 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 or equivalent reduced, avoided or sequestered by an entity to compensate for emitting that tonne elsewhere.

Permanence: Permanence is the principle that carbon offsets must permanently remove the carbon dioxide or equivalent emissions from the atmosphere or oceans. For forest carbon, a reversal of carbon storage can happen from human activity (e.g., logging) or unforeseen natural events (e.g., forest fires, pest outbreaks).

Primary market: The primary market for carbon offsets is defined as the initial transaction of offsets from the project developer to the first buyer in line—this can be an offset retailer or broker (i.e., the "secondary market") or a buyer of offsets for "end use" (i.e., end buyer) in the voluntary or compliance carbon offset markets.

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 emissions reduction certificates, called offsets.

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.

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.

REDD+ Readiness: Activities focused on building the capacity and technical capabilities that are required for national and subnational government to be eligible to receive public REDD+ funding.

Avoided Planned REDD+: Avoided planned REDD+ projects protect forests that have been legally authorized to convert to non-forest land.

Avoided Unplanned REDD+: Avoided unplanned REDD+ projects protect forests from unclear or multiple threats, such as subsistence agriculture, livestock grazing, collection of fuelwood charcoal, illegal logging, and small-scale extractive activities.

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.

Results-based Payments: For the purposes of this report, results-based payments are payments that are tied to achieved emissions reductions.

Retailers: 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.

Secondary market: The secondary market for offsets is comprised of sales among market intermediaries or between market intermediaries and end buyers.

Sequestration: The long-term storage of carbon in the biosphere or subsurface terrestrial features in order to reduce its concentration in the atmosphere.

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.

Supplier: A supplier is any organization that sells carbon offsets, such as a project developer, retailer, or broker.

Transaction: A transaction occurs at the point that offsets are contracted by a buyer, regardless 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.

Voluntary carbon markets: Voluntary carbon 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).

Appendix 2: Methodologies

This report was designed to track global finance newly committed each year to sequester carbon or avoid emissions through forestry and land-use activities. The main emissions-reducing forestry and land-use activities we track are: tree-planting, forest management, Reducing Emissions from Deforestation and Forest Degradation, and agroforestry. The report scope also includes activities such as grasslands management, low-carbon farming, and wetlands restoration. Our overall numbers include results-based payments for emissions reductions both through carbon offset transactions on carbon markets (both voluntary and compliance) and through bilateral or multilateral agreements to pay for REDD+ programs. We acknowledge a “commitment” at the point that a contract is signed, committing the counterparties to both payments and results. The relevant unit of exchange is one tonne of carbon dioxide equivalent (tCO₂e).

Our carbon markets data is collected through an annual survey of offset project developers, retailers and brokers, as well as carbon offset standard bodies and accounting registries that track and facilitate offset ownership. The bulk of the data was collected via an online survey between February 14 and April 28, 2017, though we re-opened the survey between June 15 and August 15, 2017 to collect additional data on the details of forest carbon projects. The survey was distributed to a list of approximately 1,100 organizations that Ecosystem Marketplace identified as potentially active in voluntary or compliance carbon markets. Of these, 120 organizations said they were active in developing and/or marketing forest carbon offsets, of which 97 actually completed offset transactions in 2016. All told, we tracked 259 unique transactions of forest carbon offsets and collected detailed data on land tenure, project-level finance, co-benefits, and more from 145 projects. A breakdown of our 2016 response rate by organization headquarters, project region, market type, and market role appears below.

Headquarters Location	Number of Organizations
Africa	10
Asia	8
Europe	35
Latin American and the Caribbean	16
North America	39
Oceania	12
Total	120

Number of Organizations Responding by Market Type			
Voluntary	Compliance	Active in both markets	Project developers without transactions in 2016
86	4	7	23

Number of Organizations Responding by Supplier Type		
Project Developer or Investor	Retailer, Broker, or Other	Act in Multiple Roles
63	24	33

A few things to keep in mind about our survey data:

- We attempt to contact (sometimes through multiple emails and phone calls) all organizations that are active in forest carbon markets, but survey-based research is inherently based on response rate.
- To avoid any double-counting of transaction volumes, we asked respondents to specify the volume of offsets transacted through a broker (who facilitates deals but does not take ownership of the tonnes). When we identified an overlap, the transaction was counted only once.
- We do not track the individual “lives” of offsets as they pass through the value chain. For example, if a project developer sold an offset to a retailer and then the retailer sold the same offset to a final buyer, we count each transaction separately to derive the volume and value of transactions in the overall market. This methodology is consistent with most other marketplace analyses. We do report on primary versus secondary volumes and values where we can.
- Prices and values are collected in all currencies and converted to US dollars using the average exchange rate during the relevant calendar year (in this case, 2016).
- All price data presented in this report is volume-weighted for significance.
- This report presents only aggregated data. All supplier-specific information is treated as confidential. We take this very seriously and reveal more detailed information (such as transaction volume by country or standard) only when we have data from at least three different organizations.
- Because the aim of this report is to account for all payments for emissions reductions, we do not apply any quality criteria screens for offsets included in calculations. However, we do follow up with some respondents to confirm or clarify survey responses that were incomplete or raised a red flag.

Beyond our survey, we collected additional information on compliance markets through public data sources and interviews. In particular, we used public data from the California Air Resources Board and Australia’s Clean Energy Regulator, the UN’s Clean Development Mechanism, and the New Zealand Emissions Trading Scheme for more insight into compliance market activities.

Information on payments for REDD+ programs was collected through public documents and interviews. These payments usually come about in a few phases:

- First, an announcement may be made—such as Germany, Norway, and the United Kingdom’s announcement that they will fund up to \$5B in REDD+ emissions reductions through 2020. Announcements represent potential money on the table, but they may not yet designate a recipient.
- Next, the parties to the agreement may sign a Letter of Intent, Memorandum of Understanding, or similar document that turns the announcement into a pledge. For the most part, this report considers results-based finance to be payments for verified emissions reductions. However, some results-based pledges also include money for activities other than emissions reductions (such as specific capacity-building outcomes)—and in some cases it is not possible to parse the two.
- A pledge becomes a commitment when a contract to pay for results is signed. Actual delivery of those results may occur immediately or in the future.
- The final stage of results-based payment is disbursement—when the money actually flows to the recipient party.

Appendix 3: Directory of Forest Carbon Offset Suppliers

Note: These forest carbon offset suppliers responded to Ecosystem Marketplace's survey in 2016 and indicated that they would like to be listed in the report directory. This is not a comprehensive list of all forest carbon offset suppliers.

Table Key: ● Project developer ● Retailer ● Broker ● Investor ● Other

Africa

Organization	Website	Organization Headquarters	Market Role(s) Played in 2016
BioCarbon Partners	www.biocarbonpartners.com	Zambia	●
Carbon Tanzania	www.carbontanzania.com	Tanzania - United Republic of	●
Credible Carbon	www.crediblecarbon.co.za/	South Africa	● ●
Environmental Conservation Trust of Uganda (ECOTRUST)	www.ecotrust.or.ug	Uganda	●
Form Ghana	www.formghana.com	Ghana	●
GCX Africa	www.gcx.co.za	South Africa	● ●
Green Resources	www.greenresources.no	Tanzania - United Republic of	●
Gola Rainforest Conservation LG	www.golarainforest.org	Sierra Leone	●
HIBB & CO, TOGO	www.hibbcotogo.com	Togo	● ●
Vi Agroforestry Programme	www.viagroforestry.org	Kenya	●

Asia

Organization	Website	Organization Headquarters	Market Role(s) Played in 2016
BioCarbon Group	www.biocarbongroup.com	Singapore	●
Carbon Consulting Company	www.carbonconsultingcompany.com	Sri Lanka	●
Fair Climate Network	www.fairclimate.com	India	●
Forest Carbon	www.forestcarbon.com	Indonesia	●
InfiniteEARTH Ltd	www.infinite-earth.com	Hong Kong	●

KKI WARSI	www.warsi.co.id	Indonesia	●
Swire Pacific Offshore	www.swire.com.sg	Singapore	●

Europe

Organization	Website	Organization Headquarters	Market Role(s) Played in 2016
2050 Consulting	www.2050.se	Sweden	●
ALLCOT Group	www.allcot.com	Switzerland	● ●
Althelia Ecosphere	www.althelia.com	United Kingdom	●
BP Target Neutral	www.bptargetneutral.com/uk	United Kingdom	●
Carbon Clear	www.carbon-clear.com	United Kingdom	●
CarbonSinkGroup S.r.l	www.carbonsink.it	Italy	●
ClimateCare Oxford Limited	www.climatecare.org	United Kingdom	● ●
CO2Solidaire - GERES	www.co2solidaire.org	France	● ●
EcoAct	www.eco-act.com	France	● ●
Face the Future	www.facethefuture.com	Netherlands	● ●
Ferrero Trading Lux SA	www.ferrero.com	Luxembourg	●
First Climate Markets AG	www.firstclimate.com	Germany	● ●
Fondation EcoFormation	www.ecoformation.org	Switzerland	●
Forest Carbon Ltd	www.forestcarbon.co.uk	United Kingdom	● ●
Forest Finest Consulting GmbH	www.co2ol.de	Germany	● ●
FutureCamp Climate GmbH	www.future-camp.de	Germany	● ●
Initiative Développement	www.id-ong.org	France	●
Lavola 1981, SA	www.lavola.com	Spain	●
Livelihoods Fund	www.livelihoods.eu	France	● ●

Natural Capital Partners	www.naturalcapitalpartners.com	United Kingdom	●
natureOffice GmbH	www.natureoffice.com	Germany	● ●
Nordic Offset Oy	www.nordicoffset.com	Finland	●
Numerco	www.numerco.com	United Kingdom	●
OurOffset Ltd.	www.ouroffset.com	Hungary	●
SILVACONSULT AG	www.silvaconsult.ch	Switzerland	● ●
South Pole Group	www.thesouthpolegroup.com	Switzerland	● ●
The Cochabamba Project Ltd	www.arbolivia.org.uk	United Kingdom	●
UNIQUE forestry and land use	www.unique-forst.de/en	Germany	●
United Purpose (formerly Concern Universal)	www.united-purpose.org/carbon-up	United Kingdom	●
World Land Trust	www.worldlandtrust.org	United Kingdom	●
ZeroMission	www.zeromission.se	Sweden	●

Latin America and the Caribbean

Organization	Website	Organization Headquarters	Market Role(s) Played in 2016
Asociación para la Investigación y el Desarrollo Integral (AIDER)	www.aider.com.pe	Peru	●
Bio Assets Ativos Ambientais Ltda	www.bioassets.com.br/index.php	Brazil	●
Biofílica Investimentos Ambientais	www.biofilica.com.br	Brazil	●
CARBOSUR	www.carbosur.com.uy	Uruguay	● ●
Cooperativa AMBIO SC de RL	www.ambio.org.mx	Mexico	●

Fondo para la Acción Ambiental y la Niñez	www.fondoaccion.org/	Colombia	●
Greenoxx	www.greenoxx.com	Uruguay	●
Grupo Ecológico Sierra Gorda, IAP	www.sierragorda.net	Mexico	●
IDESAM	www.idesam.org.br	Brazil	●
Pica de Hule Natural	www.econegocios.com.gt	Guatemala	●
Plataforma Mexicana de Carbono, MÉXICO2	www.mexico2.com.mx/	Mexico	●
Pronatura México, A.C.	www.neutralizate.com	Mexico	●
Proteak	www.proteak.com	Mexico	●
Sustainable Carbon	www.sustainablecarbon.com/en	Brazil	●
Uyoolche Asociación Civil	www.uyoolche.org.mx/nosotros.php	Mexico	●
WayCarbon	www.waycarbon.com	Brazil	●

North America

Organization	Website	Organization Headquarters	Market Role(s) Played in 2016
Algoma Highlands Conservancy	www.algomahighlandsconservancy.org	Canada	●
Blue Source, LLC	www.bluesource.com	United States	●
California State Parks	www.parks.ca.gov/?page_id=667	United States	●
Carbon Credit Capital	www.carboncreditcapital.com	United States	●
Carbon Offsets To Alleviate Poverty (COTAP)	www.COTAP.org	United States	●
Carbonfund.org Foundation	www.carbonfund.org	United States	●
City of Arcata	www.cityofarcata.org	United States	● ●
Clean Air Action Corp	www.cleanairaction.com	United States	●
Code REDD	www.coderedd.org www.standfortrees.org	United States	●

Community Forests International	www.forestsinternational.org	Canada	●
Conservation International	www.conservation.org	United States	●
Cool Effect	www.cooleffect.org	United States	●
ECOTIERRA	www.ecotierra.co	Canada	●
Ecotrust Forest Management (EFM)	www.ecotrustforests.com/	United States	●
Encourage Capital	www.encouragecapital.com/	United States	●
Finite Carbon	www.finitecarbon.com/	United States	●
Forterra	www.forterra.org/carbon	United States	● ●
GreenTrees	www.green-trees.com	United States	●
Jadora	www.jadora.com	United States	●
L&C Carbon	www.LCCarbon.com	United States	● ●
Mikro-Tek Inc	www.mikro-tek.com/	Canada	● ●
NativeEnergy, Inc.	www.nativeenergy.com	United States	● ●
NatureBank	www.naturebank.com	Canada	●
Nisqually Land Trust	www.nisquallylandtrust.org	United States	●
Renewable Choice Energy	www.renewablechoice.com	United States	●
Taking Root	www.takingroot.org	Canada	●
TerraGlobal	www.terraglobalcapital.com/	United States	● ●
TerraPass/Just Energy	www.terrapass.com	United States	●
The Climate Trust	www.climatetrust.org	United States	● ● ●
The Conservation Fund	www.conservationfund.org	United States	●
The Nature Conservancy	www.nature.org	United States	●
Urban Offsets	www.urbanoffsets.co	United States	● ●
Wildlife Conservation Society	www.wcs.org	United States	●
Wildlife Works Carbon LLC	www.wildlifeworks.com	United States	●

Oceania

Organization	Website	Organization Headquarters	Market Role(s) Played in 2016
Biodiverse Carbon Conservation	www.mycarbonfarming.com.au/projects/biodiverse-carbon-conservation/	Australia	● ●
Carbon Advantage	www.carbon-advantage.com.au	Australia	●
Carbon Forest Services Limited	www.carbonforestsolutions.co.nz	New Zealand	●
Cassinia Environmental	www.cassinia.com/	Australia	●
CBL Markets	www.cblmarkets.com	Australia	●
Cool Planet	www.coolplanet.com.au	Australia	●
Ekos	www.ekos.org.nz	New Zealand	● ●
Enviro-Mark Solutions Limited	www.enviro-mark.com	New Zealand	●
GreenCollar Group	www.greencollar.com.au	Australia	● ●
Greenfleet	www.greenfleet.com.au	Australia	● ●
New Forests	www.newforests.com.au	Australia	●
Sigma Global	www.sigmaglobal.com.au	Australia	● ●
xpand Foundation	www.withoneseed.org.au	Australia	● ●

Appendix 4: Payments for REDD+ Programs

Forest Carbon Partnership Facility Carbon Fund (FCPF): The FCPF has not made any payments to recipient countries for their REDD+ emissions reductions yet. So far, the fund has signed 18 Letters of Intent with recipient countries.

Donor	Pledged	Total Disbursed to Fund	Disbursed in 2016
Australia	\$18.4M	\$18.4M	-
BP Technology Ventures	\$5M	\$5M	-
Canada	\$5M	\$5M	-
European Commission	\$6.7M	\$6.7M	-
France	\$5.1M	\$5.1M	-
Germany	\$178.4M	\$178.4M	\$13.3M
Norway	\$299.9M	\$229.7M	\$58.4M
Switzerland	\$10.8M	\$10.8M	-
The Nature Conservancy	\$5M	\$5M	-
United Kingdom	\$186.6M	\$17.9M	-
United States	\$18.5M	\$18.5M	-
TOTAL	\$739.5M	\$500.6M	\$71.7M

Recipient	Potential Payment	Expected Result	Agreement Date and Link	Finance Flows to Date
Cameroon	Not specified	Up to 11.5 MtCO ₂ e	January 2017, Letter of Intent	Not yet.
Chile	Not specified	Up to 5.2 MtCO ₂ e	August 2014, Letter of Intent	Not yet.
Costa Rica	\$63M	Up to 12 MtCO ₂ e	September 2013, Letter of Intent, extended in February 2017, new Letter of Intent	Not yet.
Cote D'Ivoire	Not specified	Up to 16.5 MtCO ₂ e	November 2015, Letter of Intent	Not yet.
Dominican Republic	Not specified	Up to 7.5 MtCO ₂ e	June 2016, Letter of Intent	Not yet.

Recipient	Potential Payment	Expected Result	Agreement Date and Link	Finance Flows to Date
DRC	Not specified	Up to 10 MtCO ₂ e	June 2014, Letter of Intent	Not yet.
Fiji	Not specified	Up to 3.6 MtCO ₂ e	December 2016, Letter of Intent	Not yet.
Ghana	Not specified	Up to 18.5 MtCO ₂ e	September 2014, Letter of Intent, extended in September 2016, new Letter of Intent	Not yet.
Guatemala	Not specified	Up to 10.5 MtCO ₂ e	April 2017, Letter of Intent	Not yet.
Lao People's Democratic Republic	Not specified	Up to 8.4 MtCO ₂ e	July 2016, Letter of Intent	Not yet.
Madagascar	Not specified	Up to 16.4 MtCO ₂ e	November 2015, Letter of Intent	Not yet.
Mexico	Not specified	Up to 8.7 MtCO ₂ e	November 2014, Letter of Intent	Not yet.
Mozambique	Not specified	Up to 8.7 MtCO ₂ e	November 2015, Letter of Intent	Not yet.
Nepal	Not specified	Up to 14 MtCO ₂ e	June 2015, Letter of Intent, extended in May 2017, new Letter of Intent	Not yet.
Nicaragua	Not specified	Up to 11 MtCO ₂ e	January 2016, Letter of Intent	Not yet.
Peru	Not specified	Up to 6.4 MtCO ₂ e	March 2016, Letter of Intent	Not yet.
Republic of Congo	Not specified	Up to 11.7 MtCO ₂ e	September 2014, Letter of Intent, extended in June 2017, new Letter of Intent	Not yet.
Vietnam	Not specified	Up to 10.3 MtCO ₂ e	December 2014, Letter of Intent	Not yet.

FCPF (Continued)

Overall: In its latest annual report, the FCPF stated that \$686M is available for payments. However, it is unclear how those payments might be split among countries. Right now, only Costa Rica's Letter of Intent specifies a potential payment value of up to \$63M for up to 12 MtCO₂e. The FCPF has not disbursed funding for any emissions reductions to date.

Pledged: up to \$686M

Disbursed: \$0M

Source: <https://www.forestcarbonpartnership.org/redd-countries-1>

BioCarbon Fund (BioCF) Initiative for Sustainable Forest Landscapes (ISFL): The ISFL has two financing streams. BioCarbon Fund Tranche 3 is the part of ISFL that pays for emissions reductions. The other part, the BioCFplus provides grants in support of emissions reduction preparatory activity. For this reason, we only include finance information for Tranche 3 below.

Donor	Pledged	Total Disbursed to Fund	Disbursed in 2016
Norway	\$95.7M	\$95.6M	-
United Kingdom	\$141.4M	\$1.4M	\$0.4M
United States	\$7.0M	\$0.05M	\$0.05M
TOTAL	\$244.0M	\$146.9M	\$0.5M

Recipient	Potential Payment ¹	Expected Result	Agreement Date and Link	Finance Flows to Date
Colombia (Orinoquía region)	Up to \$50M for emissions reductions²	Up to 10 MtCO ₂ e	Letter of Intent to be signed in 2017; Emissions Reduction Purchase Agreement expected to be signed in 2018.	Not yet.
Ethiopia (Oromia region)	Up to \$50M for emissions reductions³	Up to 10 MtCO ₂ e	Letter of Intent signed in 2015; Emissions Reduction Purchase Agreement expected to be signed in 2018.	Not yet.
Zambia (Eastern Province)	Up to \$30M for emissions reductions⁴	Up to 6 MtCO ₂ e	Letter of Intent to be signed in 2017; Emissions Reduction Purchase Agreement expected to be signed in 2018.	Not yet.

Overall: The ISFL has not **paid** for any emissions reductions to date. The fund has, however, **pledged** up to **\$130M** for potential payment in the future.

Pledged: Up to \$130M

Disbursed: \$0M

Source: <http://www.biocarbonfund-isfl.org/sites/biocf/files/documents/2016%20BioCF%20ISFL%20Annual%20Report.pdf>

¹ The ISFL has not yet signed Emission Reduction Purchase Agreements (ERPAs) with any program countries. All potential payments shown below are indicative maximum amounts and are not formally agreed-upon.

² Another \$20M is available in grants to “provide funding for integrated land-use planning across ministries that considers climate change, water, and biodiversity elements; manage critical ecosystems and agricultural land use; pilot sustainable land-use practices and systems; and prepare the technical components of an emissions reduction program.”

³ Another \$18M is available in grants to “address coordination, planning, and enforcement needs within Oromia.”

⁴ Another \$8M is available in grants to “support improved land management, rural energy solutions, conservation agriculture, wildlife conservation, and institutional strengthening” in the area.

REDD Early Movers: REDD Early Movers is an initiative of the German Official Development Assistance. The program is implemented jointly by the German development bank KfW and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). Germany, Norway and the United Kingdom decided to join forces and work together through REM via delegated mandates.

Donor	Pledged	Total Disbursed	Disbursed in 2016
Germany	\$183.0M	\$49.0M	Unknown.*
Norway	\$85.0M	\$13.0M	Unknown.
United Kingdom	\$39.0M	\$2.0M	Unknown.
TOTAL	\$306M	\$63.0M	Unknown.

Recipient	Potential Payment	Expected Result	Agreement Date and Link (if available)	Finance Flows to Date
Acre, Brazil	\$42M	8 MtCO ₂ e	2012	\$36M
Colombia	\$124M	20 MtCO ₂ e	December 2014, Memorandum of Understanding	\$27M
Ecuador	\$90M	10 MtCO ₂ e	December 2014, Memorandum of Understanding	Not yet.
Mato Grosso, Brazil	\$20M	Unknown.	Not available.	Not yet.
Mexico	\$30M	Unknown.	Not available.	Not yet.

* Unlike many other funds, REM data is not publicly available. We do not know how much money has been disbursed in 2016 alone.

Overall: Amazon Fund, all donor pledges and disbursements go directly to the recipient REDD+ countries; thus, these pledges and disbursements are the exact same as those made by REM.

Pledged: \$306M

Disbursed: \$63M

Norway's Bilateral Agreements: These are each bilateral agreements, though Norway's funding for the DRC will flow through the Central African Forest Initiative (CAFI), its funding for Guyana will flow through the Guyana REDD+ Investment Fund (GRIF), and its funding for Liberia and Peru is expected to flow through the World Bank.

Recipient	Potential Payment	Expected Result	Agreement Date and Link (if available)	Finance Flows to Date
DRC	\$200M	All funding is performance-based, but for metrics other than emissions reductions.	April 2016, Letter of Intent	Not yet.
Colombia	\$134M (<i>plus</i> \$50M through REM, not double counted here)	\$134M reserved for payments for emissions reductions	November 2015, Joint Declaration of Intent (with Germany and the United Kingdom)	Not yet (aside from payments to REM, presented above).
Guyana	\$200M	Emissions reductions and other deliverables.	November 2009, Memorandum of Understanding	\$155M has been transferred to the Guyana REDD+ Investment Fund (GRIF). ⁱⁱⁱ
Indonesia	\$800M	Norway has made \$1B available to Indonesia; 20% for REDD+ Readiness activities and 80% to pay for verified emissions reductions.	May 2010, Letter of Intent	Only REDD+ readiness finance disbursed. ^{iv}
Liberia	\$84M	\$84M for emissions reductions.	2014, Letter of Intent	Only REDD+ readiness finance disbursed.
Peru	\$250M ^v	\$250M for emissions reductions.	2014, Letter of Intent	Only REDD+ readiness finance disbursed.

Overall: Norway has pledged and disbursed finance to funds listed above (REM) as well as funds not listed above (CAFI and GRIF). Some finance is also slated to go directly to the recipient country and not through a fund. This is true for some finance pledged to Colombia and for all finance pledged to Indonesia, Liberia, and Peru.

Pledged: \$1827M
Disbursed: \$155M

TABLE SUMMARY

\$2,949M in results-based payments pledged; **of those,**
\$218M has been disbursed **for achieved emissions reductions.**

ⁱ REM pledges are made in terms of currency, not tonnes, and are dependent on exchange rate fluctuations. Specifically, the Colombia agreement is comprised of pledges of up to 10.5M euros (by Germany), 400M Norwegian kroner (by Norway), and 29M £ (by the United Kingdom). The Ecuador agreement is so far comprised of pledges of up to 11M € (by Germany) and 300M Norwegian kroner (by Norway). This report series previously tracked the REM-Acre pledge as US \$40M (the estimated value when it was signed), but as the Euro has depreciated, the 25M € agreement is worth less in US dollars.

ⁱⁱ The total payment to date was acquired directly from KfW.

ⁱⁱⁱ This information was gathered by the report authors through direct communication with the Norwegian Ministry of Climate and Environment in 2017. Our 2015 report listed Norway's total results-based payment to Guyana at \$190M. The number has been downgraded based on updated information from Norway that allowed us to separate REDD+ payments from other results-based money.

^{iv} According to the original agreement, Indonesia would be eligible to receive up to \$200M as "contribution-for-delivery" of initial preparation and transformation activities (Phases 1 and 2 agreed in the Letter of Intent), and up to \$800M as a "contribution-for-verified-emissions reduction" during the third and final phase of the Partnership. Because Indonesia was unable to achieve the significant progress aimed for in the agreement, by August 2016 Norway had released approximately \$80M in total funding earmarked for the first two phases of the agreement. This information was gathered by the report authors through direct communication with the Norwegian Ministry of Climate and Environment in 2017.

^v This information was gathered by the report authors through direct communication with the Norwegian Ministry of Climate and Environment in 2017. The currency of the agreement is in Norwegian kroner. US\$ equivalents may change based on future exchange rates.

Supporter



Good Energies Foundation (<http://www.goodenergies.org>) supports sustainable systems that can prevent poverty and disruption caused by climate change in the Global South. Good Energies Foundation was established in 2007 and founded as an integral part of Good Energies Inc., a private equity company specialised in investing in the renewable energy and energy-efficiency industries. Good Energies Foundation's historical mission is the alleviation of future poverty in the Global South by mitigating climate change. Good Energies Foundation initially leveraged its know-how in solar photo-voltaic to provide access to clean energy, especially in the area of rural electrification. At a later stage, climate-change related solutions were added to the portfolio, including sustainable reforestation models. As temperatures rise, the Foundation believes that innovative solutions are urgently needed to prevent the future displacement and impoverishment of the world's most vulnerable populations.

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Ecosphere+ is a positive impact company protecting forests and natural ecosystems around the world, one of the most immediate and cost-effective ways to combat climate change. The company is on a mission to scale up business solutions to climate action by connecting consumers and businesses to the world's important ecosystems. Ecosphere+ does this through selling forest carbon offsets, which allow companies and consumers to rebalance their carbon footprint, achieve deforestation-free supply chains and contribute to the Sustainable Development Goals. Protecting forests not only reduces carbon, but also causes a chain reaction of other positive impacts, like protecting endangered species, empowering women and bringing training and new jobs in sustainable agriculture and ecotourism to local communities. Ecosphere+ is part of the EUR100 Althelia Climate Fund, the largest portfolio of forest conservation-based projects in the world, established to demonstrate that competitive financial returns can be fully aligned with the preservation of natural capital and social development. For more information, see <https://www.ecosphere.plus/>.



New Forests invests to create sustainable and productive landscapes—for its clients and the communities where it operates. New Forests (www.newforests.com.au) is a sustainable real assets investment manager offering leading-edge strategies in forestry, timber processing, infrastructure, land management, and conservation. Founded in 2005, the company provides institutional investors targeted opportunities in the Asia-Pacific region and the United States and has more than AUD 4 billion and 800,000 hectares of assets under management. The company is headquartered in Sydney, Australia with offices in Singapore and San Francisco. New Forests also manages Forest Carbon Partners (www.forestcarbonpartners.com), an investment fund that finances and develops forest carbon offset projects and is a leading provider of forest carbon offsets to the California compliance market.

Sponsors



GreenTrees, LLC has reforested more than 120,000 acres of land in the US and has planted more than 30 million new trees. The program has generated millions of tons of verified forestry offsets registered on the American Carbon Registry (ACR) in partnership with private landowners. GreenTrees is unique in its profit-sharing model, in how this model feeds scale, and in the resulting steady growth of environmental and economic co-benefits that are intrinsic to forestry. A key differentiator of Green Trees' forestry program is how it empowers landowners as "commodity brokers" and how this ownership stake fuels additional landscape-scale restoration. This model creates a huge flywheel of new forest creation and the associated co-benefits. "Nature's technology" is the tree, and the company is successfully harnessing its power as the most readily deployable and scalable solution to climate change. GreenTrees works directly with corporations, brokers, and resellers to deliver the most dynamic domestic carbon offsets available to the marketplace today. Learn more about how to be a part of the reforestation economy at: <http://green-trees.com>.



BP Target Neutral, a not-for-profit organization, develops carbon neutral products and services for BP's customers and partners. Since 2006 they have offset 2.5 million tonnes of carbon on behalf of customers. That's equivalent to taking around 1.2 million European cars off the road for one year. The organization uses the best practice of reduce, replace and neutralize to drive efficiencies, source lower carbon feedstocks, and then offset any unavoidable emissions. Underpinning their carbon neutral offers, BP Target Neutral uses carbon credits sourced from a portfolio of high quality offset projects around the world. The selection of carbon offset projects is overseen by an independent Project Selection Forum, comprised of environmental NGOs with a distinguished history in improving how corporations and individuals can minimize their impact on the environment. More information is available at www.bptargetneutral.com.



GreenWood Resources (GWR) investment strategies focus on sustainable management of one of earth's most valuable and renewable resources, trees. Founded in 1998, GWR is a global timber asset manager with almost \$2 billion and 250,000 hectares of assets under management in the United States, Latin America, and Europe. GWR provides its clients access to a globally diversified set of targeted opportunities focused on managing trees better for growing markets and diverse set of values. The company is headquartered in Portland, Oregon, with close to 150 professionals globally organized to provide both investment and forest management services where it operates. The company is also the specialized timber investment affiliate of Nuveen, a global asset manager with over \$900 billion under management, providing outcome-based investment solutions for a variety of clients around the world. More information is available at <http://greenwoodresources.com/>.



Baker & McKenzie has been at the forefront of global climate change law for more than fifteen years. The firm's team of more than 60 lawyers across the globe has worked on numerous pioneering deals, including writing the first carbon contracts, setting up the first carbon funds, and advising on the first structured carbon derivative transactions. They continue to advise on the design of international climate law, on leading market transactions, and the implementation of the Paris Agreement. Their practice is driven by climate mitigation, environmental enhancement and the development of low carbon economies, and assisting in climate adaptation. Baker & McKenzie advises on programs, projects and incentive schemes across global, regional and national economies for emissions reductions, clean and renewable energy, bio-energy, biodiversity enhancement, and environmental infrastructure. Its legal expertise helps clients structure, finance, develop, implement, commercialize, monetize or comply with the economy-changing activities that these programs, projects and incentive schemes are designed to deliver. More information is available at www.bakermckenzie.com.



Wildlife Works, a for-profit private company based in Mill Valley, California, implements marketplace initiatives to protect the planet's threatened forests and their endangered wildlife. The company was founded on the premise that if we want wildlife in our world, we have to make it work for local communities who share their environment. Wildlife Works' REDD+ projects in Kenya and The Democratic Republic of the Congo together protect 1.24 million acres of forest that provide safe haven for elephants, bonobos, lions, cheetahs and many more iconic species, while supporting over 500 local jobs and reducing over five million tonnes of carbon dioxide emissions annually. Recognized as a leader in the REDD+ sector, Wildlife Works is the first company in the world to achieve verification of a REDD+ project under the Verified Carbon Standard (VCS) and the Climate Community and Biodiversity Standard (CCB). More information can be found at <http://www.wildlifeworks.com/>.



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