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POLICY BRIEF

The Future of Carbon Offset Markets

Current Trends and Emerging Challenges

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Overview

Corporations, organizations, and even governments are purchasing offsets to reduce their carbon footprint. This policy brief provides an overview of the offset process – who buys them, who produces them, and who certifies them; describes the emerging challenges facing this market; and makes recommendations for the future.

Main Findings

For offsets to address climate change, they must create actual carbon reductions. To do so, offsets should meet the criteria for additionality, permanence, show no leakage, and be verified by a third party. Actually meeting all of these criteria will be very difficult.

While offsets are imperfect, they may be necessary to reach ambitious short-term environmental goals by building temporary bridges to encourage the transition to a decarbonized energy system.

Offsets have the potential to add both environmental and social value. However, companies, institutions, and individuals who turn to offsets should acknowledge their current shortcomings, work to mitigate them by purchasing strictly certified offsets, and ultimately continue seeking ways to further reduce their own emissions rather than relying solely on offsets. The one exception to this rule? Offsets that sustainably remove carbon from the atmosphere and are able to prove that this removal and sequestration is permanent. To achieve this latter goal will require major technical breakthroughs.

1. What are Carbon Offsets?

As more organizations and corporations seek to reduce their carbon footprints, either voluntarily or in response to regulatory mandates, many look to carbon offsets.¹ Offsets are the purchase of carbon reductions from third parties. They focus on either: removing carbon dioxide (CO₂) from the atmosphere (e.g., through planting trees) or preventing carbon dioxide from being emitted into the atmosphere (e.g., enabling renewable energy use where previously fossil fuels would have been used). Offset projects generate credits for each metric ton of CO₂ removed or prevented. The company, government, or individual who purchases the offset can use the associated credit to “offset,” or negate, some of its own carbon dioxide emissions.

How offsets are used

Organizations purchase offsets to lower their net emissions. However, the means of calculating one’s total emissions burden varies widely across organizations.

The first source of variation comes from the types of emissions being offset. For example, some seek to offset just carbon dioxide while others offset all of their greenhouse gas emissions, converting each type of greenhouse gas into a metric ton of CO₂.² The IPCC has produced guidelines about the Global Warming Potential (GWP) of various pollutants to inform conversions.³ There is an emerging new focus from a few leading organizations looking to reduce both greenhouse gases and conventional air pollutants, focusing on offsetting both the immediate health impacts of air pollution and future health and environmental issues associated with climate change.

The second source of variation is the scope of emissions being offset. Emissions sources for a given organization fall into one of three categories⁴:

- **Scope 1:** Directly emitted on-site from sources owned or controlled by the organization (e.g., emissions from activities such as a company’s production processes)
- **Scope 2:** Indirectly emitted (emitted off-site) to generate energy used at locations owned or controlled by the organization (e.g., emissions from heat or electricity generated for use by the company)
- **Scope 3:** Emitted as a result of the organization’s activities, but not necessarily connected to locations owned or controlled by the organization (e.g., employee travel, customer energy consumption as a result of using the company’s products, etc.)

Some organizations only seek to offset the emissions they directly emit (scope 1), while others more ambitiously aim to cover all emissions in their end-to-end supply chain (scopes 1-3).

Motivation for purchasing offsets

Offset purchasers fall into two broad categories: compliance purchasers and voluntary purchasers.

- **Compliance purchasers** buy offsets to meet legally mandated emissions limits. Historically compliance purchasers had to purchase Certified Emission Reduction units (CERs), issued for Clean Development Mechanism (CDM) projects, which were established by the UN Kyoto Protocol.⁵ However, as new jurisdictions have crafted their own offset programs, many, including California, South Africa, and Mexico, have allowed certain voluntary standards to count toward compliance offset requirements.⁶ See the *Sale and Purchase of Offsets* section below.
- **Voluntary purchasers** buy offsets to meet their own emissions goals. A 2017 buyer survey⁷ found voluntary offset purchasers did so for multiple reasons (percentages represent share of purchases by value): 44 percent to demonstrate climate leadership, 34 percent to achieve personal greenhouse gas targets, 13 percent in pursuit of a climate-driven mission, 5 percent to engage customers/clients to offset emissions associated with their purchases, and 4 percent to achieve sustainable supply chain development.

Voluntary offset purchasers typically take one of two approaches to offsets:

- **Avoidance Approach.** Some organizations approach offsets to continue internal practices while still meeting sustainability goals. Purchasing offsets is less expensive than reducing their own emissions. Environmental advocates oppose such offsets, arguing that these organizations are avoiding making needed changes in company practices and technology.⁸
- **Bridge Approach.** Some companies turn to offsets as a short-term bridge to drive down global emissions quickly while they work to invest in reducing the root sources of their own emissions, which will likely be more expensive and involve longer timeframes. Current data suggests that many companies recognize that offsets should be used in combination with other emissions reduction strategies. According to reports from the CDP, a group that works with companies on environmental impact disclosure, approximately 88 percent of companies who buy offsets have also formally adopted emissions reductions targets.⁹ This is a positive sign that many companies recognize that, given the limitations of offsets, they must also be paired with significant emissions reductions.

Some have also suggested purchasing offsets as an investment. At first glance, it may seem wise for companies to voluntarily purchase carbon offsets now while demand and prices are low and hold them as a hedge against future emissions regulation. While this strategy may work in many markets, it would be challenging for offsets given high regulatory uncertainty. For example, international airlines have pledged to offset their emissions above 2020 levels (agreement amended to reference

2019 levels as a result of the COVID-19 pandemic¹⁰) beginning January 2021 as part of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) program.

While some might argue the airlines should have stockpiled offsets since the program's announcement to prepare for their future demand, the UN's International Civil Aviation Organization (ICAO) only recently announced what offset certifications and dates would be permitted.¹¹ Like many other regulators, ICAO wanted to ensure that offsets in the program represent genuine and recent emissions reductions, so it banned many historical offsets (those before 2016) from its standard. The uncertainty about the "shelf life" of offsets due to regulatory unknowns makes any forward-looking hedging very risky. However, if regulation has already been announced and well-defined or a player feels confident of future regulation, using offsets as a hedge may be an option.

Sale and purchase of offsets

Lifecycle

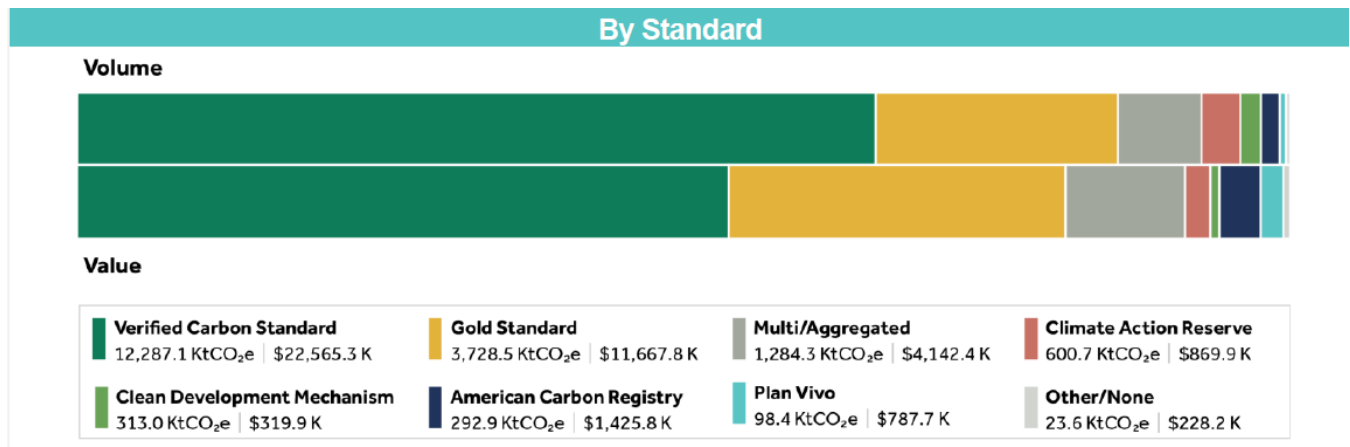
Regardless of whether an entity is creating offsets for itself or buying them from a marketplace, they should ensure the project is reviewed by a third-party certifier. This certifier confirms the project actually removes or prevents emissions and issues the associated number of offset credits. Once certified, the project is registered through one of the approved marketplaces, which can transfer and retire offsets from the market to prevent double counting¹² (see Appendix 2 for an example of a certification process). End buyers can purchase those credits through brokers, who act as intermediaries but do not ever take ownership of the offsets, or through retailers, who take ownership and resell the offsets.¹³ Once the end buyer receives the offset, it is retired; the buyer receives credit for the associated emissions reductions and the offset cannot be resold.

Certification Process

Over the past decade, many different certifiers have entered the offset market, each with slightly different standards and processes. Historically, compliance offsets only included those projects certified by the Clean Development Mechanism (CDM) because it was considered the only reliable certification program. However, many new certifiers now rival the CDM's quality. According to a 2008 World Wildlife Fund (WWF) study of seven independent certifiers¹⁴, six of the seven met or exceeded the quality of CDM projects (see Appendix 1: List of independent VER certification groups for results from the 2008 comparison). While parts of the assessment may be out of date, the primary players in the space remain largely the same today. However, even with rigorous certification criteria, it is still challenging to prove the value of each offset project. See the Potential Challenges of Offsets section for further discussion of obstacles to ensuring offset quality. Figure 1 provides a

breakdown of projects certified by different certifiers for voluntary offset transactions during the first four months of 2018.¹⁵

Figure 1. January-March 2018 Voluntary Offset Transactions by Certification



Offset Pricing

Historically, CDM prices were determined based on the cost of implementing projects that would result in a reduction in emissions.¹⁶ By ensuring that purchasers cover the cost of the offsets they are buying, this model hypothetically ensured the quality of the offset.¹⁷

While the cost-based pricing model remains widely used for setting offset prices, it could be argued that the industry may eventually shift to a value-based or market model, where offset prices are based upon the value of the negative impacts (or social costs) of the carbon emissions that would occur if not offset. Such a value-based methodology would result in rapidly growing prices as the social cost of carbon continues to rise. Figure 2 provides 2015 estimates of the social cost of carbon.¹⁸ Note that these costs rise precipitously as the discount rate decreases.

Figure 2. Social Cost of CO₂, 2010 – 2050 (in 2007 dollars per metric ton of CO₂)

Year	5% Average	3% Average	2.5% Average	High Impact (95 th Pct at 3%)
2010	10	31	50	86
2015	11	36	56	105
2020	12	42	62	123
2025	14	46	68	138
2030	16	50	73	152
2035	18	55	78	168
2040	21	60	84	183
2045	23	64	89	197
2050	26	69	95	212

Columns 2-4 represent average social cost of carbon at 5%, 3%, and 2.5% average discount rates, respectively. Column 5 represents the social cost of carbon assuming lower-probability but higher-impact outcomes from climate change (it corresponds to the 95th percentile of the frequency distribution for the social cost of carbon estimates using a 3% discount rate).

Still, other offset certification groups argue that non-carbon benefits should be considered when pricing offsets. For example, the Gold Standard argues that the industry should begin quantifying the positive impacts of offsets beyond carbon reduction (such as employment, health impacts, and other benefits aligned to the UN Sustainable Development Goals) when calculating the value of offsets.¹⁹ By this logic, each co-benefit would be assigned a dollar value and that increased value would be reflected in the price of the offset.

Offset Retirement

As offset standards and required emissions reduction goals have increased, offset accounting has become more complicated, and there are significant gaps in the current accounting system. Within the voluntary marketplace, certifiers ensure retired offsets cannot be resold by assigning each a serial number and recording it as “retired” on a public registry.²⁰ However, it remains challenging to ensure companies and countries are not double-counting offsets across a wide array of registries and standards. Article 6 of the Paris Agreement requires that any country selling offsets deduct those emissions reductions from their own balance sheets so that the emissions are not double counted toward two separate countries’ reduction goals.²¹ However, the specific accounting system has yet to be approved and may not include offsets produced under voluntary certification programs. Many hoped the parties would agree upon a global carbon accounting standard at COP25, the 2019 annual United Nations Climate Change conference. However, the parties delayed the agreement until COP26²², which is currently scheduled for 2021 after being postponed due to the COVID-19 pandemic. Until Article 6 of the Paris Agreement is finalized there is no formal international carbon accounting standard.

Potential Challenges of Offsets

Offsets can be a helpful way to address climate change, provided they truly result in reduced carbon dioxide in the atmosphere. To ensure actual carbon reductions, offsets should have the following four characteristics²³:

1. **Additionality.** Carbon reduction would not have happened without the offset.
2. **Permanence.** Reduction will continue for the entire certification period of the offset.
3. **Absence of Leakage.** Implementing an offset policy in one place should not simply lead to a relocation of those emissions in another place (e.g., you protect trees in one location, so lumber companies cut them down elsewhere.)
4. **Verification.** The above characteristics should be certified by a third party.

These criteria are critical to ensure that offsets result in true emissions reductions, but can be very challenging to achieve. In particular, ensuring additionality is very difficult as there is no counterfactual to prove the project would not be run without the incentive of selling the offsets. Additionally, permanence has proven challenging, especially for forestry projects, where the long-term protection of a given tree is difficult to guarantee.²⁴ Notably, verification has increased dramatically over the past decade with greater than 99 percent of voluntary offsets transacted in the first quarter of 2018 certified by third-party verification processes as meeting all four of the above criteria.²⁵

However, studies of historical offset programs suggest the carbon impact of purchasing even rigorously verified offsets may not reduce carbon as much as promised. For example, a 2016 review of CDM offsets found that 73 percent of the potential CDM offset supply from 2013-2020 had a low likelihood of being additional.²⁶ To combat this problem, certification groups like the Gold Standard are working to improve their ongoing monitoring and place financial liability on the project owners if true reductions are not achieved.

As governments demand more ambitious reductions in carbon emissions, the interest in purchasing offsets is likely to grow. This phenomenon will increase the price of offsets, increasing the temptation for both purchasers and sellers to reduce overhead costs associated with strict verification by loosening assessment procedures rather than continuing to tighten them to close existing loopholes. Both regulators and companies should resist this temptation and ensure the offsets strictly adhere to additionality, permanence, and leakage criteria and are assessed by third parties with a proven track record of adhering to strict standards. More importantly, entities must recognize the limitations of offsets and use them as a last resort for reducing emissions that cannot easily or cost-effectively be reduced by changing company practices.

2. Current Trends in the Offset Market

Trends in Demand

Demand of both voluntary and compliance offsets has increased over the past decade as companies and countries adopted more ambitious emissions reduction goals.

According to a 2018 analysis of the voluntary offset market, annual voluntary purchases (or retirements) increased from 0.3 million metric tons of carbon dioxide emissions to 42.8 million metric tons from 2008 to 2017.²⁷ This voluntary demand growth has been driven by for-profit corporations, who made up 87 percent of voluntary offset purchases as of 2015.²⁸

In recent years, many corporations have continued to increase their emissions reduction pledges. For example, in 2019 Google pledged carbon-neutral shipping to customers by 2020.²⁹ To achieve this goal, it plans to reduce emissions where possible, then purchase offsets equal to all remaining emissions.³⁰ As organizations and individuals set increasingly ambitious environmental goals, they are likely to purchase offsets to account for the emissions that are too expensive or too technically difficult to eliminate internally.

Despite their growth, as of 2016, voluntary offsets made up less than a quarter of a percent of global carbon emissions.³¹ Overall market demand remains primarily driven by compliance purchases. Sizing compliance demand over time is challenging because each compliance program has its own marketplace and standards. However, trends in total emissions covered under carbon pricing initiatives is a good proxy for compliance offset growth because these schemes mandate emissions reductions, creating the demand for compliance offsets.

These carbon pricing initiatives have increased significantly in the past 5 years and are likely to continue to grow. According to the World Bank Carbon Pricing Dashboard, from 2015-2020 global greenhouse gas emissions covered by a pricing program increased from roughly 12.5 percent of total emissions in 2015 to 16 percent in 2020.³² This is expected to increase to over 22 percent of emissions in 2021, due in large part to the implementation of China's national emissions trading scheme (ETS).

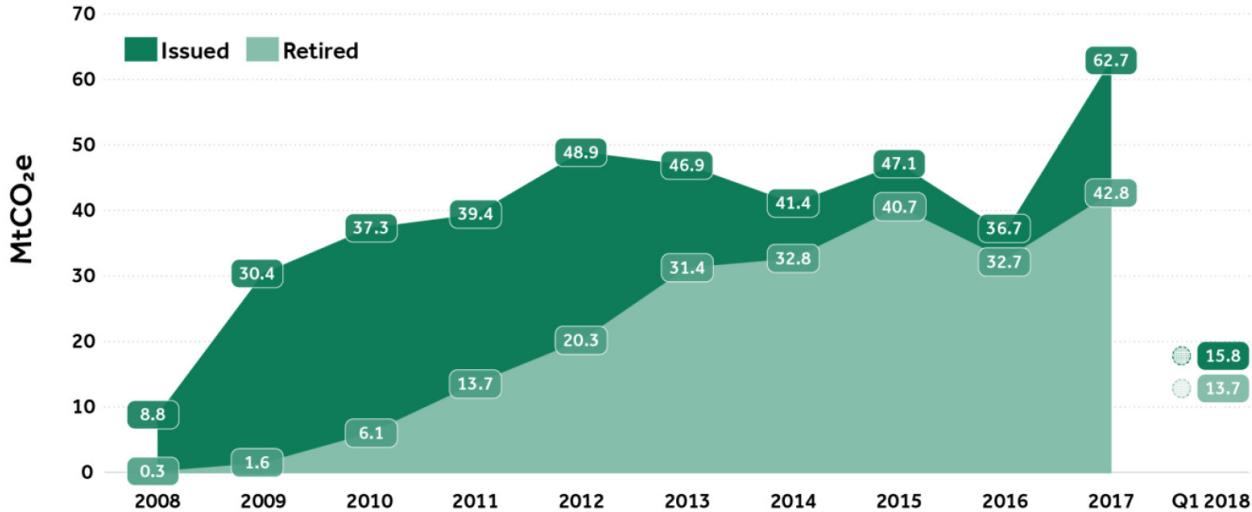
Using emissions pricing initiatives as a representation of carbon offset demand does have some limitations. For example, not all pricing programs allow for the use of carbon offsets (as of the publication of this brief, China's program is still deciding whether to allow offsets.) Additionally, even those programs that allow offsets often limit the percent of the reduction requirements that can be achieved using offsets. For example, California's Cap and Trade Program will only allow offsets to

make up a maximum of 8 percent of each entity’s compliance obligation through 2020. This shrinks to 4 percent from 2021-2025 and 6 percent from 2026 to 2030.³³ Despite the limitations of this proxy, the historic trends are clear. As mandatory carbon pricing programs increase globally, the overall offset market will continue to grow as organizations aggressively seek the least costly way to meet ever more strict emissions goals.

Trends in Supply

Supply of voluntary offsets has also increased steadily over the past decade. From 2008 to 2017, annual offset issuances, or supply, increased from 8.8 million metric tons of carbon dioxide emissions to 62.7 million metric tons. From 2008 to 2017, annual issuances consistently outpaced retirements (or demand), resulting in a growing surplus of offset supply.³⁴

Figure 3. Historical Voluntary Carbon Offset Issuances and Retirements



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

As mentioned in the *Motivation for Purchasing Offsets* section, historically CDMs were the only offsets allowed in compliance markets.³⁵ Despite this limitation, supply in compliance markets has also been robust, with supply of CDMs exceeding demand since 2012. Recently, compliance supply has expanded as certain compliance markets allow non-CDM offsets to enter their marketplace.³⁶

Regulators have significant control over compliance supply because they have the power to determine which offsets count toward compliance requirements. The two main factors regulators can use to adjust supply are the certification standards accepted by the market (e.g., can offsets certified

by non-CDM certification groups such as The Gold Standard be used to meet regulatory requirements) and the dates of issuance allowed in the market (e.g., can offsets issued before a certain date be used to meet current emissions reduction requirements). In other words, as regulators define the rules of their marketplaces, if they allow for older offsets from a wider variety of standards to count toward the required emissions reductions, supply will be larger.

While broadening supply makes sense in many cases where the voluntary standards are comparable to those of CDMs, it is critical for market regulators to ensure that they do not broaden supply so much as to threaten the quality of the offsets they offer. For example, some marketplaces allow the sale of old offsets, particularly legacy CDMs, that represent emissions removed from the air many years ago.³⁷ These increase the supply in the marketplace but threaten additionality, since there is no incremental value. As caps on carbon emissions tighten, companies will aggressively search for low-priced offsets, many of which do not result in additional removal or mitigation. Regulators need to aggressively guard against such outcomes.

3. The Future of the Carbon Offset Market

Future Supply and Demand

Going forward, the scope of the carbon offset market will depend largely upon government regulation. As mentioned above, compliance offsets make up the majority of total offsets purchased, so government decisions to alter compliance rules and requirements will have significant impact on the offset market as a whole. Two potential compliance changes could have particularly significant impact: the adoption of more ambitious goals by the signatories of the Paris Agreement, and the finalization of the international carbon accounting system outlined in Article 6 of the Paris Agreement.

If the Paris Agreement signatory countries adopt more ambitious goals, which countries pledged to do by 2020,³⁸ demand for carbon offsets will likely increase significantly. Countries, corporations, and organizations will seek the lowest-cost way to achieve these new reductions, and for many this will involve purchasing offsets rather than reducing the emissions directly. As a result, the international demand curve will shift outward as more countries look to purchase offsets.

An international accounting system, as outlined in Article 6, will help ensure adequate supply to meet this new demand. As mentioned above, there is already excess supply of offsets due to the oversupply of unused legacy CDM credits. However, to ensure additionality, regulators should consider meeting their Paris goals using only recent offset projects. Finalizing the international

accounting system outlined in Article 6 will help ensure a robust supply of these newer offsets. Such a system would likely increase supply in the short term because it will open up trade between more countries and provide countries who have a low cost of emissions reductions with an incentive to reduce emissions beyond their national goals and sell the excess reductions on the international carbon marketplace.

In the short term, these two changes in combination could result in a larger market of high-quality low-cost offsets provided they are paired with quality standards and strict verification. However, once countries increase their goals to the point that we are nearing net zero emissions, offset supply will decline due to the sheer fact that there will be fewer remaining emissions to reduce. In this world, we will likely need to shift our offsets to be exclusively carbon removing (e.g., forestry or low-cost carbon capture and sequestration) rather than carbon-preventing (e.g., fuel shifting, etc.) or move away from offsets altogether.

Future Innovation

Qualitative changes in the nature of offsets, such as a shift from offsets that prevent emissions to those that remove emissions, could also have significant impact on the future of these markets. One potentially revolutionary change would be the cost-effective development of carbon sequestration technology. Many current offset projects focus on preventing CO₂ emissions rather than actually removing CO₂ from the atmosphere. However, carbon sequestration would allow offsets to prove actual CO₂ removal. In addition to increasing offset supply, this could dramatically improve the verified impact of offsets because it assuages all concerns about additionality – when you remove CO₂, it is easy to prove those emissions would have been in the atmosphere were it not for the offset.

For that reason, Microsoft announced in January 2020 as part of its carbon negativity goal that it would invest \$1 billion over the next four years into carbon sequestration technology.³⁹ While the investment itself does not qualify as an offset, Microsoft believes this technology will be critical to achieve its goal to remove all the CO₂ it has ever produced from the atmosphere by 2050.

Another shift in the nature of offsets could come from broader incorporation of co-benefits beyond carbon reduction. Such co-benefits could help increase demand for offsets beyond purely the environmental community. Therefore, offset projects that have significant co-benefits and push the envelope of knowledge should be encouraged even if they may not meet our four standards outlined in the *Potential Challenges of Offsets* section. While adherence to strict standards is important in ensuring that carbon emissions are either reduced or removed from the atmosphere, there will be cases when greater flexibility is warranted to promote innovation. For example, offset projects in countries where governance capacity is weak and air pollution levels very high could have large spill over benefits benefitting thousands of people in some of the poorest countries in the world. As

the demand for offsets increase, there will be a growing interest in doing projects in the developing world, but these projects will require the development of better methodologies for validating and ensuring that these offsets are real and sustainable.

Pilot projects could significantly improve our knowledge about innovative technologies, new measurement, modeling or monitoring methodologies, which could be transferred to other jurisdictions. Though such pilot projects may be difficult to certify through traditional processes given their novelty, it is important to encourage innovation and creativity as the world addresses the enormous challenges inherent in moving to a lower carbon world by allowing for waivers from historic certification standards in these limited, innovative cases. However, such waivers from strict certification standards must be accompanied by verification requirements, so that the lessons learned are truly transferred and the projects are truly innovative.

4. Conclusion

While offsets are imperfect, they may be necessary to reach ambitious short-term environmental goals by building temporary bridges to encourage the transition to a decarbonized energy system. Offsets have the potential to add both environmental and social value. That said, governments, companies, and individuals who turn to offsets should acknowledge their current shortcomings, work to mitigate them by purchasing strictly certified offsets, and ultimately continue seeking ways to further reduce their own emissions rather than relying solely on offsets.

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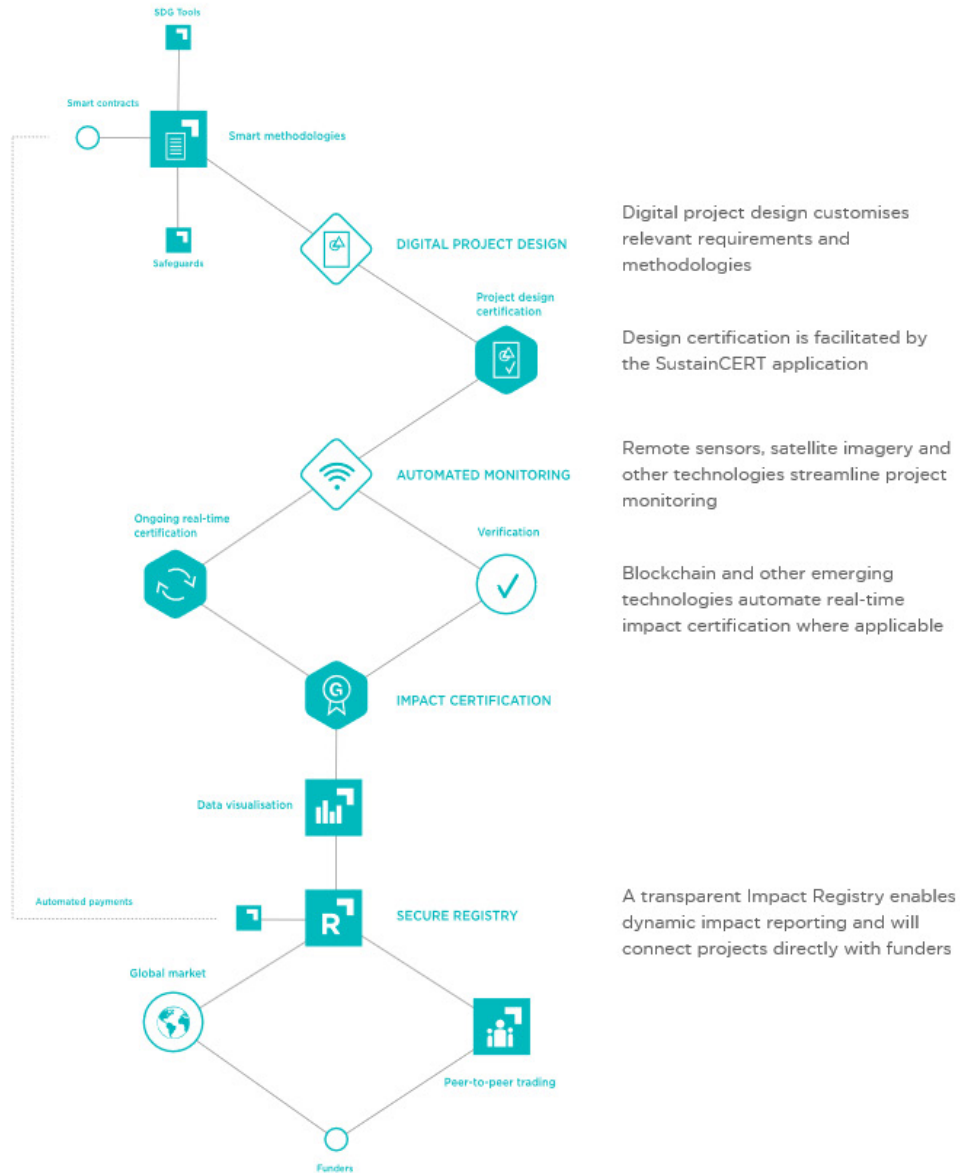
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Appendix 1: List of independent VER certification groups⁴⁰

Main Supporters	Market Share	Additionality Tests (relative to CDM)	Third-party Verification Required	Separation of Verification and Approval Process	Registry	Project Types	Excludes Project Types with high chance of adverse impacts	Co-Benefits (relative to CDM)	Price of Offsets
Clean Development Mechanism									
UNFCCC Parties	large	=	yes	yes	yes	All minus REDD, new HFC, nuclear	no	=	€14–30
Authors' Comments:	The CDM is part of the Kyoto protocol and aims to create economic efficiency while also delivering development co-benefits for poorer nations. It has been successful in generating large numbers of offsets. Whether it also has delivered the promised development co-benefits is questionable.								
Gold Standard									
Environmental NGOs (e.g. WWF)	small but growing	=/+ ¹	yes	yes	Planned	EE, RE only	yes	+	VERs: €10–20 CERs: up to €10 premium
Authors' Comments:	The GS aims to enhance the quality of carbon offsets and increase their co-benefits by improving and expanding on the CDM processes. ¹ For large scale projects the GS requirements are the same as for CDM. Yet unlike CDM, the GS also requires the CDM additionality tool also for small-scale projects.								
Voluntary Carbon Standard 2007 (VCS 2007)									
Carbon Market Actors (e.g. IETA)	new; likely to be large	= ²	yes	no	Planned	All minus new HFC	no	-	€5–15 ³
Authors' Comments:	The VCS aims to be a universal, base-quality standard with reduced administrative burden and costs. ² The VCS plans to develop performance based additionality tests. These tools have not yet been developed and are thus not included in this rating. ³ Prices are for projects implemented under VCS ver. 1.								
VER+									
Carbon Market Actors (e.g. TÜV SÜD)	small but growing	=	yes	no	yes	CDM minus large hydro	yes	-	€5–15
Authors' Comments:	VER+ offers a similar approach to CDM for project developers already familiar with CDM procedures for projects types that fall outside of the scope of CDM.								
Chicago Climate Exchange (CCX)									
CCX Members and Carbon Market Actors	large in the US	-	yes	yes	yes	All	no	-	€1.2–3.1 ⁴
Authors' Comments:	CCX was a pioneer in establishing a US carbon market. Its offset standard is part of its cap-and-trade programme. ⁴ Sales in USD: \$1.8–4.5 per metric tonne (October 07–February 08)								
Voluntary Offset Standard (VOS)									
Financial Industry and Carbon Market Actors	N/A	=	yes	no	Planned	CDM minus large hydro	yes	=	N/A
Authors' Comments:	VOS closely follows CDM requirements and aims to decrease risks for offset buyers in the voluntary market.								
Climate, Community and Biodiversity Standards (CCBS)									
Environmental NGOs (e.g. Nature Conservancy) and large corporations	large for LULUCF	=	yes ⁵	no	N/A	LULUCF	yes	+	€5–10
Authors' Comments:	The CCBS aims to support sustainable development and conserve biodiversity. ⁵ The CCBS is a Project Design Standard only and does not verify quantified emissions reductions.								
Plan Vivo									
Environmental and social NGOs	very small	=	no	no	yes ⁶	LULUCF	yes	+	€2.5–9.5
Authors' Comments:	Plan Vivo aims to provide sustainable rural livelihoods through carbon finance. ⁶ It verifies and sells ex-ante credits only. Third party verification is not required but recommended.								

Appendix 2: The Gold Standard Project Certification Process⁴¹



KEY





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