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The Voluntary Carbon Market: Market Failures and Policy

Law Working Paper N° 688/2023
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For helpful comments we are grateful to Mary Gilmore-Maurer, Eric Nowak, Sebastian Steuer and participants in a Bocconi-Oxford Junior Scholars Network Workshop in Corporate Law and a Goethe University Frankfurt LawFin Research Seminar. Usual disclaimers apply.

Abstract

Companies that have announced climate targets (for instance: becoming “net zero” by 2050) represent a market capitalization of over $20 trillion. Almost all of them will rely on carbon offsets to reach their goal. In this Article we investigate the functioning of the market on which these offsets are created and exchanged, namely the voluntary carbon market, and look into the question of whether, and if so, how it should be subject to regulation. We start out by shedding light on the mechanics of this market and then explain why a well-functioning voluntary carbon market is necessary to fight global warming and can also help developing countries build less carbon-intensive economies. However, we also spotlight the conflicts of interest and imperfect information problems that plague the voluntary carbon market and prevent it from achieving its full potential. Further, we explain why the proposals advanced by some Members of the Congress to regulate this market are misguided. Finally, we offer a simple policy recipe that can contribute to improving the functioning of the voluntary carbon market, thus increasing the likelihood that firms will rely on high-quality offsets to reach their climate goals.

Keywords: climate change, carbon offsets, greenhouse gas emissions, CORSIA, net zero targets, gatekeepers

JEL Classifications: JEL Codes: G18, G28, K32, P18, Q54, Q58

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Companies that have announced climate targets (for instance: becoming "net zero" by 2050) represent a market capitalization of over $20 trillion. Almost all of them will rely on carbon offsets to reach their goal. In this Article we investigate the functioning of the market on which these offsets are created and exchanged, namely the voluntary carbon market, and look into the question of whether, and if so, how it should be subject to regulation. We start out by shedding light on the mechanics of this market and then explain why a well-functioning voluntary carbon market is necessary to fight global warming and can also help developing countries build less carbon-intensive economies. However, we also spotlight the conflicts of interest and imperfect information problems that plague the voluntary carbon market and prevent it from achieving its full potential. Further, we explain why the proposals advanced by some Members of the Congress to regulate this market are misguided. Finally, we offer a simple policy recipe that can contribute to improving the functioning of the voluntary carbon market, thus increasing the likelihood that firms will rely on high-quality offsets to reach their climate goals.

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Introduction

Imagine that you are about to purchase a flight ticket for what promises to be the trip of a lifetime. Despite the excitement, one thing bothers you: you are well aware that flying causes significant emissions.[1] On your screen, you read a prompt that appears to be the solution to your concerns: for only a few dollars, you can offset your emissions and enjoy a guilt-free trip. But can you trust this offer? Can you be sure that by paying just a few dollars your emissions will really be offset? In this Article, we open the Pandora's Box of the voluntary carbon market (VCM) and show that the answer is a resounding "no."

The VCM is a largely unregulated market[2] where private actors buy carbon offsets[3] to voluntarily mitigate the effects of their choices on the climate.[4] For instance, corporations might buy carbon offsets to claim they have reached a state in which all of the emissions they cause are balanced by the removal of carbon from the atmosphere, and hence that they are "net-zero."[5] Pushed by corporations' interest to become – or at least appear to be – sustainable and green, the VCM is growing exponentially, and McKinsey forecasts that it might grow by a factor of up to 100 by 2050.[6]

The process of creating a carbon offset starts with a project developer, a person or, more often, an organization that develops emission reduction projects. The project developer might endeavor, say, to plant one million trees, which will absorb a certain amount of carbon dioxide (CO_2). For the sake of simplicity, we will assume that those trees will remove 100 tonnes of CO_2 from the atmosphere each year. At this point, the project developer will generally have the emission removal certified by one of the main standard setters, such as Verra or Gold Standard. In turn, standard setters rely on validation and verification bodies (VVBs) to audit the given project and ensure that it meets

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[1] INTERNATIONAL CIVIL AVIATION ORGANIZATION, ON BOARD A SUSTAINABLE FUTURE 2 (2016) ("Total CO_2 emissions from aviation (domestic and international) account for approximately 2% of total global CO_2 equivalent emissions . . . ."), https://www.icao.int/environmental-protection/Documents/ICAOEnvironmental_Brochure-1UP_Final.pdf.

[2] INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION, LEGAL IMPLICATIONS OF VOLUNTARY CARBON CREDITS 8 (2021), https://www.isda.org/a/38ngE/Legal-Implications-of-Voluntary-Carbon-Credits.pdf (noting that "[i]n contrast to the highly regulated mandatory carbon market, voluntary carbon markets currently do not involve any specific government authority oversight.").

[3] In this Article, we will use the term "carbon offsets" and "carbon credits" interchangeably.

[4] THE WORLD BANK, STATE AND TRENDS OF CARBON PRICING 2022, 35 (2022), https://climatefocus.com/wp-content/uploads/2022/06/9781464818950.pdf ("Voluntary carbon markets consist of (mostly private) entities purchasing carbon credits for the purpose of complying with voluntary mitigation commitments.").

[5] *What is Net Zero?*, NET ZERO CLIMATE, https://netzeroclimate.org/what-is-net-zero/ (last visited Feb. 9, 2023) ("Net zero refers to a state in which the greenhouse gases going into the atmosphere are balanced by removal out of the atmosphere.").

[6] CHRISTOPHER BLAUFELDER, CINDY LEVY, PETER MANNION & DICKON PINNER, A BLUEPRINT FOR SCALING VOLUNTARY CARBON MARKETS TO MEET THE CLIMATE CHALLENGE 2 (Jan. 29, 2021), https://www.mckinsey.com/capabilities/sustainability/our-insights/a-blueprint-for-scaling-voluntary-carbon-markets-to-meet-the-climate-challenge.

the quality requirements that they impose. Therefore, a key characteristic of the VCM is that there are two actors – standard setters and VVBs – assessing the quality of carbon offsets. Within our example, a VVB would check that the trees have really been planted and provide assurances that they can absorb at least 100 tonnes of CO_2 each year, while the standard setter would certify that the VVB carried out its audit according to the former's standards and verified the existence of the trees. At the end of this process, one carbon offset is issued for each metric tonne of CO_2 removed from the atmosphere. Thus, in our example, the standard setter should certify 100 carbon offsets each year. The project developer would then be able to sell these 100 offsets. A corporation that emits 100 tonnes of CO_2 each year could claim to be "net-zero" if it buys all of the offsets generated by this project.

The problem lies in the fact that the project developer, the standard setter, as well as the VVB, each have incentives to overstate offset claims (hereinafter, "to inflate offsets"). Project developers can obviously make more money if they have more than 100 offsets to sell. Similarly, according to current practice,[7] standard setters' payment depends on how many offsets they certify; hence, the greater the number of offsets they certify, the higher their revenues and profit. Furthermore, it is project developers who hire and pay VVBs, while it is standard setters who decide which VVBs to accredit and hence which VVBs can be hired by project developers. Thus, VVBs have incentives to cater to the preferences of both project developers and standard setters, and thus to inflate offsets.

Admittedly, if offset buyers were interested in purchasing only offsets that correspond to true reductions of CO_2 in the atmosphere and could easily spot offset inflation, then inflating offsets would not be profitable. To put it differently, if you could tell without a shadow of a doubt that the carbon offset advertised when buying your flight ticket does not correspond to a true reduction in emissions, you would have very limited incentives to purchase it. But assessing the quality of offsets is extremely complicated and, therefore, you can have no certainty as to the reliability of the estimate of CO_2 reductions. Furthermore, offset buyers might *prefer* cheap and inflated offsets. First, corporate buyers are obviously happy to purchase more offsets per dollar paid so that they can reach their climate targets at a lower cost. Second, carbon offsets certified by the leading standard setters increasingly provide regulatory benefits.[8] For instance, in several countries corporations purchasing carbon offsets certified by the leading standard setters can pay lower taxes.[9] It is clear that these companies have incentives to purchase as many offsets at as little cost as possible to cut their tax bill. Thus, even buyers might prefer inflated offsets.

[7] *See infra* notes 93-94 and accompanying text.
[8] *See infra* notes 119-124 and accompanying text.
[9] *See infra* notes 120-124 and accompanying text.

As all market players prefer inflated offsets, it is unsurprising that there is ample empirical evidence of offset inflation,[10] and hence that you cannot trust the prompt that appears when you purchase your flight ticket.

Against this background, this Article makes several contributions. To begin with, it provides the first in-depth analysis of the functioning of the VCM, the economic incentives of its main actors, and the market failures by which it is plagued. Second, it provides an economic justification for the emergence of a market structure in which two players – standard setters and VVBs – assess the quality of offsets, and therefore jointly act as gatekeepers. Third, it explains why the proposals advanced by some Members of the Congress to regulate this market are unlikely to mitigate offset inflation. Fourth, it offers a simple policy recipe to bolster the reputational sanctions associated with offset inflation, and therefore to improve the functioning of the VCM.

This Article proceeds as follows: Part I uses a real-world example to explain why a well-functioning voluntary market for carbon offsets is important. Part II describes what carbon offsets are, how they are developed and which quality requirements they must meet. Moreover, it outlines the current regulations affecting the VCM. Part III describes the evolution of the VCM and the main features of the most important market players. Part IV offers an in-depth analysis of the market failures that plague the VCM. Part V discusses what policymakers should and should not do to improve – or at least not worsen – the functioning of the VCM; and Part VI briefly concludes.

I. Why the Voluntary Carbon Market Can Play a Role in Mitigating Climate Change

The Katingan Mentaya Project advertises itself as the "living proof that carbon finance can combat climate change"[11] and it boasts generating 7.5 million carbon offsets every year.[12] The basic idea behind the project is as simple as it is appealing. It aims to protect more than 150,000 hectares of tropical forest peatland, preventing its conversion into industrial acacia plantations for paper production. Absent the project, the forest would have been cleared and the peat drained, which would have resulted in vast stocks of carbon being released into the atmosphere.[13] Accordingly, the project contributes to mitigating climate change by avoiding emissions equivalent to taking 2 million cars

[10] *See infra* notes 125-134 and accompanying text.
[11] KATINGAN MENTAYA PROJECT, https://www.katinganproject.com (last visited Feb. 9, 2023).
[12] *Id.*
[13] *Id.*

off the road each year.[14] In fact, its developers argue that the project does much more than that. Among other things, they claim that it contributes to gender equality and protects a variety of species, including five that are critically endangered.[15]

At the risk of sounding cynical, one key feature of the Katingan Mentaya Project is that it achieves these benefits while also becoming a (metaphorical) gold mine for the project developers. A reasonable estimate is that the carbon offsets generated by the project can be sold for $5 each,[16] which would translate into annual revenues of $37.5 million per year. The project developer has in fact succeeded in selling these offsets to large emitters such as Shell and Volkswagen.[17]

If one could take offset claims at face value, it would be clear why a voluntary market for carbon offsets is desirable. To begin with, the VCM could play a necessary role in fighting climate change. Article 2 of the Paris Agreement sets the goal of "[h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change."[18] However, limiting a temperature increase to 1.5°C implies that the world's total carbon budget from 2020 onwards is only 400-500 $GtCO_2$, while current annual emissions stand at roughly 40 $GtCO_2$.[19] Given the shrinking carbon budget, even the Intergovernmental Panel on Climate Change has acknowledged that projects aimed at removing carbon dioxide from the atmosphere are necessary.[20] Avoiding emissions equivalent to taking 2,000,000 cars off the road each year is certainly a step in the right direction. The voluntary market for carbon offsets appears then to be well-suited to help reach the Paris Agreement's goal.

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[14] Permian Global, *The Katingan Mentaya Project - Living Proof that Carbon Finance Can Combat Climate Change*, IETA 1, https://www.ieta.org/resources/Resources/TalanoaStories/Permian%20Global%20-%20IETA%20Talanoa%20Stories%20-%20May%202018.pdf (last visited Feb. 9, 2023).

[15] *Id.* at 2 (project developers describe the project's contribution to gender equality as follows: "[a]ctive promotion of activities to empower women, notably through provision of micro-finance. Health access and health education has particular focus on women's health issues." Instead, with respect to biodiversity they argue that "[t]he project area contains over 67 mammal, 167 bird, 49 reptiles, 111 fish species. Protection of this vital habitat helps conserve 5 Critically Endangered, 8 Endangered and 31 Vulnerable species.").

[16] *See infra* notes 66-67 and accompanying text.

[17] Chris Lang, *Indonesia's Katingan REDD Project Sells Carbon Credits to Shell. But that Doesn't Mean the Forest is Protected. It's Threatened by Land Conflicts, Fires and a Palm Oil Plantation,* REDD-MONITOR (Dec. 12, 2019), https://redd-monitor.org/2019/12/12/indonesias-katingan-redd-project-sells-carbon-credits-to-shell-but-that-doesnt-mean-the-forest-is-protected-its-threatened-by-land-conflicts-fires-and-a-palm-oil-plantation/.

[18] Paris Agreement to the United Nations Framework Convention on Climate Change, art. 2(a), Dec. 12, 2015, T.I.A.S. No. 16-1104 [hereinafter Paris Agreement].

[19] Aniruddh Mohan et al., *UNFCCC Must Confront the Political Economy of Net-Negative Emissions*, 4 ONE EARTH 1348, 1348 (2021).

[20] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT: GLOBAL WARMING OF 1.5 °C: SUMMARY FOR POLICYMAKERS 17 (2018), https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf ("All pathways that limit global warming to 1.5°C with limited or no overshoot project the use of carbon dioxide removal.").

Additionally, as in the case of the Katingan Mentana Project, the money often comes from large emitters and almost invariably from countries that historically have been responsible for the bulk of greenhouse gas (GHG) emissions. Thus, a strong ethical argument emerges to support the VCM, because this market shifts the cost of protecting environmental resources that are often located in developing countries onto the countries and companies that are largely responsible for the problem.[21]

Third, these projects can channel funds and technologies to help developing countries build economies that are less carbon-intensive,[22] while fostering a wide array of additional benefits like promoting gender equality. For instance, the developers of the Katingan Mentaya Project declare that they have been training and hiring women to work in fields that are traditionally dominated by men.[23] Once again, these activities are ultimately funded by the corporations that buy offsets, instead of weighing on local taxpayers and local communities.

Unfortunately, all that glitters is not gold: as we discuss in Part IV, the VCM is currently plagued by market failures that often prevent it from fulfilling its potential. The Katingan Mentaya Project itself has been accused of grossly overstating the emissions it can offset.[24] Some have even claimed that there was never a plan to replace the peatland with plantations for paper production, and that therefore the entire project is just a smokescreen.[25] In addition, there are doubts as to whether these projects really benefit local populations. For instance, the Kichwa community was allegedly forced out of its land in Cordillera Azul National Park by an offset project from an "unnamed extractive firm" without receiving any compensation.[26] As a result of such practices, several

[21] Matthias Honegger, Matthias Poralla, Axel Michaelowa & Hanna-Mari Ahonen, *Who Is Paying for Carbon Dioxide Removal? Designing Policy Instruments for Mobilizing Negative Emissions Technologies*, 3 FRONT. CLIM. 1, 2 (2021) (discussing the "well-established" moral principle that entities with significant historical emissions and technological capacities ought to do their part to undo the harm they have caused).

[22] VCM GLOBAL DIALOGUES, THE VOLUNTARY CARBON MARKET AS A CATALYST OF CLIMATE AMBITION IN DEVELOPING COUNTRIES 4 (2021), https://vcm-gd.org/wp-content/uploads/2021/10/VCM_Consolidated_final.pdf ("By channeling foreign direct investments and technology into developing countries, the VCM can support developing countries in bypassing carbon-intensive development patterns.").

[23] *Women's Career Development at Katingan Mentaya Project,* KATINGAN MENTAYA PROJECT, https://katinganmentaya.com/stories/detail/womens-career-development-at-katingan-mentaya-project (last visited Feb. 9, 2023).

[24] Yuichiro Kanematsu & Mari Ishibashi, *Indonesian Carbon Credit Project Appears To Betray Its Purpose,* NIKKEIASIA (Dec. 13, 2021), https://asia.nikkei.com/Spotlight/Environment/Climate-Change/Indonesian-carbon-credit-project-appears-to-betray-its-purpose.

[25] *Id.* ("There is [only] one pulp paper concession adjacent to the project area. The concession is inactive.").

[26] Patrick Greenfield, *The 'Carbon Pirates' Preying on Amazon's Indigenous Communities*, THE GUARDIAN (Jan. 21, 2023), https://www.theguardian.com/environment/2023/jan/21/amazon-indigenous-communities-carbon-offsetting-pirates-aoe.

indigenous communities have reported that they are studying carbon markets regulations to avoid becoming the prey of "carbon pirates."[27]

Yet in light of the benefits that the VCM could generate, it is certainly worth attempting to fix the market failures affecting it.

II. Carbon Offsets: What They Are and How They Come to Be

A carbon offset is "a reduction in GHG emissions – or an increase in carbon storage (e.g., through land restoration or the planting of trees) – that is used to compensate for emissions that occur elsewhere."[28] Generally, one carbon offset refers to one tonne of reduced CO_2 or its GHG equivalent.

Buyers of carbon offsets finance a certified climate action project, aimed at reducing or capturing emissions. As further discussed in Part III.B.4, this tool has become very appealing for companies searching for ways to compensate for their emissions and reach their net-zero goals. In this part, we discuss the different kinds of carbon offset, the requirements that an offset should meet to be considered of high quality, and the process necessary to develop an offset.

A. Types of Carbon Offset

Carbon offset projects can be divided into two categories: avoidance/reduction projects and removal/sequestration projects. The former eliminate or lower emissions from current or potential sources and operations. These offsets can either be nature-based or reliant on technology.[29] An example of nature-based avoidance is the Katingan Mentaya Project discussed in Part I, whereas one way of reducing emissions via technology entails switching to renewable energy sources.[30] But technology-based projects come in all shapes and forms. For instance, a recent offset project by Justa StoveWorks involves the distribution of energy-efficient and smoke-reducing cookstoves in Central

[27] *Id.*

[28] *See* DERIK BROEKHOFF, MICHAEL GILLENWATER, TANI COLBERT-SANGREE & PATRICK CAGE, SECURING CLIMATE BENEFIT: A GUIDE TO USING CARBON OFFSETS 6 (2019), http://npm.pixeledge.io.s3.amazonaws.com/images/2828fa14-963b-41eb-85d0-9a02fc27ae0d/1605018809-guide-to-buy-carbon-offsets.pdf.

[29] Stephen Comello, Julia Reichelstein & Stefan Reichelstein, *Corporate Carbon Reduction Pledges: An Effective Tool to Mitigate Climate Change?*, 13 (ZEW - Centre for Eur. Econ. Rsch., Discussion Paper No. 21-052, 2021), https://law.stanford.edu/wp-content/uploads/2021/04/20210505_-_Corporate_Pledges.pdf.

[30] *Id.* (noting that examples of technology-based offset projects include "renewable energy projects, green cement, or clean cook stoves.").

America at a heavily subsidized rate.[31] Besides helping local communities, these stoves produce significantly lower emissions than the appliances that would otherwise be used.[32]

Removal and sequestration projects, instead, are aimed to directly remove CO_2 from the atmosphere.[33] These projects can again be both nature- and technology-based.[34] Examples of the former are reforestation or afforestation projects, whereas the latter involve the use of technologies aimed to capture and store CO_2.[35] For instance, CarbonCapture Inc., a U.S.-based climate tech company, recently announced the largest removal project in the world, claiming that its new facility in Wyoming will be able to remove 5 million tonnes of atmospheric carbon dioxide annually by 2030.[36]

While helpful to illustrate what lies beneath carbon offsets, this basic classification obscures the incredible variety of project types. The NGO Ecosystem Marketplace identifies 170 different types of offset that it groups into the following eight categories: renewable energy; household and community; chemical & industrial; energy efficiency; waste disposal; agriculture; transport, forestry; and land use.[37]

B. Developing a Carbon Offset Project

The five-phase process of developing a carbon offset project (Fig. 1) typically takes between 18 months and six years, and starts with a project developer carrying out a pre-feasibility assessment,[38] initiating conversations with the relevant stakeholders and selecting a standard setter to later certify the project.

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[31] Verra, DISTRIBUTION OF JUSTA MODEL CHIMNEY ROCKET STOVES IN CENTRAL AMERICA (2021), https://registry.verra.org/app/projectDetail/VCS/2564.
[32] *Id*.
[33] Comello et al., *supra* note 29 at 13 ("[R]emoval offsets are generated by projects that actively remove carbon dioxide from the atmosphere, and then store the gas for a period of time.").
[34] *Id.* at 13.
[35] *Id.*
[36] *CarbonCapture Inc. Announces Five Megaton Direct Air Capture and Storage Project in Wyoming,* BUSINESSWIRE (Sept. 8, 2022), https://www.businesswire.com/news/home/20220908005446/en/CarbonCapture-Inc.-Announces-Five-Megaton-Direct-Air-Capture-and-Storage-Project-in-Wyoming.
[37] FOREST TRENDS' ECOSYSTEM MARKETPLACE, THE ART OF INTEGRITY: STATE OF VOLUNTARY CARBON MARKETS, Q3 INSIGHTS BRIEFING 6 (2022), https://app.hubspot.com/documents/3298623/view/433338095?accessId=3abc8b.
[38] NATHALIE BEKEN, FAST FORWARD: CHALLENGES TO SCALING THE VOLUNTARY CARBON MARKET7 (2022), https://www.thallo.io/wp-content/uploads/2022/10/Thallo-VCM-report_FINAL.pdf.

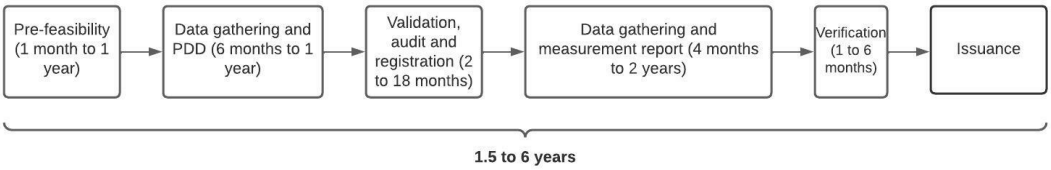

Fig. 1: The Development Process of Carbon Offsets[39]

During the second step, the project developer creates a project design document.[40] This document lays out the main characteristics of the project, providing the information needed to assess its quality and the amount of emissions reduced or avoided over the years.[41]

In the next phase, the project developer hires a VVB to validate the project design document.[42] The VVB can be chosen from among those accredited by the standard setter certifying the project. It is worth noting that VVBs must pay an accreditation fee and an annual fee to the accrediting standard setter.

As the project unfolds, the VVB monitors whether everything is proceeding according to plan. Verifications generally include audits, in-person site visits, and a detailed analysis of the relevant data.[43] Eventually, the VVB issues a final report describing its findings and attesting whether the project meets the necessary quality standards.

At this point, the standard setter verifies that the project has been executed in line with its standards and determines the volume of the offsets generated. Once the offsets are certified, an issuance fee is paid by the project developer to the standard setter and offsets can finally be issued. Generally, the fee paid by the project developer to the standard setter increases with the number of offsets certified.[44] Offset buyers who want to purchase the certified offsets must also pay an account registration fee to the standard setter. Fig. 2 summarizes the relationships among the main players involved in this process.

[39] *Id.* The length of each rectangle is proportional to the length of each phase.
[40] *Id.*
[41] *Id.*
[42] *Id.*
[43] ANDY BOSE ET AL., VOLUNTARY MARKETS FOR CARBON OFFSETS: EVOLUTION AND LESSONS FOR THE LNG MARKET 5 (2021), https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/10/Voluntary-markets-for-carbon-offsets-Evolution-features-and-lessons-for-the-LNG-market-ET03.pdf.
[44] *See infra* notes 93-94 and accompanying text.

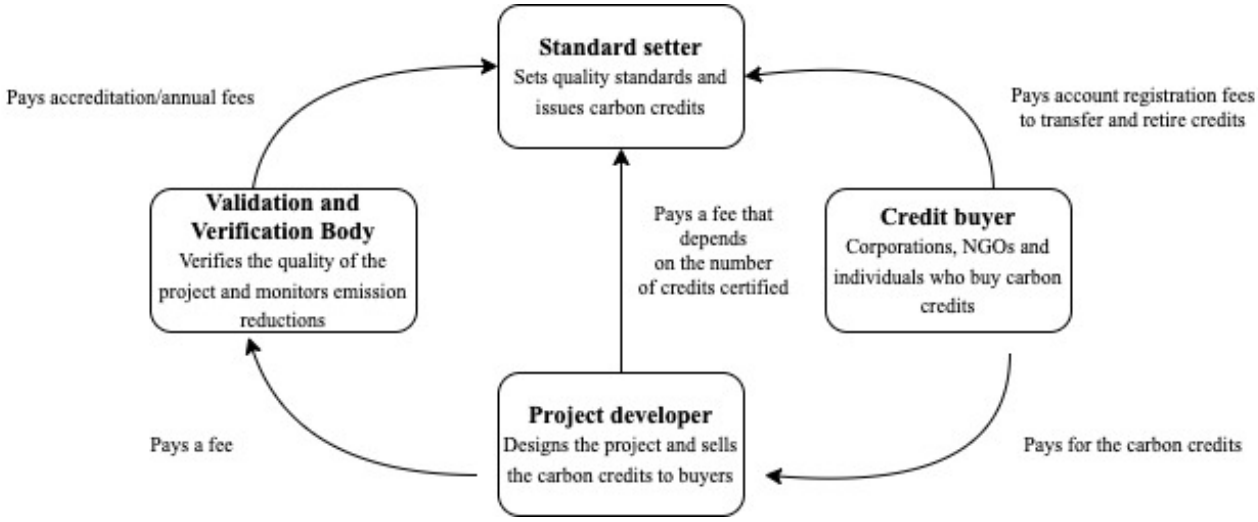

Fig. 2: The Carbon Credit Ecosystem

C. Carbon Offsets: Quality Requirements

According to the Taskforce on Scaling Voluntary Carbon Markets, a self-defined "private sector-led initiative working to scale an effective and efficient voluntary carbon market to help meet the goals of the Paris Agreement,"[45] to be considered of high quality, offsets should be real, additional, based on a credible and realistic baseline, monitored, reported, verified and permanent. Furthermore, they should minimize leakage and avoid doing net harm.[46]

The key feature here is *additionality*, which comprises two components: financial additionality and regulatory additionality. The former requires that the project would not have been implemented without the revenues from the sale of offsets. Demonstrating financial additionality is especially hard to prove for avoidance projects, as it requires establishing beyond doubt that no emissions would have been avoided without the offset project.[47] Essentially, in this case additionality relies on a counterfactual claim.[48]

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[45] TASKFORCE ON SCALING VOLUNTARY CARBON MARKETS, PUBLIC CONSULTATION REPORT 3 (2021), https://www.iif.com/Portals/1/Files/TSVCM_Public_Consultation.pdf.
[46] *Id*. at 56.
[47] Comello et al., *supra* note 29, at 17.
[48] Nicole Franki, Note, *Regulation of the Voluntary Carbon Offset Market: Shifting the Burden of Climate Change Mitigation from Individual to Collective Action*, 48 COLUMBIA JOURNAL OF ENVIRONMENTAL LAW, 177, 186 (2022) (noting that "Additionality is often measured against a predicted scenario of what *would* have happened without the offset project. Counter-factuals create an inherent uncertainty in how much carbon emissions are *actually* avoided, but offsets are nonetheless sold as definitive emissions credits.").

On the contrary, financial additionality is easier to establish for removal projects, and especially for technology-based ones. In fact, the use of technology to remove CO_2 from the atmosphere is expensive and it is thus unlikely that the project developer would have sufficient incentives to engage in such a project without the possibility of selling the corresponding offsets.[49]

Additionality also requires that the project is not carried out to meet a regulatory requirement (regulatory additionality).[50] Therefore, if an entity switches to renewable energy in response to new regulation, it cannot issue carbon offsets that meet the requirement.

Additionality ought to be calculated on the basis of a *credible and realistic baseline*. That is, independent third parties must offer estimates of the emissions in the absence of the activity.[51] For instance, formulating a baseline for a project aiming at preserving a forest implies estimating how many of the trees protected by the project would have been cut had it not been for the project. One problem with estimating a baseline is, again, that it involves dealing with a counterfactual, and hence it is a process that is plagued by inherent uncertainty.[52] Because the way of assessing the baseline depends on the kind of project, there are literally hundreds of different methodologies currently being used.[53]

A further requirement is that offset projects are *monitored, reported and verified*. As we discuss extensively in Section III.B.3, this feature implies that an accredited and independent VVB must carry out the necessary controls to ensure that the project is unfolding as expected.[54]

In addition, carbon offsets should be *permanent*. On the one hand, this implies that the project is structured in such a way that the removal or the avoidance of the emissions is not just temporary. On the other, project developers should implement mechanisms to neutralize the effects of reversal events.[55] Permanence is hard to ensure for many kinds of offset projects, and certainly for

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[49] Comello et al., *supra* note 29, at 17 ("For removal credits, especially technology-driven ones, additionality will frequently be easier to establish. It appears implausible that the suppliers of these offsets would extract CO_2 . . . without the monetary incentive of selling the corresponding offsets.").

[50] THREE-REGIONS OFFSETS WORKING GROUP, ENSURING OFFSET QUALITY: DESIGN AND IMPLEMENTATION CRITERIA FOR A HIGH-QUALITY OFFSET PROGRAM 12-13 (2010), https://climate.law.columbia.edu/sites/default/files/content/docs/Altemus-et-al.-2010-05-Ensuring-Offset-Quality.pdf (discussing regulatory additionality).

[51] TASKFORCE ON SCALING VOLUNTARY CARBON MARKETS, *supra* note 45, at 60 (noting that baselines "must be independently audited and endorsed by third party specialist experts").

[52] DERIK BROEKHOFF ET AL., OPTIONS FOR IMPROVING THE EMISSION UNIT ELIGIBILITY CRITERIA UNDER THE CARBON OFFSETTING AND REDUCTION SCHEME FOR INTERNATIONAL AVIATION, 17 (2020), https://www.carbon-mechanisms.de/fileadmin/media/dokumente/Publikationen/Studie/2020_10_27_climate_change_36_2020_schlussbericht_annex_1_0.pdf (noting that these baselines "are counterfactual, [thus] they cannot be strictly verified as a 'true' representation of emissions or removals in the absence of a project.").

[53] *Id.* at 17.

[54] TASKFORCE ON SCALING VOLUNTARY CARBON MARKETS, *supra* note 45, at 61.

[55] *Id.* at 58 ("Standards have the obligation to maintain a buffer pool or insurance or equivalent mechanism to respond and compensate for any reversal events for methodology types that include storage.").

afforestation and reforestation ones, which are the most common. For example, Badgley et al. estimated that devastating wildfires in California caused the loss of between 4.6 million and 5.7 million offsets in the 2020-2022 period.[56] But it is not only wildfires that endanger the durability of carbon stored in forests: insects and droughts are also a considerable threat.[57] Not surprisingly then, the efficacy of planting forests and trees to mitigate climate change has long been questioned.[58]

Carbon offsets should also minimize *leakage*, which refers to the idea that emissions avoided at one source might shift to a different location or sector.[59] For example, consider a case in which a number of timber forest owners start preserving their forests instead of harvesting them. The resulting drop in the quantity of timber supplied worldwide would inevitably cause a price increase. In turn, the increase in price would likely lead forest owners in other areas to expand their timber production and profit from the higher prices. In other words, the reduction in timber produced in one area would be offset by an increase in another area.[60] A corollary to this is that leakage should be assessed at an international level, as these kinds of dynamics can cross national boundaries.[61]

Last, carbon offset projects should *do no net harm,* like causing damages to local communities and ecosystems. Net harm can only be avoided by carrying out a careful impact assessment of the project, and creating channels that allow all stakeholders to share their concerns and grievances.[62]

III. The Voluntary Carbon Market

[56] Grayson Badgley et al., *California's Forest Carbon Offsets Buffer Pool is Severely Undercapitalized,* 5 FRONT. FOR. GLOB. CHANGE 1, 8 (2022).

[57] William R. L. Anderegg et al., *Climate-Driven Risks to the Climate Mitigation Potential of Forests*, 368 SCIENCE 1,1 (2020) (mentioning drought and biotic agents as risks to forest stability).

[58] *See* Miko U.F. Kirschbaum, *Temporary Carbon Sequestration Cannot Prevent Climate Change*, 11 MITIGATION & ADAPTATION STRATEGIES FOR GLOBAL CHANGE 1151, 1151 (2006) (explaining that non-permanent carbon sequestration might even make matter worse in the longer term. In fact, "[s]toring carbon . . . lowers the concentration gradient between the atmosphere and . . . potential carbon reservoirs, and consequently reduces the rate of CO_2 removal from the atmosphere. If carbon is released again from that temporary storage, subsequent atmospheric CO_2 concentrations will, therefore, be higher than without temporary carbon storage.").

[59] AARON W. JENKINS, LYDIA P. OLANDER & BRIAN C. MURRAY, ADDRESSING LEAKAGE IN A GREENHOUSE GAS MITIGATION OFFSETS PROGRAM FOR FORESTRY AND AGRICULTURE 2 (2009), https://nicholasinstitute.duke.edu/sites/default/files/publications/offsetseries4-paper.pdf (defining leakage as the "phenomenon through which efforts to reduce emissions in one place simply shift emissions to another location or sector where they remain uncontrolled or uncounted.").

[60] Robert O. Mendelsohn, Robert E. Litan & John Fleming, *A Framework to Ensure that Voluntary Carbon Markets Will Truly Help Combat Climate Change* BROOKINGS (Sep. 16, 2021), https://www.brookings.edu/research/a-framework-to-ensure-that-voluntary-carbon-markets-will-truly-help-combat-climate-change/.

[61] BARBARA HAYA, COMMENTS ON THE INTEGRITY COUNCIL FOR THE VOLUNTARY CARBON MARKETS (ICVCM) DRAFT CORE CARBON PRINCIPLES, ASSESSMENT FRAMEWORK, AND ASSESSMENT PROCEDURE 6 (2022), https://gspp.berkeley.edu/assets/uploads/page/BCTP_-_Barbara_Haya_-_comments_submitted_to_ICVCM_-_9-27-22.pdf (arguing that "leakage should be assessed internationally and not just domestically [because] it is well documented that some project types can be associated with significant levels of international leakage.").

[62] TASKFORCE ON SCALING VOLUNTARY CARBON MARKETS, *supra* note 45, at 62 (discussing the importance of implementing grievance mechanisms to give a voice to shareholders before starting the projects).

In this part, we discuss the evolution of the VCM and identify its main market players. We also outline how the market has so far been subject to little regulation, with some state-level and sectoral exceptions.

A. Evolution of the Voluntary Carbon Market and the Influence of Compliance Markets

The seed of the VCM was planted in the 1980s, when an American electricity company brokered the first-known carbon offset deal with an NGO in Guatemala.[63] In the 1990s the first private registry for voluntary offsets in the United States was established.[64] However, for many years the importance of the VCM remained limited. Only in 2016 did the VCM gain traction, growing by a factor of 10 in only five years to reach $2 billion in 2021.[65]

As the size of the market increased, the prices of offsets started to grow too, as shown in Fig. 3.[66] Nevertheless, carbon offset prices arguably remain too low, possibly reflecting an adverse selection equilibrium outcome which prevents high-quality projects from being developed.[67]

[63] Ruby Woodside, *Creating Value in the Voluntary Carbon Market: Opportunities For Small-Scale Coffee Producers in Latin America to Access Carbon Capital* 7 (2016), https://commons.clarku.edu/cgi/viewcontent.cgi?article=1092&context=idce_masters_papers.
[64] *Id.* at 2.
[65] FOREST TRENDS' ECOSYSTEM MARKETPLACE, *supra* note 37, at 2-3.
[66] However, this data should be taken with caution because most of the transactions occur over-the-counter, and hence information on prices is limited. In fact, the data only refer to transactions reported by actors who decided to respond to a questionnaire carried out by Ecosystem Marketplace.
[67] *See infra* Section IV.B. *See* also TROVE RESEARCH, FUTURE DEMAND, SUPPLY AND PRICES FOR VOLUNTARY CARBON CREDITS – KEEPING THE BALANCE 2, 8 (2021), https://trove-research.com/wp-content/uploads/2021/06/Trove-Research-Carbon-Credit-Demand-Supply-and-Prices-1-June-2021.pdf (arguing that low prices suggest that financing is not an essential factor in carbon credits exchange, and hence, that projects may have been failing the additionality test and asserting that there would need to be an increase in the average price of carbon offsets of up to $20/50 tCO_2e by 2030 for offsets to be considered credible and additional).

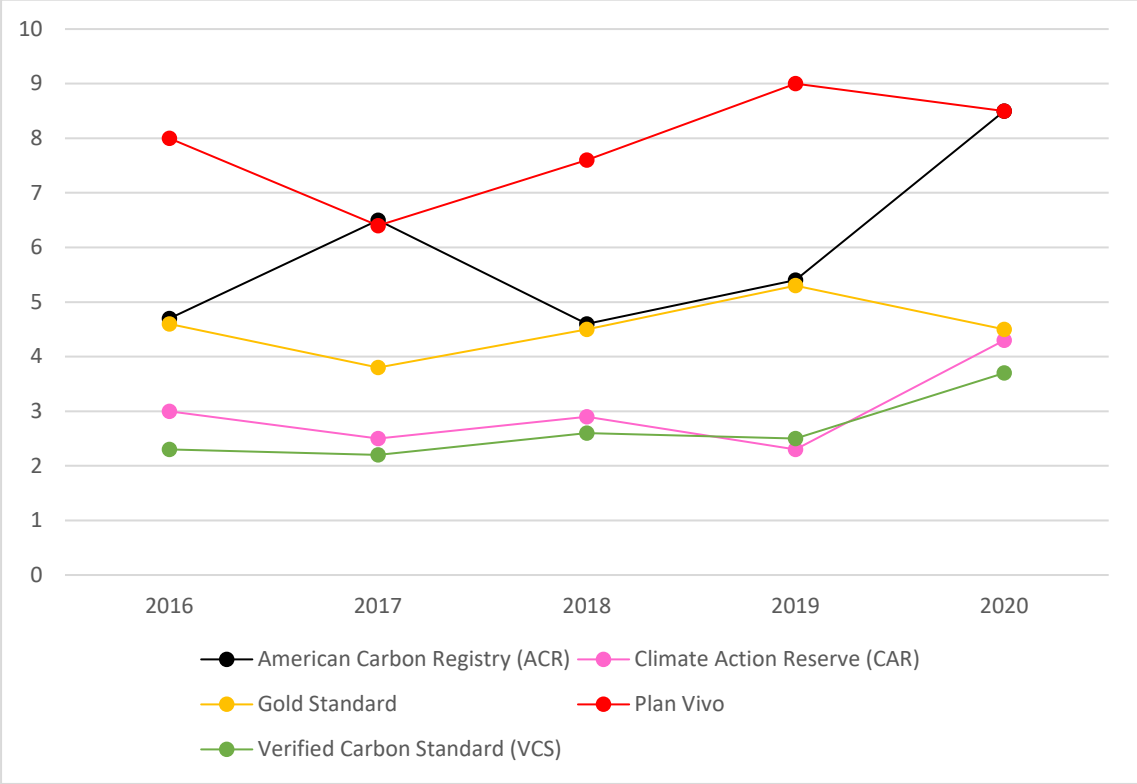

Fig. 3: Price Trends of Carbon Offsets Certified by the Main Standard Setters

The evolution of the VCM has been, and will be, tightly intertwined with the development of the much larger compliance market for offsets. Compliance markets are schemes that exist under mandatory regulations aimed at curbing GHG emissions.[68] In such markets, the market players purchase carbon offsets to meet the regulatory goals they are subject to. The origins of compliance markets can be traced back to the Kyoto Protocol, in which 37 industrialized countries and economies in transition and the European Community committed to reducing their emissions.[69] According to Art. 12 of the Kyoto Protocol, the Clean Development Mechanism (CDM) allows these countries to meet their commitments also by purchasing offsets (called "Certified Emission Reductions") from emissions reduction projects.[70]

[68] BASSAM FATTOUH & ANDREA MAINO, ARTICLE 6 AND VOLUNTARY CARBON MARKET 1 (2022), https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2022/05/Insight-114-Article-6-and-Voluntary-Carbon-Markets.pdf.

[69] *What is the Kyoto Protocol?,* UNITED NATIONS CLIMATE CHANGE, https://unfccc.int/kyoto_protocol (last visited Feb. 9, 2023).

[70] AXEL MICHAELOWA, IGOR SHISHLOV, STEPHAN HOCH, PATRICIO BOFILL & AGLAJA ESPELAGE, OVERVIEW AND COMPARISON OF EXISTING CARBON CREDITING SCHEMES 10 (2019), https://www.zora.uzh.ch/id/eprint/175378/1/ZORA17378.pdf.

The CDM has had a profound influence on the VCM. For instance, the main standard setter in the VCM considers all the methodologies approved under the CDM eligible for its offsets[71] and recognizes all of the VVBs accredited by the CDM.[72]

The Paris Agreement builds and expands on the Kyoto Protocol. A distinguishing feature of the Paris Agreement is that, unlike under Kyoto, all countries are required to establish their own climate change target, known as nationally determined contributions.[73] In order to reach their nationally determined contributions, countries can participate in international cooperation that results in internationally transferred mitigation outcomes (Article 6). Importantly, countries are also allowed to sell offsets to other entities such as companies, but Article 6 explains neither whether and how corporations can rely on offsets that are used to reach a country's goal nor whether countries can rely on offsets used to reach a corporation's net zero target.[74] With that in mind, there are diverging views on the impact that Article 6 will have on the VCM. Some argue that Article 6 will "jump-start" the VCM,[75] but others believe that it will have a chilling effect.[76]

B. Market Players

A key feature of the VCM is the presence of two gatekeepers, namely standard setters and VVBs, which assess the quality of offsets. In general, gatekeepers provide verification and certification services by pledging their professional reputations,[77] thus acting as "reputational intermediaries."[78] Gatekeepers' certifications help mitigate information asymmetries, allowing players with limited

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[71] *Clean Development Mechanism (CDM) Methodologies,* VERRA (last visited Feb. 9, 2023), https://verra.org/methodologies/cdm-methodologies/ (indicating that "[a]ll methodologies approved by the UNFCCC's Clean Development Mechanism (CDM) are eligible for use with the VCS Program.").

[72] *Validation And Verification,* VERRA (last visited Feb. 9, 2023), https://verra.org/validation-verification/.

[73] The Oxford Institute for Energy Studies, *Article 6 and Voluntary Carbon Market* 1 (2022), https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2022/05/Insight-114-Article-6-and-Voluntary-Carbon-Markets.pdf ("In contrast to the top-down approach to setting climate and emissions targets implemented under the Kyoto Protocol, the Paris Agreement (PA) adopts a bottom-up approach in which each country sets out the mitigation contributions it pledges to undertake to reduce its emissions").

[74] FATTOUH & MAINO, *supra* note 68 at 8 ("Article 6 does not offer clear guidance as to the use of carbon credits by the corporate sector that are adjusted in a country's carbon budget.").

[75] Silvia Favasuli & Richard Rubin, *Paris Accord Article 6 Approval Set To Jump-Start Evolution of Voluntary Carbon Market,* S&PGLOBAL (17 Nov. 2021), https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/111721-paris-accord-article-6-approval-set-to-jump-start-evolution-of-voluntary-carbon-market.

[76] Sebastian Vandana, *Voluntary Carbon Market Players Seek Clarity, Concrete Guidelines At COP27,* S&PGLOBAL (14 Oct. 2021), https://www.spglobal.com/commodityinsights/en/market-insights/blogs/energy-transition/101422-cop27-voluntary-carbon-markets-vcm.

[77] John C. Coffee Jr., *What Caused Enron – a Capsule Social and Economic History of the 1990s,* 89 CORNELL L. REV. 269, 279 (2004) (providing a definition of gatekeepers in line with the one presented here).

[78] Andrew F. Tuch, *Multiple Gatekeepers*, VA. L. REV. 1583, 1595 (2010).

access to information to participate in the market simply by relying on the gatekeepers' reputation.[79] Examples of gatekeepers include auditors, credit rating agencies, and investment banks.[80] Given the role gatekeepers play, markets for gatekeepers' services tend to be concentrated. This is because gatekeepers must be repeat players in order to be credible.[81] In a one-shot interaction, gatekeepers will always find it profitable to cater to the preferences of their customer, thereby reaping short-term benefits. For instance, if all of the profits of an auditor depended on a single client who happened to be engaged in shady practices, the auditor would be little inclined to report them. Instead, when a gatekeeper is a repeat player and hence interacts with many clients, the short-term gains it would obtain by catering to the preferences of one of them would be outweighed by the long-term costs associated with losing their reputation as a reliable gatekeeper. To put it differently, the portfolio of customers of a gatekeeper needs to reach a critical mass before the market will consider that gatekeeper credible.

Against this background, we describe the main market players that operate within the VCM, focusing especially on the role of standard setters and VVBs.

1. Project Developers

Project developers design a carbon offset project and then sell the related carbon offsets. Notably, the top 20 developers are responsible for almost 40% of total volumes, while the five largest are responsible for almost 20%.[82] However, most project developers only have experience with one project.[83]

Because the offset development process can last up to six years, one of the challenges that project developers face is securing sufficient funding.[84] Project developers with sufficiently deep pockets can rely on their own funding, but other players must find offset buyers willing to directly finance the project even if they will not receive the carbon credits until later. For instance, in 2021

[79] Stavros Gadinis & Colby Mangels, *Collaborative Gatekeepers*, 73 WASH. & LEE L. REV. 797, 808 (2016) (noting that gatekeepers' "stamp of approval can turn a risky investment into a legitimate business proposition, rather than a venture into the unknown." In turn, this allows more investors to join the market).
[80] Lawrence A. Cunningham, *Beyond Liability: Rewarding Effective Gatekeepers*, 92 MINN. L. REV. 323, 328-329 (2007) (describing the role played by some of the most important kinds of gatekeepers).
[81] Frank Partnoy, *Barbarians at the Gatekeepers: A Proposal for a Modified Strict Liability Regime*, 79 WASH. U. L. Q. 491, 500-501 (2001) (discussing the importance of repeated interaction for gatekeepers).
[82] ABATABLE, THE STATE OF THE CARBON DEVELOPER ECOSYSTEM 5 (2021), https://www.abatable.com/reports/voluntary-carbon-markets-developers-overview-2021.
[83] *Id.*
[84] BEKEN, *supra* note 38, at 7.

Royal Dutch Shell announced a $1.6 billion partnership with one of the world's major project developers to develop 115 million carbon credits in five years.[85]

2. Standard Setters

To certify their carbon credits and increase their credibility, project developers rely on standard setters' certification. Standard setters are organizations, often NGOs, which set the quality requirements that need to be met for a project to be certified.[86] Standard setters are said to "act as the regulators of the VCM,"[87] and their certifications are widely regarded as the most important factor in choosing carbon offsets.[88] For this reason, they can be considered the primary gatekeepers of the VCM.

Certified carbon offsets are included in standard setters' registries. Registries assign credits a serial number, which, together with additional information, is made publicly available. This registration system tracks the purchased and retired carbon offsets, and aims to prevent the double counting of credits.[89]

While there are other relevant players in the market, Verra, Gold Standard, Climate Action Reserve and American Carbon Registry dominate it.[90] In 2019/20 Verra alone accounted for two-thirds of the market, while Gold Standard covered an additional ten percent.[91]

Such a high level of market concentration means that the leading gatekeepers have an interest in preserving their reputation.[92] However, it also implies that standard setters have significant market power vis-à-vis both project developers and VVBs.

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[85] Sarita C. Singh, *Shell to Invest $1.6 Billion in JV with with EKI Enery Services*, ECON. TIMES (Dec. 15, 2021), https://economictimes.indiatimes.com/industry/renewables/shell-to-invest-1-6-billion-in-jv-with-eki-energy-services/articleshow/88288443.cms?from=mdr (reporting that "[t]he joint venture will target production of 115 million carbon credits in five years, as part of Shell's plan to expand in India's renewables space . . . .").

[86] Silvia Favasuli & Sebastian Vandana, *Voluntary Carbon Markets: How They Work, How They're Priced and Who's Involved* S&P GLOBAL (Jun. 10, 2021), https://www.spglobal.com/commodityinsights/en/market-insights/blogs/energy-transition/061021-voluntary-carbon-markets-pricing-participants-trading-corsia-credits.

[87] CLIMATE FOCUS, THE VOLUNTARY CARBON MARKET EXPLAINED CHAPTER 7 (2021), https://vcmprimer.files.wordpress.com/2022/01/vcm-explained-chapter7-1.pdf

[88] REFINITIV COMMODITIES RESEARCH, REFINITIV CARBON MARKET SURVEY 2022 19 (2022), https://www.refinitiv.com/content/dam/marketing/en_us/documents/reports/carbon-market-survey-2022.pdf (asked which factors influence their choice of offsets, the vast majority (73%) of respondents cited the unit's respective certification or standard, followed by project type (64%) and project location (59%)).

[89] *Vcs Program Details,* VERRA (last visited Feb. 9, 2023), https://verra.org/programs/verified-carbon-standard/vcs-program-details/ (noting that the goal of registry is ensuring "the uniqueness of projects and credits in the system.").

[90] BOSE ET AL., *supra* note 43, at 4.

[91] *Carbon Offsetting: How Can It Contribute to The Net Zero Goal?*, AMUNDI INSTITUTE (2021), https://research-center.amundi.com/article/esg-thema-5-carbon-offsetting-how-can-it-contribute-net-zero-goal.

[92] *See supra* notes 77-81 and accompanying text.

Most of standard setters' revenues come from the fees standard setters charge to project developers when certifying a project. For instance, Verra charges a variety of fees within its Verified Carbon Standard program, some of which are fixed while others depend on the quantity of offsets certified. For example, there is a fixed cost of $500 for opening an account with the Verra Registry, while the issuance levy for each individual project depends on the quantity of offsets certified per year (Table 1).[93]

Number of verified offsets issued for a given project	**Cost per offset ($)**
1-10,000	0.05
10,001-1,000,000	0.14
1,000,001-2,000,000	0.12
2,000,001-4,000,000	0.105
4,000,001-6,000,000	0.085
6,000,001-8,000,000	0.06
8,000,001-10,000,000	0.04
>10,000,000	0.025

Table 1: Verra Issuance Levy Schedule[94]

Given how standard setters' fees are structured, they stand to increase their revenues, and presumably their profits, if they certify more offsets per project, which is unusual for services of this kind. For example, if Verra certified 1 million offsets for a given project, then the issuance levy would be equal to $139,100, whereas if it certifies 2 million offsets it will be $259,100. By contrast, a credit rating agency's fee is not linked to the rating it issues.

Standard setters also receive compensation from buyers, who pay a fee to be able to transfer and retire carbon credits, and from VVBs, which have to pay an accreditation fee (e.g., Verra charges an annual fee of $2,500 to each VVB).[95]

3. Validation and Verification Bodies

[93] VERRA, PROGRAM FEE SCHEDULE 2 (2020), https://verra.org/wp-content/uploads/Program-Fee-Schedule_v4.1.pdf.
[94] *Id.*
[95] *Id.* at 4.

In order to certify a project, standard setters rely on the validation and verification services provided by an external independent auditor, the VVB. This entity is usually a company, appointed by the project developer and accredited by the standard setter, and its job is twofold. First, the VVB should "validate" *ex ante* the project design document according to the requirements outlined by the standard setter. Second, it should "verify" *ex post* that the project is generating the promised benefits.[96]

As noted above,[97] gatekeepers provide certifications to facilitate participation in a given market. In this case, the stamp of approval of a VVB is *de facto* necessary for project developers to access the VCM, given that all major standard setters require third-party validation and verification of the offsets. However, the identity of the VVB engaged in validating and verifying a project is generally displayed much less prominently than that of the standard setter that certified it. For this reason, VVBs are likely to be less recognizable by final buyers and hence have less reputational capital at stake than standard setters.[98] Another factor to consider here is that the number of VVBs is fairly high, as Verra alone has 23 accredited VVBs that are currently active and 29 that are no longer so.[99] These numbers suggest both that the market is fragmented and that turnover among market players is significant, in stark contrast with the standard characteristics of the markets in which gatekeepers operate.

Moreover, the major standard setters have acknowledged that there is an undersupply of VVB services, which can result in both delays and lower-quality output. The bottleneck created by the limited supply of validation and verification services should not be underestimated: according to recent estimates verification-related delays might impose costs of up to $2.6 billion to project developers and could prevent 4.8 GT credits from being issued between now and 2030.[100] This implies that standard setters might not have the luxury of being selective when accrediting VVBs.

In the presence of this combination of factors, one might be tempted to conclude that reputational constraints could fail to operate effectively on VVBs. However, VVBs' access to the market is conditional upon their persuading *another* gatekeeper (the standard setter) that they deserve to be trusted. Clearly, standard setters are well-positioned to assess the quality of the work performed

[96] *Validation And Verification,* VERRA (last visited Feb. 9, 2023), https://verra.org/validation-verification/ (detailing that "[d]uring validation, a VVB determines whether a project meets all rules and requirements from the Verra Programs" and that "[d]uring verification, a VVB confirms that the outcomes set out in the project documentation have been achieved and quantified according to the requirements of the respective standard.").
[97] *See supra* note 79 and accompanying text.
[98] REFINITIV COMMODITIES RESEARCH, *supra* note 88 (most respondents indicated that they considered the certification or standard to be important, thus suggesting that the reputational capital that matters in buyers' eyes is that of the standard setter and not that of the VVB).
[99] *Validation And Verification,* VERRA (last visited Feb. 9, 2023), https://verra.org/validation-verification/.
[100] BEKEN, *supra* note 38 (estimating that "[v]erification-related delays will cost project developers $2.6B and will prevent issuance of 4.8 GT credits by 2030.").

by a VVB and, therefore, at least in principle, could immediately punish VVBs who do not carry out high-quality verification and validation. In this vein, the scarcity of VVBs could be seen also as a signal of stringent standards applied by standard setters in certifying VVBs.

It is also worth considering that the verification and monitoring of projects carried out by VVBs is extremely costly and it can significantly shrink the margins available to project developers, which in turn might discourage the implementation of potentially promising projects.[101] This suggests that caution ought to be applied before imposing rules that might further increase the costs of validation and verification, or that might make it more costly for VVBs to earn an accreditation from a leading standard setter.

4. Credit Buyers

The demand side of the VCM is composed of two types of buyer: individuals intending to offset their carbon footprint and organizations willing to offset their emissions.[102]

Individual buyers can purchase carbon offsets directly via specialized websites such as carbonfund.org,[103] or Gold Standard's website.[104] Alternatively, they can purchase offsets when buying products from corporations, as in the case, among the many, of Cathay's flights.[105]

However, most of the demand comes, and can be expected in the coming years to continue to come, from corporations, and especially energy companies, aiming to achieve their climate targets.[106] Indeed, since the adoption of the Paris Agreement, the number of companies making net-zero pledges has been steadily growing,[107] and currently over one-third of the world's largest publicly traded

[101] Oliver Miltenberger, Christophe Jospe & James Pittman, *The Good Is Never Perfect: Why the Current Flaws of Voluntary Carbon Markets Are Services, Not Barriers to Successful Climate Change Action*, 3 FRONT. CLIM. 1, 3 (2021) (describing the process of monitoring as "a time and resource intensive process that represents a significant capacity and cost burden to project development. In some cases, the costs of these activities can constitute a majority of the market value of a carbon credit, reducing the incentive for implementation.").

[102] CLIMATE CHANGE COMMITTEE, VOLUNTARY CARBON MARKETS AND OFFSETTING 24 (2022), https://www.theccc.org.uk/publication/voluntary-carbon-markets-and-offsetting/.

[103] *Offset your life,* CARBONFUND.ORG (last visited Feb. 9, 2023), https://carbonfund.org/carbon-offsets/.

[104] *Gold Standard Marketplace,* GOLD STANDARD (last visited Feb. 9, 2023), https://www.goldstandard.org.

[105] *Fly Greener*, CATHAY AIRWAYS (last visited Feb. 9, 2023), https://www.cathaypacific.com/cx/en_HK/about-us/environment/fly-carbon-neutral-fly-greener/about-fly-greener.html.

[106] THE WORLD BANK, *supra* note 4, at 40 ("Growing corporate net zero commitments are driving demand in the voluntary carbon market segment. Large purchasers in 2021 came from a range of sectors. Energy companies, mainly large oil and gas firms, led the way in purchasing credits, increasing their demand ninefold compared to the previous year.").

[107] RICHARD BLACK ET AL., TAKING STOCK: A GLOBAL ASSESSMENT OF NET ZERO TARGETS24 (2021), https://ca1-eci.edcdn.com/reports/ECIU-Oxford_Taking_Stock.pdf?v=1616461369 (noting that there is a "rapid growth in net zero emission targets . . . .").

companies have net-zero targets, up from one-fifth in December 2020.[108] Importantly, the overwhelming majority of the companies setting a climate goal for themselves plan to rely on carbon offsets. For instance, a large study carried out by four organizations including the Oxford Net Zero research group observed that only about five percent of the companies in their dataset had explicitly stated that they would not rely on carbon offsets to reach their goals.[109] Similarly, a NewClimate Institute report analyzing the climate strategies of 25 major global companies accounting for about 5% of global GHG emissions highlights that, with only one exception, the climate goals of such companies "are likely dependent on offsetting through carbon dioxide removals or emission reduction offsets."[110] This suggests that as companies go about meeting their climate goals over the coming years, the corporate demand for carbon offsets will soar.

5. A Double-gatekeeper Market

As noted above, a key feature of the VCM is that two gatekeepers operate in the same market with the same stated goal, namely ensuring the quality of offset projects. This raises an obvious question: why are there two gatekeepers instead of just one?

We argue that the answer lies in the great heterogeneity of offset projects and in the key role played by reputation in gatekeeper services markets. As noted above, to be credible, gatekeepers must be repeat players, and hence have a sufficiently large portfolio of customers. Given the heterogeneity of projects—in terms of both type and geographical location—an entity that validates and monitors offset projects would require an enormous array of competencies to build such a portfolio of customers. The market has thus produced two gatekeepers that play complementary roles. On the one hand, VVBs provide the technical knowledge required to assess projects. However, because quickly developing this kind of knowledge in-house for a sufficiently wide variety of projects is very challenging, no VVB could reach the size needed to persuade the market that it would not trade long-term reputation for short-term gains. Standard setters, instead, do not carry out the same in-depth

[108] *Net Zero Stocktake 2022*, NET ZERO TRACKER (Jun. 13, 2022), https://zerotracker.net/insights/pr-net-zero-stocktake-2022 ("More than one-third (702) of world's largest publicly traded companies now have net zero targets, up from one-fifth (417) in December 2020.").

[109] *Companies' Table*, NET ZERO TRACKER, https://zerotracker.net/#companies-table (last visited Feb. 9, 2023) (authors' calculation based on the database created by the Oxford initiative reveal that only 55 companies out of 1090 who set a climate goal have ruled out the use of offsets).

[110] THOMAS DAY ET AL., CORPORATE CLIMATE RESPONSIBILITY MONITOR: ASSESSING THE TRANSPARENCY AND INTEGRITY OF COMPANIES' EMISSION REDUCTION AND NET-ZERO TARGETS 44 (2022), https://newclimate.org/sites/default/files/2022/02/CorporateClimateResponsibilityMonitor2022.pdf.

analysis of each project and, therefore, need less specialized knowledge, which allows them to play a monitoring role for a much wider range of projects and hence to act as reputational guarantors of the work carried out by VVBs. This analysis has two important implications: (i) interventions aimed at enhancing the reputational sanctions faced by VVBs are likely to be ineffective because VVBs are bound to have limited reputational capital among end-buyers; and (ii) what is crucial is to ensure that standard setters face sufficient reputational sanctions for inflated offsets so that they have incentives to discipline the behavior of VVBs. However, as we will discuss in the next part, the market failures that plague the VCM might prevent that from happening.

C. Regulations Affecting the Voluntary Carbon Market

The VCM is largely unregulated, with all the standards and rules by which market actors play having been developed by private actors.[111]

It seems, however, that the Commodity Futures Trading Commission's (CFTC) might have the authority to prosecute for fraud and manipulation. In fact, carbon offsets fall under the definition of "commodity" for the purposes of the Commodity Exchange Act.[112] Moreover, specific rules might apply depending on how the contract is designed. For instance, several carbon offset derivatives contracts are already listed on the CFTC's regulated exchanges,[113] and for these contracts the standard rules for derivatives apply. However, these rules have limited bite, especially because they do not engage with the thorny question of what constitutes a high-quality offset.

Another relevant provision for the VCM is Section 45(a) of the Federal Trade Commission Act, which deals with unfair or deceptive acts or practices affecting commerce.[114] Statements on offsets are deceptive when they misrepresent *regulatory* additionality (i.e. in cases where the activity resulting in a reduction of emissions was required by law), or when they misrepresent the moment at which the CO_2 emissions will be offset (i.e. claiming that emissions will be offset now when they will actually be offset years down the road).[115] In these two cases, we can reasonably expect

[111] INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION, VOLUNTARY CARBON MARKETS: ANALYSIS OF REGULATORY OVERSIGHT IN THE US 4 (2022), https://www.isda.org/a/93WgE/Voluntary-Carbon-Markets-Analysis-of-Regulatory-Oversight-in-the-US.pdf ("There are no legal, regulatory or other third-party restrictions on entities setting the standards or on how the standards are set and maintained for any particular type of [carbon offset].").
[112] *Id.* at 6. Section 1a(9) of the Commodity Exchange Act broadly defines a commodity to include, in addition to a number of crops, "all other goods and articles . . . and all services, rights, and interests . . . in which contracts for future delivery are presently or in the future dealt in."
[113] Rostin Behnam, Chairman, CFTC, Opening Statement at the CFTC Voluntary Carbon Markets Convening, Washington, DC (Jun. 2, 2022), https://www.cftc.gov/PressRoom/SpeechesTestimony/behnamstatement060222#_ftn4.
[114] 15 U.S.C. § 45(a) (1914).
[115] 16 U.S.C. § 260.5 (2012).

policymakers to be able to identify misconduct. However, Section 45(a) does not seem to cover cases where the issue at stake is the quality of the offsets used in an advertisement and where the deception is not as blatant as in these two examples.

Some policymakers believe that this framework is insufficient. For example, in 2022 a group of Democratic Party Senators urged the CFTC to "develop qualifying standards for carbon offsets that effectively reduce greenhouse gas emissions."[116] A similar request was advanced by a group of House Democrats to the U.S. Comptroller General.[117] However, at the time of writing these proposals had not yet resulted in concrete actions.

Meanwhile, international sectoral agreements as well as individual jurisdictions' regulations have been implemented that are bound to have an impact on the VCM.

First, the International Civil Aviation Organization has adopted a global market-based mechanism, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). This mechanism aims at offsetting the CO_2 emissions caused by airlines and released into the atmosphere in the time period between 2021 and 2035. By 2027, almost 90% of all international aviation activities will be subject to mandatory offsetting requirements.[118]

This scheme requires airlines to buy carbon credits to offset the emissions generated through their activity. In order to be eligible, offsets must be certified by an approved carbon-offsetting program. Among the standard setters approved by CORSIA are Verra and Gold Standard, which therefore have the power to certify offsets that can be used to comply with the CORSIA scheme. The importance of this regulatory power cannot be overstated, given that the aviation industry alone is responsible for roughly 2.5% of total CO_2 emissions.[119]

Similarly, the South African government has imposed a tax of about 120 South African Rands (approximately $6 at the time of writing) on each ton of carbon emissions.[120] Taxed entities can offset part of their emissions using carbon offsets,[121] and offsets approved by Verra can be used to this

[116] Letter from Cory Bookeret al. to Rostin Behnam, Chairman of the Commodity Futures Trading Commission 2 (Oct. 13, 2022), https://www.booker.senate.gov/imo/media/doc/letter_to_cftc_re_carbon_offsets_oct_2022.pdf.
[117] Letter from Jared Huffman, Raúl M. Grijalva & Kathy Castor to Gene L. Dodaro, Comptroller General of the United States (Aug. 30, 2022), https://huffman.house.gov/imo/media/doc/Carbon%20offsets%20letter%20to%20GAO_Huffman%20Castor%20Grijalva%208.30.22.pdf (asking for "well-defined standards in the natural carbon offsets").
[118] *2050: Net-zero carbon emissions*, IATA (last visited Feb. 9, 2023), https://airlines.iata.org/analysis/2050-net-zero-carbon-emissions.
[119] *See The Struggle to Put a Carbon Price on a Flight*, THE ECONOMIST (Dec. 15, 2022), https://www.economist.com/finance-and-economics/2022/12/15/the-struggle-to-put-a-carbon-price-on-a-flight.
[120] Carbon Tax Act 55, 2019 (Act No. 15/2019), (S. Afr.).
[121] Carbon Tax Act 18, 2019 (Act No. 15/2019), (S. Afr.).

end.[122] In Colombia Verra's certifications can grant even more significant benefits: Verra-certified offsets can in fact be used to offset *all* tax liability associated with the Colombian carbon tax.[123] That is, an entity might pay no carbon tax, provided that it purchases enough carbon offsets certified by Verra. Other countries are following the example set by South Africa and Colombia.[124]

IV. Market Failures

To the best of our knowledge, there have been no comprehensive studies of the overall quality of carbon offset projects. However, there is some evidence that the VCM has not always delivered on its promises. Compensate, a foundation which focuses on improving the integrity of the VCM, analyzed over 100 nature-based projects certified by leading standard setters and concluded that in the majority of cases the projects failed basic additionality tests. In fact, the projects were either protecting forests that were never actually in danger[125] or referred to afforestation projects that were already planned for commercial purposes.[126] Similarly, a report prepared by the Guardian, the German weekly Die Zeit, and SourceMaterial (a non-profit investigative journalism organization), found that more than 90% of Verra's rainforest offset credits are likely "phantom credits."[127] However, Verra has argued that this report relies on incorrect methodologies and hence had "limited utility" to assess the quality of the projects.[128] Peer-reviewed studies have also cast doubt on the quality of carbon offsets. For example, West et al. found that Verra-certified projects aiming to reduce

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[122] VERRA, USING VERIFIED CARBON UNITS IN THE CONTEXT OF THE SOUTH AFRICAN CARBON TAX ACT (2020), https://verra.org/wp-content/uploads/Using-VCUs-in-the-Context-of-the-South-African-Carbon-Tax-Act.pdf.

[123] *The VCS in Compliance Markets*, VERRA, https://verra.org/programs/verified-carbon-standard/vcs-in-compliance-markets/ (last visited Feb. 9, 2023).

[124] *See, e.g.*, *Singapore and Verra Sign MOU To Support National Carbon Tax*, VERRA (last visited Feb. 12, 2023), https://verra.org/singapore-and-verra-sign-mou-to-support-national-carbon-tax/ (reporting that Singapore National Environment Agency and Verra have signed a memorandum of understanding to allow Singapore-based companies to use offsets approved by Verra to meet part of their carbon tax obligations).

[125] COMPENSATE, REFORMING THE VOLUNTARY CARBON MARKET 67 (2021). https://downloads.ctfassets.net/f6kng81cu8b8/5vgGIHhsrTAbMnqaDYNGYJ/25a7d0e148a6d15cd10e2409107d7f3d/Reforming_the_voluntary_carbon_market_-_Compensate.pdf.

[126] *Id.* at 67.

[127] Patrick Greenfield, *Revealed: More Than 90% Of Rainforest Carbon Offsets By Biggest Provider Are Worthless, Analysis Shows,* THE GUARDIAN (Jan. 18, 2023), https://www.theguardian.com/environment/2023/jan/18/revealed-forest-carbon-offsets-biggest-provider-worthless-verra-aoe ("The research into Verra . . . has found that, based on analysis of a significant percentage of the projects, more than 90% of their rainforest offset credits – among the most commonly used by companies – are likely to be 'phantom credits' and do not represent genuine carbon reductions.").

[128] *Verra Disputes Guardian Findings on 'Worthless' REDD Credits,* QUANTUM COMMODITY INTELLIGENCE (Jan. 18, 2023), https://www.qcintel.com/carbon/article/verra-disputes-guardian-findings-on-worthless-redd-credits-11144.html (noting that the Guardian's study has "limited utility for assessing the impact of REDD+ projects because [it] do[es] not consider site-specific drivers of deforestation." In other words, the basic claim is that the Guardian's study miscalculates baseline emissions).

emissions from deforestation and forest degradation in the Amazon rainforest overstated emissions reductions.[129] One common concern is the definition of the baseline, as the projects' estimates had been grounded on historical deforestation trends that were no longer plausible at the time of the project's development.[130]

Controversies have also involved some of the world's largest corporations. For instance, in collaboration with Nature Conservancy, a non-profit organization, corporate giants like BlackRock, JPMorgan Chase, and Disney are investing millions to preserve forests in the United States' Northeast; or so they claim.[131] According to a Stanford scholar, Nature Conservancy is "engaged in the business of creating fake carbon offsets,"[132] by protecting forests that do not need protecting.[133] That is, forests that would not have been touched anyway. The controversy reached the point that Nature Conservancy started an internal review to assess the quality of the millions of dollars of offsets it had sold to such corporate giants.[134]

Admittedly, because developing and monitoring projects is inherently complex, instances of offsets being inflated and disagreement over the quality of some offsets are inevitable. However, as we discuss in the following sections, the way the market is structured gives relevant players insufficient incentives to minimize offset inflation.

A. The Issuer-pays Model

In financial regulation, the issuer-pays model refers to a situation in which a gatekeeper lending its reputation to issuers of listed securities or debt instruments receives its principal source of revenues from the issuers themselves.[135] In its essence, this model also characterizes the two main relationships

[129] Thales A.P. West, Jan Börner, Erin O. Sills & Andreas Kontoleon, *Overstated carbon emission reductions from voluntary REDD+ projects in the Brazilian Amazon*, 117 PROCEEDINGS OF THE NAT'L ACAD. SCI. 24188, 24189 (2020) ("Overall, we find no significant evidence that [the] projects in the Brazilian Amazon have mitigated forest loss.").
[130] *Id.* at 24188 ("These baseline scenarios typically assume a continuation of historical deforestation trends . . . , and thus eventually become unrealistic counterfactuals as the regional economic and political context change.").
[131] Ben Elgin, *These Trees Are Not What They Seem*, BLOOMBERG (Dec. 9, 2020), https://www.bloomberg.com/features/2020-nature-conservancy-carbon-offsets-trees/?leadSource=uverify%20wall ("At first glance, big corporations appear to be protecting great swaths of U.S. forests in the fight against climate change.").
[132] *Id*.
[133] *Id*. (arguing that the corporations are buying offsets for trees that were not in peril).
[134] Ben Elgin, *A Top U.S. Seller of Carbon Offsets Starts Investigating Its Own Projects,* BLOOMBERG (Apr. 5, 2021), https://www.bloomberg.com/news/features/2021-04-05/a-top-u-s-seller-of-carbon-offsets-starts-investigating-its-own-projects?leadSource=uverify%20wall.
[135] Günter Strobl & Han Xia, *The Issuer-Pays Rating Model and Ratings Inflation: Evidence From Corporate Credit Ratings* 1 (2011), http://efa2011.efa-online.org/fisher.osu.edu/blogs/efa2011/files/APE_8_2.pdf.

in the VCM: (i) the one between the project developer and the standard setter; and (ii) the one between the project developer and the VVB. In the former relationship, the project developer, whose project needs to be evaluated, pays the standard setter, whose fee depends on the number of carbon offsets certified.[136] In the latter relationship, the VVB, which needs to evaluate the validity of the project, is also paid by the project developer.

In principle, the issuer-pays model need not to result in offset inflation. On the one hand, it is clear that all three parties involved in these relationships can potentially benefit from offset inflation. The project developer benefits because the higher the number of certified carbon offsets, the more the carbon credits that can be exchanged and sold on the market. The standard setter benefits because it profits more when more offsets are certified, given that the fees it receives depend on the quantity of offsets certified.[137] Last, as the VVBs are hired and paid by the developers, they have incentives to be lax in their assessments in order to please their clients, knowing that by doing so they might have a better chance of being asked to validate another project in the future.[138]

On the other hand, if the buyers can assess perfectly well when offsets are inflated and have incentives to punish those who certify inflated offsets, then the issuer-pays model raises no concern.[139]

Assume you have to choose between two offsets and you can tell without a shadow of a doubt that one corresponds to a real reduction in emissions while the other does not. It would be safe to say that you would prefer to buy the former and you would no longer even consider the services of the standard setter and the VVB who certified and validated the latter offset as reliable. In turn, this would mitigate market players' incentives to inflate offsets, as they would lose revenues and harm their reputation by doing so.[140]

However, the literature on credit rating agencies has shown that the issuer-pays model creates significant problems when either of the following two conditions hold: (i) buyers do not detect and

[136] *Supra* note 93-94 and accompanying text.
[137] *Id.*
[138] Marco Pagano & Paolo Volpin, *Credit Ratings Failures and Policy Options*, 25 ECON. POL'Y 401, 404 (2010) (arguing that when certification providers are paid by issuers their incentives are more aligned with those of the issuers than with those of who relies on the certification).
[139] Stephen Choi, *Market Lessons for Gatekeepers*, 92 NW. U. L. REV. 916, 961 (1998) (nothing that the value of certifications provided by gatekeepers rests on the perception among purchases that they are accurate); Claire A. Hill, *Regulating the Rating Agencies*, 82 WASH. U. L. Q. 43, 50 (2004) ("If markets think a firm can get a high rating just by paying for it, ratings won't be valued.").
[140] *See, e.g.,* Steven L. Schwarcz, *Private Ordering of Public Markets: The Rating Agency Paradox*, 2002 U. ILL. REV. 1, 26 (2002) (noting that certification providers have incentives to provide accurate certifications because their profitability depends on their reputation); Gadinis & Mangels, *supra* note 79, at 810 ("Their business model relies on maintaining and augmenting this reputational capital; without it, they can no longer perform their verification role.").

punish inflated certifications; and (ii) certifications also result in regulatory benefits. In the next sections we explain why both these conditions hold in the VCM. Here, we note that one additional characteristic of the VCM pushes in the direction of inflating offsets, namely the fee structure we have described in section III.B.2: by charging fees proportionate to the credits certified, standard setters have a self-evident incentive to inflate credits, which exacerbates the concerns about the issuer-pays model.

B. Buyers Fail to Detect and Punish Inflated Certifications

Credence goods are goods that cannot be evaluated by consumers even after they have been consumed.[141] Carbon offsets fall squarely into this category, as determining their quality involves an extremely complex process that final consumers cannot second-guess even after the purchase.[142] For this reason, end-consumers are unable to punish standard setters that inflate offsets or VVBs that are too lax in their assessment. If end-consumers cannot detect and punish inflated offsets, reputational sanctions associated with selling them low-quality offsets are unlikely to constrain the behavior of standard setters and VVBs.[143] But why would end-consumer purchase offsets when they cannot assess their quality?

One plausible answer is that some buyers might simply take certifications at face value. Focusing on the market for ratings, Bolton, Freixas, and Shapiro show that when a sufficiently large fraction of investors is trusting (i.e. taking ratings at face value), then rating agencies can increase their profits by inflating their ratings.[144] This condition is likely to hold for end-consumers in the market for offsets. On the one hand, as noted above, end-consumers cannot assess the quality of offsets.[145] On the other hand, a significant fraction of buyers might be driven by selfish reasons, and thus overlook the possibility that offsets could be inflated. The economics literature has long established that people tend to donate even when their donation has no real impact. This is because

[141] For a survey on the literature on credence goods *see* Loukas Balafoutas & Rudolf Kerschbamer, *Credence Goods in The Literature: What the Past Fifteen Years Have Taught Us About Fraud, Incentives, and the Role of Institutions*, 26 J. BEHAV. & EXP. FIN. 100285 (2020).
[142] For a discussion of the factors that affect the quality of an offset, *see supra* notes 46-62 and accompanying text.
[143] Pagano & Volpin, *supra* note 136 at 404 (noting that certification inflation becomes profitable when at least some of the users of the certification are naïve and do not realize that the certifications are inflated).
[144] Patrick Bolton, Xavier Freixas & Joel Shapiro, *The Credit Ratings Game*, 67 J. FIN. 85, 102 (2012) ("[T]he financial rewards for CRAs from inflating their ratings and overselling the issue to trusting investors are just too high.").
[145] Nicole Franki, Note, *Regulation of the Voluntary Carbon Offset Market: Shifting the Burden of Climate Change Mitigation from Individual to Collective Action*, 48 COLUMBIA JOURNAL OF ENVIRONMENTAL LAW, 177, 197 (2022) (stating that "Consumers cannot independently verify whether a carbon offset truly reduces the promised amount of GHG emissions").

donating generates a so-called "warm glow."[146] In an interesting experiment, Crumpler and Grossman provide participants with an endowment and then let them decide which portion of the endowment they intend to donate to a charity.[147] However, they also explain that the amount the charity will receive is fixed, regardless of how much the participant decides to donate. In fact, for each dollar the participant donates, the same amount is deducted from the sum donated by the experimenter. Under these conditions, somebody who is donating only for altruistic reasons (i.e., to benefit the charity), would have no incentives to donate. Crumpler and Grossman find that under these conditions most people still donate to the charity, evidently for the warm glow they derive from donating.[148] As empirical evidence shows that pro-environmental behaviors also trigger a warm glow,[149] a similar dynamic is likely to unfold for offsets. Thus, people might be willing to purchase carbon offsets regardless of their quality just to feel a warm glow.

End-consumers are not the only buyers of offsets. In fact, demand for VCM offsets is currently driven by corporations aiming to reach their climate targets.[150] But there are several reasons to believe that corporations will neither act as the informed marginal consumers that can make information asymmetries less troublesome in consumer markets[151] nor impose reputational sanctions preventing developers, standard setters, and VVBs from profiting from the inflation of offsets. First, many large buyers prefer to buy offsets via bilateral deals with project developers,[152] which means that they have access to a different set of projects than end-consumers. For instance, as we have seen in Section III.B.1, Shell launched a partnership to develop offsets that it will purchase directly from the developer. For this reason, even assuming that Shell is able and willing to ensure the quality of offsets, it will do so for the ones that it will purchase and not for the ones sold to end-consumers. Second, in the absence of blatant violations, even corporations might have a hard time screening offsets for quality. Validation and monitoring of offsets is a very complex process for which there is a shortage of skills, as testified by the dramatic bottleneck caused by the lack of qualified VVBs.[153] It would be

[146] Heidi Crumpler & Philip J. Grossman, *An Experimental Test of Warm Glow Giving*, 92 J. PUB. ECON. 1011 (2008).
[147] *Id.* at 1014-1015 (describing their experimental procedure).
[148] *Id.* (finding that even under their experimental condition almost 60% of participants decided to donate to the charity).
[149] Christopher F. Clark, Matthew J. Kotchen & Michael R. Moore, *Internal and External Influences on Pro-Environmental Behavior: Participation in a Green Electricity Program,* 23 J. ENV. PSY. 237 (2003).
[150] THE WORLD BANK, *supra* note 4, at 40 ("Growing corporate net zero commitments are driving demand in the voluntary carbon market segment. Large purchasers in 2021 came from a range of sectors. Energy companies, mainly large oil and gas firms, led the way in purchasing credits, increasing their demand ninefold compared to the previous year").
[151] *See, e.g.,* Alan Schwartz & Louis L. Wilde, *Intervening in Markets on the Basis of Imperfect Information: A Legal and Economic Analysis*, 127 U. PA. L. REV. 630, 638-648 (1979).
[152] FOREST TRENDS' ECOSYSTEM MARKETPLACE, *supra* note 37, at 10-11 (2022) (reporting that the vast majority of their respondents prefer buying offsets directly from project developers).
[153] *Supra* Section III.B.3.

reasonable to exclude the possibility that firms engaged in completely different activities would have the in-house skills to evaluate the quality of offsets properly.

Most importantly, given that for end-consumers carbon credits are a credence good,[154] corporations are unlikely to face any reputational sanctions on the product market for purchasing low quality offsets. Thus, corporations have incentives to purchase cheap and inflated offsets, so that they can appear sustainable at a lower cost.

One possible constraint may come from concerned stakeholders, such as ESG-minded beneficial holders of shares and their agents (institutional investors). Consider the case of asset managers. As previously hinted, corporations might purchase offsets not only to please final consumers, but also to be included in the portfolios of many asset managers and asset owners who have undertaken to reduce their portfolios' emission intensity.[155] Asset managers' incentives may thus in theory affect corporate buyers' behavior. Yet, institutional investors similarly have very limited incentives to verify the quality of the offsets purchased by portfolio companies. On the one hand, verifying the quality of offsets bought by all companies in their portfolio would be extremely expensive and greatly increase their costs. On the other, it is unlikely that their customers could evaluate their screening procedures, and hence they would derive minimal financial benefits from investing in monitoring offsets.

In summary, reputational sanctions can constrain the behavior of VVBs and standard setters under an issuer-pays model only if the demand side of the market is both able and willing to punish low-quality offsets. As we have discussed, this does not seem to be the case. Therefore, the issuer-pays model is likely to lead to inflated certifications. This conclusion is corroborated by the extremely low prices characterizing the VCM,[156] which suggests that the demand side is unable and unwilling to push cheap low-quality offsets off the market. Worse still, it might even be evidence of adverse selection in the VCM.

C. Regulatory Licenses

Section III.C documented instances of regulations that grant standard setters a regulatory license, that is, regulations attaching positive consequences, such as a lower carbon tax burden, to

[154] *Supra* notes 141-142 and accompanying text.
[155] For a description of the climate targets of members of the UN-convened Net Zero Asset Owner Alliance (NZAOA), *see Members' Intermediate Targets*, UNEPFI, https://www.unepfi.org/net-zero-alliance/resources/member-targets/ (last visited Feb. 9, 2023).
[156] *Supra* note 66-67 and accompanying text.

those who purchase of certified carbon credits. The negative implications of granting certification services providers the ability to sell regulatory benefits are well-known, with credit rating agencies being an egregious example.[157] Over the years, regulators have attached more and more regulatory benefits to high ratings.[158] For instance, regulators permit lower capital reserves when the assets held have higher credit ratings.[159] In turn, this implies that ratings have a value that is at least in part independent of the reputation of the rating agency which issued it, as the very fact of receiving a positive rating brings with it a regulatory benefit. When the regulatory benefits associated with high ratings become significant, rating agencies find it more profitable to sell regulatory benefits by inflating ratings than by diligently processing information according to rigorous methodologies.[160] And, as noted by Professor Partnoy, this problem "can be generalized beyond credit ratings to any area in which the regulator privatizes a rating function by incorporating the ratings of a fixed number of raters into substantive regulation."[161]

In short, both economic theory and experience suggest that regulatory licenses for standard setters are likely to further displace the weak reputational mechanisms we have highlighted above.[162] Thus, granting standard setters a regulatory license is likely to lower the quality of the offsets certified on the VCM.

V. What Policymakers Should and Should Not Do

Thus far, we have described the functioning and the importance of the VCM, but also the market failures plaguing it. In this Part, we discuss what policymakers should and should not do to ameliorate – or at least not worsen – the functioning of the VCM. Table 2 summarizes our suggestions, while

[157] Lawrence J. White, *Markets: The Credit Rating Agencies*, 24 J. ECON. PERSP. 211, 212-214 (2010) (discussing the negative implications of "outsourcing regulatory judgements" to the rating agencies); Frank Partnoy, *Historical Perspectives on the Financial Crisis: Ivar Krueger, the Credit-Rating Agencies, and Two Theories About the Function, and Dysfunction, of Markets,* 26 YALE J. REG. 431, 432-433 (2009) (arguing that without regulatory overreliance of ratings the 2007-2009 crisis might not have occurred or at least would not have been as deep).

[158] *See, e.g.,* Frank Partnoy, *The Siskel and Ebert of Financial Markets: Two Thumbs Down for the Credit Rating Agencies*, 77 WASH. U. L. Q. 619, 686-703 (1999) (providing an overview of the regulatory licensing power of rating agencies).

[159] *See, e.g.,* Howell E. Jackson, *The Role of Credit Rating Agencies in the Establishment of Capital Standards for Financial Institutions in a Global Economy*, *in* REGULATING FINANCIAL SERVICES AND MARKETS IN THE TWENTY FIRST CENTURY 311, 313 (Eilís Ferran & Charles A.E. Goodhart eds., 2001).

[160] Christian C. Opp, Marcus M. Opp & Milton Harris, *Rating Agencies in the Face of Regulation*, 108 J. FIN. ECON. 46 (2013) (showing formally that in the presence of significant regulatory benefits rating agencies find it more profitable to inflate ratings and sell regulatory benefits than to invest in information acquisition; Partnoy, *supra* note 158, at 682 (noting that when "a favorable rating eliminates or reduces [regulatory] costs, then rating agencies will sell regulatory licenses to enable issuers and investors to reduce their costs.").

[161] Partnoy, *supra* note 158, at 682-683.

[162] *See supra* Section III.B.5.

the next two sections discuss each of the points mentioned in Table 2 in more detail. Last, we offer an example of policy intervention that builds on these guidelines.

Dos	Don'ts
Increase the transparency of the market	Ex-ante regulation
Give incentives to agents who possess the relevant information to identify low-quality offsets	Ex-post liability
Strengthen reputational sanctions for inaccurate certifications	Regulatory licenses

Table 2: Dos and Don'ts

A. Don'ts

We identify three approaches that policymakers should refrain from endorsing: (i) imposing stringent ex-ante regulations; (ii) imposing gatekeeper liability; and (iii) granting gatekeepers regulatory licenses.

1. Ex-ante regulation

Ex-ante regulations are a broad range of measures that affect an activity with a view to reduce or avoid the externalities it generates.[163] Examples include safety standards, Pigouvian taxes, and transferable discharge permits.[164] As discussed in Section III.C, an ex-ante regulation recipe has been advocated by various Democratic members of Congress.[165]

However, putting such a recipe into practice is easier said than done. Regulation can only be efficient if policymakers have sufficient information on the optimal conduct and can detect and sanction violations by the regulated.[166] None of these conditions are satisfied. For a single aspect alone – determining baseline emissions – the Clean Development Mechanism has adopted more than 200 different methodologies.[167] Thus, setting standards sufficiently comprehensive to ensure that offsets effectively reduce GHG emissions would require an enormous amount of information.

[163] Charles D. Kolstad, Thomas S. Ulen & Gary V. Johnson, *Ex Post Liability for Harm vs. Ex Ante Safety Regulation: Substitutes or Complements?*, 80 AM. ECON. REV. 888 (1990).
[164] *Id.*
[165] *Supra* Section III.C .
[166] Louis Kaplow & Steven Shavell, *Economic Analysis of Law*, *in* HANDBOOK OF PUBLIC ECONOMICS Vol. 3. 1661, 1694 (Alan J. Auerbach & Martin Feldstein eds., 2002).
[167] *Supra* note 52.

Furthermore, projects are carried out in the most disparate parts of the globe, and hence assessing their impact and verifying their performance often requires a deep understanding of local conditions. Not coincidentally, the calls from Democratic policymakers are very vague as they mention the identification of appropriate standards without specifying what those standards might be.[168]

Evidence supporting the view that ex-ante regulations cannot easily ensure the quality of offsets comes from regulated offset markets. For instance, a study carried out by scientists from the University of Berkeley analyzed 80 percent of the offset credits issued by the California Air Resources Board and found that an astounding 82 percent did not represent true emissions reductions.[169] More recent research has further corroborated the idea that California's forest carbon offsets program is systematically over-crediting.[170]

The situation is equally dire in Australia. Professor Macintosh, the creator of the Emissions Reduction Fund's carbon credit scheme, found that 70 to 80 percent of the offsets issued by the Australian Carbon Credit Units are "devoid of integrity—they do not represent real and additional abatement,"[171] and further argued that this represents "a fraud on the environment, a fraud on taxpayers and a fraud on unwitting private buyers of [Australian Carbon Credit Units]." [172]

Stunning figures have also been reported in two studies focusing on the Clean Development Mechanism. One finds that for 85% of the projects covered in their analysis there is a small probability that emissions reductions are additional and not overestimated, whereas for only 2% of the projects there is a high probability that emissions reductions are additional and not overestimated.[173] The other study observes that at least 52% of the analyzed carbon offsets do not meet the additionality requirement.[174] Indeed, compliance markets are considered so unreliable that a Gold Standard spokesperson said that the group would not certify "any offsets from the UN's [Reducing Emissions from Deforestation and Forest Degradation] forest conservation program, even

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[168] *See supra* notes 116–117 and accompanying text.

[169] BARBARA HAYA, THE CALIFORNIA AIR RESOURCES BOARD'S U.S. FOREST OFFSET PROTOCOL UNDERESTIMATES LEAKAGE 1 (2019), https://gspp.berkeley.edu/assets/uploads/research/pdf/Policy_Brief-US_Forest_Projects-Leakage-Haya_4.pdf (finding that "82% of [the] credits [analyzed] likely do not represent true emissions reductions due to the protocol's use of lenient leakage accounting methods.").

[170] Grayson Badgley et al., *Systematic Over-Crediting in California's Forest Carbon Offsets Program*, 28 GLOB. CHANG. BIOL. 1433, 1442 (2002) (concluding that the program issues offsets "on the basis of flawed calculations").

[171] Mike Foley, *Whistleblower's 'Fraud' Claim Threatens Integrity Of $4.5 Billion Carbon Offset Scheme*, THE SYDNEY MORNING HERALD (Mar. 22, 2022), https://www.smh.com.au/politics/federal/whistleblower-s-fraud-claim-threatens-integrity-of-4-5-billion-carbon-offset-scheme-20220324-p5a7ma.html.

[172] *Id.*

[173] MARTIN CAMES ET AL., HOW ADDITIONAL IS THE CLEAN DEVELOPMENT MECHANISM? ANALYSIS OF THE APPLICATION OF CURRENT TOOLS AND PROPOSED ALTERNATIVES 11 (2016), https://www.verifavia.com/uploads/files/clean_dev_mechanism_en.pdf.

[174] Raphael Calel, Jonathan Colmer, Antoine Dechezleprêtre & Matthieu Glachant, *Do Carbon Offsets Offset Carbon?* 30 (CESifo Working Paper No. 9368, 2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3950103.

though it accounts for 80% of global forest-based offsets, because baseline accounting problems are so pervasive."[175] In other words, the largest regulated market has produced standards that are deemed to be too low by VCM participants.

Given the poor results produced by regulated markets, it is important to preserve a space in which private experimentation and market mechanisms can lead to the development of new solutions and new standards.

2. Gatekeeper Liability

Another possible approach could be making standard setters – and eventually VVBs – liable when they certify low-quality offsets. The fundamental premise on which gatekeeper liability is grounded is that gatekeepers are in a position to reduce the risk of misconduct on the part of their clients.[176] When this requirement is met, and when the government can accurately identify the optimal level of gatekeeper monitoring and can observe gatekeepers' actual level of monitoring, then imposing ex-post liability for inaccurate certification can provide gatekeepers with the right incentives.[177] Whether this is actually the case in a given market is an empirical question. For instance, Professor Coffee argued that defining the standard of care for credit rating agencies would be akin to descending into the Serbonian bog.[178] Given the complexity and the heterogeneity of the problems that arise in developing and monitoring the development process of carbon offsets, defining appropriate standards of care would be several orders of magnitude more complex with respect to the VCM than for the credit rating market. And while adopting a strict liability rule would spare courts the need to identify the optimal care level, it would still leave them wrestling with the possibly even thornier issue of identifying low-quality offsets.

Under these circumstances, courts are likely to set standards that are either too lax or too stringent. In the former case, they would fail to induce VVBs and standard setters to adopt an optimal

[175] Tim McDonnell, *Carbon Offsets Are Going Primetime and They're Not Ready,* QUARTZ (May 20, 2021), https://qz.com/2009746/not-all-carbon-offsets-are-a-scam-but-many-still-are.

[176] See Reinier H. Kraakman, *Corporate Liability Strategies and the Costs of Legal Controls*, 93 YALE L. J. 857, 890 (1984) ("The first requisite for gatekeeper liability is, of course, an outsider who can influence controlling managers to forgo offenses.").

[177] Louis Kaplow & Steven Shavell, *Economic Analysis of Law*, *in* HANDBOOK OF PUBLIC ECONOMICS Vol. 3. 1661, 1688 (Alan J. Auerbach & Martin Feldstein eds., 2002) (noting that "courts need to be able to calculate optimal care . . . and to be able to observe actual care."); Assaf Hamdani, *Gatekeeper Liability*, 77 S. CAL. L. REV. 53, 84 (2003) ("When the government can accurately specify the appropriate level of gatekeeper monitoring and fully observe the actual level of monitoring that gatekeepers have adopted, both negligence and strict liability will provide gatekeepers with optimal monitoring incentives.").

[178] John C. Coffee Jr, *Gatekeeper Failure and Reform: The Challenge of Fashioning Relevant Reforms*, 84 B. U. L. REV. 301, 347 (2004).

level of monitoring, whereas excessively stringent standards might even lead to the unraveling of the market.

Market unraveling is an especially serious and concrete threat. On the one hand, given the complexity of verifying and monitoring projects, even well-intentioned VVBs and standard setters can make mistakes relatively frequently. Being forced to pay monetary damages in all these circumstances might force VVBs and standard setters to abandon the market. On the other hand, the low price at which carbon offsets currently trade implies that often the margins for project developers are fairly small.[179] Were VVBs and standard setters to increase their fees substantially to cover the costs of the expected liability, this could drive many project developers out of the market.

Furthermore, given the complexity that characterizes the VCM, it is unlikely that courts would be able to formulate a single and predictable standard. In the presence of uncertainty as to the required behavior, either of the following two negative consequences could arise: where uncertainty as to how to behave is extreme, parties could be expected to limit their investment in compliance and, more specifically, in ensuring that the offsets are of sufficiently high quality.[180] Alternatively, parties may have incentives to invest excessively in precautions,[181] which might stifle innovation and further increase the risk of the market unraveling.

Furthermore, to hold the gatekeeper liable, one would have to prove that its conduct caused the victim's loss and then the court would have to quantify such loss. In this context, for liability to be triggered, either the standard setter or the VVB must have caused a quantifiable harm to the buyers of the offsets. While the specific details would depend on the way a liability regime for standard setters and VVB is implemented, assessing causation and estimating harm would be very complex.

3. Regulatory Licenses

Policymakers around the globe have started incorporating certifications from leading standard setters in their regulations.[182] The rationale is that leading standard setters are the most suited actors to identify high quality offsets. However, as discussed in Section IV.C, regulatory licenses displace

[179] Shane Shifflet & Ryan Dube, *Carbon Credits Sell Well. In Peru Locals See Very Little of the Money,* WALL STREET J. (Jan. 19, 2023) (reporting that investors and intermediaries alone take about 33% of the revenues from carbon credits. When one considers that other players like standard setters and VVBs need to be compensated, it is clear that project developers only receive a small fraction of the revenues).
[180] Richard Craswell & John E. Calfee, *Deterrence and Uncertain Legal Standards*, 2 J. L. ECON. & ORG. 279, 280 (1986) ("Very broad uncertainty, on the other hand, is more likely to lead to undercompliance.").
[181] *Id.* ("overcompliance is likely to be common, even when all parties are risk-neutral, in a variety of situations where the uncertainty is relatively small").
[182] *Supra* notes 119- 124 and accompanying text.

reputational sanctions, which are crucial to ensure that standard setters have incentives to avoid offset inflation. From this perspective, the granting of a key regulatory license to standard setters in CORSIA and in the carbon tax mechanism of South Africa and Colombia was a step in the wrong direction. Worryingly, other countries seem to be inclined to grant leading standard setters the power to issue regulatory licenses.[183]

B. Dos

Especially with respect to new markets, it is of course easier to identify policy recipes that would *not* help than those which might bear fruit. With that in mind, and based on our previous analysis of the VCM and its market failures, we now turn to outline what policymakers could do to improve the functioning of the VCM.

1. Increase Transparency

When it comes to improving the functioning of the VCM, the mantra is increasing transparency.[184] A promising attempt in this direction comes in the form of the Climate Warehouse of the World Bank, which is a "a public metadata layer that uses blockchain technology to facilitate peer-to-peer connections among decentralized registries to link, aggregate, and harmonize underlying data, and enable the transparent accounting of [internationally transferred mitigation outcomes]."[185] In a nutshell, the Climate Warehouse is a meta-registry that reports in a uniform format on the projects certified by all standard setters and included in the various registries.

The Climate Warehouse is built using a blockchain technology which, according to the developers, provides four key advantages: a fully auditable and secure record of transactions (transparency); decentralized governance and peer-to-peer support (accountability); full immutability and traceability (integrity); and inclusiveness, thanks to the fact that the meta-registry is "public, fully open-source, and permissionless."[186]

While commendable, this initiative will not be sufficient to improve the functioning of the VCM. Unless the market failures described in Part IV are addressed, increasing transparency will not

[183] *See supra* note 124.
[184] For instance, the report of the Taskforce on Scaling Voluntary Carbon Markets mentions the words transparent and transparency 32 times.
[185] WORLD BANK, CLIMATE WAREHOUSE SIMULATION III: FINAL REPORT 2 (2022), https://documents1.worldbank.org/curated/en/099605009212233328/pdf/IDU09ef226cf0a663041d60869f07078d1af9fd3.pdf.
[186] *Id.* at 8.

of itself achieve much. Standard setters and project developers would still profit more by inflating offsets and reputational sanctions would still be ineffective given that consumers would still be unable (or unwilling) to assess the quality of offsets. In other words, while information would become more accessible (and assuming, for the sake of argument, that the regulator correctly identifies the information contents that would matter for its intended users), there would be no agents with sufficient incentives to identify and punish gatekeepers certifying low-quality offsets. Consequently, reputational sanctions would remain ineffective.

Increased transparency must thus be coupled with two additional interventions if it is to have a positive impact on the market: first, agents with the relevant knowledge and expertise should be given the incentive to identify low-quality offsets; and, second, mechanisms to strengthen reputational sanctions for inaccurate certifications should be in place. These two proposed interventions are discussed in turn.

2. Tweaking Standard Setters' Incentives

As discussed in Section IV.A, the fundamental problem of the VCM is that there are no market players with sufficient incentives to invest resources in detecting low-quality offsets. One possible solution would be to devise a mechanism to promote private litigation with a view to enhance the effectiveness of reputational sanctions. The basic idea is to give NGOs standing to sue standard setters and VVBs who have posted inaccurate information on the World Bank's Climate Warehouse and reward them for proving that the information was indeed inaccurate.

Five important questions regarding the mechanics of the dispute resolution system we propose are: (i) how would this reward system work? (ii) Who would provide the monetary rewards for NGOs? (iii) Who bears the litigation costs? (iv) Who adjudicates the cases? And (v) what are the sanctions faced by standard setters when it is found that they have inflated offsets? We discuss each question in turn.

First, we suggest implementing a mechanism that provides financial rewards to NGOs that prevail in the litigation having successfully identified inflated offsets. To do so, the first step would entail creating a fund from which suing NGOs can be compensated. We argue that the fund should be financed by governments and corporations. Corporations, however, should be under no obligation to contribute, and yet contributions made by each company should be displayed in the registry. We include in the appendix a simple game showing that under plausible assumptions companies would still have incentives to contribute. Clearly, the system would be perceived as more legitimate by

market players if they were to voluntarily opt-in. The best way to understand why corporations would have incentives to fund this mechanism is to imagine the different reputational consequences they would face if the offsets they purchased were found to be of low quality. Of course, if a company is caught advertising low-quality offsets, the reputational consequences are likely to be negative, and the company would be accused of greenwashing. For instance, if an investigative report by a newspaper discovers that Shell has purchased low-quality offsets, then Shell would be perceived as involved in greenwashing. On the contrary, if Shell had contributed to the fund, it could easily spin the message. While it would still be true that it bought low-quality offsets, the entity identifying them as such would be given a financial reward to which Shell itself had contributed. In other words, on top of paying standard setters and VVBs to certify the offsets, Shell would be financing a system in which actors are rewarded for identifying low-quality offsets among the ones it has purchased. It would be difficult to ask more of a corporation, considering that directly investigating the quality of offsets is beyond its core competencies. Thus, contributing to the proposed mechanism would reduce the reputational sanctions that corporations face when purchasing low-quality offsets. While we have argued that these reputational sanctions are unlikely to be of a sufficient magnitude to deter the inflation of offsets, they are likely to be larger than the relatively small sums companies should donate to make the proposed system work.[187]

At the end of each year, the NGOs to have successfully identified inflated offsets would split the fund, with each NGO receiving a fraction of the fund that is proportional to the inflated offset it identified. For instance, assume that the fund is $100. Assume also that two NGOs have identified inflated offsets, one for 30 tonnes of CO_2, and the other for 20 tonnes of CO_2. Then, the first NGO would receive 60% of the fund ($60) and the second would receive 40% ($40). This litigation mechanism would then give hard monetary incentives to NGOs and other actors to detect low-quality offsets.

Second, we suggest that the allocation of litigation costs should depend on the outcome of the procedure. If the claimant (i.e. the NGO), wins, it is refunded the costs of litigation by the defendants. If the claimant loses, then the costs of litigation are covered by the fund, unless the adjudicators consider the case brought by the NGO to be frivolous. In that case, the litigation costs would have to

[187] A relatively large number of corporations have stated that they refrain from purchasing carbon credits for fear of reputational sanctions. *See* Dieter Holger, *Many Companies Are Shying Away from Carbon Credits*, WALL STREET J. (Jan. 17, 2023) (noting that around 40% of the corporations surveyed by the World Economic Forum and Bain & Co. cite the risk of reputational damage as one of the reasons for not purchasing carbon offsets). Their reluctance suggests that the expected value of reputational sanctions is higher than zero, and hence that firms have incentives to contribute to the proposed mechanism. It also implies that improving how reputational mechanism works might lead new buyers to join the market.

be covered by the NGO. To further minimize the risk of frivolous litigation, one could impose a limit on the number of times an NGO can have its litigation costs covered by the fund before having to pay its own litigation costs.

Third, we suggest that the selection of the adjudicators should mirror what happens in arbitration. That is, each party selects one arbitrator, while the third arbitrator is jointly appointed by the parties.[188] If the parties cannot reach an agreement, the third arbitrator would be appointed by the World Bank, as already happens at the International Centre for Settlement of Investment Disputes.[189] A key advantage of this appointment procedure is that it strengthens parties' support for the entire process.[190]

Last, we argue that even when it is established that standard setters have certified inflated ratings, there should be *no monetary sanction*. In fact, as discussed in Section V.A.2, discriminating between high-quality and low-quality offsets is a highly complex task, and there would thus be a high number of false positives and false negatives. That situation, combined with monetary sanctions, would likely push standard setters and VVBs out of the market.

To be sure, this mechanism, while helpful, would be insufficient. As it ultimately relies on reputational sanctions for the VCM players, what must additionally be ensured is that the information about litigation outcomes reaches offset buyers and end consumers.

3. Strengthening Reputational Sanctions for Inaccurate Certifications

Transparency and litigation could improve the functioning of the VCM only if reputational sanctions are attached to undesirable behavior. For that to be the case, information must be presented in a way that makes it easy for offset buyers—and for end consumers who purchase from firms relying on offsets—to identify low-quality offsets. However, these actors have limited incentives to invest resources for the purpose of deciphering the complex information contained in the registries. Thus, we suggest that the outcome of the litigation should be summarized in a way that people can easily process and understand.

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[188] Chiara Giorgetti, *Who Decides Who Decides in International Investment Arbitration*, 35 U. PA. J. INT'L L. 431, 443 (2013).

[189] Convention of the Settlement of Investment Disputes Between States and Nationals of Other States, Mar. 18 1965, 17 U.S.T. 1270 art. 38 ("If the Tribunal shall not have been constituted within 90 days . . . the Chairman shall . . . appoint the arbitrator or arbitrators not yet appointed.").

[190] Catherine A. Rogers, *The International Arbitrator Information Project: An Idea Whose Time Has Come*, KLUWER ARB. BLOG (Aug. 9, 2012), https://arbitrationblog.kluwerarbitration.com/2012/12/10/the-international-arbitrator-information-project-from-an-ideation-to-operation/ ("Empirical studies consistently verify that parties' ability to select arbitrators is one of the primary reasons they select arbitration as a means of dispute resolution.").

In particular, we suggest that red flags should appear next to projects that have undergone the litigation process and for which it has been shown that the number of certified offsets was inflated. Projects that did not result in any real avoidance or removal of GHGs should appear with five red flags. This would be the case for a project that protects a forest that was not in danger. For projects that only avoided or removed up to 20% of the emissions claimed, the Climate Warehouse should display four red flags, and so on.

The platform could then include a ranking with the performance of the various standard setters indicating how many red flags they received and how many offsets they certified. A similar ranking could also be included for VVBs, but given that reputational mechanisms are far less important for VVBs, ranking them would yield limited benefits, if any.

There are multiple reasons to believe this mechanism would be effective in conveying relevant information to offset buyers. First, summarizing information using a coarse visual scale has been proven to influence behaviors. For instance, Morningstar displays five globes next to the name of the firms with the highest ESG scores, whereas next to firms with the lowest scores it displays only one globe. Evidence shows that investors have responded to this way of conveying information.[191] Second, other evidence suggests that using color codes is a very effective way of conveying information.[192] Visually highlighting negative performance in red color would likely thus nudge buyers into processing the relevant information and making comparisons among offset projects and market players.

Moreover, as the market grows, so does the interest in carbon offsets. This is clearly testified by the growth in the number of Google searches for "carbon offset" (see Figure 4).[193]

[191] Samuel M. Hartzmark & Abigail B. Sussman, *Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows*, 74 J. FIN. 2789, 2790 (2019) (finding that investors allocate "more money to funds ranked five globes and less money to funds ranked one globe.").
[192] Norman J. Temple, *Front-Of-Package Food Labels: A Narrative Review*, 144 APPETITE 144485, 5 (2020) (finding that ways to convey information using colors – like the multiple traffic light – tend to be among the most effective ones).
[193] A similar trend can be observed also for the search "carbon credits."

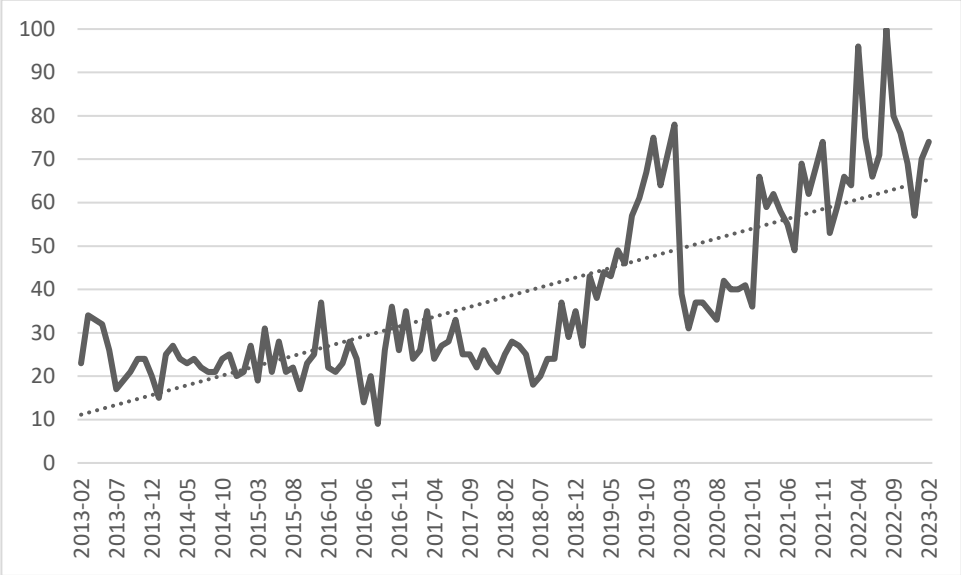

Fig. 4: Google searches for "carbon offsets" in the United States between February 2013 and November 2023

On the other hand, news sources have often reported on carbon offsets and on scandals involving offsets.[194] However, gathering information on problems in the VCM is a daunting task, given the lack of transparency. Once the system we propose is in place and litigation outcomes become available, news sources would be able to identify problematic projects and compare the average performance among standard setters. For instance, a very quick search would immediately reveal who receives more red flags between Verra and Gold Standard. In turn, this would greatly increase news sources' ability to report interesting information on the VCM.

4. Advantages of the Proposal

We have already discussed how our proposal gives incentives to agents who possess the relevant information to identify low-quality offsets, and strengthens reputational sanctions for inaccurate certifications. In addition to this, our proposal also presents additional advantages.

[194] For instance, between 10/1/2021 and 10/1/2022 the Financial Times has published 68 articles with the words "carbon offset," and the Wall Street Journal 71.

To begin with, we noted that the VCM is a market created by private actors and regulated by private actors. Our proposal is consistent with this key feature of the VCM, as the sanctions would be issued following private litigation and adjudicated by actors appointed by private parties. Parties' ability to select their own arbitrators is one of the main reasons why private parties rely on arbitration to adjudicate their disputes.[195] This is because having a say on who decides the case is "reassuring, and strengthens [the] support for the entire process."[196] Thus, in a market that has been created *by* private parties *for* private parties, it seems only natural that private parties would decide who adjudicates the emerging disputes.

Second, our proposal is cognizant of the fact that in a complex market genuine disagreements and honest mistakes are bound to be common. Even well-meaning and diligent standard setters will make mistakes and certify low-quality offsets from time to time. Thus, a well-meaning standard setter might be driven out of the market if it must pay monetary compensation whenever it makes a mistake in good faith, a court makes a mistake, or there is genuine disagreement on the quality of an offset. For this reason, our system allows for the evaluation of market players' relative performance. For instance, assume that well-meaning standard setters who take good care will make mistakes 10% of the time due to the complexity of the offset certification process. Assume also that one particularly zealous standard setter makes mistakes only 5% of the time. Currently, the zealous standard setter would have no effective way to signal its superior accuracy to other market participants and therefore its extra effort might not be adequately rewarded. Worse still, if an ex-post liability rule is implemented, the zealous standard setter would still be required to pay compensation to offset buyers whenever it is discovered that it has made a mistake *and* whenever a court makes a mistake in assessing its performance.[197] Instead, because under our system everyone would immediately be able to compare the past performance of various standard setters, the zealous standard setter would be rewarded for being more accurate than its competitors, instead of being punished for its relatively few mistakes.

The fact that sanctions are only reputational and that standard setters can be evaluated on relative performances mitigate the consequences of the unavoidable false positives and false negatives. On the one hand, market players decide how much weight to attach to each red flag. On the other hand, because there is no reason to assume that mistakes in adjudication would not be

[195] Catherine A. Rogers, *supra* note 190.
[196] Chiara Giorgetti, *supra* note 188, at 443.
[197] We are assuming the existence of a strict liability rule because a negligence rule would introduce an additional source of mistakes. Namely, for courts it will be hard to identify the optimal standard of care that standard setters should adopt.

randomly distributed among standard setters, then the users of the platform will still be able to identify which standard setter outperforms the others.

Moreover, under our system adjudicators do not need to establish causation between the conduct of the gatekeeper and the harm suffered by the offset buyer, nor would they need to quantify the harm caused by a standard setter that certified a low quality offset. As establishing causation and quantifying the harm are likely to be two important sources of mistakes under a standard regime of gatekeepers' liability, our system would also result in greater accuracy in adjudication.

VI. Conclusion

In this Article, we have carried out an in-depth analysis of the voluntary carbon market. We have argued that the voluntary carbon market can potentially play an important role in fighting global warming and in helping developing countries to build less carbon-intensive economies. However, we have also shown that the market is currently plagued by failures preventing it from reaching its potential, and that the proposals advanced thus far by policymakers are unlikely to improve the status quo. Worse still, policymakers have contributed to weakening the incentives of market players by granting standard setters the power to issue regulatory licenses. Against this background, we have proposed a different approach to addressing the market failures characterizing the voluntary carbon market, namely a system that relies on reputational mechanisms and transparency instead of invasive ex-ante regulation or potentially crushing ex-post liability.

Appendix

Basic structure of the game:

1) We assume that the proposed dispute resolution mechanism has been implemented.
2) We assume that there are two firms, A and B. The two firms must decide whether they want to contribute to the mechanism described in Section V.B.2 by making a donation c.
3) When firms do not make contributions, there is a certain probability $Pr(discovered)$ that an NGO will find out they have purchased low-quality offsets. When this happens, they face a reputational loss equal to r.
4) When one firm makes a contribution, it raises the probability that the other firm will be discovered to $pr(discovered|contribution)$, with $Pr(discovered) < pr(discovered|contribution)$. This is because we assume that NGOs are more likely to target firms who have not contributed over firms who have contributed.

5) Contributing to the mechanism eliminates the reputational sanction.[198]

The payoffs of the game are reported in Table 3.

Firm A/B	Contribute	Don't contribute
Contribute	$c/2\,,c/2$	$c, pr(discovered\|contribution) * r$
Don't contribute	$pr(discovered\|contribution) * reputational\ loss, c$	$Pr(discovered) * r, Pr(discovered) * r$

Table 3: Payoffs of Firm A and Firm B Depending on Whether they Decide to Contribute or not to the Proposed System

It is sufficient that

$$Pr(discovered) * reputational\ loss > c$$

to ensure that both firms will contribute. Moreover, if

$$Pr(discovered) * reputational\ loss < c$$

and

$$pr(discovered|contribution) * reputational\ loss\ > c/2,$$

then "both firms contributing" is a Nash equilibrium but is not necessarily a unique one. If beliefs over the other firm contributing are strong enough, such as in the case where the other firm contributed to the NGO in the previous year, the Nash equilibrium is self-sustaining.

As we argue that c is orders of magnitude smaller than $Pr(discovered) * reputational\ loss$, then firms can be expected to contribute spontaneously.

[198] *See* Section V.B.2.

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