DE-RISKING NET-ZERO THROUGH OFFSET INSURANCE: A PROPOSAL

Abstract

Trust in offsets–and the entities that depend on them to make Net-Zero claims– is at an all-time low. Many offsets currently available on the voluntary carbon market have limited monitoring, reporting and verification procedures and, consequently, low to no environmental integrity. Yet few companies can afford to invest wholly in permanent removal-based offsets, despite this being best practice. To combat these issues, this paper proposes a novel 'Offset Insurance Product' (OIP). An OIP provides a stop-gap measure for Net-Zero claims, with a claim only being necessary should offsets not have covered residual emissions the year in question. In this situation, insurance is a useful tool given that permanent removal options cost significantly more, than alternative offsets, but are the only way to verify that residual emissions (and their associated greenhouse gas effects) are neutralised in the near term. An OIP stands to reshape the risks and incentives actors face in the offsetting sector. As re/insurers face significant losses caused and aggravated by climate change, they have a rational incentive to address it. The opportunity for value creation through an OIP furthers this incentive. Governments, too, are pressed for ways to stimulate the alignment of financial flows with the Paris Agreement and achieve Net-Zero. Project developers of removals also lack the certainty of demand. There is also evidence of a crisis of confidence amongst the general public too. By countering these, the OIP stands to be a win on multiple fronts: insurers can address their Scope 3 emissions and create stability for the permanent removals industry, companies are incentivised to reduce emissions, select high-quality credits and where they fail despite their best efforts, are safeguarded against legal risks; developers of permanent removals get a degree of certainty in the near-term supply, enabling them to their scale operations; and finally regulators and the general public can have added surety on the feasibility of the 'Net' in Net-Zero. In these ways, OIP offers an example of the innovation needed for the industry to respond to both the environmental threat and economic opportunity that climate change presents.

1. Introduction

The imperative to align financial flows with the Paris Agreement has drawn support from a wide range of public and private actors. As the formation of the Net-Zero Insurance Alliance (NZIA) in 2021 demonstrates: the insurance industry is no exception. While many insurers have near-term targets to address their Scope 1 (direct emissions) and Scope 2 emissions (indirect emissions related to energy), there is an additional need for them to address their Scope 3 emissions (other indirect emissions).[1] It is particularly important for insurers to address their 'insured emissions', as this is where the vast majority of their greenhouse gas footprint lies.[2] To this end, the NZIA has identified numerous measures that insurers can take to shift towards Net-Zero emissions, including developing their new products.[3] Even prior to the advent of Net-Zero, new products that support environmental, social and governance (ESG) goals had been emerging in the broader finance sector. However, such products do not appear to be sufficient to address the climate crisis. For one, there is limited evidence that they have tangibly reshaped financial flows. Even more pressingly there is the potential that they have provided a false sense of social and environmental responsibility, acting as a façade instead of real change. Consequently, ESG products do not appear to offer the necessary tools alone to enable the financial sector at large, nor the insurance industry specifically, to address Net-Zero.

One area where this is particularly prescient is the 'net' aspect of Net-Zero, which is under threat due to poor quality offsetting practice. Offsetting is a strategy to counterbalance an entity's residual emissions by purchasing carbon credits, usually via the voluntary carbon market (VCM). Poor quality offsetting occurs when reliance on carbon credits without environmental integrity exists. Offsets based on projects that seek to avoid or reduce emissions tend to have a lower price point than their conventional and technological

[1] See World Resources Institute and World Business Council for Sustainable Development (2004) *A Corporate Accounting and Reporting Standard*.
[2] See Partnership for Carbon Accounting Financials (2022) *GHG emissions associated to insurance and reinsurance underwriting portfolios*. PCAF.
[3] Net-Zero Insurance Alliance (2022) *Insuring the Net-Zero transition: Evolving thinking and practice*. UNEPFI.

removal counterparts. This makes them a more accessible option to many carbon credit purchasers. Yet, they tend not to have the same environmental integrity as projects that remove carbon, especially technological carbon dioxide removal (CDR) which tend to store carbon on longer timescales. Due to a lack of demand, these superior offsets remain prohibitively expensive to all but the most willing actors. Consequently, developers of technological removals may not be able to scale their operations as rapidly as needed to meet the 1300x fold increase in volume that is needed by 2050.[4] Offsetting practice can also be subject to a temporal disjunct between the purchase of offsets through carbon credits and the determination of an entity's actual emissions levels in a given year. Often entities find out after the fact that they did not meet their emissions reductions targets (and subsequently under-purchased credits to counterbalance residual emissions) and/or that they relied on poor quality credits which did not perform to their expected avoidance, reduction, or removal level. For this reason, extensive use of offsets often does not result in a credible progress towards Net-Zero. Such a finding may of course damage an organisation's credibility. Yet, it could soon also carry legal risks for entities if they fail to deliver their Net-Zero commitments in a specified year.

The consequences for entities relying on poor-quality carbon credits for offsetting purposes came to the fore in January 2023 with the release of an investigation co-led by the Guardian.[5] One of its headline findings was that more than 90% of emissions avoidance-based offsets offered by Verra were worthless.[6] While the results of this expose were not surprising to experts long familiar with the issues that plague carbon credit project, it affected market confidence and prices in the VCM itself. Naturally, in response to the Guardian Investigation questions were raised about the extent to which the entities relying on these offsets should have conducted due diligence. Such due diligence is

[4] Smith, S. M., Geden, O., Nemet, G. F., Gidden, M. J., Lamb, W. F., Powis, C., Bellamy, R., Callaghan, M. W., Cowie, A., Cox, E., Fuss, S., Gasser, T., Grassi, G., Greene, J., Lück, S., Mohan, A., Müller-Hansen, F., Peters, G. P., Pratama, Y., Repke, T., Riahi, K., Schenuit, F., Steinhauser, J., Strefler, J., Valenzuela, J. M., Minx, J. C. (2023) The State of Carbon Dioxide Removal - 1st Edition.
[5] Patrick Greenfield (2023) *Revealed: more than 90% of rainforest carbon offsets by biggest certifier are worthless, analysis shows* [Online] The Guardian https://www.theguardian.com/environment/2023/jan/18/revealed-forest-carbon-offsets-biggest-provider-worthless-verra-aoe [Accessed 2 February 2023].
[6] *Ibid.*

essential in any investment, particularly one that attracts considerable moral (and environmental) hazards as the use of carbon credits for offsetting purposes does. Overall, the Guardian Investigation served as a reminder that while on paper carbon credits that represent one ton of emissions avoided, reduced, or removed are often treated as fungible: in practice, they are not. As the Oxford Principles for Net-Zero Carbon Offsetting demonstrate, there is a need to shift to permanent removals over time.[7] Yet due to cumulative radiative forcing, it is offsetting practice today that matters the most for future warming. Hence it is much more important to credibly offset a ton of emissions today than in 2049. Yet the voluntary carbon market, at present, does not possess adequate incentives to deliver this integrity.

The poor quality offsetting practices that have been brought to light recently make it clear that systemic change is needed to ensure Net-Zero aligned offsetting. Specifically, more needs to be done to address the information asymmetry entities face and its consequences for making a credible Net-Zero claim. Insurers are primed to understand risk and insure entities against it and have made their own commitments towards Net-Zero. On this basis, there is considerable potential for a novel Offset Insurance Product (OIP) to be of utility. This paper explores the case for an OIP. Part Two provides a primer on Net-Zero, and the role offsets play in it, and the extent to which the financial sector, including insurers, have taken steps towards alignment of their financial flows with the Paris Agreement. Part Three introduces the OIP in detail, mapping its potential structure and the opportunities and risks it offers. Part Four considers how an OIP could be operationalised within the current market. Part Five concludes with an overall assessment of an OIP's role in promoting Net-Zero aligned offsetting and ensuring broader systemic alignment of financial flows with the Paris Agreement.

[7] University of Oxford (2020) *The Oxford Principles for Net Zero Aligned Carbon Offsetting*. University of Oxford.

2. Primer

Offsetting must be understood within the context of the Paris Agreement and the commitments made towards its aims. By building off their foray into ESG issues, the financial sector is one such group that plays an important role in delivering the aims of the Paris Agreement. This includes insurers, who as will be shown, may pursue Net-Zero objectives themselves, while also enabling those in the real economy to achieve their own mitigation commitments.

2.1 The Paris Agreement

The Paris Agreement is the principal framework through which efforts to respond to climate change are conceived. It aims to 'strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty'.[8] Article 2(1) houses the Paris Agreement's three long-term goals. The first relates to mitigation, calling for warming to be limited to 'well-below 2 degrees' compared to pre-industrial levels whilst pursuing efforts to limit warming to 1.5 degrees.[9] The second seeks to improve global adaptation efforts by improving levels of resilience and development.[10] The third, calls on parties to make 'finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development'.[11] One of the major developments that the Paris Agreement has spurned relates to the objective of Net-Zero, as a means of reaching its temperature goal. To this end, Article 4(1) of the Paris Agreement describes a commitment to 'achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century'.[12] Interestingly, and unlike its state-focused predecessor in the Kyoto Protocol, the Paris Agreement places more of an emphasis on contributions from all actors. As a testament to this, Net-Zero Tracker records that Net-Zero commitments now cover some

[8] *Paris Agreement* to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.
[9] *Ibid.* at 2(1)(a).
[10] *Ibid.* at 2(1)(b).
[11] *Ibid.* at 2(1)(c).
[12] *Ibid.* at 4(1).

88% of global emissions, 92% of total gross domestic product and 89% of the world's population.[13] This translates to roughly ¾ of all countries, 1/5 of all regions and cities, and ½ of the largest companies.[14] The Race to Zero, a broader collation of the efforts of non-state actors towards Net-Zero, boasts a membership of over 11,000 non-state actors.[15] The strong diffusion of Net-Zero commitments amongst a wide range of actors indicates there are underlying incentives at play currently. These range from higher stock prices for corporate actors, through to enhanced public relations and marketing optics.[16] While these remain largely incentives that drive Net-Zero adoption, in future it could also be driven by regulation. However, it is important to note that despite widespread adoption of Net-Zero plans, there remains difficulty translating that into tangible progress towards reaching a state of Net-Zero.

2.2 Reaching Net-Zero

While Net-Zero is first and foremostly linked to the mitigation goal of the Paris Agreement, reaching it requires progress on its finance goal too. Given the array of commitments to reach Net-Zero, it is necessary to consider what exactly such progress requires. As defined by the Intergovernmental Panel on Climate Change, achieving a Net-Zero state is achieved when 'anthropogenic emissions are balanced globally by anthropogenic removals over a specified period'.[17] The definition of Net-Zero reinforces the fact that there are two components to Net-Zero: reducing emissions and removing emissions. The former tends to be cheaper, easier, and more effective than the latter. For this reason, reducing emissions within one's value-chain should be the primary focus of any Net-Zero strategy. However, there remains a substantial volume of emissions where reduction is less feasible: these are hard to abate residual emissions. Here removals come into play, particularly through the use offsets.

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[13] Net-Zero Tracker (2023) [Online] https://zerotracker.net/ [Accessed 10 Aug 2023].
[14] *Ibid.*
[15] https://unfccc.int/climate-action/race-to-zero-campaign
[16] Riggs, F. (2023) *Solving The Climate Crisis Investment Conundrum: Green As A Service?*. [Online] https://www.forbes.com/sites/forbestechcouncil/2023/02/09/solving-the-climate-crisis-investment-conundrum-green-as-a-service/?sh=177e6f7b2893 [Accessed 6 February 2023].
[17] IPCC 2018 Glossary https://www.ipcc.ch/sr15/chapter/glossary/

Offsets are defined by the IPCC as a "reduction in emissions of carbon dioxide or other greenhouse gases made in order to compensate for ("offset") an emission made elsewhere".[18] A primary way of sourcing offsets is through purchasing carbon credits on a voluntary carbon market. Such carbon credits existed before the advent of Net-Zero and have highly variable characteristics. The most popular carbon credits to date are those based on avoided emissions within an external value chain, the most common of which is projects that avoid emissions associated with deforestation. Another category relates to emissions reductions, these could be in the form of industrial scrubbers being added to powerplants, through to projects that switch traditional cooking devices in developing countries to cleaner stoves. These categories have a comparatively low price point compared to the third category of removals yet come with attached concerns over their environmental integrity. A common example of this is overestimating the extent to which a given forest may be threatened by deforestation, or not factoring in the substitution effect that could result in more of the cleaner burning stoves being used.[19] Notwithstanding issues related to the environmental integrity of such credits, they can also reduce the incentive for an entity to reduce its own in-house emissions due to lowering the marginal cost of abatement.[20] At best, avoided emissions credits only result in a zero-sum of emissions from an offsetting perspective. As a result, if there are weaknesses in any area of the project's design or implementation, or in their end use of such credits as offsets, they can quickly lead to real emissions increases instead.[21]

So too can credits based on removals if not managed appropriately. Removals can be grouped into two main categories: conventional and technological.[22] Conventional

[18] IPCC (2018). IPCC meetings go carbon-neutral [Online]. https://www.ipcc.ch/2018/06/15/ipcc-meetings-go-carbon-neutral/#:~:text=A%20carbon%20offset%20is%20a,%E2%80%9D)%20an%20emission%20made%20elsewhere. [Accessed 12 February 2023].
[19] Grantham Research Institute on Climate Change and the Environment (2023) Insurance: responding to climate impacts and rewarding resilience [Online] https://www.lse.ac.uk/granthaminstitute/insurance-responding-to-climate-impacts-and-rewarding-resilience/ [Accessed 3 February 2023].
[20] Mitchell-Larsen, E. and Allen, M., (2022) 'Prosets: a new financing instrument to deliver a durable net zero transition', *Climatic Change*, Vol.174, Art.15, p. 5.
[21] This does not mean that they do not have other forms of benefits, such as Sustainable Development
[22] Less commonly they can also be differentiated by the type of carbon storage that they employ, for instance whether it is stored geologically, terrestrially, in the oceans or in products

removals include some nature-based solutions, such as planting new trees or restoring wetlands. By contrast, technological removals, may involve chemical processes like Direct Air Carbon Capture and Storage (DACCS) or the mineralisation of carbon dioxide into rocks. The range of pathways through which carbon removal may occur, also leads to variance in the degrees of permanence on which they remove carbon on. Conventional stocks last as long as the lifespan of a species, a lifespan which may be shortened through exposure to storm, fire or other hazards.[23] On the other end of the spectrum, mineralising carbon dioxide may result in permanence for thousands of years. Both biological and technological-based removals face constraints and thus are limited in nature. We simply do not have enough inputs to remove all emissions through any one source. Nevertheless, removals remain the only way to reach Net-Zero. At the same time, many technological removals have not been scaled to meet the need required, and require an exponential scaling up.[24] As a result, the VCM has failed to deliver truly 'net-zero' aligned offsetting as yet.[25] Moreover, the supply of more permanent CDR options continues to exceed demand.[26] As more actors set Net-Zero pledges and become interested in offsets–including through Article 6 of the Paris Agreement–there is growing importance attached to getting offsetting right.

2.3 Progress towards Net-Zero

While the use of offsets in furtherance of a Net-Zero commitment continues to remain largely voluntary, there are signs that this is changing through a variety of regulatory and legislative approaches. To begin with, a litany of mandatory climate disclosures have been established, with several more on the horizon.[27] These tend to require not only the disclosure of physical climate risk an organisation faces but also that the organisation outline its climate mitigation plans, including a Net-Zero target. Net-Zero targets have

[23] Due to the risk of threats to such projects it is common for them to employ a buffer pool in the range of 15-30% but even then, this buffer pool has in some cases been extinguished in line with the original source of the conventional removal.
[24] Smith et al., *ibid.*
[25] Mitchell-Larsen, E. and Allen, M., *ibid.* at 10.
[26] *Ibid.* at 10.
[27] Mandatory Climate Disclosures have come into or are coming into effect in New Zealand, United Kingdom, the European Union and United States. Several other countries have them under development including India, Japan, China, Hong Kong, Switzerland, Canada and South Korea.

even become an explicit part of some government procurement practices.[28] In tandem, these could create a legal requirement for an entity to disclose progress towards a Net-Zero target, including the extent to which it relies on offsets and face litigation if these claims do not withstand scrutiny.

It is not just market access that climate conditionality is important for, consequences for failing to progress towards a claimed Net-Zero target could see repercussions for directors and officers based on their associated claims. For instance, the European Commission has proposed that its Unfair Commercial Practices Directive is updated to require Net-Zero claims to demonstrate "recognised excellent environmental performance" or potentially face a penalty.[29] Concurrently there is a growing trend of shareholder activism on the part of both public and private investors. Such activism spans the gamut from individual investor to some of the most significant funds in the world.[30] It is therefore clear that organisations face external and internal pressures to pursue Net-Zero objectives and align their offsetting strategy accordingly. Yet, engaging in the VCM to source offsets with environmental integrity can be complex. As the next section explores, Net-Zero can be particularly complex for financial institutions, who both need to focus on their own carbon footprint, as well as the emissions of the entities that they service.

2.4 The Role of Financial Institutions in Progressing Net-Zero

Financial institutions play a dual role in reaching Article 2(1)(c). On the one hand, they have their own direct Scope 1 and 2 value chain emissions to address. On the other hand, they help to finance, insure, or advise the full range of emissions intensive entities across

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[28] For instance, the Biden Administration instituted a requirement that government contracts worth USD $50 million and over have to set a Science Based Target towards Net-Zero. Similarly, the United Kingdom Government also requires Net-Zero targets related to procurement. See President of the United States (2021) *Executive Order on Climate-Related Financial Risk* [online] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/05/20/executive-order-on-climate-related-financial-risk/ [Accessed 2 February 2023] and Her Majesty's Government (2021) *Firms must commit to net zero to win major government contracts* [Online] https://www.gov.uk/government/news/firms-must-commit-to-net-zero-to-win-major-government-contracts [Accessed 2 February 2023].

[29] Laine, A., Ahonen, HM., Pakkala, A., Laininen, J., Kulovesi, K., Mäntylä, I. (2023) *Guide to good practices for voluntary carbon markets*. Government of Finland, p 123.

[30] Neate, R. (2023) World's biggest investment fund warns directors to tackle climate crisis or face sack. [Online]. The Guardian. https://www.theguardian.com/business/2023/feb/03/worlds-biggest-investment-fund-warns-directors-to-tackle-climate-crisis-or-face-sack [Accessed 5 February 2023].

the economy. This is reflected in the emergence of a diverse range of Net-Zero related campaigns under the umbrella of the Race to Zero regime, from the Net-Zero Banking and Insurance Alliances to the Net-Zero Asset Owners and Managers Alliances. Yet it is not the first time financial institutions have forayed into environmental issues. This is best demonstrated by the emergence of the ESG movement. ESG-related products and portfolios have been in vogue now for several years and emerged out of a broader trend towards awareness of ESG issues, and growing consciousness of corporate responsibility in those areas. Compared to traditional products, ESG-related products are characterised by their co-benefits they offer for the environment and/or society.[31] In tandem with the uptake of other forms of corporate social responsibility, the advent of such products has also led to enhanced sustainability reporting of an organisation's activities. The maturation of ESG as a concept relevant to financial flows has led actors to shift from screening portfolios for negative externalities to actively steering their portfolio towards positive impacts whilst maintaining a focus on enhancing profitability.[32] Under ESG investments, climate change is just one consideration out of an array of issues. However, with the signing of the Paris Agreement, climate change came to the fore for financial institutions, in particular through the focus on Net-Zero. Within this landscape insurers play a unique role.

Insurance is a foundational aspect of the economy. The industry is set up to address risks as an absorber of financial shocks.[33] In turn, access to insurance affects strongly links to access to capital for real-economy actors. That said, it is not just insurers and reinsurers as risk carriers, that can play a role in addressing climate change. Insurance marketplaces such as Lloyds of London, brokers, and supporting institutions–such as associations all

[31] Such developments have also been stewarded by a range of initiatives, including the Principles for Sustainable Insurance in 2012, a voluntary framework that has now attracted 144 signatories representing 33% of global premiums.

[32] In January 2023 year, the Chief Governance and Compliance Officer of Norges Bank Investment Management, a fund which manages more than 13tn Norwegian kroner (£1tn), said that it was preparing to vote against the re-election of at least 80 company boards for failing to set or hit environmental or social targets, including Net-Zero. Bailey, R., Bice, A., Wittenberg, A., Lasius, R., and Bhargava, A. (2023) *Insurance and Sustainability Opportunities for 2023*. [Online] Oliver Wyman. https://www.oliverwyman.com/our-expertise/insights/2023/jan/insurance-and-sustainability-opportunities-for-2023.html [Accessed 2 February 2023].

[33] Net-Zero Insurance Alliance, *ibid*. at 7.

play their respective roles.[34] Indeed, climate change is increasingly be seen as a central issue for those in the insurance industry from an 'enterprise risk management' perspective as it is a crosscutting issue across the domains of underwriting, asset management and corporate governance.[35] Insurers have a relationship with the insuree in terms of both liability (insurance) and asset (investment) forms.[36] Insurers can also be considered institutional investors who can and do engage with their investee companies.[37] In this way they face form a part of financial supply chains that can either harmonise or halt progress towards mitigating climate change. Until very recently there had been 'virtually no work' done on climate-aligned insurance models.[38] However, adopting a 'follow the risk' principle rather than a 'follow the money' principle can help to underscore how central insurance is.[39]

Insurers are increasingly alive to the risks posed by climate change to the industry given that climate change is a risk multiplier. Climate change worsens natural hazards and other catastrophes that may affect an insured asset. In turn, impacts of climate change are factored into models which calculate premiums in relevant areas, including through catastrophe modelling. These tools help to illustrate an insurer's exposure to climate change.[40] Within the insurance industry, actuaries have shown interest in appreciating climate risks for insurance and expanding the range of metrics to judge such risks.[41] Moreover, in areas of the world most affected by climate change, there is exploration of how insurers can build resilience, rather than disbursing funds in the wake of a natural disaster as part of the recovery, there have been some pilot models where the same funds are disbursed before a claim event–enabling recipients to enhance their resilience and

[34] *Ibid.* at 12.
[35] *Ibid.*
[36] *Ibid.*
[37] Particularly in life insurance lines of business. *Ibid.* at 18.
[38] *Ibid.* at 7.
[39] *Ibid.* at 8.
[40] Or their reinsurer in turn.
[41] For example, the United Kingdom's Institute and Faculty of Actuaries Faculty of Actuaries has launched a new training course on Climate Risk and Sustainability in 2022, and published reports on Net-Zero Investing. Horwitz, B., Turner, J., Bamania, P., Konwar, P., Murgorgo, D., Mwale, M., Virdi, M., and Kitchen, A. (2022) Net Zero Investing- A Beginner's Guide. Institute and Faculty of Actuaries.

ultimately lower subsequent harm and insured losses.[42] Nevertheless, blind spots remain in actuarial analysis, given that the areas considered most relevant to Net-Zero claims tend to be motor, property, and agricultural sectors.[43] In this way, the insurance industry has tended to focus on the impact of climate change on their insured entities, rather than the climate change caused by entities they insure. This could be changing, for the first time specialist ESG and climate actuarial roles are being advertised in the industry. However, mitigation goals of Net-Zero cut across all lines of business for an insurer, and thus require more fundamental changes to business models.

That said, within the context of the Paris Agreement, there is increasing recognition that insurers can do more to address align financial flows with the Paris Agreement. The NZIA provides the best example of this.[44] The NZIA was founded at the G20's Climate Summit in 2021 and has since grown from a membership of eight insurers and reinsurers, to 29– now representing 15% of world premium volume globally.[45] Despite laudable progress in initiating and growing up the NZIA, many of its members have only just begun their Net-Zero transition planning, including assessing their own climate risk. Thus far this has principally been on the climate contribution of their internal (Scope 1 and Scope 2) value chain emissions. However, it is the Scope 3 emissions where the majority of an insurer's value chain emissions lie. Indeed, such 'insured emissions' could amount to some 700x of their Scope 1 and 2 emissions.[46] It is clear then that more work is needed to understand the role of insurers in terms of what could constitute Net-Zero aligned insurance.

As defined by the United Nations Environment Programme's Principles for Sustainable Insurance Initiative, Net-Zero Insurer requires progress across four pillars.[47] The first

[42] These are being deployed in tandem with parametric insurance products which significantly streamline payouts. See Jarzabkowski, P., K. Chalkias, D. Clarke, E. Iyahen, D. Stadtmueller & A. Zwick (2019) *Insurance for climate adaptation: Opportunities and limitations*. Global Commission on Adaptation.

[43] Stefan, R. and Agarwal, V., 'Net Zero and offsets – How to make it work?' GIRO, Liverpool, United Kingdom November 2022.
[44] United Nations Environment Programme (2023) *Net-Zero Insurance Alliance* [Online] https://www.unepfi.org/net-zero-insurance/ [Accessed 5 August 2023].
[45] AXA (NZIA Chair), Allianz, Aviva, Generali, Munich Re, SCOR, Swiss Re and Zurich Insurance Group were founding members.
[46] CDP (2020) The Time to Green Finance- CDP Financial Services Disclosure Report 2020.
[47] Net-Zero Insurance Alliance, *Insuring the Net-Zero Transition*, *ibid.* at 27.

pillar requires insurers to reduce greenhouse gas emissions in their own internal activities in a manner commensurate with reaching 1.5°C low or no-overshoot scenario–both in the short term (2030 or sooner) and the long term (2050).[48] The second pillar concerns the degree to which the insurer supports the transition to Net-Zero in the real-economy through their underwriting portfolio.[49] The third pillar relates to the extent to which they embed Net-Zero commitments in their business practices by setting internal Net-Zero targets and developing external policies to support the delivery of Net-Zero goals.[50] The fourth pillar concerns how the insurer discloses its Net-Zero activities through a range of stakeholders.[51] Notwithstanding this guidance, there remains confusion about what the NZIA specifically tasked re/insurers with. This led to the development of a target-setting protocol that was released at the World Economic Forum's meeting in Davos in January 2023. The protocol aims to facilitate NZIA members beginning to independently set 'science-based, intermediate targets for their respective insurance and reinsurance underwriting portfolios in line with a Net-Zero transition pathway consistent with a maximum temperature rise of 1.5°C above pre-industrial levels by 2100'.[52] In this manner, it reveals a menu of pathways available for re/insurers to decarbonise, including by setting:[53]

1. Overarching emission reduction targets
2. Sectoral decarbonisation targets
3. Portfolio coverage targets
4. Focused engagement targets
5. Re/insuring the transition targets

Current members of NZIA have until July 31 2023 to comply with the protocol. Despite setting these clear prescriptions, saying this, the NZIA clearly outlines that the expectations it sets for its members must be seen within the broader commitments of

[48] *Ibid.*
[49] *Ibid.*
[50] *Ibid.*
[51] *Ibid.*
[52] UN-convened Net-Zero Insurance Alliance (2023) *Target-Setting Protocol Version 1.0*. UNEPFI.
[53] *Ibid.* at 8.

governments, industry actors and intermediaries, cautioning that if the decarbonisation efforts of others lag, then insurers might not be able to achieve their commitments either.[54] The prescriptive approach of the NZIA has led to a considerable backlash, for instance through allegations of anti-trust behaviour.[55] This has led to the withdrawal of several significant insurers from its purview and led it to relax its investment rules in turn.[56] Nonetheless, the NZIA remains vital to the Net-Zero insurance landscape. To make the most of opportunity, insurers "must change some of its mindset to formulate a consistent forward-looking pricing model for new risks".[57] Despite its risk exposure, the insurance industry has been somewhat slow to adapt to the various risks posed by climate change. Consequently, there is an ongoing need to build expertise in climate mitigation techniques and how this shapes risk exposure as organisations transition to Net-Zero, including their use of offsets.[58] One way to develop such capacity is through the development and launch of an OIP.

3. Offset Insurance Product Proposal

There are both risks and opportunities inbuilt into the Net-Zero paradigm concerning the use of offsets. One the one hand, the advent of offsetting can help entities with hard-to-abate emissions to address their climate-impact in an environmentally robust way. Yet, the use of poor-quality offsets or overreliance on offsetting (at the expense of in-house greenhouse gas reductions) could risk progress towards the aims of the international climate law architecture: to avert dangerous levels of global warming.[59] As a leading insurer states "today, forward-thinking insurance companies are driving the global economy by originating solutions that safeguard businesses, governments and

[54] *Ibid.* at 6.
[55] Smith, I. and Bryan, K. (2023) Lloyd's and five big insurers quit sector's net-zero initiative [Online] https://www.ft.com/content/4940831b-72ec-459d-aaee-0d86fb7593df [Accessed 6 August 2023].
[56] Murray, J. (2023) Net Zero Insurance Alliance relaxes membership rules [Online] https://www.businessgreen.com/news/4119671/net-zero-insurance-alliance-relaxes-membership-rules [Accessed 7 July 2023].
[57] Aon (2023) 3 Ways the Insurance Industry can accelerate Net Zero by Facilitating Capital [Online]. Aon. https://www.aon.com/insights/articles/2023/3-ways-insurance-industry-can-accelerate-net-zero-by-facilitating-capital [Accessed 2 February 2023].
[58] Net-Zero Insurance Alliance, *Insuring the Net-Zero Transition*, *ibid.* at 10.
[59] United Nations Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc No. 102-38, 1771 U.N.T.S. 107.

communities".[60] This includes "matching capital to risk where it is needed".[61] Given the global transition towards Net-Zero, offsetting is one of those areas. Just as insurance is a prerequisite for driver registration, a regulator may also impose insurance as a condition of the use of offsets.[62] In this way, insurers could have a role in providing a "reasonable expectation of permanent sequestration" for a defined contract period.[63]

3.1 Design and operation of an OIP

An OIP seeks to ensure against the risk of 'atmospheric' default of offsetting practice: either through project default, for instance, failure in delivery or reversal of credit (including buffer). An organisation may also fail to secure sufficient credits in a given year. These defaults will become apparent *ex-post;* therefore, simply remedying them with additional offsets sourced from the VCM is insufficient to undo the additional warming effect caused by the default. These defaults can also create several reputational, regulatory, and legal risks. Only permanent removals can be sure to have adequately offset the offset failure (and thus ameliorate these risks) in a manner commensurate with a Net-Zero Aligned Offsetting strategy. A claim could occur in circumstances where an audit reveals atmospheric default more than de minimis (>1%) up to an agreed threshold, beyond this if catastrophic failure of a carbon credit portfolio occurs (>30% for example), a penalty payment would also be incurred by the insured, to ensure that organisations still have a clear incentive to limit defaults of their offsets through their own due diligence procedures. If a default occurs, the insurer could either cancel and retire such credits on behalf of the insured or transfer them to the insured's account for them to do the same.[64] An OIP has short-term applications given that current offsetting strategies of many rely on offsets with a higher risk of reversal. It is likewise useful in the long-term where there

[60] Aon, *ibid.*
[61] *Ibid.*
[62] This is particularly so given there is debate over the extent to which there is an ongoing risk of reversal associated with many offsets in use today. Mignone, B.K., Hurteau, M.D., Chen, Y., and Sohngen, B. (2009) 'Carbon offsets, reversal risk and US climate policy', *Carbon Balance and Management*, Vol. 4, No.3, p 2.
[63] Sedjo,R.D., Marland, F.G.(2003) 'Inter-trading permanent emissions credits and rented temporary carbon emissions offsets: some issues and alternatives', *Climate Policy*, Vol.3, Issue 4, pp 435-444 at 440.
[64] To begin with they could also disburse funds, although this does not unlock the full potential value of an OIP model.

are increasingly long-term contracts for permanent CDR are needed and the risk of under-delivery of the resultant units is heightened.

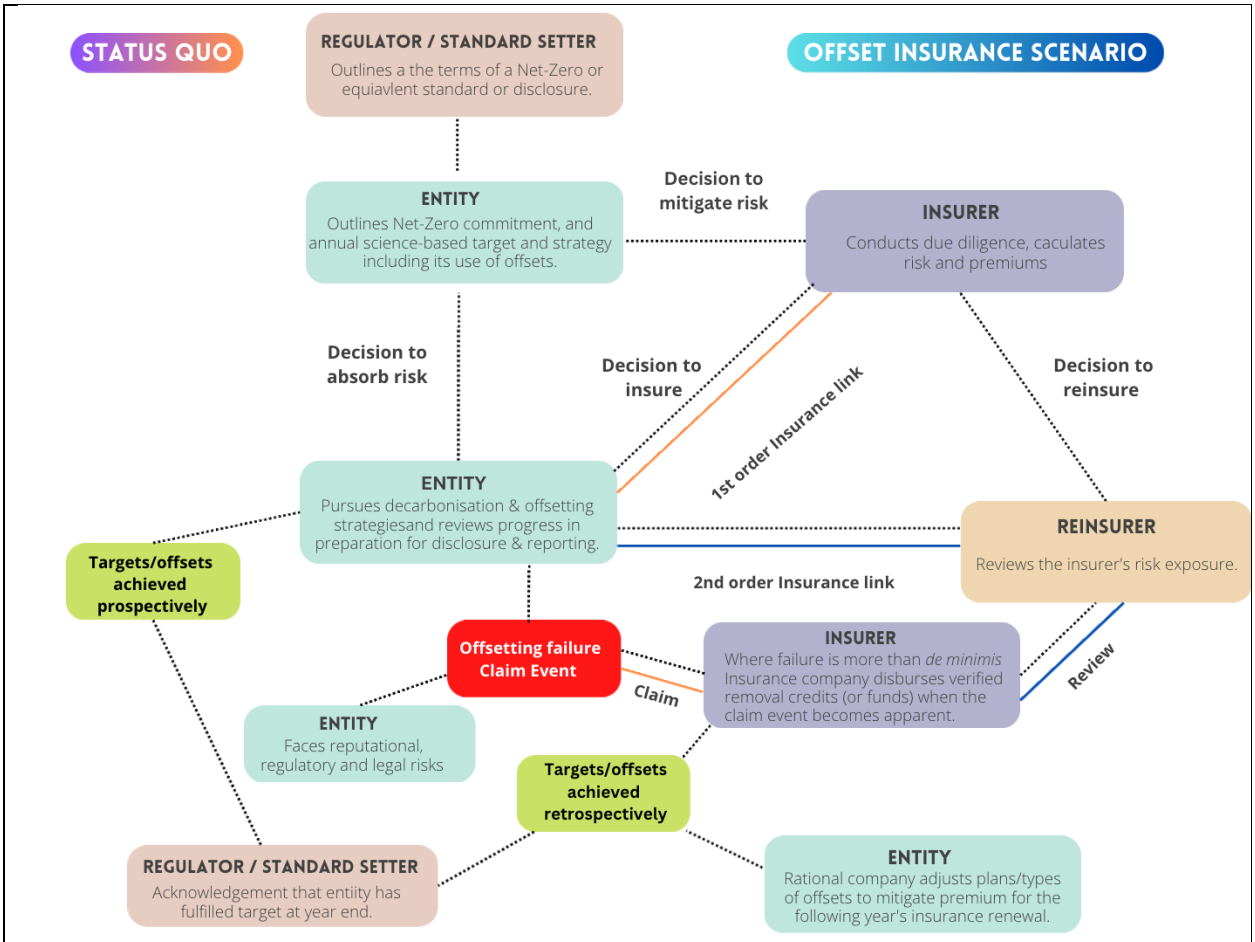

Figure One: Status Quo vs Offsetting Insurance Model

Figure One displays the design and operation of an OIP. On the left, it outlines the current status quo where an organisation absorbs the reputational and legal risks of not meeting its Net-Zero commitments. On the right, it presents the chain new value chain proposed by an OIP. As is clear, both pathways start with a regulator or standard setter who sets the terms for a Net-Zero or equivalent commitment.[65] While a Net-Zero or equivalent commitment may be a direct legal requirement in future, it can already define market

[65] Terms could include the extent to which offsets can be used, and what types of offsets these are. While such terms have tended to be generalised, they are increasingly becoming more sector specific. The Science Based Targets Initiative being a good example of this, they released a Net-Zero Standard in 2021, and are now releasing specific sector-based Net-Zero guidance too.

access to contracts or enhance the reputation of an entity.[66] An organisation then establishes the specifics of its Net-Zero commitment, most commonly this is to be Net-Zero in a future year, with a science-based targets of declining emissions towards this goal. At this juncture, the organisation must decide on its approach to reach its commitment. An organisation could choose to reduce all emissions in-house. More commonly, it will identify a proportion of residual emissions that remain unabatable and thus require offsetting.[67] If the latter, then depending on resourcing, it may procure a range of credits directly from suppliers or via third-party intermediaries. Due to its use of offsets, it may then choose to mitigate its risks through accessing an OIP. The process to acquire an OIP would involve the insurer scrutinising the offsetting plans, and contracts that the organisation has entered into.[68] It would then conclude a premium price that factors in the risk of offset default. Aspects that factor into the risk could relate to both the characteristics of the carbon credits in an offset portfolio and the extent of reliance on offsets as a fraction of total emissions. In either case, when an organisation tallies its emissions vs removals at the end of the accounting period, it will be evident whether or not their promised commitment was reached. Organisations that overshoot their emissions goals for the year–either by failing to reduce value-chain emissions sufficiently or through inadequate offsets–could trigger a claim for an OI and result in the cancellation of an appropriate amount of credits if the insurer holds a stock of them, or failing that monies to procure permanent removals.[69] On the insurer's side, such a claim would then be followed up as part of the policy renewal cycle, thereby affecting the premium paid on renewal. It is suggested that the terms of OI would likely require overshoot to be more than *de minimis* but up to an agreed policy level, which if exceeded prompts a penalty payment. This is to ensure there remains an incentive for organisations to diligently research, purchase and monitor their use of offsets. Upon the breach, the

[66] See Section 2.2. In this vein, even if a Net-Zero commitment is voluntary, it could also attract legal consequences if there remains a risk of misrepresentation and attendant liability

[67] The extent to which this is permissible depends on the sector but is typically no more than 5-10% of emissions. ISO (2023) *Net-Zero Guidelines* [Online]

[68] Here an insurer may require certain clauses, for example, to ensure there is liability for non-delivery or non-permanence and that there is a sufficient buffer available.

[69] The former is more preferable to the latter due to the added demand certainty it provides to offset providers, and the lead times between purchase and delivery of removal credits which is 14 months on average. Refrence State of CDR report.

insurer may also have recourse to recover funds from the project developer directly, yet OI also plays a role in assuming liability should a seller of removals go out of business.[70] In this way, OI stands to legitimise Net-Zero claims and create demand for permanent removals in line with best practice.[71] While the OIP model put forward here focuses on the purchasers of carbon credits, another form could be available to suppliers of offsets to likewise guard against the risk they face.

The timeline with which the annual cycle of OIP could be designed around is also an important factor in its practicality. Often times, emissions scopes are calculated on an annual or fiscal year basis. Historically, the purchase of carbon credits typically occurs within the last quarter of the reporting year. However, this looks set to change as organisations transition towards a portfolio approach to their offsetting, with some acquired through the VCM and negotiated through forward contracts. For simplicity, the covered period of the OIP should match the same period. However, decisions to scrutinise the risk will be made off the previous years' offsetting portfolios, and their performance. Where there is a high reliance on credits with lower environmental integrity and/ or a high risk of reversal, the insurance premium for OIP is likely to be higher than in instances where there is limited reliance on credits with higher environmental integrity and a lower risk of reversal. To ensure the long-term benefit to OIP is realised, it is suggested coverage should be guaranteed past the project development itself.[72]

3.2 Opportunities an OIP offers

The ongoing economy-wide transition to Net-Zero necessitates a host of changes core to insurance underwriting and risk management.[73] The insurance industry is highly annualised, as are science-based targets on the way to Net-Zero. This alignment could work in tandem to reinforce the importance of determining action on an individual year basis. Insurance presents one of the best ways to manage the risks of abatement projects

[70] Sedjo and Marland, *ibid.* at 440.
[71] University of Oxford, Principles for Net-Zero Aligned Carbon Offsetting, *ibid.*
[72] This is an aspect that the Article 6.4 Supervisory Body is currently grappling with and there is expected to be further guidance on soon.
[73] Net-Zero Insurance Alliance, *Insuring the Net-Zero Transition*, *ibid.* at 22.

and ensure a stable and efficient carbon market.[74] Managing these risks requires developing expertise on the potential and end deployment of emissions technologies. This will, in turn, aid in the design of insurance products to manage risks from such technologies.[75] In this way, insurers can present a unique value proposition to assist businesses in the Net-Zero transition.[76] The opportunity to create a new product to help align with broader ESG had already proven to be a feature of financial institutions. For insurers as a subset of financial institutions, OIP likewise offers the unique benefit to an insurer of adding a product (and thus profit) while enhancing their climate profile. In this way, implementing an OIP could be used as an example of insurers demonstrating their commitment to aligning financial flows with the Paris Agreement. As already outlined, insurers face many orders of exposure to climate change. Therefore, offering products that assist in the transition indirectly aids in their own utility from an asset perspective.[77] The creation of new markets could also incentivise some insurers to withdraw insurance capacity where the climate risks of an asset, industry or client outweigh the benefit of insurance to them.[78] In this way, enabling insurers to act in congruency with the plans of the NZIA.

OIP also stand to stimulate high-quality information on the use of offsets amongst insured entities, which has a number of flow-on effects. Already through research, analytics and modelling, insurers already factor in estimates of climate risk into their premiums.[79] To establish the market for OIP an insurer must understand its clients' emissions profiles better. A necessary step in gaining OIP is an overview of the client's disclosure of its Scope 1-Scope 3 emissions and use of offsets to date. To ensure the insurer is not taking on inordinate risk in offering an OIP, there is an incentive for them to develop and build on best practice innovations in modelling emissions profiles and (increasingly) the effectiveness of offsets. A corollary of this work to ensure knowledge of the emissions profiles of its clients is that an insurer can better quantify the 'insured emissions' element

[74] *Ibid.* at 10.
[75] *Ibid.* at 29.
[76] *Ibid.* at 22.
[77] *Ibid.* at 16.
[78] *Ibid.* at 30.
[79] *Ibid.* at 16.

of its own Scope 3 emissions. This is already an advance on current models, especially when insured emissions are estimated to be 700x of its Scope 1 and 2 emissions.[80] At the same time, there is an incentive for companies to be as forthright as possible in disclosing their use of offsets, as an OIP contract could include a penalty excess for exceeding a maximum level of coverage, and an additional premium added to future renewal years. Evidence of the need for such coverage is provided by disclosure trends within securities commissions.[81] The need to understand climate disclosure effectively has driven technological advances too, for example, NASDAQ, who recently applied a machine-learning technique to assess and analyse the climate elements of thousands of corporate reports.[82] On the other, corporates face growing legal risk and at the very least, uncertainty should they fail to disclose, or provide an incomplete or underestimate of their emissions profile and how much of it is sequestered. OIP can also help implement the nascent Article 6 carbon markets under the Paris Agreement, and the extent to which the system promotes environmental integrity.[83]

Demand for more permanent CDR continues to be a challenge, as do long lead times between the purchase and delivery of units. This stands in contrast to the offsets available on the VCM at large, where credits of a range of vintages remain available for purchase (stretching back to 1996). This is the reason why insurance becomes invaluable to both project developers and end-user organisations. Through forward contracts with insurers, it is possible to gain further long-term certainty of demand, enabling project developers to scale operations.[84] On the end-user's side, it could be argued that as the cost of permanent CDR goes down in future, they could directly make up shortfall through the VCM. Despite forward contracts for CDR being more expensive now then they will be in future once they are scaled, they are finite, and their limited availability will only be in

[80] CDP, *ibid.*
[81] U.S. Securities and Exchange Commission (2023) *Climate and ESG Risks and Opportunities* [Online] https://www.sec.gov/sec-response-climate-and-esg-risks-and-opportunities [Accessed 23 February 2023]. ; The Board of the International Organization of Securities Commissions (2022) *Voluntary Carbon Markets Discussion Paper*. OICU-IOSCO.
[82] Nasdaq (2023) AI-powered Study Benchmarks Climate Reporting Across Whole Market [Online] https://www.nasdaq.com/articles/ai-powered-study-benchmarks-climate-reporting-across-whole-market [Accessed 13 February 2023].
[83] Net-Zero Insurance Alliance, *Insuring the Net-Zero Transition*, *ibid.* at 29.
[84] Which already requires a 1300x fold increase in volume by 2050. See Smith et al., *ibid.*

even more in demand as the world edges closer to Net-Zero target dates. Even if it was available, it is highly unlikely that the insured could afford to offset their shortfall using permanent CDR. This means that end-user organisations can access a guaranteed supply to make up their shortfall in offsets in a Net-Zero aligned manner which may otherwise prove too difficult. Hence there remains significant benefit to adopting an OIP model.

As more entities set Net-Zero targets, and the removals reduce in price, premiums for OIP will likely go down over time. In tandem with ongoing risk of under delivery, this could mean that OIPs will likely see continued growth over time as an insurance product over time. Similarly, as the technology underlying more permanent removals is better understood, companies will be better equipped to assess the opportunities net-negative technologies present and how that relates to their potential claims.[85] While not a long-term solution to the need to switch to permanent removals, demand for OIP is likely to continue to grow to the extent it offers a stabilising force to the volatile–yet essential–VCM.

3.3 Risks of an OIP

There are of course limitations to OIPs. For starters, there may be difficulty establishing the initial market for such insurance. The need to set Net-Zero targets remains voluntary for companies, despite company access to certain markets sometimes being predicated on adopting and/or showing progress towards one. Unless the company is under particular scrutiny and suffers legal or serious reputational risks in relation to offsetting, there may not access such insurance without regulatory compulsion. Moreover, while supply of quality removals currently outstrips demand, in the coming years supplies of high-quality removals may be put under pressure. To secure sufficient high-quality removal credits in the coming decades, near-term investment is required to scale projects so they are ready for delivery at the necessary time. Such investments may require longer-term investments than insurers are used to therefore requires insurers to "work with new

[85] Microsoft, for example, seek to remove their historical emissions since 1970. Microsoft (2023) Carbon Dioxide Removal [Online]. Microsoft. https://www.microsoft.com/en-us/corporate-responsibility/sustainability/carbon-removal-program [Accessed 25 February 2023].

and existing capital providers to increase appetite for longer-term risks".[86] Removals may shift from low-hanging (and more cost-effective) removals to high-hanging (and more expensive options) over time, raising the cost of accessing them. This should only increase the vital role OIP may play in future.

At the same time, we cannot offset our way to Net-Zero, and there is danger in relying too much on removal technologies which are not yet scaled. It could further call into question the validity of leading standards such as Verra and Gold Standard, for instance, if the validity of units which they had already certified and cancelled were called into question. Moreover, given the emergence of the derivative offset markets, there is also a question of whether adding insurers into the medley of actors involved in offsetting would lead to greater efficacy of the system. However, perhaps the greatest risk of OIP being offered is that it seeks to add a degree of legitimacy to the use of offsets in reaching Net-Zero. In this sense, allowing OIP could be perceived as validating the weak outcomes of the market. However, the cost of OI can help levelise the cost of removals. For instance, offsets with a higher risk of reversal are subject to a higher per-credit insurance cost, than those with a lower risk of reversal over the covered term. Also important is the ultimate economics of value-chain emissions reduction and offsetting matters–including the heavy fiscal penalty incurred if the offsets purchased by a company are severely deficient in reaching their Net-Zero targets.[87]

At present there is also a relative paucity of data with which re/insurers can determine risk against.[88] Insurers may be hesitant to first engage in this market given the information gaps and asymmetries currently present. In this sense, even a high use of novel removals may not reduce insurable risks as novel technology would initially have little or no data or claims history attached to it.[89] This may mean it could take some time for premiums to stabilise due to trial and experimentation in pricing OIPs. Similarly, because the relationship between the insurer and insured differs from that of an investor

[86] Aon, *ibid*.
[87] For instance, as occurs under the European Union's Emissions Trading Scheme if insufficient credits are rendered a penalty is paid.
[88] Sedjo and Marland, *ibid*. at 440.
[89] Net-Zero Insurance Alliance, *Insuring the Net-Zero Transition*, *ibid*. at 16.

and investee, insurers may be reticent to engage insuree in the climate impact elements of their business.[90] At the same time, it may not be in the company's interest to fully disclose a chequered past using poor-quality offsets. As a result, the advent of OI, like any new product, may take time to grow. Due to these risks, OIPs are not a silver bullet, and instead should be seen as one of many policies insurers can deploy in aid of the Paris Agreement.

4. Discussion

Many Net-Zero commitments of companies are built on shaky foundations, just as insurers offer insurance against earthquakes as natural hazard, there is an equal opportunity for them to provide stable ground for Net-Zero commitments to be made on. As of 2023, over 955 of the world's largest companies currently have Net-Zero pledges.[91] Many more companies are also part of the broader Race to Zero.[92] At the same time, it is doubtful that most companies are currently on track to achieve them as progress on most Net-Zero targets remains murky.[93] Enhanced climate disclosure has the potential to transform this. Yet, it is clear that companies do not yet possess the capacity to fulfil their Net-Zero targets. Signs of uncertainty also remain amongst regulators concerning the impact of mandating Net-Zero targets. OI can address these risks and opportunities unique to offsets, in a way that utilises companies' profit-maximising and risk-minimising aspects objectives. Furthermore, it reinforces precisely how as Mark Carney terms, "climate change can be the greatest commercial opportunity of our times".[94]

[90] That said, concerns in this regard could still be factored into the pricing decisions. Net-Zero Insurance Alliance, *Insuring the Net-Zero Transition*, *ibid.* at 26.
[91] Net-Zero Tracker, *ibid.*
[92] UNFCCC (2022) *Race to Zero* [Online] <https://unfccc.int/climate-action/race-to-zero-campaign>.
[93] ECIU and Oxford University (2023) *Global Stocktake 2022*. Net-Zero Tracker.
[94] Carney, M. (2021) Mark Carney: Investing in net-zero climate solutions creates value and rewards [Online] https://www.un.org/en/climatechange/mark-carney-investing-net-zero-climate-solutions-creates-value-and-rewards [Accessed 10 February 2023].

Indeed, other insurers have also begun to offer a variety of carbon-related insurance products to capitalise on this opportunity.[95] Examples of this include products offering incentives for decreased automobile usage or green building practices through to insurance related fluctuations in carbon pricing.[96] An OIP and the management and climate risks it seeks to assuage also have parallels risks that more general existing insurance policies may already cover, and for which there may be a climate-related uptick in disputes under.[97] Depending on the regulatory regime, directors' and officers' liability insurance could be engaged if a failure to achieve a Net-Zero target or undertake decisions in line with one, could translate to allegations that a company director and/or officers are not acting in the company's best interest. Here the breach would trigger damages paid to the government or third party relying on the Net-Zero assurances of the organisation. However, without further regulation, there is no attendant requirement to use the damages to make-good the climate-harm of the default, thus distinguishing this option from OIP at large. There are also limitations on D&O insurance, for example, risks for which directors and officers cannot be indemnified.[98] For this reason, the case for OI to be a standalone product appears preferable, especially given that regulation of claims is still nascent, while reputational and litigation risk against the company generally still stands.

A form of OIP focused on delivery risk has emerged in the marketplace produced by a Kita who acts as a Lloyd's cover holder. A cover holder is authorised to contract insurance on behalf of a broader syndicate of insurers. Kita offers 'Carbon Purchase Protection Cover'. So far, this cover extends only to afforestation projects, with coverage for other credits like biochar under development.[99] It covers projects that are certified by an approved list of suppliers, and that have an independent third party providing validation and verification of the carbon expected/delivered. In the near term, Kita pays out claims in monetary terms (presumably enabling the insured to choose if it purchases alternative

[95] Yang, J., and Luo, P. (2020) 'Review on international comparison of carbon financial market'. *Green Finance*, Vol. 2, No. 1, pp 55-74 at 65.
[96] *Ibid.*
[97] Including public liability claims.
[98] For example, criminal charges.
[99] Kita (2023) Frequently Asked Questions [Online] https://www.kita.earth/faqs [Accessed 4 August 2023].

offsets with those funds). However, they indicate that this could change in future, with a carbon credit pay-out also under development. While their initial offering remains limited in scope, they remain interested in developing broader forms of carbon insurance to "create tailored products that solve real risks, thus enabling the key point of all of this– helping scale carbon solutions to fight the climate crisis".[100] Just as in the OIP model, Kita is underwritten by a syndicate of insurers, providing added layers of scrutiny and surety. Chaucer has acted as an investor and lead underwriter, with follow capacity from Munich Re Syndicate and RenaissanceRe.[101] However, unlike Kita, a more generalised OIP could provide insurance for the full credit portfolio (not just removal-based offsetting). It would also focus on remediation, not via the same type of project-based credit but with a more permanent CDR in recognition that this is the best way to repair the climate harm caused. An OIP model also adopts pricing based on the company's overall risk factor, rather than just the risk rating of the credit itself, to consider a company's broader transition planning–including the extent to which it is or is not reliant on offsets to reach its target. Hence while there is a live example of carbon insurance as a viable business model, there are prospects for it to scale significantly, as Kita recognises as well.

The notion of an OIP is, therefore not beyond the realms of possibility and, indeed has started to be implemented by some first movers. A number of commonalities of first movers have begun to emerge: those active in European and North American markets; who have an established history as an insurer, including new product development; and who have proven willing to experiment with low-carbon products in past.[102] Three key examples further illustrate the potential that the insurance industry has to develop OIPs. Swiss Re, headquartered in Zurich, Switzerland is one of the world's largest insurers. In 2020 Swiss Re, in collaboration with Climeworks (a supplier of removal credits) concluded a world-first long-term (purchase agreement for removals generated by direct

[100] *Ibid.*
[101] Chaucer [2023] Chaucer announces innovative new partnership with Kita, the carbon insurance specialist, to insure the delivery risk of carbon sequestration projects [Online] https://www.chaucergroup.com/news/chaucer-announces-innovative-new-partnership-with-kita-the-carbon-insurance-specialist-to-insure-the-delivery-risk-of-carbon-sequestration-projects [Accessed 12 August 2023].
[102] *Ibid.* at 65-66.

air capture- with a length of 10 years and value of USD 10 million.[103] In 2021 Swiss Re joined a consortium of five companies– South Pole's NextGen facility– to buy 1 million carbon removal credits from a range of projects by 2025 to help provide them with secure revenue streams and drive down the cost of their technologies.[104] These are the same removals that could be used as reserves for an OIP. At the same time, Swiss Re is making an effort to address its full value chain of emissions, for instance, by adopting a USD $100 per tonne internal carbon levy, which will increase to USD $200 by 2030- including scope 3 elements such as business travel.[105] Axa, headquartered in Paris, France has also followed suit. In 2021 AXA acquired a carbon credit platform, ClimateSeed. As AXA states this was part of its "overall strategy to play a part in addressing climate change" but also gave them "*deeper insight into this new area of business*" (emphasis added).[106] This is because, similarly to an OIP model, AXA believe there are "ways we can design indemnity triggers that will protect clients and enable them to fulfil emissions target goals when something out of their control goes wrong".[107] While they note the utility of this in terms of unexpected events on the corporate emissions side–for instance, a long detour caused by the blockage of a shipping canal– this could likewise be extended to the broader catch-all provided by an OIP, which includes removals not having been effective in a given year.[108] On the carbon credit supply side, Aon, has partnered with Revalue Nature, a carbon credit provider, to insure their investments against unforeseen events such as wildfires or bug infestations.[109] Such developments illustrate the significant opportunity for insurers willing to innovate through OIPs, both as part of their institutional portfolios or through bespoke cover holders like Kita.

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[103] Swiss Re (2021) Swiss Re and Climeworks launch partnership by signing world's first ten-year carbon removal purchase agreement [Online] https://www.swissre.com/media/press-release/nr-20210825-swiss-re-climeworks-partnership.html [Accessed 12 February 2023].
[104] Twidale, S. (2022) Swiss Re, UBS among founding buyers in carbon removal scheme [Online] Reuters. https://www.reuters.com/business/sustainable-business/swiss-re-ubs-among-founding-buyers-carbon-removal-scheme-2022-05-22/ [Accessed 11 February 2023].
[105] Swiss Re (2020) Swiss Re introduces triple-digit internal carbon levy to support transition to Net-Zero emissions in operations by 2030 [Online] Swiss Re https://www.swissre.com/media/press-release/nr-20200914-swiss-re-introduces-triple-digit-internal-carbon-levy.html [Accessed 11 February 2023].
[106] AXA (2022) Enabling the offset; what role can insurance play in offsetting emissions? [Online] Axa. https://axaxl.com/fast-fast-forward/articles/enabling-the-offset-what-role-can-insurance-play-in-offsetting-emissions [Accessed 15 February 2023].
[107] *Ibid.*
[108] Aon (2023) *Weather, Climate and Catastrophe Insight* at 602.

5. Conclusion

Our world is changing world and the insurance industry with it too. Insurers can play a key role in addressing the numerous transition risks we face. Yet without reform, they also risk cementing the path dependency of heavily emissive sectors.[110] It is here where the insurance industry stands to make its biggest contribution to the Paris Agreement goal of aligning financial flows with a low-carbon development pathway. Despite the industry making headway through the advent of the NZIA, many insurers face difficulty translating their Net-Zero commitments into action. There is concern about insurers setting Net-Zero targets without knowing how they will reach them across their value chain: a feature common across many of the entities they themselves insure. Addressing insured emissions requires creativity. The advent of OI is one example of such thinking. It provides the kind of product innovation the NZIA calls for whilst also building off existing precedent in the industry- both at large and through the recent emergence of Kita. At the same time, it could help the industry to understand and address their customers' emissions (and use of offsets), and in turn, their own Scope 3 insured emissions. In this way, an OIP strikes a balance between ambition and pragmatism. This is important because the writing is very much on the wall—both for poor-quality offsets and the entities who depend on them to substantiate Net-Zero or equivalent claims. OI can counter this through the creation of a virtuous cycle of transparency and integrity. However, it cannot stand alone. As such, it remains just one aspect of the broader effort needed to both reduce emissions and enhance removals to meet the Paris Agreement's temperature goal.

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[110] Net-Zero Insurance Alliance, *Insuring the Net-Zero Transition*, *ibid.* at 17.