Voluntary Carbon Markets and Offsetting

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Climate Change Committee

Contents

Acknowledgements

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The wide range of stakeholders who responded to our call for evidence.

The Committee

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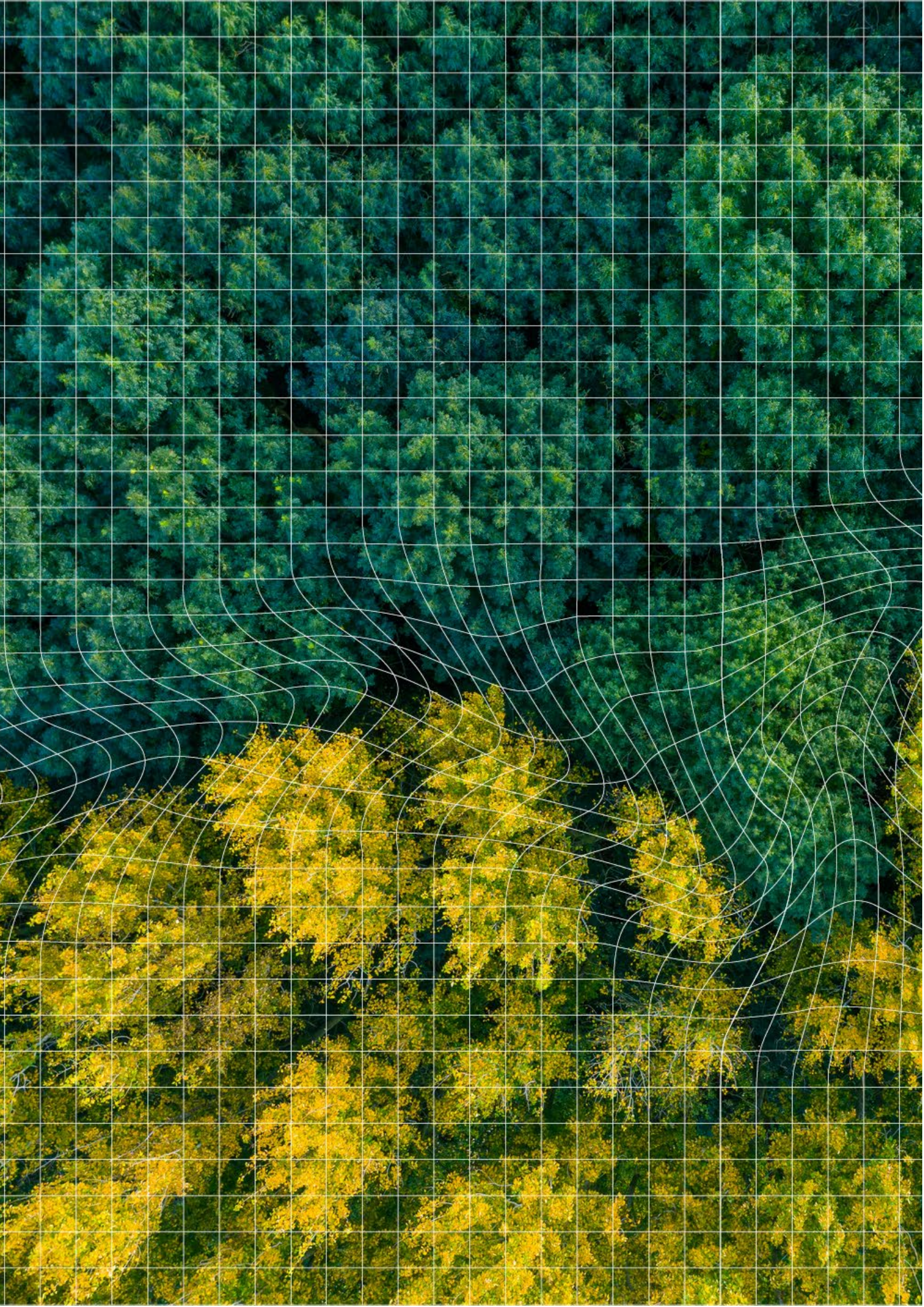


Executive summary

Voluntary carbon markets are growing. High-integrity carbon credits purchased by businesses can play a small but important role in supporting the transition to Net Zero. But before growing voluntary carbon markets, Government must put in place stronger guidance, regulation and standards to ensure purchase of carbon credits is not used as a substitute for direct business emissions reduction, and to improve the integrity and transparency of carbon credits. In the absence of these measures, there is a real risk that voluntary carbon markets slow progress towards Net Zero or damage other priorities such as climate adaptation and biodiversity.

(a) Background to this report

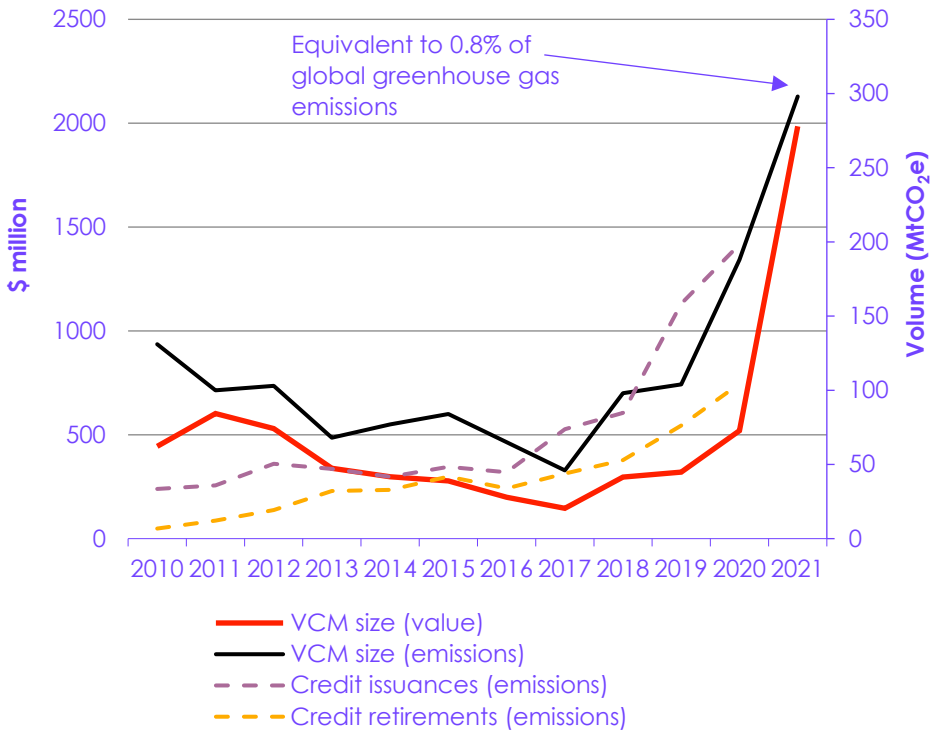
Voluntary carbon markets (VCMs) are markets where carbon credits are purchased, usually by organisations, for voluntary use rather than to comply with legally binding emissions reduction obligations.

Voluntary carbon markets (VCMs) are increasing in size, driven by business demand, but are contested in their utility.

Growth in voluntary carbon markets. In recent years, VCMs have grown in scale (see Figure 1) and risen in prominence in national and international policy discussions. Businesses, typically in the financial services and energy sectors, purchase credits to 'offset' their current residual emissions. Most carbon credits today support land-based measures to reduce or remove emissions (e.g. reducing deforestation or tree planting) and renewable energy projects.

Evidence and our approach. The effectiveness of voluntary purchases of carbon credits by businesses is hotly contested. Advocates point to the potential role of carbon credits in supporting valuable environmental projects and supporting wider Sustainable Development Goals. Critics raise concerns around their accuracy and whether their purchase slows down direct emissions reduction by businesses. To assess the evidence behind these viewpoints, we launched a Call for Evidence, commissioned data collection on carbon credits in the UK and conducted a literature review (see Table 1). Based on this evidence, we have assessed what actions are needed from Government and Devolved Administrations to ensure VCMs are supportive of UK and global Net Zero goals (see Table 2).

Figure 1 Estimated growth in size of global VCMs by value and volume



Source: Ecosystem Marketplace (2022) *State of the Voluntary Carbon Markets;* World Bank data (2022) *Total greenhouse gas emissions*.
Notes: Figures are estimates, based on information from participants in a market survey managed by Ecosystem Marketplace. VCM size (both value and emissions) shows volume of voluntary carbon credits traded in a given year. Issuances shows the number of projects that, having been verified, were issued with a unique serial number and can be purchased. Retirements shows the number of issued credits that were 'used' or claimed by their owner. All figures are estimates. Market volume is weighted based on market data reported by Ecosystem Marketplace respondents. Proportion of greenhouse gas emissions is calculated using World Bank data for global emissions.

(b) VCMs could in future support Net Zero, but currently there are significant risks

(i) High-integrity and well-regulated VCMs could support global and domestic Net Zero priorities, but only to a limited degree

VCMs could help address underinvested areas that are needed to reach Net Zero, but they risk disincentivising business emissions reductions.

The voluntary purchase of high-integrity* carbon credits could support faster emissions reductions. Increased financial flows are needed into underinvested areas which public purses to date have not sufficiently funded, such as rapid global ecosystem restoration before 2030 and the development of engineered removal technologies. Financial flows are also needed from developed to developing countries to rapidly scale up global investment in low-carbon solutions. In this context, carbon credits – whether used to make voluntary emissions reduction claims or to contribute to wider global efforts – are one mechanism to facilitate much-needed financial support towards emissions reductions.

* See Box 2.2 for a full definition of high-integrity carbon credits. High-integrity carbon credits are accurate in the emissions reduction or removal they report and are additional. They are consistently monitored, long-lived, transparent and do not cause environmental or social harm.

Businesses should prioritise reducing emissions. These funding flows are needed in addition to, not instead of, substantial direct business emissions reduction in the next ten years. For example, by installing low-carbon technologies, reducing energy consumption and changing business models. The focus should be on ensuring that the policy levers and enablers are in place to ensure businesses undertake the direct emissions reduction needed for Net Zero. Carbon credits should only ever be supplementary.

A relatively small feature of the transition. Even with much higher prices and demand, funds generated by VCMs would be a relatively small portion of the overall funding for the low-carbon transition required globally. While VCM funding flows can be seen as a way to transfer money for climate outcomes from developed countries to developing countries,* business voluntary action should not be relied on as a substitute for UK international climate finance responsibilities.

(ii) Currently VCMs could disincentivise business direct emissions reduction while many carbon credits make inaccurate claims

The evidence reviewed for this report suggests that VCMs are not currently supporting Net Zero globally: low prices and inaccurate claims mean that credits may not be meaningfully reducing emissions, while their use may cause buyers to take less action on their own emissions impact.

Appropriate business use of carbon credits. The UK will only reach 'Net Zero' once almost all emissions have been directly reduced to zero, and the remaining small amount of residual emissions (e.g. equivalent to 15% of 2019 emissions in the Government's Net Zero pathway) are then neutralised by removals. For a UK business to be on track for Net Zero, the foremost strategy should be to reduce emissions in line with the key features of the UK's sectoral pathways, on track for emissions to be near zero by 2050. Only in this context is it appropriate for a business to consider purchasing carbon credits for their remaining emissions. There are other options a business might consider, such as moving ahead of sectoral pathways or supporting the transition through funding low-carbon innovation in challenging areas.

Slowing business action. The very low pricing of carbon credits (including in comparison to other mechanisms such as emissions trading schemes) means they may provide an easier option to reduce 'net' emissions compared to more expensive direct actions. This could disincentivise business direct emissions reduction. The lack of regulation or required disclosure on how they are used in business Net Zero claims, and lack of clear guidance on what activities should and should not be 'offset', increases this risk. Many companies that use carbon credits do not specify what activities are being 'offset' and largely rely on carbon credits for their Net Zero claims.

Carbon credits often over-claim their emissions reductions and could therefore lead to greater global emissions if they are being used as a substitute for direct abatement.

Inaccurate claims. Calculating additional emissions reduction or removals is technically challenging, in particular for land-based projects (e.g. forests or peatlands). In the past, some land-based projects have over-claimed the emissions reduction or removal they are achieving, leading to overinflated claims of impact. Carbon credit projects range in permanence (how long they are expected to last), which is not always accurately captured in reporting. Carbon credit projects that do not build resilience into project design may not result in long-lasting emissions reduction or removal.

* Carbon credits are also generated by developed countries, with developed country buyers.

Engineered removal projects, with geological storage, can produce carbon credits with a very high level of permanence, but the standards and measurement, reporting and verification (MRV) for these projects are still evolving. Although standards both globally and in the UK are being improved, the risk remains that the emissions reduction or removal reported may have happened anyway (i.e. it is not additional) or may not persist into the future.

Potential to actively harm Net Zero. In combination these issues mean VCMs could slow progress on global greenhouse gas emissions reduction, by facilitating continuing emissions from businesses relying on projects with overstated emissions savings.

(b) Government must take steps to ensure integrity of carbon credits

(i) Government should guide and regulate business claims

Government action is required to improve transparency in the use of carbon credits for organisational Net Zero claims.

There is a role for Government to guide and regulate this space to ensure business reliance on carbon credits does not slow progress to Net Zero.

Guidance and regulation for business reliance on carbon credits. Firstly, Government should use the Net Zero Transition Plan Standard to require UK businesses to disclose their reliance on carbon credits, including detailing the type of carbon credit purchased, the quantity and duration of the carbon credits, what activity is being 'offset' and why. They should develop more specific guidance for businesses on what type of activity can reasonably be 'offset' versus abated at different time periods (see our illustration of this in Table 5).

Government should provide a clear definition of 'Net Zero' that can only be used once all possible emissions have been reduced.

Definition of 'Net Zero'. Government should provide a clear definition of a 'Net Zero' business, which can be used reliably. This definition should in time be made into regulation by integrating it into the Net Zero Transition Plan standard, and into the existing Green Claims Code.

- The Committee's view is that a business is only 'Net Zero' once nearly all scope 1, 2 and 3 emissions have been reduced, and the few remaining emissions are counterbalanced with long-term removals. This is similar to the definition of Net Zero outlined by the Science Based Targets (SBTs) initiative.

- To encourage businesses to reduce their emissions in line with long-term science aligned targets, and to fund high-integrity mitigation beyond the value chain of the business (including via carbon credits), Government should establish a term for a business that is 'on track' to Net Zero. This should build on the Voluntary Carbon Market Initiative (VCMI) initiative proposed definitions, but change the labels from 'Net Zero' to a more accurate description, such as 'on track for Net Zero' or 'Offset Zero'.

Supporting direct business emissions reduction. Beyond this specific guidance and policy, Government's attention should be principally on ensuring that regulations and the enabling environment are such that businesses take necessary actions to decarbonise their operations and supply chains.

(ii) Government must help improve carbon credit project integrity

Carbon credit standards in the UK. The UK Government should continue work to improve existing standards for carbon credits. Building on the relatively robust UK standards in the Woodland Carbon Code and Peatland Code, the Government and Devolved Administrations should continue to strengthen the additionality* and long-term monitoring of biodiversity in carbon credit projects. They should continue to ensure the robustness of other emerging UK codes.

Government should ensure that the integrity of carbon credits are substantially improved before they are used as a tool to reduce global emissions.

Carbon credit standards globally. The Government should also continue to use its influence to advocate for a strengthened global set of standards for carbon credits, with robust measurement, reporting and verification (MRV) approaches. This could include integrating the Integrity Council for the Voluntary Carbon Market (IVCMI)'s Core Carbon Principles into a UK standard, required in UK Environmental Reporting Guidelines, to encourage existing standards to adopt ICVMI's Core Carbon Principles. It could also include advocating for greater transparency in international registries, so that all voluntary carbon credit transactions, including the identify of buyer and seller, project details including whether the project is based on avoided emissions or removals, level of permanence, and date of retirement are publicly available.

(iii) Businesses can engage in other voluntary action supportive of Net Zero

Wider business voluntary action. While these measures are being developed, businesses should be encouraged to engage in other business voluntary action that can support Net Zero. This includes further action within their value chain, such as 'insetting'† and setting a strong internal carbon price. They should also be encouraged to support beyond value chain mitigation in other ways, such as purchasing carbon credits without claiming the reduction in emissions, supporting Net Zero policies, upskilling workers and developing low-carbon products.

(iv) Provided carbon credit integrity and business claim integrity is ensured, Government could encourage carbon credits for land

VCMs for carbon credits from the UK may be a useful mechanism for UK land outcomes. Purchase of carbon credits from the UK by UK businesses and organisations (or those with emissions in the UK)‡ can usefully contribute towards delivering sector pathways, especially land use, which are currently off-track and underfunded. This has particular value in the near-term. Carbon credits from the UK might also be a stepping stone towards compliance regimes§ for sectors such as aviation where residual emissions are expected in 2050, and provide early complimentary funding for engineered removals.

* Additionality refers to whether a carbon credit project would have gone ahead in the absence of a VCM.

† 'Insetting' is when a company implements emissions-reduction projects within its own value chain. For example, this may involve implementation of renewable energy or nature-based solutions within supply chains.

‡ Throughout the report we refer to 'UK businesses' as a general group. This can include businesses with headquarters elsewhere but significant emissions occurring within the UK.

§ Compliance regimes are systems regulated by law that require actors to comply with emissions reduction requirements. An example of a compliance regime is an emissions trading system (ETS).

However, Government should not solely rely on carbon credits from the UK to meet UK and Devolved sector targets. UK Government and Devolved Administrations are responsible for meeting the statutory goal of Net Zero and the associated interim emissions targets. These will be achieved predominantly through regulations, financial incentives and other market mechanisms. Where Government does intend to rely upon VCMs for carbon credits from the UK, this should be explicit and Government must be ready to address any shortfall in delivery through other means in the relevant sector.

(v) More evidence and guidance is needed on Corresponding Adjustments

Government needs to build the evidence base to help guide UK businesses on what approach they should take to Corresponding Adjustments.

A Corresponding Adjustment is an adjustment when a carbon credit is purchased. It is applied to the emissions balance of the country hosting the carbon credit, in order to avoid double counting of the emissions saved in a global stocktake. It requires that the emissions reduction achieved when a carbon credit is purchased is not then counted towards the host country's Nationally Determined Contribution (NDC).* The emissions savings 'sold' via the carbon credit must be taken from the total emissions balance that is used when tracking and accounting for NDCs.

Corresponding Adjustments could help with additionality, but evidence is complicated. In theory, carbon credits accompanied with a Corresponding Adjustment could give more confidence over additionality (i.e. whether the credit genuinely leads to extra emissions reductions in the long run). There is therefore a question as to whether in future UK businesses should prioritise carbon credits that are accompanied by a Corresponding Adjustment. However, the impact on additionality may remain complicated to establish, and will depend for example on the nature of the host country's emissions reduction commitments, and the degree of success in strengthening NDCs.

Requiring Corresponding Adjustments could have negative effects. We received evidence pointing to the added complexity and expense associated with requiring Corresponding Adjustments, which could undermine the operation of markets for carbon credits. Requiring Corresponding Adjustments would also forego the opportunity in the near term for carbon credits to help close the implementation gap between action committed in NDCs and expected to be driven by current policy plans.

Government should build evidence to help inform businesses on the potential use of carbon credits with Corresponding Adjustments. For now, the Government should focus on strengthening regulatory arrangements aimed at ensuring additionality and permanence. Beyond this, the merit of prioritising purchase of carbon credits with Corresponding Adjustments is not yet clear. Government should draw together the emerging international evidence on the impacts of attaching a Corresponding Adjustment and use this to help inform businesses on what approach to Corresponding Adjustments they should take in their purchase of carbon credits in future.

* NDCs are the principal mechanism by which countries will achieve the objectives of the Paris Agreement. They are national climate action plans, highlighting the targets, policies and measures they will take to reduce emissions and adapt to climate change impacts. Countries communicate new or updated NDCs every five years.

(c) Impacts beyond carbon need to be considered in carbon credit projects

Wider social and environmental impacts are an important consideration for carbon credit projects.

High-integrity carbon credit projects can provide benefits beyond emissions reduction, contributing to wider Sustainable Development Goals.

Carbon credit standards should better consider biodiversity and other ecosystem services. Carbon credit projects (biological or engineered) should consider risk to biodiversity and the wider environment, and avoid creating projects that are not climate change resilient and so risk losing some of the carbon stored in vegetation and soils. For UK land codes, Government should improve scrutiny of wider impacts over project lifetimes, for example considering their interaction with biodiversity priority areas. Aligning UK land-based carbon credit projects to targets for nature as well as for carbon could help to deliver widespread habitat protection and restoration, a more resilient natural environment and help society adapt to climate change.*

More evidence on social impacts is needed. There is limited evidence on the interaction between UK carbon credit projects, local communities and land access. Impacts vary depending on location and land use and are not consistently felt across the UK. Scotland is developing policy on natural capital investment that embeds community engagement. Governments throughout the UK should investigate ways to ensure access to carbon markets for groups where there are currently considerable barriers (e.g. tenant farmers) and that outcomes deliver community and public benefits. At a global level the Government should continue to advocate for strengthened safeguards against community disempowerment or land use change that is exclusionary.

* This is not intended to preclude biodiversity credits, which we have not reviewed the evidence on.

(d) Evidence summary and recommendations

Table 1 summarises the strength of evidence assessed for this report against the various issues and opportunities raised over how voluntary carbon markets might support or undermine Net Zero.

Table 2 sets out our recommended actions for the UK and devolved administrations and how these aim to address the issues and opportunities.

Table 1
Evidence on issues and opportunities presented by voluntary carbon markets to Net Zero

Issues		Strength of evidence
1	Slowing direct emissions reduction	Medium
2	Emissions reductions/removals from carbon credits from the UK are overstated	Medium
3	Emissions reductions/removals from carbon credits from overseas are overstated	Strong
4	Negative impacts on global emissions reduction ambition	Limited
5	Negative impacts on biodiversity* and equity	Medium
Opportunities		**Strength of evidence**
1	Support UK Net Zero pathway by funding biological or engineered removals	Medium
2	Support UK Net Zero pathway by supporting UK land outcomes	Medium
3	Direct financial flows to nature-based projects/biological removals globally	Strong
4	Raise overall global emissions reduction ambition	Limited

Notes: Evidence strength is assessed on evidence reviewed from our call for evidence, data collection and literature review. **Strong** – robust evidence to support the claim. **Medium** – some evidence to support the claim, but some gaps in the evidence base, uncertainties or complexities. **Limited** – some indications in support of the claim, but significant gaps in the evidence base, and significant uncertainties or complexities. For assessment of the opportunities, 1 and 2 were assessed as Medium as although there is relatively robust evidence to show that VCMs can be supportive, there is also evidence to show there are alternatives to VCMs to achieving the outcomes discussed.

* Biodiversity is defined in the Encyclopaedia of Ecology (2008) as the constellation of plants, animals, fungi and microorganisms on Earth; their genetic variation; and the ecosystems of which they are a part.

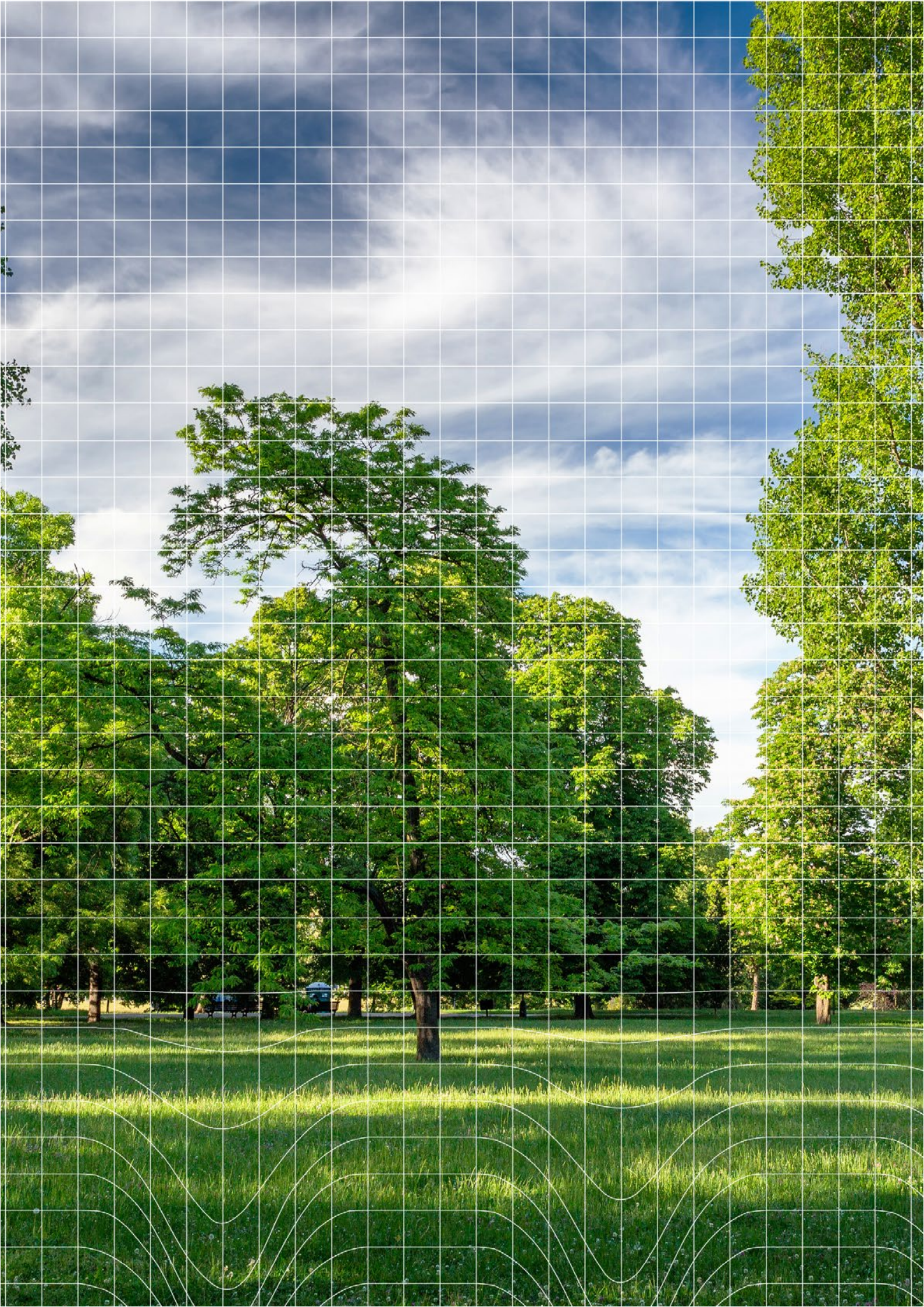
Table 2
How our recommendations address the issues and opportunities presented by VCMs

Recommendation	Issue / opportunity addressed	Rationale	Risks	Benefit to Net Zero
Ensure VCMs do not slow down direct business emissions reduction.				
Require disclosure of business carbon credit usage in Net Zero transition plan standard	1 1, 2, 3	Increases transparency of 'offset' usage, which incentivises responsible use.	Reporting burden on businesses.	High
Publish guidance on activities that can be 'offset' and where / when carbon credits can be used to claim emissions reductions	1 1	Encourages businesses to reduce their direct emissions before relying on carbon credits, ensuring priority business emissions reduction takes place.	Businesses do not engage with guidance. Guidance fails to keep pace with technological development.	High
Establish definitions of what constitutes 'Net Zero' and 'Offset Zero' (or similar) at the business level	1 1, 2, 3	Provides more confidence in voluntary use of carbon credits. Avoids misleading consumers/greenwashing.	Potentially resource intensive. Could undermine or confuse existing standards.	High
Prioritise other mechanisms (e.g. regulation) before VCMs to reduce emissions to meet Net Zero pathway	1		Reduces financial flows to carbon credit projects.	High
Consider the role of other mechanisms to support emissions beyond value chain	1, 4, 5 1, 2, 3	Can continue to facilitate financial flows to solutions in UK and globally. Can have additional positive impacts.	Strengthened standards may be required.	Low
Clarify UK Environmental Reporting Guidelines for the use of woodland carbon credits	1 2	Clarifies whether Woodland Carbon Code credits can be used for net emission claims now and/or in future.	Depending on what is decided, could reduce financial flows to carbon credit projects.	Low
Protect and raise the integrity of carbon credits projects, and ensure VCMs are lowering overall global emissions.				
UK: Ensure transparent registries for all land-based carbon credits; standardise approach across codes; ensure MRV of codes; consider wider impacts of projects including on biodiversity	2, 5 2	Create a high-integrity VCM in the UK. Increase prices so they better reflect the cost of emissions reduction. Encourage demand across a range of Nature-based Solutions.	Cost of measuring wider benefits.	Low

Global: support efforts for raised global standards for trading; improve transparency; advocate for Net Zero claim standardisation	1, 3, 5 3, 4	Increase prices so better reflect cost of emissions reduction; improve integrity of emissions reductions claims made by businesses; facilitate creation of high-integrity projects.	Hard to facilitate level of global cooperation.	High
Build the evidence base on Corresponding Adjustments, so UK businesses have greater clarity on when a Corresponding Adjustment should accompany a carbon credit	4 4	Brings more credibility to carbon credits. Prioritising carbon credits with Corresponding Adjustment for specific countries could help raise global mitigation ambition and increase the additionality of projects.	Challenging to develop advice given limited evidence base on impacts. Requiring Corresponding Adjustments could reduce financial flows to VCM projects. Mechanisms are not yet established to attach Corresponding Adjustments to carbon credits.	Medium
At COP27 and beyond take steps to improve international accounting practices of NDCs, trading and Corresponding Adjustments	4, 5 3, 4	Making carbon credits from overseas as additional as possible, through strengthening rules around Corresponding Adjustments and raising standards.	Hard to facilitate level of global cooperation. Negotiations already complex and challenging.	Medium
Act in accordance with the modest role VCMs can play in the UK Net Zero pathway				
Publish a UK Land Strategy. If it includes VCMs, include plans for equitable access, stacking* and biodiversity†	5 2	Coordinate wider changes needed to land, manage risks for biodiversity and access.	Minimal.	Medium
Plan sufficient funding mechanisms for engineered removals, considering VCMs as one mechanism among many to complement initial development	1	Helps to support development of engineered removals sector.	Over-reliance on voluntary markets.	Low
Set out the role VCMs can play in upscaling investment in nature conservation, protection and restoration activities	2, 5 1, 2	Help find synergies and avoid conflicts.	Policies and schemes may not join up sufficiently.	Low

* Stacking refers to combining multiple funding sources to support a carbon credit project.

† Biodiversity is defined in the Encyclopaedia of Ecology (2008) as the constellation of plants, animals, fungi and microorganisms on Earth; their genetic variation; and the ecosystems of which they are a part.



Chapter 1: Overview

(a) What are carbon credits, VCMs and 'offsetting'?

A **carbon credit** is a token representing the avoidance or removal of greenhouse gas emissions, measured in tCO_2e.

Buyers use carbon credits to enhance their climate credentials and sellers use them to finance activities to reduce emissions.

Rationale for carbon credits. Carbon credits involve a financial transfer from one entity seeking to gain credit for a reduction in emissions to another offering to deliver this emissions reduction. Buyers use them to enhance their climate credentials and sellers use them to pay for actions that reduce emissions. Where buyers continue to take actions that they otherwise would have and where sellers would not take these actions in the absence of the credit market, credits can result in a net reduction in global emissions.

- Particularly for compliance-based carbon markets (where a regulator sets the terms of transfer), carbon credits can also support efficient allocation of abatement.

Article 6 of the UNFCCC Paris Agreement includes guidance on what carbon credits can be used for.

Article 6. Article 6 of the Paris Agreement contains two operative parts which relate to carbon credits.

- Article 6.2 establishes a reporting and accounting framework that enables countries to voluntarily trade international "mitigation outcomes". This allows buyers to claim the emissions reductions when accounting for their Nationally Determined Contribution (NDC), while the seller relinquishes the right to them. In this way, double counting between the two targets is avoided.

- Article 6.4 establishes a new centralised crediting mechanism established under the UNFCCC which will generate carbon credits. These credits can be used for voluntary purposes (i.e. - can be used as 'offsets'), as well as potentially to meet compliance obligations (e.g. for regulated entities within an emissions trading scheme).

- The mechanism established under Article 6.4 must deliver an "overall mitigation in global emissions", achieved by automatically cancelling 2% of credits generated. A further 5% of credits will be monetised by the UNFCCC, with the proceeds directed towards the UNFCCC's Adaptation Fund.[1]

VCMs enable carbon credits to be used by organisations voluntarily, rather than to comply with regulations or an emissions trading scheme.

Voluntary carbon markets (VCMs). Voluntary carbon markets (VCMs) are markets where carbon credits are purchased, usually by organisations, for voluntary use rather than to comply with legally binding emissions reduction obligations such as an emissions trading scheme or carbon tax. Credits can be bought from public international crediting mechanisms (including the new centralised crediting mechanism mentioned above), private international crediting mechanisms, and domestic crediting mechanisms. See Box 1.1 for a brief history of VCM standards and programmes.

Definition of 'offsetting'. Some voluntary purchasers of carbon credits include the emissions savings represented by the carbon credit in the 'net' emissions they report. This is often referred to as 'offsetting' emissions.

Box 1.1
A brief history of carbon credit programmes and institutions.

Global

Since the United Nations Kyoto Protocol in 1997 international carbon credits have been available for purchase under the Clean Development Mechanism (CDM) and the Joint Implementation (JI) mechanism, allowing host countries to sell the credits from their emissions reduction projects to other countries. These credits were used to count towards the purchasing countries' emissions reduction targets.

Building on these transfers independent organisations developed in the late 1990s, initially focussed on areas where the CDM and JI did not operate. By the early 2000s the main voluntary standards for carbon credits were Verified Carbon Standard (VCS)/Verra, Gold Standard, Climate Action Reserve (CAR) and American Carbon Registry (ACR).

Compliance schemes such as cap and trade schemes and carbon taxes are also increasing in prominence and can interact with carbon credits. For example, for a period the EU emissions trading system (ETS) accepted credits from the CDM, but not from other schemes. Global crediting activity increased rapidly until 2012, crashed in 2013 (due to a drop in demand from the EU ETS following the exclusion of almost all Kyoto credits for compliance in phase 3) and has stabilised since the Paris Agreement in 2015.

In recent years there has been growth in independent mechanisms for carbon credits. In 2019 they were responsible for 65% of annual credits issued (17% in 2015) (see Figure 1.1).

This is accompanied by a gradual shift away from renewable energy and towards nature-focussed projects. Of CDM/JI credits, 70% come from projects in industrial gases, renewable energy and fugitive emissions*. Of forestry credits, 99% are from independent mechanisms (including VCS and regional initiatives).

UK

In 2011 the UK closed its 'Quality Assurance Scheme' (QAS), a Government-led initiative that sought to provide consumers with a quality kitemark for carbon credits, due to limited uptake by carbon credit providers. The QAS mostly included credits from the CDM, and emissions trading schemes. Although it was open to independent carbon credits such as those from Gold Standard or VCS to participate, these independent standards did not apply.

The Woodland Carbon Code (WCC) was established in 2011 as the UK's government-backed standard for quantifying emissions reduction from woodland and forestry projects. Projects must demonstrate successful woodland establishment, with tree growth and sequestration rates assessed at year five, thereafter at a minimum of ten year intervals.

The Peatland Code (PC) was established in 2018, designed specifically for peatland restoration projects. Credits can only be used to 'offset' UK based emissions.

Agricultural soil carbon credits are an area under active development with a number of initiatives operating in the market, but at present no standardised code is established.

Source: Edinburgh University (2010) *Governing the carbon 'offset' market;* World Bank (2020) *State and Trends of Carbon Pricing.*

* Fugitive emissions include methane leakage from gas distribution and transmission networks, methane and CO_2 emissions from flaring and venting during oil and gas production and methane leaks from closed (and existing) coal mines.

(b) What are the different kinds of carbon credit?

Carbon credits can come in several forms, broken into reduction/avoidance credits and removal credits.

Types of carbon credit. Carbon credits can cover a range of activities which either claim to reduce emissions or remove them (see Box 1.2).

- **Reduction/avoidance.** Examples of carbon credits that reduce/avoid emissions that would have been produced include: displacement of fossil-fuel generated electricity with electricity from renewable sources; avoiding deforestation or preventing peatland degradation; and carbon capture and storage at industrial facilities.

- **Removal.** Examples of carbon credits removing carbon dioxide from the atmosphere include: biological removals, such as afforestation, soil carbon enhancement, peatland restoration; and engineered removals, such as direct air carbon capture and storage (DACCS) (see Box 1.3).

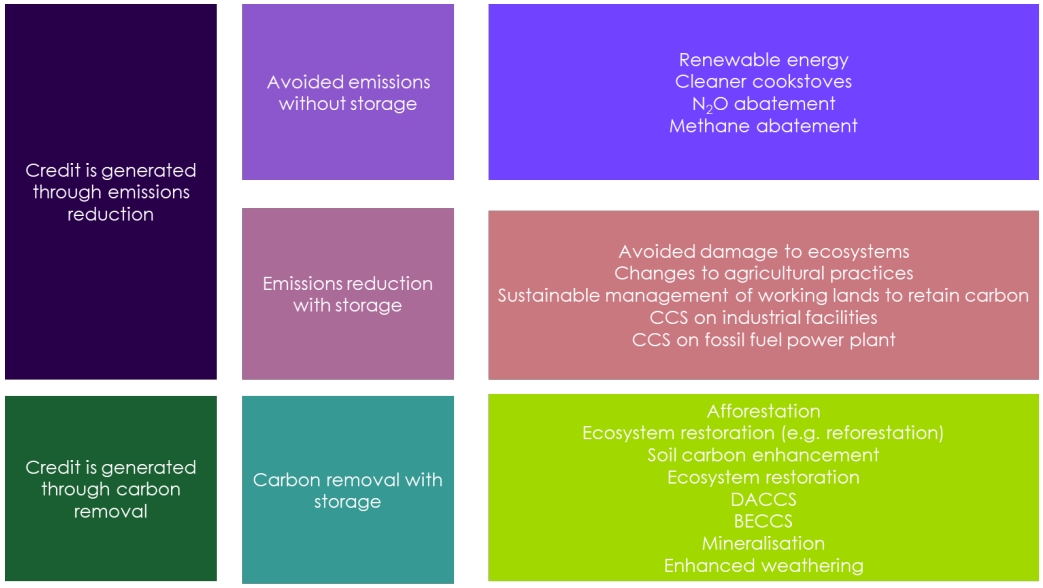
Carbon credit markets today are dominated by forestry and renewable energy projects, with biological removals increasing rapidly.

Voluntary purchase of carbon credits today. The most common carbon credit purchases today are for forestry or renewable energy projects.

- **Supply**. Previously many carbon credits were focussed on renewable energy, but global carbon credits are increasingly comprised of projects that focus on biological removal. Forestry credits were 42% of the global total in the last 5 years[2] (see Figure 1.1).

- **Demand.** Most global demand for carbon credits comes from financial services, oil, gas & petrochemical and consumer goods organisations (see Box 1.4). Demand is driven by Net Zero targets or offering consumers the opportunity to 'offset' their purchases. There is also interest from public institutions and consumers in 'offsetting'.

Box 1.2
Types of carbon credit



Source: University of Oxford (2020) *Oxford Principles for Net Zero Aligned Carbon Offsetting.*
Notes: The potential of these approaches to provide long-term carbon storage and to be scaled requires research and depends on the social-ecological context and impacts of climate change. Avoided emissions are generally less certain than emissions reduction due to the challenges in calculating counterfactual baselines.

Removals can be engineered or biological. Nature-based solutions are biological removals which are people-led and biodiversity-based.

Box 1.3
Defining greenhouse gas removal approaches

Engineered: technological approaches that use chemical and physical processes to remove carbon dioxide, including directly from the atmosphere (e.g. DACCS) or from biomass (see BECCS bullet below), and store it in geological isolation from the atmosphere on a very long-term basis. Geological storage can be a more permanent removal option than other methods.

Biological: enhances or manipulates living systems to promote the net removal of carbon dioxide from the atmosphere, storing carbon in vegetation, soils and sediments. Ecosystems can be affected by societal and climate impacts in the future so these removals are generally considered less permanent.

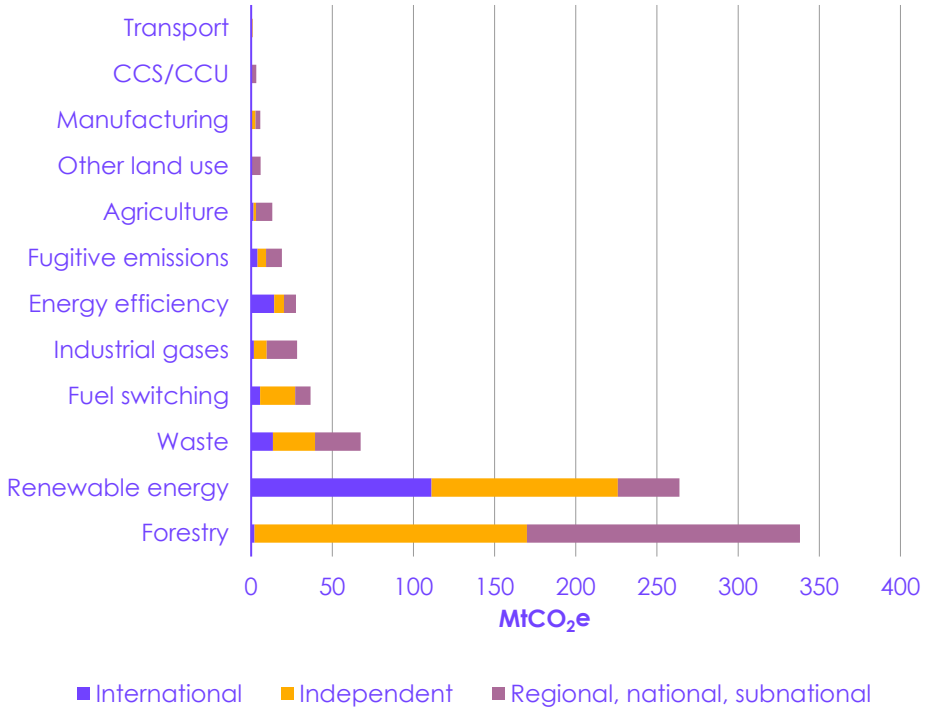
- **Nature-based solutions (NbS)**: are a subset of biological removals that provide local benefits for biodiversity and people. Examples include protection and restoration of native forests and wetlands, including peatlands and mangroves.

BECCS: bioenergy with CCS combines biological uptake of CO_2 with geological storage via the combustion or fermentation of harvested biomass and capture of the resulting CO_2. This could be considered engineered or biological.

Source: United Nations Environment Assembly Resolution on Nature-based Solutions (2022).

Carbon credit issuances are dominated by forestry and renewable energy projects.

Figure 1.1 Breakdown of carbon credits issued from 2015- 2019



Source: World Bank Group (2020) *States and Trends of Carbon Pricing.*
Note: This includes carbon credits generated by domestic crediting schemes.

Carbon credits are voluntarily purchased in the UK by businesses, cities/councils/regions and, to a lesser extent, citizens.

Box 1.4
Purchasers of carbon credits

Businesses.

- Most global demand for VCMs comes from the private sector, driven by their voluntary Net Zero commitments and products offering consumers the option to 'offset' the emissions resulting from their purchases.
- There has been a substantial rise in Net Zero commitments. 60% of FTSE100 companies had committed to a Science Based Target in 2021 (one third in 2020).
- A third of FTSE350 firms include 'offsets' in their published emissions reduction plans. Of the FTSE350 who disclosed the size of reliance on 'offsets' in their latest report, it is estimated the 'offsets' cover a significant proportion of their emissions (between 36% and 80%, depending on estimation methods). These emissions did not all occur in the UK.
- There has high demand for carbon credits from financial services, petrochemical/oil and gas, and consumer goods sectors in the last few years. There is emerging demand from events/entertainment and food and beverage sectors.
- Some of the most significant public purchases of UK land-based carbon credits recently have come from UK financial institutions.

Citizens. Aggregated data on demand for 'offsets' from individuals is limited. Studies have found a high consumer willingness to favour products claiming green credentials, but a very low willingness to pay to 'offset' emissions from flights.

Councils, cities, and regions. Nearly two thirds of local councils in England aim to be carbon neutral by 2030. Aggregated data on demand for 'offsetting' from local authorities is limited, but anecdotally many are seeking to use 'offsets' in their Net Zero plans. Around 15% of cities and around 30% of states/regions globally planned to use 'offsets', out of those reviewed by ECIU and University of Oxford.

Source: Berger, Kilchemann, Lenz, Scholder (2022) *Willingness to pay for carbon dioxide VCOs*; Trove Intelligence Analysis (2021); ECIU & University of Oxford (2021) *Taking stock: a global assessment of Net Zero targets;* Abatable (2021) *Voluntary carbon market developers overview*; Allied Offsets (2022) *Supply and Demand in the UK Voluntary Carbon offset Market.*

(c) Size of the market

VCMs are estimated to be worth around $2 billion. The market has increased rapidly in size between 2018-2021, although remains small compared to compliance schemes.

Small market size. VCMs are small in terms of both emissions and financial value.

- Ecosystem Marketplace estimates the global VCM* volume for 2021 was around $2 billion in value[3] (as of Dec 2021) and almost 300 $MtCO_2e$ in terms of emissions (as of Nov 2021).[4] This is equivalent to 0.8% of estimated global CO_2 emissions in 2021 (see Figure 1.2).[5]
- In 2018 voluntary carbon market volume was around 2% of global emissions trading schemes and global carbon tax coverage in terms of emissions coverage (see Figure 1.3).[6]

Market growth. There has been a rapid increase in market volume since 2017 (see Figure 1.2).

- In 2021, estimated VCM value increased over 5-fold compared to the market volume in 2018.[7]

* This reflects credits being traded annually rather than those being issued, which is significantly lower.

- However, as the starting point for VCMs was low, this is still a relatively small absolute increase (estimated rise in value of $1.7 billion)[8], especially when compared with the sizes of compliance schemes (see Figure 1.3).

Ambitious projections. Some estimations suggest demand for global carbon credits could grow by up to a factor of 100 by 2050 (see Figure 1.4).[9] However, this is based on large assumptions about business behaviour and how the policy landscape will develop.

- For example, growth projections are largely derived from assumed future carbon credits demand from oil and gas companies and the aviation sector. Also, business emissions reduction plans are not binding and the level of reliance on carbon credits may change due to regulations, costs or reputational pressures.

Low prices. Prices for carbon credits remain relatively low, although UK land-based credits are more expensive than global averages (see Figure 1.5).

- Global carbon credit prices are estimated at around $3/tonne* on average although prices vary between $1 - $15/tonne based on type, size, location and accreditation standard.[10]

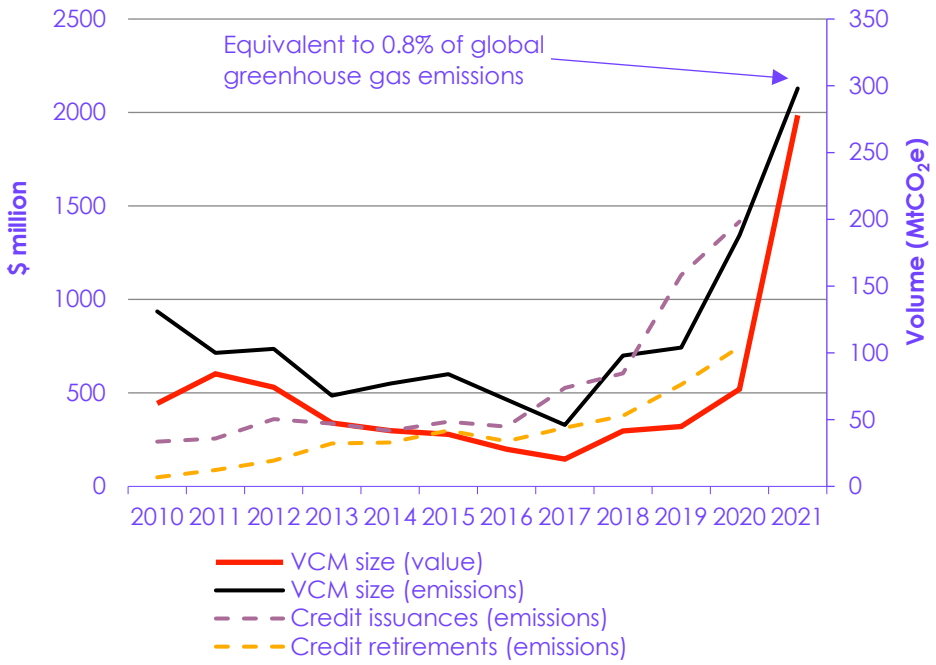
- In the UK, land-based carbon prices are based on Pending Issuance Unit (PIU) prices, rather than verifiable carbon units. PIUs under the Woodland Carbon Code range between £10 – 20, and £10 – 12 under the Peatland Code. To compare, the cost of a carbon permit contract under the EU ETS has ranged between roughly $50 – $100[11] in the last year, while the Committee's Sixth Carbon Budget analysis expected peat restoration to cost £5-40/tCO_2 and afforestation† £65-105/tCO_2 in 2035.[12]

* This is the estimated weighted average price from January 2021 up until 9 November 2021.

† This covers new conifer planting and new broadleaved planting.

The size of the voluntary carbon market has grown substantially in the last decade.

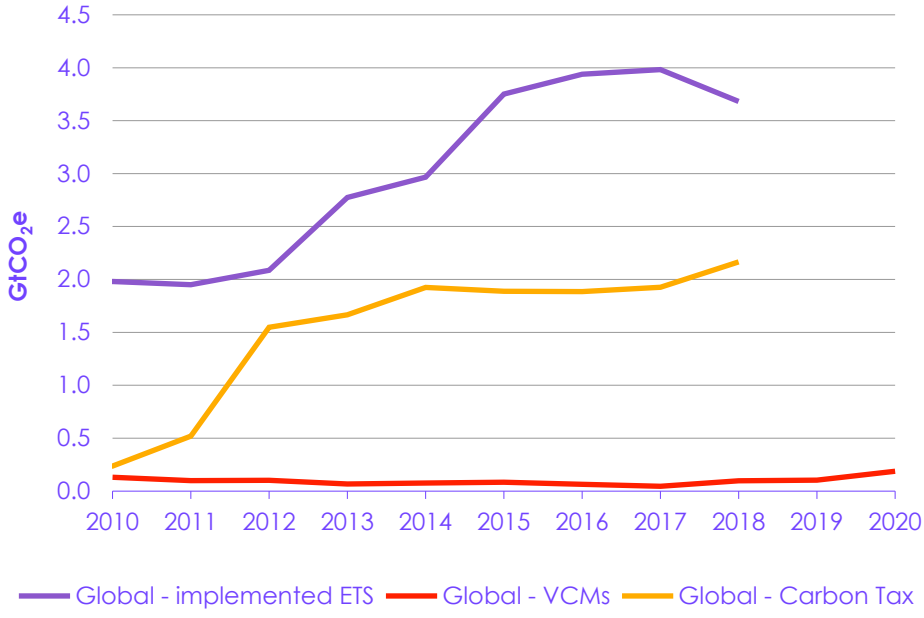
Figure 1.2 Estimated growth in size of global VCMs by value and volume



Source: Ecosystem Marketplace (2022) *State of the Voluntary Carbon Markets;* World Bank data (2022) *Total greenhouse gas emissions*.
Notes: Figures are estimates, based on information from participants in a market survey managed by Ecosystem Marketplace. VCM size (both value and emissions) shows volume of voluntary carbon credits traded in a given year. Issuances shows the number of projects that, having been verified, were issued with a unique serial number and can be purchased. Retirements shows the number of issued credits that were 'used' or claimed by their owner. All figures are estimates. Market volume is weighted based on market data reported by Ecosystem Marketplace respondents. Proportion of greenhouse gas emissions is calculated using World Bank data for global emissions.

Compliance regimes are substantially larger than voluntary carbon markets.

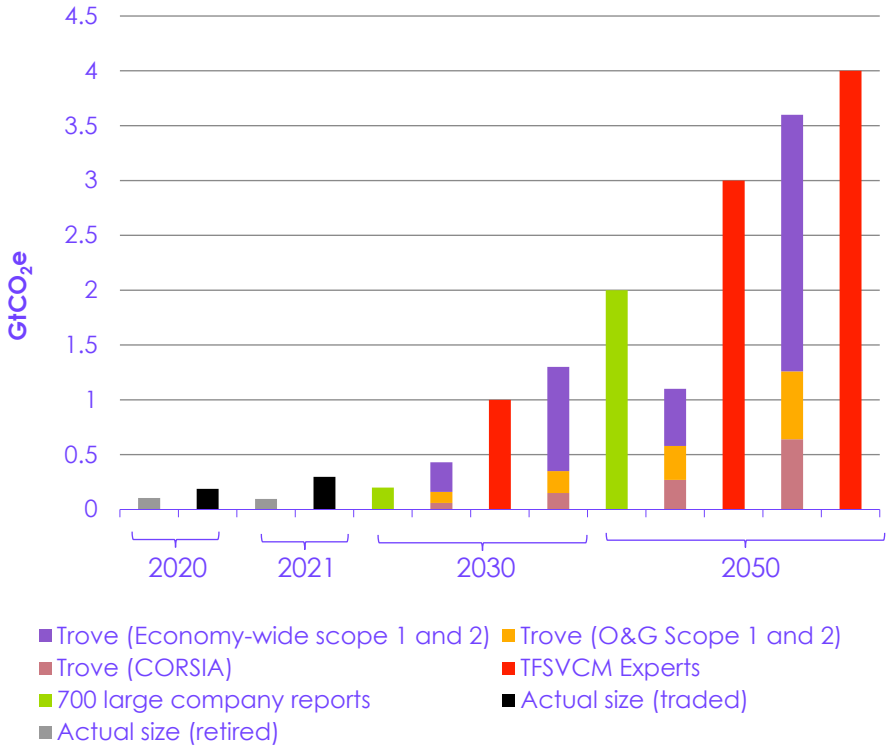
Figure 1.3 Emissions coverage of VCMs compared to compliance regimes globally



Source: World Bank published datasets on carbon pricing and ETS. EDGAR data on greenhouse gas emissions. Ecosystems Marketplace data on VCMs.

Demand for carbon credits for 'offsetting' purposes is projected to increase considerably between now and 2050. However, this is based on significant assumptions.

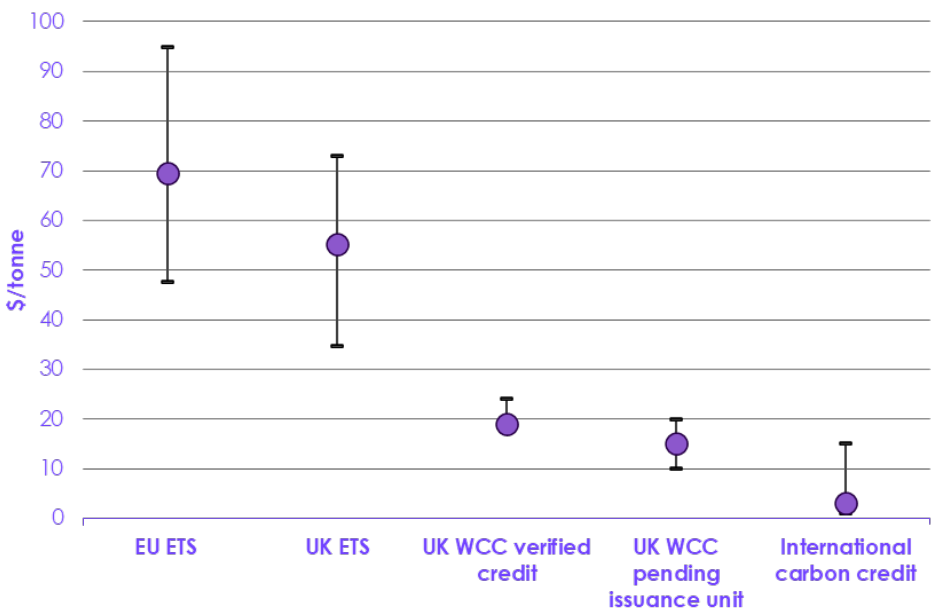
Figure 1.4 Published projections of future range of global demand for carbon credits for 'offsetting' to 2050



Source: Trove Insights (2021) *Future Size of the Voluntary Carbon Market;* Mckinsey (2021) *A Blueprint for scaling voluntary carbon markets to meet the climate challenge;* Ecosystems Marketplace (2022).
Notes: The assumptions underpinning these estimates are considerable and may not hold, especially as many are based on non-binding business targets. However, they give an indication of a range of expectations for demand for carbon credits for 'offsetting' purposes.
Data from 700 company targets was collected by McKinsey & Company and presented as a lower bound, as it does not cover all companies and does not account for possible growth in commitments. We do not have access to the data used for the 700 company targets.
Projections from Trove are split into three categories: (1) estimating 'offset' demand from CORSIA (2) estimating 'offset' demand from European oil and gas company scope 1 and 2 emissions (3) estimating a minimum future demand for carbon credit based on the 368 firms out of the CDP database with Net Zero commitments – assuming the residual emissions are 'offset'. Trove estimate a lower and upper bound for each segment of future demand, hence why we show two columns for Trove.
Projections from TFSVCM are based on a TFSVCM survey with subject matter experts. We took an average of the upper and lower bound of these projections for 2050.

The prices of carbon credits are substantially lower than other carbon prices, particularly for carbon credits from overseas.

Figure 1.5 Carbon credit price comparison



Source: EU Carbon Price Tracker (2022) *Research commissioned by the CCC;* Ecosystem Marketplace (2021) *State of the Voluntary Carbon Markets;* World Bank data (2022) *Total greenhouse gas emissions.*

(d) Policies and frameworks

There are some policies being developed in the UK and internationally relating to carbon credits and 'offsetting'.

UK specific policies are nascent but starting to emerge:

- **Net Zero Transition Plan Standard**. The UK will require listed UK companies to disclose their Net Zero transition plans from 2023. It remains to be seen what the guidance will be for the use of carbon credits for net emissions claims.

- **UK Environmental Reporting Guidelines.** Guidance asks firms to report gross emissions as a headline figure, and although they cannot consider credits from UK woodland projects as 'offsetting' their emissions, they can report emissions savings from these. If they have purchased and retired emissions reductions meeting the guidelines' 'good quality emissions criteria' these can be reported in their net emissions.

- **Evidence gathering.** In 2019 the Government gathered evidence on whether to require transport providers to offer customers the option to 'offset' their carbon emissions.[13] In 2021 the Government's Decarbonising Transport strategy stated this would not be required, to maintain a focus on reducing direct emissions.[14]

- **CMA Green Claims Code.** The Competition and Market Authority (CMA) published a Green Claims Code in 2021 to ensure businesses comply with the law in communicating their green credentials. They committed to carrying out a full review of misleading green claims in 2022 and have recently announced investigations in the fashion retail sector.[15] For future claims (such as 'Net Zero' claims) businesses are expected to demonstrate clear specific pathways, with milestones, and be clear on the level of reliance on 'offsets'.

- **Ecosystem Market Framework.** The Government is soon expected to announce details of the Ecosystem Market Framework, developed to underpin integrity in existing and developing nature-based codes. Standards that outline the minimum requirements for codes to be considered 'high integrity' will act as the core of the Framework.

Devolved Administrations. UK Environmental Reporting Guidelines cover the UK. Voluntary carbon markets are an area of reserved policy, for both UK voluntary carbon markets (such as UK land-based codes) and for international codes operating in the UK.

Global policies and guidance for VCMs are emerging, although most are incomplete and participation is voluntary:

- **Updates to Article 6 at COP26 relating to voluntary carbon markets.** Following discussions at COP26, Article 6 provides a way for countries hosting carbon crediting/emissions reduction activities to voluntarily apply 'Corresponding Adjustments' for carbon credits. This would mean that the emissions reduction represented by the carbon credit would not be counted towards the host country's NDC target (see Box 3.3). The initial set of rules for a new mechanism to replace the CDM were also agreed. This new Article 6.4 mechanism will be usable by the private sector, with 2% of generated carbon credits automatically cancelled and a further 5% monetized by the UNFCCC, with the proceeds going to the UNFCCC's Adaptation Fund.

- **Science Based Targets initiative's (SBTi) voluntary Net Zero Standard** was published in 2021. Companies can only claim to be 'Net Zero' once their long-term SBT is met, which for most companies will be once approximately 90% of all three emissions scopes* have been reduced. The remaining emissions can be neutralised through permanent removal. Companies are encouraged also to invest in emissions reduction beyond their value chain, but not to use these in their 'net' emissions reporting.[16]

- **The Race to Zero** campaign's leadership practices criteria require (1) prioritising reducing emissions; (2) clearly specifying what sinks and credits are used to make what, if any, neutralisation claims; (3) clarifying how sinks and credits are used on the path to (Net) zero and after (Net) Zero is attained; (4) transitioning any neutralisation of residual emissions to permanent removals by the time (Net) Zero status is attained.[17]

- **Voluntary Carbon Markets Integrity Initiative (VCMI)** is developing a claims Code of Practice to guide how carbon credits can be voluntarily used and claimed by businesses and others as part of credible Net Zero decarbonisation strategies. Their draft code includes Gold and Silver 'Net Zero' labels, which require firms to be meeting science-aligned emissions reduction targets, and paying for carbon credits for remaining emissions. The code is due to be finalised by 2023.[18]

* The Greenhouse Gas Protocol defines three "scopes" of emissions for companies. Scope 1 emissions are direct greenhouse gas emissions occurring from sources owned or controlled by the company, such as from company boilers or vehicles. Scope 2 emissions are emissions arising from the generation of electricity that the company purchases. Scope 3 emissions capture all other indirect emissions that occur as a consequence of the activity of the company, such as the extraction of materials, transportation of purchased fuels, or use of sold products and services.

- **The Integrity Council for Voluntary Carbon Markets (ICVCM).** Work is underway to develop Core Carbon Principles (CCP) and an Assessment Framework to set new threshold standards for high-quality carbon credits, provide guidance on how to apply the CCPs, and define which carbon crediting programs and methodology types are CCP-eligible. The CCPs would be voluntary.

- **Standards for carbon neutrality.** British Standards Institute (BSI) has offered a standard since 2010 (PAS 2060) which can be purchased and sets out how to measure, reduce, 'offset' and document in order to be carbon neutral. ISO is developing a standard on carbon neutrality (ISO 14068) due end of 2023, covering organisations and products, including events, buildings and services. The standard is expected to allow the use of carbon credits (based both on reduction and removals) to counterbalance unabated emissions at any point in an organisation's pathway to Net Zero. ISO standards are voluntary and are purchased. ISO is also providing an international platform to develop Net Zero guiding principles, to reach international consensus around definitions of Net Zero and how this definition should be incorporated into initiatives, strategies and policies.

- **CORSIA.** The Carbon 'offsetting' and Reduction Scheme for International Aviation is an international agreement adopted in 2016 by the International Civil Aviation Organisation (ICAO) that requires airline emissions from international flights above a baseline to be 'offset'. 107 countries are pledging to participate as of January 2022. It will become mandatory for countries to participate from 2027.

2. Our approach to thinking about VCMs

This report presents our advice to Government on how to respond to the risks and opportunities to Net Zero that are presented by voluntary carbon markets, in particular when they are used for 'offsetting' claims.

CCC work on business. This report sits within a wider theme of work within the CCC considering the role of business and finance in the UK's pathway to Net Zero. This report focuses specifically on the practice of voluntary purchases of carbon credits, as a prominent and fast-growing component of current UK business activity* relating to Net Zero.

This report does not consider the role of international carbon credits in meeting the UK's statutory targets. We have already advised that the UK Government should not rely on international carbon credits to meet its legislated carbon budgets.[19] That remains the Committee's position.

VCMs are prominent and controversial. Voluntary carbon markets (VCMs) are rising in prominence domestically and globally as businesses seek to demonstrate their climate credentials. However, VCMs remain a confusing space to navigate with contrasting opinions, approaches and guidance.

- There are diverging and often strongly held views on VCMs: some view them as a tool to enable unsound climate claims (often referred to as greenwashing), others as helping to fund high-integrity† projects (including nature-based solutions, carbon removal technologies, or renewable energy), whilst providing wider social co-benefits.
- There is growing interest in purchasing carbon credits, particularly from large UK businesses.
- Some engaged in the VCM space describe it as a 'wild west', with confusion about what a responsible approach to 'offsetting' entails on an organisational and policy level. Amidst differing viewpoints and limited data and evidence, it can be a confusing space to navigate.
- In response, there is increasing focus globally and in the UK on developing frameworks for guiding and potentially regulating VCMs. Government has a role to play in ensuring the potential opportunities presented by VCMs are realised, and the emerging risks are mitigated.

This report assesses the evidence of the risks and opportunities VCMs present for the UK's pathway to Net Zero and provides policy recommendations.

Structure of our analysis. In this report we assess the evidence on the risks and opportunities that VCMs present to Net Zero in the context of the UK, and outline key policy implications. Although carbon credits are bought and sold around the world, we primarily focus on the role of UK actors and UK policy.

- We consider the risks and opportunities of VCMs in two parts. Firstly, in terms of risks and opportunities VCMs present to Net Zero in the UK and globally.

* Throughout the report we refer to 'UK businesses' as a general group. This can include businesses with headquarters elsewhere but significant emissions occurring within the UK.

† See Box 2.2 for a full definition of high-integrity carbon credits. High-integrity carbon credits are accurate in the emissions reduction or removal they report and are additional. They are consistently monitored, long-lived, transparent and do not cause wider environmental or social harm.

Secondly, in terms of risks and opportunities VCMs present to areas beyond Net Zero, such as biodiversity* and equity.

- We then set out suggested policy actions to respond to these risks and opportunities. In some places we make specific recommendations for these decisions. In others we outline some key considerations that should inform decisions that Government may need to make.

- In terms of risks and opportunities, we consider the global impacts of VCMs purchased by those in the UK or sold within the UK. In terms of policy implications, we focus largely on UK policy levers, although we also consider the role the UK can play in influencing global standards and norms.

- We largely focus our analysis on purchase of carbon credits in their use to support Net Zero claims. However, in our consideration of policy decisions and implications, we broaden our focus to consider the roles of other activities that are sometimes included in discussions around 'offsetting', such as 'insetting'†, internal carbon pricing, compliance schemes, and contribution credits.

Our Call for Evidence, internal literature review and commissioned data collection provided the evidence on the risks and opportunities explored in this report.

Evidence. To inform our work, in spring 2022 we launched a Call for Evidence on voluntary carbon 'offsetting', conducted an internal literature review and commissioned data collection on carbon credit projects in the UK. This was supplemented by targeted stakeholder engagement with groups under-represented in the Call for Evidence. The main risks and opportunities that these exercises highlighted are listed in Box 1.5. A more detailed summary of the findings of each of these exercises is published alongside this report.

Box 1.5
Summary of risks and opportunities highlighted in the Call for Evidence

In spring 2022 we launched a Call for Evidence on voluntary carbon markets, receiving 56 responses, and references to over 200 sources. We reviewed these, augmented them with targeted stakeholder engagement and undertook an internal literature review to assess the strength of the evidence and synthesise findings. This synthesis underpins our analysis in this report.

Most common opportunities, risks and policy implications that sources highlighted (not filtered based on strength of evidence):

- Opportunities and strengths
  - VCMs can generate significant funds for high-integrity Nature-Based Solutions and removals, in particular in lower-income countries.
  - VCMs can enable resilience to climate change by supporting biodiversity and local livelihoods.
  - Funds from VCMs can help establish and expand sectors (e.g. renewable energy/removals).
  - For some sectors, standards for carbon credit projects are relatively robust, such as peatland and woodlands in the UK, and some international standards.
- Risks
  - Emissions reductions or removals due to carbon credit projects are overstated due to issues of additionality, impermanence and methodology.

† 'Insetting' is when a company implements emissions-reduction projects within its own value chain. For example, this may involve implementation of renewable energy or nature-based solutions within supply chains.

  - Direct emissions reduction is disincentivised as carbon credits are seen as easier or cheaper. There is a risk of overclaiming and reputational risks for 'offset' purchasers.
  - Limited data on type, location, price and retirement of purchased carbon credits.
  - Potential unintended negative impacts to adaptation, biodiversity, equitable land access and sustainable food production.
- Policy implications
  - Regulations for business claims that rely on carbon credits to ensure they are only used for genuine residual emissions.
  - Strengthened standards supported by government or overseen by a regulated trading body to ensure 'offset' integrity and build market confidence, with:
    - a clear difference between avoidance, reduction or removal of greenhouse gases.
    - a requirement that local biodiversity and equity are supported/enhanced by projects funded through carbon credits.
    - agreed standards for monitoring, reporting and verification (MRV), including protocols for comparability and technological verification given the growth in volume.
    - New standards for different habitats (e.g., saltmarshes, soil).
  - All carbon credit sales/purchases and retirements listed in the public domain in a centralised data source.
  - Legal definition of terms such as 'Net Zero' and 'carbon neutral'.
  - Take steps to raise carbon credits prices to $50-100/tonne by 2030.
  - Ensure every carbon credit project correctly claims its impact on emissions, making sure it is additional, permanent or long-term, like for like, does not lead to emissions shifting elsewhere and does not deter innovation.
  - Require Corresponding Adjustments to accompany voluntary purchase of carbon credits.
  - Government/regulators encouraging a shift in focus towards approaches with fewer accounting risks (e.g., contribution credits or set $/tonne for unavoidable emissions).
  - Compliance regimes/taxes to be considered as a simpler and more reliable way to achieve desired outcomes – VCMs are valuable largely as a pathway towards these.

Source: See published summary report of the Call for Evidence for full list of sources.
Notes: the opportunities, risks and implications outlined above were put forwards by multiple stakeholders but do not represent a consensus, the strength of the evidence or a majority position. In this summary we try to reflect the framing and language in the responses; this does not reflect the CCC position.

Endnotes

[1] UNFCCC (2021) *Cooperative Implementation.* https://unfccc.int/process/the-paris-agreement/cooperative-implementation

[2] World Bank (2020) *State and Trends of Carbon Pricing 2020.* https://openknowledge.worldbank.org/bitstream/handle/10986/33809/9781464815867.pdf

[3] Ecosystem Marketplace (2022) State of the VCM Briefing Q3.

[4] Ecosystem Marketplace (2022) *Data Dashboard.* https://data.ecosystemmarketplace.com/

[5] Ecosystem Marketplace (2022) *State of the Voluntary Carbon Markets 2022.* https://www.ecosystemmarketplace.com/publications/state-of-the-voluntary-carbon-markets-2022/

[6] World Bank (2022) *Carbon Pricing Dashboard.* https://carbonpricingdashboard.worldbank.org/map_data

[7] Ecosystem Marketplace (2022) *State of the Voluntary Carbon Markets 2022.* https://www.ecosystemmarketplace.com/publications/state-of-the-voluntary-carbon-markets-2022/

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[9] Mckinsey (2021) *A blueprint for scaling voluntary carbon markets to meet the climate challenge.* https://www.mckinsey.com/business-functions/sustainability/our-insights/a-blueprint-for-scaling-voluntary-carbon-markets-to-meet-the-climate-challenge

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[12] Climate Change Committee (2020) *Sixth Carbon Budget – Agriculture.* https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Agriculture-land-use-land-use-change-forestry.pdf

[13] DfT (2021) *Carbon offsetting in transport: government response.* https://www.gov.uk/government/consultations/carbon-offsetting-in-transport-a-call-for-evidence/outcome/carbon-offsetting-in-transport-government-response

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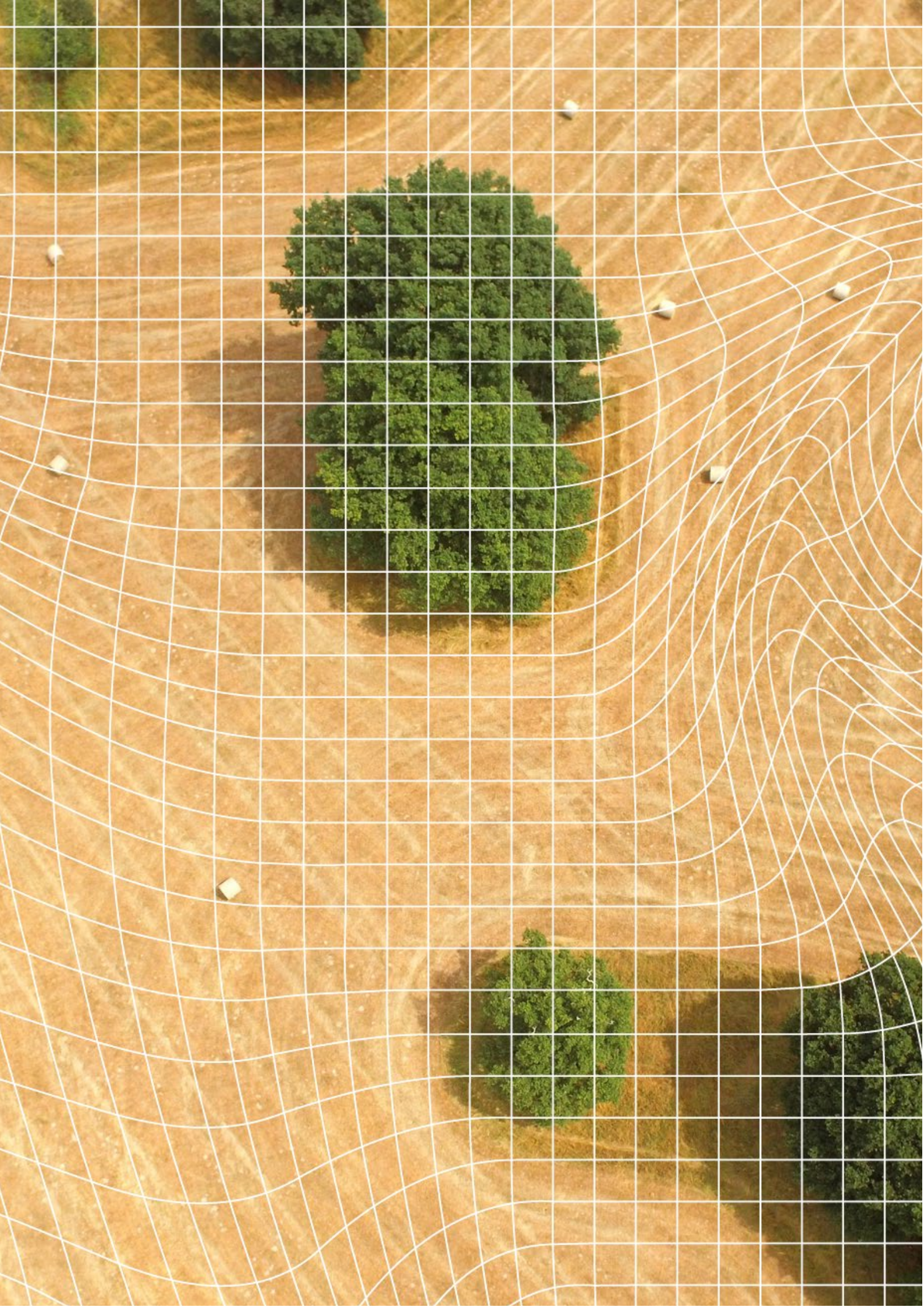
[15] Competition and Markets Authority (2021) *Making environmental claims on goods and services.* https://www.gov.uk/government/publications/green-claims-code-making-environmental-claims/environmental-claims-on-goods-and-services

[16] Science Based Targets (2021) *SBTI Corporate Net-Zero Standard.* https://sciencebasedtargets.org/resources/files/Net-Zero-Standard.pdf

[17] Race to Zero (2021) *Starting Line and Leadership Practices 2.0: Minimum criteria required for participation in the Race to Zero campaign.* https://racetozero.unfccc.int/wp-content/uploads/2021/04/Race-to-Zero-Criteria-2.0.pdf

[18] Voluntary Carbon Markets Integrity Initiative (2022) *Provisional Claims Code of Practice.* https://vcmintegrity.org/vcmi-claims-code-of-practice/

[19] Climate Change Committee (2021) *Letter: Advice on the use of international emissions credits to Rt Hon Kwasi Kwarteng MP*. https://www.theccc.org.uk/publication/letter-advice-on-the-use-of-international-emissions-credits-to-rt-hon-kwasi-kwarteng-mp/



Chapter 2: Risks to Net Zero from VCMs

VCMs risk slowing action to reduce emissions by businesses. There is also a risk they make inaccurate claims about the emissions reduction or removal they achieve.

In this chapter we discuss two risks VCMs pose to Net Zero: disincentivising business emissions reduction and inaccurate reporting of emissions reduction/removal claimed by carbon credits.

Impact on direct business emissions reduction. The very low pricing in VCMs means they are in many cases likely to be disincentivising business direct emissions reduction, by providing an easier option to more expensive steps to directly reduce businesses own emissions. The lack of regulation or required disclosure on how they are used in business Net Zero claims, and lack of clear guidance on what activities should and should not be 'offset', increases this risk. Many companies that use carbon credits do not specify what activities are being 'offset' and rely on carbon credits to a large degree for their Net Zero claims.

Integrity of carbon credits. Calculating additional emissions reduction or removals is technically challenging, particularly for biological projects. In the past, many land-based credit projects have over-claimed the emissions reduction or removal they are achieving, leading to overinflated claims of impact. Carbon credit projects range in permanence, which is not always accurately captured in the removals reported. Carbon credit projects that do not build resilience and biodiversity into project design may not result in long-lasting emissions reduction or removal. While geological carbon credit projects can have a very high level of permanence, standards and MRV for these projects are still evolving. Although standards both globally and in the UK are being improved, the risk remains that the emissions reduction or removal reported may have happened anyway or may not persist into the future.

Potential to actively harm Net Zero. In combination these issues mean VCMs could contribute to increased global emissions, facilitating continuing emissions from businesses who may be relying on projects whose emissions savings are overstated. In Chapter 5 we set out what Government should do to address these risks.

1. Impact on direct business emissions reductions

(a) Summary

VCMs could reduce business action on direct emissions reduction, slowing progress towards Net Zero.

In this section we assess the risk that VCMs lead to delayed or avoided direct emissions reduction by businesses, slowing progress to Net Zero. We focus on risks to Net Zero specifically, however we outline the risk this can pose to purchasers in Box 2.1.

A considerable decrease in global emissions from businesses, regions and governments is needed in the next ten years to meet the Paris Agreement temperature goal. This requires most organisations to make substantial direct emissions reductions from their scope 1, 2 and 3 emissions across almost all sectors, including making investments in low-carbon technologies and supply chains. Companies must reduce their own emissions before considering neutralising remaining emissions.

'Offsetting' is beginning to play a key role in Net Zero claims and plans but should only be used once all other necessary abatement to stay in line with the UK pathway to Net Zero have been achieved. The evidence highlights a significant risk that carbon credits can be used to 'offset' necessary abatement, as a result of a lack of guidance and transparency on their appropriate use.

(b) Current reliance on 'offsetting' in Net Zero targets

There is significant lack of reporting on the use of 'offsetting' to reach Net Zero claims and minimal advice on when 'offsets' can be used.

Lack of clarity in Net Zero claims and use of 'offsetting'. There has been a rise in Net Zero claims from companies, governments and regions in the last five years. Despite this, there is a lack of advice to businesses on what activities should be 'offset' (see Box 2.1 on the possible effect on business reputation). Business Net Zero business plans often rely on 'offsetting' with many providing very limited information on what activities are being 'offset'.

- Out of the 35% of the FTSE350 whose emissions reduction plans include the use of 'offsets', the vast majority did not specify what kind of carbon credit project would be used and did not specify what activities would be 'offset' beyond 'residuals' or 'hard to abate' emissions.

- A report looking at 2,000 global companies found most commitments are unclear on whether they intend to use 'offsetting', or if they will, on conditions for their use.

(c) What does appropriate use of carbon credits look like?

Voluntary purchase of carbon credits separate to 'offsetting' claims is beneficial.

- As discussed in Chapter 3, voluntary purchase of carbon credits by private sector actors can help further the global and UK transition.

- Some businesses purchase high-integrity carbon credits and do not use these to make a claim about their own net emissions. This is actively supportive of the transition to Net Zero and should be encouraged, assuming there are no other mechanisms by which these purchases slow their own direct abatement.

Carbon credits must only be used to 'offset' emissions that currently cannot be abated and where the company gross emissions are in line with the UK Net Zero pathway.

Voluntary purchase of carbon credits must only be used to 'offset' emissions which cannot yet be abated. While business attention to Net Zero is very welcome, organisations should not avoid more challenging or costly (but necessary) emissions reductions by using carbon credits.

- As we set out in our report on business in 2020,[1] at a minimum, businesses should only be countering emissions via carbon credit purchase for scope 1, 2 and 3 emissions which genuinely cannot be reduced. This particularly applies to emissions which are most within a business's control.

- Relying on a carbon credit to 'offset' emissions could mean a business then invests in high-carbon technology that becomes 'locked' in for many years. This would in the long run lead to higher emissions than if funds used for 'offsetting' were used to invest in low-carbon technology. Therefore, businesses should also prioritise available funds to invest in longer-term decarbonisation before considering relying on 'offsetting'.

- Emissions savings from carbon credits may not be additional (see previous section) and they can fail to address the need for fast business action to decarbonise operations alongside the activities carbon credits are supporting.

- We cannot rely on biological solutions alone to achieve the 1.5°C target set by the Paris Agreement. Recent estimates suggest that globally, land-based measures could deliver 20 – 30% of the overall mitigation required.[2] Biological approaches to emissions reduction therefore need to be seen not as substitutes but as complementary to deep emissions reduction via decarbonisation approaches.

Direct emissions reduction should be at least in line with the UK pathway. Our advice to the UK Government remains that the UK should not rely on international carbon credits to meet UK carbon budgets but can use them to go beyond UK targets.

- Similarly, UK companies should ensure their gross emissions are in line with the emissions reduction implied by the UK Net Zero pathway as a priority. They can look to use high-integrity carbon credits to help further the transition, either in the UK or elsewhere.

  – For example, if in a sector under UK pathways, emissions should be reduced to 50% by 2035, a business operating in this sector* should not keep its direct emissions at 75% and purchase carbon credits for the final 25%. Instead, it could reduce its emissions to 50%, and then purchase high-integrity carbon credits for some or all of the remaining 50%.

Businesses should not be claiming 'Net Zero' until all their possible emissions have been reduced and any residuals are balanced by long-term removals.

Net Zero is an end state. The UK will not be 'Net Zero' until almost all territorial emissions have been reduced to zero or close to zero, and the remaining emissions that cannot be avoided are counterbalanced by long-term removals, so that the net addition of CO_2 to the atmosphere is zero. Businesses should not be considered 'Net Zero' until they are in a similar place – with only unavoidable emissions remaining and 'offset' by long-term removals.

* Many businesses will span across CCC sectors. Business and industry roadmaps and targets, if aligned to the Government Net Zero Strategy or carbon budgets, may be relevant reference points.

- A business should not claim to be 'Net Zero' until it is near the end of its emissions reduction journey, with almost all emissions reduced (certainly without any emissions remaining from electricity, heating or surface transport), and any residual emissions counterbalanced by long-term removals.

- While it is on the journey towards Net Zero, it is appropriate for a business that has a long-term science aligned target, is on track to this target, and is investing in carbon credits for its remaining emissions, to gain reputational benefit for its action through claims other than 'Net Zero', such as 'on track for Net Zero' or 'Offset Zero'. See Chapter 5 for discussion of the policy implications.

(d) Indications of over reliance on 'offsetting'

Reporting of 'offsetting', low carbon credit prices and the role of 'offsetting' in company sustainability policies point to the risk of over-reliance by business actors.

The available evidence indicates a significant risk that carbon credits are not being used in line with the appropriate use outlined above.

Indications of over-reliance on carbon credits. Lack of data means we cannot confidently draw conclusions on overuse of 'offsets'. However, the size of current and expected 'offsetting' demand suggest it is very likely some companies are relying on carbon credits when they are able to reduce their own emissions directly.

- Net Zero plans rely on 'offsetting' but are early in their development and are vague about their use. This makes it plausible carbon credits will be relied on to 'mop up' emissions which could be reduced.

- The total emissions savings from 'offsetting' predicted for 2050 under some estimates outstrips residual emissions in IPCC and UK Net Zero pathways. This indicates plans are leading to over-reliance on 'offsetting' as opposed to emissions reduction.

- Around a third of the FTSE350 set out details on the amounts of carbon credits purchased for 'offsetting'. Of these, a significant proportion of their scope 1 and 2 emissions are covered by 'offsetting' for the most recent reporting year.*

Very low global carbon credit prices mean businesses are likely to choose carbon credits over decarbonisation if they are seen as substitutable with necessary abatement.

- The fact carbon credit prices are much lower than most measures to cut emissions means carbon credits may be seen as a more attractive option than necessary direct emissions reduction.

* It is estimated that out of the FTSE350 who set out detail on carbon credits purchased, on average 80% of their emissions are covered by offsets. This falls to around a third of their emissions when an average weighted for emissions is calculated.

- Current carbon credit prices have been put at around £3-5/tonne*[3], much lower than average annualised abatement costs of necessary emissions reductions, such as for non-residential buildings measures (£175/tonne in 2035) or for manufacturing and construction measures (£65/tonne in 2035).†[4]

- The High-Level Commission on Carbon Prices estimates the carbon prices that would incentivise the changes needed in investment and production patterns to be Paris-aligned. Its carbon prices of at least US$40-80/$tCO_2$ (£37-74) in 2020 and US$50-100 (£46-£92) in 2030 are significantly higher than global average carbon credit prices.[5]

- The prices offered for consumers to purchase 'offsets' for flights also tend to be very low, with one airline charging just over £3.50 for a flight from London to New York.[6]

Role of Net Zero Strategy policies. The above risk of over-reliance on 'offsets' only materialises if 'offsets' are seen as a substitute for necessary abatement. In theory sector specific regulation should ensure necessary business direct emissions reductions take place, but it is unlikely to be sufficient at present.

- If carbon credits are used alongside necessary direct emissions reduction, they legitimately fund the cheaper options for emissions reduction that are not otherwise happening.

- In theory, policy and regulations should ensure necessary emissions reductions take place by businesses, and purchase of carbon credits for 'offsetting' therefore only counters the emitting activities that are not yet sufficiently targeted by policy.

- However, current regulations do not yet ensure all necessary business emissions reduction is taking place (e.g. see policy gap charts in our 2022 Progress Report), so guidance and structures are required to ensure businesses are only drawing on carbon credits to 'offset' activities that we would expect to still have residual emissions.

(e) Implications

A clear risk. Our assessment points to a clear risk that 'offsetting' could lead to reduced business direct emissions reduction. The risk that 'offsetting' facilitates slower business action on emissions could have a knock-on effect on public mistrust in business and Government Net Zero action, even towards those relying on carbon credits responsibly.

Policy implications include guidance and regulation for business claims (see Chapter 5) to ensure carbon credits are only used for genuinely hard to abate sectors and are only used after investing in supply chains and longer-term emissions reduction. They also include ensuring more transparency in international registries for carbon credit issuances, purchases and retirements,‡ and considering other mechanisms for businesses to reduce emissions beyond their value chain which do not feed into a claim about net emissions.

* Exchange rate as of 29th September 2022. £1=$1.08.

† These costs will have changed since estimated in 2020 due to changes in energy prices.

‡ While registries exist for specific international and UK carbon credit standards and programmes, there are challenges in tracing carbon credit ownership and retirement.

Purchase of carbon credits for 'offsetting' claims poses risks to purchasers.

Box 2.1
Risks to purchasers of carbon credits for 'offsetting' claims

In theory, carbon credits provide an opportunity for businesses to show their consumers and investors their efforts to support and align with Net Zero.

At present however, businesses investing in carbon credits for 'offsetting' claims face the risk of wasted investment in credits that are not credible or high-integrity, and that reputations suffer as a result.

- VCMI's interviews with businesses revealed a common concern around the difficulty involved in assessing the integrity of 'offsetting' options, and the potentially high impact of reputational damage for being perceived to have bought poor carbon credits. Interviewees were concerned the presence of greenwashing in general could undermine consumer trust in high integrity claims, regardless of their validity.
- Research shows consumers' view of a brand is negatively impacted when its environmental claim is suggested to be 'greenwash'.

There is limited clarity on what responsible behaviour is in terms of level of reliance on carbon credits and which carbon credits to use. This includes the question of whether to invest in carbon credits from the UK or overseas, and whether to apply a Corresponding Adjustment or not.

- Currently the bulk of carbon credits bought by UK companies are based overseas (0.1% of FTSE350 credits used for 'offsetting' are estimated to be sourced from UK land-based projects). However, demand for carbon credits based in the UK is increasing.[7]

For those UK businesses trying to do 'offsetting' or beyond value chain mitigation responsibly, the lack of regulations around business Net Zero claims reliance on carbon credits means they can be at a competitive disadvantage for being more responsible and paying more.

As we set out in Chapter 4, regulations around business Net Zero claims, carbon credit standards, and greater clarity on what activities it is appropriate to 'offset', could help address some of these challenges.

Although we focus on business Net Zero claims, there are also a number of companies offering consumers the opportunity to purchase 'carbon neutral' products, or to 'offset' directly, on the basis of carbon credits, with limited information on what they involve.

Source: VCMI (2022) *Summary of Interviews Conducted During the Inception Phase;* Allied Offsets (2022) *Voluntary Carbon Offsetting in the UK;* CMA (2022) *Misleading Environmental Claims.*

(a) Summary

Some carbon credits are currently overestimating their effect on emissions reduction/avoidance.

High-integrity carbon credits are additional, not over-estimated, long-lasting, measurable and verifiable (see Box 2.2 for full description). If carbon credits do not meet these criteria and are being used as a substitute for direct emissions reductions, VCMs could result in higher net global emissions.

We found evidence of carbon credit projects from overseas demonstrating limited additionality, overestimating emissions reductions/removals and not being long-lasting.

Standards. Appropriate monitoring, verification and reporting practices that are designed to address different carbon credit activity types are needed to ensure all carbon credits sold are truly reducing or removing emissions and that the quantity of emissions reduced is accurate. The UK codes for woodlands and peatland are relatively robust examples of such standards.

It is possible that certain biological carbon credits can never be treated as like-for-like with emissions.

- **Feasibility of full additionality.** There is a question as to whether certain biological carbon credits should ever be treated as sufficiently 'offsetting' actual emissions, given the uncertainties in calculating the counterfactual/baseline and the limitations around permanence of sequestration. In Chapter 4 we discuss the implications this has for the role certain biological carbon credits can have in company 'Net Zero' claims.

Box 2.2
Defining high-integrity carbon credits

High-integrity carbon credits are additional, accurately estimated and claimed, measurable and verifiable, and have long-lasting benefits.

Not overestimated. The reported emissions reduction or removal does not exceed what the carbon credit project achieved. This requires an accurate baseline (i.e. quantification of what emissions would have been in the absence of the project), capturing indirect effects of the project (including leakage, when the carbon credit project encourages increased emissions elsewhere), and credits not being forward-credited (i.e. credits being issued for emissions reduction expected in the future, which may not be achieved due to unforeseen circumstances).

Not claimed by another entity. The carbon credit conveys an exclusive claim to greenhouse gas emissions or removal. This precludes 'double issuance' (when more than one credit is issued for the same emissions reduction/removal), 'double use' (when the same credit is used twice, for instance, the unit is duplicated between registries).

Additional. The project/activity would not have happened in the absence of the VCM. No laws, financing streams, or regional common practices mean the project/activity would have taken place anyway. Additionality has the following characteristics:

- **Jurisdictional**. The project would not have occurred anyway as a result of a requirement through laws or regulations. In its strictest interpretation, this would exclude projects that form a part of the host country's emissions reduction plans.*
- **Financial.** The project would not be commercially viable in the absence of the additional revenue raised through selling carbon credits. For example, the rapid fall in cost of renewable energy technologies means that carbon credits for renewable energy may not be fully additional.

- **Common practice.** The activity funded by 'offsetting' is not already common practice in an area.

Long-lived. Activities that sequester emissions ensure removals remain out of the atmosphere for a very long time. For example, for a forestation project, the forest lasts for the next 100 years or more.

Measurable and verifiable. The emissions reduction can be accurately quantified using established methodologies. These must then be checked by independent third-party verifiers.

Not associated with environmental or social harm. Measures are in place to ensure no harm to local communities or wider ecosystem services. Where possible, projects support wider social and environmental benefits.

*As outlined in Chapter 3 section 3, we recognise the value in carbon credits in the short-term which are helping to meet existing emissions reduction commitments.

Source: *Securing Climate Benefit: A Guide to Using Carbon 'offsets'* (2019); SEI & GHGMI (2019) *CORSIA Emissions Unit Eligibility Criteria*; ICAO (2019) *Environmental Reporting Guidelines.*

(b) Assessing evidence of overestimation and failed additionality

Estimating emissions reduction/removal that accompanies a carbon credit requires setting out an assumed baseline projection against which the activity can be measured. This can be challenging to do, as the baseline is effectively an assumed counterfactual situation.

Ensuring the additionality of a project is challenging. As outlined in Box 2.2, multiple considerations relating to laws, common practices and funding streams need to be taken into account, all of which can change over time. Assessing additionality can be subjective and underpinned by value judgements, as it can be hard to assess whether a project would have taken place in the absence of a VCM.

In the Annex, we outline examples of projects which have not been fully additional, or which have made overestimated claims.

Evidence of overestimated claims. We found strong evidence of overestimated claims and failed additionality in carbon credits from overseas.

- **Table A.1** in the annex shows examples where projects have tried to provide high-integrity carbon credits yet have still been shown to fail additionality tests, or to make overestimated claims.

- **Carbon credit prices.** Carbon credit prices can give some indication of the cost of carbon credits, which in turn can give an indication of their integrity. Some present prices are lower than might be expected, suggesting that they may not be fully reducing/removing the quantity of emissions they claim providing fairly strong evidence of failed additionality and overclaiming. However, low prices could also reflect low demand.

  – ETC estimate that the current cost of a forest restoration project, taking into account risk adjustment and monitoring, verification and reporting is $10-35/tonne today, rising to $85/tonne in 2050. [*,8]

  – Current average global prices for forestry and land use projects range between $2 and $16 per tonne of CO_2[9], varying by region and project. UK prices for the Woodland Carbon Code (See Overview section) and for Soil Carbon credits (£23-40) are more in line with ETC cost estimates for today but not necessarily for future decades.

* ETC's published figure show a cost of $30/tonne currently. They estimate a range of $10-35/tonne.

- **Forward-crediting.** The time at which a carbon credit is 'claimed' by a company can be inaccurate. If an emissions saving is claimed before it is achieved, this suggests greater emissions reduction today than reality and is open to the risk that the saving does not materialise (e.g. due to forest fires).

  - In biological projects that sequester carbon, CO_2 is removed from the atmosphere gradually over time. If used appropriately, companies should only claim emissions as 'offset' once this sequestration has taken place.

  - Research commissioned by the CCC found examples of companies claiming on WCC credits before they are fully realised. Claiming on these credits inaccurately suggests emissions reductions have taken place, when in fact a promise of future emissions reduction has just been purchased.

- **Not capturing indirect effects, including 'leakage'.** This is mainly observed in biological credits. For example, credits in South America can see tree planting in one area be replaced with deforestation in another. Evidence of this issue has been seen in REDD+ projects. A 2011 study of 120 protected areas in pan-tropical and subtropical areas found records of significant 'leakage'.[10] Avoiding displacement or leakage requires complete accounting and good governance, particularly for carbon credits from overseas.

- **Measurement.** Measurement uncertainties make it challenging to be completely certain of the exact emissions reductions relative to the hypothetical, and therefore that 100% of the emissions reductions are additional. This varies by project type.

  - It can be challenging to 'measure' baseline emissions. While this may be more straight forward for a CCS credit (where the baseline emissions generally equate to those that are captured by the project) it is more challenging to calculate emissions displaced by a renewable energy project.

  - It can also be challenging to accurately measure the actual emissions associated with a project, including the amount of carbon stored in trees in any given year, for example.

  - Engineered removals tend to be easier to measure with precision but might still have wider impacts that are difficult to quantify for example in supply chains and energy provision.

  - Concerns have been raised that some REDD+ baselines have been inflated, leading to overestimations.

- **Challenge varies across project types.** It is possible additionality would be easier to ensure for engineered removals, provided appropriate standards are in place. Avoided emissions measurements are generally less certain than emissions reduction due to the challenges in calculating counterfactual baselines (See Box 1.3 for different credit types).

Despite efforts on standards to address additionality concerns, some risks that projects fail to be fully additional still exist.

UK land-based standards go some way in addressing concerns of overinflated claims, but issues remain.

- Certification standards play an important role in assessing the integrity and robustness of a project and in the absence of a regulatory framework are relied upon by purchasers to provide an assurance on additionality. This is achieved through a series of tests against the additionality factors set out above.

- **Additionality tests.** The UK land-based codes for woodlands and peatlands (see Box 3.2) include additionality tests that must be met for a project to proceed. Although credits are likely to lead to additional woodland projects, blending carbon credit funding with public funding may reduce additionality.

  – In the UK context rates of woodland creation and peatland restoration are low, and the potential value of carbon credits will stimulate landowners to take action to plant or restore degraded habitats.

  – UK Government policies to look to the private sector to leverage blended funding approaches to deliver for a wide range of environmental and social outcomes, including carbon, could potentially undermine financial additionality.

- **Limited additionality.** UK land-based credits suffer from jurisdictional additionality failure (when interpreted in the strictest sense) as they are being used to deliver on the UK's legal emissions targets and Net Zero Strategy rather than go beyond them. However, Net Zero land policy is currently insufficient so carbon credits are helping in the near-term to close the implementation gap to the UK's Net Zero pathway. See Chapter 3 section 3 for discussion on Corresponding Adjustments.

- **Governance.** Though robust codes and standards are vital to underpin high-integrity VCMs, the governance frameworks within which they sit must also be considered. Frameworks that address standards and assurance (e.g. both supply and demand), and their integration, are necessary to provide confidence to those selling and purchasing carbon credits, or other natural capital based outcomes. This will ensure mechanisms are developed to provide expert oversight, embed an evolving evidence base, and identify unintended consequences resulting from existing and new markets, supporting government to react. While the UK voluntary carbon markets are currently aligned across the home nations, VCM policy being reserved means there is risk for them to diverge in the future. Governance frameworks should be designed to facilitate continued collaboration.

- See Chapter 4 for our assessment of UK land-based standards beyond carbon.

International standards. Historically, carbon credits used for 'offsetting' have over inflated their claims, as evidenced by our Table A.1 in the Annex**.** It shows that all codes fail to be fully additional despite rules/criteria in place that attempt to address this. There is a need for improved baseline methodologies, MRV for new codes, and development of standards for removals that are not nature-based.

Guidance is required on how land-based emissions should be accounted for.

More guidance is required to help business and land managers to navigate the complexity of accounting for land-based emissions, particularly companies that have supply chains within the land and agriculture sectors. The Greenhouse Gas (GHG) protocol is expected to issue standards and guidance on how companies can account for land use, land-use change, carbon removals and sequestration within and external to their GHG inventory boundaries in 2022.

(c) Assessing evidence of impermanece

Removals that are geologically stored can be considered effectively "permanent". Biological removals require careful management and protection to be long-term.

Permanence. The permanence of a removal refers to the likelihood that the CO_2 that has been sequestered will be re-released in future due to natural or human disturbances. Permanence of removals is key in ensuring that the intended climate outcomes are realised. To fully 'offset' company emissions that are released and stay in the atmosphere, carbon credits should be resulting in permanent sequestration of GHG emissions.

- Engineered removals that make use of geological or geochemical storage (e.g. through injection of CO_2 into subsurface rock formations) have an extremely low likelihood of CO_2 release. When properly executed, these types of removals can securely contain CO_2 for many millennia so can be considered to be effectively permanent.[11]

- The permanence of biological removals is generally lower but can be long-term. For example, removals achieved through tree planting can be maintained for centuries with appropriate management and strong protection. However, they remain exposed to some reversal risk resulting from environmental change (drought, fire, pests and disease), or purposeful deforestation should priorities shift. Similar considerations apply to peatland restoration and blue carbon enhancement. Biodiverse and connected ecosystems are generally more resilient to changes.

- It is argued by some that as fossil fuel emissions move geologically secure carbon into the carbon cycle with a very long-term climate warming effect, they cannot be 'offset' on a one-to-one basis by less secure biological projects which cannot be guaranteed to store carbon for millennia.[12]

- Risks of reversal for removals should be clearly estimated and provisions should be made in advance to compensate for any CO_2 released. Projects should be designed to consider the need for resilience to future climate impacts. Some accreditation approaches include a buffer (e.g. UK Woodland Carbon Code) whereby some percentage of the removal is reserved rather than credited to compensate for possible losses. However catastrophic events (e.g. forest fires) can result in near-total loss of the projects and their associated emissions reductions. Carbon credit pricing might also reflect the level of guarantee of permanence.

- Research by Unearthed into 10 forestry projects used by airlines and verified by Verra found that the projects often only lasted several decades and are not a removal that should be claimed as permanent by the purchaser.

The 2021 BEIS Task and Finish report: Monitoring, reporting and verification of greenhouse gas removals (GGRs), provides a fuller discussion of considerations for permanence.[13]

(d) Conclusions

This chapter has summarised the risk that carbon credits can fail many important tests that result in them not having the lasting reduction of CO_2 in the atmosphere that they claim. This subsequently leads to organisations overclaiming on their business emissions reduction achievements. Policies like monitoring, verification and reporting, clear standards and monitoring business claims can act to prevent some of this overclaiming.

However, there is a question as to whether in particular certain biological projects can ever be treated as sufficiently 'offsetting' actual emissions, given the uncertainties in calculating the counterfactual/baseline and the limitations around permanence of sequestration. We discuss the policy implications of this question in Chapter 5 in more detail, including whether carbon credits should ever be used as a one-for-one replacement for carbon emissions.

Endnotes

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Chapter 3: The potential positive role of VCMs

In this chapter we consider what role high-integrity* voluntarily purchased carbon credits, which are not used as a substitute for business emissions reduction, can play in supporting Net Zero in the UK and globally. It is a pre-requisite that businesses should prioritise fully all opportunities to cut their own emissions, and that carbon credits have a high degree of integrity (see Chapter 2).

Buyers of carbon credits use them to enhance their climate credentials, sellers to finance activities reducing emissions.

Rationale. Carbon credits involve a financial transfer from one entity seeking to gain credit for a reduction in emissions to another offering to deliver this emissions reduction. Buyers use them to enhance their climate credentials and sellers use them to pay for actions that cut emissions. Where buyers continue to reduce their own emissions as they otherwise would have and where sellers take actions that they would not have in the absence of a VCM, credits can result in a net reduction in global emissions.

Voluntary purchase of carbon credits could help to reduce the funding gap for high-integrity removals.

Global. In section 1 of this chapter we discuss how voluntary purchases of carbon credits could play an important role in filling funding gaps. In particular, we suggest this could be the case for high-integrity biological and engineered removals globally, but only if carbon credit demand, integrity and prices increase considerably. VCMs should not be relied upon as the primary option for addressing global funding gaps.

Although voluntary purchase of carbon credits may help reach UK carbon budgets in areas with critical implementation challenges such as land, Government remains responsible for meeting carbon budgets.

UK. In section 2 of this chapter we outline that Government plans to harness UK voluntary carbon markets for sectors such as land could help the UK meet its Net Zero targets. However, Government and Devolved Administrations' responsibility for achieving Net Zero should not be seen as passed onto voluntary purchases by private sector. Government and Devolved Administrations must ensure targets on emissions reductions, land use change and removals can be met through other means if this becomes necessary.

- UK residual emissions should be addressed progressively through compliance-based mechanisms that by 2050 deliver the matching long-term removals required. VCMs may have a role in paving the way towards this for some sectors, such as land and aviation.

- High-integrity carbon credits for emissions reduction or removal in the UK could be purchased legitimately by UK companies to contribute towards reaching economy-wide Net Zero. Such purchases should not be used to 'offset' emission sources that businesses should be directly reducing to be in line with delivering UK carbon budgets (see Table 5).

In future, for certain circumstances, Government may wish to advise UK companies to purchase carbon credits from overseas with Corresponding Adjustments.

Raising overall ambition. In section 3 of this chapter, we discuss the need for greater evidence on the role of Corresponding Adjustments in voluntary purchase of carbon credits.

- For carbon credits sold from the UK and bought by UK companies (or companies with emissions in the UK), a Corresponding Adjustment is not required in the immediate term, however, as the emissions savings fall under a legislated target, this underlines the importance that the businesses are not treating the credits as a substitute for direct emissions reduction.

- In future, for carbon credits (sold from overseas or from the UK) that are bought by UK companies (or companies with emissions in the UK), in some circumstances attaching a Corresponding Adjustment could help

* See Box 2.2 for a definition of high-integrity carbon credits.

strengthen the additionality of the credit. However, there are complications to this, which we discuss in more detail in section 3.

(a) Summary

VCMs can harness financial flows but should not be used as a replacement for international finance commitments from governments.

This section assesses the potential benefit to global Net Zero of high-integrity VCMs, when carbon credits are used in combination with and not instead of direct business emissions reduction. We conclude:

- **Harnessing financial flows.** If carbon credits were high-integrity and used alongside necessary direct abatement by businesses (see Chapter 2), VCMs could provide a funding mechanism for activities that support Net Zero where these activities are not yet investable or profitable, compliance markets are not yet established, or sufficient public funding is lacking.

- **Not a silver bullet.** However, VCMs are not the only option for channelling finance to global priorities and are not a silver bullet. In Chapter 5, we suggest that business support for these priorities that is not accompanied by an 'offsetting' claim would be a preferable mechanism, particularly for certain biological projects which are subject to concerns around permanence and additionality (see Chapter 2).

- **Not a replacement for international finance commitments.** While VCMs can play a valuable role in transferring finance to low-income countries, this finance should not be relied on to make up the shortfall in international climate finance commitments from governments.

(b) Biological and engineered removals

The IPCC WGIII Sixth Assessment Report finds that alongside rapid and deep decarbonisation the deployment of removals will be 'unavoidable' in counterbalancing residual emissions from hard-to-abate sectors to reach Net Zero emissions. In delivering this, both nature-based and engineered removals will be important with the total removals in 2050 potentially ranging from around 4 - 6 GtCO2e.[1]

(i) Engineered Removals

To meet climate goals, increased funding for engineered removals is required. VCMs could, alongside other mechanisms, help increase funds.

Engineered removals are an attractive option due to their high degree of permanence. However, they are currently at an early technological stage.

Funding is needed. Funding is needed for engineered removals to support the development and implementation of engineered removals such as BECCS and DACCS.

- The Energy Transitions Commission (ETC) estimate that 4.5 $GtCO_2e$ of engineered removals is needed by 2050 to limit warming to 1.5 °C, requiring an average annual investment of $100 billion per year in the run up to 2050.[2]

- At present, most government funding for engineered removals is focussed on R&D, albeit the 2022 US Inflation Reduction Act increases the tax credits available to support engineered CO_2 removal.

- Voluntary business funding is playing an important role in supporting early stage engineered removal facilities, for example the Frontier fund has committed just under $1 billion to purchasing engineered removals through to 2030.[3]

One measure among others. While VCMs could play a useful role in paving the way to compliance markets for funding engineered removals, they would be one measure among others, and a range of other financing mechanisms will likely be required.

- For example, based on the above ETC estimates, roughly $800 billion could be needed for engineered removals in the period 2024 – 2035.[4] Depending on price assumptions, we estimate VCMs from CORSIA would only provide between $3 – 205 billion funding in the same period (see Box 3.1).

- VCMs might add most value as a precursor to directed government support or compliance markets for specific sectors (e.g. through inclusion into emissions trading schemes as discussed in the 2022 BEIS consultation on Developing the UK Emissions Trading Scheme).[5]

(ii) Biological removals including nature-based solutions

Funding for biological removals, such as reforestation and peatland restoration, is required. VCMs could, alongside other mechanisms, help increase funds.

Funding is needed. To keep warming well below 2°C above pre-industrial levels and closer to 1.5°C, more funding for biological removals and emissions reduction, such as reforestation and peatland restoration is needed.

- At COP26 a commitment was made by over 100 countries covering 85% of the world's forests to halt and reverse deforestation and land degradation by 2030.[6] In the longer-term, land-based measures could contribute 20-30% to overall required mitigation.*

- The IPCC Working Group III report finds that removals via land-based measures† at the point of Net Zero, range from less than 1 $GtCO_2e$ to 3 $GtCO_2e$ per year.[7]

- At present there is a substantial funding gap for such measures. The COP26 commitment is backed by a pledged $20 billion over the next four years. Current worldwide government funding for removals (predominantly biological) is estimated to be only around $10 billion per year. To succeed where previous pledges have failed, more funds will be required (e.g. the ETC estimated up to $200 billion per year by 2030).[8]

Nature-based solutions (NbS) have received significant attention in recent years as the links between climate, nature and societal well-being are increasingly recognised. Nature-based solutions‡ sit within the classification of biological removals (see Box 1.4 for definitions), and their use has the potential to offer higher-integrity sustainable carbon credits. Working collaboratively, their use could prevent unintended consequences such as biodiversity loss and community exclusion from land.

* This is the case provided the 70-80% of decarbonisation from other sources is achieved; otherwise climate change could turn the biosphere into a net source of greenhouse gas emissions.

† The IPCC Working Group III report considers land use, land use change and forestry (LULUCF) activities.

‡ NbS can support climate mitigation on land, coastal and marine systems by protecting existing carbon stocks held in native forests, wetlands and grasslands, adopting new management approaches that seek to enhance carbon in productive systems (e.g. restorative agriculture and agroforestry) and restoring habitats where they have been lost or degraded.

- Estimates of the mitigation potential of NbS show considerable variability and further work is needed to reduce the uncertainty. A conservative estimate focussing on globally replacing lost carbon stocks from terrestrial ecosystems suggests that up to 100–200 $GtCO_2$ in negative emissions uptake may be possible by 2100.[9]

- The UN Environment Programme[10] estimates that NbS finance must triple by 2030 and increase four-fold by 2050 relative to 2020 if global climate, biodiversity and land degradation targets are to be met.

- Though nature-based approaches may be initially expensive to establish, when their longevity, wider benefits and resilience are taken into account, they offer cost-effective methods to address both climate mitigation and adaptation.[11,12]

- Future climate change and societal demands for land present a threat to the permanence of biological options and nature-based solutions.

VCM demand and prices would need to increase in order to deliver sizeable climate outcomes. This must be used alongside public finance.

VCMs helpful if demand and prices rise. Forest creation and management have become an established approach in VCMs, and the recognition of NbS approaches as a high integrity approach makes them increasingly important in carbon finance. VCMs and related measures could help address the funding gap for biological removals and emissions reduction.

- However, this is only possible if there is a large increase in global VCM demand and prices, and substantial public funding will still be required. Figure 3.1 shows the estimated size of funding generated by VCMs if we assume current prices, or prices of $75 (indicative amount based on Carbon Pricing Leadership Coalition work)[13], compared to the funding needs for nature-based solutions.

- Directly implementing projects within business value chains ('insetting') or contributions which do not make 'offsetting' claims can also play a role. This would help avoid some of the concerns set out in Chapter 2. See Chapter 5 for our discussion on policy implications.

(c) Transfer of funds to low-income countries

Low-income countries could benefit from financial flows harnessed via VCMs, but this should replace existing public or private finance commitments.

VCMs could also transfer resources towards low-income countries that disproportionately face climate impacts despite their low emissions. International commitments to international climate finance include mobilising private finance.

However, VCMs should not be relied on to make up the shortfall towards public finance commitments or be a replacement for the private finance that is needed for investment in the global clean energy transition. As Figure 3.1 shows, only if VCM demand and prices rise substantially would they make a large contribution to international climate finance commitments.

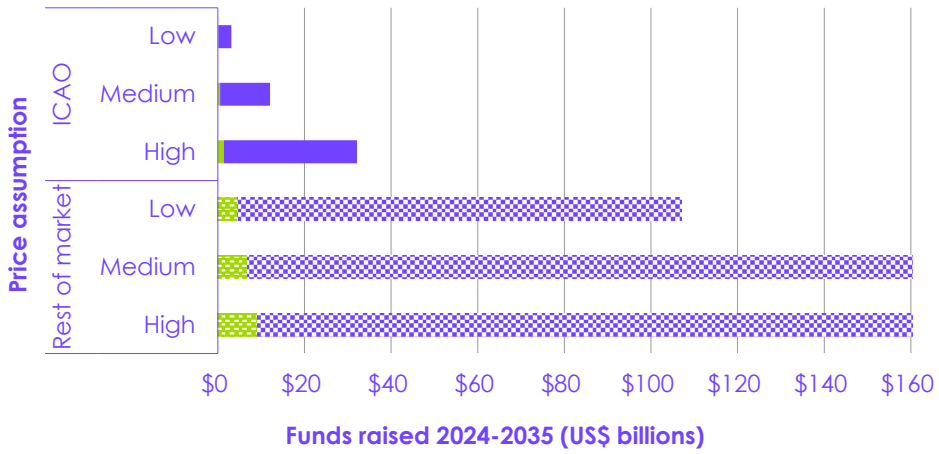
Box 3.1
CORSIA / Aviation

'Offsets' will be required by the aviation industry to remove any remaining emissions after implementing new technologies. This is an example of where a voluntary engagement with VCMs can transition into a form of compliance regime.

In 2016, ICAO adopted an agreement to require all airlines to 'offset' their international flight emissions above a baseline. This baseline was recently changed to 85% of 2019 levels, making it less ambitious than the expected average of 2019 and 2020 levels. The requirements apply from 2021 (although the fall in emissions during the pandemic means it is unlikely that airlines will be required to 'offset' pre-2024).

In 2020, the scheme approved the first seven 'offset' standards that would be eligible under the scheme, including: Gold Standard, Verified Carbon Standard (VCS), Clean Development Mechanism (CDM) and REDD+. There are criticisms of the scheme including that it only addresses the growth in CO_2 emissions from international aviation on participating routes and ignores non-CO_2 effects.*

Figure B3.1 Potential funds raised through offsets under CORSIA

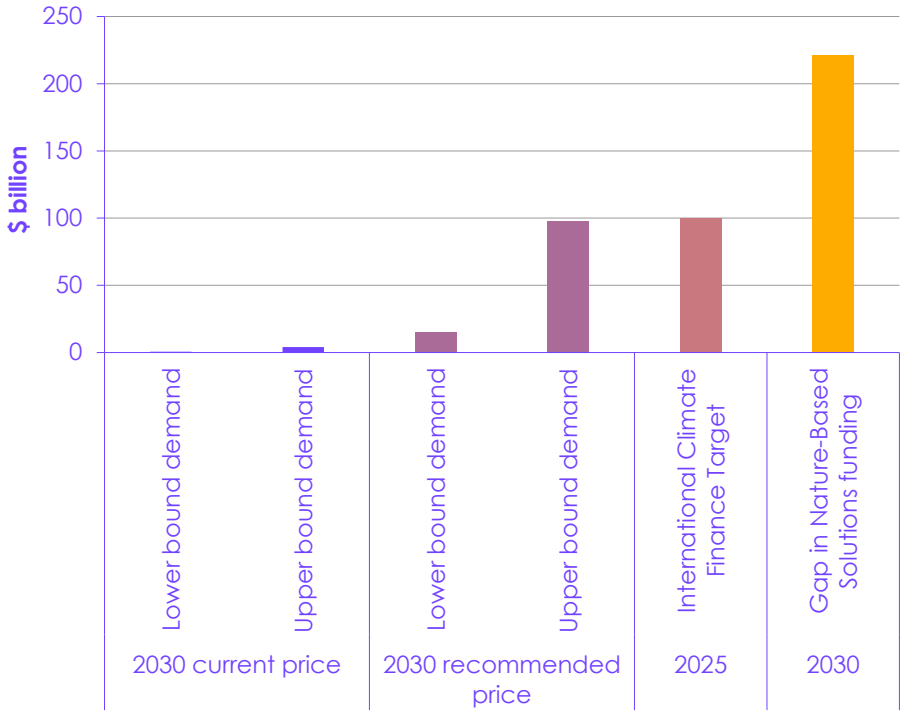


Source: ICAO (2022) *Analyses in Support of the 2022 CORSIA Periodic Review*; ICAO (2021) *Update to Scenario Based Analyses of Potential Impacts of Covid-19 on CORSIA;* Carbon Pricing Leadership Coalition (2017) *Report of the High-Level Commission on Carbon Prices*; ICAO (2012-2020) *The World of Air Transport;* CCC analysis.
Notes: Low, Medium and high ICAO values are based on global emissions covered by CORSIA (under the old 2019/20 baseline) 2024-2035 multiplied by the ICAO's expected 'offset' price in 2026 ($). Note this has not been updated to reflect the new baseline agreed at the 41st ICAO General Assembly in October 2022 of 85% of 2019 emissions. The 'rest of market' uses a range of prices from The Commission on Carbon Pricing's 2030 scenarios.

* Aviation non-CO_2 effects (including contrails, NOx emissions, sulphates and other factors) warm the climate but have high levels of uncertainty and exhibit regional and seasonal variation. Despite these uncertainties, their net effect almost certainly contributes a warming effect to the climate.

VCM funding is substantially below climate finance funding targets so they should not be solely relied on to meet finance gaps.

Figure 3.1 Comparing estimated projections of VCM funding with global annual funding priorities



Source: UNEP (2021) *State of Finance for Nature*; UNFCCC (2022) *Climate Finance in Negotiations*; High-Level Commission on Carbon Prices (2017) *Report of the High-Level Commission on Carbon Prices*; Trove Insights (2021) *Future Size of the Voluntary Carbon Market*; Mckinsey (2021) *A Blueprint for scaling voluntary carbon markets to meet the climate challenge*. Ecosystems Marketplace (2022).
Notes: To estimate maximum VCM financial flows in 2030, we took the highest estimate of the volume of VCM demand and the lowest estimate of the volume of demand (see Figure 1.4. For current prices we assumed an average price of $3/tonne, and for recommended price we assumed a price of $75/tonne, based on the average recommended carbon price by the Carbon Pricing Leadership Coalition's High Commission on Carbon Prices. It is important to note the red upper bound requires a lot of assumptions: that the very upper bound of suggested demand is achieved (whose assumptions rest on non-binding business commitments, assumptions about CORSIA) and that the price increases significantly and across the board.

(a) Summary

This section builds on the previous section by setting out some overarching ways VCMs might contribute to the UK Net Zero pathway. As above, this is assuming high-integrity carbon credits, which are used in combination with and not instead of direct business emissions reduction.

Domestic sale of carbon credits from the UK should not be heavily relied on to meet UK carbon budgets. However, it can be used in the short-term to help meet critical implementation gaps. By 2050, residual emissions should fall within compliance markets.

Carbon credits from overseas. We have already advised that the UK Government does not rely on international carbon credits to meet its legislated carbon budgets.[14] That remains the Committee's position.

Carbon credits from the UK. UK Government and Devolved Administrations are responsible for meeting their binding Net Zero and carbon budget targets. These will be achieved predominantly through regulations, financial incentives and other market mechanisms. However, for certain areas where there are critical implementation gaps, Government may choose to harness VCMs for carbon credits from the UK. Where this is the case, Government should be explicit about their use and ready to address any shortfall in delivery through other means in the relevant sector.

- **Voluntary business financing for land outcomes.** The land use sector in the UK is an area that would initially benefit from voluntary private sector financing, given the challenges in financing it through alternative means.

- **Transitioning to compliance markets.** Although Government should not heavily rely on VCMs for carbon credits from the UK to achieve Net Zero targets, there may be some areas where they are a useful stepping stone towards a compliance market. By 2050 long-run residual emissions (such as in aviation) should fall within compliance markets to support removals. VCMs for carbon credits from the UK could help pave the way in the next few decades for a transition towards compliance markets.

We now consider how VCMs for carbon credits from the UK could support the overall UK Net Zero pathway and then in specific sectors.

(b) UK Net Zero Strategy pathway

(i) 2050

Long-term residual emissions. In the UK Government's Net Zero Strategy, residual emissions are anticipated in several sectors in 2050, (e.g. agriculture and aviation, see Figure 3.2). To meet the UK's legally binding 2050 target these must be balanced out by removals from the engineered removals sector and land use, leading to 'Net Zero'.

Sectors with residual emissions should fund engineered or land-based solutions via a compulsory carbon market.

Funding for removals. Sectors that cannot reduce their emissions in time for 2050 (such as aviation) could therefore fund engineered removals or land-based solutions via a carbon market.

- As Figure 3.3 shows, funding flows will be needed for UK removals: an average of £1 billion additional investment per year for land-based removals and from 2040 - 2050 an average of £0.4 billion additional investment per year for engineered removals.

VCMs could pave the way for compliance markets. We do not advise using VCMs to achieve this national balance in the long-term, as where possible the Government should not rely on voluntary mechanisms which are outside of its control to meet legislated targets. The UK should instead rely on other ways of financing removals, such as through compliance regimes, government funding or taxation. However, VCMs could play a useful role in the near term, to help pave the way for a transition into compliance-based mechanisms towards 2050.

(ii) Before 2050

Avoiding 'lock-in'. Figure 3.2 highlights the importance that actors with emissions that should be abated at some future point do not continue to emit due to use of carbon credits from the UK instead. For example, while there will still be emissions from light duty surface transport in the 2030s which might be 'offset' by purchasing UK woodland carbon credits, it would not be appropriate to forward-purchase additional carbon credits with the intention of using them for 'offsetting' emissions from these vehicles in the 2040s as by then this sector should have fully transitioned to zero emissions.

Supporting planned abatement. For sectors that have residual emissions over the next few decades there is, in theory, the potential to purchase carbon credits from the UK to support either required abatement in other sectors (e.g. tree planting) to meet UK targets, or to go above and beyond UK targets.

- Provided UK companies' own emissions are in line with the steps necessary to deliver UK carbon budgets (see Chapter 2 section 1), they may then legitimately purchase high-integrity carbon credits from the UK to support activities that help the wider UK transition towards Net Zero.
  - Controls would need to be in place to ensure that carbon credit purchase is not facilitating the avoidance of necessary emissions reduction (see Chapter 2 section 1 and Table 5) and to ensure the integrity of the carbon credit project (see Chapter 2 section 2).
  - For example, if in a sector under UK pathways, emissions should be reduced to 50% by 2035, a business operating in this sector* should not keep its direct emissions at 75% and purchase carbon credits for the final 25%. Instead, it could reduce its emissions to 50%, and then purchase high-integrity carbon credits for some or all of the remaining 50%.

Governments should not ultimately rely on VCMs as Net Zero delivery mechanisms.

As we outline in the sections below, frameworks to facilitate this are already in place for UK land outcomes. If this approach does not deliver the funding for abatement required to meet UK carbon budgets, Government must introduce other measures to achieve its targets.

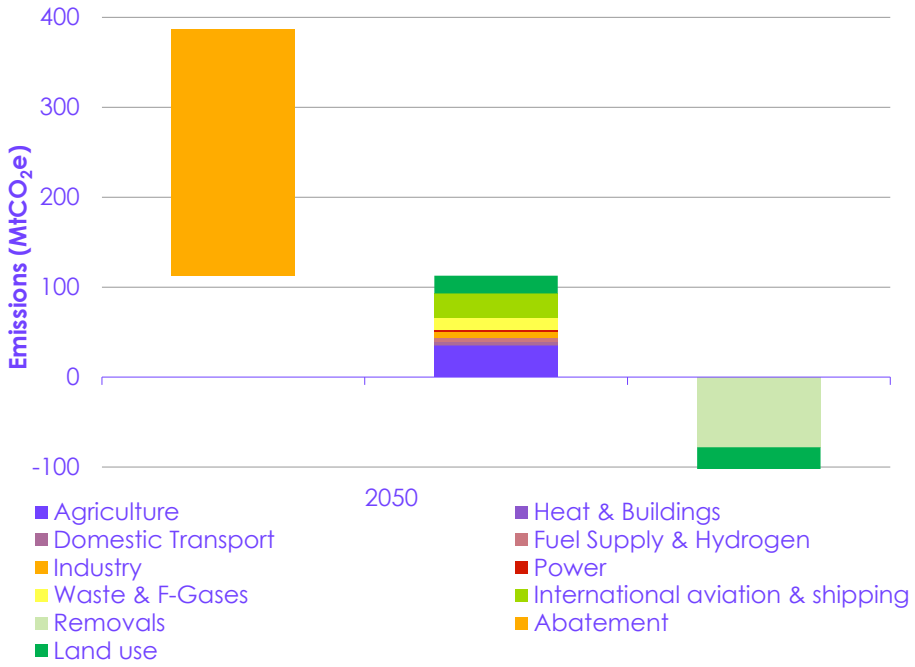
Decreasing role. We might expect carbon credit demand from some businesses to decline through time, as their emissions decrease through decarbonisation.

* Many businesses will span across CCC sectors. Business and industry roadmaps and targets, if aligned to the Government Net Zero Strategy or carbon budgets, may be relevant reference points.

Therefore, VCMs should be decreasingly relied upon in the later decades of the transition.

Carbon credits should be purchased by sectors with residual emissions in 2050, but only to fund high-integrity removals, and within a compliance regime.

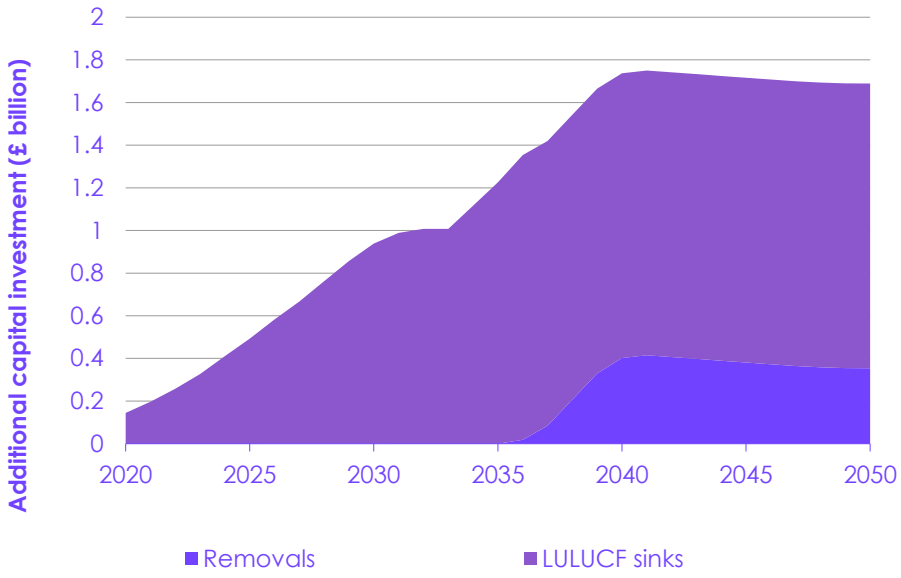
Figure 3.2 UK residual emissions from different sectors in 2050



Source: BEIS (2021) *UK Net Zero Strategy Technical Annexes*; CCC (2020) *Sixth Carbon Budget*.
Notes: Most of the abatement 'chunks' are based on the Net Zero Strategy Technical Annex. We used Sixth Carbon Budget data to split general land use & agriculture into distinct agriculture and land use categories.

VCMs may be useful for meeting some of the capital investment requirements for high-integrity removals and land-based sinks.

Figure 3.3 Additional capital investment needed for removals and land-based sinks in the CCC pathway



Source: CCC (2020) *Sixth Carbon Budget*.

(c) Land

VCMs can play a role for delivering outcomes beyond managing emissions, although the Government's land use framework must address some key risks.

Land in the UK, both inland and along the coast, needs to deliver for multiple outcomes. The sector should become a net CO_2 sink by the mid-2030s (i.e. lead to net removal of CO_2 from the atmosphere by then). The role of VCMs as a delivery mechanism for wider social and environmental outcomes alongside carbon, as well as the potential risks from inappropriately sited projects (Chapter 4), must be addressed in the Government land use framework due in 2023.

Financial incentives will be needed to achieve the necessary land use outcomes, particularly in upscaling woodland creation and peatland restoration, for the UK to reach Net Zero. Public subsidies are expected to be compatible with private sector schemes such as carbon trading and payments for wider natural capital approaches.[15]

- Farmers and land managers are unlikely to engage in land use change unless it is financially viable or advantageous to do so, with the carbon value needing to be high enough to incentivise large-scale land use change.[16]

- The cost of land-based measures to sequester carbon must be considered against continued returns of the previous land use, such as agriculture.

The UK Government has plans for private capital to deliver UK-based land outcomes and leverage over £500 million a year by 2027 to fill the investment gap.

Government plans. The UK Government is planning a significant role for private capital to channel investment towards Net Zero objectives and environmental improvement (see Box 3.2). This will also diversify funding streams for land managers and farmers.

- Nature related government policy commitments face significant under investment over the next decade. Climate change mitigation outcomes via land-based approaches have been identified as the outcome with the largest funding gap.[17]

- The UK government intends to develop private markets to support investment into natural capital with the aim of leveraging a minimum of £500 million of private investment annually by 2027, and more than £1 billion a year by 2030, to support delivery of nature-based approaches.[18]

  - The 2021 Natural Environment Investment Readiness Fund (England) (NEIRF) from Defra and the Environment Agency aims to support the development of projects that can generate revenue from ecosystem services and operate on repayable investment. The fund is also supporting projects that are developing codes or standards, toolkits and methodologies to help measure, quantify, verify and monitor environmental uplift, beyond carbon capture established in the Woodland Carbon Code and Peatland Code, such as hedgerows and saltmarsh.

VCMs can support land use change but carry risk of land-use 'lock-in' for farmers and have additionality risks.

Financing mechanisms beyond VCMs. The transition from the EU Common Agriculture Policy to 'public money for public goods' will underpin land use change at scale, with VCMs potentially playing a supporting role. However, using VCMs carries the risk of 'lock-in' for farmers and has additionality risks (see Chapter 2). Alternative private financing mechanisms include 'insetting', contribution credits and compliance-based mechanisms.

- **Questions of ownership.** When a private entity purchases a carbon credit, they then own the right to claim the associated abatement or removal of emissions. Once sold, the seller (e.g. farmer or land manager) cannot use the actions that generated the credit to make claims about their own emissions reduction.

- **'Insetting'** (emissions reduction within scope 3 boundaries of a company) by businesses that have supply chains in land and agriculture could resolve this conflict by applying credits to products rather than company emissions. This way, the carbon credit is applicable to both the farm and credit purchaser.[19]

  – Accounting for 'insetting' is complex, at risk of double counting and must be applied within a company supply chain. Land managers who sell credits to a company outside their supply chain may have to make additional emissions reduction or purchase carbon credits should they be required to meet GHG targets in the future.[20]

- **Transition to compliance markets.** While carbon markets and beyond value chain mitigation may be supportive of Net Zero, these markets might need to transition into compliance markets over time, and business actors can be encouraged to support land-based outcomes through approaches such as 'insetting'.

There are two key land use codes in the UK (the Woodland Carbon Code and Peatland Code), with more currently in development.

Box 3.2
UK land-based carbon codes

UK land based verifiable 'carbon credits' are limited to two codes: the Woodland Carbon Code (WCC) and the Peatland Code (PC). A code for agricultural soil carbon 'offsets' is in development, although some independent initiatives are presently operating.

Since 2011 the WCC has been the UK standard for quantifying emissions reduction from woodland creation projects. Projects must demonstrate successful woodland establishment, with tree growth and sequestration rates assessed at year five and then every ten years.

- 18.5kha of woodlands have been validated and verified under the WCC. The 2019 Woodland Carbon Guarantee led to a significant uptick in the registration of woodland creation projects in 2020. Over 30 kha are listed as 'under development'.
- If successfully delivered, the current registered WCC woodland projects could sequester 15.4 $MtCO_2$ over their lifetime (up to 100 years).
- If registration of WCC projects continue at the current trend, and are aligned to UK tree planting targets, then the Code could support establishment of around 260 kha of new woodland by 2050 (see Figure 3.4).

The 2018 PC is designed specifically for peatland restoration projects. Projects use established emission factors to estimate baseline emissions and restoration abatement. Field surveys at year 5 and every 10 years that follow are required for verification.

- As of April 2022, 12.4 kha of peatland are registered under the PC. Of this, 1.6 kha have been validated (restoration in progress) and 10.8 kha are under development or pending review (see Figure 3.5).
- Twelve projects have been validated and could reduce emissions from degraded peatlands by 0.25 $MtCO_2e$ over the project lifetime (averaging at 70 years). Projects under development and forecast to start in 2023/2024 could abate 1.9 $MtCO_2e$ if successfully established (average project length 85 years).

Both the WCC and PC include a buffer, which acts as a bank of unclaimed units to cover losses should a woodland or peatland project fail.

Projects under the WCC contribute 20% of their net carbon sequestration, while PC projects contribute 15% of net GHG emissions reductions over the project duration. This safeguards the investment made by purchasers of carbon units and helps the amount of carbon claimed to persist for the long-term.

Soils codes tend to focus on regenerative farming practices aiming to diversify income streams for farmers while keeping land in production. Six companies are currently engaging with UK farmers in this area, but transparency is lacking, making it difficult to estimate the farmland area involved and the credits generated.

Carbon prices across the land-based codes range between £10 and £40 tCO_2e.

- WCC: the carbon price reflects site specific aspects of the woodland creation project, such as planting and management costs and other benefits it may provide. The cost of pending issuance units range between £10 and £20 /tCO_2e.[21]
  - The Woodland Carbon Guarantee provides a guaranteed price on delivery of verified Woodland Carbon Units every 5 or 10 years up to 2055/56. The average price per unit in 2021 was £19.[22]
- PC: yet to issue verified Peatland Carbon Units. The price of peatland PIUs is approximately £10 – £12 tCO_2e[23], though peatland projects have recently reached comparable prices to woodland.[24]
- Soil: Interviews with those working in the agriculture soil market suggest that soil carbon credits average at £30, with a range of £23 – £40 reported.

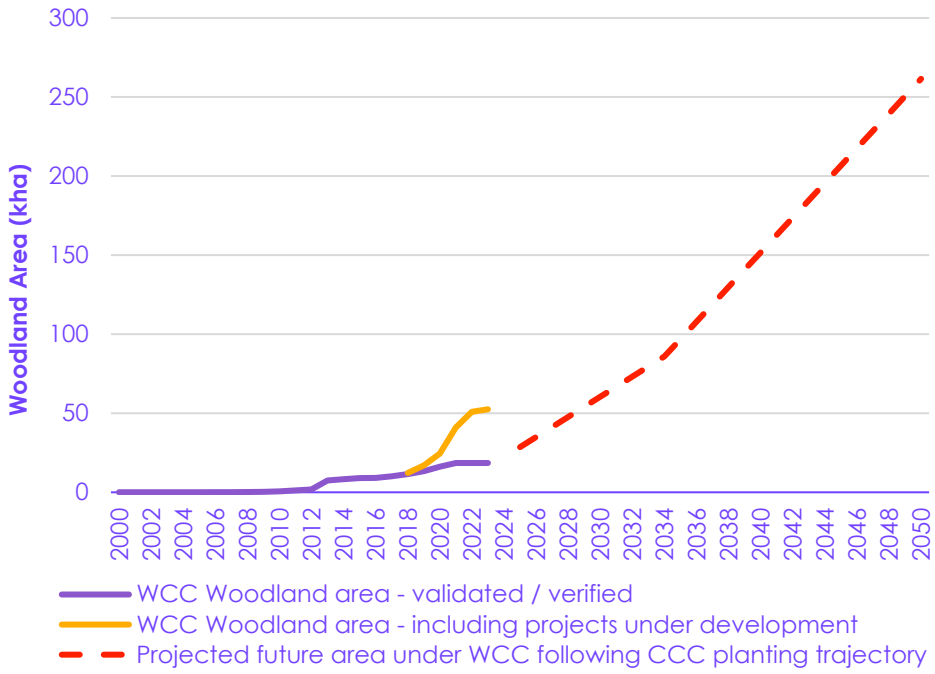
Current prices mean woodland creation (for objectives outside timber production) and peatland restoration projects are unlikely to be viable on carbon prices alone. The stacking of 'carbon credits' funding with public subsidies or levering private investment in other areas of natural capital that recognise broader ecosystem benefits could support the economic viability of project while potentially increasing their resilience.

Voluntary carbon markets, including the two land-based codes above, are an area of devolved power. Inward investment to the Peatland Code and Woodland Carbon Code from overseas investors is not currently permitted.

Source: Data extracted by Allied Offsets on behalf of the CCC in April 2022.

Projected future area covered by the Woodland Carbon Code could increase exponentially, although these estimates are very uncertain.

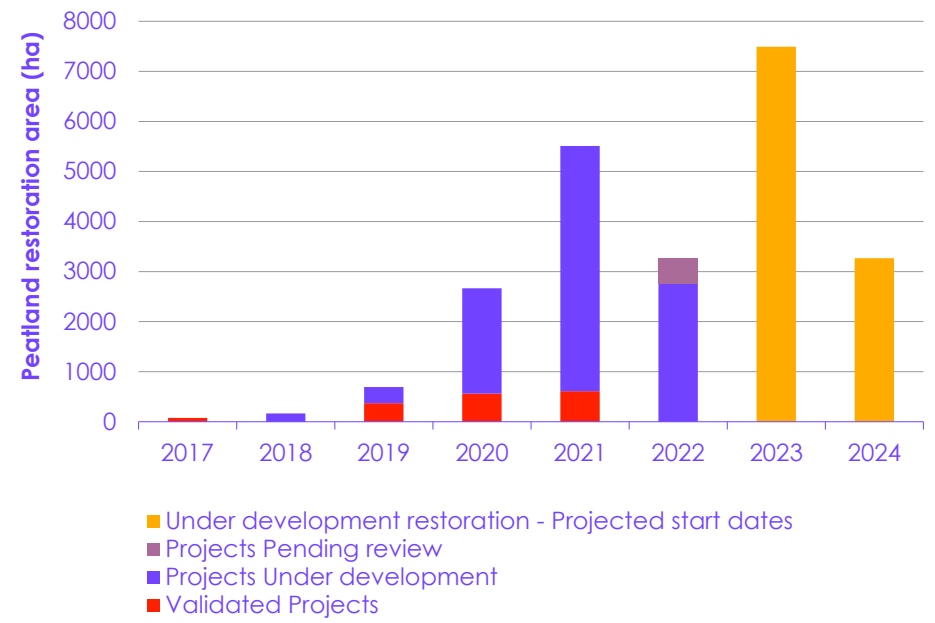
Figure 3.4 Historic and projected potential area of woodland under the WCC



Source: The UK Carbon Registry, the Woodland Carbon Code and CCC analysis. Data extracted in April 2022[1].
Notes: Future planting projections start from 2025 and is based on the CCC 6CB Balanced Pathway trajectory that sets out 1.3Mha of woodland creation by 2050. The Woodland Carbon Code projects have made up around 20% of planting rates in recent years and is assumed to continue (though the favourable additionality rules will change in October 2022, increasing clarity and policy focus for blended / stacked finance support continued uptake). Therefore, projected area represents 20% of the CCC afforestation pathway but should be considered to be speculative and an indication of the potential woodland area that could be underpinned by carbon codes.
[1]Allied Offsets (2022)

The UK area of peatland covered under the Peatland Code is also growing very rapidly.

Figure 3.5 Current UK area of peatland registered and under development under the Peatland Code



Source: Peatland Code data and CCC analysis. Data extracted by Allied Offsets on behalf of the CCC in April 2022.

(d) Engineered removals

VCMs could play a role in establishing a compliance mechanism used by aviation and other emitting industries to fund long-term greenhouse gas removals.

VCMs might complement Government action to develop engineered removal technologies. The Government's Net Zero Strategy requires deployment of engineered removals to begin this decade, reaching 5 $MtCO_2$ a year by 2030 and rapidly increasing thereafter.

- Potential policy solutions to support initial deployment are outlined in the 2022 BEIS Business Models for Engineered Greenhouse Gas Removals consultation.[25]

- VCMs might play a limited role in providing a source of near-term complimentary funding, prior to longer term funding for engineered removals through other mechanisms, for example a compliance-based scheme for sectors with residual emissions such as aviation (see below) becoming established.

(e) Aviation

Aviation is likely to be a key sector that will be funding the removal of greenhouse gas emissions given its substantial residual emissions by 2050.

A possible stepping-stone to compliance. Funding for long-term greenhouse gas removals could be facilitated through a compliance scheme for aviation that develops off the back of demand for VCMs (e.g. through strengthening of CORSIA or via more stringent schemes).

Removals needed for Net Zero. Aviation is the most carbon intensive form of transport and the technology required for the sector to reach absolute zero is unlikely to be commercially scalable by 2050. The Government's Jet Zero Strategy has aviation emitting over 19 $MtCO_2e$ in 2050 and, with no commitments to reduce these emissions through demand management, the sector will require high-integrity greenhouse gas removals to be Net Zero. Also, the technology requires international cooperation which contributes to the risk of not delivering.

CORSIA. The industry has started the process of requiring airlines to purchase 'offsets' for emissions above a baseline through CORSIA (see Box 3.1). There are currently some limitations with the scheme:

- **Ambition level uncertainty.** Some ICAO members are aiming to reduce its ambition.

- **Allows alternative fuels.** It permits airlines to meet their targets using SAF, which already contributes to 28% of the emissions savings in the Government's aviation emissions pathway by 2050. Their inclusion in CORSIA may mean that up to 28 $MtCO_2e$ of greenhouse gases will be needed to be 'offset' through GHG removals in 2050. Further, these fuels do not provide a 100% emissions savings and often fail to fully address the non-CO_2 effects from aviation.

- **Not binding.** ICAO has no way of fully enforcing the rules onto member states, although the UK Government has committed to remaining a part of their scheme in their July 2022 Jet Zero Strategy.*

* Department for Transport (2022) *Jet Zero Strategy: Delivering Net Zero aviation by 2050.*

- **Eligible schemes.** The same risks apply to the eligible 'offsetting' schemes endorsed by CORSIA as many carbon credit schemes discussed later in this report.

Beyond CORSIA. Many Airlines are already voluntarily 'offsetting' their emissions or providing consumers with the ability to 'offset' their flights.

- Based on commitments in UK-based airline reports or sustainability pledges, we estimate that 96% of domestic and 18% of international seat-kms flown are attached to some form of carbon 'offsetting' scheme.

- There is a risk that this reliance on voluntary 'offsetting', particularly given the low cost of carbon credits relative to the nascent technologies required to decarbonise the aviation industry, could prevent airlines decarbonising their activities.

- Notably, a European airline recently announced that it would stop buying carbon credits for 'offsetting' and instead set a roadmap to Net Zero through the Science Based Target Initiative, which encourages real decarbonisation before 'offsetting' can be used, recommending other beyond value chain mitigation in the meantime.

Transition to compliance markets. For the aviation sector, VCMs and/or CORSIA could provide a useful start for the transition towards a compliance scheme for airlines to fund engineered removals. Although Government will be required to fund some of the initial development of these technologies, in the longer term, costs should be paid for by the emitting industry (e.g. aviation).

Direct abatement is the priority. However, this must not be at the expense of direct abatement. Airlines should not use carbon credits, excluding formal 'offsets' paid through CORSIA, to 'offset' increased emissions resulting from higher passenger demand compared to pre-pandemic (i.e. 2019) levels. Any increase in demand should only be pursued if it is possible to do so without increasing absolute emissions above a science-based target pathway.

(f) Financial institutions

Financial institutions, like other industries, should prioritise encouraging their investments (i.e. scope 3 emissions) to reduce their emissions as far as possible before relying on 'offsets'.

Prioritising direct abatement. Financial institutions are a key purchaser of carbon credits. As for other sectors, financial institutions should undertake all activities possible to decarbonise their scope 1, 2 and 3 emissions before considering carbon credits. The majority (85%)[26] of financial institutions' emissions sit in scope 3. As such, alongside addressing building emissions and controlling business travel, they should focus their efforts on developing strategies to help their investments decarbonise their operations before relying on carbon credits. This can partly be achieved through scrutiny of company Net Zero transition plans (see our 2022 Progress Report for our advice on what these should cover).

3. Applying Corresponding Adjustments

A Corresponding Adjustment is an adjustment when a carbon credit is purchased. It is applied to the emissions balance of the country hosting the carbon credit, to ensure that the emissions reduction achieved by the carbon credit cannot be counted towards the host country's NDC. The emissions savings 'sold' via the carbon credit must be taken from the total emissions balance that is used when tracking and accounting for NDCs to avoid double counting in a global stocktake. It is applied to the emissions balance of the country hosting the carbon credit, to ensure that the emissions reduction achieved by the carbon credit cannot be counted towards the host country's NDC.

Prioritising carbon credits with Corresponding Adjustments. There is a question as to whether in future UK businesses should prioritise carbon credits that are accompanied by a Corresponding Adjustment, both for carbon credits generated in the UK and overseas. The guiding principle in judging this should be what approach will maximise global emissions reductions over time. A second key principle is that the approach to Corresponding Adjustments should not lead to financial flows from VCMs staying within developed countries.

A limited evidence base. The potential effect of UK companies prioritising purchase of carbon credits from overseas which have Corresponding Adjustments is hard to judge, as there is a limited evidence base, and there are multiple factors at play, including the host country's specific circumstances and impacts on longer-term incentives and funding flows (see Box 3.3).

Corresponding Adjustments can in some circumstances help improve the additionality of a carbon credit.

Favouring credits with Corresponding Adjustments could support additionality. Corresponding Adjustments could in future support additionality, although this will depend on the nature of the country's emissions reduction commitments, and the degree of success in strengthening NDCs and implementation of the Paris Agreement. Favouring credits with Corresponding Adjustments should not be in place of ensuring additionality through other means, such as strong carbon credit standards and robust monitoring (see Chapter 2).

- For example, we can expect that a carbon credit from a developed country with a legislated and comprehensive emissions reduction target is likely to have stronger additionality if accompanied by a Corresponding Adjustment. This is because we can expect that activities to support the legislated commitment would have happened anyway.

- However, in a developing country context a Corresponding Adjustment might not necessarily strengthen additionality. For example, a Correspondingly Adjusted carbon credit generated by a project outside the scope of a developing country's non-binding emissions reduction target but supporting a commonplace activity, might prove to be less additional than a non-adjusted credit within the same country's target that finances projects that are too expensive to realise otherwise.

Carbon credits from the UK. Corresponding Adjustments are not needed currently for credits from the UK purchased by UK companies.

- In the immediate term, for carbon credits from the UK bought by UK companies (or companies with emissions in the UK), a Corresponding Adjustment is not required. Systems are not yet in place to apply them,

these transactions are within UK borders, and the carbon credits are filling a critical implementation gap.

- However, as the land outcomes achieved by carbon credits from the UK fall under UK legislated targets, technically these credits are not fully additional.

- As a result, this underlines the importance, set out in Chapter 2 section 1, that UK companies are not treating the purchase of carbon credits from the UK as a substitute for the direct emissions reduction needed to be in line with UK carbon budgets (see Chapter 2 section 1). Government may wish to outline limitations to the use of carbon credits from the UK for UK business 'Net Zero' claims.

Recommendations to Government. Government should build the international evidence base on the impacts of attaching a Corresponding Adjustment and use this to help inform UK businesses on what approach to Corresponding Adjustments they should take in their purchase of carbon credits. Government should continue to work to strengthen NDCs and implementation of the Paris agreement structures so that Corresponding Adjustments can play the most useful role possible. We outline our recommendations in more detail in Chapter 5.

There is significant debate around whether voluntarily purchased carbon credits should be accompanied by Corresponding Adjustments.

Box 3.3
Corresponding Adjustments – contrasting considerations

Applying a 'Corresponding Adjustment' is the method established by Article 6 of the Paris Agreement to avoid the same emissions reduction being counted against two countries' targets when a carbon credit is purchased.

- For carbon credits bought for compliance purposes, selling countries must add on to their greenhouse gas inventory emissions an amount equal to what they have sold, giving a total emissions balance that reflects what they claim when tracking and accounting for their NDC. Conversely buyers of carbon credits must make a subtraction equivalent to the amount they have used to meet their NDC target.
- At COP26 it was agreed that host countries could choose to apply a Corresponding Adjustment for carbon credits purchased voluntarily, relinquishing the claim on the underlying emissions reductions. As the carbon credit would be used for voluntary purposes, there would be no equivalent adjustment by the buyer.

There are currently contrasting considerations as to whether voluntarily purchased carbon credits should be accompanied by a Corresponding Adjustment.

Against requiring Corresponding Adjustments:

- Low-income countries who are often the hosts of carbon credit projects could be against their emissions reduction ambition being raised further.
- Low-income countries may feel compelled to offer 'low-hanging fruit' as carbon credits to compete for finance, rather than undertaking these actions directly.
- Requiring Corresponding Adjustments could dampen demand for carbon credits, reducing funding flows to support implementation of existing NDCs.
- Carbon credits are already adding value by supporting the existing abatement ambitions of other countries, filling the 'implementation gap'.
- Using carbon credits to address the 'ambition gap' could diminish the responsibility of governments to increase the ambition of their national targets.
- Corresponding Adjustments do not ensure credits projects themselves are good integrity. Low-integrity carbon credits with Corresponding Adjustments attached could be misinterpreted as high-integrity.

- Countries do not yet have systems in place to authorize Corresponding Adjustments effectively. Requiring Corresponding Adjustments could therefore slow down project development.
- Encouraging UK companies to require credits from overseas to be accompanied by a Corresponding Adjustment, but not applying the same approach to carbon credits from the UK, could reduce the role VCMs can play in facilitating funding flows to developing countries.

In favour of requiring Corresponding Adjustments:

- Carbon credits with Corresponding Adjustments will help close the 'ambition gap' whereas carbon credits without Corresponding Adjustments are supporting projects that would be required to happen anyway under an NDC. This is of particular concern if carbon credits are being used instead of necessary direct emissions reduction by companies.
- Voluntary purchase of carbon credits shouldn't be used to pick up the slack in international climate finance (i.e. – part of the 'implementation gap'), especially if they are being used to allow developed country emissions to continue.
- Many low-income countries already have emissions reduction targets conditional on financing from developed country governments. Carbon credits should not replace the role of developed country government funding in supporting achievement of existing emissions reduction targets.
- In some contexts, host countries will be responsible for the raised ambition resulting from carbon credits accompanied by a Corresponding Adjustment. As a result, they may only endorse carbon credit projects that are long-lived and high-integrity.
  - However, this requirement for countries to compensate for failed carbon credits may be limited, especially if the loss relates to a non-target year, or if the project is outside the scope of an NDC.
- Accompanying carbon credits with Corresponding Adjustments may increase the credibility of VCMs, helping them to grow.
- Carbon credits with a Corresponding Adjustment enable a host government to charge a certain percentage share of proceeds or retain a share of issuance of the credits (i.e. to be used towards NDC fulfilment). This could increase carbon credit prices, helping discourage use of carbon credits in place of direct abatement.
- If increasing numbers of emissions reduction commitments from countries are legally binding and comprehensive, applying a Corresponding Adjustment is more likely to be improving the additionality of the credit, and raising overall global emissions reduction beyond existing pledges.

Source: CCC (2022) *Call for Evidence on Voluntary Carbon Offsets*; Brander, Broekhoff et Hewlett (2022) *The Future of the Voluntary Offset Market: The Need for Corresponding Adjustments*; VCMI (2022) *Provisional Claims Code of Practice*.

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Chapter 4: Wider impacts of VCMs

For carbon credits to make a positive contribution they should not only support the transition to Net Zero, but also support, or at least not harm, other objectives. In many cases there are inherent synergies (e.g. stopping deforestation avoids CO_2 emissions and protects nature), but there may also be potential conflicts (e.g. focusing solely on carbon could lead to monoculture plantations that harm or miss opportunities to enhance nature). This chapter explores these wider impacts.

(a) Impacts on wider environmental and social outcomes

Carbon credit projects can present an opportunity for rapid land-use change required to meet Net Zero targets, although there are significant risks for environmental and social outcomes.

Environment targets. From Autumn 2022, under the Environment Act, England will have a clear set of long-term targets for protecting and restoring nature. This has the potential to drive environmental improvement in a similar way that the targets under the Climate Change Act have supported reduction of greenhouse gas emissions. If measures are not sited appropriately then a single focus on carbon could come at the expense of other land outcomes. Aligning UK land-based carbon credits to targets for nature* as well as for carbon could act to deliver widespread habitat restoration, a more resilient natural environment and help society adapt to climate change.

Potential for positive and negative environmental impacts. VCMs can play a role in driving investment in nature protection and restoration activities through delivery of nature-based solutions at scale. Integrating carbon credit projects with approaches that consider the restoration of nature and improving connectivity between sites can offer a wide range of environmental benefits like improved biodiversity, flood and drought resilience, improved air and water quality, and reduced risks from wildfire, pests and diseases. However, there are risks attached to adaptation and resilience of the natural environment from the poor delivery of private 'offset' schemes.

VCMs will drive land use change. The development of carbon markets for carbon credits from the UK will incentivise land use change over a range of time and spatial scales.

- Carbon credit projects can lead to rapid land use change. For example, the registration period for the Woodland Carbon Code (WCC) is typically 4 – 6 months.

- The costs of surveys, establishment and validation and verification mean projects need to cover a significant area to be financially viable, even when VCM finance is bundled with other forms of support such as grants and subsidies. This can lead to large areas of land being "locked in" to permanent land use change.

- The average WCC project area and duration in the UK is 39 hectares (ha) over a period of 81 years.[1] Project duration is different to permanence. Under the WCC, landowners are required to commit to permanent land use change. In Scotland, where conditions are conducive to forestry, project areas are significantly larger than the UK average at 71 ha.

* This is not intended to preclude biodiversity credits or codes focussed on ecosystem services beyond carbon, which fell outside of the scope of our evidence review.

Land use change brings risks. Land use change is not without risk to the wider natural environment and social outcomes. The potential scale of future land carbon credit projects means they must make a positive contribution to wider environment benefits and other government targets. Outcomes, both for carbon and wider objectives, are highly dependent on locating projects sensitively and appropriately.

UK established codes embed 'do no harm'. The WCC and the Peatland Code (PC) have processes in place to ensure that projects 'do no harm'. The PC is government-backed, and the WCC is listed in the International Carbon Reduction and Offset Alliance (ICROA)'s Code of Best Practice.

- Forestry projects in the past have received criticism for the planting of monocultures. Woodland projects are now required to conform to the UK Forestry Standard which means that planting can assign at most 75% to a single species.[2] Large projects could therefore continue to result in areas with few benefits for biodiversity.
    - Recent changes to WCC rules on additionality may promote more diverse and/or native planting by incentivising planting plans with lower financial returns.
- Land-based projects should be assessed on a by-project basis – the environmental benefits and trade-offs are variable even when falling under the same certification standards.

More could be done on environmental outcomes and resilience. While carbon is monitored and verified throughout the lifetime of a project, other outcomes such as biodiversity are not subject to the same level of scrutiny. For the WCC, nature considerations are only covered by a toolkit and there are currently no guidelines for the PC.[3]

- Improved spatial mapping of habitats is required to safeguard them from targeting for projects. For example, species rich grasslands and peatlands have been planted with trees, despite potential damaging effects, due to not having been previously identified for their biodiversity value.[4]
- Alongside these, the resilience of land to future climate change, as well as the potential for the natural environment to support adaptation (e.g. through natural flood defences), must be considered. Land-based projects that fail to adequately consider biodiversity and the ecosystem services they support risk creating habitats that are not climate resilient, leading to the loss of the carbon stored in vegetation and soils.

Strong codes and standards are essential to manage the risks associated with using carbon credits to facilitate land-use change.

Ensuring new UK standards also embed principles of 'do no harm' and considering how all standards can further embed resilience and wider environmental impacts would heighten the positive contributions of UK land-based carbon credits. Long-term monitoring, reporting and verification that tracks the impact of projects beyond carbon is needed. Enabling landowners to access high-integrity codes for other ecosystem services, such as biodiversity and flood risk, alongside carbon codes will support the delivery of the wider benefits carbon credit projects can offer, when sited appropriately.

(b) Impacts on land values, equity and social outcomes

Changes in the UK land market. Due to Common Agricultural Policy (CAP) reform, the UK is undergoing a transition away from area-based payments. Home nations' approaches range from retaining direct subsidies to 'public money for public goods'. Private finance will play an important role in achieving environmental objectives such as climate mitigation as well as diversifying farm incomes. The increased recognition of carbon and natural capital has led to changes in the UK land market, with land suitable for carbon credits and other environmental objectives seen as a viable financial opportunity by investors.

VCMs have been anecdotally linked to land price increases, although lack of transparency limits a strong conclusion on this issue.

Increasing demand for large-scale land purchases. Green investors and business buyers are increasing demand for large-scale land purchases for 'offsetting', 'insetting', rewilding and forestry opportunities. Prices and off-market sales have significantly increased. It is difficult to assess the impact as off-market sales lack transparency and business land purchases may not yet be registered with the UK Land Carbon Registry.

- Agricultural land quality is no longer the key determinant of farmland value. Price rises are now also driven by high demand for marginal and plantable land, particularly in Scotland. Woodland carbon markets are an important contributor to this, but currently the main identified driver is high UK timber prices.[5]
    - Changes to additionality rules in the WCC may result in timber production and generating an income from carbon finance becoming incompatible. The impact of the changes on trends of land purchase and value are not yet evident.
- Taking account of current business commitments, the established carbon codes, and schemes that address soil or habitat restoration, we estimate that around 160 kha of UK land is currently allocated to private finance initiatives that include carbon as an objective.
- This represents around 0.7% of the UK land area. Though this may be considered a relatively small area nationally, land and estate acquisitions can be significant in size, having an immediate impact when considered on a local scale. As set out in Chapter 2, Section 2, the UK land VCM has the potential to increase rapidly, exacerbating impacts on adjacent communities.

Implications for land managers, tenant farmers and local communities. The evidence available to assess the impact of carbon and natural capital markets on UK rural communities is limited, and often anecdotal. The issues we describe suggest there are significant risks, particularly as land use change can be rapid with an expectation of permanence.[6] Approaches to leverage private finance in exchange for carbon 'offsets' is at risk of exacerbating existing land inequalities if not addressed by green finance.

- Increased land values could exclude new entrants and young farmers.
- Due to contractual constraints tenant farmers (representing 28% of agricultural land in the UK and half of all farms in England and Wales) can be limited or excluded from private carbon markets, restricting their access to diversified income streams during a time of agricultural policy transition.[7]

- Communities may have limited engagement with land in carbon and natural capital markets, and typically receive few benefits from investment.

- Alongside wider environmental benefits, projects should seek to provide socioeconomic benefits to neighbouring communities. If designed appropriately, projects could provide opportunities such as job creation, new skills, improved recreation, and diversified revenue streams.

Community engagement. The development of carbon credit frameworks and standards that facilitate the integration of private markets should consider the needs of local communities, address the potential for conflict, and ensure access for a wide range of actors. The Scottish Government is developing participatory and collaborative approaches for investment in its natural capital:

- The Land Reform Bill consultation (2022)[8] seeks views on how to maximise community benefits from investment in natural capital, including carbon.

- In advance of the Bill, a set of 'Interim Principles for Responsible Investment in Natural Capital' was launched, stating that high-integrity investment should deliver environmental, social and economic outcomes, provide community and public benefits, and be underpinned by engagement and collaboration.[9]

(c) Global impacts

At a global level, VCMs can have negative and positive impacts on Sustainable Development Goals.

We have not conducted an in-depth review of the evidence on wider social and equitable impacts of carbon credits from overseas. However, it is clear there are opportunities and risks. High-integrity carbon credit projects from overseas can provide benefits beyond emissions reduction, contributing to wider Sustainable Development Goals. Conversely, there have also been reports of projects not engaging local communities and/or leading to the loss or degradation of local ecosystems. As we note in the policy implications, Government should continue to use its influence so that global carbon credit standards consider wider impacts effectively.

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Chapter 5: Recommendations

In this chapter we outline the policy implications of our assessment in Chapters 2, 3 and 4, set out our recommendations to Government and share an illustrative table of what emissions reductions businesses might be expected to make before considering voluntary carbon credit purchase.

(a) Policy Implications

Government action is required to provide clarity to businesses and develop robust VCMs.

Government action is needed. If no further Government action is taken, there is a risk that VCMs continue to grow without appropriate quality controls or guidance in place, resulting in businesses relying on carbon credits in place of direct emissions reduction, and a missed opportunity to ensure only high-integrity carbon credit projects are bought and sold. Most importantly, this could slow progress in achieving Net Zero in the UK and beyond, as well as negatively impacting on the credibility of even the most responsible Net Zero targets and claims by businesses and Governments.

Ensuring businesses reduce emissions is the priority. The primary step for businesses is to achieve real emissions reductions. Carbon credits should only be purchased in addition to other measures, and not as a mechanism to delay direct action, now or in the future. The Government is playing a useful role in supporting the VCMI initiative to provide guidance on business claims using carbon credits. For such guidance to be effective the Government needs to strengthen aspects of the guidance and then ensure it is properly regulated.

Addressing the concerns with VCMs before scaling the market will ensure they are a useful tool for delivering climate goals.

Continuing to champion and update standards will reduce concerns around integrity and should be a prerequisite before looking to scale VCMs. Chapter 2 section 2 highlighted the range of concerns around overestimating the impact of carbon credit projects. We found that it will be challenging to ever fully ensure the additionality and permanence of certain carbon credit projects. The UK has relatively robust woodland and peatland standards, and there is a need to ensure new emerging land-based codes covering other ecosystems should be as robust, and to continue to advocate for similarly robust standards internationally. Governance frameworks to ensure expert oversight, to embed an evolving evidence base, and identify unintended consequences resulting from existing and new markets will continue to be important. They should be designed to facilitate continued collaboration across all of the UK.

Engineered removals. Due to their long-term sequestration potential, we expect a role for engineered removals for longer-term 'offsetting' of certain long-term residual emissions, although this could transition from VCMs to compliance markets. However, these should not be a substitute for emissions reduction, nor seen as 'instead of' biological removals; both engineered and biological solutions are needed.

Corresponding Adjustments. In the immediate term, purchase of high-integrity carbon credits that aren't used to displace direct abatement have a useful role to play in supporting emissions reduction projects in the UK and globally. In future, carbon credits with a Corresponding Adjustment attached could play a useful role in demonstrating greater additionality and raising country emissions reductions, in certain contexts. However, the impacts of prioritising carbon credits with Corresponding Adjustments are complex and depend on the robustness of MRV, NDCs and the Paris Agreement. With this in mind, the Government should continue to work to strengthen reporting around the Paris Agreement, and expand the evidence base to provide guidance to businesses on the circumstance in which they should prioritise carbon credits that are accompanied by a Corresponding Adjustment.

(b) Recommendations

In light of these conclusions we make three main recommendations, with supporting actions below. Taking forward these recommendations should result in:

- Businesses allocating increased resource towards emissions reduction within their value chains, and only relying on 'offsetting' as a last resort.
- Carbon credits that are high-integrity and more likely to be additional (though they may never be fully additional).
- VCMs being a trusted mechanism among others that facilitates funding for removals and nature-based solutions in the UK and globally in the next ten years.
- VCMs possibly playing a role in helping a transition towards compliance markets for funding permanent or very long-term removals in the UK, including both nature-based and engineered approaches working side by side.

Prioritise business emissions reduction, while providing mechanisms for businesses to support high-integrity removals.

1. **Encourage businesses to support high integrity nature-based and biological solutions and engineered removals, while focussing on achieving direct business emissions reduction.**

- By end of 2022, in the UK Net Zero Transition Plan standard, require disclosure of existing and planned carbon credit usage in net emissions claims, setting out the amount, timing and type of carbon credits purchased, to what emitting activity they are being applied, and whether the credit was accompanied by a Corresponding Adjustment.
- By June 2023, publish guidance on what activities it is appropriate to 'offset' and when. This could include:
  - Outlining which business emissions should be abated before businesses rely on 'offsetting', building on our illustrative Table 5.
  - Pointing to the need for carbon credits use for 'offsetting' to match the activity they are 'counterbalancing' like for like, at least in the long-term. For example, requiring direct emissions to be neutralised by very long-term emissions removals rather than shorter-lived reductions.

Provide a clear and robust definition on what being 'Net Zero' means for businesses.

- By mid-2023, establish what consitutes a business reaching 'Net Zero' or being 'Net Zero aligned' or 'Offset Zero'. This could draw on aspects of the SBTi's Net Zero Standard and VCMI's draft Code of Practice.
  - The Committee recommends that 'Net Zero' should only be claimed by organisations once almost all emissions are reduced and the remaining are neutralised by permanent removals. An alternative label, such as 'Offset Zero' or 'on track for Net Zero' should be available to offer reputational benefit for those organisations who have a long-term emissions reduction target aligned with UK carbon budgets, who are on track to meeting it, and who have purchased high-integrity carbon credits to cover their remaining scope 1, 2 and 3 emissions.

- By end of 2023, building on the above guidance on appropriate activities and Net Zero business claims, set out plans to turn this into regulation. This could involve:
  - Establishing 'Net Zero' as a statutory definition.
  - Deterring business 'Net Zero' claims that rely too heavily on carbon credits by adding misleading and/or unsubstantiated Net Zero claims to the list of banned practices under consumer law or by creating freestanding legislation to prohibit misleading Net Zero claims (as recommended by the CMA for environmental claims more broadly).
  - Using the CMA's Green Claims Code to highlight what acceptable and unacceptable reliance on 'offsetting' is. Drawing on this and (existing or amended) consumer protection law to investigate those contravening the guidance.
  - Drawing on advertising standard rules to ensure businesses do not claim to be 'Net Zero' based on inappropriate reliance on 'offsetting'.
  - Integrating a definition of 'Net Zero' or 'Net Zero aligned' in the Net Zero Transition Plan standard. This could be based on a strengthened form of SBT's or VCMI definition of 'Net Zero', such that in transition plans there is a clear definition of when a UK company can claim to be 'Net Zero' or 'Net Zero aligned'.
  - In the UK Environmental Reporting Guidelines, requriring businesses using carbon credits in net emisisons reporting to demonstate there are no technically and economically feasible alternatives in the near or midterm that could be invested in to achieve permanent reductions in the long term.
- Prioritise encouraging businesses to take direct action to reduce their emissions, and contribute to the wider Net Zero transition, including through their supply chains, policy influence and investments. The Committee intend to outline this in more detail in a future report on business Net Zero action.
- Consider the role of other 'beyond value chain mitigation' (measure which can reduce emissions outside of a business' value chain). Once developed, these could reduce the risk of condoning slower direct emissions reduction, and might enhance reputations.
  - For example, contribution credits (where a buyer of a credit does not reflect the carbon credit in their net emissions accounting, but claims they have contributed to emissions reduction elsewhere), commiting to spending a set £ per remaining tonne of emissions on emissions reduction projects, or using carbon credits to counterbalance historical emissions.
  - In doing so, the Government should keep in mind the potential need for standards to oversee such alternative practices.
  - These alternatives could include projects that are beneficial across emissions, biodiversity, and social priorities.

- By end of 2022, clarify the UK Environmental Reporting Guidelines for businesses to outline what role UK Woodland Carbon Code credits can play in their emissions accounting.

Continue efforts to strengthen codes and standards to ensure integrity of carbon credit projects in the UK and globally.

2. **Continue efforts to protect and raise the integrity of carbon credit projects, in the UK and globally, and to ensure VCMs are resulting in lower overall global emissions and positive wider impacts.**

UK Government and Devolved Administrations:

- As they emerge, extend the UK registry to include all land-based carbon credit projects as appropriate. Continue to take steps to ensure strong transparency across carbon credits from the UK.

- Ensure all UK codes follow a standardised approach to ensure confidence, consistency and robustness. Soil carbon should be a priority for this, but others under development (e.g. blue carbon and hedgerows) should be considered.

- Ensure monitoring, reporting and verification in existing and new codes consider the wider impacts of carbon credit projects, such as the effects on communities and biodiversity. Improved spatial data on existing environmental objectives will be needed for this.

- Ensure VCMs also do not harm other objectives, especially climate adaptation and nature recovery.

Use global influence through the course of 2022 and 2023 to:

- Support efforts for a raised global standard for carbon credits. This could include integrating the Integrity Council for the Voluntary Carbon Market (ICVCM)'s Core Carbon Principles into a UK BSI standard, required in UK Environmental Reporting Guidelines, to encourage existing standards to adopt ICVCM's Core Carbon Principles.

- Continue to advocate for greater transparency in international registries, so that all VCM transactions, including the identity of buyer and seller, project details, and date of purchase and retirement are publicly available.

- Advocate for a similar approach internationally to what we propose for guiding and regulating UK business Net Zero claims.

Develop an approach to Corresponding Adjustments:

- Build the international evidence base on the impacts on Corresponding Adjustments, including through supporting global initiatives such as VCMI to assess in what country contexts attaching a Corresponding Adjustment can add most value to project additionality and to overall global emissions reduction.

- Based on this, point UK businesses to guidance on what approach to Corresponding Adjustments they should take in their purchase of carbon credits.

    - Consider the option that for certain claims (e.g. 'Net Zero' claims) only carbon credits with very high degrees of additionality can be used.

- Continue to work to strengthen reporting around the Paris Agreement and to secure more comprehensive, binding and ambitious emissions reduction commitments globally. This may help develop the role of Corresponding Adjustments.

Carbon credits should not be prioritised above other abatement measures. They can play a useful role in supporting removals and land sink sectors in the near-term.

3. Support the modest but useful role VCMs can play in the UK Net Zero pathway, in tandem with other measures.

- Prioritise mechanisms other than VCMs to stay on track or go ahead and beyond the Net Zero pathway, such as regulations, financial incentives and other market mechanisms (e.g. producer obligations or compliance regimes). Continue to work in the near-term to harness UK carbon markets to support UK land outcomes, given the ciritical delivery and funding challenges. By mid-2023, identify which other areas (if any) VCMs could be useful in the short-term as an initial stepping stone towards compliance regimes or to fill critical financing gaps. Have plans in place to address any shortfall in sector pathway delivery by VCMs.

- **Engineered removals.** Set out what role (if any) VCMs could play within the Government's strategy for developing engineered removals.

  – VCMs might help support early engineered removals, however they should primarily be funded through Government measures.

The Government must publish a UK Land Strategy that considers the role of VCMs in delivering required land use change.

- **Land Strategy.** As recommended elsewhere, the Government's UK Land Strategy due in 2023 must coordinate changes in land use needed as part of the Net Zero transition. It should include a consideration of the role of VCMs within this. If VCMs play a role, it should set out:

  – Mitigation measures to prevent adverse consequences on communities and the wider environment.

  – Whether/how public and private investment can be stacked or bundled.

  – How it will facilitate access to VCM funds for groups beyond land owners i.e. tenant farmers and local communities.

  – How UK land-based carbon credits could align to targets for nature as well as for carbon. This could act to support delivery of widespread habitat protection and restoration, a more resilient natural environment and help society adapt to climate change.

- **Nature and community.** Set out the role VCMs can play in upscaling investment in nature conservation, protection and restoration activities through the delivery of nature-based solutions at scale. Ensure that VCMs consider and integrate with wider environmental, public and community benefits to build resilience and prevent unintended negative outcomes.

Table 5.1
Illustrative list of actions for mainstream businesses to prioritise before considering voluntary purchase of carbon credits – 2020s

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to.
• Switch car fleets to electric vehicles. • Incentivise employee travel towards walking, cycling and public transport. • Replace all air travel with alternatives (e.g. trains or video conferencing) where alternatives are available. • Encourage reduction of lamb, beef and dairy from employee diets, and set example through canteen provision and hospitality. • Encourage more efficient end-user consumption and disposal of manufactured products. For example, increase product durability and longevity, and encourage customers to recycle and re-use goods, including through making products and packaging easier to recycle and repair. • Make more efficient use of resources in production, including through light-weighting products and packaging, reducing material inputs, and material substitution for more efficient materials. • Ensure all electricity consumption is low-carbon, either on-site or directly procured to create new low-carbon generation. • For building owners: Invest in building energy efficiency measures e.g. energy systems management, behaviour change and building fabric insulation to reduce energy consumption. EPC B should be achieved wherever it is cost effective and practical to do so. • For building renters/leasers: Invest in energy systems management and promote behaviour change to reduce energy demand. Engage with the landlord to advocate for investment in building fabric insulation to bring building up to EPC B wherever it is cost effective and practical to do so. • For buildings off the gas grid: replace fossil fuel heating systems with a low-carbon alternative, from 2024	• Switch van fleets to electric vehicles (where there is off-street parking available). • Use green delivery and haulage services, like rail freight and green services like e-cargo bikes and electric delivery vans. Use logistics/consolidation to reduce volume. • Provide charge points for EVs for business fleets and citizens. • Short-term: use sustainable biofuels in HGVs. • Choose shipping solutions/ports with high fuel efficiency and ambitious plans/investments in electrification, low-carbon ammonia and/or hydrogen. • Where owns land: support increased afforestation and peatland restoration. • Procure waste management services which provide separate collections for recycling and food waste, with no waste to landfill and focus on recycling plastics. • Incentivise / enable consumers to share and use products for longer and to avoid disposable items. • For larger businesses: consider using procurement models or tariffs which specify creation of new electricity generation, e.g. power purchase agreements. (100% renewable tariffs do not have additionality so are not a substitute for PPAs). • Audit electricity use and reduce electricity consumption through investment in efficient appliance, energy systems management and building occupant behaviour change. • Businesses who produce/sell products or are in construction: Adopt circular economy strategies to prevent waste by reducing excess use of materials (e.g. packaging), and designing in repair, recyclability, and extended use. • Replace gas boiler at end of lifetime to a low-carbon alternative, e.g. heat pump, low-carbon heat network, or hydrogen boiler. (Exception: this may be challenging when it is not yet clear if the area will be prioritised for district heating or hydrogen or if leasing the property).	• For businesses with shipping included in supply chains: onshore supply chains and reduce shipment of heavy items.

• When commissioning new buildings, ensure they are built to be ultra-energy efficient and to rely on low-carbon heating only from 2025 • Increasingly move away from fossil fuel use and production, and towards low-carbon energy.		

Table 5.2
Illustrative list of actions for mainstream businesses to prioritise before considering voluntary purchase of carbon credits – 2030s

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
Everything listed in 2020s to 'definitely be done'. • Finalise any outstanding energy efficiency measures in buildings by early 2030s. • For buildings with gas boilers: replace the boiler at end of lifetime with a low-carbon alternative.		

Table 5.3
Illustrative list of actions for aviation businesses to prioritise before considering voluntary purchase of carbon credits – 2020s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
• Improve aircraft fuel efficiency at 2%/year (Jet Zero Strategy). • Adopt Sustainable Aviation Fuels in line or at a higher rate than with the Government's SAF mandate.		

Notes: Carbon credits, excluding formal 'offsets' paid through CORSIA, should not be used to 'offset' increased emissions resulting from higher passenger demand compared to pre-pandemic (i.e. 2019) levels. Any increase in demand should only be pursued if it is possible to do so without increasing absolute emissions.

Table 5.4
Illustrative list of actions for aviation businesses to prioritise before considering voluntary purchase of carbon credits – 2030s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
Everything listed in 2020s to 'definitely be done'. • Adopt Sustainable Aviation Fuels in line or at a higher rate than with the Government's SAF mandate. *(10% by 2030 in Jet Zero Strategy).* • Adopt class 1 & 2 zero emission aircraft where technology is commercially available.		

Notes: Carbon credits, excluding formal 'offsets' paid through CORSIA, should not be used to 'offset' increased emissions resulting from higher passenger demand compared to pre-pandemic (i.e. 2019) levels. Any increase in demand should only be pursued if it is possible to do so without increasing absolute emissions.

Table 5.5
Illustrative list of actions for manufacturing and construction businesses to prioritise before considering voluntary purchase of carbon credits – 2020s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
• Ensure new buildings are ultra-energy efficient and rely on low-carbon heating only from 2025. • Upgrade to more efficient processes and equipment. • For boiler manufacturers: increase sales of heat pumps.	• Adopt circular economy principles and upgrade buildings. Ensure timber, low-carbon steel, low-carbon cement and other low-carbon production inputs are used for construction of new buildings. Minimise emissions at construction phase as much as possible. Ensure new buildings/developments enable sustainable travel, building this into the early stages of the planning process. • Consider replacement cycles for existing technologies over the next decade and plan to prepare to introduce alternatives which can run on low-carbon fuels. • Build up supply chains and worker skills to ensure readiness for new net zero technologies in future.	• Support establishment of CCS clusters, including by expressing interest in joining future networks where possible. • Demonstrate and build confidence in new fuel switching and CCS technologies, for applications across the manufacturing and construction sectors.

Table 5.6
Illustrative list of actions for manufacturing and construction businesses to prioritise before considering voluntary purchase of carbon credits – 2030s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
Everything listed in 2020s to 'definitely be done'. • Continue to implement energy and resource efficiency measures. • Switch away from using high-carbon fuels to low-carbon alternatives such as low-carbon hydrogen or electricity. • Implement CCS on remaining emissions, especially those arising from processes in the minerals sector. • Reduce emissions from ore-based steelmaking to near-zero emissions by 2035.		

Table 5.7
Illustrative list of actions for transport businesses to prioritise before considering voluntary purchase of carbon credits – 2020s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
• Car manufacturers: switch to full EV/plug-in sales.	• Public transport companies: electrify railways. • Companies with HGVs: In the short-term, use sustainable biofuels in HGVs. • Shipping companies and ports: adopt low-carbon shipping fuels and use shore power to minimise emissions in port. • When replacing bus fleets, invest in zero emission buses.	

Table 5.8
Illustrative list of actions for transport businesses to prioritise before considering voluntary purchase of carbon credits – 2030s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
Everything listed in 2020s to 'definitely be done'. • When purchasing HGVs under 26 tonnes, vans, buses, motorbikes and coaches ensure they are zero-emissions vehicles. • Public transport companies: electrify railways.		

Table 5.9
Illustrative list of actions for hospitality, food & waste businesses to prioritise before considering voluntary purchase of carbon credits – 2020s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
• Waste companies: reduce operational and embedded emissions as far as possible.	• Audit and reduce food waste at least in line with the Courtauld Commitment.	

Table 5.10
Illustrative list of actions for hospitality, food & waste businesses to prioritise before considering voluntary purchase of carbon credits – 2030s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
Everything listed in 2020s to 'definitely be done'. • Everything listed in 2020s to 'definitely be done' or 'definitely done unless constraints' before considering 'offsetting'.		

Table 5.11
Illustrative list of actions for farming and land use businesses to prioritise before considering voluntary purchase of carbon credits – 2020s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
• Farmers: increase take-up of low-carbon farming practices and machinery and improvements in productivity	• Farmers: increase carbon sequestration in soils and vegetation (such as hedgerows and tree planting on farmland), consider the role of biomass crops, and implement the sustainable use of agricultural peatlands.	• R&D and market commercialisation of innovative options (e.g. sustainable increase in energy and food crop yields, low-carbon off-road machinery and livestock breeding measures).

Table 5.12
Illustrative list of actions for farming and land use businesses to prioritise before considering voluntary purchase of carbon credits – 2030s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
Everything listed in 2020s to 'definitely be done'.		

Table 5.13
Illustrative list of actions for fuel supply businesses to prioritise before considering voluntary purchase of carbon credits – 2020s (See Table 5.1 and 5.2 for actions which apply to most businesses)

• Should definitely be done.	• Should be considered, unless compelling technical/financial constraints, which should be disclosed.	• We would encourage businesses to do.
• Transition investment towards low-carbon energy. • For fossil fuel supply companies: improve monitoring of flaring and venting on site. By 2025, only permit flaring and venting when necessary for safety. If they are needed, switch from venting to flaring. • For gas network companies: deploy measures to reduce methane leaks from gas distribution and transmission networks.	• For fossil fuel supply companies: ensure offshore oil and gas platforms and installations increasingly use low-carbon energy, with no direct emissions from new installations.	• Support development of CCS to demonstrate its potential use across fuel supply – in producing hydrogen / bioenergy or in capturing residual refining process emissions.

Table 5.14
Illustrative list of actions for fuel supply businesses to prioritise before considering voluntary purchase of carbon credits – 2030s (See Table 5.1 and 5.2 for actions which apply to most businesses)

Should definitely be done.	Should be considered, unless compelling technical/financial constraints, which should be disclosed.	We would encourage businesses to do.
Everything listed in 2020s to 'definitely be done'. • Increasingly move away from fossil fuel use and production, and towards low-carbon energy. • Implement CCS to capture residual emissions from bioenergy conversion, hydrogen production, and refining.		

Annex

Glossary

Definitions	
ACR	American Carbon Registry
Additionality	Demonstrating that the change in emissions would not exist in the absence of revenue from the purchase of the carbon credit
BECCS	Bioenergy with carbon capture and storage
BEIS	Department for Business, Energy & Industrial Strategy
BSI PAS 2060	British Standards Institution Publicly Available Specification: Specification for the demonstration of carbon neutrality
CA(s)	Corresponding Adjustment(s)
CAP	Common Agricultural Policy
CAR	Climate Action Reserve
CB6	Sixth Carbon Budget
CCC	Climate Change Committee
CCP	Core Carbon Principle
CCS	Carbon capture and storage
CDM	Clean Development Mechanism
CfD	Contract for Difference
CMA	Competition and Markets Authority
COP26	2021 United Nations Climate Change Conference
CORSIA	Carbon 'offsetting and Reduction Scheme for International Aviation
DACCS	Direct Air Carbon Capture and Storage
Defra	The Department for Environment, Food and Rural Affairs
ECIU	Energy & Climate Intelligence Unit
EPC	Energy Performance Certificate
ETC	Energy Transitions Commission
EU ETS	European Union Emissions Trading System
FTSE350	Financial Times Stock Exchange 350 share index
GGR	Greenhouse Gas Removal
GHG	Greenhouse gas
$GtCO_2e$	Gigaton of CO_2 equivalent
HGV	Heavy Goods Vehicle
ICAO	International Civil Aviation Organization
ICROA	International Carbon Reduction and 'offset' Alliance
IPCC	Intergovernmental Panel on Climate Change
IPCC WGIII	Intergovernmental Panel on Climate Change Working Group 3

ISO	International Organization for Standardization
ISO 14068	International Organization for Standardization's Standard on Greenhouse gas management and climate change management and related activities - Carbon neutrality
JI	Joint Implementation
kha	Kilo hectare
LULUCF	Land Use, Land-use Change and Forestry
M&C	Manufacturing and Construction
$MtCO_2e$	Megaton of CO_2 equivalent
MRV	Monitoring, reporting and verification
NbS	Nature-based Solutions
NDC	Nationally Determined Contributions (NDCs)
NEIRF	Natural Environment Investment Readiness Fund
NZ	Net Zero
NZS	HMG's 2021 Net Zero Strategy
O&G	Oil and Gas
PC	Peatland Code
REDD+	Reducing emissions from deforestation and forest degradation
SBT	Science Based Target
SBTi	Science Based Targets initiative
SD VISta	Sustainable Development Verified Impact Standard
tCO_2e	Tonne of carbon dioxide equivalent
TFSVCM	Taskforce on Scaling Voluntary Carbon Markets
UK ETS	United Kingdom Emissions Trading Scheme
VCMI	Voluntary Carbon Markets Integrity Initiative
VCM	Voluntary Carbon Market
VCS	Verified Carbon Standard
WCC	Woodland Carbon Code
ZEV	Zero Emission Vehicle

Table A1
Evidence of limited additionality and overestimated claims

Category	Project/institution	How standards are addressing the issue	Evidence of overclaiming of emissions reductions
International	Clean Development Mechanism (CDM)[1]	Carbon credits will be awarded only to project activities where emissions reductions are "additional to those that otherwise would occur", i.e., additional reductions compared to the "baseline scenario". The CDM uses all forms of tests[2]: • Barrier analysis • tech analysis • financial analysis • Automatic additionality (for microscale activities) • Standardized additionality benchmarks	**Type of concern: multiple: common practice / financial** Criticised for not delivering significant emissions reductions beyond what was already occurring. Depends on the project type with most energy-related (e.g. wind, hydro, waste heat recovery etc) being less likely to be additional. • At least 52% of approved carbon 'offsets' under the Clean Development Mechanism were allocated to projects that would have been likely to be built without carbon 'offsets'.[3] • 85% of 'offset' projects in the CDM had a low likelihood of having achieved emissions reductions which were additional and not over estimated.
	Joint Implementation (JI)[4]	Eligibility requirements set by the host Party and determined on a project basis. CDM Additionality Tool is often used.	**Type of concern: financial / jurisdictional / effectiveness** An in-depth review of JI by the Stockholm Environment Institute found that of a random sample of 60 JI projects, 73% came from projects for which additionality was not plausible (i.e., the projects would have proceeded without carbon revenues). They also found that only 1 of the 6 largest JI project types had high environmental integrity, with 80% of ERUs issues from projects of low or questionable environmental integrity.[5]
	Reducing emissions from deforestation and forest degradation (REDD+)	Generally, have to demonstrate additionality at the project level.[6]	**Type of concern: financial / leakage** Meant to be used to make a credit out of avoided deforestation have faced challenge of proving additionality (no way of knowing that under a counterfactual of no 'offsetting' scheme that deforestation would have occurred).
Local / Regional	California's Compliance 'offset' Programme	Checklist of 5 criteria.	**Type of concern: technical / common baseline** Less than 20% of credits sold in California forest 'offset' program led to additional carbon capture beyond what forests would have achieved.
Independent	Gold Standard	All Gold Standard Projects seeking the issuance of Gold Standard Certified Impact Statements or Products shall be demonstrated to be additional. Relies on additionality tests used in CDM or JI.[7]	Have contrasting views with VCS on several elements fundamental to 'offsetting' (e.g. required permanence of biological removals, requirements to apply Corresponding Adjustments, additionality required towards a Paris-aligned NDC).

	Verified Carbon Standard (VCS), Verra (Sustainable Development Verified Impact Standard (SD VISta))	VCS projects often use the CDM Additionality Tool.	**Type of concern: timing / baseline** Research by Unearthed into 10 forestry projects used by airlines and verified by Verra found projects only lasted several decades. They also found that quantification methods were on shaky foundations, as they use deforestation rates in similar areas to generate a counterfactual, which then were not deforested. Verra permits the use of a software called Dinamica EGO which itself says it should not be used for REDD+ baselines.
UK	Woodland Carbon Code	• Has a requirement that planting must pass the legal and investment tests. • Has a capacity buffer to account for the risk of a project not realising its emissions reduction commitments once verified. • Introducing new additionality rules in Oct 2022 to reflect that timber prices have risen substantially. Commercial timber projects may not pass investment test that states additional funding from carbon credits is required to be financially viable. • Aim is to maintain credibility while helping to direct funding where it is needed i.e increased planting of native and broadleaf species in addition to conventional timber options with high yields.[8]	**Type of concern: financial** UK land prices and government grants make woodland creation increasingly profitable, meaning WCC projects may have taken place anyway in the absence of such schemes.
	Peatland Code	• Has a capacity buffer to account for the risk of a project not realising its emissions reduction commitments once verified. • Restoration projects must meet the conditions set by the legal, finance and either investment or barrier test. • Must demonstrate via financial analysis that 15% or more of the project cost over the project lifetime, including initial survey and site preparation, will be covered by carbon finance.	**Type of concern: technical** Development of the quantification of abatement is required to reflect changes to the UK GHGI and reflect a wider range of peatland condition categories. This is currently in process.

Endnotes

[1] Oko Institut (2016) *How additional is the Clean Development Mechanism?* https://ec.europa.eu/clima/system/files/2017-04/clean_dev_mechanism_en.pdf

[2] PMR (2016) *Carbon Credits and Additionality*. https://openknowledge.worldbank.org/bitstream/handle/10986/24295/K8835.pdf?sequence=2

[3] LSE (2021) *Do carbon offsets offset carbon?* https://www.lse.ac.uk/granthaminstitute/publication/do-carbon-offsets-offset-carbon

[4] UNFCC *Joint Implementation Determination and Verification Manual.* https://ji.unfccc.int/Ref/Documents/DVM.pdf

[5] SEI (2015) *Has Joint Implementation reduced GHG emissions?* https://www.sei.org/featured/joint-implementation-undermined-global-climate-ambition-study-finds/

[6] Baker McKenzie (2014) *The Consolidated Guide to the REDD+ Rules under the UNFCCC*. https://www.bakermckenzie.com/-/media/files/insight/publications/2014/11/consolidated-guide-to-the-redd-rules-under-the-u__/files/read-publication/fileattachment/bk_global_reddrule_nov14.pdf

[7] Gold Standard (2019) *Principles & Requirements.* https://globalgoals.goldstandard.org/101-par-principles-requirements/

[8] Scottish Forestry (2022) *New additionality rules for the Woodland Carbon Code*. https://forestry.gov.scot/news-releases/blog-new-additionality-rules-for-the-woodland-carbon-code

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