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Policy options to engage with Voluntary Carbon Markets

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Summary

- Voluntary carbon markets (VCMs) refer to the voluntary trade in carbon units, each equivalent to one tonne of Greenhouse Gas (GHG) reduced or removed from the atmosphere.
- Developed countries are increasingly using VCMs to finance activities that deliver GHG removals, particularly from land-based projects. VCM approaches support national nature and climate targets, often by linking carbon and nature markets and bundling carbon and biodiversity benefits, typically in ways that supplement or align with existing national policies.
- Case studies from Australia, Finland, Portugal and Scotland demonstrate varied approaches to the development of domestic VCMs. These countries have either aligned their VCM approaches with existing regional or international supply and demand-side integrity standards, or developed new domestic guidance tailored to national and local contexts.
- The countries studied share similar approaches that reflect the importance of meeting national climate commitments without relying on international carbon units. To support this, they prioritise VCMs that finance domestic mitigation activities and restrict national actors from purchasing or selling units on international carbon markets (including those operating under Article 6 of the Paris Agreement).
- To ensure that VCMs contribute to broad and inclusive prosperity that is socially and environmentally sustainable, it is important that all stakeholders – especially land users and affected communities – can access and benefit from these markets. To support these aims, Wales should incorporate just transition principles, equitable income sharing, and transparent stakeholder engagement in its approach to VCM development.
- To date, Wales has not developed a tailored approach to engaging with VCMs. Welsh stakeholders wishing to participate in international VCMs currently rely on UK-wide markets. Wales is also part of the Woodland and Peatland Codes, which concentrate supply and demand for voluntary wood creation and peatland restoration domestically.
- Recommendations for the Welsh Government include minimising reliance on international units to compensate its emissions; increasing domestic voluntary supply and demand to meet climate targets; regulating new approaches to VCMs; establishing a clear separation from compliance schemes and other types of carbon markets; and integrating co-benefits considerations and just transition principles into policy design, in line with Wales' Well-being of Future Generations Act 2015.

Glossary

Carbon credits
A tradable certificate representing the removal or reduction of one tonne of carbon dioxide (or equivalent greenhouse gases) from the atmosphere. Carbon credits are generated by projects that reduce, avoid, or remove emissions and can be sold in voluntary or compliance carbon markets.

Carbon dioxide removal (greenhouse gas removal)
Human driven activities that capture and durably store CO_2 from the atmosphere in geological, land or ocean reservoirs or in products. This includes human enhancement of natural removal processes but excludes natural CO_2 uptake not caused directly by human activities.

Carbon units
A general term for quantified emissions reductions or removals that are certified and may be used for trading or claims in carbon markets. Includes both reduction and removal units and encompasses carbon credits and other similar assets, regardless of the issuing standard.

Compensation (claims) – also offsetting
The purchase and use of carbon units to counterbalance greenhouse gas emissions from a specific activity or organisation, usually with the aim of making a carbon neutrality claim. Often involves purchasing credits equivalent to the volume of residual emissions at the entities' net zero date.

Contribution (claims)
A type of claim where carbon units are purchased to support mitigation activities without implying that the buyer's own emissions have been offset (and its total net emissions reduced). This approach aligns with emerging standards that discourage offsetting in favour of supporting broader climate goals.

Demand integrity
The extent to which the use of carbon units by buyers (including claims and market behaviour) is credible, transparent, and aligned with best-practice approaches to mitigation.

Emissions Trading Scheme(s) (ETS) – also 'cap and trade' schemes
Regulatory mechanisms that cap total emissions from polluting sectors (i.e., electricity generation, industrial processes and transport) and allow entities to trade allowances representing 1 tonne of CO_2 equivalent within the cap. Participants must surrender allowances equivalent to their emissions, which creates an incentive to reduce emissions when the cost of abatement exceeds the allowance cost within the market cap.

Environmental integrity
The degree to which projects within voluntary carbon markets result in real, additional, and permanent emissions reductions or removals, and do not cause significant social or environmental harm. It is a key principle underpinning the supply and demand sides of carbon markets.

Just transition
An approach or framework which guides sectoral or whole-of-economy decarbonisation strategies. Just transition principles in climate action include seeking a fair distribution of benefits and costs, inclusive decision-making processes, recognition of the rights of vulnerable groups and addressing existing inequalities which affect transition outcomes. In the context of carbon markets, a just transition entails equitable benefit-sharing and meaningful stakeholder engagement.

Insetting
The practice of financing emissions reductions or removals within an organisation's own value chain and managing decarbonisation projects in-house.

Reduction units
Carbon units that represent verified decreases in greenhouse gas emissions, typically through energy efficiency, fuel switching, increased rotation age of forest stands. These are distinct from removal units.

Removal units
Carbon units generated by activities that capture and durably store CO_2 from the atmosphere in geological, land or ocean reservoirs or in products. Examples include tree planting, biochar application, or engineered solutions like direct air capture.

Supply integrity
The credibility and robustness of the actions and processes involved in generating carbon units, including project design, additionality, permanence, monitoring, reporting and verification (MRV), and avoidance of leakage or double counting.

Acronyms

ACCUs Australian Carbon Credit Units
AFOLU Agriculture, Forestry and Other Land Uses
BVCM Beyond Value Chain Mitigation
CCA Climate Change Authority
CCC Climate Change Committee
CCP Core Carbon Principles
CER Clean Energy Regulators
CFI Carbon Farming Initiative
COP Conference of the Parties
CORSIA Carbon Offsetting and Reduction Scheme in International Aviation
CPR Carbon Pricing Mechanism
CRCF Carbon Reduction and Carbon Farming
CSRD Corporate Sustainability Reporting Directive
DESNZ Department for Energy Security and Net Zero
EMDEs Emerging Markets and Developing Economies
ER Emission Reductions
ERF Emissions Reduction Fund
ETS Emissions Trading Scheme
GDP Gross Domestic Product
GHG Greenhouse Gases
ICROA International Carbon Reduction and Offset Alliance
ICVCM Integrity Council for the Voluntary Carbon Market
ISO International Organisation for Standardisation
ITMOs Internationally Transferred Mitigation Outcomes
LT-LEDS Long Term Low Emission Development Strategy
MCU Mitigation Contribution Unit
MVC Mercado Voluntario de Carbono
NDC Nationally Determined Contribution
NGOs Non-governmental Organisations
PACM Paris Agreement Crediting Mechanism
PC Peatland Code
PCUs Peatland Carbon Units
PIUs Pending Issuance Units
PRINC Principles for Responsible Investment in Natural Capital
SBTi Science Based Integrity Initiative
SDGs Sustainable Development Goals
SMEs Small and Medium Enterprises
VCMs Voluntary Carbon Markets
VCMI Voluntary Carbon Market Integrity Initiative
WCC Woodland Carbon Code
WCUs Woodland Carbon Units

Introduction

To support future Voluntary Carbon Markets (VCM) policy development, the Welsh Government has asked the Wales Centre for Public Policy (WCPP) to investigate how other countries have developed schemes and policies, including regulations, relating to VCMs, and how lessons from these countries could be applied in Wales.

This report provides a series of country case studies. These case studies each present a qualitative analysis of policy documentation and supporting literature, highlighting key features of VCM policy development in the respective country. The report also evaluates key themes related to the application of VCMs and policies and regulations to control their use in Wales. These themes were distilled from desk research and engagement with Welsh Government officials early in the research process. The report concludes by drawing out lessons and implications from the country case studies for the Welsh Government to consider with respect to engaging with VCMs.

In commissioning this report, the Welsh Government expressed particular interest in two main questions, with the following sub-topics:

1. **How have other countries and regions developed and implemented policies, schemes and or/regulations on VCMs in respect to the following areas:**

    a) The principles underpinning government-backed schemes, on the supply side (credit integrity) and demand side (claim integrity), including whether and how they align with independent integrity initiatives or the work of other bodies such as SBTi;

    b) The policies and guidance governments have adopted to integrate high-integrity carbon units into their decarbonisation (e.g. to fund emissions reduction measures) or to control their use;

    c) The relative focus on removals and/or avoidance;

    d) How governments account for carbon traded in VCMs, including whether adjustments are made for units traded across regional or national borders;

    e) The delivery of co-benefits;

    f) Risks and potential unintended consequences of VCMs for decarbonisation aims and how governments are working to mitigate them; and

    g) Interactions with compliance markets and other relevant policies.

2. How could lessons from these countries and regions be applied in Wales?

Based on our analysis of Wales' legislative and regulatory landscape, we have identified the following policy opportunities where engagement with VCMs could be relevant or beneficial:

- Supporting mitigation and adaptation targets through Carbon Budget 3 (2026–2030) implementation planning, Carbon Budget 4 setting, and the Climate Adaptation Strategy. Guidance on VCMs can help ensure the integrity of emissions inventories and carbon budget accountability.
- Financing AFOLU transition, through support for tree planting and other land use targets under Wales' carbon budgets, alongside implementation of the Woodland Carbon Code, while ensuring resilient land use (under adaptation efforts).
- Managing impacts from the integration of engineered carbon dioxide removal into the UK ETS.
- Ensuring that private investments are sustainable and high integrity, for example by distinguishing between investments supporting reductions and those supporting removals.
- Enabling Welsh non-state actors to meet their climate plans, in a responsible and high integrity manner, preventing climate-washing or other fraudulent practices.

In this section, we highlight not only potential goals for Wales' approach to VCMs, but also how this approach might be designed and operationalised, based on insights from our case studies.

What are VCMs?

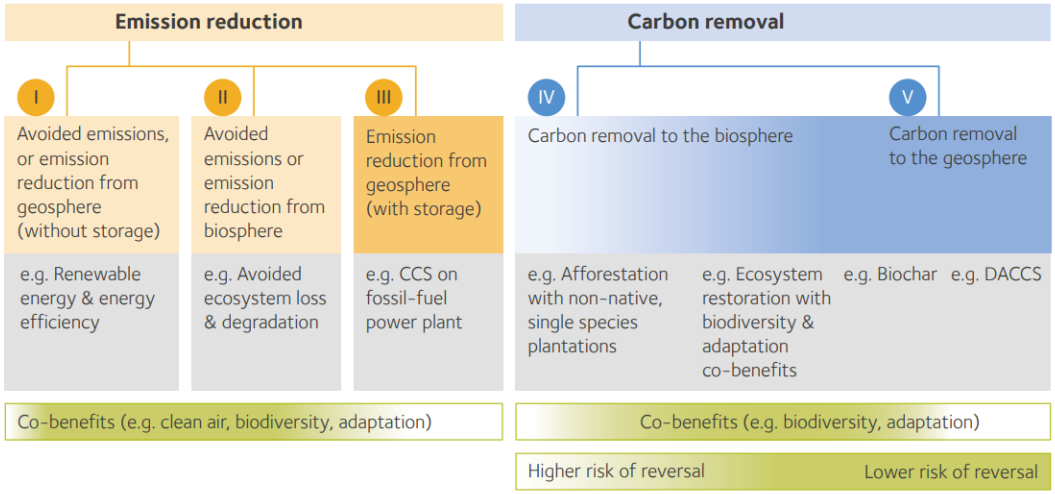
VCMs enable governments and non-state actors to purchase voluntary carbon units, which are equivalent to either the reduction of greenhouse gas (GHG) emissions or the removal of GHGs from the atmosphere. While voluntary carbon units are typically used for voluntary purposes, such as to help companies meet their net zero targets, in some cases they may also be used to fulfil obligations under government compliance mechanisms, such as Emissions Trading Schemes (ETS), or international climate commitments, such as Nationally Determined Contributions (NDCs) and long-term low-emission development strategies (LT-LEDS). In this report, we use the general term 'unit' to refer to carbon credits and related assets that serve the same purpose, irrespective of specific labels used in different schemes.

Historically, voluntary carbon units have been used for offsetting purposes, to help meet buyers' emissions targets or make carbon-neutral claims. However, voluntary carbon units

are not only used to compensate for existing emissions but may also be used to claim a broader ‘contribution’ to global mitigation and co-benefits, such as biodiversity protection or climate adaptation.

Within the two broad categories of units, emissions reductions and carbon removals, there are further sub-categories and a wide range of activity types that project developers can pursue. Figure 1 provides further detail.

Figure 1. Taxonomy of carbon units and underlying activities



Source: Axelsson et al., (2024: 24)

VCMs can be international, involving the cross-border trade of voluntary carbon units generated elsewhere, or domestic or regional, allowing the purchase and use of units generated within specific participating jurisdiction(s). The creation and operationalisation of domestic VCMs, as well as domestic actors’ participation in international VCMs, can be regulated through government policy frameworks. Voluntary carbon units are typically certified by independent verification bodies, following standards developed by third parties, either private or public.

However, in recent years, VCMs have come under scrutiny, as research and investigations have highlighted integrity issues associated with many accredited mitigation activities. These issues occur throughout the entire carbon unit supply chain. On the supply side, such activities often suffer from a lack of additionality and durability, insufficient considerations of leakage, and non-robust emissions accounting (Haya et al., 2023; Probst et al., 2024; West et al., 2020). On the demand side, the purchase and use of low-quality carbon units to offset real emissions can lead to greenwashing and undermine climate targets. Voluntary offset schemes have also been accompanied by negative environmental and human impacts, including biodiversity loss and violations of local communities' rights (Chávez, 2024). Both

reduction and removal activities are subject to a variety of risks on the supply and demand sides.

Independent and multi-stakeholder standard-setting bodies, such as the Integrity Council for the Voluntary Carbon Market (ICVCM), the Voluntary Carbon Markets Integrity Initiative (VCMI), and the Science Based Targets Initiative (SBTi), have sought to promote integrity and regulate both supply and demand in these markets. These standards increasingly recognise that voluntary carbon units, particularly those with high risks of reversal, should not replace deep internal emissions reductions within organisations, but rather complement them by addressing residual or hard-to-abate emissions, particularly in sectors that are difficult to decarbonise, such as aviation, certain heavy industry, and agriculture. Therefore, within these standards, non-state actors are encouraged to purchase and use voluntary carbon units, both domestically and internationally, to address all emissions associated with their operations, including those beyond their direct control.

In addition, some market standards and frameworks, such as the Oxford Offsetting Principles, suggest a transition of offsetting towards counterbalancing residual emissions using durable removals, rather than units from avoidance and reduction projects (Axelsson et al., 2024). Research suggests that residual biogenic and fossil emissions – under the 'like for like' principle – should be counterbalanced with removals that meet comparable permanence thresholds (Burke and Schenuit, 2023). States may also purchase and use international carbon units under the Paris Agreement to address their residual emissions, raise the ambition of their NDCs, and work towards net zero or net-negative emissions over time (see Box 1). Investment in carbon units through market mechanisms should enhance, rather than replace, international climate finance obligations.

Box 1. Article 6, VCMs, and Corresponding Adjustments

The Article 6 framework of the Paris Agreement enables participating parties, including both state and non-state actors, to voluntarily cooperate in raising the ambition of their NDC targets, addressing residual emissions, and achieving net zero or net-negative emissions over time. Article 6.2 provides flexible guidance on the trading of Internationally Transferred Mitigation Outcomes (ITMOs), which include corresponding adjustments to prevent double counting of the same emission reductions or removals by two countries. These adjustments ensure that emission reductions are deducted from the host country's national inventory, allowing the buyer country to count them towards its own NDC targets or other climate commitments, such as long-term low-emission development strategies (LT-LEDS). Buyers are typically required to pay a premium on carbon units that include corresponding adjustments.

Article 6.4 establishes a centralised mechanism – the Paris Agreement Crediting Mechanism (PACM) – overseen by the Article 6.4 Supervisory Body, for accrediting, storing, and trading Emission Reductions (ERs) and Mitigation Contribution Units. The operationalisation of Articles 6.2 and 6.4 relies on both legacy VCM infrastructure and emerging domestic guidance and regulations. Developed countries generally participate in these mechanisms to meet their NDCs more cost-effectively, offsetting purchased mitigation outcomes against hard-to-abate emissions, supporting host countries in meeting their NDC targets, and contributing to global mitigation (and adaptation) efforts.

Article 6.8 allows for the trading of non-mitigation approaches, including knowledge and technology transfers. Whereas Articles 6.2 and 6.4 are progressing towards full operationalisation following COP29, Article 6.8 remains less developed.

Policy engagement with VCMs

Policy engagement with VCMs can promote integrity on both the supply side, by shaping which mitigation activities are funded through VCMs and how they are generated and implemented, and the demand side, by governing the responsible use of carbon units.

To date, developed countries have mostly engaged, or sought to engage, with VCMs in the following ways:

- setting out guidance or expectations for domestic actors' participation in VCMs;
- creating domestic certification schemes for the generation of VCM units (which may operate in parallel with compliance ETS);
- regulating, certifying, or providing guidance on the claims made by entities within their jurisdiction relating to the use of VCM units; and
- purchasing international carbon units from Emerging Markets and Developing Economies (EMDEs) to fulfil emissions reduction pledges under the Paris Agreement.

By engaging with VCMs, developed countries can mobilise finance for underfunded mitigation activities both domestically and internationally, and support progress towards net zero or net-negative emissions. They can also assist EMDEs in meeting their climate targets (Bhattacharya et al., 2024). VCMs have been particularly important platforms for funding and scaling carbon dioxide removal activities (Smith et al., 2024), which are essential to reaching

global net zero and meeting the Paris Agreement goal of limiting average global warming to 1.5 to 2 degrees Celsius (IPCC, 2022).

Beyond advancing climate action, meaningful engagement with VCMs can contribute to the advancement of other Sustainable Development Goals (SDGs), including poverty reduction, good health, gender equality, and enhanced biodiversity (Macquarie, 2023). High-integrity VCM schemes can generate co-benefits for host communities, often among the most vulnerable groups to climate change. However, to fully realise the potential of VCMs, robust regulation of approaches to these markets is necessary.

Welsh policy context

The UK has a long history of involvement in carbon markets, having pioneered a compliance ETS scheme in 2002 to meet obligations under the Kyoto Protocol. This scheme was re-established after its de-linking from the EU ETS in 2021. In recent years, the UK has introduced the Woodland and Peatland Carbon Codes to finance woodland creation and peatland restoration by facilitating voluntary trade in carbon units linked to these activities. It has also issued guidance on approaches to high-integrity voluntary carbon and nature markets, which it is seeking to develop through a series of public consultations.

Engagement with VCMs is becoming increasingly relevant for the Welsh Government in the context of its decarbonisation and adaptation goals, its transition plans for the agriculture, forestry and other land use (AFOLU) sector, and the participation of Wales-based entities in the UK ETS.

Overarching policy goals

In addition to contributing to the UK's NDC, Wales has its own statutory emissions reduction targets, as established by the **Environment (Wales) Act 2016**. The Act requires Welsh greenhouse gas emissions to be reduced to net zero by 2050, and for Welsh Ministers to set out decarbonisation policies and accompanying five-year carbon budgets. Engagement with VCMs could play a significant role in setting and meeting carbon budgets and other climate commitments, providing additional finance streams to complement or address shortfalls in existing public or private finance for mitigation activities.

Wales achieved its first carbon budget (2016–2020) and the 2020 interim target, reducing emissions by an average of 27.8% below baseline levels, exceeding the 23% target (Welsh Government, 2022). In 2021, the Senedd approved interim emissions reduction targets for 2030 and 2040, along with two carbon budgets covering 2021–2025 (Carbon Budget 2) and 2026–2030 (Carbon Budget 3). In its advice to the Welsh Government on Carbon Budgets 2 and 3, the Climate Change Committee (CCC) recommended the planting of 43,000 hectares

of new woodland by 2030 and 180,000 hectares by 2050, as a cost-effective contribution to reaching net zero by 2050. The Welsh Government accepted this recommendation in its Carbon Budget 2 plan.

The land use sector is particularly relevant in this context. Despite setting ambitious targets for peatland restoration and woodland creation, the Welsh Government has consistently underperformed relative to CCC benchmarks necessary for decarbonisation of land use. The CCC's advice for Wales to align with the Balanced Pathway to net zero calls for the share of restored or rewetted peat to rise from 41% today to 52% by 2033 and 85% by 2050 (CCC, 2025a). For woodland creation, this pathway calls for 22,000 hectares by 2030 and 208,000 hectares by 2050, compared with the Welsh Government's current targets.

However, in 2020/21 only 580 hectares of new woodland were planted – well below the 2,000-hectare annual target. Similarly, peatland restoration efforts remain below expectations, prompting a proposed increase to 1,800 hectares annually by 2030/31, up from the current 600–800 hectares. Achieving this ambition will require overcoming persistent skills shortages within delivery bodies and boosting landowner engagement to ensure a reliable supply of land. While private finance through VCMs offers a mechanism to close these gaps and accelerate progress in line with the Balanced Pathway, the Welsh Government must also formalise public funding commitments that respond to these implementation shortfalls.

The Wales Climate Adaptation Strategy seeks, among other priorities, to support resilient ecosystems and maintain and enhance biodiversity, with the aim of also delivering benefits for future generations. For example, it seeks to support climate-resilient forestry productivity by encouraging mixed woodland and species diversification, and to invest in Local Nature Partnerships that bring together organisations, businesses, and communities to take collective action to address local priorities (Welsh Government, 2024a: 23).

Meeting these goals will require addressing a substantial funding gap. The Finance Gap for UK Nature Report identified a shortfall of £5–7 billion in Wales over the next 10 years (Green Finance Institute, 2021). At the same time, the UN Environment Programme has highlighted nature-based solutions as vital to tackling both the climate and nature emergencies (UNEP and IUCN, 2021). In response, the Welsh Government is seeking to scale up delivery for nature recovery by increasing and diversifying sources of sustainable finance. This involves moving beyond reliance on public funding to create a new investment model tailored to Wales' specific needs and social, cultural, and environmental context. To this end, a new approach to sustainable investment is being developed, focused on nature-based solutions and ecosystem services (Welsh Government, 2024b).

In Wales, VCMs could offer a valuable source of finance to help meet climate targets and support nature-based solutions. Engagement with VCMs also aligns with the Well-being of

Future Generations Act by supporting wellbeing goals and ensuring a just transition to net zero in agriculture. However, potential risks, such as land rights issues in nature-based offset projects, make it essential to establish strong environmental, social, and governance safeguards.

Carbon and nature market mechanisms

Wales is part of the UK ETS Authority, established through the **Greenhouse Gas Emissions Trading Scheme Order 2020**, which replaced the UK's participation in the EU ETS. The UK ETS is a compliance 'cap and trade' scheme that applies to energy-intensive industries, the power generation sector and aviation. The Department for Energy Security and Net Zero (DESNZ) recently consulted on integrating nature-based and engineered greenhouse gas removals into the UK ETS (HM Government, 2024a). This proposal aligns with broader trends in the UK's carbon management policy deployment strategy, indicating a shift from government subsidies towards market mechanisms.

In line with these wider UK trends, Wales is currently seeking to scale carbon sequestration within its **Sustainable Farming Scheme**, which aims to balance sustainable food production with improvements in biodiversity, the environment and climate change. Recent consultations, including a review panel on carbon sequestration, have examined options related to on-farm carbon sequestration and the wider implications for achieving net zero in agriculture (Welsh Government, 2024b).

Beyond the UK ETS, Wales participates in VCM activity through the UK's **Woodland Carbon Code (WCC)** and **Peatland Code (PC)**, on whose boards the Welsh Government holds seats. These Codes provide certification standards for project development, monitoring, reporting and verification, and unit issuance, specifically for woodland creation and peatland restoration. They effectively constitute a VCM in the UK, verifying that projects have reduced or removed CO_2 emissions and generating carbon units that can be purchased and retired by companies operating under the UK Government's Environmental Reporting Guidelines (HM Government, 2019), as well as by companies that do not fall under these guidelines. Currently, these carbon units can only be used to offset UK based emissions.

Alongside carbon markets, there is a growing trend in the development of nature markets to fund and scale land-based mitigation activities. However, the development of nature markets has slowed across the UK, partly due to concerns over the reliability of claimed emissions reductions from 'avoidance' projects (such as avoided deforestation) in international carbon markets – including concerns about the additionality of these projects and their risk of reversal – which has led to the UK to regard such projects as too high-risk (Scottish Government, 2024a).

To mitigate integrity risks in these markets and engagement with VCMs more broadly, the UK Government published the *Principles for Voluntary Carbon and Nature Markets Integrity*

in November 2024 (HM Government, 2024b). These principles offer guidance for market participants on making claims. In April 2025, the UK government launched a consultation on proposed steps for implementing the six principles. These include:

- endorsing the ICVCM framework and VCMI standards to support supply and demand-side integrity;
- integrating carbon units into sustainability disclosure regulations, including voluntary guidance and potentially mandatory transition plans; and
- developing standards for claims and regulatory regimes, and legal definitions.

The consultation also notes that "ambition to support integrity and scale of these and other market-based measures is shared with the Devolved Governments, with which we continue to work closely to align policies where appropriate and build on successful initiatives" (HM Government, 2025: 9). Clearly, steps taken by the UK Government to develop and engage with VCMs, and nature markets will have consequences for market activity in Wales, especially where governance structures and infrastructure apply to Welsh entities and projects.

Relatedly, in late 2024, the Welsh Government consulted on Draft Sustainable Investment Principles for nature-based solutions and the ecosystem services they provide. These principles are intended to ensure that any funding is high-integrity, benefits and engages local communities, and avoids inappropriate land-use change and greenwashing (Welsh Government, 2025).

The CCC, in its recommendations for the UK's **Seventh Carbon Budget**, has advised against the UK relying on international cooperation to reach domestic carbon budgets, which are able to be achieved domestically (CCC, 2025b). In earlier advice concerning emissions sectors under significant Welsh Government control, the CCC noted that "progress towards future decarbonisation in Wales has been too slow", and that – among other recommendations – new models and incentives are needed to attract private investment for forestry (CCC, 2023: 39).

Overall, these regulations, policies and schemes underpin Wales' climate transition targets and provide a foundation for potential engagement with VCMs by the Welsh Government.

Country case studies

To offer reflections for the Welsh Government on effective policy options for engagement with VCMs, we analyse and draw lessons from policies, including regulations, schemes, and guidance, in **Australia, Finland, Portugal** and **Scotland**.

These case studies were selected by the Welsh Government following the presentation of a long list of potential case studies and an assessment of their relevance and comparability to Wales. The criteria used to ensure comparability of selected case studies with the Welsh context are: (i) comparable jurisdiction (based on factors such as population size, GDP and GHG emissions), (ii) the presence of existing compliance carbon markets, and (iii) a strong agricultural sector and potential for engagement in VCMs in the AFOLU sector.

Additional criteria used to assess whether these cases can offer best practices in VCM engagement include evidence of general active engagement with VCMs by public authorities (including policies currently under development), and the availability of data, such as policy documentation, academic literature, and access to expert contacts within the research team's network.

Our analysis is conducted at a jurisdictional level, rather than at an instrument level. More specifically, for each selected government, we examine the full range of regulations, policies, strategies and schemes informing their approaches to VCMs. A jurisdictional lens is important, as government engagement with VCMs is best understood by considering the full suite of relevant policy instruments and any interactions between them.

Detailed findings for each case study are presented in **Annex 1**, structured around research questions 1a–1g. These tables also indicate gaps in the evidence base, where no data could be found for a given sub-question.

Australia

Australia's carbon markets are well developed, comprising both compliance and voluntary schemes that have been in place for over a decade. Australia's VCM framework is primarily underpinned by the Carbon Credits (Carbon Farming Initiative) Act 2011 (CFI Act) (Carbon Market Institute, 2024). This legislative framework establishes the rules for generating Australian Carbon Credit Units (ACCUs) through eligible project methodologies that reduce or remove greenhouse gas emissions, as outlined in Table 1. The Clean Energy Regulator (CER) administers the scheme, providing monitoring, reporting and verification, and registry services.

Under the ACCU Scheme, projects that reduce or sequester emissions using eligible methodologies earn ACCUs, which can then be traded on the voluntary market. Prior to reforms in December 2024, these ACCUs could be purchased by the Federal Government through reverse auctions under the Emissions Reduction Fund. This purchasing function has since been scaled down from sole purchasing by the Australian Government, to a hybrid approach where the government purchases ACCUs via the **Powering the Regions Fund**, alongside private purchasing by non-state actors. Within the ACCU Scheme, abatement efforts fall into three broad categories: emissions reduction; avoidance of emissions; and

carbon removal and sequestration. The vast majority of credits have been issued for biological removals, particularly under the 'vegetation management' category.

Table 1: List of ACCU methods

Agriculture	• Animal effluent management • Estimating sequestration of carbon in soil using default values • Estimation of soil organic carbon sequestration using measurement and models • Fertiliser use efficiency in irrigated cotton
Energy efficiency	• Facilities method • High efficiency commercial appliances • Industrial and commercial emissions reduction • Industrial equipment upgrades • Refrigeration and ventilation fans
Mining, oil and gas	• Carbon capture and storage • Oil and gas fugitives
Vegetation management	• Plantation forestry • Reforestation and afforestation • Savanna fire management • Tidal restoration of blue carbon ecosystems • Reforestation by environmental or mallee plantings FullCAM 2024

Source: Australian Government (2025)

Alongside the voluntary market, Australia also operates a compliance carbon market, the 'Safeguard Mechanism', which requires the largest industrial emitters to meet sectoral emissions reduction targets. There is integration between the Safeguard Mechanism and the ACCU scheme. Obligated industrial entities[1] can surrender a portion of their compliance obligations.

Table 2: Evolution of carbon markets in Australia

Foundational schemes	• **Carbon Farming Initiative Act 2011 (CFI)**: Established a framework for generating ACCUs through emissions reduction or sequestration projects

1 Facilities emitting more than 100,000t CO2 e per year from the following sectors are obligated: Mining, oil and gas production, manufacturing, transport, waste facilities and electricity generators are participants if emissions exceed a sectoral baseline.

	(e.g., reforestation, savannah burning and herd management). • **Carbon Pricing Mechanism (CPM) (2012 to 2014)**: A short-lived national carbon tax/ETS repealed in 2014 under the Abbot Coalition Government.
Emissions Reduction Fund (ERF) (2014 to 2023)	• The **ERF** was a voluntary scheme to replace the CPM. The Federal Government purchased ACCUs via reverse auctions to fund projects. Subsumed into the reformed ACCU scheme in 2023. • **Safeguard Mechanism** (established 2016): a key compliance mechanism targeting the largest industrial emitters who are required to meet specific abatement targets (emissions baselines decline by 4.9% per annum to 2030), through both onsite abatement and the purchase of ACCUs.

Improvements to domestic schemes

The Independent Review of Australian Carbon Credit Units, known as 'the Chubb Review' (2022), was a major evaluation of the governance and operational elements of the ACCU Scheme and its predecessor, the CFI. The Review found the scheme to be 'fundamentally well-designed when introduced' but noted the need for improvements after over a decade of operation (p. III).

The Chubb Review made 16 recommendations, all of which were accepted by the Australian Government. These focused on clarifying governance, improving transparency, facilitating positive project outcomes, putting in place guardrails to protect scheme integrity, and broadening inclusion and distribution of benefits (particularly for rural, remote, and First Nation communities). A subsequent review by the Climate Change Authority (CCA) in 2023 largely endorsed these findings (CCA, 2023).

In response, the Australian Government has committed to implementing a series of reforms to strengthen the integrity of the ACCU Scheme. A budget allocation of AUD $66.1 million (£31.5 million) over five years (2023–2028) has been allocated for this purpose. Key actions to date include: reforming the Safeguard Mechanism to increase transparency and method integrity; publishing carbon estimation area data via the Clean Energy Regulator; revoking the avoided deforestation method due to evidence of systemic over-crediting (e.g. Merzian et al., 2021); and allowing a proponent-led process for new method development, whereby project developers can propose new methodologies.

Supply side integrity

Section 133 of the CFI Act established Offset Integrity Standards, assessed by the Emissions Reduction Assurance Committee, to ensure high-integrity credit supply. These standards require abatement to be additional, measurable and verifiable, eligible to meet Australia's Paris Agreement targets, and that methods are evidence-based and conservative in measurement.

However, the Chubb Review found that the complexity of these standards had led to inconsistent interpretation and verification at the project level. It recommended greater clarity through the introduction of supplementary ACCU Scheme Principles (Recommendation 6). In response, the government proposed six guiding principles: integrity, transparency, equitable access, participation and benefit-sharing, practicality, environmental and regional sustainability, and respect for First Nations (DCCEEW, 2023). These draw on the ICVCM's Core Carbon Principles (CCP) and will inform, but not replace, the legislated integrity standards. The final version is yet to be published.

Demand side integrity

Climate Active is a voluntary Australian Government certification programme that allows organisations to measure, reduce and then offset their carbon emissions to achieve carbon neutrality. It plays a key role in driving demand for carbon credits in Australia. To receive accreditation, businesses must follow the mitigation hierarchy before offsetting 'remaining emissions' using both international and ACCU credits. To receive accreditation under the scheme, all participants from mid-2023 must purchase at least 20% ACCUs to achieve 'carbon neutrality' under the scheme (Climate Active, 2024).

Climate Active aims to improve integrity by requiring that eligible units[2] meet best practice offset integrity principles[3] (additional, permanent, measurable, transparent and address carbon leakage), are independently audited and officially registered, to ensure abatement is robust and genuine.

Scaling nature-based solutions

In its Climate Change Statement, the Australian Government sets a goal to 'expand options for carbon sequestration, including nature-based and engineered, to balance residual emissions' (DCCEEW, 2024). While Australia's ACCU Scheme has long supported both

2 Businesses can use Australian Carbon Credit Units (ACCUs), most Certified Emissions Reductions (CERs), Removal Units (RMUs), most verified Emissions Reductions (VERs) and Verified Carbon Units (VCUs). All units must have a vintage year later than 2012.

3 Including the Australian Standard (AS) ISO 14064 series, ISO 14040 series, ISO 14065:2013 – Greenhouse gases and GHG Protocol standards.

avoidance projects (e.g., methane capture, deforestation prevention) and removal projects (e.g., reforestation, soil carbon sequestration), the 2024 Statement signals a clear shift in emphasis: carbon removals will be prioritised to align with Australia's net zero objectives.

This shift in approach is reflected in the repeal of avoidance-based methods within the ACCU Scheme, which faced criticism for over-crediting and delivering limited climate benefits. Among land sector methods, the 2015 **Avoided Clearing of Native Regrowth Methodology** was repealed in April 2025, and the **Avoided Deforestation Methodology** was repealed in May 2023.

The CCA acknowledges that land managers face trade-offs when deciding whether to sell units representing carbon abatement on their land or to retain these units for their own use (CCA, 2024). It recommends that landholders receive impartial advice from agronomists, business and legal advisors on the risks and benefits of engaging with carbon markets, including through retention of carbon for insetting, ACCU Scheme supply, or alternative project development through private standards.

The Australian Government recently established a '**Nature Repair Market**' which is an initiative to create a voluntary market for biodiversity credits. Enacted through the **Nature Repair Market Act** passed in 2023, the framework enables the issuance and trading of biodiversity certificates. The legislation aims to encourage private investment in environmental restoration while supporting climate and biodiversity goals.

Under this framework, landholders can earn biodiversity certificates for activities such as habitat restoration, species protection and invasive species control. These certificates can be sold to businesses, governments or individuals seeking to offset their environmental impact. Importantly, the market is designed to operate alongside the ACCU Scheme, enabling integrated projects that deliver both carbon and biodiversity benefits.

Interactions between markets

There are established linkages between the ACCU Scheme and the Safeguard Mechanism. Emitters can use ACCUs to offset emissions, but recent reforms cap this usage at 30% of an emitter's baseline emissions per financial year to avoid over-reliance and incentivise direct emissions reductions. Emitters exceeding this limit must provide a justification to the CER for not achieving further onsite abatement (DCCEEW, 2025).

To date, there are no interactions between Australia's domestic VCM scheme and international carbon markets. ACCUs are not authorised for export under Article 6, and Australia does not accept international units under the Safeguard Mechanism, nor has it entered any agreements to export or receive ITMOs (CCA, 2023). However, Australia's NDC leaves open the possibility of using international units under Article 6. In this context, the CCA (2022) has recommended the development of a National Carbon Market Strategy to

clarify the role of domestic and international units and identify the circumstances in which ACCUs may be authorised for export.

There are also recommendations for the Government to issue guidance on the use of offshore mitigation in reaching NDCs (e.g. Carbon Market Institute, 2024). As part of the 2026–27 review of the reformed Safeguard Mechanism, the Australian Government has indicated that it will determine a policy position on the use of international units for compliance purposes (DCCEEW, 2024).

Finland

Finland recognises the importance of high-integrity carbon units to avoid greenwashing practices and prevent mitigation deterrence. Government-funded research and stakeholder engagement outcomes suggest a growing role for VCMs in closing the implementation and finance gaps in nature-based solutions and technological removals. Finnish businesses and operators have expressed a desire, through consultations, to scale up the production of and demand for domestic carbon units (Ahonen et al., 2024).

The rules for VCM engagement are outlined in the Guide to Good Practices for Voluntary Carbon Markets (the 'Finnish Guide'), a policy document published by the Finnish Ministry of Agriculture and Forestry and the Ministry of the Environment (Laine et al., 2023). The Guide builds on the regional Nordic Code of Best Practice for Voluntary Compensation of Greenhouse Gas Emissions developed by the Nordic Dialogue on Voluntary Compensation (Nordic Council of Ministers, 2022).

To ensure alignment with evolving market practices and Finland's national climate targets, the government has proactively funded research to inform the evolution of VCM policy. Four major studies – Regulation of Voluntary Emission Compensation *(2021),* Voluntary Carbon Markets in the Land Use Sector *(2023),* Carbon Dioxide Use and Removal *(2023), and* Role of Voluntary Climate Action and the Effects of the Changing International Framework for Finland (2025) – have shaped national guidance and identified policy options (Kujanpää et al., 2023; Laine et al., 2021, 2025; Laturi et al., 2023).[4]

Finland's engagement with VCMs intersects with its membership within the EU ETS, a cap-and-trade compliance market, and broader EU regulatory frameworks. Finnish policies on VCMs typically align with EU regulatory frameworks and with selected international best practices.

Supply side integrity

4 Primarily through the Government's Plan for Analysis, Assessment and Research.

Finnish VCM guidance on minimum integrity criteria for the generation and use of carbon units seeks to prevent potential greenwashing and climate-washing practices, and to provide clarity to market participants in navigating a carbon standard ecosystem that currently lacks interoperability (Ahonen et al., 2024). Small and Medium Enterprises (SMEs) are particularly affected by inconsistencies among the growing number of private and public carbon standards (ibid).[5] Finnish businesses have called for clearer methodologies and protocols for monitoring, reporting and verification, especially in relation to technological removals, which are expected to be increasingly supported by VCMs.

The 2023 Finnish Guide outlines both supply- and demand-side integrity measures aimed at ensuring the credibility of the Finnish carbon market and supporting voluntary climate mitigation action through the production and use of carbon units. It draws on relevant EU legislation and international best practices, including those developed by states and under international treaties, international carbon crediting mechanisms, and voluntary standard setters. It suggests that for a mitigation activity to be high-integrity, it should: i) be additional, ii) apply robust baselines, iii) apply robust quantification methodologies, iv) apply monitoring and reporting, v) be permanent, vi) avoid carbon leakage, vii) be real, independently verified and certified, viii) prevent double counting, and ix) do no significant harm (Laine et al., 2023).

A 2025 study advising the Finnish Government on future VCM trajectories calls for further updates to this guidance (Laine et al., 2025). It highlights the limitations of applying international methodologies and certification frameworks – many of which are designed for developing country contexts – to Finland's domestic conditions. However, developing entirely new Finnish standards is seen as costly, time-consuming, and less feasible for smaller operators. Instead, the study recommends applying existing international criteria (as an added lens), supplemented with certified methodologies tailored to the Finnish context to ensure the quality and integrity of carbon units.

Among existing standards, the study highlights two that best ensure integrity in supply of carbon credits:

- **EU Carbon Removal Certification Framework (EU CRCF):** Adopted in 2024, this is the first EU-wide voluntary framework for the certification of carbon removals. It establishes QU.A.L.ITY criteria – Quantification, Additionality, Long-term storage, and Sustainability (QU.A.L.ITY) – as minimum criteria to ensure carbon removal integrity.

5 In the 2024 Finnish stakeholder event held by the Nordic Dialogue, Jussi Tamminen, founder and CEO of Maku Brewing, a small Finnish craft beer brewery explained that SMEs face significant challenges in navigating voluntary carbon markets as guidance/regulations are often designed for larger-scale entities. See report on: https://pub.norden.org/temanord2024-544/temanord2024-544.pdf

- **ICVCM CCPs**: These go further, including extra criteria related to governance, emissions impact, and sustainable development.

Furthermore, Laine et al. (2025) identify that additionality and permanence requirements under the CRCF are less stringent and more feasible to meet in the Finnish context. The study finds that only two types of mitigation activities in Finland currently meet ICVCM CCP requirements: reducing emissions from dairy cows and increasing the number of retained trees during final felling operations.[6] Due to their lower permanence requirements, the study recognises CRCF-certified carbon farming credits to represent more significant supply potential for VCMs. However, the demand for these types of temporary credits remains uncertain and depends, for instance, on regulations for which units can be used in compliance markets such as the EU ETS and regulations governing voluntary claims, such as the EU Corporate Sustainability Reporting Directive (CSRD) and the Green Claims Directive.

Demand side integrity

In addition to the standards recommended under the 2023 Finnish Guide, Laine et al. (2025) recommend adherence to the following frameworks to ensure high-integrity in the demand of carbon credits, including claims made after purchase: the EU Empowering Consumers for the Green Transition Directive, the EU Green Claims Directive, the International Organisation for Standardisation (ISO) 14068-1 carbon neutrality standard, and the Voluntary Carbon Market Integrity (VCMI) Claims Code of Practice.

To prevent mitigation deterrence, the Finnish Guide recommends that offsetting through carbon units should be additional to an organisation reducing its own value chain emissions. The 2025 study also cites the Oxford Offsetting Principles as best practice towards net zero aligned offsetting, suggesting that offsetting should be limited to counterbalance residual or hard-to-abate emissions with durable and high-integrity removals (Axelsson et al., 2024). In line with this, Finnish organisations may use VCMs for voluntary contribution and compensation purposes.[7]

Finland has adopted strict guidance on the use of carbon credits for compensation claims (Laine et al., 2021). Finnish organisations are advised not to make claims that they have

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6 Other mitigation activities that can fulfil the above certification requirements are included in the Climate Plan for Land Use Sector, some of which are supported by the Catch the Carbon program (see 'Scaling nature-based solutions'). However, the Kolkom project warns that many such measures cannot fulfil suitability requirements for voluntary carbon markets, as many of these measures might already be covered by other climate targets, which limits their potential to generate carbon credits or rendering it difficult to demonstrate any financial additionality from carbon markets.

7 The best combination of developments for achieving Finland's national climate targets would be an increase in net-zero targets for Finnish companies and climate support claims based on domestic units.

compensated for their emissions with carbon units, due to the ambiguity of such claims (Finnish Government, 2025). Instead, claims from using carbon units can be either: (i) offsetting claims, when purchased carbon units are used to counterbalance climate harm caused by the claimant; or (ii) national contribution claims, when purchased carbon units[8] contribute to national targets.

When used for offsetting purposes, purchased carbon units should not be counted towards tracking or accounting of any national climate targets. Units cannot be used for more than one type of claim.[9] These requirements aim to prevent double counting.

In line with guidance on Beyond Value Chain Mitigation (BVCM) from SBTi and the private crediting mechanism, Gold Standard, Ahonen et al. (2025) recommend increasing the use of contribution claims by organisations purchasing carbon units. Companies using carbon units for offsetting claims must align with the Finnish Competition and Consumer Authority guidelines on the presentation of environmental marketing. If, on the other hand, companies use carbon units for contribution purposes, they must ensure alignment with targets established under Finland's climate neutrality targets under its Climate Change Act.

Scaling nature-based solutions

The Finnish Government is considering the use of voluntary carbon units to mobilise private finance and scale nature-based solutions, particularly carbon sequestration projects. Land-based carbon sequestration, particularly the capture and utilisation of biomass carbon, is an important mitigation measure for Finland to reach carbon neutrality by 2035. However, these projects require substantial upfront investment and rely on private or blended finance to be scaled effectively.

To assess the feasibility of such an approach, the Finnish Government has funded knowledge research and pilot projects through its Catch the Carbon programme, coordinated by the Ministry of Agriculture and Forestry. This programme is intended to implement the Climate Plan for the Land Use Sector, which aims to contribute to Finland's carbon neutrality target. Topics analysed in this programme include soil carbon sequestration and storage and the impacts of ash fertilisation in peatland forests.[10]

The recently adopted EU CRCF Regulation is recognised as the most suitable framework to improve the quality of carbon removal credits linked to soil emission reductions exchanged in VCMs (Laine et al., 2025). For example, the Climate Plan for the Land Use Sector suggests

8 In this report, we consider carbon units are used only upon their retirement.

9 Both types of claims are distinct from ecological compensation, in which adverse anthropogenic impacts on biodiversity in one area are counterbalanced by improving biodiversity in another area, which is regulated under the Finnish Nature Conservation Act.

10 See, for example, the SuoHitu and the HiiletIn projects, respectively.

that regional authorities could finance the establishment or expansion of national parks by selling CRCF-certified units from carbon farming activities on VCMs, thus monetising both their climate and biodiversity benefits. These activities should be aligned with Finland's obligations under the Convention on Biological Diversity, which seeks to ensure the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from biodiversity. Finland has also announced plans to develop a framework allowing companies to invest in voluntary biodiversity credits, modelled on principles from the carbon market system (Finnish Government, 2024a).

Finland also aims to use VCMs to scale nature-based solutions through investments from fuel distributors. The Finnish Government has proposed an amendment to the Act for the Promotion of the Use of Renewable Fuels in Transport to introduce a flexibility mechanism, so that fuel distributors can fulfil their obligations to increase the share of renewable energy in their operations, by purchasing emission reduction credits (Finnish Government, 2024b). Under the current proposal, these units would be derived from activities in effort-sharing sectors not covered by the EU ETS, including domestic transport, buildings, agriculture, small industry, and waste management. However, there are plans to adopt a separate decree that will specify rules extending this flexibility mechanism to the land-use sector as well, allowing fossil fuel distributors to fund domestic carbon financing mitigation through VCMs.

Financing durable removals

Finland also aims to increase investments in carbon removals through VCMs, with higher levels of durability through VCMs, such as land-based and technological removals with a low risk of reversal. Finland is one of Europe's leading producers of biochar, a key carbon removal method in international VCMs. This positions Finland well to expand both biochar exports and the associated certified removal units.

Despite this potential, a government-funded study concluded that neither the EU ETS nor voluntary markets currently offer sufficient financial incentives to scale carbon capture and storage or other carbon dioxide removal technologies (Kujanpää et al., 2023). As a result, Finland is increasingly looking to Article 6 as the most credible market for the generation and trading of removal units. Both Norway and Sweden are already engaging with Article 6 mechanisms, and Finnish businesses and operators have expressed strong interest in following suit (Laine et al., 2023).[11]

However, due to the early-stage development of many removal technologies and their related crediting methodologies, Finnish stakeholders lack clarity on the best quality criteria

11 See Climate Leadership Coalition (2025).

to ensure the integrity of removal units that they purchase (Ahonen et al., 2024). They view the strengthening of public private partnerships as crucial to scaling these removals.

Portugal

Portugal created a domestic VCM, *Mercado Voluntario de Carbono* (MVC) in early 2024 through Decree Law No. 04/2024. This policy supports Portugal's transition to a low-carbon society under the Roadmap for Carbon Neutrality 2050 (Republic of Portugal, 2019) and the National Energy and Climate Plan 2030, while reinforcing the SDGs. It aims to align with EU and international carbon unit criteria in preparation for potential future engagement with international carbon markets, including mechanisms under VCMs and Article 6. However, the MVC operates separately from the EU ETS, of which Portugal is a member. Carbon units generated under the MVC must be used domestically for voluntary climate action only – they are not allowed to be exported or used for compliance purposes, such as to comply with the EU ETS, the Carbon Offsetting and Reduction Scheme in International Aviation (CORSIA) or to contribute to other countries' NDC goals through engagement in Article 6.2. Portugal has stated that it does not intend to use international carbon units to meet its 2050 climate neutrality target (Republic of Portugal, 2019).

By establishing a more regulated VCM, the Portuguese Government introduced rules aimed at increasing the volume of carbon unit transactions within the country, while complementing and operationalising its land sector policies. Initially, the MVC was created as an additional source of finance to scale up carbon removals, particularly in the forest and agriculture sectors. Its scope has since expanded to encompass emission reductions and blue carbon projects (Global Change and Sustainability Institute, 2024). It prioritises projects that regenerate vulnerable areas and enhance biodiversity in areas vulnerable to or affected by the climate crisis, creating an important demand pull. Given Portugal's exposure to climate-induced natural disasters, particularly wildfires, carbon projects in the country are exposed to high reversal risks. The MVC is designed to address these risks, including through the use of buffer pools and insurance policies.

To ensure integrity in the production, trading and use of carbon units, the MVC includes public methodologies, monitoring, reporting and verification protocols, and a publicly accessible registry. Methodologies and protocols from private entities are approved after undergoing a rigorous approval process from designated authorities, which include government representatives. Carbon units generated under the MVC can be purchased by entities domiciled in Portugal and used for either voluntary compensation or contribution purposes.

Since the MVC is relatively new, there is limited evidence so far on the results from its implementation. However, it has attracted significant interest from domestic stakeholders. By the end of 2024, 108 proposals for carbon projects had been submitted to the Agency for

Energy, with an overwhelming majority expressing interest on developing carbon removal rather than reduction projects (Republic of Portugal, 2024). Information on the scheme is clearly and transparently presented on a publicly available website.[12]

Operationalising the domestic voluntary carbon market

The MVC has been operationalised through a series of legal orders establishing its governance framework, trading infrastructure, and quality criteria for mitigation activities.[13]

The MVC is overseen by the Portuguese Environmental Agency, which also monitors developments under Article 6. This dual responsibility reflects Portugal's intention to expand the MVC under international frameworks in the future. The Agency for Energy is responsible for managing carbon projects and maintaining the credit registration platform, which functions as a public registry, providing information on carbon projects, credits issued, market participants, transactions, and the status of carbon units. A technical monitoring committee develops new carbon project methodologies that define minimum criteria for the quantification and quality of carbon units. If other entities, public or private, develop their own methodologies, these must be submitted for approval first through a public consultation and then to the Portuguese Environmental Agency. The membership of the technical monitoring committee varies depending on the technical needs associated with the development of methodologies, as outlined in Decree Law No. 04/2024.

Portugal's emphasis on creating public governance mechanisms – including a publicly available registry and public consultations – instead of relying on existing private programmes to provide these services (for example, the standards maintained by Verra or Gold Standard) demonstrates a preference for direct oversight to ensure transparency and integrity throughout the carbon unit value chain.

Supply and demand side integrity

Units generated within the MVC may only be generated and used within Portugal. They cannot be used for compliance purposes, such as under the EU ETS or the CORSIA. Furthermore, they may not be exported for voluntary use by international entities or used to contribute towards other countries' NDC targets, for instance as ITMOs under the Article 6 framework (see Box 1). In addition, to prevent double counting, units traded under the MVC

12 Available at: https://mvcarbono.pt/eng/faq/

13 Among these: Order No. 3771/2024 creates the technical monitoring committee; Order No. 13808/2024 appoints the representatives on the committee; Order No. 239/2024/01 establishes fees to participate in the registration platform; Order No. 240/2024 defines the qualification criteria for exercising the activity of an independent verifier of GHG mitigation projects and identifies the managing entity of the qualification system; Order No. 241/2024/01 establishes the general requirements for the electronic registration platform of the VCM.

are excluded from Portugal's national GHG accounting or other international commitments. Purchased units may only be used for voluntary compensation or contribution purposes.

Although units generated in the MVC are not allowed to be traded or transferred outside of Portugal, approved methodologies are required to align their quality standards and accounting measures with international standards (e.g. ICVCM CCPs or the Verified Carbon Standard). For carbon removal projects, approved methodologies are also required to meet the QU.A.L.ITY criteria under the EU CRCF Regulation (European Parliament, 2024).

The MVC places particular importance on permanence and addressing the potential risk of reversal from low durability projects. To manage this, the MVC requires the following measures:

- Projects must update risk assessments if a reversal occurs;
- Projects must acquire insurance to replace units sold in cases of unintentional reversal, as determined by relevant members of the government;
- In cases of intentional reversal, projects must cancel twice the amount of units issued.
- All projects must contribute units to a guarantee fund, which acts as a buffer to cover unintentional reversals. Implementation of the guarantee fund varies geographically: for projects that generate verified or future carbon units, 20% of these units must be stored in the guarantee pool; for projects in vulnerable territories, such as those most at risk of fire, the requirement is only 10%. Vulnerable territories are generally located in rural areas and are listed in the National Plan for Integrated Rural Management.

However, the introduction of this guarantee mechanism risks decreasing the liquidity of the market. To address this potential loss of liquidity, the MVC allows producers to sell Future Carbon Credits. These are credits that are generated before the actual reduction of GHG emissions of carbon sequestration by the project, but they are capped at no more than 20% of the total expected carbon units over the project's lifecycle.

To further ensure integrity of carbon unit generation, the MVC outlines specific criteria for the approval of methodologies. These are based on International Panel on Climate Change guidelines and the good practice guidelines used to develop Portugal's national GHG inventory. Existing methodologies, whether created by public or private crediting mechanisms, must be approved by designated national committees and undergo public consultation processes, to ensure that they align with the principles underpinning the national MVC. As of early May 2025, only one methodology was under public consultation, and none had been approved (Ministry of Environment and Energy, 2025).

This concern with durability also reflects buyers' preferences. Domestic stakeholders understand that offsetting through VCMs should be a last resort, used only after a corporation has reduced in-house emissions as much as possible (Global Change and Sustainability Institute, 2024). Buyers especially value the integrity in the operations of the MVC because they aim to meet the requirements of corporate standard setters, such as the SBTi (ibid).

Scaling nature-based solutions

The MVC has prioritised nature-based solutions, especially forest and agricultural activities. This is evident from the fact that the first methodology created under the technical monitoring committee focused on afforestation. Most of the projects currently proposed under the MVC are also aimed at carbon sequestration. Technological removals are not currently part of the MVC.

The MVC gives specific priority to increasing carbon sequestration potential in vulnerable areas, contributing to the conservation of natural capital and the creation of more resilient landscapes, including reduced vulnerability to fires, as identified in land-based policies.[14] Burnt forest areas may also be considered a priority under this market. Units from mitigation activities developed in these priority areas are exempt from some fees required of other MVC projects, such as the project registration fee. Although these projects contribute only 10% of the units issued to the guarantee fund (compared to 20% for other projects), at the end of their lifecycle – and in the absence of risk of reversal – project developers can claim the return of up to 40% of the units that have been forwarded to the buffer account.

These types of projects are particularly important in Portugal due to the country's exposure to wildfires. However, as well as permanence concerns, carbon projects in vulnerable areas might not meet standards of additionality – for example, forests that are under natural regeneration schemes following natural disasters. To overcome this potential barrier to investment in vulnerable territories, the MVC encourages these projects to demonstrate co-benefits, such as the promotion of biodiversity and natural capital. To support this, Decree No. 04/2024 introduced a new type of unit called Carbon Plus Credits. These units incorporate significant additional benefits in terms of biodiversity and natural capital, as well as carbon sequestration, and can be issued if the respective methodology includes a method to calculate and monitor that benefit. Due to their added value, Carbon Plus Credits are typically sold at a premium.

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14 These vulnerable territories are identified under Ordinance No.301/2020,33 and are typically those covered under Landscape Reorganization and Management Plans (PRGP) or Integrated Landscape Management Areas (AIGP), established under the terms of the Council of Ministers Resolution No. 49/202034 as well as areas that are part of Forest Intervention Zones (ZIF), Baldios, Natura 2000 Network and National Network of Protected Areas.

Scotland

Scotland has prioritised natural capital markets as a central part of its climate strategy, particularly focusing on peatland restoration, reforestation, and afforestation. The Scottish Government considers VCMs essential for financing and scaling land-sector removals to meet its net zero emissions target by 2045, provided that investment aligns with the Natural Capital Market Framework (Scottish Government, 2024a). The *Updated Climate Change Plan* commits to achieving net zero solely through efforts made in Scotland, without relying on the purchase of international offsetting credits (Scottish Government, 2020; Scottish Land Commission, 2022a).

Woodland Carbon Code and Peatland Code

Within the context of VCMs, the Woodland Carbon Code (WCC) and Peatland Code (PC) are carbon markets operating across the UK, with substantial activity occurring within Scotland. As with Wales, engagement with VCMs is an important policy tool for Scotland to fulfil afforestation and peatland restoration goals. The WCC and PC have been operational for 13 and 7 years respectively and constitute a fully domestic (government-backed) VCM. Unlike compliance carbon markets governed by international climate agreements, these Codes function outside formal regulation and are not used explicitly to meet national emissions targets – though carbon sequestration in woodland and peatland are captured within the UKs National Greenhouse Gas Inventory. The WCC and PC support government peatland restoration and woodland creation objectives as ancillary financing mechanisms and have been (and continue to be) developed, administered and governed, wholly or in part, by the Scottish Government.

The WCC and PC certify that carbon projects meet minimum requirements, particularly regarding the measurement and delivery of carbon benefits. These Codes enable projects to issue verified carbon credits representing one tonne of CO_2 or CO_2e removed or avoided. These units can then be sold to fund peatland restoration or woodland creation. Both Codes allow for the issuance of ex-ante credits, known as Pending Issuance Units (PIUs). These units are converted into ex-post units called Woodland Carbon Units (WCUs) or Peatland Carbon Units (PCUs), once verified by a third party.

The WCC and PC are widely regarded as high-integrity schemes, with units trading at a premium compared to other afforestation/reforestation or peatland restoration credits on international carbon markets (AlliedOffsets, 2025).

As of August 2024 (for PC) and July 2024 (for WCC):

- The PC covers 35,799 hectares in Scotland, projected to prevent 8.36 million tonnes of CO_2e.

- The WCC covers 67,523 hectares in Scotland, expected to sequester 21 million tonnes of CO_2.
- Around 1.4 million PC PIUs and 10.6 million WCC PIUs have been issued (Scottish Government, 2024a).

The Scottish Government has indicated that it will work to more closely integrate public and private financing in the development of these codes. This includes coordination between the WCC, PC and public financing streams (Scottish Government, 2020). This is reflected in part through the establishment of the **UK Land Carbon Registry** where project and credit data from the PC and WCC are hosted.

The WCC is administered by Scottish Forestry on behalf of the Forestry Commission, Welsh Government and Northern Ireland Forest Service. Governance includes these agencies and an advisory board comprising experts from academia, NGOs, and carbon market participants. Project validation and verification is conducted by bodies accredited by the UK Accreditation Service.

Though not legally mandated, the WCC is **recognised** by the UK government as the national voluntary standard for woodland-based carbon sequestration. The WCC operates in alignment with the UK Climate Change Act 2008 and Scotland's Climate Change (Emissions Reduction Targets) Act 2019 by supporting reforestation activities critical to achieving land sector decarbonisation. By financing carbon sequestration and storage, the WCC contributes to afforestation targets set out in Scotland's Forestry Strategy 2019–2029 (2019), the updated Climate Change Plan 2018–2032 (2020), and the legally binding target of net zero emissions by 2045.

The PC was developed by the International Union for Conservation of Nature UK Peatland Programme. It is endorsed by the UK Government and informed by a technical advisory body that includes representatives from environmental agencies across the UK administrations (including NatureScot), academia, NGOs, and industry. Like the WCC, the PC is a voluntary standard with no legal status but is officially supported by the Scottish Government and integrated into its wider climate strategy, including the Climate Change Plan (2020), which set an annual target to restore 20,000 hectares of peatland. Validation and verification are carried out by the Soil Association and Organic Farmers and Growers. The PC supports the delivery of the Scottish Government's £250 million Peatland ACTION programme and contributes to the objectives of the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 by delivering reductions and removals through the restoration of degraded peatlands.

The WCC and PC operate independently from the UK ETS. While they are not currently linked to compliance markets, there are ongoing policy debates within the UK Government

about potentially integrating carbon removals – from both nature-based and engineered sources – into the UK ETS (HM Government, 2024a). As domestic VCM schemes, the WCC and PC do not interact with international carbon markets such as PACM or CORSIA.

Supply and demand side integrity

To uphold integrity and promote ethical investment in natural capital markets, the Scottish Government has introduced the Principles for Responsible Investment in Natural Capital (PRINC) (Scottish Government, 2024b). These principles are voluntary but provide a comprehensive framework to ensure that natural capital investments support wider goals in economic development, biodiversity enhancement, climate adaptation, community benefit, and a just transition.

PRINC promotes ethical, values-led investment that aligns with Scottish and international policies (e.g. the UN Principles for Responsible Investment, Fair Work, and Land Rights & Responsibilities). Investors are encouraged to consider local land conditions, enhance natural capital, and address issues such as biodiversity and flood resilience. It recommends the use of verified frameworks such as the WCC and PC, and promotes inclusive practices such as community collaboration and avoiding unnecessary land acquisition. While non-binding, PRINC may inform future regulations or benefit-sharing requirements.

Complementing PRINC, the Natural Capital and Market Framework (Scottish Government, 2024a) outlines six principles for responsible investment: integrated land use, stakeholder engagement, community benefit, ethical conduct, high environmental integrity, and support for diverse land ownership. This framework is discussed further in the annex. These principles reflect Scotland's increasing policy emphasis on transparent and verifiable investment practices within VCMs and align with wider UK policy developments.

On the supply side, projects using the WCC must comply with relevant legislation and standards, such as the UK Forestry Standard and the Scottish Land Rights and Responsibilities Statement (Scottish Government, 2022). Both the WCC and PC apply financial and legal tests to safeguard credit integrity, including assessing the necessity of carbon finance and requiring permanence measures such as conservation covenants and risk buffers. Both codes may issue PIUs, which must be verified and retired before any carbon claim can be made. To prevent double counting, the UK Land Carbon Registry is the only registry that holds WCUs and PCUs.

On the demand side, the Voluntary Carbon Market Integrity (VCMI) Claims Code of Practice (VCMI, 2023) provides a high-integrity framework for carbon credit use, which UK companies are encouraged to follow (Scottish Government, 2024a). The Scottish Government, in collaboration with other UK administrations, is supporting a UK-wide consultation led by DESNZ to explore policy interventions that strengthen integrity in VCMs. This consultation may also address the potential endorsement of the VCMI Claims Code and additional

guidance on credit usage. Further supporting this is BSI Flex 701 (2025), which sets out principles around transparent purchasing, adherence to the mitigation hierarchy, accurate claims, and buyer integrity through disclosure.

Both the WCC and PC are seeking further recognition as high-integrity standards. The PC is pursuing ISO accreditation, ICROA approval, and compliance with ICVCM CCPs (2023). The WCC, which is already accredited by ISO and the International Carbon Reduction and Offset Alliance (ICROA), also plans to apply for ICVCM certification.

Nature-based solutions and community inclusion

Despite the high integrity and price premium for WCC and PC units that can be observed relative to international VCMs, Scotland's Natural Capital Market Framework contends that investors still view VCMs as a risky investment. Given the inherent uncertainties and risks associated with investing in natural capital markets, the Natural Capital Market Framework outlines several emerging trends regarding the characteristics of investors in VCMs in Scotland:

- Values-driven investors: those who accept lower financial returns and higher risks in exchange for environmental or social impact;
- Philanthropists: wealthy individuals or charitable trusts that fund natural capital projects aligned with their values and objectives;
- Off-takers (buyers who pre-purchase units) and insetters: companies or land managers who directly fund projects to offset their own impact, either voluntarily or due to regulation;
- Diversified project investors: those who invest in projects with multiple revenue streams, such as nature credits, timber, meat or public grants; and
- Long-term, patient capital providers: often equity-based investors such as pension funds and insurers, with recent initiatives like the UK Government's 'Mansion House Compact'.

Feasibility and pilot studies are underway for a **Soil Carbon Code**, an **Agroforestry Carbon Code** and a **Saltmarsh Carbon Code**. In addition to new methods for commodifying carbon sequestration, there is also growing interest in developing 'nature carbon markets' that combine carbon sequestration with broader natural capital enhancement. The Scottish Government has outlined an intention to develop an ecosystem restoration code '…to ensure that companies… have the chance to invest in high-integrity ecosystem restoration and biodiversity initiatives… This code would ensure the high-integrity governance, measurement, reporting, and verification required to help channel responsible private

investment into projects that enhance the structure, function, and resilience of ecosystems' (Scottish Government, 2024a).

The Scottish Government is also supporting efforts to integrate biodiversity and community benefit indicators into the WCC and PC via a 'Community Inclusion Standard Best Practice Guide' (Nixseaman and Cook, 2025). This guide outlines steps and actions intended to guide how project developers engage with affected communities to work collaboratively with them in the design of the project and achieve positive social impacts. It also introduces the concept of unit 'tagging', where projects with measurable and therefore verifiable co-benefits can more easily command a market premium. Community Land Scotland is involved in the development of a Community Benefits Standard through the Nature Finance Certification Alliance, which focuses on community wealth building and a just transition to net zero (Nixseaman and Cook, 2025).

Reflections for Wales

The case studies presented – Australia, Finland, Portugal, and Scotland – illustrate diverse yet converging approaches to the governance, design and integration of VCMs in national climate and nature strategies. These variations in the approach and regulatory frameworks of VCMs present practical lessons and implications for Wales, especially in the context of its legal obligations under the Well-being of Future Generations (Wales) Act 2015, its Net Zero Wales commitments, and ongoing reforms in land-use and public financing. This section draws out lessons and suggests how the Welsh Government might engage with VCMs to meet its climate and nature targets, identifying relevant goals, design principles, and implementation criteria.

Goals for VCMs

This section outlines goals and targets that Wales could pursue through its engagement with VCMs. This list is not exhaustive but highlights key trends across the four case studies.

Financing nature-based solutions

Governments are increasingly engaging with VCMs to scale up and diversify finance streams for nature-based solutions, particularly carbon sequestration projects, placing emphasis on developing high integrity schemes using the best available science and guidance. The use of VCMs to finance nature-based solutions is typically integrated within or reflective of existing land-use policies.

- Australia has developed the domestic ACCU Scheme, which supports financing of nature-based solutions, with most issued credits linked to biological carbon removal projects, backed by demand from the Climate Active programme.
- Finland is currently piloting soil carbon sequestration and ash fertilisation in peatland forests as part of its Climate Plan for the Land Use Sector, indicating a role for VCMs as potential financing streams.
- Portugal incorporates VCMs into national land resilience policies by focusing on land-based removals and enhancing the carbon sequestration potential of vulnerable territories. Considering the longer lifecycles of removals, the market allows for the trade of credits that have not yet materialised to build stronger demand signals for such projects.
- Scotland has repeatedly indicated support for VCMs to finance nature-based removals, viewing the WCC, PC, and under-development carbon codes as an ancillary mechanism

to achieving government targets on peatland restoration and woodland creation. The Nature Investment Partnership pilot, led by NatureScot, exemplifies the potential for aligning public and private financing to overcome barriers to woodland creation.

Wales can engage with VCMs to attract additional finance for nature-based solutions and ecosystems services, aligning with its sustainable investment goals (Welsh Government, 2024). The history of the WCC and PC highlight opportunities to deliver on woodland creation and peatland restoration targets which benefit climate and nature. However, Welsh peatland and afforestation/woodland management targets are not yet being met, as highlighted in the CCC's Progress Report for Wales and reiterated in the latest guidance on the fourth carbon budget (CCC, 2023, 2025a). There is scope to move towards achieving these targets by explicitly regulating or endorsing the role of VCMs and recognising their ancillary role in achieving climate and nature goals, as Scotland has done. This might include developing government-sponsored carbon neutrality certification schemes, drawing on Australia's Climate Active programme as a model, or creating different types of credits to incentivise investment in land-based removals, such as in the case of Portugal. Importantly, any governance of VCMs in Wales should be integrated into overarching sectoral policies such as the Sustainable Farming Scheme.

It is crucial that all projects under a future VCM schemes demonstrate financial and regulatory additionality – meaning they would not proceed without incentive provided by VCMs and are not already regulated or funded by other national policies or carbon market schemes. In the Welsh context, this implies that any mitigation activities or elements that might be potentially funded by VCMs are not also covered under the UK ETS, WCC, or PC, or receiving grants under Welsh legislation and policies, such as the Woodland Creation Planning Scheme. VCMs should be used to increase ambition above existing mitigation efforts by prioritising activities that are unlikely to receive sufficient support through other channels (compared to what is needed to meet decarbonisation objectives).

Linking to biodiversity markets

Governments are increasingly seeking to introduce biodiversity benefits into, or to establish nature-based markets alongside, their VCM approaches. This has led to the creation of standalone nature markets or mechanisms designed to incentivise the development of emissions reduction and carbon removal projects that also deliver biodiversity enhancements.

- Australia has created the 'Nature Repair Market', which allows landowners to 'bundle' nature and carbon revenue by designing projects that meet the criteria of the Nature Repair Market (currently only the replanting native forest and woodland ecosystems method is available) and relevant ACCU Scheme methods.

- Finland has established biodiversity/ecological offsetting markets separately from its carbon markets.
- Portugal promotes carbon projects with biodiversity benefits by tagging a premium price to these credits.
- Scotland does not operate a standalone market for nature and biodiversity improvements, but the Natural Capital Market Framework and associated Principles for Responsible Investment in Natural Capital can provide a foundation upon which formal natural capital markets could be built.

Unlike the four case studies, the UK Government intends to issue integrity guidance that applies jointly across voluntary nature and carbon markets (HM Government, 2025). The implications from the development of this guidance will have significance for Wales, as this guidance is likely to influence the decisions of most UK stakeholders wishing to engage in domestic or international VCMs. In parallel, Wales has already taken inspiration from Scotland by seeking to create its own set of sustainable investment principles to support nature recovery (Welsh Government, 2025). To minimise future friction, we recommend that Wales, in its approach to VCMs:

- Analyses and, where appropriate, aligns with the policy processes shaping UK nature and carbon markets;
- Draws further lessons and experiences from Scotland's principles, frameworks, and any future measures, and explores the potential for alignment to reduce costs and uncertainty within and between domestic UK markets;
- Incorporates findings from its consultation on sustainable investment principles and draws on the lessons above to enable smooth and effective implementation of these and future measures.

Design of VCMs

This section explores overarching design choices for a future Welsh approach to VCMs, beyond its current involvement in the voluntary supply and demand of carbon units under the WCC and PC. The four cases analysed differ in their design of VCM approaches and the types of legal and policy instruments used to govern these markets.

- Australia has established a domestic VCM through the ACCU Scheme, which intersects with its compliance trading system, the Safeguard Mechanism. International trading and export of carbon units are restricted under the CFI Act and government policy.

- Finland has issued voluntary guidance for domestic companies to participate responsibly in international VCMs. However, stakeholders increasingly express greater confidence in purchasing domestic rather than international carbon units.

- Portugal has implemented a regulated domestic VCM through national legislation, restricting the supply and demand of carbon units to within its borders. This market does not intersect with compliance schemes, such as the EU ETS or CORSIA.

- Scotland maintains domestic-only markets through the WCC and PC. These codes are not linked to international markets, aligning with the Scottish Government's position that both domestic and international targets should be achieved through action within Scotland.

To varying degrees, all countries have taken steps to regulate domestic VCM operations and to limit or restrict the purchase of international credits to meet domestic climate targets. However, in most cases (except Portugal), landowners are free to establish projects under international private standards (e.g. Gold Standard or Verra) that operate separately from regulated domestic schemes.

Each design choice has consequent implications for corresponding adjustment measures. Countries that clearly separate domestic VCMs from compliance schemes and international markets, do not directly implement corresponding adjustment measures, as all reductions and removals from these schemes are accounted for within national GHG inventories. Among our case studies, Finland is the only country advising companies to use their carbon units for contribution to national targets, rather than for offsetting their own organisational emissions. This safeguards against double counting.

This is reflected in the UK context. The recent CCC's recommendation for the UK's 7th Carbon Budget confirms that the UK is fully capable of achieving its domestic climate targets without reliance on international carbon units (CCC, 2025b). In line with this, the UK Government's recent consultation on the integrity of its carbon and nature markets implies that it does not intend to apply corresponding adjustments for voluntary carbon units or support ITMOs for voluntary purposes (HM Government, 2025). Domestic voluntary schemes like the WCC and PC already operate without corresponding adjustments, as their carbon benefits are aggregated in the UK's national GHG inventory.

Given the trends in our case studies, and the UK's overarching approach, Wales should:

- Align with the CCC's recommendation by aiming to meet its climate targets with limited or no reliance on international carbon units, where feasible;

- Strengthen domestic supply and demand of voluntary carbon units by supporting the WCC and PC, and monitoring projects' alignment with national principles and guidance.

Additional bespoke schemes (for example, in sustainable agriculture) may be developed if national circumstances permit.

We recommend that the Welsh Government assess the range of options at its disposal in designing its approach to VCMs. Based on the four case studies above, these options include (i) designing guidance to inform Welsh non-state actors' engagement with international VCMs, or (ii) creating a Welsh domestic VCM. Either option can be voluntary or regulated, or a combination of the two. The selected approach should be customised to the Welsh context and mitigation financing needs, for example through the existing standards it draws on or integrates, and its requirements for monitoring, reporting and verification.

If the Welsh Government decides to create or engage with additional VCM schemes, we recommend the following actions, based on lessons from the case studies and current best practice for managing VCMs:

- Publicly consult on the best approaches for Wales to engage with VCMs, including the merits of issuing specific guidance for the supply or demand side, or regulations for market participants to ensure market integrity;
- Separate unit supply and claims made from trading under additional domestic VCM schemes from compliance schemes (such as the UK ETS);
- Control or limit the integration of additional domestic VCM schemes into international carbon markets, including whether Welsh units can be internationally traded and, if so, under which frameworks (e.g. Article 6) and for what purposes (e.g. contributing to national mitigation efforts or supporting another country's NDC targets);[15]
- Clearly specify the end uses of different types of markets (e.g. for compensation or contribution, for voluntary or compliance purposes) to avoid double-counting.

Operationalisation of VCMs

This section outlines key elements the Welsh Government should consider when operationalising future approaches to VCMs. While not exhaustive, these reflect prevailing trends across our four case studies and are consistent with Welsh Government priorities.

Integrity of units and claims

15 The linking of different types of carbon market schemes can present challenges if these schemes were to de-link in future. For an example beyond the scope of the case studies in this report, the experience of the New Zealand ETS linking and delinking from the Kyoto protocol's Clean Development Mechanism offers a cautionary example as to how increased unit supply affects market sentiment and behaviour (Kerr et al., 2021).

Governments aim to ensure integrity across the supply and demand sides of VCMs by specifying standards and regulations that market participants *should* or *must* adhere to in producing and claiming carbon units. Some governments endorse private standards, methodologies and guidance, while others create public ones.

On the supply side:

- Australia applied Offset Integrity Standards under the CFI Act and harmonises its ACCU Scheme with the ICVCM CCPs, except for SDG quantification and net zero alignment, which are treated as separate policy issues.
- Finland recommends voluntary alignment with international benchmarks such as the EU CRCF QU.A.L.ITY and ICVCM CCPs for measuring carbon units generated or purchased domestically or internationally.
- Portugal has developed public methodologies and criteria reflecting local conditions. These are created and approved through relevant public authorities and public consultations, with future alignment planned with the EU CRCF and other international standards. A key concern is managing risk of reversal in carbon projects, such as in forests vulnerable to wildfire.
- Scotland prescribes the use of WCC and PC for projects to demonstrate supply-side integrity. Both the WCC and PC are seeking greater market recognition as high-integrity standards, with the PC pursuing ISO accreditation, ICROA approval, and compliance with ICVCM CCPs. The WCC is already ISO and ICROA accredited and is applying for ICVCM certification.

On the demand side:

- Australia uses the government-sponsored Climate Active certification programme, which certifies business decarbonisation pathways. It requires participants to purchase at least 20% of their offsets from ACCUs and ensures any non-domestic credit purchases meet separate integrity standards.
- Finland recommends aligning claims requirements with EU-wide regulations (e.g. the Omnibus package and Consumer Protection Directives), as well as national regulations, including Finnish Competition and Consumer Authority guidelines.
- Portugal encourages the use of carbon units primarily to compensate for residual emissions.

- Scotland supports ongoing UK-wide consultation to explore policy interventions that strengthen integrity in voluntary markets, including potential endorsement of the VCMI Claims Code.

In the UK context, both the WCC and PC define supply-side quality standards. The UK Government is currently consulting on the use of ICVCM CCPs for supply-side quality criteria, and VCMI principles to ensure demand-side integrity (HM Government, 2025).

Based on the standards, principles and regulations endorsed or created across our four case studies and recent UK developments, Wales should:

- Assess the suitability of UK-approved standards (e.g. integrity standards for carbon unit supply and demand) through meaningful public consultation, including whether, and which parts of, these standards adequately assess unit quality from the types of projects Wales wishes to finance through VCMs.
- Where practical, align supply- and demand-side integrity standards with those endorsed and applied by the UK Government to reduce complexity and support market interoperability.
- Where needed, amend or develop new integrity standards or principles to reflect Welsh priorities while maintaining alignment with broader UK policies and schemes, and considering EU developments such as its sustainable investment principles.

Co-benefits

Approaches to environmental and social co-benefits vary across the four countries studied, though most to date have focused more on biodiversity than social equity.

- Finland does not address co-benefits within its VCM policies, instead creating a separate ecological offsetting market to enhance biodiversity.
- Portugal attaches a premium price and offers low transaction costs for voluntary carbon projects that contribute to biodiversity efforts or regenerate vulnerable territories.
- Australia recognises that co-benefits are delivered by land-based ACCU projects and their ability to attract market premia. However, there are no agreed mechanisms to identify co-benefits or share them with stakeholders beyond project proponents or landowners (Carbon Market Institute, 2024).
- Scotland has conducted considerable research and engagement on the distributional implications of natural capital markets and mechanisms for benefit sharing. Relevant efforts include the Scottish Land Commission's Good Practice Guidance (2023) on

Delivering Community Benefits from Land coupled with the protocol on Responsible Natural Capital and Carbon Management (Scottish Land Commission, 2022b).

Notably, none of the countries analysed have explicitly embedded just transition principles into their VCM policies, despite the importance of these principles in carbon markets (Ernest et al., 2024).

Wales is particularly well placed to take a lead in this area. The Well-Being of Future Generations (Wales) Act commits Wales to equality, resilience and global responsibility. Like Scotland, Wales is also seeking to embed considerations of equitable sharing of incomes across market participants in its Sustainable Investment Principles. Given similar challenges faced by rural communities and natural capital projects in Wales and Scotland, ensuring transparent and open consultation in addition to defined benefit-sharing mechanisms will be vital.

Reflecting lessons from the case studies, and given the similarity with the Scottish context, these commitments should be operationalised in Wales through:

- Public consultation on how to integrate co-benefits – both environmental (e.g. biodiversity enhancement) and social (e.g. equitable income-sharing) – into Wales's approach to VCMs;
- Analysis of the impact of VCM projects on sectoral targets, such as the AFOLU transition;
- Exploration of how just transition principles could be integrated into future VCM policy instruments, with the goal of ensuring that voluntary carbon projects also lead to job creation and support sustainable enterprises. This represents a key opportunity for Wales to take international leadership in an area where current international examples are limited.

Conclusion

This report has explored options for Welsh Government to consider engaging further with Voluntary Carbon Markets, in response to research questions reflecting the priorities of Welsh policymakers and the current context of climate and nature finance policymaking in Wales.

Our research analysed and drew lessons from four jurisdictions – Australia, Finland, Portugal and Scotland – regarding their policy engagement with VCMs. Each country has developed a distinct strategy shaped by national circumstances and respective economic, social, and environmental priorities.

We synthesised implications for Wales by drawing from good practices across the full set of countries, taking into account specific aspects of their VCM approaches that warrant particular attention or consideration for the Welsh context. We found that countries employ a varied range of approaches and policy instruments to regulate engagement with VCMs and ensure integrity across their supply chains. These include creating their own domestic VCMs and creating bespoke methodologies for carbon unit issuance (Portugal); developing tailored guidance for market actors to participate in the international VCMs (Finland); regulating the interaction between voluntary and compliance carbon markets (Australia); and developing principles to guide investment in nature and carbon projects (Scotland).

A recurring theme is the use of VCMs and nature markets to supplement domestic priorities to enhance terrestrial carbon sinks and deliver improvements to degraded ecosystems alongside a transition to more durable carbon removals rather than traditional reduction or avoidance projects. Although both international private standards and domestically developed standards alike have been identified to suffer from problems demonstrating additionality and permanence on the supply side, or integrity of claims on the demand side, countries have demonstrated an ability to review and respond to integrity challenges reflexively, so that VCMs can continue to provide ancillary funding for carbon sequestration and nature recovery. One example is Australia's revocation of 'avoidance' methods. Notably, all countries in the sample stress the importance of minimising reliance on international carbon units to meet their NDCs and ensuring that the use of VCMs supports – rather than replaces – deep domestic emissions reductions.

The policy context in Wales is increasingly conducive to meaningful engagement with VCMs. Commitments under the Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015 create a strong legislative foundation and justification for engaging with VCMs to unlock private finance, especially in support of lagging woodland creation and peatland restoration targets. To date, Wales has largely relied on UK-wide initiatives like the Woodland and Peatland Carbon Codes, without developing a tailored

national approach to VCMs. The merits of developing additional domestic VCMs are explored in the latter stages of this report. However, developments at the UK level – including the introduction of new integrity principles for carbon and nature markets – will shape the landscape in which Welsh actors operate. These changes offer a timely opportunity for Wales to define a clearer policy stance on VCMs, including their design, operationalisation and end use.

Lessons from the case studies suggest that Wales could benefit from adopting principles of ethical investment and community inclusion, as illustrated by Scotland's Natural Capital Market Framework and Finland's guidance on contribution-based claims. Portugal's regulated domestic market model offers a compelling example of public governance that fosters transparency and trust, while Australia's integration of demand-side certification illustrates how voluntary schemes can complement compliance mechanisms when carefully designed.

The report presents several recommendations for Wales, grouped according to the key themes observed across the four case studies. These are summarised in Table 3 below.

Table 3: Recommendations by theme in this report

Goals for VCMs	Future role of VCMs	• Publicly consult on the future role of VCMs in Wales, in alignment with relevant sectoral policies, and nature and climate financing needs and targets • Ensure that any future VCM projects provide financial and regulatory additionality beyond existing schemes and funding (including the UK ETS, WCC and PC)
Linking to biodiversity markets	• Analyse and consider aligning future VCM approaches with UK nature and carbon market policies • Draw on and incorporate lessons from experience in Scotland, UK consultation findings on carbon and nature markets, and Welsh Government's own consultation on nature investment to ensure smooth and effective implementation	
Design of VCMs	• Aim to meet climate targets with minimal reliance on international carbon units, and strengthen domestic VCM supply (by supporting WCC, PC, or developing new schemes) • Assess options for engaging with VCMs (e.g., creating guidance for engagement with international markets or creating a domestic scheme) • Regulate trading under additional schemes, separate domestic VCMs from compliance markets to prevent double-counting, and clearly define market end uses (compensation vs. contribution, voluntary vs. compliance).	

Operationalising VCMs	Public consultations and integrity of carbon units and claims	• Assess UK-approved integrity standards through public consultations and align with UK and EU government policy where appropriate • Amend or create new integrity standards ones to reflect Welsh priorities, where appropriate (e.g. if these are not addressed by UK and UK policies) while staying aligned with UK and EU policies.
Environmental and social co-benefits	• Hold public consultations and create meaningful social dialogue on integrating co-benefits (environmental and social) into VCMs • Integrate just transition principles into any engagement approach to VCMs	

Importantly, our recommendations for Wales are general and derive from subjective research into good engagement practices across selected case studies. Further research – for example, on the role of VCMs in helping Wales achieve its climate and nature targets – would support more detailed policy development aligned with the recommendations above. Future research should place emphasis on the different options regarding the specific role of VCMs in financing mitigation, taking into account Welsh climate and land use policy priorities, and in turn, the necessary design and operational elements to ensure integrity and alignment of future VCM approaches with their designated role.

References

Ahonen, H.-M., Berninger, K., Gründel, L., et al. (2024). **Building capacity for best practices in the voluntary carbon market: Insights from a series of Nordic capacity building events**. Nordic Council of Ministers. Retrieved from: **https://pub.norden.org/temanord2024-544/authors.html**

AlliedOffsets. (2025). **VCM Pricing & Activity**. Retrieved from: **https://alliedoffsets.com/pricing-activity/**

Australian Government. (2025). **ACCU Scheme methods**. Clean Energy Regulator. Retrieved from: **https://cer.gov.au/schemes/australian-carbon-credit-unit-scheme/accu-scheme-methods**

Axelsson, K., Wagner, A., Johnstone, I., et al. (2024). **Oxford principles for net zero aligned carbon offsetting (revised 2024).** Smith School of Enterprise and the Environment, University of Oxford. Retrieved from: **https://www.smithschool.ox.ac.uk/sites/default/files/2024-02/Oxford-Principles-for-Net-Zero-Aligned-Carbon-Offsetting-revised-2024.pdf**

Bhattacharya, A., Songwe, V., Soubeyran, E., et al. (2024). Raising ambition and accelerating delivery of climate finance. **Third report of the Independent High-Level Expert Group on Climate Finance. London School of Economics and Political Science**. Retrieved from: [Epub ahead of print]

BSI. (2025). **Nature markets – Overarching principles and framework – Specification March 2025 Version 2**. British Standards Institution. Retrieved from: **https://www.bsigroup.com/siteassets/pdf/en/insights-and-media/insights/brochures/uk-ks-strgy-strgc-nss-sus-other-mp-bsiflex701v2-0025-pdf.pdf**

Burke, J. & Schenuit, F. (2023). **Governing permanence of Carbon Dioxide Removal: A typology of policy measures**. CO2RE Hub. Retrieved from: **https://co2re.org/wp-content/uploads/2023/11/CO2RE_Report_CDR_Permanence-FINAL-v7.pdf**

Carbon Market Institute. (2024). **A National Carbon Market Strategy for Australia.** Carbon Market Institute. Retrieved from: **https://carbonmarketinstitute.org/app/uploads/2024/06/2024.06_FINAL_National-carbon-market-strategy_CMI-policy-brief.pdf**

CCA. (2022). **Review of International Offsets.** Retrieved from: **https://www.climatechangeauthority.gov.au/sites/default/files/documents/2024-09/2024SectorPathwaysReview.pdf**

CCA. (2023). **2023 Review of the Carbon Credits (Carbon Farming Initiative) Act 2011**. Retrieved from: **https://www.climatechangeauthority.gov.au/sites/default/files/documents/2023-12/2023%20Review%20of%20the%20Carbon%20Credits%20Act%202011%20-%20publication.pdf**

CCA. (2024). **Sector Pathways Review.** Retrieved from: **https://www.climatechangeauthority.gov.au/sites/default/files/documents/2024-09/2024SectorPathwaysReview.pdf**

CCC. (2023). **Progress report: Reducing emissions in Wales.** Retrieved from: **https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-Report-Reducing-emissions-in-Wales.pdf**

CCC. (2025a). **Wales' Fourth Carbon Budget Advice for the Welsh Government.** Retrieved from: **https://www.theccc.org.uk/wp-content/uploads/2025/05/Wales-Fourth-Carbon-Budget-advice.pdf**

CCC. (2025b). **The Seventh Carbon Budget: Advice for the UK Government.** Retrieved from: **https://www.theccc.org.uk/publication/the-seventh-carbon-budget/**

Chávez, L.T. (2024). **Carbon Offsetting's Casualties.** Human Rights Watch. Retrieved from: [Epub ahead of print]

Chubb, I., Bennett, A., Gorring, A., et al. (2022). **Independent Review of Australian Carbon Credit Units.** Department of Climate Change, Energy, the Environment and Water. Retrieved from: **https://www.dcceew.gov.au/sites/default/files/documents/independent-review-accu-final-report.pdf**

Climate Active. (2024). **Technical Guidance Manual.** Australian Government. Retrieved from: **https://www.climateactive.org.au/sites/default/files/2024-09/technical_guidance_manual_2024.pdf**

DCCEEW. (2023). **ACCU Review Discussion Paper.** Retrieved from: **https://storage.googleapis.com/files-au-climate/climate-au/p/prj270072e8cbe57c2824d8b/public_assets/ACCU%20Review%20Discussion%20Paper.pdf**

DCCEEW. (2024). **Annual Climate Change Statement 2024**. Retrieved from: **https://www.dcceew.gov.au/sites/default/files/documents/annual-climate-change-statement-2024.pdf**

DCCEEW. (2025). **Safeguard Mechanism overview.** Retrieved from: **https://www.dcceew.gov.au/climate-change/emissions-reporting/national-greenhouse-energy-reporting-scheme/safeguard-mechanism/overview#flexible-compliance-arrangements**

Ernst, E., Kumar Dhir, R. & Harsdorff, M. (2024). **Carbon markets and their implications for a just transition for all.** International Labour Organization. Retrieved from: **https://www.ilo.org/publications/carbon-markets-and-their-implications-just-transition-all**

European Parliament. (2024). **Regulation (EU) 2024/3012... establishing a Union certification framework for permanent carbon removals.** Retrieved from: **https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202403012**

Finnish Government. (2024a). **Framework created for voluntary biodiversity markets.** Ministry of the Environment. Retrieved from: **https://valtioneuvosto.fi/en/-/1410903/framework-created-for-voluntary-nature-values-market-cooperation-started-to-boost-their-development**

Finnish Government. (2024b**). Legislative proposal to moderate rise in distribution obligation levels. Ministry of Economic Affairs and Employment.** Retrieved from: **https://valtioneuvosto.fi/en/-/1410877/legislative-proposal-to-moderate-rise-in-distribution-obligation-levels-to-parliament**

Finnish Government. (2025). **Voluntary carbon offsetting.** Retrieved from: **https://ym.fi/voluntary-carbon-offsetting**

Global Change and Sustainability Institute. (2024). **Challenges and Functioning of the Voluntary Carbon Market in Portugal.** Retrieved from: **https://www.changeinstitute.pt/en/news/challenges-and-functioning-of-the-voluntary-carbon-market-in-portugal-discussed-on-world-environment-day**

Green Finance Institute. (2021). **Finance Gap for UK Nature Report.** Retrieved from: **https://hive.greenfinanceinstitute.com/gfihive/insight/finance-gap-for-uk-nature-report/**

Haya, B.K., Evans, S., Brown, L., et al. (2023). **Comprehensive review of carbon quantification by improved forest management offset protocols.** Frontiers in Forests and Global Change, 6.

HM Government. (2019). **Environmental Reporting Guidelines.** Retrieved from: **https://assets.publishing.service.gov.uk/media/67161e8696def6d27a4c9ab3/environmental-reporting-guidance-secr-march-2019.pdf**

HM Government. (2024a). **Integrating greenhouse gas removals in the UK ETS.** Department for Energy Security and Net Zero. Retrieved from: **https://www.gov.uk/government/consultations/integrating-greenhouse-gas-removals-in-the-uk-emissions-trading-scheme**

HM Government. (2024b). **Principles for voluntary carbon and nature market integrity.** Department for Energy Security and Net Zero. Retrieved from: **https://www.gov.uk/government/publications/voluntary-carbon-and-nature-market-integrity-uk-government-principles/principles-for-voluntary-carbon-and-nature-market-integrity**

HM Government. (2025). **Voluntary carbon and nature markets: Raising integrity.** Department for Energy Security and Net Zero. Retrieved from: **https://www.gov.uk/government/consultations/voluntary-carbon-and-nature-markets-raising-integrity/voluntary-carbon-and-nature-markets-raising-integrity-consultation-document-accessible-webpage**

ICVCM. (2023). **Core Carbon Principles, Assessment Framework and Assessment Procedure.** The Integrity Council for the Voluntary Carbon Market. Retrieved from: **https://icvcm.org/the-core-carbon-principles/**

IPCC. (2022). **Climate Change 2022: Mitigation of Climate Change.** Cambridge University Press. Retrieved from: **https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf**

Kerr, S., Ormsby, J. & White, D. (2021). **Delinking the New Zealand Emissions Trading Scheme from the Kyoto Protocol: Comparing theory with practice.** *Climate Policy*, 21(6), 792–803.

Kujanpää, L., Reznichenko, A., Saastamoinen, H., et al. (2023) **Carbon dioxide use and removal: Prospects and policies.** Helsinki: Finnish Government. Retrieved from: **https://julkaisut.valtioneuvosto.fi/handle/10024/164795**

Laine, A., Airaksinen, J., Yliheljo, E., et al. (2021). **Regulation of voluntary carbon offsets.** Finnish Government. Retrieved from: **https://julkaisut.valtioneuvosto.fi/handle/10024/163347**

Laine, A., Ahonen, H.-M., Pakkala, A., et al. (2023). **Guide to good practices for voluntary carbon markets.** Finnish Government. Retrieved from: **https://julkaisut.valtioneuvosto.fi/handle/10024/164732**

Laine, A., Ahonen, H.-M., Pakkala, A., et al. (2025). **Vapaaehtoisten ilmastotoimien rooli...** Finnish Government. Retrieved from: **https://julkaisut.valtioneuvosto.fi/handle/10024/165825**

Laturi, J., Aalto, L., Forsman-Hugg, S., et al. (2023). **Voluntary carbon markets in the land use sector development, demand and measures in Finland.** Palervo Economic Research. Retrieved from: **https://www.ptt.fi/wp-content/uploads/2023/05/PTTrap285.pdf**

Macquarie, R. (2023). **The voluntary carbon market and sustainable development.** Grantham Research Institute, LSE. Retrieved from: **https://www.lse.ac.uk/granthaminstitute/publication/the-voluntary-carbon-market-and-sustainable-development/**

Merzian, R., Hemming, P. & Schoo, A. (2021). **Questionable Integrity: Non-additionality in the Emissions Reduction Fund's Avoided Deforestation Method.** Australia Institute and ACF. Retrieved from: **https://australiainstitute.org.au/wp-content/uploads/2021/09/ACF-Aust-Institute_integrity-avoided_deforestation_report_FINAL_WEB.pdf**

Ministry of Environment and Energy. (2025). **Carbon methodology for new afforestation developed by the Technical Committee for Monitoring the Voluntary Carbon Market.** Mercado Voluntário de Carbono. Retrieved from: **https://participa.pt/pt/consulta/metodologia-de-carbono-sobre-novas-florestacoes-mercado-voluntario-de-carbono**

Nixseaman, R. & Cook, A. (2025). **Best Practice Guide: Community Inclusion for Community Benefit.** Deciding Matters.

Nordic Council of Ministers. (2022). **Draft Nordic Code of Best Practice for Voluntary Compensation of Greenhouse Gas Emissions.** Retrieved from: **https://nordicdialogue.com/wp-content/uploads/2022/07/Nordic_Dialogue_Code_draft_for_consultation.pdf**

Probst, B.S., Toetzke, M., Kontoleon, A., et al. (2024). **Systematic assessment of the achieved emission reductions of carbon crediting projects.** *Nature Communications*, 15(1), 9562.

Republic of Portugal. (2019). **Roadmap for Carbon Neutrality 2050 (RNC2050): Long-term Strategy for Carbon Neutrality of the Portuguese Economy by 2050.** Republic of Portugal. Retrieved from:

https://unfccc.int/sites/default/files/resource/RNC2050_EN_PT%20Long%20Term%20Strategy.pdf

Republic of Portugal. (2024). **Análise às manifestações de interesse.** Agência para o Clima. Retrieved from: https://mvcarbono.pt/wp-content/uploads/AnaliseManifestacoesInteresse.pdf

Scottish Government. (2019). **Scotland's Forestry Strategy 2019–2029.** Retrieved from: https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/

Scottish Government. (2020). **Update to the Climate Change Plan 2018–2032: Securing a Green Recovery on a Path to Net Zero.** Retrieved from: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/12/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/documents/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/govscot%3Adocument/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero.pdf

Scottish Government. (2022). **Scottish Land Rights and Responsibilities Statement 2022**. Retrieved from: https://www.gov.scot/publications/interim-principles-for-responsible-investment-in-natural-capital/

Scottish Government. (2024a). **Natural Capital Market Framework.** Retrieved from: https://www.gov.scot/publications/natural-capital-market-framework/pages/3/

Scottish Government. (2024b). **Principles for Responsible Investment in Natural Capital.** Retrieved from: https://www.gov.scot/publications/interim-principles-for-responsible-investment-in-natural-capital/

Scottish Land Commission. (2022a). **Natural Capital and Land: Recommendations for more equitable policies.** Retrieved from: https://www.landcommission.gov.scot/downloads/62baa9e7e982e_Natural%20Capital%20and%20Land%20Recommendations%20Report.pdf

Scottish Land Commission. (2022b). **Responsible Natural Capital and Carbon Management.** Retrieved from: https://www.landcommission.gov.scot/downloads/62eb846b28bdb_Responsible%20Natural%20Capital%20and%20Carbon%20Management%20Protocol.pdf

Scottish Land Commission. (2023). **Delivering Community Benefits from Land.** Retrieved from:

https://www.landcommission.gov.scot/downloads/65572c79e77be_Guidance%20on%20Community%20Benefits%E2%80%9316.11.23.pdf

Smith, S., Geden, O., Gidden, M., et al. (2024). **The State of Carbon Dioxide Removal 2024 – 2nd Edition.** Retrieved from: https://static1.squarespace.com/static/633458017a1ae214f3772c76/t/665ed1e2b9d34b2bf8e17c63/1717490167773/The-State-of-Carbon-Dioxide-Removal-2Edition.pdf

UNEP & IUCN. (2021). **Nature-based Solutions for climate change mitigation.** Retrieved from: https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/37318/NBSCCM.pdf

VCMI. (2023). **Claims Code of Practice.** Voluntary Carbon Markets Integrity Initiative. Retrieved from: https://vcmintegrity.org/vcmi-claims-code-of-practice/

Welsh Government. (2022). **Carbon Budget 1 (CB1): Final Statement of Progress (2016 to 2020).** Retrieved from: https://www.gov.wales/carbon-budget-1-cb1-final-statement-progress-2016-2020

Welsh Government. (2024a). **Climate Adaptation Strategy for Wales.** Retrieved from: https://www.gov.wales/sites/default/files/publications/2024-10/climate-adaptation-strategy-for-wales-2024.pdf

Welsh Government. (2024b). **Sustainable Investment Principles.** Marine and Biodiversity Division. Retrieved from: https://www.gov.wales/sites/default/files/pdf-versions/2025/2/4/1738857388/sustainable-investment-principles.pdf

Welsh Government. (2025). **Consultation on draft Sustainable Investment Principles: Summary of responses.** WG51499. Retrieved from: https://www.gov.wales/sites/default/files/consultations/2025-03/sustainable-investment-principles-summary-of-responses.pdf

West, T.A., Börner, J., Sills, E.O., et al. (2020). **Overstated carbon emission reductions from voluntary REDD+ projects in the Brazilian Amazon.** *Proceedings of the National Academy of Sciences*, 117(39), 24188–24194.

Appendix: Country case study detail by research question

Australia

Research Questions	Findings	Sources
	The CFI Act (s133) established Offset Integrity Standards (outlined below) to ensure high-integrity credit supply. These standards are assessed at the method level by the Emissions Reduction Assurance Committee.	
The principles underpinning government-backed schemes, including provisions to ensure integrity with unit supply and demand (claims) and alignment with independent integrity initiatives.	There are no integrity standards on the demand side, but companies have indicated that they will use these credits to comply with their voluntary targets and to align with SBTi requirements. **Climate Active** is a voluntary Australian Government certification programme through which organisations can measure, reduce, and then offset their carbon emissions to become carbon neutral. The Climate Active scheme supports integrity by determining which offset units are eligible and ensures that credit supply follows best-practice offset integrity principles (additional, permanent, measurable, transparent, and addressing carbon leakage). Units must also be independently audited and registered to	Carbon Credits (Carbon Farming Initiative) Act 2011 **Climate Active Australia**

	ensure that abatement is robust and genuine (Climate Active, **2024**).	
The policies and guidance governments have adopted to integrate high integrity carbon units into their decarbonisation aims or to control their use.	Key policies include the ACCU Scheme, the Safeguard Mechanism, and the Climate Active Australia scheme. Limited quantities of international units are allowed under Climate Active, but both the Safeguard Mechanism and the ACCU Scheme are wholly domestic.	Clean Energy Regulator (2025): **ACCU Scheme** DCCEEW (2025): **Safeguard Mechanism**
The relative focus on removals and/or avoidance	The government states in its Climate Change Statement (**2024**) a goal to 'expand options for carbon sequestration, including nature-based and engineered, to balance residual emissions'. It has historically supported both avoidance projects (e.g. methane capture, deforestation prevention) and removal projects (e.g. reforestation, soil carbon sequestration) through the ACCU Scheme. However, the 2024 Statement signalled an intention to prioritise carbon removals in order to address residual emissions and align with long-term net zero objectives. This shift in approach is exemplified in the sunsetting of several avoidance-based methods within the ACCU scheme. Focusing on land sector methods, the **Avoided Clearing of Native Regrowth Methodology** (2015) was repealed in April 2025 and the **Avoided Deforestation Methodology** was repealed on May 2023 due to repeated evidence of over-crediting and poor climate outcomes. Earlier versions of	Australian Government (2024): **Annual Climate Change Statement 2024** DCCEEW (2025): **Current ACCU Methods**

	reduction/removal methods have also been repealed or revised. Currently eligible methods (under the vegetation method) consist entirely of reduction and removal methodologies.	
How governments account for the carbon traded in VCMs and whether they adjust for units traded across regional/national borders.	The Australian Government has not yet clarified whether voluntary offsetting will contribute toward national targets. The Climate Change Authority has recommended that the Government establish a clear national approach to voluntary offsetting that aligns with Australia's interests and fosters international understanding of its stance (CCA, 2022). Some methods within the ACCU Scheme, particularly in the LULUCF sector, will be accounted for in the National GHG Inventory over time. These removals will contribute to the NDC. However, Australia has no current plans or policies to allow Article 6.4 project developments or to engage in ITMOs. There is no corresponding adjustment requirement for non-Article 6 credits.	Climate Change Authority (2022): **Review of International Offsets**
The delivery and monitoring of co-benefits	There is no explicit mechanism within the ACCU Scheme that details how financial benefits are shared between project proponents and the landowners or communities where the projects are located. The Chubb Review and the 2023 CCA Review have both recommended improving reporting on non-carbon benefits. They note that better transparency and reporting of co-benefits would result in higher income for the project. This is	Chubb et al. (2022): **Independent review of Australian carbon credit units** Climate Change Authority (2022): **Review of the**

borne out in the data for those project types seen to deliver more co-benefits (Core Markets, 2023) although co-benefits are currently priced through negotiation between buyer and seller.

Voluntary buyers – and increasingly some compliance buyers – are willing to pay a premium for ACCUs with demonstrable co-benefits. These include Environmental Plantings, Soil Carbon, and Savanna Fire Management projects (CCA, 2025). Carbon credit co-benefits may currently be claimed or verified through a limited number of established programmes, including the Queensland Landscape Restoration Fund, Accounting for Nature, and the Core Benefits Verification Framework. Co-benefit verification systems are under development both nationally and internationally, with new programmes expected in the near future. One of these is the Australian Government's Nature Repair Market.

The Carbon + Biodiversity Pilot (a national initiative) allows specified ACCU projects using pilot planting protocols to undertake mixed-species environmental plantings designed to enhance biodiversity, though without measurement through a formal framework. These projects must be maintained for at least 25 years. Participants receive ACCUs as well as a biodiversity payment that partially offsets costs, with the payment amount varying by project.

Carbon Credits (Carbon Farming Initiative) Act 2011.

Core Markets (2025): **Many markets in one: Valuing risk, opportunity and co-benefits in the ACCU market**

	Two state-wide mechanisms have also been developed to support co-benefits. First, the Queensland Land Restoration Fund may pay an additional premium for ACCUs with non-carbon benefits verified through proponent and third-party assurance. Second, High Impact Partnerships grants in New South Wales provide matched grants that support the delivery of carbon abatement plus non carbon benefits. These are state-level purchasing programmes and do not represent general ACCU Scheme policy.	
Risks and unintended consequences of VCMs to decarbonisation aims and mitigate options.	No data found.	
Interactions with compliance markets and other relevant policies.	The Safeguard Mechanism allows emitters to use ACCUs to offset emissions. However, reforms now cap offset usage at 30% to prevent over-reliance and prioritise direct emissions reductions. If this cap is exceeded, facilities must submit a justification to the CER, explaining why greater onsite abatement was not feasible (DCCEEW, **2025**).	DCCEEW (2025): **Safeguard Mechanism**

Finland

Research questions	Findings	Sources

	Supply side: To ensure integrity in the production of carbon credits, the 2023 Guide refers to the then under-development 'QU.A.L.ITY' criteria of the EU CRCF Proposal as the best guidance for certifying removals. The 2025 study informing the Finnish Government on future trajectories for VCMs recommends updating this guidance to reflect evolving standards and regulations in the carbon markets ecosystem. It suggests that the production of carbon credits should comply with criteria laid out in the EU CRCF and the ICVCM CCP.	Laine et al., (2023): **Finnish Guide to Good Practices in Voluntary Carbon Markets**
The principles underpinning government-backed schemes, including provisions to ensure integrity with unit supply and demand (claims) and alignment with independent integrity initiatives.	Demand side: To ensure the integrity of claims made from the use of carbon credits, the 2023 Guide refers to the updated EU Unfair Commercial Practices Directive, which includes environmental claims, and other pieces of EU legislation then under development, such as the taxonomy of sustainable investment, and the regulatory frameworks for the CSRD and CSDD. Companies are encouraged to demonstrate good practices through third-party websites or working groups. The 2025 study further recommends the use of the EU Empowering Consumers for the Green Transition initiative, the EU Green Claims Directive, the ISO 14068-1 carbon neutrality standard, and the VCMI Claims Code of Practice. It also suggests more stringent guidance on the use of carbon credits for compensation claims, and promotes the use of contribution claims aligned with guidance for Beyond Value Chain Mitigation (BVCM) from the Science-Based Targets Initiative (SBTi) and the private crediting mechanism, Gold	Laine et al., (2025): **The role of voluntary climate actions and the effects of the changing international framework for Finland.**

	Standard. Given the current lack of market demand for contribution claims, the study suggests the use of these principles to encourage support for mitigation activities that are not based on carbon credits.	
The policies and guidance governments have adopted to integrate high integrity carbon units into their decarbonisation aims or to control their use.	Finland recognises the potential of CRCF regulation to raise the quality of carbon removal credits on soil emission reductions exchanged in VCMs. Regional authorities could finance the establishment or enlargement of national parks through the sale of CRCF-certified units from carbon farming activities on VCMs, thereby monetising both climate and biodiversity benefits. Recently the Finnish Government has proposed an amendment to the Act for the Promotion of the Use of Renewable Fuels in Transport introducing a flexibility mechanism, which allows fuel distributors to use emission reduction credits in effort-sharing and later land use sectors.	Laine et al., (2025): **The role of voluntary climate actions and the effects of the changing international framework for Finland.**
The relative focus on removals and/or avoidance	Current regulations predominantly focus on the development of VCMs to scale up land-use and technological removals, with limited reference to avoidance projects. Finland endorses the Oxford Offsetting Principles as best practice. These principles allow offsetting to be claimed only against residual emissions in hard-to-abate sectors using durable emission removals, recommending a long-term shift to 100% removals for offsetting purposes.	Finnish Government (2021): **Catch the Carbon Programme** Ministry of Agriculture and Forestry (2023): **Government Report on the Climate Plan**

	The Climate Plan for the Land Use Sector, along with the Catch the Carbon programme, provides funding and knowledge support for the development of specific land-use removal projects suitable for generating credits for VCMs. These efforts are aligned with the recommendations of the Kolkom project and the 2025 study. There is also renewed focus on technological removals, given their durability and potential for long-term business opportunities.	**for the Land Use Sector** Kujanpää et al., (2023): **Carbon Dioxide Use and Removal Prospects and Policies**
How governments account for the carbon traded in VCMs and whether they adjust for units traded across regional/national borders.	The Finnish Government recognises double counting as a major risk in VCMs, particularly where private sector offsetting overlaps with national emissions inventories. In the absence of EU regulations on corresponding adjustments, **one study commissioned by the Finnish government** recommends encouraging companies to make contribution rather than compensation claims when purchasing carbon credits, allowing such purchases to contribute to Finland's climate neutrality goals.	Laininen et al., (2022): **Special Issues related to voluntary emissions compensation**
The delivery and monitoring of co-benefits	There are no specific criteria for the delivery of co-benefits from carbon-credit-generating projects supported by the development of VCMs. According to the Climate Plan for the Land Use Sector, in addition to the UN Convention on Climate Change and the Paris Agreement, Finland is committed to several other international agreements and commitments that are closely linked to the Climate Plan for the Land Use Sector. The	Ministry of Agriculture and Forestry (2023): **Government Report on the Climate Plan for the Land Use Sector**

	Convention on Biological Diversity obliges the conservation of biodiversity, the sustainable use of its components and the fair and equitable sharing of benefits arising from biodiversity. The UN Convention to Combat Desertification serves as an agreement on soil management and conservation. The United Nations Forum on Forests and the associated UN Forest Instrument, although not legally binding, promote the sustainable management, use, and conservation of forests.	
Risks and unintended consequences of VCMs to decarbonisation aims and mitigate options.	No information available.	
Interactions with compliance markets and other relevant policies.	EU regulations and legislation provide significant guidance on ensuring integrity in the supply and demand sides of VCMs. The generation, use, and trading of carbon credits in VCMs is likely to intersect significantly with the EU compliance market, the EU ETS, of which Finland is a part. However, none of the existing guidance directly addresses these intersections. If companies use carbon credits for offsetting claims, these must align with the Finnish Competition and Consumer Authority guidelines on the presentation of environmental marketing. If, on the other hand, carbon credits are used for contribution purposes, they must align with the targets established under the Carbon Neutral Finland 2035 initiative.	Laine et al., (2023): **Finnish Guide to Good Practices in Voluntary Carbon Markets** Laine et al., (2025): **The role of voluntary climate actions and the effects of the changing international framework for Finland.**

Portugal

Research Questions	Findings	Sources
The principles underpinning government-backed schemes, including provisions to ensure integrity with unit supply and demand (claims) and alignment with independent integrity initiatives.	The legislation establishes integrity criteria on the supply side, including leakage, additionality, conservative baselines, permanence, and sustainable development. Special emphasis is placed on permanence due to the focus on generating credits from forest areas with high fire risk and other vulnerable territories. There are no integrity standards on the demand side, but companies have indicated that they will use these credits to comply with their voluntary targets and align with SBTi requirements.	Republic of Portugal (2024): **Decree No.04/2024 establishing Portugal's domestic carbon market**
The policies and guidance governments have adopted to integrate high integrity carbon units into their decarbonisation aims or to control their use.	Carbon credit methodologies are developed and approved by public entities, namely the Technical Monitoring Committee (the composition of which changes to include relevant members of government, depending on the type of methodology) and the Portuguese Environmental Agency, respectively. These efforts are complemented by land use policies.	Republic of Portugal (2024): **Decree No.04/2024 establishing Portugal's domestic carbon market**

The relative focus on removals and/or avoidance	The Portuguese VCM was created to support the financing and upscaling of carbon sequestration activities. It predominantly focuses on land-based solutions, such as forestry and agriculture, but also includes blue carbon projects involving marine and coastal ecosystems.	Republic of Portugal (2024): **Decree No.04/2024 establishing Portugal's domestic carbon market**
How governments account for the carbon traded in VCMs and whether they adjust for units traded across regional/national borders.	No corresponding adjustments are required, as carbon credits generated within Portugal's VCM cannot be used to meet national targets, comply with other carbon market schemes (such as the EU ETS and CORSIA), or be traded under the international VCM or Article 6 carbon market mechanisms. This separation avoids double counting with national GHG inventories or compliance systems.	Republic of Portugal (2024): **Decree No.04/2024 establishing Portugal's domestic carbon market**
The delivery and monitoring of co-benefits	Portugal's VCM allows for the generation of Carbon Plus Projects, which deliver additional biodiversity and natural capital co-benefits beyond carbon sequestration.	Republic of Portugal (2024): **Decree No.04/2024 establishing Portugal's domestic carbon market**

Risks and unintended consequences of VCMs to decarbonisation aims and mitigate options.	The VCM is regulated. Credits generated in the VCM are not allowed to be used to meet national targets. Therefore, they are not counted toward Portugal's national GHG inventory.	Republic of Portugal (2024): **Decree No.04/2024 establishing Portugal's domestic carbon market**
Interactions with compliance markets and other relevant policies.	Credits are also not allowed to be used in other similar markets. The VCM exists in parallel to other compliance markets such as the EU ETS.	Republic of Portugal (2024): **Decree No.04/2024 establishing Portugal's domestic carbon market**

Scotland

Research Questions	Findings	Sources
The principles underpinning government-backed schemes, including provisions to ensure integrity with unit supply and	The Voluntary Carbon and Nature Markets consultation seeks views on whether the UK Government should endorse the ICVCM's CCPs and its framework for assessing carbon market	**The Forestry and Land Management (Scotland) Act 2018**

demand (claims) and alignment with independent integrity initiatives.	programmes and methodologies as representing a minimum quality requirement for VCM credits. Supply side: For WCC projects, project proponents must comply with **The Forestry and Land Management (Scotland) Act 2018**, the **UK Forestry Standard** and **Scotland's Forestry Strategy**. In addition, project development should also align with the Land Rights and Responsibilities Statement (LRRS), which aims to balance the rights of different stakeholders, from landowners and land managers to local communities and wider society (Scottish Government, 2024). The WCC has announced, via Carbon Pulse (**2025**), that it intends to apply for approval under the ICVCM CCPs in April 2025. The WCC and PC standard documents provide further indication as to how high integrity credit supply is ensured (pertinent points are briefly summarised below). Both codes use a combination of legal and financial tests. The WCC's financial test focuses on whether carbon finance is necessary for the project to be financially viable or the most attractive land use. The PC's financial test sets a specific threshold: a minimum of 15% of total project costs over the duration must be covered by carbon finance. Regarding permanence, both codes use a risk buffer (with requirement for a 20% contribution) to address impermanence risk. Both require informing future landowners about commitments and the PC	HM Government (2023): **UK Forestry Standard** Scottish Government (2019): **Scotland's Forestry Strategy** VCMI (2023): **Claims Code of Practice** HM Government (2024b): **Principles for voluntary carbon and nature market integrity** British Standards Institute (2024): **Flex 701 Overarching Principles and Framework**

encourages use of conservation covenants where appropriate (for example in Fen projects).

The WCC requires landowners and their successors in title to commit to a permanent change of land use to woodland. Both codes mitigate risk of double counting by hosting project information jointly on the UK Land Carbon Registry. Importantly, both use a system of PIUs (Pending Issuance Units) that are converted to verified units (PCUs/WCUs) upon verification, and require units to be retired before being used for claims.

Demand side: The VCMI Claims Code (2023) offers a robust framework for ensuring high-integrity carbon credit use, and companies operating in the UK and participating in VCM activity are encouraged to adopt it. The Scottish Government has expressed a commitment to collaborate with other UK administrations to identify the best approaches for ensuring integrity in nature and carbon markets. This is evident in its support for a UK-wide consultation (which the Scottish Government will contribute to) led by the Department for Energy Security and Net Zero, DEFRA, and HM Treasury. This consultation will explore interventions to strengthen voluntary carbon and nature markets.

The UK Government (HM Government, 2024) is currently seeking views on whether to endorse the VCMI Claims Code

	of Practice alongside guidance on voluntary credit usage disclosures. Other pertinent frameworks to ensure demand-side integrity include the **BSI Flex 701 Overarching Principles and Framework** which establishes principles regarding transparency and disclosure of purchasing activities, how to reduce environmental impacts through the use of purchased units; following the mitigation hierarchy; making accurate claims and not double counting; aligning environmental performance claims with the measurement processes used to quantify units for sale; and ensuring buyers and suppliers provide information to enable assessment of their integrity by market stakeholders.	
The policies and guidance governments have adopted to integrate high integrity carbon units into their decarbonisation aims or to control their use.	**Facility for Investment Ready Nature in Scotland (FIRNS)** (2022) is a joint fund capitalised by the Scottish Government and the National Lottery Heritage Fund to provide seed funding for 35 projects designed to attract private investment into Scotland's natural capital markets. The programme sets voluntary expectations grounded in the LRRS, supporting its implementation alongside the Scottish Government's Interim Principles for Responsible Investment in Natural Capital. It provides guidance on delivering community benefits, fostering local engagement, addressing ownership and tenure issues, and ensuring that environmental improvements are achieved with community backing.	Scottish Government (2022): **Facility for Investment Ready Nature in Scotland** Scottish Land Commission (2023): **Delivering community Benefits from Land** Scottish Land Commission (2023):

	The Natural Capital and Market Framework has formally endorsed guidance and strategies from the Scottish Land Commission's Good Practice Guidance (2023) on **Delivering Community Benefits from Land** coupled with the Commission's protocol on **Responsible Natural Capital and Carbon Management** which places expectations on landowners and managers; advisers (e.g. project developers, intermediaries, brokers and land agents); organisations	**Responsible Natural Capital and Carbon Management**
The relative focus on removals and/or avoidance	The Scottish Government's Updated Climate Plan focuses entirely on reducing emissions from their sources across high emitting sectors and increasing carbon removals, particularly through nature-based solutions such as forestry and peatland restoration (supported by the WCC and PC). It also envisions a role for engineered based greenhouse gas removals to support land sector compensation of residual emissions.	
How governments account for the carbon traded in VCMs and whether they adjust for units traded across regional/national borders.	WCC and PC are fully domestic schemes, so there is no requirement to account for inter-jurisdictional transfers of WCUs or PCUs, and corresponding adjustments are not needed. While WCUs and PCUs are not currently used for compliance under the UK ETS or CORSIA, the climate benefit generated by the projects does contribute to national goals. Carbon sequestration resulting from projects validated and verified to the WCC will, in common with other woodland creation not financed through VCMs, contribute directly to the UK's and Scotland's national emissions reduction targets, as set out in relevant climate change acts. Sequestration from	

	WCC projects will also contribute to the UK's Nationally Determined Contribution under the Paris Agreement.	
The delivery and monitoring of co-benefits	The Natural Capital Markets Framework 'recommends' the Scottish Land Commissions Protocol on Responsible Natural Capital and Carbon Management, which includes a recommendation for landowners and managers to consider establishing a community benefit fund. This would provide direct financial returns to local communities while supporting local priorities and aspirations through procurement, fair work, and inclusive ownership models. For the WCC, projects are usually required to complete an Environmental Impact Assessment outlining any potential adverse impacts. The project is also required to follow the **UK Forestry Standard** and supporting Guidelines for Climate Change, Soil, Water, Biodiversity, Landscape and Historic Environment. Furthermore, project developers are required to use a **WCC Benefits Tool** to monitor impacts across biodiversity, water, community and economic dimensions. The PC recommends landowners consult the Scottish Land Commission guidance on **Delivering social and economic community benefits from land** when developing projects. • Landowners and managers are encouraged to work with the local community to identify opportunities to share the benefits from the management of natural capital and carbon (Scottish Land Commission, 2022).	Scottish Government (2024): **Natural Capital Markets Framework** HM Government (2023): **UK Forestry Standard** Scottish Land Commission (2023): **Delivering social and economic community benefits from land** Woodland Carbon Code (2022): **Benefits Tool**

	• It is recommended that landowners and managers consider opportunities to contribute to community wealth through procurement, fair work, and inclusive ownership (Scottish Land Commission, 2022). • Considering the establishment of a community benefit fund to provide direct financial returns to local communities is also recommended. • The Peatland Code references the Scottish Land Commission's **'Community Benefits'** webpage for guidance as to how to monitor and ensure community benefits.
Risks and unintended consequences of VCMs to decarbonisation aims and mitigate options.	The Scottish Government acknowledges that achieving net zero will require both public funding and private investment, particularly in afforestation and peatland restoration. There is growing concern, highlighted by the Scottish Land Commission (Robbie and Jokubauskaite, 2022), that the WCC and PC are contributing to rising land values across Scotland. The Commission (p.19) makes several recommendations to mitigate unintended consequences of land-based sequestration projects: Recommendations on Environmental Impacts • Increase oversight and monitoring of the environmental impacts of carbon markets.

- Implement an ecosystems approach by assessing the cumulative impacts of multiple carbon projects at a landscape scale.

Recommendations on Inclusion in Decision-making

- Strengthen oversight and monitoring of adherence of carbon projects to good practice standards for community engagement.
- Explore possibilities to ensure that intergenerational impacts on communities are considered at the design stage of the carbon projects.

Recommendations on Benefit Sharing

- Explore policies supporting community benefit packages in the context of carbon projects.
- Develop pathways for partnership with communities in relation to carbon projects or community ownership of such projects.
- Offer support and advice to communities regarding how to either implement a community led carbon project or how to work in partnership with a landowner and/or developer.

Interactions with compliance markets and other relevant policies.	WCUs are not currently eligible for use in compliance mechanisms (e.g. the UK ETS) or in CORSIA. While carbon sequestration from WCC projects contributes to UK and Scottish national GHG reduction targets, this is distinct from allowing project-level units to be used for compliance purposes. As discussed, the integration of nature-based greenhouse gas removals, including those generated under the WCC and PC, into the UK ETS is under active consideration. The Scottish Government, in collaboration with the UK Government, the Welsh Government, and the Department of Agriculture, Environment and Rural Affairs for Northern Ireland, has jointly consulted on whether high-quality, nature-based greenhouse gas removals could be integrated into the UK ETS. They are working together to decide whether or not to do this. .

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