

The CarbonStore User Guide to The Woodland Carbon Market

Table of Contents

Introduction	3
Carbon Sequestration	4
The Basics	
A Carbon Source, Sink and Store	
Explaining Soil Carbon	
The Wider Benefits of Woodland Creation	6
So What Exactly is CO ₂ e?	6
The UK Government's Targets for Woodland Creation	7
A New Incentive to Plant Trees	
The Woodland Carbon Code: An Introduction	9
Outlining the Code's Credentials	
The Purpose of the Woodland Carbon Code	
The Principles Underpinning the Woodland Carbon Code	
The Woodland Carbon Code: A Step-by-Step Guide	11
Important Terms and Definitions	
Step 1: Registering a Project on the UK Land Carbon Registry	
Step 2: Validating a Project under the Woodland Carbon Code	
Step 3: Verifying a Project under the Woodland Carbon Code	
CarbonStore: Supporting the Woodland Carbon Market	19
Our Services Cover All Aspects of the Woodland Carbon Market	
Explaining the Background to the Market for Woodland Carbon Credits	
The Purchase and Sale of Woodland Carbon Credits	
The Different Approaches to Selling Carbon	
CarbonStore's Approach to Selling PIUs and WCUs	
The Five Steps for Buying and Selling Woodland Carbon Credits	
Glossary of Terms	25

Introduction

With the market for WCUs and PIUs still in its relative infancy, CarbonStore is particularly keen to support its healthy evolution by providing a service that is knowledgeable, honest, trustworthy and transparent.

One important element of that is developing a better understanding of the Woodland Carbon Code, its practices, and its principles, among both the companies buying PIUs and WCUs and the landowners selling them. It is for these reasons that we have produced this User Guide, so all parties have a clear understanding of the terminology and the processes involved in the selling and purchasing of woodland generated carbon units.

It is essential that companies buying PIUs and/or WCUs can trust the implicit claim that a WCU represents one tonne of sequestered carbon dioxide equivalent. In order to maintain this confidence, all schemes wishing to generate legally recognisable and saleable PIUs and WCUs must follow a series of complex and detailed checks and inspections. CarbonStore guides you through the process.

For the environmental and sustainability managers reading this User Guide, I hope it gives you confidence and reassurance about the integrity of the PIUs and WCUs which you are contemplating buying.

For the farmers and landowners, I hope it offers a useful explanation about the whys and wherefores of the various steps needed to generate saleable and increasingly valuable PIUs and WCUs.

While pursuing our quantitative targets, it is equally important that we maintain our qualitative standards. We must design, plant, and manage our prospective woodlands to the highest levels. Whether you are a landowner or a company, by working with CarbonStore you can rest assured that we will be guiding you with your best interests at the forefront of our service offering.



Gavin Adkins
Managing Director
Tilhill and CarbonStore

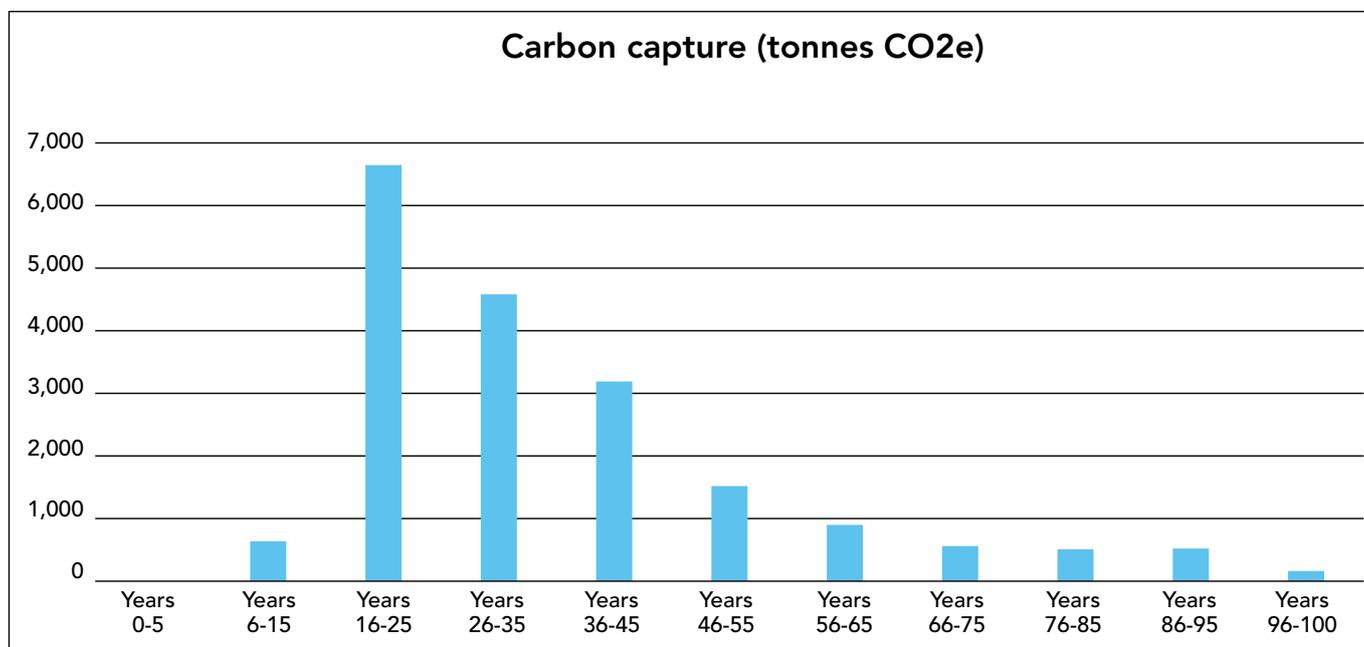
Carbon Sequestration

The Basics

Carbon sequestration describes the process in which carbon dioxide (CO₂) is removed from the atmosphere and stored through biological, chemical, or physical processes. In the case of woodland creation, trees use solar energy to convert CO₂ and water into carbohydrates and oxygen through photosynthesis. These carbohydrates form the building blocks for the biomass of the tree and, therefore, the storage of carbon.

One often forgotten caveat is that trees not only photosynthesise but respire also. Through this process, trees convert some of these carbohydrates and oxygen back into CO₂, water, and energy. As trees grow, the process of photosynthesis dominates that of respiration so meaningful volumes of carbon are sequestered. Once they reach maturity, however, these processes are broadly in equilibrium so the trees are emitting as much CO₂ as they are sequestering.

Chart 1: Chronology of Sequestration Volumes on a Standard Woodland.



This balance between photosynthesis and respiration is embedded in the Woodland Carbon Code's carbon calculator. Its forecast for a standard 50-hectare woodland's sequestration schedule over 100 years

(see chart 1 above) shows that CO₂ removals peak between years 16 and 25 of a tree's life. Thereafter, they gradually decline so that, by year 100, they are approaching equilibrium.

A Carbon Source, Sink and Store

There is a lot of confusion surrounding terms such as 'carbon sink', 'carbon store' and 'carbon source'.

In a nutshell:

- A **carbon source** releases more carbon than it absorbs.
- A **carbon sink** is any reservoir that absorbs more carbon than it releases.
- A **carbon store/stock** maintains a constant amount of carbon.

These three terms are neatly illustrated during a woodland's life cycle. Initially, a planting project is a

carbon source, due to the ground disturbance, the use of tree guards, the fencing etc. Thereafter, as the trees grow, it becomes a (significant) carbon sink before, as *chart 1* shows, maturing into a carbon store. Depending on the species choice, the soil type and other factors, the time between these stages varies considerably but, generally speaking, the woodland is a **source** in years 0-5, a **sink** in years 5-100, and beyond that it acts as a **store**.

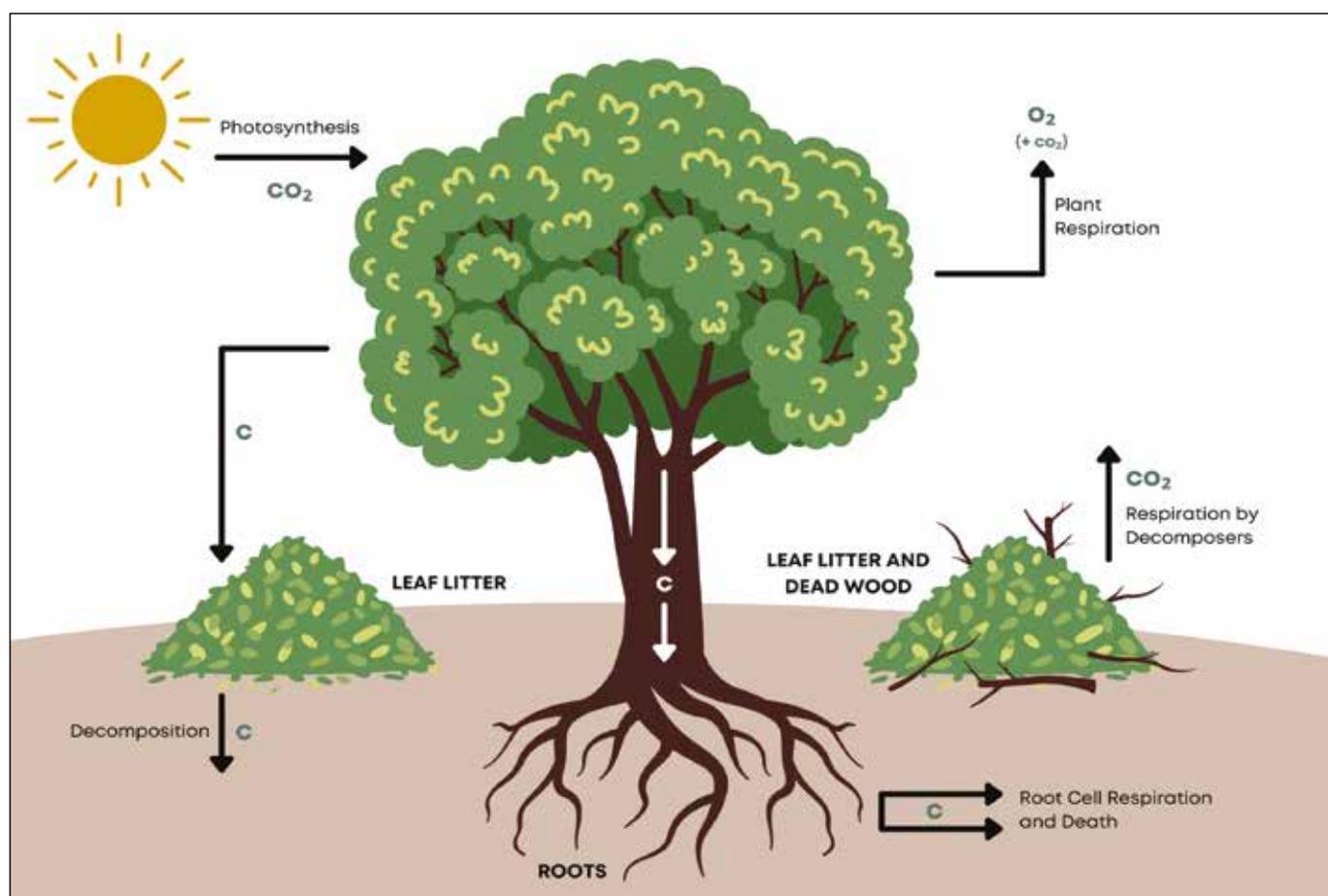


Image 1: *The Carbon Cycle of a Single Tree.*

Explaining Soil Carbon

An important but often overlooked store of carbon is the soil. On average, the top 1 metre of soils in UK woodlands contain three quarters of the 'in-forest' carbon stock (see *image 1*). This 'in-forest' stock accounts for the timber of the tree itself, all biomass in the leaf litter, other vegetation and the soil.

Even though the soil disturbance from ground preparation for tree planting will release carbon dioxide back into the atmosphere (primarily through microbial respiration), over the lifetime of the woodland the increase in biomass, improved soil stability and the mitigation of flooding means that the amount of carbon stored in the soil can increase dramatically.

The Wider Benefits of Woodland Creation

Aside from the previously discussed benefits of trees as the most effective (and wholly natural) carbon sink available, woodland creation generates a multitude of other ecological, environmental, social and economic benefits:

- **Improve Biodiversity:** Woodlands provide essential habitats to a wealth of wildlife, including nesting birds, shade-loving plants (known as sciophytes), and fungi. Tree planting has a central role in our efforts to tackle our biodiversity crisis.
- **Flood Mitigation:** A mature tree captures over 700 gallons of water per year. A recent survey estimated that carefully planted patches of woodland across a river basin can stem the flow velocity in the neighbouring river, when rainfall is high, by almost 50%.
- **Water Filter:** Flood water often contains high levels of phosphorus pollutants and nitrogen. Without trees, that flood water would flow directly into rivers and lakes without being filtered. Trees break the rainfall allowing soil microbes to transform the pollutants.
- **Reducing Soil Erosion:** Wind and rain are the two largest natural forces eroding our soils. Raindrops have the power and momentum to penetrate soil when they hit the ground. If the land is dry, wind can do significant damage. Trees break up droplets of

rain and weaken their strength while roots hold the soil together and protect it from the effects of wind.

- **Health Benefits:** According to Forest Research: *“Woodlands provide an opportunity to exercise in a calm and restful environment. Exercise in woodlands relieves physical symptoms such as high blood pressure and obesity, as well as mental symptoms of stress and depression.”*
- **Timber’s Sustainability Benefits:** Timber has the lowest embodied energy (i.e. energy used in its processing, production, and transport, from tree to consumer use) of any mainstream building material, and significantly less than for steel, concrete, or aluminium.

These wide-ranging advantages of trees mean that woodland creation can provide an entirely natural but almost perfectly designed antidote to many of society’s most serious challenges. We are suffering an unprecedented loss to our biodiversity in the UK. Extreme hydrological events are rising.

According to a previous Environment Secretary, we are *“30-40 years from a complete eradication of soil fertility in parts of the UK”*. Finally, we are increasingly in need of a home-grown timber resource to meet the government’s target for new, sustainable homes.

What Exactly is CO₂e?

We talk about trees sequestering carbon and helping to mitigate climate change. But how does this tie up with the CO₂e (carbon dioxide equivalent) which we refer to elsewhere?

In practice, there are seven greenhouse gases (GHG) which the Kyoto Protocol identified as contributing to global warming. Carbon dioxide (CO₂) is the most prevalent, accounting for 80% of GHG emissions.

This is followed by methane (CH₄), which comprises 10%, and nitrous oxide (N₂O) which makes up 7% of all GHG emissions. The remaining 3% is accounted for by the fluorinated gases, such as hydrofluorocarbon, used in refrigerants and aerosol propellants.

Each of these GHGs absorb different levels of energy so have different effects on the earth’s warming. Scientists have therefore developed Global Warming Potential (GWP) to enable comparisons between the global warming impacts of different GHGs. Specifically, GWP is a measure of how much energy the emissions of one tonne of a gas will absorb over a given period, relative to the emissions of one tonne of CO₂.

The UK government estimates the GWP of methane and nitrous oxide to be 25 and 298 respectively. This standardised metric then provides an easy benchmark for companies and offsetting projects alike who are attempting to balance emissions and mitigations. A company emitting four tonnes of methane must sequester (4 x 25) 100 tonnes of CO₂e to neutralise its impact on the earth’s warming.

By using one tonne of CO₂e as a benchmark against which we can measure the impact on global warming of other GHG emissions, companies and offsetting projects are able to work on the same, easily understood and readily exchangeable unit of offsetting currency.

The UK Government's Targets for Woodland Creation

In January 2020, the Climate Change Committee (CCC) released its 123-page report: "Land Use: Policies for a Net Zero UK," in which it explained that:

"Sustainably managed forests are important for reducing emissions across the economy. They provide a store of carbon in the landscape and harvested wood can be used sustainably for combustion and carbon sequestration in the energy sector (e.g. when used with Carbon Capture and Storage (CCS) technology) and as wood in construction, creating an additional stock of carbon in the built environment."

The report noted that, in 2017, the total emissions from agriculture, land use and peatlands across the UK was 58 million tonnes of CO₂e (carbon dioxide equivalent). However, the CCC argued that, 'with ambitious steps,' these emissions could be reduced by 64% to 21 Mt CO₂e by 2050.

Indeed, afforestation and agro-forestry would play a central role in these land use related emissions reductions. By increasing UK woodland cover from 13% to at least 17%, through planting 30,000 hectares each year until 2050, our newly planted forests and woodlands would be sequestering 14 Mt CO₂e by 2050.

With the government legally committed to achieving net zero emissions in the UK by 2050 and simultaneously conscious of the wider societal challenges, it has consistently reiterated its commitment, first outlined in its 2019 manifesto, to plant 30,000 hectares annually across the UK.

Breaking this ambition down by country, Scotland aims to be planting 18,000 hectares per year by 2024/25 and England is committed to planting 7,000 hectares annually by 2024. Wales' and Northern Ireland's targets equate to 5,000 hectares and 1,200 hectares respectively each year between now and 2030.





A New Incentive to Plant Trees

As chart 2 illustrates, the UK government has ambitious targets. Within 5 years, we must increase the area of annual tree planting across the UK by x2.2 back to a level that we have achieved just once (in 1989) in the past 45 years. We must then maintain this level for the next 25 years.

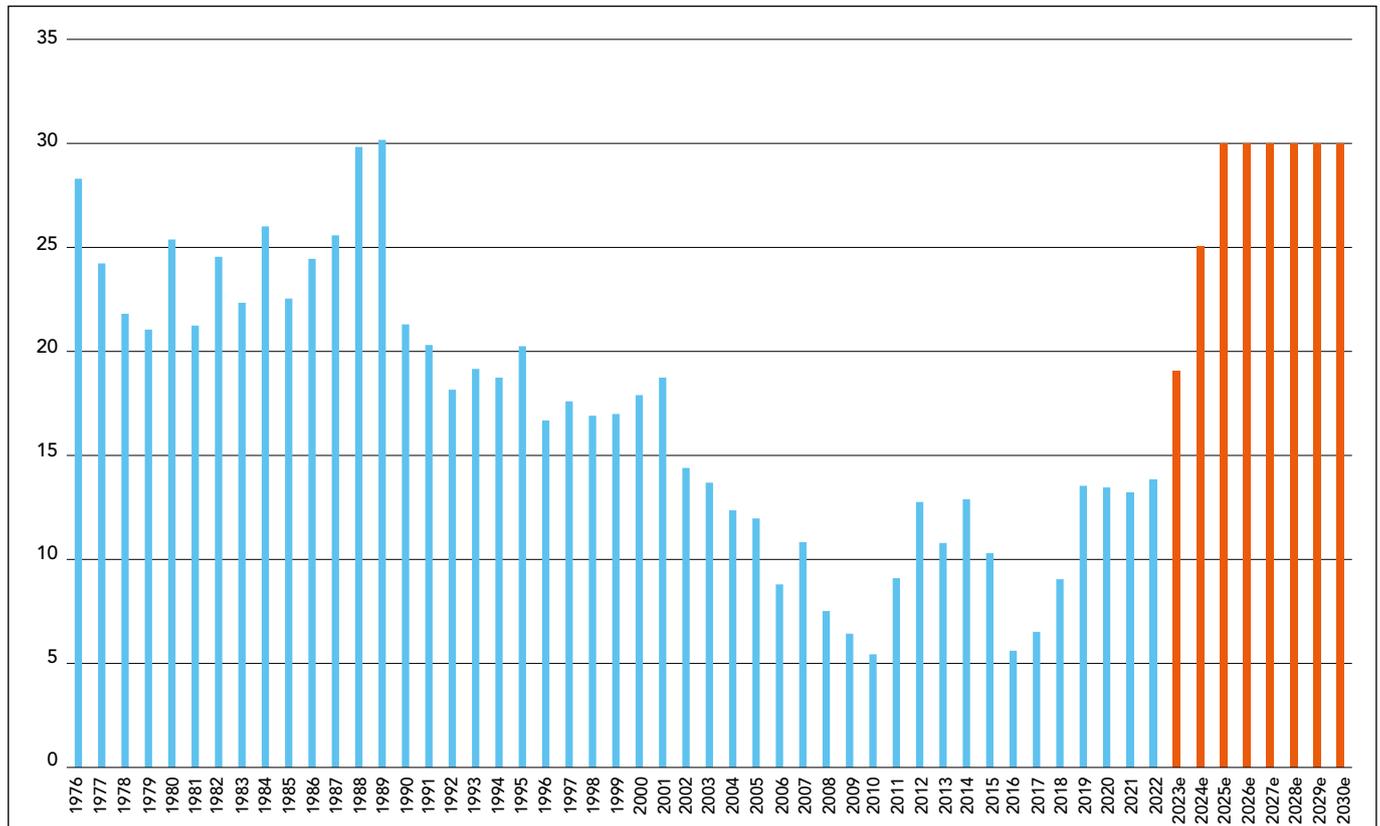
Realising these goals requires the development of an entirely new market for the valuable services which woodlands provide. As we have seen, trees are one of the best natural carbon sinks available and can therefore play a central role in helping us to reduce our carbon in the atmosphere and combat climate change.

The UK government has developed a standard which, by quantifying these benefits (it calculates the

tons of CO₂e sequestered per hectare of woodland, depending on the species mix, growing conditions, management regime etc.), and regulating the issuance of carbon credits, creates a credible, valuable and saleable product which performs two vital functions:

- 1 It provides landowners with an additional financial incentive to redeploy otherwise uneconomic land as woodland.
- 2 It enables carbon-emitting organisations to offset their residual emissions while simultaneously generating other meaningful benefits to society.

Chart 2: Area of new woodland creation in the UK ('000 hectares, 1976-2030e)



The Woodland Carbon Code: An Introduction



Outlining the Code's Credentials

The Woodland Carbon Code (WCC) is that standard and, in line with the quality and value of its work, it enjoys strong credentials. It was launched, through the support of DEFRA, by the Forestry Commission back in 2011. It therefore enjoys the backing of the UK government and is now operated by Scottish Forestry.

Moreover, the science underpinning its carbon sequestration calculations has been developed by

Forest Research, the Forestry Commission's world-renowned silvicultural research division.

Finally, the Woodland Carbon Code has been endorsed by ICROA, the International Carbon Reduction and Offsetting Alliance. As such, companies buying carbon credits which have been issued and authorised by the Code can take complete confidence that it complies with the highest standards of international carbon offsetting regulations.

The Woodland Carbon Code Enjoys High Level Support.



The Purpose of the Woodland Carbon Code

As we explained earlier, many landowners need a strong incentive to plant trees. They face various choices when deciding how best to use their land and, being keen to maximise their income, they need a convincing financial incentive to allocate parts of their land to woodland.

Currently, our zero-carbon technology is still insufficient for companies to operate their businesses free from any carbon emissions yet many are committed to achieving net zero. As a result, there is strong corporate demand for carbon credits which enable companies to offset the unavoidable emissions generated by their factories, offices, company cars etc.

As such there is high and rising corporate demand for the carbon offsetting services which farmers and landowners can offer. However, these services need strong oversight and careful regulation to ensure companies can trust the carbon capture claims implicit in the carbon credits they are buying from landowners i.e. that they represent the permanent removal of one tonne of CO₂e.

The Woodland Carbon Code provides this oversight. By outlining a consistent, uniform, and rigorous set of procedures, inspections, and practices which landowners must follow when applying for woodland carbon-related funding, it ensures companies can have confidence in the veracity and credibility of the woodland carbon credits they are buying.

The Principles Underpinning the Woodland Carbon Code

How does the Code ensure widespread trust in its woodland-generated carbon credits? It achieves this by adhering tightly to the six core principles of carbon offsetting projects, outlined by ICROA in its Code of Best Practice. This means all projects authorised by the Code must follow six basic rules which confirm that their emissions reductions are:

- i) **Real:** All emission reductions and removals must be proved to have genuinely taken place. *(For woodland carbon projects, this test is straightforward; Are the trees standing and alive?).*
 - ii) **Measurable:** All emissions reductions and removals must be accurately quantified. *(The WCC has developed its carbon calculator and requires regular onsite visits to measure the volume of sequestered carbon).*
 - iii) **Permanent:** Carbon credits shall represent a permanent removal or reduction in emissions.
- (With woodland liable to storms, fire, and disease, the WCC has developed its own solution to this test – we explain more below).*
- iv) **Additional:** The project must demonstrate that, without carbon funding, the project would not have proceeded i.e., it must be additional to that which would have occurred anyway. *(The WCC uses its additionality spreadsheet to test this).*
 - v) **Independently Verified:** All emission reductions and removals shall be verified to a reasonable level of assurance by an independent third party. *(Every authorised woodland undergoes an audited onsite mensuration survey, at least every ten years).*
 - vi) **Unique:** Only one carbon credit can be associated with a single emission reduction or removal as one tonne of CO₂e. *(This explains the WCC's rigid rules on permissible claims).*

The Woodland Carbon Code in the Context of Global Voluntary Carbon Markets

The Woodland Carbon Code authorises carbon credits which are part of the voluntary carbon market. This means their carbon credits are bought by companies who are voluntarily offsetting their residual GHG emissions (as opposed to those buying carbon credits to meet legally binding obligations). WCC-authorised carbon credits is just one of many methods which companies can use to reduce their net emissions. Solar panel installations (in India), cooking stove projects (in Sudan) and clean ethanol incentives (in Kenya) are examples of alternative offsetting projects with prices per carbon credit ranging between U\$4 and U\$25 per credit.

This is significantly lower than the £20 to £30 price range in which WCC-authorised carbon credits are trading. So why are prices so different? Buyers evaluate a carbon offsetting project based on various criteria: How reliable is the carbon standard regulating the project? How visible is the project to the companies' stakeholders? What are the wider societal benefits of the project? On each of these points, UK-based woodland carbon projects score highly.

The Woodland Carbon Code is a highly respected carbon standard as it adheres to ICROA's core principles rigidly (arguably much more so than other carbon standards). Being based in the UK, these projects are also close to the offices, customers and suppliers of companies buying the carbon credits so their benefits are directly enjoyed by many of their biggest stakeholders. Finally, UK woodlands contribute towards 13 of the United Nations' 17 Sustainable Development Goals and, as such, generate many benefits to society beyond just carbon sequestration.

As we shall see, the Woodland Carbon Code requires many spreadsheets to be completed, forms to be filled out and evidence of claims to be provided. As the annotations (in italics above) explain, these are essential steps in complying with ICROA's basic principles.

It is therefore important to understand that this time-consuming paperwork meets an important need – by rigidly upholding ICROA's principles, it maintains the credibility of the units which are authorised by the Woodland Carbon Code and, in so doing, also protects their value.

The Woodland Carbon Code: A Step-by-Step Guide

Important Terms and Definitions

The Woodland Carbon Code has its own unique set of terms and definitions and any basic understanding of the WCC requires some familiarity with these phrases and vocabulary. The glossary (at the back of this guide) provides a comprehensive list of definitions however, the following outlines the most important and frequently used terms.

So far, we have used 'carbon credits' as the generic term to describe the units issued and authorised by the WCC. In practice, the Code issues two types of credit and it is important to understand the differences between them:

i) Pending Issuance Units (PIUs)

The first type is called Pending Issuance Units, usually known as PIUs. They are issued soon after the trees are planted and the volume of PIUs issued is determined by the Code's carbon calculator. PIUs help solve the long-standing challenge of trees and time. On the one hand trees take many decades to capture their full potential of carbon. On the other, landowners, planting those trees require an accessible and immediate income from their land.

By issuing legally recognised, saleable, and valuable PIUs early in a woodland's life, the Code helps to overcome this problem. As this all suggests, a PIU represents a

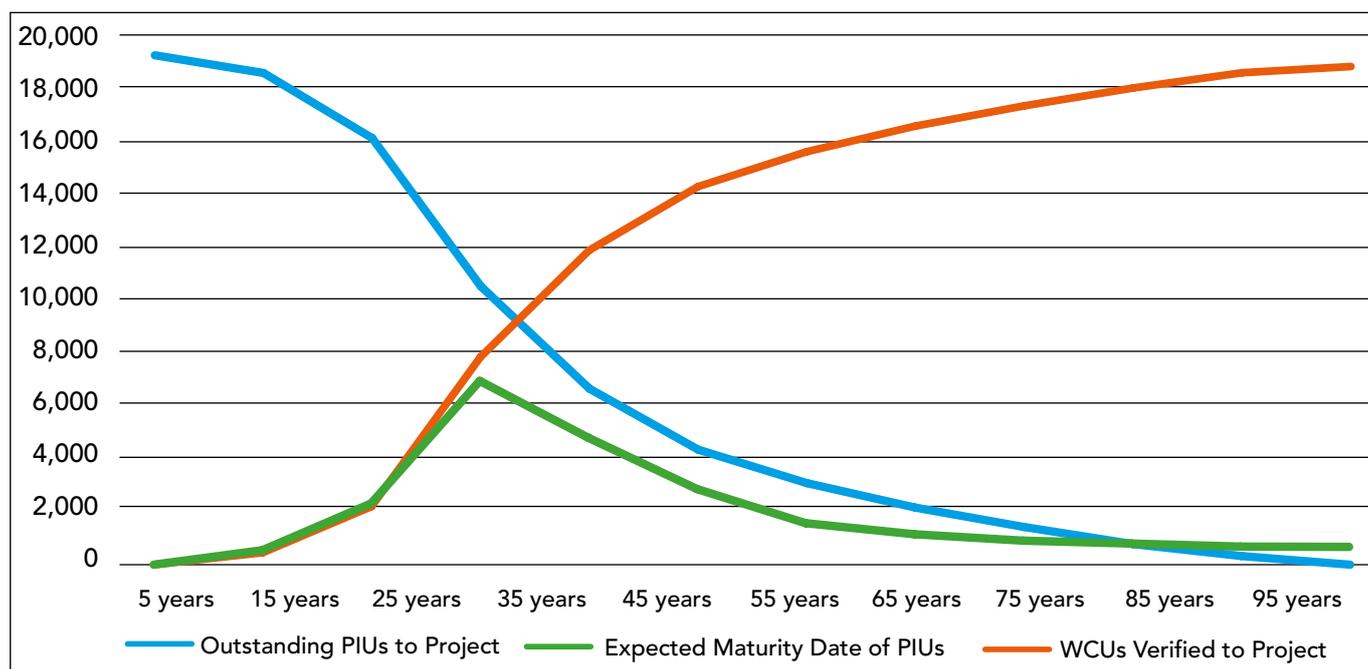
promise, by a landowner, to sequester one tonne of CO₂e as the trees grow and mature and are, as such, a 'future' carbon credit. This means that companies cannot use them to offset their current emissions but they can be used to plan their long-term net zero strategy and make claims of being 'on the path to' carbon neutrality.

ii) Woodland Carbon Units (WCUs)

The second type is called Woodland Carbon Units, often referred to as WCUs. Each WCU represents one tonne of sequestered CO₂e. Throughout the life (or duration) of an authorised woodland, it is subject to a series of inspections, known as verifications, by a third-party auditor. Verification occurs initially five years after planting and thereafter (at least) every ten years.

At each verification, the auditor checks that the trees have grown as expected and sequestered the predicted volume of carbon dioxide. Assuming they have, the relevant number of PIUs (i.e. promises to deliver) are commuted into WCUs (i.e. promises delivered upon). Thus, all the units issued to a woodland will initially be classed as PIUs. As it then grows and sequesters carbon dioxide, a rising proportion of these PIUs will be converted into WCU's. *Chart 3* illustrates the conversion of PIUs into WCUs on a standard woodland project with a duration of 95 years.

Chart 3: Timeline Outlining the Conversion of PIUs into WCUs on a standard 50-hectare Broadleaf Woodland.



iii) The Land Carbon Registry

The UK Land Carbon Registry is the database that stores and publicly displays data about the status of all projects which have been authorised by the Woodland Carbon Code (and the Peatland Code). It details the ownership of the PIUs (if they have been sold by the woodland owner, who can remain anonymous if they prefer), the volume remaining unsold and how many have been verified as WCUs. The registry is managed by S&P Global and provides a public and transparent picture of UK-based Woodland (and Peatland) Carbon Units.

All projects must be recorded on the UK Land Carbon Registry before any works starts on site through a process known as registration (see more below) and, in order to register a project on the registry, you must:

- EITHER open your own account. This means that you are the Project Developer (see glossary) and will

submit the carbon calculator, file the registration details and, in time, complete the validation and verification processes yourself and in your own name (see more below). Unless a woodland owner has multiple projects in their ownership, the difficulty of grouping 'individual projects' like these means audit fees are much higher.

- OR your project can be registered under CarbonStore/Tilhill's master account. This carries no greater commitments for you but allows us to register the project on your behalf by completing the carbon calculator, finalising the validation and managing your project's PIUs and WCUs. It also allows us to include your project within a 'group' which reduces the validation and verification costs significantly (again, see more below).



Step 1: Registering a Project on the UK Land Carbon Registry

The process starts by registering your intention to develop a woodland carbon project on a designated area of land with the Woodland Carbon Code. S&P Global administers the UK Land Carbon Registry on behalf of the Woodland Carbon Code so they will manage the PIUs and WCUs issued into your project's account.

Registration is similar to opening a new bank account. Although the project's account holds nothing in it at this stage, it establishes a depository where the PIUs and WCUs can be safely held once the project is validated or verified, and PIUs or WCUs are issued. Registration requires two basic documents and project details:

- The Woodland Carbon Code's carbon calculator.
- A map of the project and some basic details outlining its purpose, location and duration.

i) The Woodland Carbon Code's carbon calculator

The carbon calculator allows us to predict the volume of CO₂ which a woodland, of any size, species mix and duration, planted in any place, will sequester. The science underpinning this calculator was developed by Forest Research, the Forestry Commission's world-leading silvicultural research department, and it is the recognised template for such predictions.

It comprises four basic sections:

- **Project Basics:** This illustrates the basic details of any project: when planting was completed (known as the project start date), how long it will operate under the Woodland Carbon Code (which is referred to as the 'duration') and the net planting area. These details set the parameters for the subsequent sections.

Example project used for illustrative purposes.

Project Basics	
Project start date	01 April 2023
Project duration (years)	100
Total net planting area – excluding open space (ha)	10.00
Country	Scotland
If in England, are you using the Woodland Carbon Guarantee?	N/A
If using the Woodland Carbon Guarantee, 10-yearly or 5-yearly verifications?	N/A

- **Emissions from Establishment:** As we explained earlier, the creation of a woodland generates carbon emissions. This section quantifies the volume of CO₂e emitted from fencing, spraying, tree shelters and any road building and subtracts these emissions from the volumes sequestered by the woodland.
- **Species, Spacing and Yield Class:** Each compartment of the woodland has its own species, its own yield class, it may have different felling dates, and it will most likely be in different sizes. This section allows you to input each compartment's individual features so that the calculator can assess the volume of CO₂ to be sequestered based on specific parameters.

Emissions from Establishment	Spacing (m)	Area (ha)	tCO ₂ e/ha	tCO ₂ e
Seedlings	1.7	10.00	-0.52	-5.2
Ground Preparation (Fuel)		10.00	-0.06	-0.6
Tree Shelters		0.00	-0.82	0.0
Fencing		10.00	-1.64	-16.4
Herbicide		30.00	-0.001	0.0
Road Building		km	tCO ₂ e/km	tCO ₂ e
Roads		0.00	-43.13	0.0

- **Pending Issuance Units by Vintage:** The final section maps out the timing when PIUs will be commuted to WCUs during a project's duration. A 'vintage' represents the period between each verification and the 'Total PIUs to Project' are the total volume of PIUs which a landowner is able to sell to a company once the project has been validated and the PIUs issued. However, this figure requires a more detailed explanation.

Verification: years since start date	Vintage start date	Vintage end date	Total PIUs in vintage to be listed (tCO ₂ e)	PIUs to Buffer (tCO ₂ e)	PIUs to Project (tCO ₂ e)
5	01 April 2023	31 March 2028	55	11	44
15	01 April 2028	31 March 2038	1,277	245	982
25	01 April 2038	31 March 2048	2,052	411	1,641
35	01 April 2048	31 March 2058	1,675	335	1,340
45	01 April 2058	31 March 2068	848	169	679
55	01 April 2068	31 March 2078	502	101	401
65	01 April 2078	31 March 2088	342	68	274
75	01 April 2088	31 March 2098	246	49	197
85	01 April 2098	31 March 2108	231	47	184
95	01 April 2108	31 March 2118	172	34	138
100	01 April 2118	31 March 2128	76	15	61
Total			7,426	1,485	5,941

The Discounts Applied to the Total PIUs to Project

Total PIUs to Project account for just 64% of the total volume of CO₂ which the carbon calculator expects the project to sequester over its duration. Conscious that PIUs only represent a promise to deliver, cautious of any undue optimism in its underlying scientific assumptions and recognising that natural capital assets, such as woodlands, are susceptible to natural disasters, the Woodland Carbon Code has applied two discounts before reaching the 5,941 PIUs available for sale in the example above.

The First 20% Discount

This is applied before any figures are displayed on the carbon calculator and is, effectively, an insurance policy by the Woodland Carbon Code, to minimise the risk that its underlying assumptions on tree growth are too optimistic and an unrealistically large number of PIUs are sold (or promises are made) before the trees mature.

To illustrate this using the example above, the 20% discount has already been deducted from the 7,426 total PIUs in vintage to be listed. This means that the Woodland Carbon Code actually expects this project to sequester (120% x 7,426) 8,911 tonnes CO₂e i.e., 1,485 tonnes more than are available to be sold when the scheme is validated

It is important to note that this initial discount is returned to the woodland owner when the PIUs are verified and commuted to WCUs. Indeed, receipt of this rebate simply requires the trees to 'have grown as they normally would'. If this is the case, woodland owners can expect to receive 20% more WCUs than the PIUs listed in each vintage.

The Buffer – the Second 20% Discount

As ICROA's key principles outline, all verified carbon units must represent a permanent emissions removal. For the Woodland Carbon Code, whose projects are inherently susceptible to natural disasters, such as storms, disease and fire, this guarantee of permanence represents a challenge; If the woodland were to burn down, any verified WCUs would, quite literally, go up in smoke.

The Woodland Carbon Code therefore requires all schemes to contribute 20% of their total verified WCUs to a centralised 'buffer' account which provides a pot from which the WCC can draw unused WCUs if the trees in a verified scheme are damaged and the guarantee of permanence is jeopardised.

ii) A Map of the Project

The registration process also requires projects to submit a map of the scheme detailing the site boundary and a plan of the planting. This map, like the carbon calculator, will be publicly accessible so the WCC has strict requirements regarding the content, the scale, and the inclusion of a grid reference. Further details are available under 'mapping guidance' on the Woodland Carbon Code's website.

Step 2: Validating a Project under the Woodland Carbon Code

A key criterion for all ICROA-endorsed offsetting standards, such as the Woodland Carbon Code, requires that:

"...offset projects and carbon reduction claims are independently validated and verified. Validation and verification must be carried out by a suitably qualified, independent organisation."

In line with this mandate, the Woodland Carbon Code outlines the protocols and procedures for validating woodland projects and two independently appointed bodies, Organic Farmers and Growers, and The Soil Association, validate the projects.

The Simple Steps to Validation

In practice, validation is a desk-based exercise when the auditor reviews the 34-page Project Design Document (see more below) and the additionality spreadsheet (also discussed below), among other things, to ensure that the scheme complies with ICROA's principles of carbon offsetting.

According to the Code, a project must be validated within three years of it being registered and cannot be validated until the planting has been completed. Most projects are validated within 2-3 months of planting. Soon after validation, the project's account on the UK Land Carbon Registry is issued with legally recognised PIUs which the woodland owner can sell to whomever they wish, whenever they choose and in whatever volumes they prefer.

The Documents and the Tests Needed for Validation

Proving the Project is Additional

We explained earlier that all ICROA-endorsed standards require their offsetting schemes to prove that, without carbon funding, the project would not have proceeded i.e. the project is additional to that which would have occurred anyway.

The Woodland Carbon Code has therefore devised two important tests to establish whether a project is additional and all projects must pass both tests to secure carbon funding:

- **Legal Test:** This simply asks whether there is any legal obligation to plant the land. For example, compensatory planting for woodland clearance from a housing development or the erection of power lines would not pass this test.
- **Investment Test:** The purpose of this test is to demonstrate that, without carbon finance, woodland creation is either: (a) not the most economically or

The Independent Auditors: Organic Farmers and Growers and the Soil Association



financially attractive option for that area of land (i.e. woodland creation is profitable, but less so than grazing or other likely non-woodland uses) or (b) is not economically or financially viable on that land at all (i.e. woodland creation is not profitable).

The Woodland Carbon Code Cashflow Spreadsheet

Also known as the 'Additionality spreadsheet', the Code's Cashflow Spreadsheet has been devised to assess a project's eligibility against the Investment Test and therefore seeks to answer two important questions:

- Would the land have been planted with trees anyway?
- Has carbon funding been pivotal in making woodland a viable use for the land?

It answers these two questions through the completion of a formulaic spreadsheet which compares the existing income from the land with the projected income from the woodland, excluding carbon funding.

If the income from the latter (the woodland scenario, excluding carbon) exceeds that from the former (the current income from the land), the Woodland Carbon Code reasons that the woodland would have been planted anyway, that it is not additional (to the normal course of events) and that it should not be eligible for carbon funding.

However, if the expected income from the woodland (excluding carbon funding) is less than the existing income from the land, the Code argues that carbon funding is essential to making the project a viable proposition, that the woodland would not have been planted without the extra income and that the project is eligible for carbon funding.

The spreadsheet reaches this conclusion by adding up all the costs associated with preparing the ground, planting the trees and then managing them to ensure

a healthy woodland emerges. As such, establishment techniques, the length of any fencing and road construction, and the costs of the young trees are all considered.

The spreadsheet then calculates the total income from the woodland, such as grant funding, thinning income and timber income, and applies a discount rate to estimate the current value of these future income streams. It then subtracts the present value of total costs from that of the income to estimate the Net Present Value of the woodland.

The spreadsheet also requires details about the current land use: is it upland moorland, grazing pasture or arable? Depending on the land type and the country (and hence the subsidy regime), it applies a standard income per hectare to estimate the income foregone by planting the land with trees. It is this foregone income which must exceed the Net Present Value of the woodland for the project to qualify for carbon funding.

The Project Design Document (PDD)

The PDD is a 34-page report that must be completed by the project developer and describes how the project will meet the various requirements of a project operating under the WCC. There are five principal sections, each of which require supporting evidence:

1. Eligibility

The Code needs to establish that the project is eligible for carbon funding. The project developer therefore needs to supply the key project dates, show that the land hasn't previously been woodland (for at least 25 years), provide evidence of ownership (or a

tenancy agreement) as well as confirmation that the landowner will comply with the law and conform with the UK Forestry Standard.

2. Project governance

The WCC wants confirmation that the landowner will abide by the rules of the Woodland Carbon Code, that a long-term management plan is in place for the woodland, that the local community and interested parties have been consulted, that risks have been considered and that an agreement is in place to monitor and maintain verification of the project.

3. Carbon sequestration

Although a carbon calculator was submitted when the project was registered, the WCC requires projects to consider the baseline carbon sequestered in the previous land use and any potential carbon leakage because of the project. This allows a more accurate assessment of the net carbon sequestration from the project.

4. Environmental quality

Projects need to demonstrate that they have considered the environmental aspects of sustainable forest management when designing the woodland. They should therefore provide an Environmental Impact Assessment, if required or, if not, evidence that environmental impacts of the project are likely to be positive.

5. Social responsibility

Both the WCC and companies buying PIUs and WCUs care strongly about the social impact of potential projects. Any benefits to the local economy, the neighbouring community, the local wildlife or the local water resources should all be highlighted.



The Cost of Validation

There are three separate fees related to validating a project with the Woodland Carbon Code:

i) Audit Fees

The Woodland Carbon Code has appointed the Soil Association and Organic Farmers and Growers as the independent bodies authorised to assess a project's eligibility for carbon funding. This work entails detailed scrutiny of the Project Design Document and their fees for this work are approximately £1,400 per project, though this can be reduced significantly if a project is placed within a group (see more details on grouping projects below).

ii) Markit Registry Fees

As we explained earlier, S&P Global administers the UK Land Carbon Registry, managing projects on the registry, issuing PIUs to those projects upon validation and then converting the PIUs into WCUs upon verification. IHS Markit charge £0.1 per PIU for these services which is payable before any PIUs can be issued.

iii) Project Developer Fees

The process of registering, validating and, in time, verifying projects with the Woodland Carbon Code is technical, it requires a high level of forestry knowledge and there are many potential pitfalls that could render

Costs Associated with Validating a Project.

Itemised Costs		£
Cost of Validation	Standard charge levied by auditor	1,400
Markit Registry Fees for Issuing PIUs into the Account	Levied at £0.01 per PIU	594
Total Costs		£1,994

Grouping Projects

It is possible to group a selection of projects together to reduce the fees paid to the auditors for validating and verifying projects. For example, each project in a group containing five projects will pay approximately £650 for validation, as opposed to £1,400 charged for an individual project.

Each group requires a group manager, similar to a project developer, who coordinates interactions with the auditors during validation and verification. CarbonStore, due to the volume of projects on which it is the Project Developer, is able to undertake this role.

a project ineligible. Many woodland owners therefore prefer to appoint an experienced and skilled Project Developer, such as CarbonStore, to undertake this work on their behalf.

The completion of the Project Design Document, the gathering together of the accompanying documents, and the response to any queries from the validators (at OF&G or the Soil Association) takes a significant amount of work. It is therefore best to use experienced Project Developers who are familiar with the process.

CarbonStore, with a specialist team focusing on this work, is well-equipped to undertake it efficiently and cost-effectively. Before any work starts, we will explain the process to you, we will send you a breakdown of the projected fees for your approval and we can outline the projected carbon-related income from the project once it has been validated or verified.

Finally, when planning your woodland, it is worth keeping in mind that the costs associated with validating (and verifying) a project are relatively fixed. This means that there is little difference in fees for a 10-hectare scheme and a 100-hectare scheme, that carbon-oriented woodlands of less than 4-5 hectares are less viable and that larger projects generate a higher return on capital.

We require the woodland owner to sign up to the group agreement, provide information promptly and accurately and inform us of significant changes to the woodland.

Each of these projects must pass its own additionality test (see above) before being validated, in the same way as individual projects. You can group schemes together from different areas or owners and each group has a maximum of 15 standard-sized (i.e. 5 hectares or larger) projects.

Step 3: Verifying a Project under the Woodland Carbon Code

The final step in a woodland's path to generating Woodland Carbon Units (WCUs) i.e., legally recognised carbon offset credits which represent a tonne of sequestered carbon (as opposed to the promise of such, denoted by a PIU), involves verifying the woodland.

Indeed, it is a requirement of all ICROA-endorsed carbon standards that all their authorised projects are 'independently verified.' In practice, this entails a monitoring survey which informs the Project Progress Report which must then be submitted to the Soil Association for an independent audit.

The Soil Association carry out their own survey on the site (for all individual projects) before passing the project to the Woodland Carbon Code for their authorisation, who pass it to S&P Global who commute the corresponding number of PIUs into WCUs.

- i) Monitoring/Mensuration Survey:** The woodland is stratified and survey plots are chosen accordingly. At the year 5 verification, the plots are monitored to ensure the young trees are growing healthily. Verifications at years 15 and beyond involve a mensuration survey when the volume of standing timber is measured and, based on that measurement, the volume of captured carbon is calculated. The volume of sequestered carbon then determines the

number of PIUs which are converted into WCUs (each WCU represents one tonne of carbon).

- ii) Project Progress Report:** This is the sequel to the Project Design Document, completed at validation. Any updates to the project's management plan, its ownership, its environmental credentials etc must be recorded, alongside the results from the monitoring or mensuration surveys.
- iii) Submission to Independent Auditor:** Either the Soil Association or Organic Farmers and Growers will appoint a 'verifier' to audit the Project Progress Report and undertake their own monitoring/mensuration survey.
- iv) Issuance of Woodland Carbon Units:** At year 5, the mensuration survey will see a pre-scripted volume of PIUs converted into WCUs (as per the carbon calculator). The volume of WCUs issued during the verifications at year 15 and beyond will depend on the result of the mensuration survey and, as such, the growth of the trees. S&P Global are responsible for converting PIUs into WCUs and issuing the WCUs. They charge £0.05 per WCU and payment must be made before the WCUs can be issued. To avoid complications, CarbonStore can settle this cost on your behalf and invoice you afterwards for reimbursement.

Costs Associated with Verifying a Project.

Itemised Costs		£
Cost of Verification (as Individual Project)	Standard fee levied by the auditors	£2,100
Cost of Verification (as Group Project)	Standard fee levied by the auditors	£700
Monitoring/Mensuration survey	2 day's work for standard-sized project of 20 hectares	–
Preparation of Project Progress Report	1 day's work for standard-sized project of 20 hectares	–
Markit Registry Fees for Issuing PIUs into the Account	Levied at £0.05 per WCU	£297
Total Costs £		-£3,097

Explaining the Costs of Verification

The various steps associated with verification take time and work so it is important that project owners are aware of these ongoing costs associated with the project:

- Project owners should assume the monitoring and mensuration surveys take roughly a day and a half's work for the stratification plan and the site visit. For larger projects, this may take considerably more time.
- Preparation of the Project Progress Report: Although the volume of work will vary depending on the project, it is likely to take another day's work to

complete the 16-page report so that it is ready for submission to the auditors.

- Independent Audit Costs: The Soil Association charges £2,100 +VAT for a 'single project verification' however, if the project is within a group of four, the verification costs are £3,000 for the group or £750 per project.
- IHS Markit Registry Fees: Finally, IHS Markit charge a standard fee of £0.05 per WCU for converting PIUs into WCUs and issuing those WCUs to the appropriate account.

CarbonStore: Supporting the Woodland Carbon Market

Our Services Cover All Aspects of the Woodland Carbon Market

The Woodland Carbon Code is complicated. It uses many acronyms and much jargon. It requires a large volume of paperwork and four detailed spreadsheets to be completed. There are (at least) three legal agreements to be signed, relating to the Code, the group agreement (see above) and the corporate buying the carbon units. Finally, the UK Land Carbon Registry can seem puzzling.

The development of the woodland carbon market also represents the evolution of a new and significant trend. Until now, there has been little overlap between the rural and urban economies; the two sectors have operated in broadly separate spheres.

However, the woodland carbon market, by facilitating the flow of money from mainly urban-based companies into the rural economy, with the former securing the services of the latter, represents a growing interconnection between these two disparate sectors.

At CarbonStore, we have designed our services specifically to meet these various requirements:

i) Advice related to the Woodland Carbon Code

Before submitting your woodland to the rules and regulations of the Woodland Carbon Code, it is important that you fully understand the obligations, the costs and the potential benefits of doing so. We will explain those to you clearly before undertaking any work, including an estimate of the costs and income streams.

ii) Act as Project Developer for Woodland Carbon Code Projects

Gathering and compiling the data necessary to complete the Project Design Document (for validation) and the Project Progress Report (for verification) can be a complex process. CarbonStore has developed a set of procedures which minimises the trouble for you and allows us to complete the work as efficiently as possible.



iii) Co-ordinate Group Schemes and Act as Group Project Manager

As we discussed earlier, group schemes represent an opportunity for woodland owners to significantly reduce their costs of validation and verification. Our knowledge of the Code, our experienced team and the volume of projects we handle enables us to provide an efficient and effective Group Manager service.

iv) Supporting the Sale and Purchase of PIUs and WCUs by Landowners and Companies

As the woodland carbon division of Tilhill, CarbonStore already has strong links across the rural economy. We have also established strong

connections in the UK's corporate sector which comprises a large cohort of carbon credit buyers.

With feet firmly established in both camps, we are ideally placed to help landowners to sell their PIUs or WCUs and companies to buy them. We have also developed the most robust legal contracts to support the purchase of woodland-generated carbon credits.

Finally, through Tilhill, we have a wide choice of woodland carbon schemes with carbon credits available for sale, varying in location, species mix, community benefits and price. CarbonStore is therefore the leading operator in the market for brokering transactions for woodland carbon credits.

Explaining the Background to the Market for Woodland Carbon Credits

i) The Corporate Perspective

A growing number of companies are making Net Zero commitments i.e., they are reducing their CO₂e emissions from their operations as much as possible and then mitigating their residual CO₂e emissions by buying carbon credits from carbon offsetting schemes, such as woodland creation projects.

Corporate efforts to achieve Net Zero are gathering momentum. According to the FTSE 350 Boardroom Bellwether in 2022, an annual survey by the Financial Times, 89% of companies had published Net Zero commitments, against 57% in the 2021 survey.

Although there is significant scope for companies to reduce their CO₂e emissions at source, technology, for example in transport, remains insufficient for many to operate with zero emissions. As a result, demand for carbon credits is rising.

ii) The Woodland Owner's Perspective

Meantime, farmers and landowners are continually looking to maximise the income from their land. Although grant funding is already available in England, Scotland, Wales and Northern Ireland to support woodland creation projects, this only covers the capital costs necessary to establish the project. It doesn't recompense the income foregone by redeploing the farmland as woodland.

Farmers therefore need an additional income stream to make woodland creation a viable land use, relative to the other options. By enabling newly planted woodlands to sell woodland carbon credits to companies who are targeting Net Zero, carbon-related funding provides that additional income which makes woodland creation a financially attractive alternative.

iii) Estimating the Potential Carbon-Related Income for Woodland Owners

When contemplating the potential income from woodland carbon, it is important to consider the high level of fixed costs (between £30,000 and £40,000) associated with operating a project within the regulations of the Woodland Carbon Code.

Due to these costs, projects covering less than 5 hectares rarely generate sufficient carbon income to be viable and larger projects generate a significantly larger profit margin as the costs comprise a much smaller portion of the overall income.

The example detailed below considers the potential income from a 72-hectare woodland comprising predominantly broadleaves which has been issued with 19,986 PIUs (see table 5 opposite) and, assuming the trees grow "as they should," will receive a further 3,997 WCUs as the project is verified.

The woodland owner has two options:

- a) The PIUs could be sold soon after planting (see table 6 opposite). With PIUs currently achieving approximately £20 each and the additional WCUs likely to achieve (at least) £30 each, the net carbon-related income from the woodland would be approximately £490,000.
- b) Alternatively, the landowner could sell the WCUs as they are verified (see table 7 opposite). Due to the higher price of WCUs, the net income from selling 23,983 WCUs at £30 each would be approximately £715,000.

Table 5: PIUs and WCUs Issued to a Standard 80-hectare Woodland.

Years from Validation	0	5	15	25	35	45	55	65	75	Total
No. of PIUs Available for Sale at Year 0	19,986	0	0	0	0	0	0	0	0	19,986
No. of WCUs Verified at Each Vintage	0	165	2,417	8,286	4,090	3,204	1,824	712	362	19,986
No. of WCUs Rebaited to Landowner from Initial Discount	0	33	483	1,657	818	641	365	142	72	3,997
Total no. of WCUs Available for Sale	0	198	2,900	9,943	4,908	3,845	2,189	854	434	23,983

Table 6: Approximate Income Assuming PIUs are Sold Upfront.

Years from Validation		0	5	15	25	35	45	55	65	75	Total
Revenue from sale of PIUs	Assume £20 per PIU	£399,720	£0	£0	£0	£0	£0	£0	£0	£0	£399,720
Revenue from sale of WCUs	Assume £30 per WCU	£0	£990	£14,502	£49,716	£24,540	£19,224	£10,944	£4,272	£2,172	£126,360
Fixed expenses	See above	(£5,199)	(£3,758)	(£3,871)	(£4,164)	(£3,955)	(£3,910)	(£3,841)	(£3,786)	(£3,768)	(£36,252)
Net Income		£394,521	(£2,768)	£10,631	£45,552	£20,586	£15,314	£7,103	£7,103	£7,103	£490,938

Table 7: Approximate Income Assuming WCUs are Sold upon Verification.

Years from Validation		0	5	15	25	35	45	55	65	75	Total
Revenue from sale of WCUs	Assume £30 per WCU	£0	£0	£87,012	£298,296	£147,240	£115,344	£65,664	£25,632	£13,032	£752,220
Fixed expenses	See above	(£5,199)	(£3,758)	(£3,871)	(£4,164)	(£3,955)	(£3,910)	(£3,841)	(£3,786)	(£3,768)	(£36,252)
Net Income		(£5,199)	(£3,758)	£83,141	£294,132	£143,286	£111,434	£61,823	£21,846	£9,264	£715,968

The Purchase and Sale of Woodland Carbon Credits

i) Understanding Companies' Ambitions

With Net Zero still a voluntary undertaking for most companies, they have many factors to consider when selecting a suitable woodland from which to purchase carbon credits. The most obvious issue is size: What are their residual CO₂e emissions and how many carbon credits do they need to buy?

Companies are also keen to maximise the promotional benefits associated with their environmentally responsible investments. They are therefore keen to capture photos of the woodland, they would sometimes like to erect a sign highlighting their important contribution to the woodland and they often want to encourage their employees to visit the woodland and appreciate its benefits.

ii) Explaining the Woodland Owner's Responsibilities

We mentioned earlier that the sale of a PIU represents a 'promise' by the woodland owner to capture a tonne of carbon as the trees from their woodland grow

and mature. As such, there is a responsibility on the woodland owner to manage the woodland properly and ensure the trees grow healthily.

If the woodland fails to grow due to negligence, the woodland owner will be liable to the company for some corrective action. It is also important that companies understand, if they are taking photos of the woodland and arranging onsite visits for their employees, that they must be respectful and considerate of the woodland owners' property.

iii) The Importance of Robust Legal Contracts

As the above suggests, it is important that these various rights and responsibilities are clearly understood and agreed by both parties before any sale can be completed. CarbonStore has therefore worked hard to develop the most comprehensive and robust legal agreements for woodland carbon transactions in the market.

The Different Approaches to Selling Carbon

Until now, global voluntary carbon markets have developed their own unique and slightly opaque modus operandi. This is as true for cooking stove offsetting projects in Sudan and solar energy projects in India as it is for woodland-based offsetting schemes in the UK.

The main elements matching these offsetting projects and their carbon credits with their end-users, the companies wishing to offset their carbon emissions, have been intermediary organisations. Although such intermediaries fulfil an important role, akin to a broker, they have blurred the market.

The Conventional Approach to Selling PIUs and WCUs

This 'blurring' is neatly illustrated by the conventional approach used to sell woodland carbon in the UK. Until now, intermediary-type companies have purchased carbon units directly from landowners. They then hold them on their balance sheet before selling them onto companies in a separate transaction (see *diagram below*).

Although such companies often undertake the validation and verification for landowners, their profits are ultimately influenced by the price difference between their purchase cost from the landowner and their sales price to the corporate. As a result, the true value of PIUs and WCUs has become blurred.

The Traditional Approach to Selling PIUs/WCUs vs CarbonStore Approach



CarbonStore's Approach to Selling PIUs and WCUs

CarbonStore adopts a wholly different approach which, by matching landowners wanting to sell PIUs and WCUs directly with companies wanting to buy them, ensures complete transparency in the prices paid to or by each party in the transaction.

Moreover, CarbonStore, by charging a percentage-based commission fee for arranging the transaction ensures that the rewards and costs of woodland-based carbon offsetting services are equitably distributed between the two most important parties in the transaction.

Developing a More Informed and Engaged Landowning Base

With prices for PIUs and WCUs rising, carbon funding is becoming an increasingly significant source of income from woodland creation. However, for landowners to access this revenue properly, it is important they understand the Woodland Carbon Code, the commitments it asks of landowners and the various forms, spreadsheets, and inspections which it entails.

We, at CarbonStore, hope this brochure, by explaining the key principles underpinning the Woodland Carbon Code and the main steps involved, helps to achieve that goal. However, it would require intensive tuition to explain every aspect of the Code.

The Five Steps for Buying and Selling Woodland Carbon Credits

The sale of PIUs and WCUs involves five straight-forward steps (see *diagram*):

1) Promoting the Scheme

The first step involves promoting the scheme to potential buyers. CarbonStore produces a brochure detailing the project's key details alongside its benefits to the local ecology, community, and economy. We send this brochure to our clients and also promote it through the 'Carbon Projects' page on our website. It is also distributed via our social media platforms.

2) Attracting a Buyer

As discussed earlier, CarbonStore enjoys strong links to the corporate sector which we are actively developing. These connections ensures that your project will enjoy the widest possible awareness and the maximum interest from the target audience.

3) Agreeing Price, Access and Signage Rights

A transparent and equitable price for PIUs and WCUs is vital to the woodland carbon market's success. Accordingly, we publish a regular newsletter offering updates on recent pricing trends and transactions across the market. We will help both parties agree a price which fairly reflects the species mix, ecological merits, location and accessibility of the woodland.

4) Completing the Legal Agreements

We explained earlier that the sale of a PIU represents a promise, by a woodland owner, to sequester one tonne of CO₂e as their trees grow so that, in time, they deliver a verified WCU. This is an important commitment which, for the sake of the wider market, must be upheld.

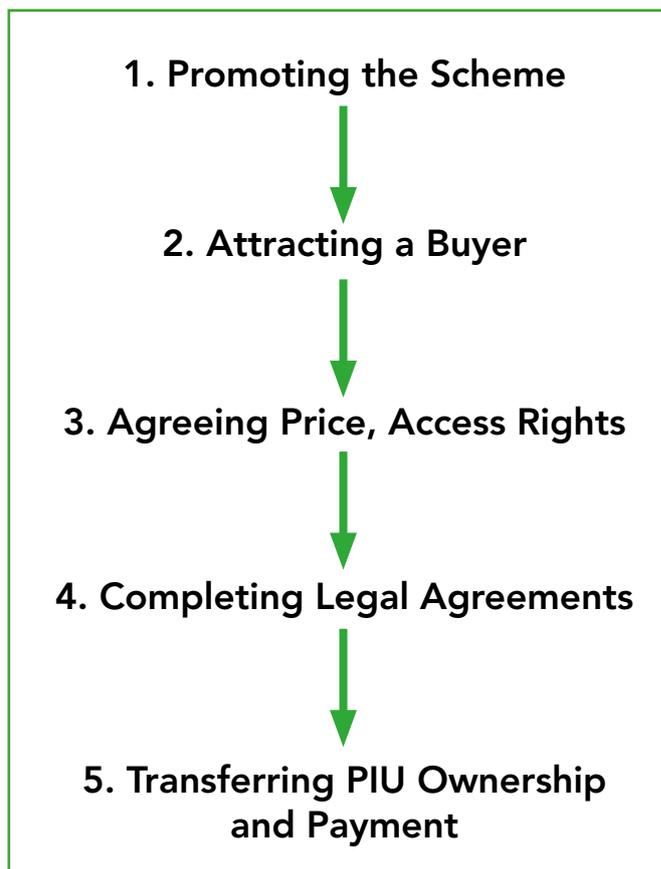
Woodlands are a natural asset and this can leave them susceptible to unavoidable events, such as wind, disease, and fire. These are no one's fault and it is important that their risks are reasonably apportioned in any agreement between the buyer and seller of a PIU.

On the other hand, crop failure may result from poor woodland management. Unlike the force majeure circumstances previously described, poor silviculture is wholly avoidable and we believe it is important to reflect this in the legal agreements.

5) Transferring PIU Ownership and Payment

This final task is undertaken by the Project Developer on the UK Land Carbon Registry. Once the agreed payment has been received, the Project Developer transfers the units to the corporate buyer's account on the registry.

The Five Steps to Securing the Sale of Carbon Units



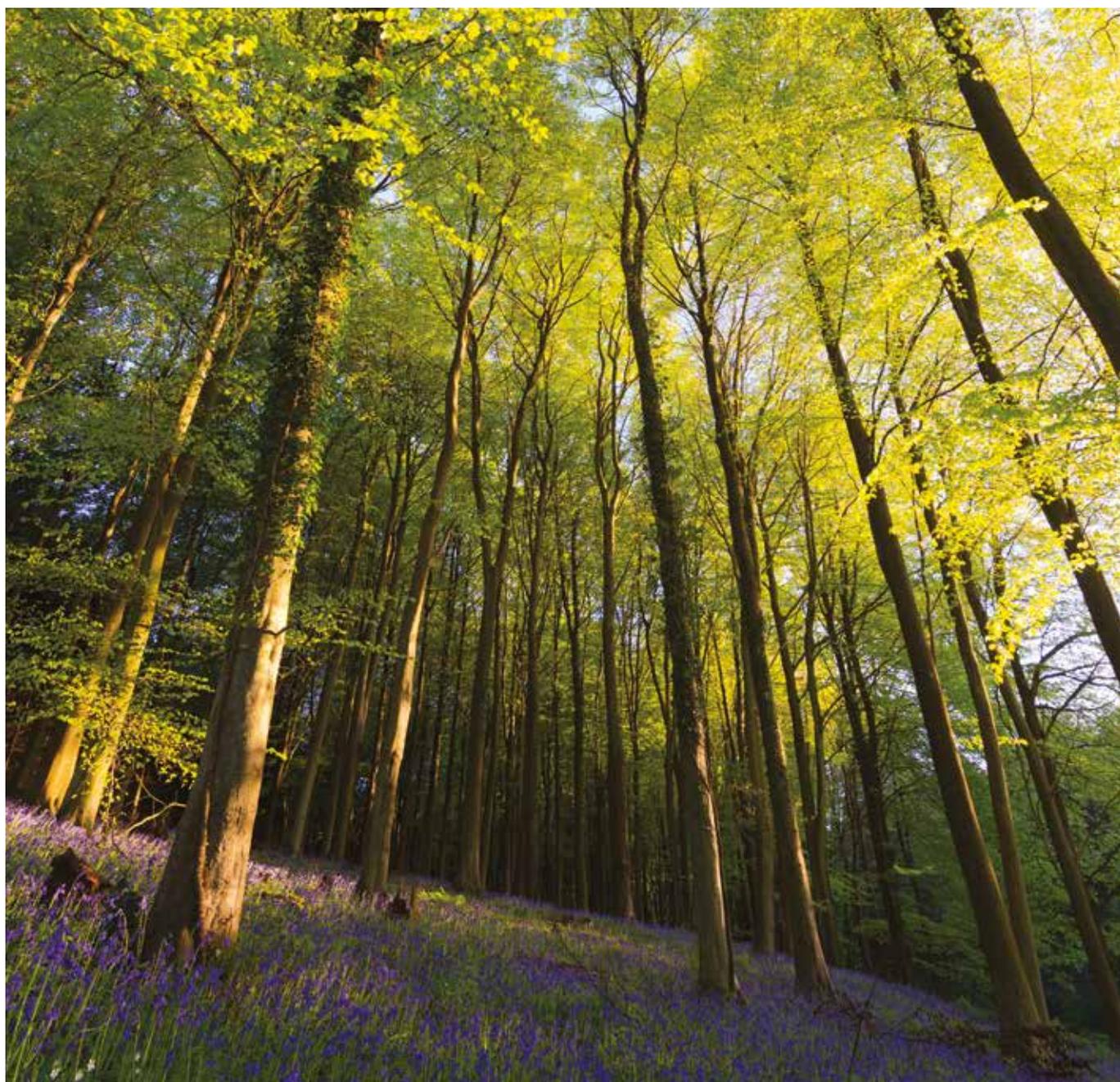
Please note that an important obligation of both landowners and project developers, contained in the Landowner Commitment Statement and the Project Developer Agreement, is that they ensure buyers of PIUs and WCUs 'make true and accurate carbon statements about the project'.

A Healthy and Constructive Relationship between Landowners and Companies

Understandably, both landowners and companies want to ensure that they are selling or buying units to or from a partner that they are comfortable with. It is important to many landowners to know that the companies buying their units are reputable, and that they are already doing everything they possibly can to reduce their Greenhouse Gas (GHG) emissions. For investors, they want to invest in the best possible projects in the market, maximising the social, environmental and ecological benefits that the woodland creation can provide. Therefore, at CarbonStore, we introduce landowners to potential investors as early as we possibly can in the process, helping to develop this crucially important relationship from day one. This can even be pre-planting!

Of course, the objectives and needs of one company can vary enormously to those of another, and this is the same for landowners. CarbonStore helps to match the most appropriate projects with the most suitable companies, to ensure that both the landowners and investors are happy. There are a variety of wants and needs from companies that landowners should be aware of, but the landowner should feel confident that they only need to agree to those objectives that they themselves feel comfortable with.

For example, many companies are interested in bringing staff or customers to the woodland to plant some of the trees themselves. This can really help to highlight how important the woodland creation is to the company, and to strengthen the attachment to the woodland for the staff and customers. Although, if the landowner would prefer to keep all the woodland planting 'in house' then that is absolutely fine, and they are under no obligation whatsoever to allow more access than they are comfortable with.



Glossary of Terms

Additionality – A project is ‘additional’ if it, and the activities supported by it, are not legally required and could not have taken place without carbon finance.

Area – Carbon can be claimed for the net woodland area rather than the gross area.

- **Net woodland area** is the area of a project planted with trees or allowed to regenerate naturally. It excludes any designed or other open areas.
- **Gross woodland area** is the area of a project including any open areas. This can include designed open ground as well as other open land or water bodies.

Assignment – Labelling/Assigning a Pending Issuance Unit on the UK Woodland Carbon Registry with the name of the buyer. Assigned units cannot be re-sold, but they can be used and ‘retired’ once they are verified.

Barrier – Any obstacle to reaching a goal that can be overcome by a project or measure.

Baseline – The projected changes to carbon on the site if the project weren’t to go ahead (the ‘business as usual’ scenario). This is a reference projection to which the carbon benefits of project activities can be compared over the project lifetime.

Buffer – A carbon pool of ‘unclaimed carbon’ to cover unavoidable potential losses which may occur from the project over time, thus ensuring the permanence of verified Woodland Carbon Units. The unit type for buffer credits is ‘PIU Reserve’ or ‘WCU Reserve’.

Carbon pool – A system that can store and/or accumulate carbon, e.g. above-ground biomass, leaf/needle litter, dead wood and soil organic carbon.

Carbon reporting – Involves a carbon owner or organisation reporting carbon sequestration in their annual environmental or greenhouse gas report. This can only be done once, after the carbon is sequestered, and the relevant number of units should have been ‘retired’ from the UK Woodland Carbon Registry. *See Carbon statement.*

Carbon sequestration – Direct removal of carbon dioxide from the atmosphere through land-use change, afforestation, reforestation and/or increases in soil carbon.

Carbon statement – a statement of what a project will sequester or has sequestered to date. It can be restated by more than one party with an interest in a project. *See Carbon reporting.*

Carbon dioxide (CO₂) – A naturally occurring gas and by-product of burning fossil fuels or biomass, land-use changes and industrial processes. It is the principal

anthropogenic (caused by human activity) greenhouse gas that affects the Earth’s climate.

Carbon offsetting – A way of compensating for greenhouse gas emissions by making an equivalent carbon dioxide saving elsewhere. This currently involves calculating emissions and then purchasing Kyoto compliant ‘credits’ from emission-reduction projects elsewhere. Kyoto compliant woodland creation can currently only occur outside the UK. This will change in 2020 once the Paris Agreement comes into effect.

Climate change – Change or changes in the climate which can be directly or indirectly attributed to human activity (UNFCCC Article 1).

CO₂e (Carbon Dioxide Equivalent) - This is a standard unit for measuring carbon footprints. The idea is to express the impact of all major greenhouse gases in terms of the amount of CO₂ that would create the same amount of warming. That way, a carbon footprint consisting of lots of different greenhouse gases can be expressed as a single number.

Compensatory planting – New woodland created to compensate for woodland lost elsewhere which provides at least the equivalent woodland-related net public benefit embodied in the woodland which was removed (e.g. for development (windfarms or in urban areas) or where woodland is removed to restore open habitats).

Deforestation – Permanent or long-term removal of woodland; the direct, human-induced conversion of forested land to another land use, or the long-term reduction of the tree canopy cover below the minimum 20% threshold.

Double-counting – There are a number of issues which might result in double-counting:

- **Double-selling** – The same carbon unit is sold more than once to different parties. The incidence of this can be minimised by the use of a carbon unit registry.
- **Double certification** – The same carbon project is validated/verified against two or more carbon standards. The incidence of this can be minimised by insisting that projects only use one registry and carbon registries ensure that a project is not already registered on another carbon registry.
- **Double-monetisation** – A carbon unit in an Annex 1 country is monetised once as a voluntary unit by a project and a second time by the project host-country’s government as an allowance (Assigned Amount Unit or Removal Unit). This is an issue in most Annex 1 countries.

- **Double-claiming** – An organisation or government makes a claim about the same unit of carbon reduction as another organisation. It may be perceived as satisfactory that an organisation claim ‘we created a carbon neutral product’ and another organisation claims ‘we sell a carbon neutral product’ or government claims ‘we reached our emissions reduction target’.

Environmental Impact Assessment (EIA) – These regulations apply to forestry related projects. If the Forestry Commission/Natural Resources Wales/Forest Service considers that project proposals may have a significant effect on the environment then the proposer must obtain consent for the work from the relevant body and submit an Environmental Statement as part of the application for consent.

Forest – See ‘Woodland’.

Greenhouse Gases (GHGs) – The gases which are causing the warming of the Earth’s atmosphere that is leading to climate change. The Kyoto Protocol deals with six of these: carbon dioxide, hydrofluorocarbons, methane, nitrous oxide, perfluorocarbons and sulphur-hexafluoride. These contribute to the ‘greenhouse effect’.

Group Scheme – A group of projects that work together to gain validation/verification. These projects will be coordinated and overseen by a group scheme manager. The group scheme manager is responsible for ensuring that all projects within the group conform to the Code.

ICROA – The International Carbon Reduction and Offset Alliance is a non-profit organisation made up of the leading carbon reduction and offset providers in the voluntary carbon market.

IHS Markit Registry – The online register of properties that have registered for the WCC is held by a consultancy company called IHS market.

Individual Project – A project that is registered, validated and verified under the Woodland Carbon Code by itself, in its own name by a Project Developer, in contrast to a group scheme.

Kyoto Protocol – the Kyoto Protocol is an international agreement linked to the UNFCCC. The major feature of the Kyoto Protocol is that it set binding targets for 37 industrialised countries and the EC for reducing GHG emissions in the first accounting period of the Protocol (2008 and 2012). In 2012 the Durban Agreement has set accounting rules for the second accounting period (2013– 2020). See also the Paris Agreement at www.unfccc.int.

Landowner Commitment Statement – This details all the commitments required of the landowner in order to validate their project with the Woodland Carbon

Code. Further details are available on the Code’s website.

Land Carbon Registry – see *IHS Markit Registry*.

Leakage – is GHG emissions outside the project boundary as a result of the project (e.g. displacement of agricultural activities might result in deforestation or intensification of use of non-wooded land elsewhere).

Long-term average carbon stock – The mean carbon stock over the long-term in a woodland, averaged over several whole rotations, if clearfelling. For projects where there is no clearfelling the long-term average is assumed to be no less than the carbon predicted to be sequestered by Year 100, for a given scenario. For sites where clearfelling is proposed, then the long-term average is calculated over several whole rotations of a given length, where the carbon stock onsite varies from zero at the start of each rotation to a maximum just prior to clearfelling.

Monitoring Report – A report/spreadsheet summarising the results of monitoring by field survey carried out prior to each verification.

Organic Soil – Soil which contains more than 50cm deep organic (or peat) surface horizon overlaying the mineral layer or rock.

Paris Agreement – the Paris Agreement, which came into force in 2016, is the international agreement, following on from the Kyoto Protocol, in which every country determines, plans and regularly reports its contribution to mitigate climate change. At the time of writing it had been ratified by over 85% of 197 countries. See also the Kyoto Protocol at www.unfccc.int.

Pending Issuance Unit (PIU) – The purpose of these units is to demonstrate the quantity of potential future sequestration. PIUs will help to keep track of up-front sales/purchases but they cannot be retired or used/ reported.

Permanence – The issue of ensuring that removal of carbon dioxide from the atmosphere is permanent, and not reversed at a future point in time. Woodland projects carry a risk of reversibility and as such safeguards must be in place to minimise that risk and to guarantee replacement or alternative woodland should a reversal occur.

Project Design Document – A document created by the project developer for validation to describe how the project meets the requirements of the Code at the outset.

Project Developer – The individual or company who represents a project/group through the validation/ verification process or in the UK Woodland Carbon Registry. The project developer could be the landowner, a third party representing the landowner, or the group manager.

Project Developer Agreement – The commitments undertaken by the project developer when agreeing to supervise a project through validation and verification.

Project Duration – The time over which project activities are to be monitored, verified and carbon sequestration claims are to be made. Projects can be up to 100 years in duration.

Project End Date – The last day a project accounts for carbon sequestration. Project end date = project start date + project duration. If start date = 01/04/2013 and project duration is 100 years, then end date is 31/03/2113.

Project Implementation Date – The date when planting begins (or fencing/deer control for natural regeneration).

Project Progress Report – A report created by the project developer for verification to demonstrate how the project continues to meet the requirements of the Code.

Project Registration Date – The date when a project moves from 'Draft' to 'Under Development' status in the UK Woodland Carbon Registry.

Retire – Moving a Woodland Carbon Unit on the UK Woodland Carbon Registry to a publicly available 'retirement' account to show it has been taken out of circulation and cannot be used again.

Reversal – A reversal is when the net greenhouse gas benefit of a project, taking into account the baseline, leakage and project carbon sequestration, is negative in a given monitoring period. The size of the reversal is the net carbon sequestration at the current verification minus the net carbon sequestration at the previous verification.

'Small' – Project is a single project with five hectare net planting area or less where the small project process is used.

Standard Project – Single woodland creation project which can be any size but and can constitute several individual blocks of woodland with planting spanning up to a five consecutive planting seasons; blocks of woodland must be part of a contiguous land ownership unit or must be under the same ownership and management plan.

UK Woodland Carbon Registry – the official record of the location of projects, the predicted and actual carbon sequestration as well as the owners and retirement of carbon units.

Validation – The initial evaluation of a project against the standards of the Woodland Carbon Code, undertaken by a certification body accredited by the UK Accreditation Service.

Validation/Verification Body – independent third-party organisations accredited by the UK Accreditation Service to validate or verify Woodland Carbon Code projects.

Verification – The ongoing evaluation of a project against the standards of the Woodland Carbon Code, undertaken by a certification body accredited by the UK Accreditation Service to assess against the WCC. Verification assesses the carbon sequestration that has actually occurred as well as continuing sustainable forest management.

Vintage – The time period in which credits are delivered. For the Woodland Carbon Code, the delivery of carbon is predicted and verified in five or ten-yearly blocks (e.g. 2017–2027); each time period is known as a vintage.

Voluntary Carbon Market – The Voluntary Carbon Market (VCM) was formed with the aim of driving finance to activities that reduce greenhouse gas (GHG) emissions.

WCaG – Woodland carbon guarantee (the £50m fund set aside by government to buy Woodland carbon units at auction)

WCC – Woodland Carbon Code (the standard).

WCF – Woodland carbon fund (a separate grant scheme in England).

Woodland – Land under stands of trees with a canopy cover of at least 20% (25% in Northern Ireland), or having the potential to achieve this. This definition includes integral open space and felled areas that are awaiting restocking (replanting) (This definition is also applicable to 'forest').

Woodland Carbon Unit (WCU) – When a project is verified, PIUs which have been confirmed as sequestered will be transferred to WCUs. These units can be considered as guaranteed, delivered carbon 'credits', and as such can be retired and used/ reported.

Woodland creation – The direct, human-induced conversion to woodland of land that has not previously been forested according to historical records. The Code sets a threshold of a continuous absence of woodland over the previous 25 years.



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