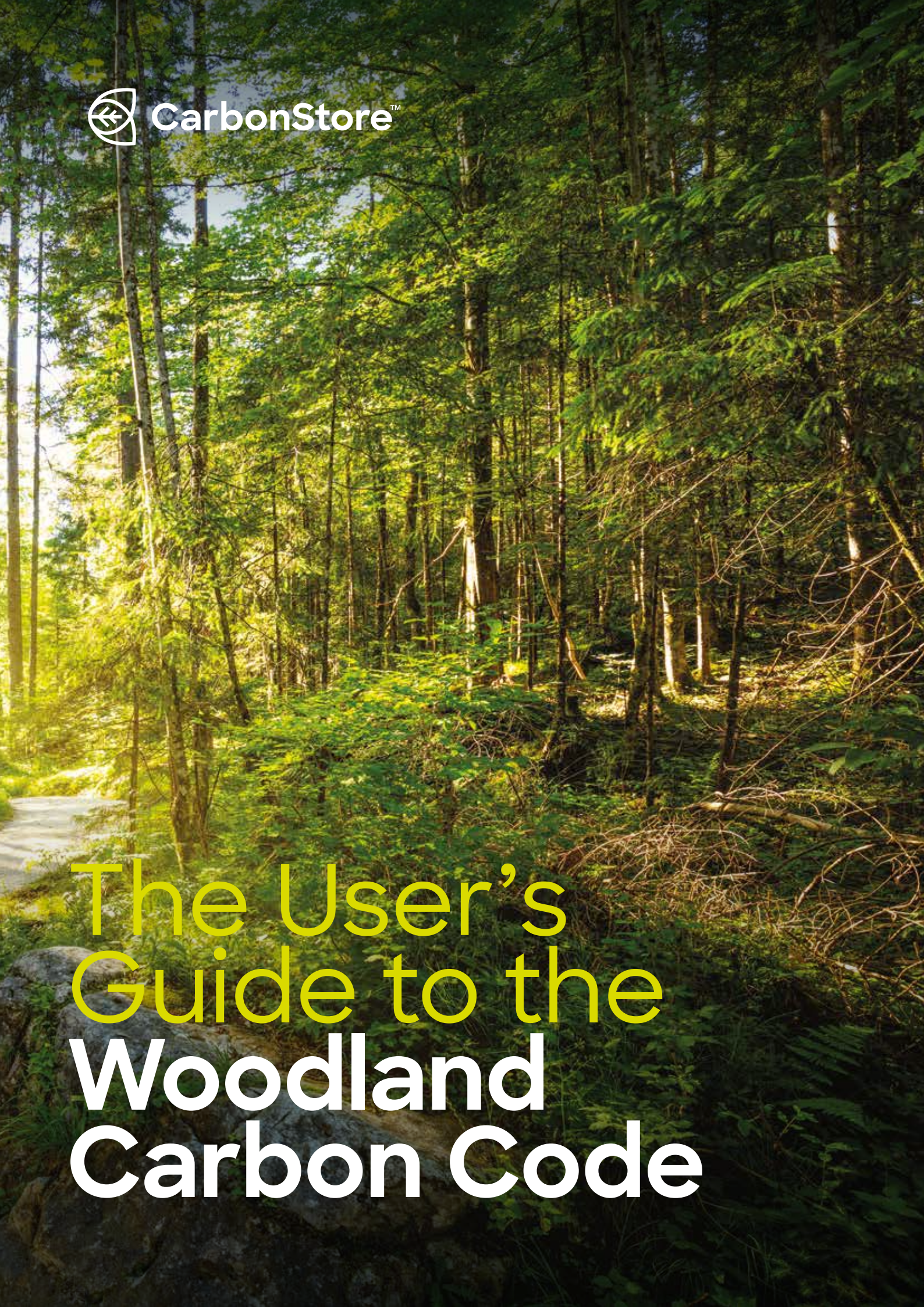


The User's Guide to the Woodland Carbon Code

Contents

Welcome to CarbonStore

Navigating the woodland carbon market can be complex, filled with intricate regulations, detailed paperwork, and critical processes. At CarbonStore, we make this easy.

Our expert team simplifies every step, from registration and validation to the sale of carbon units, handling all the complicated elements so you don't have to.

This comprehensive guide explains clearly how the woodland carbon market works, outlines what you need to know about the Woodland Carbon Code and demonstrates how CarbonStore's unique services efficiently connect responsible businesses with landowners.

Whether you're aiming to offset your carbon emissions, maximise the income from your land, or diversify your income, CarbonStore will guide you with confidence, clarity and experience through every stage.

Proud to have worked with:

National Trust · CPI EuroMix · mclaren packaging · sWc The Shared Wood Company · selco BUILDERS WAREHOUSE · ENGIE

CarbonStore: Supporting the Woodland Carbon Market

Our Services Cover All Aspects of the Woodland Carbon Market

The Woodland Carbon Code is the carbon standard for woodland creation in the UK. It establishes the rules and protocols which woodlands and their owners must follow to generate trusted, reliable and increasingly valuable woodland carbon credits.

Unfortunately, the Code is complicated. It uses many acronyms and a lot of jargon. There are deadlines to heed and costs to beware of. It also involves a large volume of paperwork. At CarbonStore we will help you smoothly navigate and understand these various complications.

In addition, the market for woodland carbon credits is evolving rapidly. There are different options for selling your carbon credits and various ways to maximise their value. For example, the Woodland Water Code and the Woodland Carbon Code's biodiversity metric both offer interesting opportunities. Here too, CarbonStore is ideally placed to guide you through the process so that you maximise all the potential value within your young woodland.

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.

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.

Co-ordinate Group Schemes and Act as Group Project Manager

Thanks to our experienced team and our leading position within the market, CarbonStore can help you reduce the audit costs for your project by almost 50%.

We do this by grouping projects together. Once again, we can explain the details of this process if you are interested in exploring this option further.

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

Since our establishment in 2019, CarbonStore has developed strong links with companies looking to buy woodland carbon credits. As a result, we have helped transact over 0.5mn carbon credits and established ourselves firmly as one of the markets leading brokers.

As the market develops, companies are adopting more original ways to procure carbon credits. Many are content to buy them as validated PIUs or verified WCUs (explained on pages 25 to 33) however certain larger buyers are keen to partner with landowners through the design stage and before planting starts.

For landowners, this presents the opportunity both to fund the planting costs and to guarantee a long-term income stream during the planning process. In such situations, we help landowners fully understand the benefits and drawbacks of these arrangements.

Carbon Sequestration

The Basics

Carbon sequestration describes the process in which carbon dioxide (CO^2) 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 CO^2 and water into carbohydrates and oxygen through photosynthesis.

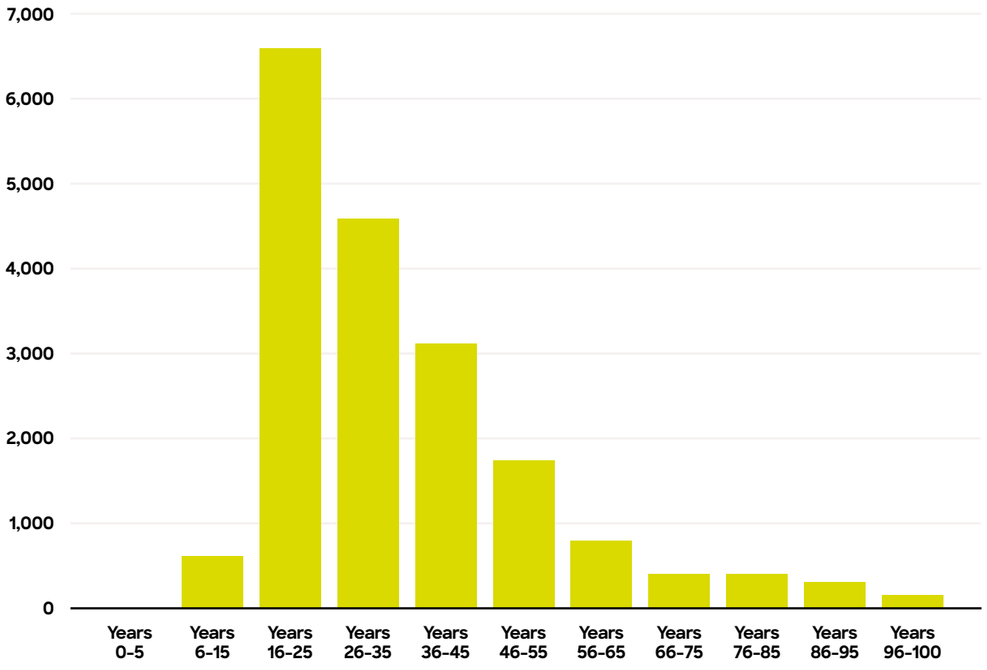
These carbohydrates form the building blocks for the biomass of the tree and, therefore, the storage of carbon.

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 CO^2, 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 CO^2 as they are sequestering

Carbon capture (tonnes CO^2e)

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 shows that CO^2 removals peak between years 16 and 25 of a tree's life. ***See chart 1 above.***

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.

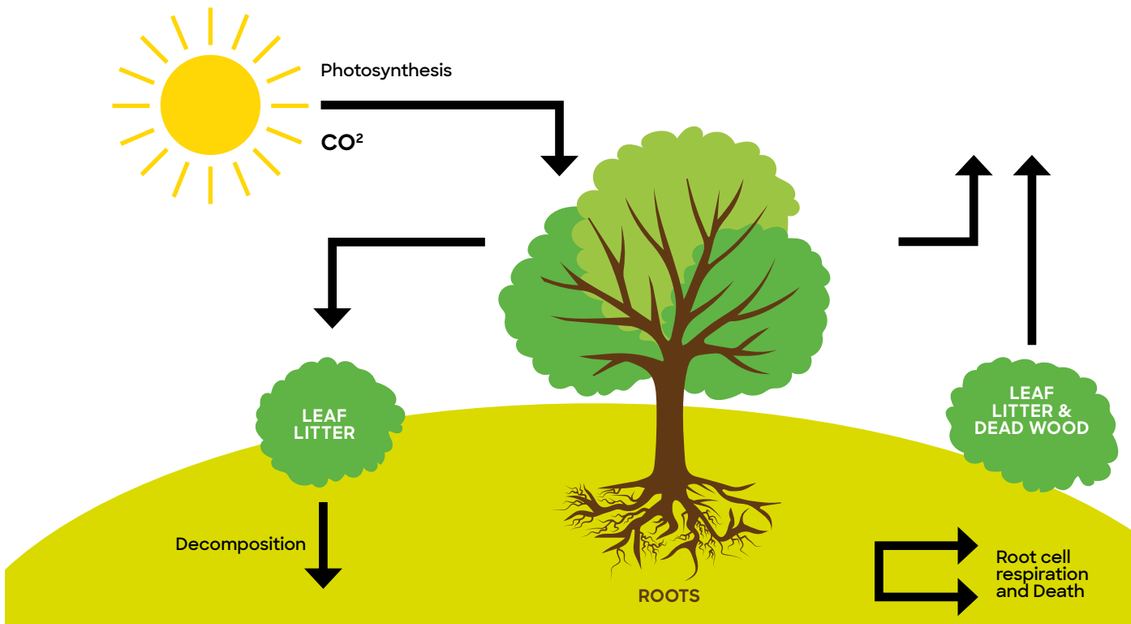
A carbon sink
is any reservoir that absorbs more carbon than it releases.

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 The Woodland Carbon Code is currently developing its Biodiversity Metric which assesses the species mix, area, location etc of a new woodland and quantifies the biodiversity benefits generated by its planting. The hope is that, by highlighting these benefits, the value of the accompanying carbon credits increases.

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%. Forest Research is currently developing the Woodland Water Code which aims to quantify and evaluate this benefit and Flood Mitigation credits could be available for woodlands planted in specifically designated areas.

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. The Woodland Water Code also aims to quantify and evaluate woodlands' ability to cleanse water of its 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 content (i.e. energy used in its processing, production, and transport, from tree to consumer use) of any mainstream building material, and significantly less than that of 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 CO^2e?

In practice, there are seven greenhouse gases (GHG) which the Kyoto Protocol identified as contributing to global warming. Carbon dioxide (CO^2) is the most prevalent, accounting for 80% of GHG emissions.

This is followed by methane (CH^4), which comprises 10%, and nitrous oxide (N^2O) 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 CO^2.

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 CO^2e to neutralise its impact on the earth's warming.

By using one tonne of CO^2e 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.

Forests not only provide a store of carbon in the landscape. The timber which they generate, when used in the construction industry, provide an additional long-term store of carbon dioxide. Moreover, it has the lowest embodied carbon content of any construction material being 73% lower than that of steel.

The report noted that, in 2017, the total emissions from agriculture, land use and peatlands across the UK was 58 million tonnes of CO^2e (carbon dioxide equivalent). However, the CCC argued that, 'with ambitious steps,' these emissions could be reduced by 64% to 21 Mt CO^2e 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 14.5% currently to 16.5% by 2050, through planting 30,000 hectares each year until 2050, our newly planted forests and woodlands would be sequestering 14 Mt CO^2e 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.

Breaking this ambition down by country, Scotland aims to be planting 18,000 hectares per year between now and 2030 and England is committed to planting 7,500 hectares annually to 2030. Meantime, 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. Over the next 3-4 years, we must increase the area of annual tree planting across by the UK by 150% 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.

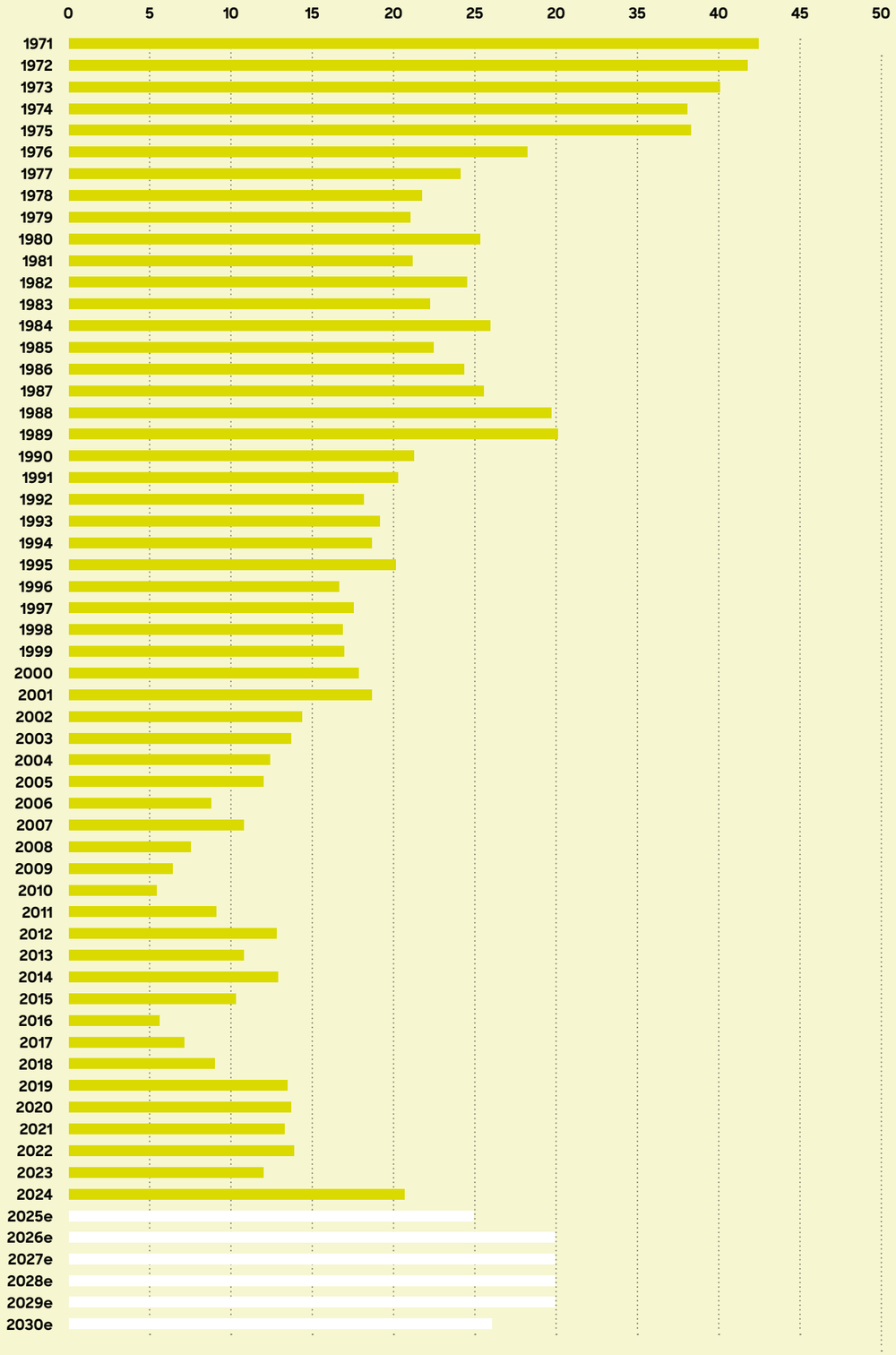
The UK government has developed a standard which, by quantifying these benefits (it calculates the tons of CO^2e sequestered per hectare of woodland, depending on the species mix, growing conditions, management regime etc.), and regulating the issuance of carbon credits, creates a credible, valuable 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.

Carbon capture (tonnes CO^2e)

Chart 2:
Area of New Planting ('000 hectares)



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 importance 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 the ICVCM, the Integrity Council for Voluntary Carbon Markets.

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.

Forestry Commission · Scottish Forestry / Coilltearachd na h-Alba · Forest Research · HM Government · Llywodraeth Cymru / Welsh Government

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 CO^2e.

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:

1. 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?).

2. 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).

3. 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: the buffer. We explain more on this below.).

4. 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).

5. 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).

6. 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).

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 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 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 are 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 much confidence can companies have that their carbon credit represents one tonne of CO^2e removed from the atmospohere? 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.

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:

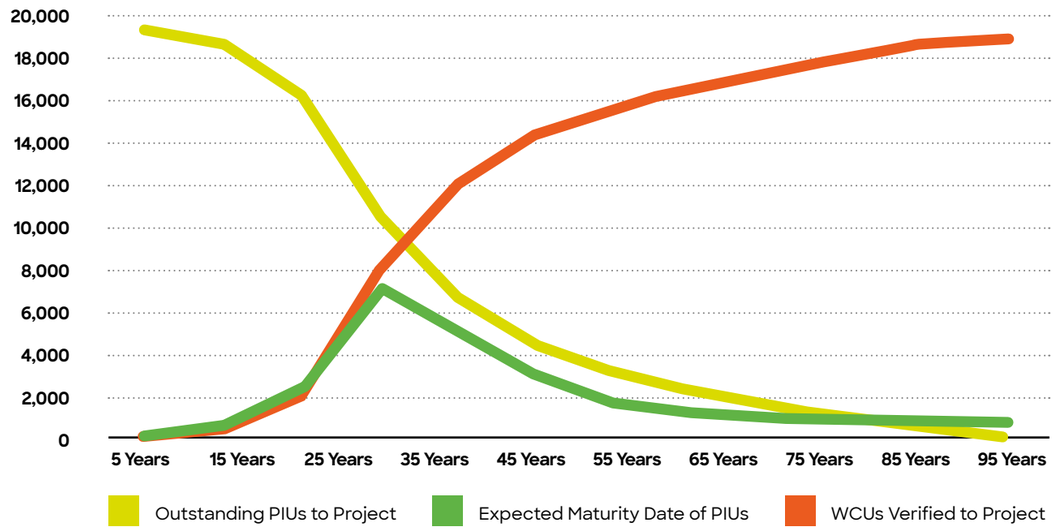
Pending Issuance Units (PIUs)
The first type is called Pending Issuance Units, usually known as PIUs. They are issued soon after the trees are planted and the volume of PIUs issued is determined by the Code's carbon calculator. PIUs help solve the long-standing challenge of trees and time. On the one 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 overcomes this problem by enabling woodland owners to realise some income early in their woodlands life. As this all suggests, a PIU represents a promise, by a landowner, to sequester one tonne of CO^2e 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.

Woodland Carbon Units (WCUs)
The second type is called Woodland Carbon Units, often referred to as WCUs. They are the successors to PIUs as each WCU represents one tonne of sequestered CO^2e. 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.



Credit National Trust, Paul Harris

The UK 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 location and status of every woodland which has been approved by the Code, alongside the volume of PIUs and WCUs issued to each project. In addition, it records the ownership of every PIU and WCU, whether it has been sold and, if so, to whom. 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).

  The advantage of this approach is to keep the process relatively clean and simple. However, it means you will be submitting your project as an "individual project" (see glossary) who's validation and verification audit fees are 3-4x higher than if it is submitted as part of a "group" (see more below).

- **OR use Tilhill's aster account.**

  This involves registering and validating your woodland under CarbonStore/Tilhill's master account.

  Although it carries no greater commitments for you, it significantly reduces the validation and verification audit fees (see further details in the Grouping Projects section on page 17).

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

The Woodland Carbon Code's carbon calculator

The carbon calculator allows us to predict the volume of CO^2 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:

1. 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.

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

2. Emissions from Establishment:
As we explained earlier, the creation of a woodland generates carbon emissions. This section quantifies the volume of CO^2e emitted from fencing, spraying, tree shelters and any road building and subtracts these emissions from the volumes sequestered by the woodland.

Emissions from Establishment	Spacing (m)	Area (ha)	tCO^2e/ha	tCO^2e
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^2e/km**	**tCO^2e**
Roads		0.00	-43.13	0.0

3. 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 CO^2 to be sequestered based on specific parameters.

4. 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^2e)	PIUs to Buffer (tCO^2e)	PIUs to Project (tCO2e)
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 CO^2 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 CO^2e 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.

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 high integrity 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."

-

To fulfill this mandate, the Woodland Carbon Code outlines strict protocols and procedures which all woodland carbon projects must adhere to during the validation and verification process. It has also appointed two independent bodies, Organic Farmers and Growers and the Soil Association, to undertake the associated audits.

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 commence validation within 2-3 months of planting however please note that it can take 12-18 months before the PIUs are issued and the process is completed. 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 high integrity 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 fail 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 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 a plan is in place to monitor and maintain the trees so that a healthy woodland emerges.

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:

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 range between £1,800 and £2,400 per project, though this cost can be reduced significantly if a project is placed within a group (see details on grouping projects below).

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. S&P Global charge £0.15 per PIU for these services which must be paid before any PIUs can be issued.

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 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 compilation of suitable maps, 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 the validation and verification work 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.

Costs Associated with Validating a Project.

Itemised Costs		£
Cost of Validation	Standard charge levied by auditor	2520
S&P Global Registry Fees for Issuing PIUs	Levied at £0.15 per PIU	891
Total Costs		**£3,411**

Grouping Projects

We mentioned earlier that it is possible to reduce the audit fees for a project by placing it within a group, usually containing three or four other projects. This can generate meaningful cost savings over a project's duration, as the table below illustrates.

Projects are registered individually and then placed within a group during the validation process with the cost savings generated because the auditor can apply a "sampling approach" to their audit which reduces the number of projects required for audit.

Each group requires a group manager, who must also be the project developer for each project. The group manager liaises with the project owners and coordinates interactions with the auditors during validation and verification.

Due to the number of projects which we are validating, CarbonStore regularly undertakes the group manager role for woodlands which have been planted by smaller, independent forest managers. We require the woodland owner to sign up to the group agreement, provide information promptly and accurately and to inform us of any significant changes to the woodland. For example, if the ownership changes or if any force majeure event damages the trees.

The nature of the Woodland Carbon Code means the group manager/project developer develops a long-term relationship with the project owner. As such, CarbonStore can keep project owner's abreast of any significant developments emerging both across the woodland carbon market generally and the Woodland Carbon Code in particular.

Step 3: Verifying a Project under the Woodland Carbon Code

The final step in a woodland's path to being issued with Woodland Carbon Units (WCUs) i.e., the legally recognised carbon credits representing a tonne of sequestered carbon (as opposed to the promise of such, denoted by a PIU), involves its verification. It is important to recognise that this is a requirement of all high integrity projects, without which the carbon credits would lose much of their credibility and value.

In practice, verification entails a monitoring survey of the woodland which informs the Project Progress Report (PPR). The PPR also updates various details, such as the management regime, harvesting plans etc., from the Project Design Document which was completed at validation. A woodland must be verified initially within five years of the project's start date i.e., the date on which planting was completed and thereafter at least every 10 years.

There are five steps associated with the verification process:

1. Monitoring / Mensuration Survey

This starts with a stratification of the woodland, dividing it into appropriate strata and identifying the location of each plot. The Woodland Carbon Code's monitoring survey template also needs to be completed and the proposed survey plan must be approved by the nominated verification body i.e. Organic Farmers and Growers or the Soil Association.

The woodland is then ready for its monitoring survey. Please note that the year 5 survey is slightly different from those in years 15, 25 etc.:

- **Year 5 Monitoring Survey:**
  Although various details are gathered, such as average height, species mix, loss rate etc, this is essentially a stocking density survey, and the Woodland Carbon Code requires the stocking density on all approved sites to be no more than 10% below target. If the stocking density is less than 90% of target, remedial action is required (see below)

- **Mensuration Survey at Years 15, 25 etc.:**
  This involves counting all the trees within a plot, estimating their height and measuring their breast height diameter. This allows the volume of captured carbon to be calculated which then informs the volume of PIUs that can be converted into WCUs.

The survey results offer a useful update on the woodland's progress for its forest manager so, if needed, we can arrange a call after the survey is completed to discuss the results and highlight any areas warranting attention.

2. Project Progress Report

This 18-page document is the sequel to the Project Design Document, completed at validation. Alongside the results from the monitoring / mensuration survey, any updates to the project's management plan, its ownership, and its environmental credentials must be inputted, alongside photographs from each plot which were also captured during the survey.

The PPR, alongside all the accompanying evidential documents are then sent to the validation/verification body for the audit.

3. Submission to Independent Auditor

As the approved auditing bodies, either Soil Association or Organic Farmers and Growers will complete the verification audit. This involves checking that the claims within the PPR are accurate and that the related documents corroborate each other.

The auditor will also undertake their own independent assessment of the monitoring / mensuration survey to confirm its accuracy. This usually raises certain questions which CarbonStore, as the woodland's project developer, answers and resolves.

4. Verification Rating by the Woodland Carbon Code

Depending on the results of the audit, the Woodland Carbon Code will issue a verification statement which will have a green, amber, red or "not verified" rating. Each rating has different implications for your woodland and the WCUs issued to it:

Green Rating (unmodified)

This implies that "the project delivered all carbon units within the current vintage and there are no concerns about the ability of the project to deliver units in future vintages."

Amber Rating (modified)

This suggests "the project delivered all carbon units within the current vintage but is verified subject to ongoing corrective actions being completed." That corrective action might involve something like a beat up and provided that is completed, there will be no concerns as to the project's ability to capture the volume of carbon implicit in the number of PIUs issued.

Red Rating (adverse)

This denotes that "the project failed to deliver all carbon units within the current vintage and/or there are concerns about this project's ability to deliver sufficient units in future vintages." This occurs if the stocking density is more than 30% below target in any of the strata across the net planted area. Again, remedial action can rectify the situation but this will be more substantive than for the amber rating.

Not Verified:

Where there are serious concerns about the woodland, where the corrective actions were insufficient or not implemented within the agreed time frame, the Woodland Carbon Code will highlight the project as "unsatisfactory." In this situation, both the project and the PIUs will be marked as "not delivered."

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5. Issuance of Woodland Carbon Units

At the Year 5 Verification, a pre-scripted volume of PIUs will be converted into WCUs. Sometimes the woodland may be a net source of carbon emissions (see above) in which case there will be no WCUs issued. If the woodland has become a carbon sink and some are issued, it is usually a nominal amount.

In contrast, the volume of WCUs issued during the Verification at years 15, 25 etc. depends on the results of the mensuration survey and, as such, the growth of the trees.

Assuming the trees have grown "as they should", the initial discount of 20% (see above in the section discussing the Woodland Carbon Code's carbon calculator) is rebated to the project owner at each successful verification.

S&P Global, which operates the registry, are responsible for the conversion of PIUs and the issuance of WCUs. They charge £0.1 per WCU and payment must be made before any WCUs can be issued. To avoid complications, CarbonStore will usually pay this cost on behalf of the project owner and invoice them afterwards for reimbursement.

The Costs Associated with Verification

It is important to recognise that verification is a requirement of all ICROA-endorsed carbon offsetting projects so the process contributes significantly towards the saleable value of PIUs and WCUs. The various steps associated with verification take significant time and effort so the associated costs are an unfortunate but important necessity:

- **Monitoring/Mensuration Survey:**
  The drafting of the stratification plan, the monitoring / mensuration survey, the completion of the monitoring report and the follow up call with the forest manager take approximately two days' work. For larger projects, this may take considerably longer.
- **Project Progress Report:**
  It takes a further days' work to complete the 18-page report, submit it to the auditors, answer any questions and ensure the necessary remedial action has been implemented.
- **Verification Audit Costs:**
  Costs for a single project vary between £1,800 and £3,400 however, as mentioned above, these are significantly less for group projects, the audit costs for which range between £750 and £1,300.
- **WCU Issuance Fees:**
  S&P Global charge £0.1 per WCU issued. These costs cover the management and administration of the registry. They also contribute towards the operational costs of the Woodland Carbon Code.

Costs Associated with Verifying a Project.

Itemised Costs		£
Cost of Verification (individual project)	Standard fee levied by auditor	£3,520
Cost of Verification (group project)	Standard fee levied by auditor	£1,450
Monitoring / Mensuration Survey	2 days' work for standard-sized project of 20 hectares	-
Preparation of Project Progress Report	1.5 days' work for standard-sized project of 20 hectares	-
Travel costs for auditor	Hotel, train etc for independent check of monitoring survey	£180
S&P Global's WCU Issuance Fees	Levied at £0.1 per WCU	£594
Total Costs		**£4,294**

The Market for Woodland Carbon Credits: An Introduction

The Corporate Perspective

A growing number of companies are making Net Zero commitments i.e., they are reducing their CO^2e emissions from their operations as much as possible and then mitigating their residual CO^2e 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 CO^2e 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.

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 redeploying 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.

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 on the following page 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	25	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	25	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 PIU	£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	25	45	55	65	75	Total
Revenue from sale of WCUs	Assume £30 per PIU	£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 Background to Corporate Demand for Carbon Credits

Corporate's Net Zero Requirements: The Voluntary Carbon Market

As the UK Government strengthens its commitment to net zero by 2050, companies are facing growing obligations to measure and report their climate-related impacts. For now, these responsibilities are focused on large companies, defined as those employing more than 250 staff or generating annual revenues greater than £36mn. As policy evolves, these duties will likely be applied to medium and small companies.

Regulations such as Streamlined Energy and Carbon Reporting (SECR), the Task Force for Climate-Related Financial Disclosure (TCFD), Climate-Related Financial Disclosures (CFD) and the UK Sustainable Reporting Standards (UKSRS) all require large UK companies to report their energy usage, their scope 1 and 2 greenhouse gas emissions and their efforts to reduce their carbon emissions.

The requirement to report their climate-related impacts, by forcing companies to measure and analyse their GHG emissions, implicitly encourages them to offset their emissions. However, the choice on whether or not to buy carbon credits, including the WCUs issued and approved by the Woodland Carbon Code, as part of any offsetting strategy is voluntary. PIUs and WCUs are therefore part of the voluntary carbon market.

The Compulsory Market for Carbon Credits: A Potential Boon for PIUs and WCUs

The UK's compulsory market sits alongside the voluntary market and includes all large companies in energy-intensive industries, such as power generation, chemical, steel and cement production, and aviation. It operates under the UK Emissions Trading Scheme (UK ETS) and was launched in 2021 to replace the UK's participation in the EU ETS.

The UK ETS operates under a "cap and trade" system whereby the government sets a limit on the total emissions allowed by an industry. The corporates which comprise that industry then buy or receive permits to emit greenhouse gases. Those that emit less than their allowance can sell them to those exceeding their limits.

At the year-end, companies must surrender enough allowances to cover all their emissions otherwise they face heavy fines. Currently, WCUs cannot be used within the UK ETS however this might change going forward. In June 2025, the government released a consultation on the issue and discussions are ongoing.

If inclusion of WCUs within the UK ETS is permitted, the greater volumes and the security of demand would provide woodland owners with increased confidence in carbon funding and its potential value. It would also likely incentivise faster evolution within and greater sophistication around the market for PIUs and WCUs.

Supporting the Market for WCUs and PIUs

Pricing Transparency

Since 2022, the Woodland Carbon Code has been working with Ecosystem Marketplace to improve pricing transparency across the market and give the owners of PIUs and WCUs greater confidence in their value. Over the past 3 years, Ecosystem Marketplace has asked all Project Developers to record the price per PIU, the volume sold and the nature of the underlying woodland for each of their transactions.

The results are available on the Woodland Carbon Code's website (see below: UK Carbon Pricing). According to their data, in 2024, the volume weighted average price for all PIUs traded was £26.85 while PIUs from predominantly broadleaved woodlands averaged £27.85 and those from mainly conifer woodlands averaged £25.04.

Template Legal Agreements

In 2025, the Woodland Carbon Code released its template legal agreements to support the sale of PIUs and WCUs from validated and verified woodlands (see below: Template Agreements). These had been drafted by a cohort of leading Scottish legal firms, are free to use and offer buyers and sellers a wide range of options, depending on the nature of their transaction.

Until then, Project Developers had used their own legal templates, the terms and conditions of which differed widely. Although the standardised templates still require external legal advice, they are helping to reduce PIU transaction costs and enabling the market to coalesce around a common set of principles when selling PIUs.

Template Agreements
www.woodlandcarboncode.org.uk/download-template-agreements

UK Carbon Pricing
www.woodlandcarboncode.org.uk/uk-carbon-prices

Maximising the Value of Woodland Creation

The Woodland Carbon Code is keen to help woodland owners quantify and access the value of other nature-related benefits of planting trees, beyond carbon. These include trees' ability to help mitigate flooding, to provide shade to streams and rivers and to enhance wildlife and biodiversity. Accordingly, two schemes are being piloted:

Biodiversity Crediting
This intends to quantify the biodiversity-related benefits of validated and verified woodlands and rate them accordingly. When the PIUs or WCUs are sold, their owners should receive a higher price due to the underlying biodiversity benefits that the planting work has created. The scheme is expected to launch in 2026.

The Woodland Water Code (WWC)
The WWC aims to measure three different water-related benefits of tree planting schemes: their ability to remove pollutants as water flows into streams and rivers, their potential to help mitigate flooding and their scope to improve fish stocks and water life, through shading its attendant reduction in water temperatures.

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The Process for Selling PIUs and WCUs

The complexities of the transaction process mean that two distinct processes have emerged when selling PIUs, depending on the transaction size. For small-scale transactions i.e. those less than 1,500 PIUs, the "intermediary" approach is most efficient. For any transactions larger than 1,500 PIUs, woodland owners are best-placed engaging directly with a company:

Intermediary Approach

This involves a woodland owner selling PIUs to a carbon broker who has opened a Retail Aggregator account with the S&P Global registry, allowing them to hold PIUs on their balance sheet until they find a buyer for those PIUs. Once a buyer is found, the Retail Aggregator then sells the PIUs to the corporate end-user in a separate transaction, generating a profit through the mark-up between its purchase and re-sale price.

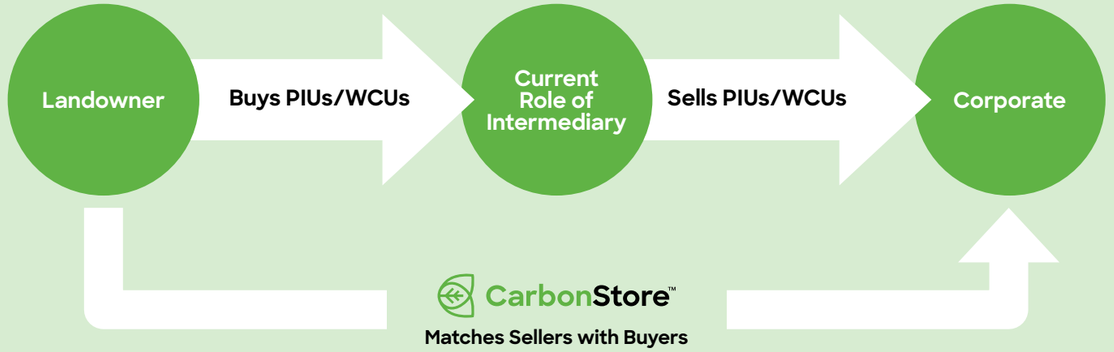
Because the Retail Aggregator undertakes all the bureaucratic work and the company is saved the complication of opening a corporate end-user account, there is much less administrative work required of this approach. For smaller, less valuable transactions, it is therefore the most efficient method when buying and selling PIUs.

Direct Transaction Approach

Under this approach, the woodland owner selling PIUs engages directly with the corporate buying them. They agree the basic terms of the transaction e.g. price, volume, access rights, exclusivity rights on any outstanding PIUs etc. These are then applied to the WCC's legal templates, reviewed by both parties and signed.

Such transactions usually require a broker to support the process who will have introduced the two parties, explained the process, and outlined the key terms for discussion. The broker will also guide both parties through the various steps until the landowner has received the funds and the PIUs have been transferred to the buyer's Corporate End-User account on the registry.

The Traditional Approach to Selling PIUs/WCUs vs CarbonStore Approach



Points to Consider when Selling PIUs

Ongoing Responsibilities and Liabilities

The sale of PIUs represents a promise that the underlying woodland will capture a pre-agreed volume of carbon dioxide by a set date. In the example below, the woodland owner must therefore capture 645 tonnes CO^2e by 2041, a further 2,700 tonnes by 2051 and finally 1,642 tonnes by 2061.

Verification: years since start date	Vintage start date	Vintage end date	Total PIUs in vintage (tCO^2e)	Buffer contribution (tCO^2e)	PIUs to project (tCO^2e)	PIUs sold to company (tCO^2e)
5	31 March 2026	30 March 2031	0	0	0	0
15	31 March 2031	30 March 2041	807	162	645	645
25	31 March 2041	30 March 2051	3,375	675	2,700	2,700
35	31 March 2051	30 March 2061	2,052	410	1,642	1,642
45	31 March 2061	30 March 2071	1,413	283	1,130	0
55	31 March 2071	30 March 2081	1,106	221	885	0
65	31 March 2081	30 March 2091	418	84	334	0
75	31 March 2091	30 March 2101	132	26	106	0
85	31 March 2101	30 March 2111	130	26	104	0
95	31 March 2111	30 March 2121	244	49	195	0
100	31 March 2121	30 March 2126	19	4	15	0
Total			**9,696**	**1,940**	**7,756**	**4,987**

What happens if the woodland owner fails to deliver on this promise? The legal contracts will outline the penalties, depending on the cause of the tree failure. These can be divided into two categories:

Force Majeure:
The trees may have been damaged by an event outside the woodland owner's control, such as from storm damage or fire. In this case, the woodland owner must replant the lost trees at their own expense, and the company will accept that the delivery of verified WCUs might be delayed but will eventually materialise.

Non-Force Majeure:
This refers to all events within the woodland owner's control and varies from negligence in their management of the woodland (e.g. broken fences, insufficient beat up) to poor silvicultural advice or irresponsible behaviour e.g. campfires in the woodland.

The penalties for PIU failure can be discussed when drafting the contract terms but are usually more severe, requiring the woodland owner to purchase PIUs of a similar vintage from other woodland carbon projects. CarbonStore encourages companies to cap the liabilities, thus limiting the woodland owner's risk.

Selling PIUs according to Vintages

Companies will usually set themselves a date by which they aim to be net zero e.g. by 2050 or 2065. In this case, they will only be looking to buy PIUs maturing into WCUs before these dates (because it is only WCUs, representing a tonne of captured carbon, that can be used to offset against their GHG emissions).

Thus, in the example above, if the company had a net zero target of 2065, they would only be looking to buy the PIUs maturing in the Year 15 vintage, the Year 25 vintage and the Year 35 vintage. The PIUs maturing in the vintages beyond Year 35 would still be saleable but likely become more popular as we approach those dates.

The Sale of WCUs

Woodland owners face a simple choice when selling their woodland carbon credits: They can either sell them as PIUs in which case they generate some income early in the woodland's life but they also assume those responsibilities and liabilities discussed above. Alternatively, they could wait until the PIUs are verified as WCUs before selling.

A WCU represents a tonne of CO^2e which has already been captured. Thus, their sale not only carries no ongoing liabilities but also allows them to be used immediately by companies to offset their emissions. They therefore trade at a substantial premium to PIU prices and the accompanying sales contracts are more straightforward.

Be Alert to the Survey Results at Verification

When a woodland owner has sold all available PIUs within a vintage e.g. in the example above, they have sold all 645 PIUs in the Year 15 vintage, it is essential that the results from the two monitoring surveys at the Years 5 and 15 are in line with expectations. Failure to do so could render them liable to the liabilities discussed earlier.

Conclusion

Despite efforts by the Woodland Carbon Code and others (including ourselves) to simplify and explain the technicalities, the process of selling PIUs is complicated and landowners should acquaint themselves fully with the accompanying risks and responsibilities which they would be assuming.

If you have any doubts or questions, please feel free to contact ourselves at CarbonStore and we will be able to offer clear and impartial advice.

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.

Backed by Forestry Expertise, Driven by Trust

CarbonStore operates as a specialist in woodland carbon, bringing clarity, transparency, and confidence to landowners and carbon buyers alike.
We bring the depth of experience and knowledge to every project - from understanding policy and process, to ensuring projects deliver meaningful results on the ground.

Part of a Trusted Forestry Network

We are proudly part of the Tilhill Forestry and BSW Group family, organisations with decades of experience in sustainable woodland creation, management, and timber production. This connection gives us access to in house forestry knowledge, market insight, and end to end understanding of woodland value, from seed through to long term stewardship.

Independent, Collaborative, Professional

We are committed to supporting a broad range of landowners, managers, and forestry professionals. Collaborative by nature, we believe that strong relationships across the industry are vital to growing a successful and credible woodland carbon market.

What This Means for You

- Expert, impartial support through every stage of your carbon journey
- Robust, practical knowledge grounded in real world forestry operations
- Professional standards, with flexibility to work alongside a variety of partners and land agents

At CarbonStore, we’re here to support the success of your project.
Our focus is on integrity, quality, and shared value for people, business, and the environment.

CarbonStore™ | Tilhill Forestry | BSW GROUP member of binderholz — Building Sustainable Worlds

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 (CO^2)

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).

CO^2e (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 CO^2 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 (wind farms 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 longterm 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 10 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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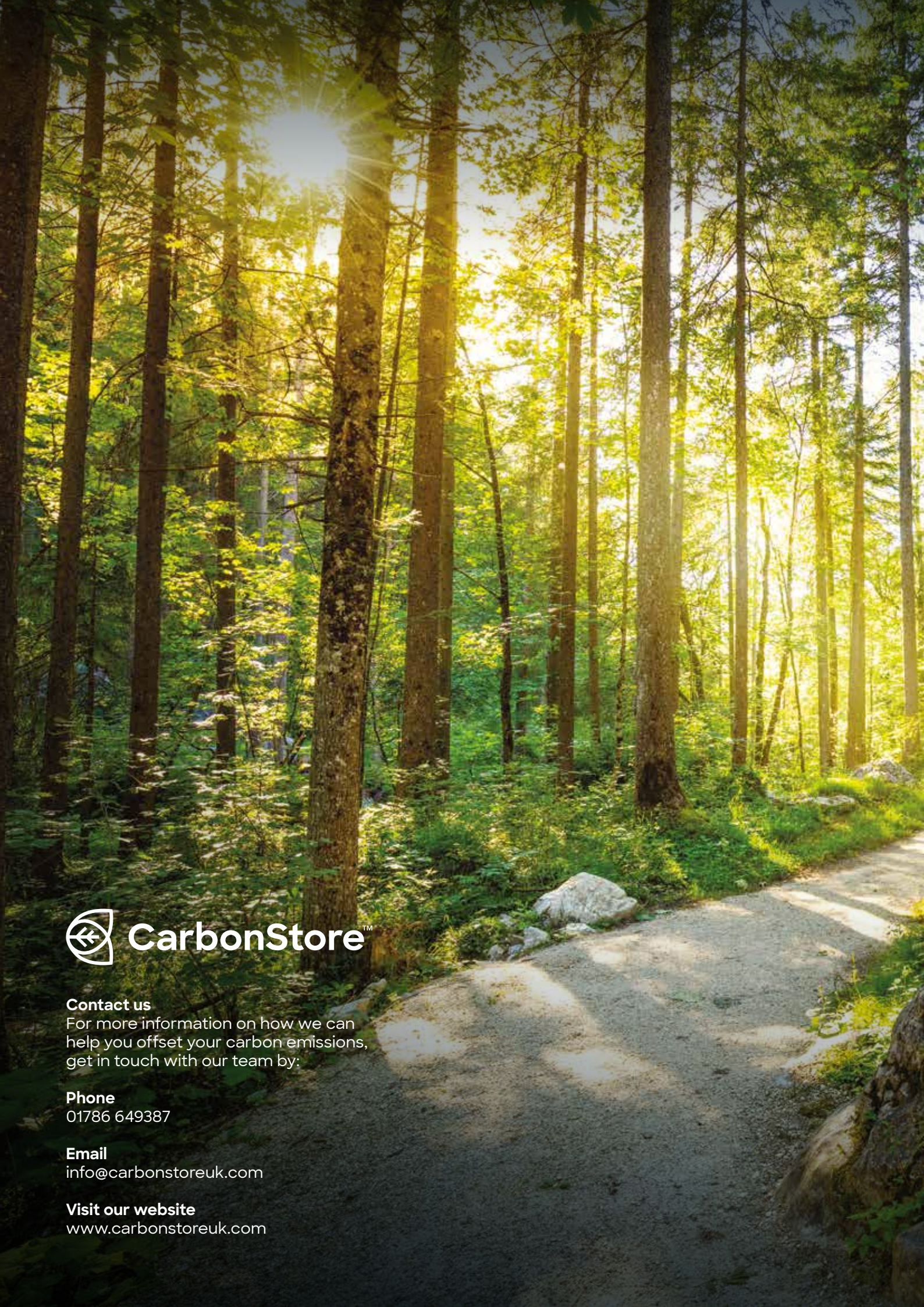

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Contact us
For more information on how we can help you offset your carbon emissions, get in touch with our team by:

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01786 649387

Email
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Visit our website
www.carbonstoreuk.com

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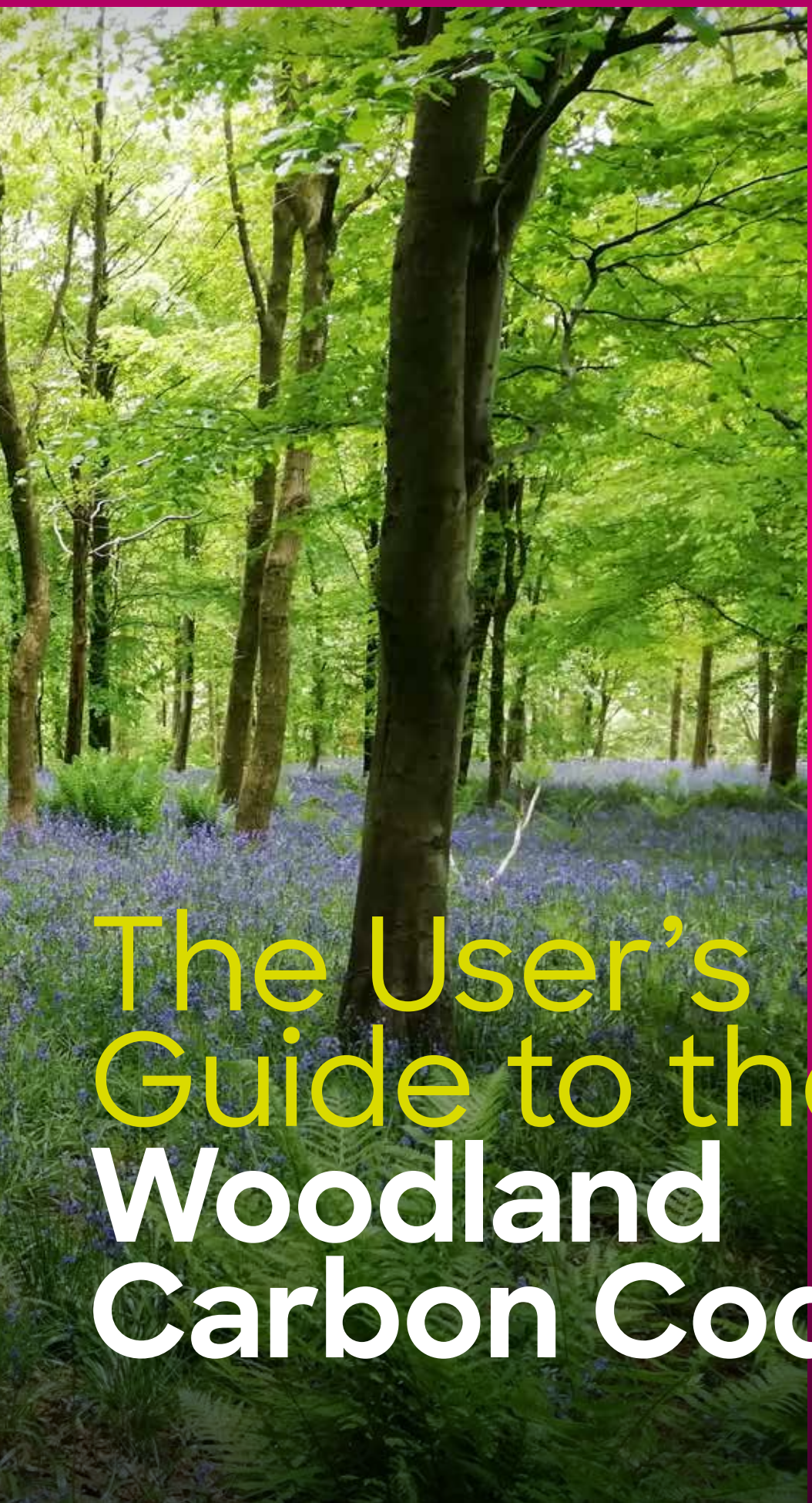

The User's Guide to the Woodland Carbon Code