Carbon Trading - what does it mean?

by Teleri Fielden, FUW Policy Officer

To reach Net Zero emissions by 2050, a combination of emissions reduction and carbon removal will be needed. All industries and businesses will need to make significant changes to reduce their emissions.

For many farmers this means focusing on reducing their own business emissions, carbon auditing, working with their supply chain, improving productive efficiency and increasing carbon sequestration on-farm.

However, farmers and landowners also 'control' most of the opportunities for land-based carbon sequestration through woodland and hedgerow creation, soil carbon and peatland restoration, and therefore the supply of carbon credits into the now booming, voluntary carbon offset market.

Definitions

A Carbon Offset or Carbon credit

A carbon credit represents an emission reduction equivalent of one metric tonne of CO2, which can be used to compensate for or 'offset' an equivalent tonne of emissions elsewhere. A company can purchase an offset/carbon credit to help compensate for some of their emissions output.

Carbon markets

Compliance market	Voluntary market
For the biggest emitters (e.g. aviation, oil and gas industries) who have **compulsory** emission reduction obligations. This is regulated by regional/national Emission Trading Schemes. They have **limits to how much they can offset** (Cap and Trade).	For any other company that wishes to purchase carbon credits to offset their emissions, or for 'corporate social responsibility' reasons to demonstrate their green credentials. (**Any type of company can purchase as many offsets as they want**). This is the market farmers in the UK can supply, however it is far less regulated.

Carbon store or stock	Carbon sequestration (CO2e)
A carbon stock is the quantity of carbon stored in, for example, soil, or ancient woodlands. A permanent pasture with a very high Soil Organic Carbon (SOC) content could act as a large carbon stock but may not be actively 'sequestering' as it is nearly at SOC saturation or equilibrium. However, it is important to protect and maintain these stocks to ensure that they don't emit carbon again if, for example, they are eroded/ ploughed/burnt. **The world's soils are the largest terrestrial carbon sink storing 3.5 times more carbon than in the world's plants**.	The process of actively capturing or removing CO2 from the atmosphere and depositing it. For example, woodlands capture CO2 from the atmosphere through photosynthesis and store it in their biomass. **The rate of sequestration is what is converted into credits** through 'tonne of carbon dioxide equivalent' (CO2e) E.g. one hectare of newly established broadleaf woodland is expected to sequester around 400 tonnes CO2e over 100 years.

Types of offsetting

Emission reduction	Emission removals
Created by reducing or avoiding emissions that would otherwise have happened. For example, restoring peatland to prevent it from releasing carbon, capturing methane gas at landfill sites, or opting for a 'no till' system rather than ploughing to prevent SOC loss.	Absorbing (sequestering) carbon from the atmosphere and storing it, such as through woodland creation or increasing Soil Organic Carbon.

Governance and schemes

These Government recognised standards are tailored to the UK but also meet the requirements of international carbon standards. They provide assurance and a process to ensure quality offsets.

Woodland Carbon Code (WCC)

Registration: This can be done through carbon advisors or brokers e.g. Forest Carbon.
The farmer or landowner must register with the WCC before planting starts, then decide on a project or group scheme. (Free).

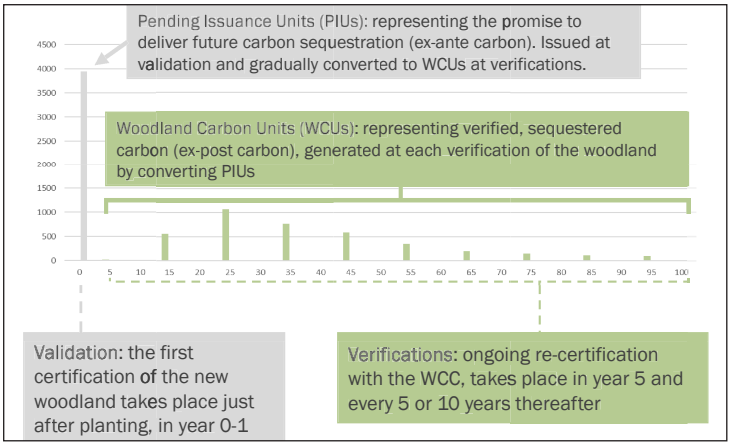
Validation: Within three years of registration. An independent validator checks the predicted carbon sequestered and general standards. Cost of approximately £1,000 depending on project size. Pending Issuance Units (PIUs) can be sold at this point.

Monitoring: Field survey in year five.

Verification: In year five and every ten years thereafter, an independent validator verifies the standards and the amount of carbon sequestered, thus creating Woodland Carbon Units. These can then be sold, held, or used against farm emissions. Cost of approximately £1,500 depending on size and complexity.

See https://www.woodlandcarboncode.org.uk/landowners-apply for more details.

Pending Issuance Units (PIUs)	Woodland or Peatland Carbon Units
A 'promise to deliver'. PIUs are a calculation of how much carbon is expected to be sequestered over the entire lifetime of the project. It is possible to sell these upfront for a lump sum, however they will be worth less. Companies cannot use these as offsets.	At each verification the PIUs are converted into carbon units in line with how much carbon has been sequestered, providing a guarantee to the purchaser.



Example of a ten hectare broadleaf plantation - total tonnes of CO2. Forest Carbon

Peatland Carbon Code

The Peatland Carbon Code follows a similar process to the Woodland Carbon Code. However, validation must occur before and immediately after the restoration works take place. Due to the cost of restoration and the additional biodiversity and water retention benefits peatland provides, such projects tend to be funded by a mix of public and private money.

Codes under development

UK Farm Soil Carbon Code

This is currently being developed by the Sustainable Soils Alliance with funding from the UK Government. They aim to develop a Code to enable farmers to quantify reduced greenhouse gas emissions and soil carbon capture through soil management, enabling farmers to sell offsets, use them for their own carbon footprint measurements or demonstrate biodiversity improvements.

Hedgerow Carbon Code

This is currently being developed by the Game and Wildlife Conservation Trust to recognise the potential of hedgerows for carbon sequestration and encourage hedgerow habitat management.

Principles

Additionality

For an offset to work and genuinely reduce CO2 in the atmosphere, it needs to be **in addition** to current CO2sequestration. Otherwise, they are simply providing businesses with a licence to pollute. It must prove that the emissions reduction or removal wouldn't have occurred in the absence of the carbon market. Therefore large timber plantations may not be eligible in the future, as they are financially viable without the need for a carbon payment.

This is why only new tree planting is currently eligible, as the sequestration of existing trees and soils is already being calculated in global emission levels.

Permanence

An offset should be as permanent as possible, or at least be in place for a lengthy period of time to guarantee that CO2 is kept out of the atmosphere over that period. However, this can be difficult for soil carbon as it can be emitted easily.

Similarly, a fire could reverse the carbon sequestration of a woodland. Therefore contracts tend to be long term to ensure a degree of permanence (>30 years for peatland, >30-100years for woodland with a commitment to replant if any are removed/damaged).

Contracts also include buffers to allow for disease or establishment failures.

Broadleaf woodland example per hectare (high quality and well managed)					
Verification years	tco2e/ ha	£12 a tonne	£25 a tonne	£50 a tonne	£100 a tonne
15	20	£240	£500	£1,000	£2,000
25	100	£1,200	£2,500	£5,000	£10,000
35	110	£1,320	£2,750	£5,500	£11,000
45	60	£720	£1,500	£3,000	£6,000
55	50	£600	£1,250	£2,500	£5,000
65	15	£180	£375	£750	£1,500
75	15	£180	£375	£750	£1,500
85	15	£180	£375	£750	£1,500
95	15	£180	£375	£750	£1,500
Total	**400**	**£4,800**	**£10,000**	**£20,000**	**£40,000**

& Glastir Native Woodland Carbon Creation for 12 years	
Establishment	£4,500
Annual maintenance pa	£60
Annual premium pa	£350
& BPS	(? dependent on SFS changes)
x 12 years	£4,260
Total	£8,760

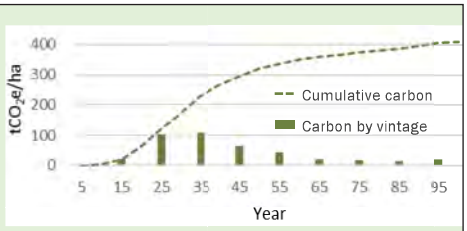
This example does not include costs for verification, brokers or maintenance

Broadleaves – non-intervention

Sample species: birch, oak, rowan, elm

Yield class: 4

Yield curve explainer: native broadleaves tend to grow more slowly, but non-intervention management allows the woodland to sequester a significant amount of carbon over time.



(Yield curve graph model from Forest Carbon publications)

Price examples

Disclaimer: Due to the uncertainty around prices, the immaturity of the market and the evolution of regulations, these are estimations of prices and sequestration rates. Verified Woodland Carbon Units are currently worth around £10-£25 per tonne. Pending Issuance Units are worth less, generally £5-£12 per tonne. Prices are expected to rise but it is not guaranteed.

Carbon & Timber totals per rotation	Enhanced Mixed Woodland per rotation (50:50 broadleaf to conifer)	High proportion Conifer per rotation (75%)
Rotation length (years)	50	30
Total CO2e	350	380
Total Timber volume	440	475
Timber payment (at £75/tonne standing)	£33,000	£35,625
Carbon: £12 a tonne	£4,200	£4,560
Carbon: £25 a tonne	£8,750	£9,500
Carbon: £50 a tonne	£17,500	£19,000
Carbon: £100 a tonne	£35,000	£38,000
(Not including costs of maintenance, thinning and WCC validation, nor land value increase)		

Conifers & Timber example per hectare

If a site is completely clear felled, the amount sequestered is capped according to how long the trees are growing for. The carbon payment is only eligible on the first rotation of timber within the Woodland Carbon Code. However, some sites will retain a percentage of broadleaves, allowing for a higher carbon crop, such as in the examples below (based on high quality plantations), in addition to the timber return.

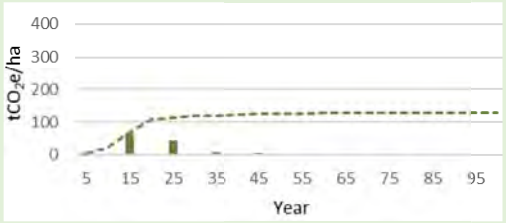
& Glastir Enhanced Mixed Woodland grant	
Establishment	£3,600
Annual maintenance	60
Annual premium payment	350
x 12 years	4920
Total	**£8,520**

Conifers – thin & fell

Sample species: Sitka Spruce, Other conifers

Yield class: 16-20

Yield curve explainer: due to permanence the long term average of biomass on site is applied as a cap for clear fell projects. This means clear fell projects are limited in the amount of carbon credits generated.



Frequently Asked Questions

What methods of carbon sequestration can I use in my own farm carbon calculator?

This depends on the calculator and reason(s) for completing a carbon audit. Many supply chains only focus on emissions (in order to calculate CO2 per kilogram of product) therefore on farm sequestration is not taken into account. However, other calculators (e.g. Farm Carbon Toolkit and Agrecalc) do include carbon sequestration such as from on farm woodland planted after 1990, hedgerow length and width and average soil organic matter content. There is no need (currently) for these to go through a process of verification as the credits aren't being sold.

How do I know if I can generate carbon credits?

Currently, any new woodland creation or peatland restoration projects can register and sell credits in the future once they have been validated through their corresponding Carbon Codes. **It is wise to check your own carbon footprint first, in case you need to offset some of your own emissions to become Net Zero in future**. The Soil and Hedgerow Carbon Codes may provide future opportunities to generate credits on farms.

What about the carbon already stored in my soils?

This is a valuable carbon store, and is included in national emission calculations, but carbon markets require additional (new) sequestration to create an offset. Future Government payments may value maintaining and protecting this store. The ability to increase SOC depends on the type of soil, the current level of SOC and past and present management. For example, sandy soils will have less potential to capture more SOC, but clay soils with depleted levels will have a better potential.

Who can claim the carbon on my farm?

Currently, if you decide to sell carbon credits from **new** woodland planting (*see Additionality and Woodland Carbon Code*), those credits can only be used by the purchaser, and then the credit is 'retired'. So, the buyer has an exclusive claim to that sequestration the tree did as it appears on their carbon balance sheet. **You cannot use it against your own farm carbon footprint - that would be 'double-counting'**. However, that woodland will also be counted within Wales' national emission calculations. Any credits **not** sold can be used within your own farm carbon audit.

Can an international company buy carbon credits generated from land in Wales?

No, in the UK, they have decided not to allow credits generated through the Woodland and Peatland Code to be sold and used to offset emissions created overseas. However, companies based elsewhere in the UK can buy and use them, or international companies could purchase them to offset their UK based emissions.

How are some farmers accessing finance for their soil management or regenerative farming before there is an official soil carbon code?

Some schemes can create verified emission 'reductions' or removals that are not sold as official offsets. Companies cannot use them to offset their own emissions, however, they can make claims about having contributed to decarbonisation of the economy. E.g. Soil Capital, Gentle Farming.

What is the Welsh Government's position on this?

The Welsh Government supports the Woodland Carbon Code therefore woodland established through Glastir Woodland Creation or other schemes can be registered on the code to sell carbon units (*see Pricing*). The Welsh Government also have their own national targets on woodland creation (180,000ha of new woodland by 2050, the equivalent of 10% of agricultural land) and peatland restoration (deliver 600-900ha of peatland restoration per year) as part of Wales' route to net zero.

They recognise that this will not be possible through public sector support alone, but will require attracting private sector investment into woodland creation and forestry (which includes carbon finance). They have established an expert working group to 'consider models to attract investment into woodland creation without disrupting existing communities and patterns of land ownership'.

Advantages	Disadvantages
* Long term income stream (lengthy contracts of 30-100 years) * Tax free (this is developing) * Market likely to grow significantly * Contributing to reducing the impacts of climate change on future generations * Minimal upfront cost - establishment and planning often paid for by grants * Possible to blend public and private finance e.g. Glastir Woodland Creation, timber return and carbon * Additional funding stream at a time of Government cuts * Provides an income stream for future generations on the farm * Can offer farm production benefits in addition to carbon (e.g. hedgerow carbon code = shelter for livestock, or increasing soil carbon improves soil health and fertility, production and water infiltration)	* Only covers **new** woodland planting and new peatland restoration currently - soils and hedgerow Codes in development * Permanent land use change once the woodland is planted * Uncertain prices dependent on supply and demand * Length of contracts and ownership of 'carbon assets' creates barriers for tenants * Expensive validation costs - better suited to larger or group projects to share costs over * Increases land acquisition by companies wishing to generate their own credits * Net zero will not be achieved if companies use offsets to avoid reducing their emissions * Additional demand on land * Any credits sold from the farm can only be used by the buyer, therefore the farm business will not be able to claim the sequestration themselves * Doesn't reward existing good practice, e.g. depleted soils have the largest capacity for increasing soil organic carbon which could generate credits
"If the price of carbon rises to £50/tonne, Carbon sequestration payments could be worth up to £1.7billion per year in the UK, half of total value of public support payments for agriculture." Green Alliance report, "Natural Capital - the battle for control"	*"At least 1.6bn hectares - an area five times the size of India, equivalent to all the land now farmed on the planet - would be required to reach Net Zero for the planet by 2050 via tree-planting alone."* Oxfam report "Tightening the net: Net Zero climate targets implications for land and food equity"

What is the FUW doing about the threats around carbon trading?

The FUW formulated a policy on Carbon Trading using the Land Use and Parliamentary Committee proposals for Carbon Quotas, which was refined during a subsequent meeting of the Presidential Policy Team and passed by the FUW Grand Council at the end of 2021.

The Policy Team have since conducted research into the scale of land acquisition, afforestation and Glastir Woodland Creation funding leaving Wales. Policy Staff have contributed to numerous media interviews and journalist research requests from BBC Radio Cymru to Radio Four's Costing the Earth, from Byd ar Bedwar to Countryfile. In January the FUW hosted a well received webinar on 'Preventing Wales' Corporate Land Grab: Balancing Carbon Trees and Communities' which is available to re-watch on the FUW Members website. Members and staff have also received presentations on the process of using carbon calculators.

The Union continues to raise and lobby these issues during meetings with politicians and other industry stakeholders. Our 'Call to Action on Carbon Trading' was launched at the 2021 Royal Welsh Winter Fair - you can read the full document on our website under 'policy reports'.

Key recommendations:

1) Offsetting must complement not replace lowering emissions

2) Welsh farmland must not become a dumping ground for other industries and countries seeking to offset their emissions

3) Communities not corporations should be in control of Welsh land

4) Sales of carbon credits from farmland must not undermine the ability of farm businesses to become Net Zero themselves in future

5) Effective governance is needed to ensure the Voluntary Carbon Market is regulated

6) Contracts must be transparent and protect the landowner

7) Other land uses (as opposed to solely new woodland) should be recognised and rewarded

8) A singular Soil Carbon Code is required

9) Carbon calculators need to be accredited and standardised

10) 'LULUCF' (on farm sequestration) and renewable energy production on-farm needs to be recognised within farm emissions

Union Policy:

Whilst it is recognised that carbon credits could potentially become important income for some farms in the future, given:

a. The sale of carbon credits from Welsh farmland risks undermining the ability of farms, Welsh agriculture or Wales as a whole to become carbon neutral

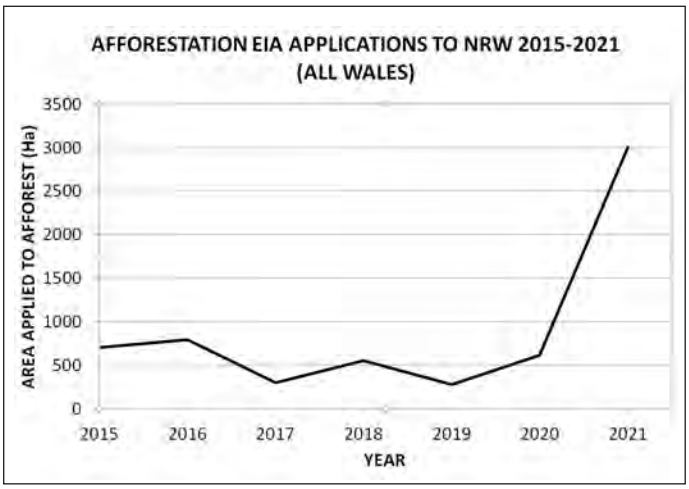
b. The concerning rise in the sale of Welsh farmland to individuals and companies from outside Wales in order to create carbon for sale outside Wales or offset their own footprints

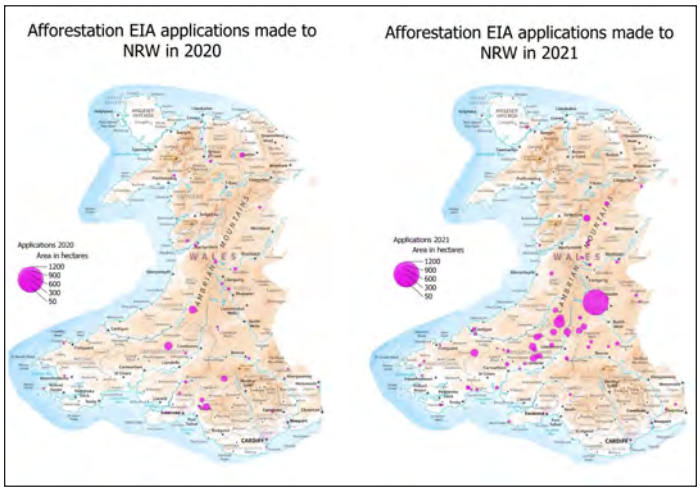
c. The fact that in at least some instances such non-Welsh entities and individuals are being funded by Welsh Government to plant such areas

The Welsh Government and Senedd should take urgent action to tackle this issue through some form of control mechanism, and that while carbon quotas may not be the best way forward it is among a range of measures that should be considered in order to prevent growing adverse impacts for Welsh family farms, Welsh communities and Wales as a whole.

Who is driving large-scale afforestation?

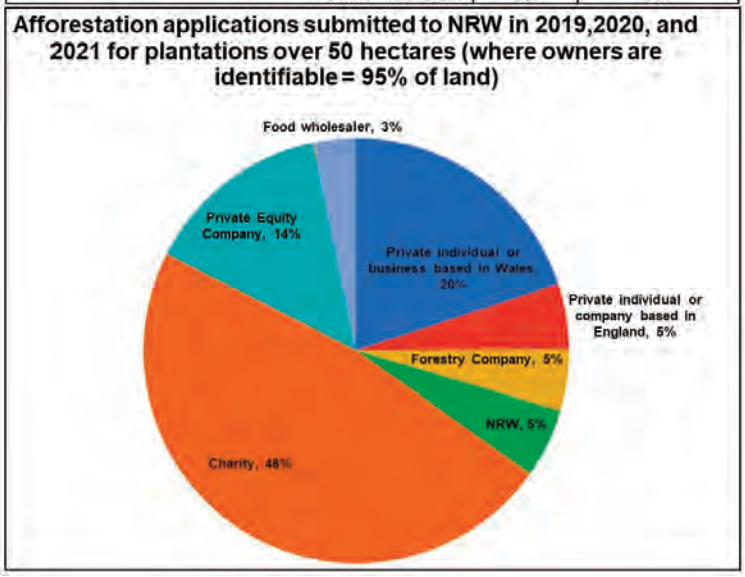
Planting new woodland is the main method for selling carbon or natural capital credits now or in the future. See below for figures collated and published by the FUW from NRW's Environmental Impact Assessment (EIA) application registry and the UK Land Registry. These figures demonstrate the trend of companies, charities or individuals from outside of Wales driving this afforestation or land acquisition. However we must ensure Welsh farmers and local rural communities (not corporations) are in the driving seat on carbon, woodland and timber solutions to ensure a sustainable future for our family farms.





Afforestation applications submitted to NRW in 2019,2020, and 2021 for plantations over 50 hectares (where owners are identifiable = 95% of land)

Where owners are based	AREA (ha)	PERCENTAGE
Owners of land based in Wales	696	25.%
Owners of land based in England	2074	75%
Nature of owners		
Private company or individual based in Wales	549	20%
Private company or individual based in England	133	5%
Forestry Company	129	5%
NRW	146	5%
Charity	1325	48%
Private Equity Company	395	14%
Food wholesaler	92	3%



Furthermore, applications for the Welsh Government Glastir Woodland Creation grant from outside of Wales is increasing.
Between 2019-2020 **the number of applicants with addresses from outside Wales grew from 3 - 8%**, with the **proportion of land accepted** for the grant from those addresses **rising from 10% - 16%**.
This represents an unacceptable loss of Welsh tax payers money and agricultural funding, which Welsh Government must address.