



Science and Technology Committee

Corrected oral evidence: Nature-based solutions for climate change

Tuesday 19 October 2021

10 am

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Members present: Lord Patel (The Chair); Baroness Blackwood of North Oxford; Baroness Brown of Cambridge; Viscount Hanworth; Lord Holmes of Richmond; Lord Krebs; Baroness Manningham-Buller; Baroness Sheehan; Baroness Walmsley; Baroness Warwick of Undercliffe; Lord Winston; Lord Sarfraz; Lord Kakkar.

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Questions 51 - 64

Witnesses

Dr Pat Snowdon, Head of Economics and Woodland Carbon Code, Scottish Forestry; Dr Renée Kerkvliet-Hermans, Peatland Code Co-ordinator, IUCN UK Peatland Programme; Annette Burden, Wetland Biogeochemist, UK Centre for Ecology and Hydrology.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witnesses

Dr Pat Snowdon, Dr Renée Kerkvliet-Hermans and Annette Burden.

Q51 **The Chair:** Good morning, everybody, committee members who are here and those who are on the Zoom, and particularly our witnesses Dr Snowdon, Dr Kerkvliet-Hermans and Annette Burden. Thank you very much indeed for coming to help us today. We appreciate it very much.

If I might kick off with the first question, do the carbon code standards work well in your experience? Are they enough of an incentive for the private sector to adapt or invest? How do they compare with international standards?

Dr Pat Snowdon: Broadly, they have worked well to date. For the Woodland Carbon Code, we have had a tripling of registrations in the past year. There has been a huge surge in interest, so the code is certainly attracting a lot of interest and increasing levels of investment in woodland creation. We have modelled the Woodland Carbon Code on the world's leading global standards such as Verra, the Verified Carbon Standard, and the Gold Standard, so it has the key components of a high-quality standard such as measures for permanence, additionality, transparency through the use of a carbon registry, and independent third-party validation and verification. These are the central components of a good-quality code.

We believe that has worked well to date. We will need to move with the times. Carbon markets are evolving and, in terms of providing a sufficient incentive, the carbon price is the key element here to attract more people into the market. Carbon prices have been rising under the emissions trading scheme. We are not a part of that, but nevertheless we are part of this general increasing trend in carbon prices. That has made a notable difference in the last two or three years.

Annette Burden: I am leading a project to develop a pilot for a potential new saltmarsh carbon code. There is no saltmarsh carbon code at the moment, but we have had a lot of interest from private investors and corporations about potentially investing in a carbon code if it is developed. There is a huge amount of interest at the moment in blue carbon from saltmarshes, seagrasses and mangrove beds. Saltmarshes are the blue carbon habitat we know the most about.

In terms of incentivising investment, our coastlines are quite vulnerable in the UK now. With increased sea level rise and storminess through climate change, they are only going to become more vulnerable, so doing nothing to our coastlines is not really going to be an option in the future. Converting some of our coastline back into coastal habitat will need to happen and is a great nature-based solution to that flooding problem. Being able to realise the carbon benefit of that as well is a win-win scenario. Land managers of coastal land will have to do something in the future anyway.

Dr Renée Kerkvliet-Hermans: I am the Peatland Code co-ordinator for the IUCN UK Peatland Programme. The Peatland Code follows very closely in the footsteps of the Woodland Carbon Code, so we follow the same principles as the Woodland Carbon Code to the same international standards. The Peatland Code has also worked really well to date. We saw a real increase in projects in the last year. We have more than doubled, and maybe even almost tripled, our projects.

We still need a blended approach for peatlands. Peatland restoration is really pretty expensive. Doing that on just private investments, carbon credits, at the current prices is really difficult, so we still need a blended approach of public and private funding for peatland restoration. However, if the prices go up, we might be able to do that fully on carbon funding.

Importantly, we are selling emission reductions. To get to the scale of investment required for the restoration that is needed, we need to make sure that these carbon units remain saleable so that companies can use them and make offset claims on the units. With the emission reductions and new net-zero guidelines, a lot of the offset you use needs to be sequestration. That might become more difficult for us as emission reductions.

I just want to stress that peatlands are emitting a lot of greenhouse gas fluxes. If we do nothing, these emissions will continue, so we need to restore them, which is slightly different from some of the other avoided emission credits. We have seen that public funding is not enough for this. I just want to stress that, in order to reach the scale we need, we need to be sure that companies can keep on using the credits. They can at the moment.

Q52 **Baroness Sheehan:** The first two witnesses, Dr Snowdon and Annette Burden, mentioned that there has been a several fold increase in interest. Can I just get an idea of how balanced that interest is between investors and projects available?

Dr Pat Snowdon: Thanks for the question. It is both. Since the net-zero targets came in, there has been a huge surge in interest for the Woodland Carbon Code. With increasing levels of demand and higher carbon prices, that starts to feed through more projects on the supply side as well. More landowners are becoming aware of it. They are becoming more knowledgeable about carbon step by step, and that encourages them to take the leap and enter the carbon market.

Demand has been the key driver behind this. To some extent, supply is still a constraint for us. We would like more land managers to plant woodlands under the Woodland Carbon Code. The more carbon prices go up, the more this demand is sustained, and the more land managers will supply.

Q53 **Baroness Brown of Cambridge:** Dr Kerkvliet-Hermans, the Peatland Code covers upland peat at the moment. Does it do anything about lowland peat, and is there an intention to extend it?

Dr Renée Kerkvliet-Hermans: Currently, it involves blanket bog and raised bog, so it also involves lowland raised bog. It is not just uplands at the moment. However, fens are not currently included. We have scientists from the UK Centre for Ecology and Hydrology who are looking at updating our emission factors, but also at whether we can include more condition factors, as well as fens. It is very likely that we can, so there should be enough scientific evidence to get emission factors for fens as well.

What exactly will come under the code? We have to wait to get all the scientific evidence in place, but we are expecting that work to be finished at the start of next year.

Q54 **Lord Krebs:** Can I ask our witnesses whether there are carbon offsets or carbon credit markets that take place outside the carbon codes? Should the code be made compulsory for a wider range of restoration projects? In asking the question, I should declare an interest, because I am sustainability adviser to Drax, which burns biomass to generate electricity in Yorkshire. Pat, are there markets outside the scope of carbon codes for the forest products?

Dr Pat Snowdon: The Woodland Carbon Code is really the only show in town for woodlands in the UK in the carbon market. The Verified Carbon Standard may have had one project in the UK in the last few years, but it is an international standard, so the Woodland Carbon Code is really the only standard that is being used. We have seen some interest come forward for alternative standards, but none of them has come to fruition to date. It is quite an exercise to put a fully functional code in place.

By and large, the market looks for good-quality codes. The Woodland Carbon Code has been endorsed by ICROA—the International Carbon Reduction and Offset Alliance. It is a global watchdog. The carbon sector looks very closely at what standards ICROA recommends it to use. If the number of carbon codes grows in the future, some sort of meta-governance across them may be needed. That could be if we have codes not just for woodlands and peatlands, but for other areas.

The Woodland Carbon Code is a voluntary scheme, so there are no plans to make it compulsory. There are one or two exceptions. A new initiative was launched a couple of years ago in England called the Woodland Carbon Guarantee whereby farmers enter into auctions to receive contracts from the Government to plant woodlands and receive payments for the carbon. If they want to enter these auctions, it is essential that they register under the Woodland Carbon Code. In other words, there are cases emerging where it is tied as a compulsory part of a wider policy initiative, but it still remains a voluntary standard.

Lord Krebs: Perhaps Renée could comment on this from the point of view of peatland codes.

Dr Renée Kerkvliet-Hermans: For peatlands, as far as I am aware there are also no other carbon offsetting schemes outside the Peatland Code. For the reasons Pat has just given, it is quite difficult to set up a

standard. You do not do it in just a couple of months. A lot of work goes into it.

The Peatland Code is also a voluntary scheme, and people might have reasons why they would not want to go through a carbon credit scheme. It is also important to keep in mind that the Peatland Code does not tell you best practice; it checks for the transaction of carbon. Making it compulsory so that peatland restoration is done to a high standard is not the right mechanism. I am not sure whether that was why you asked, but just in case.

Lord Krebs: Annette, do you have anything to add on this?

Annette Burden: I do not really. I and my colleagues are just at the beginning of the journey of potentially setting up the saltmarsh carbon code, but we are looking to the woodland and peatland codes to see what they have done. At the moment, the saltmarsh code will be a voluntary standard. Whether it is made compulsory in some places is yet to be decided in a sense. As part of the development of the code, we will be looking into other carbon codes and whether they could be used in the UK. There are none, as far as I know, but we will look to see if there are any that could.

Lord Krebs: I would like to come back to Pat Snowdon in particular, because it seems that the forest area is where this is most highly developed. I just wondered how things work internationally in relation to the carbon code that you are referring to. Under the Kyoto agreement, there are international standards for carbon accounting. I wondered whether the carbon code is a subset of that or operates separately. When countries report their greenhouse gas emissions, do they respond to the Kyoto requirements or to the carbon code requirements?

Dr Pat Snowdon: Under Kyoto, and now Paris, the Government account for all woodland creation in its greenhouse gas inventory. That will contribute, therefore, towards its climate change targets. For each Woodland Carbon Code project, there is project-level accounting. These two processes are separate, so they are not added together. In some ways, it is analogous to a company reporting its turnover but a Government reporting GDP; the essential thing is that you do not add those two things.

In terms of international reporting requirements, we are a domestic standard, so there is no option for credits under the Woodland Carbon Code to be sold into another country. They contribute only towards the UK's greenhouse gas targets, so there is no prospect of double-counting. It would be a concern if there were, and that is where the international rules about how carbon credits are traded are so important. There is work ongoing under the Paris agreement to attempt to finalise the rulebook about this. I am not yet certain whether that will be achieved at COP 26 or later.

We are an entirely domestic scheme, so we keep all the credits within the UK. It is only for offsetting emissions that take place within the UK, and the credits can be counted only under the UK's greenhouse gas inventory.

Q55 Baroness Brown of Cambridge: At the moment, the carbon codes are what they are. They are just about the carbon sequestration value, but they have regulatory standards to incentivise nature-based solutions deployed in the right locations. Should we extend this in order to take a natural capital accounting approach and include in the nature of the credit, if it is appropriate, something about flood resilience, river shading or other significant benefits that these natural solutions can bring? Can I start with Annette Burden for that one? You have already talked about the flood resilience issue being very significant for wetlands and saltmarshes.

Annette Burden: If we took flood defence into account for saltmarshes, it would make a huge difference. In reality, it would be really complex to try to add. Coming up with a carbon code is quite a complex task as it is, so bringing in other services and co-benefits could make it really complex, especially if you had different customers for the different services and you had to get them all to agree to commit to funding at the same time.

Then again, it is not impossible. We are looking at the saltmarsh code as a blended approach to financing restoration projects, so you might have financing for a project to go ahead with flood defence in mind, and the carbon credit finance would top it up. We have heard about projects that people have in mind, but they only have 80% funding for them. It might then be through carbon financing that we could finance the remaining 20% that is needed. We will be looking at this as we develop the saltmarsh carbon code and definitely looking at whether to include other benefits such as flood defence.

The way the market has responded, as far as I understand it, is that there is a bit of a premium on carbon credits where projects provide these co-benefits, but they are not necessarily within the framework of the code. They are just highlighted as another benefit to it.

Baroness Brown of Cambridge: Dr Snowdon, we are probably a bit further along in the accounting of the benefits for trees and woodland.

Dr Pat Snowdon: At the moment, the Woodland Carbon Code credits are often described by others as charismatic carbon. You do not just get carbon; you get all the wider benefits that come with woodlands. These will include flood alleviation, biodiversity, landscape benefits, recreational values and benefits for local communities. That has been a key attraction for people to invest under the Woodland Carbon Code. Yes, a lot of companies want to tackle climate change and get carbon credits, but they also want to be seen to be doing the right thing by investing in communities, biodiversity, et cetera, in this country.

Some people say that a tonne of carbon is a tonne of carbon, but I would say that that is not always the case. There could be differentiation in the market in future whereby credits that offer these wider benefits are seen as preferred by many rather than just being purely about the carbon. At the moment, we effectively bundle these benefits into the carbon credits; we do not sell them separately. We have a woodland benefits tool on our website that allows projects to assess their wider benefits. They simply

go into this tool and answer a number of questions, and it will give them a score against biodiversity, water quality, et cetera.

We may need to do work in the future to further highlight the wider benefits if this becomes more important in the market. There is also a debate about whether separate credits could be sold for biodiversity. Rather than bundle these different benefits together, you would start to stack them separately as different types of credits. That is an ongoing discussion, particularly with Defra, at the moment. We will see where the market goes for biodiversity credits, et cetera, but in principle we are open to the idea of stacking. The key for us will be that that is done within our own rules on additionality, for example.

Baroness Brown of Cambridge: Do you have a preference? Would you like to see the code extended or improved to take better account of the non-carbon benefits, or would you prefer to see this additional market for the other benefits alongside? Which would be better?

Dr Pat Snowdon: That is a good question. At the moment, we are quite happy with the benefits being bundled in, because we see that as an attraction for the woodland carbon credits. We also do not want to make the schemes too onerous for landowners. There is quite a lot for them to grapple with already in understanding how carbon credits and carbon markets work.

Setting up separate types of credits, whether for biodiversity, nutrient water quality or things like this, has potential down the line. Yes, we would welcome it, but they are not sufficiently well developed yet. At this stage, we are content with the way things are. We will look to embrace these opportunities in future, because it will be important that the wider natural capital benefits are recognised and attract real value in the markets, which is one of the Government's objectives through things such as ELMS.

Baroness Brown of Cambridge: Is your future the next five years or 10 years? How soon do you see this happening?

Dr Pat Snowdon: I am perhaps not the best person to ask about biodiversity credits, but that could happen within five years, in which case we will need to deal with it in that timeframe. Water quality could happen within five years as well. There are already a number of schemes, particularly in England, where land managers are arranging auctions run by water companies to deliver water benefits. The five-year timescale is quite possible.

Baroness Brown of Cambridge: I do not know if Dr Kerkvliet-Hermans would like to add anything.

Dr Renée Kerkvliet-Hermans: The Peatland Code is specifically not called the peatland carbon code, because we have always had the intention to include these other co-benefits that peatland restoration brings about. With the degraded peatlands, when you raise your water table you very quickly stop emitting greenhouse gas fluxes, and that is what we can quantify at the moment. When you do this, and when you

revegetate, you also reduce flood risk. You increase your biodiversity as well as increasing your water quality.

At the moment, those are very difficult to quantify and sell, but we will look into them at some point to see if we can include them. In the same way as with woodlands, it is implied and bundled into the carbon units, so our carbon units get a higher price because people recognise these additional benefits.

If we reach our Paris agreement goal, and that is assuming that we will at some point, there will be less of a need for carbon offsets. If companies have reduced their emissions as we would like them to, there will be fewer residual emissions that they will need to offset. So there will be a need for a natural capital market in the future. It will be quite a distance in the future, but it is good to start thinking about how we can get companies to invest in nature-based solutions outside carbon.

Baroness Brown of Cambridge: Given the urgency of delivering emissions reductions, sequestering carbon and reaching net zero, are we moving these things forward quickly enough?

Dr Renée Kerkvliet-Hermans: I do not think so, unfortunately. There is a real urgency. Peatlands are emitting about 22 megatonnes of CO₂ equivalent a year. That is more than our forests are sequestering a year, so that shows you the urgency. We need to restore them now, and that is unfortunately not happening quickly enough.

Q56 **Lord Winston:** I have a very quick question. I do not quite understand how biodiversity credits would work. Does that depend on the different species? How do you differentiate between bacteria and larger organisms or plants, for example? Could you just explain that to me? Forgive me for being so simple, but I do not quite understand the measurements.

Dr Pat Snowdon: I could offer a brief answer. There is a biodiversity metric that Defra and Natural England have developed for use in relation to biodiversity net gain. This looks at different attributes of different forms of biodiversity. It is not just about species and habitats; it is about rarity, distinctiveness and other attributes. I could not give you details on exactly what lies behind the metric, but it is used as a way to unify different forms of biodiversity under the same metric. It is the fundamental part of the biodiversity net gain arrangement because, depending on how the metric is designed, that will determine which forms of biodiversity may be favoured in future.

One of the other things it has to take into account is the time taken to establish biodiversity. If you plant a woodland, for example, you need to be patient. These time issues need to be considered as well.

Q57 **Viscount Hanworth:** I was wondering how the financial return from the so-called co-benefits of a project can be made to accrue to the owners of the projects. An economist would call these the externalities of the project. How can those devolve on to the owners of the project or the people who have taken the initiative? I do not know who can answer that. Does anybody feel capable?

Dr Pat Snowdon: I can try to make an answer for you. You are correct that economists describe them as externalities. The task then, if you want the land manager to receive a payment for them, is to internalise them within the market. That can be done through the generation of credits, for example; that is what has happened with carbon.

If you are looking at water quality, I mentioned a moment ago that auctions have been run in southern England in particular whereby a water company can set up a fund to pay for restoration work to improve water quality. Farmers will bid into this fund saying, "We'll carry out the following work at a certain price", and whoever is most cost effective under the auction will then be awarded contracts to do that work. That is one way to internalise that water quality value within a market. Those are the types of mechanisms, but a wide range of instruments can be used to internalise externalities: the taxation system, through favourable taxation arrangements for positive externalities; auction trading systems as I have described; carbon credit systems et cetera.

Q58 **Baroness Walmsley:** I should declare my interest as a former chair and current supporter of Botanic Gardens Conservation International, many of whose initiatives and reports are relevant to this inquiry.

My question is about uncertainties. We have been hearing from some of our witnesses about the difficulties of monitoring and measuring the carbon benefits of certain works. Dr Snowdon, my question is to you first, because you have the more mature carbon code. Do the carbon codes as written currently account sufficiently for the scientific uncertainties in carbon sequestration rates and storage potential for existing ecosystems and restoration projects? If this is a major problem with the codes, how could you improve it?

Dr Pat Snowdon: With nature-based solutions, it is very important that full account is taken of any risks in the future. We have taken a conservative approach to estimating carbon sequestration under the Woodland Carbon Code. We have forest growth models, which our research agency Forest Research has developed over decades and will predict how quickly different species of trees will grow under different growing conditions across the UK. You can use those growth models to convert that growth into carbon.

If it is estimated that a woodland would sequester 10,000 tonnes of CO₂ over its lifetime, we take off 20% under the Woodland Carbon Code, purely for conservative purposes in case the models are not 100% accurate. A further 20% is then placed into a shared buffer across all the projects in case anything happens to the woodland in future. You can see that roughly 40% is taken off the estimates, and that provides a fairly wide margin of error. We are quite confident that that has been a good approach to take.

All projects also need to examine their onsite risks, whether they relate to drought risk, windthrow, pests or disease. They put together a project design document—every project must do this—that will say how they have mitigated any of these risks. Take ash dieback, for example.

Projects will say, "We haven't used ash" or "We've broadened our mix of species to reduce their vulnerability to pest and disease risk". There are a number of actions that projects themselves can take. It is in their interests to do that, because they are taking some risk in setting these projects up and they want to ensure that they deliver the credits that the buyers have paid for.

Baroness Walmsley: Am I not right in thinking that the measurements or the assessments are made on the basis of the diameter of the trunk and do not take into account what goes on in the soil with the roots?

Dr Pat Snowdon: That is one of the measures, yes. When you plant a woodland, you initially have nothing to look at. At year 5, you have your first verification, where we do a stocking density check to check that the required number of trees are there and they are looking healthy. At 10-year intervals after that, we require further verification checks to be carried out, where there is a proper measurement of the size of the trees. Allowance is made for roots and the wider branches and foliage of the trees. All these are built into the carbon models that Forest Research has developed. These are the same models that are used in the Government's greenhouse gas inventory for forestry purposes.

Baroness Walmsley: Dr Kerkvliet-Hermans, what is the situation with peatland?

Dr Renée Kerkvliet-Hermans: For peatlands, we have emission factors. We have four condition categories under the Peatland Code: actively eroding, drained, modified, and near natural. The two baselines that are eligible are actively eroding and drained. We assume that a condition category can move by only one, so drained would move only into modified. That is the amount of PIU's (Pending Issuance Units, or expected emission reductions) we issue at the start.

All these four categories have emission factors associated with them. Our emission factors are also very conservative. They are based on UK data, with the exception of DOC because that one is based on the IPCC default values at the moment. We also take off a 10% precision buffer and we have a 15% risk buffer for units if something happens outside the control of a project.

At the moment, we have scientists looking at our emission factors, updating them to the latest science and aligning them with the UK greenhouse gas inventory. It is very important that these emission factors are updated regularly, because new science is coming out all the time.

The way we verify our units, which is also at year 5 and then every 10 years, is that an independent auditor goes onsite, and checks mainly for any risk of reversal of your restoration. They check whether all dams are still holding up, the water table is nice and high, and the site is re-vegetating, so there are no eroding bits any more. Those are all very closely linked to your emissions. That is how we check that.

Baroness Walmsley: Ms Burden, how are you taking these uncertainties into account when designing the saltmarsh carbon code?

Annette Burden: At the moment, one of the first jobs to do in the saltmarsh pilot project is a review of the literature. That will inform us as to where we are with our scientific understanding and how confident we can be with our carbon predictions for saltmarshes in different typologies. The chances are that the saltmarsh carbon code will start with IPCC emission factors.

There will be quite a high level of uncertainty in our carbon estimates just because the scientific evidence will not be there. I guess that is the benefit of developing a domestic carbon code rather than adopting a methodology. This just means that we have complete control over it and can have a process of ongoing improvement. As Renée said, the Peatland Code emission factors are being updated at the moment with the most up-to-date scientific knowledge. That is the kind of process we will go through with the saltmarsh carbon code as well.

- Q59 **Lord Krebs:** I have a very quick follow-up question on some of the points that Baroness Walmsley raised. Perhaps Dr Snowdon could answer this. I am not quite clear in my mind how you build in the duration of the carbon storage. Say you plant a forest in a certain area, and you refer to possible diseases or fire hazards. You have an estimate that the forest will last for, say, 50 years before something happens to it. Over that time, do you integrate the area under the curve of how much carbon is stored? Do you discount into the future, saying, "The longer it lasts, the less likely it is to last further because something bad will happen to it?" How do you deal with the uncertainties around duration of these projects?

Dr Pat Snowdon: Basically, the trees grow in an S-shaped curve. They grow slowly, then they speed up and then it tapers off. It varies over time. The time length of this varies according to the species. The credits will accrue over time. You will not have any verified credits that you can use in the early years until the trees grow, and then you get a faster stream of credits coming online after that.

Lord Krebs: I understand that, but then, projecting forward, you also have to discount for the possibility that the trees will have died, burned down or something.

Dr Pat Snowdon: We have had risk analysis done to support this approach. We believe that that is adequate at the moment.¹

- Q60 **Baroness Walmsley:** This is just a quick follow-up. This committee is always very interested in the use of new technologies. Are there new technologies in measurement and monitoring that we can reasonably make use of in any of your areas or ecosystems? I can see that Dr Renée Kerkvliet-Hermans is nodding.

Dr Renée Kerkvliet-Hermans: The one thing that is really up and coming in peatland restoration is remote sensing. A lot of people and

¹ Dr Snowdon dropped out of the call at this point due to connectivity issues. He completed his answer to this question when he re-joined the evidence session.

companies are working in this area to see whether they can use remote-sensed data to measure fluxes from peatlands. It is not at a fine enough scale yet, but it is definitely an area we are keeping a close eye on. If that became available, the emission reduction that we are selling would be more accurate. It might also become easier and cheaper to do this for projects.

- Q61 **Baroness Blackwood of North Oxford:** As we have been hearing, the carbon codes are at different levels of maturity, but a lot of intended credits have been sold with only a small number of those converted into verified credits. Will there be a potential issue ahead for converting those intended credits into verified credits? What might that mean for this programme? I can see you nodding, Dr Kerkvliet-Hermans.

Dr Renée Kerkvliet-Hermans: We have no verified units to sell yet. As I said, it takes five years for the first verification to happen, and the Peatland Code is almost six years old. We will have verified units, but there have indeed been sales of these intended credits, or the pending issuance units, as we call them.

When someone sells these pending issuance units or intended credits, there is always a legal contract between the buyer and the seller. That is about who carries the risk of that unit not getting verified in the future. That risk is usually with the seller, so the landowner. It is in their interest that they keep their land in good condition, keep the registration going and make sure that those credits get verified. I do not anticipate a lot of issues with these, because it is in their own interest.

Annette Burden: We will look at whether we can do things slightly differently within the saltmarsh carbon code. There is a need to wait to see whether the carbon that you are selling can be verified, because you have to see whether it is permanent. Saltmarshes are quite front-loaded, so when you do a restoration project you gain a huge amount of carbon in the first few years of their life. It tapers off after that, and they act more like a natural marsh. You get such a high amount of carbon to begin with that we might be able to reduce the time it takes to be able to verify the carbon. It is all to be decided yet as we look at the literature, but we are hoping that we might be able to do it a bit quicker.

- Q62 **Baroness Blackwood of North Oxford:** That was going to be my next question. Since you have raised this, Annette, I will ask you. Is the timescale in which investments need to be made deterring investments?

Annette Burden: From a buyer point of view, it can be a bit frustrating if they can buy only intended credits, because they cannot be used officially as an offset until they are verified. From the point of view of people running the code and for the sellers of them, we have to have a precautionary approach. It is a bit of a Catch-22 that we need to be sure that we are selling the carbon that is there, so to verify it takes quite a while. I do not really know what the answer is. As I said, maybe in salt marshes we can get to verified carbon units quicker, just because of the way they work, but I am not entirely sure what the answer is to that.

Baroness Blackwood of North Oxford: I can see you nodding as well, Dr Kerkvliet-Hermans.

Dr Kerkvliet-Hermans: It is an issue that has been raised to me one or two times so far. I am not sure how widespread the issue is, but it is definitely a concern to some investors that they could invest a lot of money now but not get the use or return of verified credits until far in the future. Like Annette also said, we have to follow international carbon standards rules to remain credible, so we cannot verify units until our emission reductions have happened. Therefore, you cannot make offset claims on units that are not verified, because they might not get verified, so that emission reduction might not happen.

When our number of projects grows, I hope we will get more verified units that are available to sell, so that companies then can just buy verified units instead of having to invest in a project up front and wait for those credits to become verified. We are quite a bit away from that, unfortunately.

Baroness Blackwood of North Oxford: Dr Snowdon, I do not know whether you heard the questions, but the first was about the relatively small number of intended credits that have been converted into verified credits. Secondly, is the timescale in which investments must be made deterring investment? Is there a risk to the investment picture, given what we are looking at?

Dr Snowdon: Yes, a relatively small number of credits have been verified, but it is increasing for us. We launched the code 10 years ago, so our first verified credits started coming in in 2016, at the year 5 verification. That will increase in years to come. They are very popular. Any that have not been sold already get sold very quickly.

Time is always an issue for forestry. There is a Chinese proverb, I think, that says that the best time to plant a tree is 20 years ago. Whether you are doing it for carbon or for timber, you are looking at a long life cycle and you need to be patient. We are not unused to situations where you have to wait for the trees to grow before you can get the product that you want to finally use.

It may deter some investors, but, as Renée was very clear in pointing out a minute ago, it is really important to follow this principle of ex-post accounting when it comes to using carbon offsets, so you are using only verified credits, rather than a future promise to deliver. Anything else would undermine trust in the market. That is why we have to accept these timescales.

At the same time, we have had huge levels of interest. You have to wait for the credits to be verified, but achieving net zero is a medium to long-term strategy in itself. In many instances, companies have these long-term objectives. Tree planting can fit very well with that.

Baroness Blackwood of North Oxford: On the point that you raised about accounting, do you believe that the benefits generated by the carbon codes are well enough integrated into existing regulations and forms of greenhouse gas accounting, domestically and internationally? It

sounds like you think so, but what is your analysis of that?

Dr Snowdon: Yes, they are. The Government's environmental reporting guidelines, which are published by Defra, cover this area and allow companies to report verified woodland carbon units against their net emissions, when they report their greenhouse gas emissions. We are totally in line with that.

Baroness Blackwood of North Oxford: Is there anything that prevents these credits being traded as part of the UK ETS?

Dr Snowdon: Yes. We are not part of the ETS at the moment. We are a voluntary scheme, so we are not part of any mandatory government mechanism such as the ETS. The scope of the ETS at the moment does not extend to land use.

Q63 **Baroness Warwick of Undercliffe:** I am looking for something very specific here. I wonder, given what we have said about timescales and so on, whether you could give actual examples of successful restoration projects that have been supported by the codes and explain to us what the factors were that ensured their success. Conversely, are there any examples of where the codes have failed to ensure robust projects? Have lessons been learned from those?

Annette Burden: I am not sure how much I can add here, as there are no restoration projects for saltmarsh yet through the carbon code. I would only say that the biggest factor behind any success of the code is the methodology behind it, making sure that it is based on robust scientific knowledge and that the verification methodologies for additionality and permanence et cetera are all very robust. The other two witnesses will be able to add more to this than I can.

Dr Kerkvliet-Hermans: So far, we have 42 projects registered under the code, of which seven are validated so far. Of those seven, I think most have now finished their restoration, but not all. I can talk a bit about some of those seven. There are projects that have, for example, a 50% carbon funding and a 50% public funding, but also projects that have 16% carbon funding and 84% public funding. The proof will be in the first verification to see how successful these projects have been.

Within one year of finishing restoration, they get another check. That is just that post-restoration validation check to double-check that they achieved what they said they were going to do on the ground, to see whether the dams are still holding up and that kind of thing. Those checks are so far looking good. Projects are doing what they said they were doing. Sometimes projects can actually, because of snow or for other reasons, not get into certain areas. Then we need to adjust the projected carbon units for those projects. The verification will be the first real official check to see how successful the projects are, but I am confident that they are doing well.

I do not have any failed projects. I am hoping I do not have to add "yet" there, but it is possible. Time will tell.

Dr Snowdon: We have 305 projects that have been validated across UK now and 96 of them have been verified at year 5. That is encouraging for us. The 305 projects cover about 15,500 hectares and it is estimated that they will deliver almost 6 million tonnes of CO₂ over their lifetimes. We have a number of case studies on the website that I would be very happy to provide information on after this session. These bring the projects to life a little and demonstrate some of the wider benefits. For example, there is one in the Scottish Borders, close to the Southern Upland Way, which delivers recreational benefits for the surrounding area and supports flood mitigation and biodiversity, as well as the carbon. There are plenty more examples I could give.

Finally, going back to what makes a good carbon standard, there are some key principles. It is about permanence and additionality. It is about transparency—having a carbon registry where every unit is tracked. Finally, it is about independent validation and verification. Those are the factors for success.

Baroness Warwick of Undercliffe: Have any disappointed you?

Dr Snowdon: We have had some projects where the independent verifier has not verified the project as it is not satisfied with the growth rates at that point. In that instance, they have to submit a report and then the project has to make good that shortfall. Typically, that will be insufficient stocking density at year 5. They can address that by replanting some of the trees and making that good. They will not be verified until that happens.

Q64 **Lord Krebs:** I want to come back to a point I raised earlier about timescale. How can you judge a project to have been successful in the sort of time periods you have had, well under 10 years in some cases? I would have thought that success has to be measured on a long-term basis. What do you say to that?

Dr Snowdon: That is true. The success of these projects will be judged by what they have done in, say, 50 years' time. To support our case for that, I would say that we use tree growth models that have been tried and tested over decades, so we are confident about the rates of tree growth. There are a number of measures in place to deal with potential risks, say from pests and disease, in the design of woodland projects.

Woodland creation itself is a permanent change in land use under law. Once the trees have reached what we call licensable size, you require a felling license to fell it. You get that only on condition that you replant. There are a number of factors in the UK that support permanence and provide confidence in the market that these projects will deliver.

The Chair: Thank you very much indeed, Dr Snowdon, Dr Kerkvliet-Hermans and Dr Burden, for coming this morning to help us. It has been most informative. Certainly for somebody like me, it has been immensely informative. Dr Snowdon, you suggested that you might send us some further material. We would be pleased to have it. If you have any further comments to make, please feel free to write in. You will get a copy of the transcript. If there are serious errors, please let us know. For today,

thank you very much indeed. We appreciate it. Goodbye.