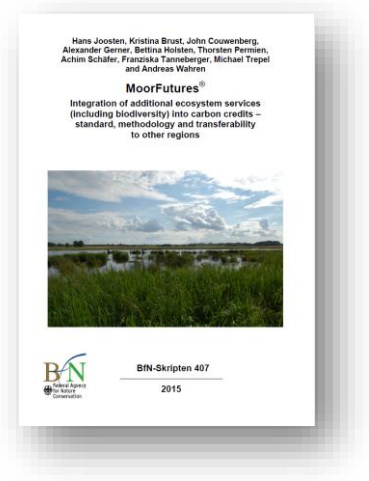
Policy workshop for work package WP.T2 (5th Feb 2020)

The Care Peat consortium met in Eindhoven in February 2020 to enable progress with the overall project. As part of that Partner Meeting we organised a workshop for the Policy and Economic modelling work package WP.T2. This is a summary of what was discussed.

Business Case 1 – Carbon Credits (D1.1)



Proposal for Carbon Credits to be used for peatland restoration

The Care Peat project will encourage the establishment of Carbon Credit schemes in each of the participating countries, in which reliable carbon certificates are developed so that peatland rewetting can be financed on the voluntary carbon market.

A carbon credit is a generic term for any tradable certificate or permit representing the right to emit one tonne of carbon dioxide or the equivalent amount of a different greenhouse gas.

Natuurmonumenten

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Note: MoorFutures developed in Greifswald Germany, is the European standard for voluntary carbon credit schemes for peatlands.

Country	CC Scheme	Who	What
Belgium	Not yet	Rik Hendrix, Bart Veroutere	Have a desire to establish a Peatland CC Scheme
France	Not yet	Francis Muller, Daniel Gilbert	No plans yet
Ireland	Not yet	Niall Ó Brolcháin, Terry Morley, John Connolly	Have a desire to establish a Peatland CC Scheme
Netherlands	Yes	Paul Vertegaal	Green Deal Pilot National Carbon Market
United Kingdom	Yes	Jo Kennedy, Sarah Johnson, Anne Selby, Tim Thom, Jillian Hoy	Peatland Code

Case Study - WP.T2 Carbon certificates for peatland projects Netherlands Paul Vertegaal (Natuurmonumenten)

'Green' carbon certificates

- Volutary offsetting market, no ETS 'credits'
- Green Deal National Carbon Market
- Transparent and 'reliable' method development
- Additionality
- Ex-ante payment

>>> valuta voor veen

Policy workshop for work package WP.T2 (5th Feb 2020)

Green Deal National Carbon Market

Sellers, buyers, governments, intermediates
www.nationaleco2markt.nl
Transparent & reliable

- Procedure Governmental support & approval
- Independent advisory committee
- Independent validation and verification
- Monitoring

Additonality

Only carbon which wouldn't be 'rescued' without the project can be used. It is Additional to:

- Instrumentalized climate policy (rules, laws, subsidies)
- Instrumentalized nature conservation policy & funds
- Autonomous natural processes/speed

Nature projects

- Non-commercial projects, financing subsidy gaps by certificates allowed
- Ex ante delivery of certificates
- Biodiversity is an extra feature

First approved 'green' method (2019)

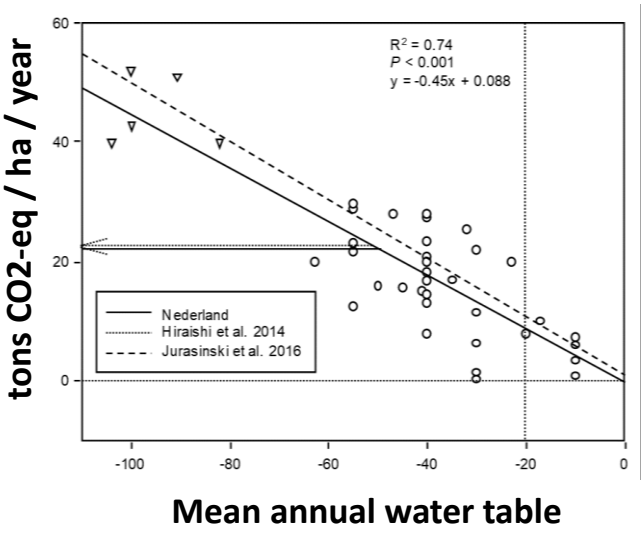
3 project types:

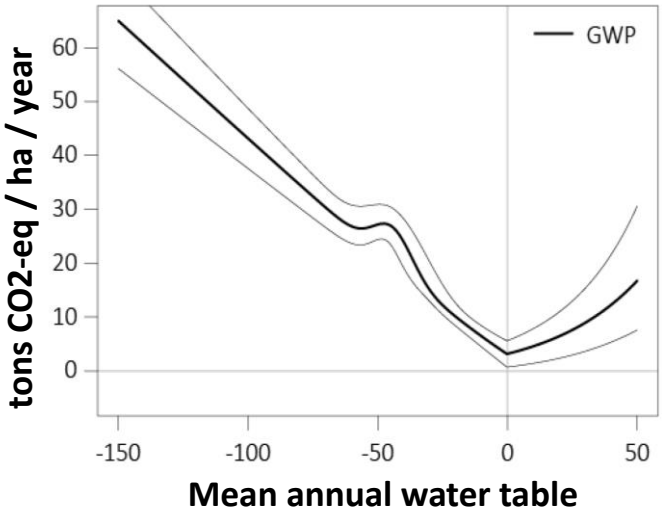
- Peat meadows (dairy farming)
- Paludi culture (Typha)
- Nature conservation (botanical grassland, meadow birds)

First project spring 2020: 450 hectares organic dairy
2020: restoration raised bog Fochteloerveen

Valuta voor Veen – carbon estimate

Water table as proxy for GHG emissions and **emission reduction**:
CO_2 according to Fritz *et al.* (2017)
Combined CO_2, CH_4 and N_2O according to Jurasinki (2016)



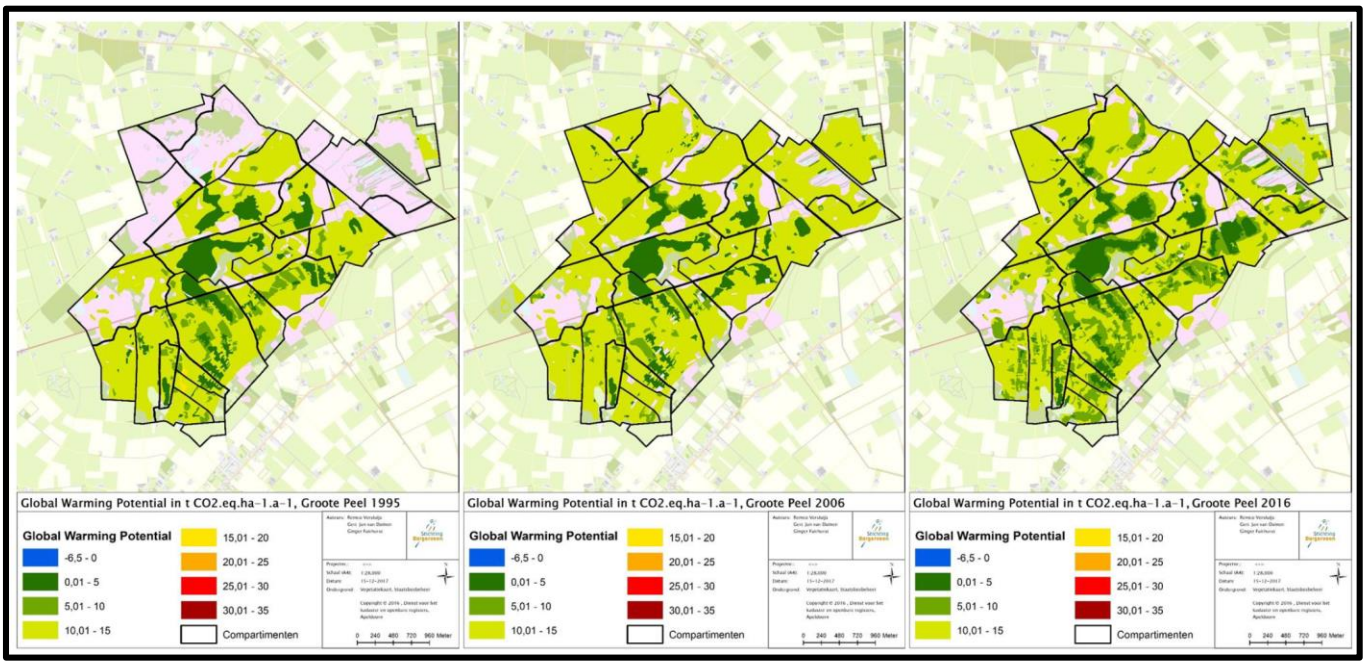


Peat bogs

Vegetation (+ water table classes) as proxy for CO_2 **emission and sequestration** and CH_4 emission:
GEST method (Greenhouse gas Emission Site Types)
Couwenberg *et al.* (2008, 2011); MoorFutures, Peatland Code (UK).
Not yet recognized in the Green New Deal
Example: Groote Peel (Van Duinen, Fritz & Couwenberg, 2018)

Groote Peel (example)

Vegetation maps 1995, 2006, 2016 → water table classes → GHG



Business Case 2 – Blue Credits (D1.2)

Proposal for Blue Credits to be used for peatland restoration

A proposal for Blue Credits is being developed in partnership with the CConnects Interreg NEW project, to improve regional effectiveness within the scope of the Care-Peat objectives.

Better management practices can help protect the storage and quality of water and the ability of wetlands to function properly and to store both water and carbon.

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Country	BC Scheme	Who	What
Belgium	Not yet	Kris de Cleer, Bert Boonen	Would be suitable for Belgium
France	Not yet	Francis Muller	
Ireland	RBAPS	Niall Ó Brolcháin	Local RBAPS scheme to improve water quality in Owenriff River in order to save fresh water Pearl Mussels
Netherlands	In development	Valentina Secchi, Herman Cohenstuart, Dianne Nijland	BC Options 1. Incorporating them in the Carbon credit system 2. Creating a Blue credit market 3. Establishing a subsidies-based system
United Kingdom	RBAPS	Alison Whalley, Michael Pilkington	4 relevant RBAPS schemes including one that is close to Blue Credits

Blue credits in Carbon Connects :

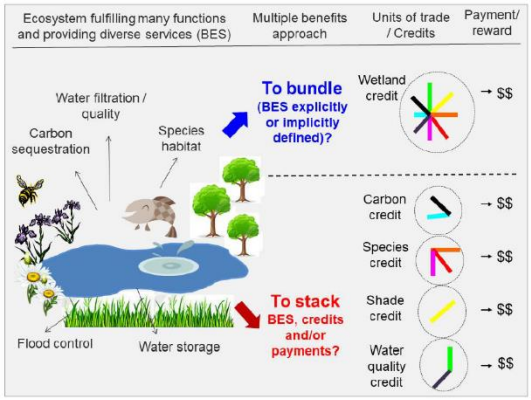
Translates water purification, water storage, water retention and depuration, services to Blue credits. These are financial units which can be traded.

Trading should support and promote projects which enhance ecosystem services.

Combining empirical experiments and existing knowledge to quantify:

- Water storage
- Water retention
- Water depuration capacity in wetlands

Some work has been done as part of the MoorFutures initiative in Germany in this regard.



- **Bundling:** is a suite of ESS sold as a single package

- **Stacking:** overlapping ESS are measured and separately 'packaged' into different credit types that together form a stack.

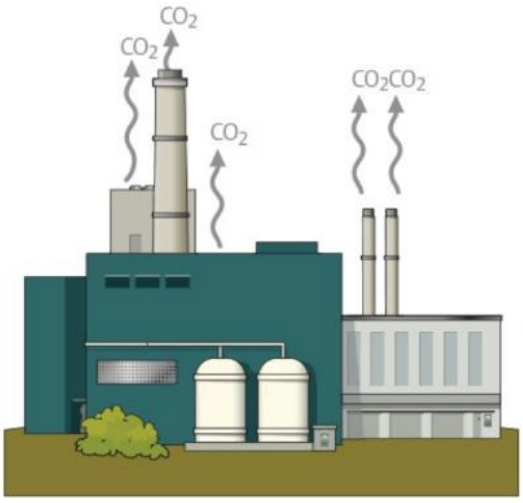
Payment systems

- Credit system: Blue credits are traded on the voluntary market.
- Subsidies: government incentive is a form of financial support with the aim of promoting wet-agriculture practices
- Labeling/certificate (true price): certificate which ensures certain standards e.g. responsible peatland management

What is the most suitable system for the NWE countries?

1. Additionality vs maintenance

- C-crediting system perspective: the main goal is to reduce CO2 emission. The additionality (i.e. the concentration reduced by buying the C credit) is central.
- Wider perspective: land may already be there and get paid for the ecosystem services they provide. Then, they may also sell credit for CO2 emission reduction.
- **2. Global vs regional**
- **3. Payment systems**
- Incorporating Blue credits in the Carbon payment system (i.e. credit, subsidies, labelling/certificates);
- Creating a Blue credit system (either credit, subsidies, Labelling/certificate)
- **What is the most suitable system for the NWE countries?**



Business Case 3 – Carbon Locking (D1.3)

Theoretical business case for low carbon substrate materials

Digging is necessary to re-vitalise peatland. Substrate materials can be used to strengthen waterfronts. Perhaps other applications are possible? *Substrate is a term used in materials science to describe the base material on which processing is conducted to produce new layers of material such as deposited coatings.*

Country	Scheme	Who	What
Belgium	No		
France	No		
Ireland	No		
Netherlands	Yes	Paul Vertegaal, Katrien Wijns, Wim Bles	Nature management organizations are interested in such applications from both the economic point of view and the socio-political aspect
United Kingdom	No		

Business Case 4 – Carbon Farming, Paludiculture (D1.4)

Bespoke model for the social and economic impact of Sphagnum farming

A pilot Sphagnum farm will be established by Care Peat on existing farmland in the UK. A bespoke model for the social and economic impact of the farm will be developed based on reviewing related carbon standards and case studies of payments for ecosystem services.

Sphagnum farming is the cultivation of peat moss (Sphagnum) aiming for the production and harvest of peat moss biomass. For this purpose the Sphagnum is cultivated in order to gain renewable raw material for the production of horticultural growing media.

Country	Scheme	Who	What
Belgium	Yes	Stefan Versweyveld	Happy to expand to case to paludiculture. Nitrogen problem in Belgium. Interested in pursuing this in terms of Nature conservation. Wants to establish a pilot with Sphagnum Farming in Belgium.
France	Not yet		
Ireland	Yes	Terry Morley, Fernando Fernandez	Experimental scheme being set up with the National Parks and Wildlife service. Some tests carried out by Bord na Mona
Netherlands	Yes	Roel van Gerwen	Sphagnum farming is one of the paludiculture strategies IPV is exploring, among other applications.
United Kingdom	Yes	Sarah Johnson, Neal Wright, Simon Caporn, Jack Clough, Deborah Land	There is strong interest at a government level in *Sphagnum* farming and other paludiculture in the UK, particularly within Defra who are keen to understand the carbon benefits of a change in agrucltural land management.

Bespoke model for social & economic impact of Sphagnum farming

From Carbon Farming to Paludiculture. Can agriculture both feed people and fight climate change? A vast majority of the rich peat soils in lowland areas in the UK have been drained either for grassland production or for agricultural fields. Conventional agricultural use of peatlands is inherently unsustainable, and the

drainage is the root cause of many of the problems associated with current management. Such as loss of biodiversity, decrease in water quality and storage greenhouse gas emissions. The impact of soil degradation also means it is not economically sustainable in the long term - soil degradation/wasting of peat soils.
Rewetting helps to solve most of the problems caused by drainage and this is what we are doing on the sites we are restoring, but restoration usually implies a stop or reduction in the agriculture production on peatlands. Wholesale restoration may not always be possible or desirable for farmers needing to make a living – as peatlands, once re-wetted, can no longer be used for conventional drainage-based agriculture
So what is the solution? is there another choice for farmers?

There is strong interest at a government level in Sphagnum farming and other paludiculture in the UK, particularly within Defra who are keen to understand the carbon benefits of a change in agricultural land management. However, little is known regarding the magnitude of carbon benefits, the timescales over which they can be achieved, and how easily such an approach can be upscaled.
There is also a strong interest at a government level in the UK in relation to the carbon benefits of a change in agricultural land management. Carbon Farming: keeping carbon in the ground. Paludiculture: (growing crops on wet peatland).

The LWT Carbon Farm at Winmarleigh Moss, with partners Manchester Metropolitan University and Microproagation Services Ltd., is designed to test the carbon farming approach at a land scape scale. In our project we are growing a permanent non-harvested crop of *Sphagnum* moss for the purpose of storing and protecting soil carbon and sequestering further atmospheric carbon. The site is a former lowland raised bog that was drained in the 1970s and converted to agricultural farm land.
The 'product' of the farm is the carbon that is captured in the vegetation and soils, and the reduction of carbon emissions. although 'selling' the carbon kept in the soil (carbon offsetting) would provide some income to "Carbon Farmers".
We will also be assessing the effect of re-wetting this area on the functioning of the adjoining nature reserve, and hope to demonstrate the viability of alternative land management techniques on peatland sites adjacent to wildlife restoration sites and show benefit both in terms of carbon and improvement to the wildlife site.
A bespoke model for the social and economic impact of the farm will be developed and tested based on reviewing related carbon standards and case studies of payments for ecosystem services.

LWT Carbon Farming pilot: Growing a permanent non-harvested crop of *Sphagnum* moss for the purpose of storing and protecting carbon in peat soils. It is perhaps the first Carbon Farm in the UK?

Carbon Farming Opportunities

Lead to more sustainable systems for farmers that maintain wet conditions, protecting peat soils, reducing CO_2 emissions, cleaning water, benefiting wildlife. Contribute to the data Defra needs to develop new funding schemes. Demonstrate to farmers what they can do with poor quality marginal land that could bring them greater revenue in the future. Help to bring in carbon-related revenue for land that may not fit with current carbon offsetting schemes

Carbon Farming Challenge

To be successful, carbon farming may need support from subsidies or carbon-offsetting schemes. We aim to hopefully get results that can persuade landowners (ands policy makers) to use fields to capture and store carbon, preventing it from escaping and adding to the problems of climate change. And also show additional ecosystem service benefits – biodioversity, natural flood management etc

Water retention area, irrigation and pump systems, top soil, nutrient input and day to day Monitoring & Management.

Paludiculture

Paludiculture – from the Latin 'palus' for swamp + 'cultura' for cultivation

What it is not…

Paludiculture is not nature protection: it is agriculture with clear production goals

What it is…

A wetter way of farming on peatlands, that does not degrade the peat layer

Various potential crops and products (approx.80)

Key crops: *Sphagnum* moss (growing media)

Carbon Farming is about protecting, storing and capturing CO2 the carbon is the product, an intermediary between conservation and farming. Once you start harvesting a crop from wet /rewetted peatlands to sell (for food, fibre, energy etc) then the carbon farm becomes a paludiculture instead.

Paludiculture is not nature protection: it is agriculture with clear production goals. What paludiculture is, is a concept that allows rewetted peatlands to remain productively used.

-Paludiculture harvests above ground biomass of plants – of either spontaneous veg or planted crops - that thrive under wet conditions.

-It is a form of agriculture on peatlands for biomass production (e.g. food, fibre and energy) that doesn't require habitats to be drained.

So is a wetter way of farming on peatlands that does not degrade the peat layer and may even add to peat accumulation.

-Paludiculture is not a panacea It may not be suitable or desirable in not all areas but, paludiculture offers another tool in the farming tool box.

-Paludiculture is about diversifying agricultural activities – for example targeting paludiculture activities on marginal land.

-Instead of fighting to keep areas drained that otherwise would be wet.

Paludiculture is a developing concept

So there are a wide range of potential "paludicrops" and markets which can be split broadly into 6 groups Food, fodder for animal feed, medicines, raw materials, biomass for energy as substitute fossil raw materials. From the Literature we can expect a yield of 5-6.5 Tonnes (Dry matter) per hectare (S.palustre and S.papillosum, with some S.fallax "pollution") (Temmink et al., 2017)

Active Nutrient sinks of 34 kg N, 17 kg K and 4 kg P ha−1yr−1. More research on species, weed prevention, harvesting etc. is needed.

Raw material:
Orchid trade is worth a staggering 505million USD annually in global exports and imports. The Netherlands is the world's largest exporter at nearly 40%. New Zealand moss 'harvest' is worth $5.1 million NZD annually (2.5 million GBP) the majority of this goes to Japan for Orchids.

Medicine:
Sphagnum has antibacterial properties due to an active compound called sphagnan. Historically in WW1 dried sphagnum moss was used as the 'first field dressing' by soldiers which both absorbed blood and stopped infection. Richard has written a very accessible blog on this.
http://richardlindsayartsandletters.org.uk/the-amazing-sphagnum-bog-moss-from-ww1-to-the-climate-war
More recently: A literature review was commissioned with the University of Greenwich into the medical applications of Sphagnum, it has been shown to be effective in inhibiting growth of several bacterial species of biomedical interest such as *Campylobacter jejuni*, *Escherichia coli* O157:H7, *Listeria monocytogenes*, and *Salmonella enterica*, *S. epidermidis, S. aereus*, *K. pneumoniae* as well as respiratory pathogens. There is a large untapped potential here. People need to eat, and we need to make a living, but we need a healthy world to work, eat and live in'.

Paludi-where? UK Sphagnum farming trials

Project Name	Project Dates	Main UK Partners	Areas Investigated
Sphagnum Farming UK - A Sustainable Alternative to Peat in Growing Media	2018 - 2019	Micropropagation services Ltd. Manchester Metropolitan University, University of East London, Lancashire Wildlife Trust	Sphagnum cultivation.
Waterworks Project	2019 - 2021	The Wildlife Trusts of Bedfordshire, Cambridgeshire and Northamptonshire Cambridgeshire Acre, University of East London	Typha, Reed, Sphagnum, Glyceria and other cultivation
Bolton Fell Sphagnum farming	2018 - ongoing	Natural England Barker and Bland	Sphagnum cultivation

Also growing number of paludiculture trials in the UK, various partners, from Biomass production for energy, sphagnum cultivation, medical applications to raw material for construction.

Opportunities
Lead to more sustainable systems for farmers that maintain wet conditions, protecting peat soils, reducing CO_2 emissions, cleaning water, benefiting wildlife. New products, jobs and markets for the farming sector. Potentially it provides a higher income than carbon farming as it provides a crop to sell. Lower climate benefit than carbon farming, but the landowner may also be able to claim carbon-reduction subsidies/payments in addition to selling a crop.
Paludiculture / *Sphagnum* farming will help to limit future carbon emissions from peat soils, and potentially lead to new products and markets for farmers. It will create more sustainable systems for farmers on peat soils through developing crops that grow in wet conditions, protecting peat soils, reducing CO_2 emissions, cleaning water, benefiting wildlife, sharing knowledge and creating new opportunities for farmers and growers.

It provides a crop and potentially a higher income than carbon farming. The economics are still not certain but there is an immediate market for cropped *Sphagnum*. It has a lower climate benefit than carbon farming, but the landowner may also be able to claim carbon-reduction subsidies/payments in addition to selling a crop.

Challenges

Still in trial stage. Requires much more intensive management and a purer crop than carbon farming. Lack of policy, legal framework. Lack of funding support, markets. Machinery and Logistics. Carbon farming could become a viable practice much sooner. Paludiculture is explicitly mentioned as a sustainable land use option in several global initiatives as well as in the IUCN UK Peatland Programme's UK Peatland Strategy 2018-2040. So why then are we not seeing more of it in UK peatlands?

These are key challenges to the implementation of paludiculture - capture the results of multi-stakeholder discussions at the Paludiculture UK 2017 conference (Natural England, 2018) .
Paludiculture has many benefits:

Climate: Conservation of carbon fixed in peat and reduction of CO_2 emissions by rewetting degraded peatlands
Environment: Reduction of the emission of pollutants into ground and surface water (eutrophication) in comparison to agricultural land use; renewed function of water purification and water retention in peatlands as well as a local cooling effect due to increased water evaporation.
Wildlife: Providing surrogate habitats for associated mossland flora and fauna, and providing stepping stones/ corridors. Paludiculture trials in Germany found that *Sphagnum* beds, even when cropped, provided a habitat for some rare species of spider (Muster et al, 2015) and all types of paludiculture would provide a great buffer to restoration/pristine mossland sites.
Landscape: Conservation of open landscape.
Economics: Production of alternative, renewable, biomass to replace fossil raw materials and fossil fuel, job creation for farmers and supply chains and alternative means of income in rural areas as well as regional creation of value.

Challenge: Paludiculture is developing, although still in its infancy. For example, although paludiculture production of *Sphagnum* has a ready market (to provide a horticulture product), *Sphagnum* production in large quantities is still at the trial stage and also requires much more intensive management and a purer crop than carbon farming. In addition, the focus on the climate emergency, government targets on emission reductions and associated policy as well as the predicted changes to the agri-subsidy system *may* mean that carbon farming becomes common / viable practice much sooner. Muster C., Gaudi G., Krebs M., Joosten H. (2015) *Sphagnum farming: the promised land for peat bog species?* Biodivers Conserv 24:1989–2009 DOI 10.1007/s10531-015-0922-8

Conclusions

More information needed on the magnitude of carbon benefits, timescales, and how such an approaches can be up-scaled. Carbon Farming and Paludiculture need not be mutually exclusive – both have benefits, and could be side-by-side in the wider landscape. There are many challenges, but many opportunities for innovation. It will not be easy – it will require a complete land use change to work. If developed properly it can save money, benefit farmers and society as a whole.

Business Case 5 – Renewable Energy Co-location (D1.5)

Theoretical business case for using renewable energy sources to fund the restoration of peatlands

The practice of turf cutting and burning by private citizens is still practiced in Europe. To phase this out and to give those with traditional turbary rights a viable alternative, we are developing a business model to explore the installation of renewable energy generation co-located with functional peatland wetlands.

Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as solar, wind and biomass.

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Country	Scheme	Who	What
Belgium	Interested	Stefan Versweyveld	There is a lot of discussion in relation to wind turbines. Interested in promoting renewable energy in community context. Interested in community power, Black Alder plantations and Biomass.
France	No		
Ireland	Yes	Niall Ó Brolcháin, John O'Sullivan	Galway Wind Park, restoring land back to its original state, sometimes even enhancing it; working with local contractors so as many local people benefit from the economic opportunities created.
Netherlands	Yes	Kristijan Civic	There might be examples done by Staatsbosbeheer – they have been exploring this model to fund nature management and restoration in general, but not sure if specifically for peatland.
United Kingdom	Yes	Sarah Johnson, Chris Field	The Scout Moor Wind Farm Habitat Enhancement Fund (HEF) was set up to enable environmental improvement works the fund has contributed to 12 projects including over 200 hectares of bog re-wetted.