Onshore Wind And Peatlands In Wales

A Future For Healthy Peat And Clean Energy

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Onshore Wind: Accelerating Peatland Restoration In Wales

We are in the midst of a climate, biodiversity and land degradation crisis in Wales that is threatening our very way of life.

Removing our reliance on fossil fuels is imperative, but the transition to renewables is also an opportunity to promote the restoration of our natural landscapes, working hand in hand to cut emissions while safeguarding and enhancing our environment. There is a delicate balance to be struck to ensure both priorities are achievable.

From a climate perspective, onshore wind is one of the quickest and cheapest ways to cut carbon emissions. With the right enabling actions, capacity in Wales could triple over the next decade to help meet our growing need for electricity. Without this rapid increase in onshore wind Wales will not be able to meet its net zero targets.

In terms of biodiversity and land degradation, a key focus for Wales is the protection and restoration of its peatlands. Peatlands work like a carbon storage unit by slowing down the breakdown of plants and turning them into peat. It's estimated 90% of our deep peat is degraded, and protecting these areas is a high priority for Welsh Government. Ambitious targets have been set for peatland restoration over the coming years. However, managing the process – and paying for it – is a costly, and specialised undertaking. Public funding for this beyond 2025 is uncertain.

Wind farms are typically situated in remote highland areas, which often contain degraded peatlands and peaty soils.

This overlap provides an opportunity. Through landowner agreements, onshore wind farms are one of the few remaining sustainably funded opportunities for peat restoration. Onshore wind in Wales has the very real potential to accelerate the delivery of nature conservation, clean energy, reduced flood risk and zero carbon objectives.

Developer surveys show the Welsh Government's national peat map is misleading. Peaty deposits are much more widespread than indicated here, and are often found in areas ear-marked for onshore wind.

Source (map): Welsh Government, DataMapWales, Peatlands of Wales Maps - https://datamap.gov.wales/maps/peatlands-of-wales-maps/

Why Is Peat Important?

In their natural state, peats store carbon as it lays down natural material at a rate of about 1mm per year. It is this unique ability to naturally hold on to carbon that sets them apart[1].

Peatlands cover at least 4%[2] of Wales, and exist as a waterlogged, carbon storing landscape which supports a diverse variety of critical ecosystems, species, and habitats, and form a vital component of Wales's historic landscape. Healthy peatlands fulfil a variety of environmental functions including water management and forming habitats for plants and animals. As carbon-rich soils, peatlands may store up to 30% of Wales's soil carbon alone[3]. Natural Resources Wales (NRW) estimates that Wales's deep peat currently stores 196million carbon tonnes – over 5 times Wales's annual carbon emissions[4].

Alongside its role as a carbon store, healthy peatland also helps to prevent flooding by absorbing excess water, while simultaneously locking in pollutants. The biodiversity benefits are significant, with peatland supporting a diverse range of plant and animal species, from sphagnum mosses and sundews to golden plover, lapwings, and the large heath butterfly. Restoration of peatlands therefore supports the Welsh Government's policy to interconnect decarbonisation of the energy sector with biodiversity restoration, nature conservation, and water management.

Welsh Government Targets

To tackle and reverse peatland degradation, the Welsh Government created a **National Peatland Action Programme (NPAP)**, with funding for 2020 to 2025. In its first 3 years, NPAP has restored approximately 1,650ha of peat (equivalent to approximately 1,650 rugby pitches).

Alongside that goal is the national target for all of Wales' electricity to come from renewable sources by 2035. The majority of peatlands in Wales lie above 200m, which are often also the windiest areas that are ideal for onshore wind and vital for realising that target. Data limitations in the Welsh Government's national peat map mean that even in areas ear-marked as suitable for onshore wind, there may still be a lot of peatlands. Surveys often find poorer quality peat which is why building wind farms in these locations could accelerate peat restoration, hitting goals for both nature recovery and renewable energy.

[1] For further information about this process, see NRW, Peatland Information Note

[2] https://cdn.cyfoethnaturiol.cymru/media/692545/national-peatlands-action-programme.pdf

[3] "https://naturalresources.wales/media/cvwoa5lj/access-eng-npap-y3-accessible.pdf" National Peatland Action Programme: Year 3 Report, 2022/23, p.37.

Degraded Peatland

Degraded peatland cannot provide the many benefits of healthy peatlands and can – if not maintained – release carbon dioxide back into the atmosphere, undermining actions being taken to combat the climate emergency. NRW estimates that 90% of deep peatland in Wales is in poor condition and releasing carbon, with total peatland emissions at around 550,000 t.CO2 e/yr, demonstrating the overwhelming importance of rapid restorative action[5].

Peatlands have become degraded for many reasons. Large areas were drained for agriculture and plantation forestry, whilst peat has also been cut for household heating. Some peatlands have suffered from over- or under-grazing, allowing invasive species to thrive, and the drying of peat under varying management pressures has increased the risk of fires. Pollutants have also proven destructive, with deposits of atmospheric nitrogen and sulphur killing peat forming mosses.

Eroding peathag

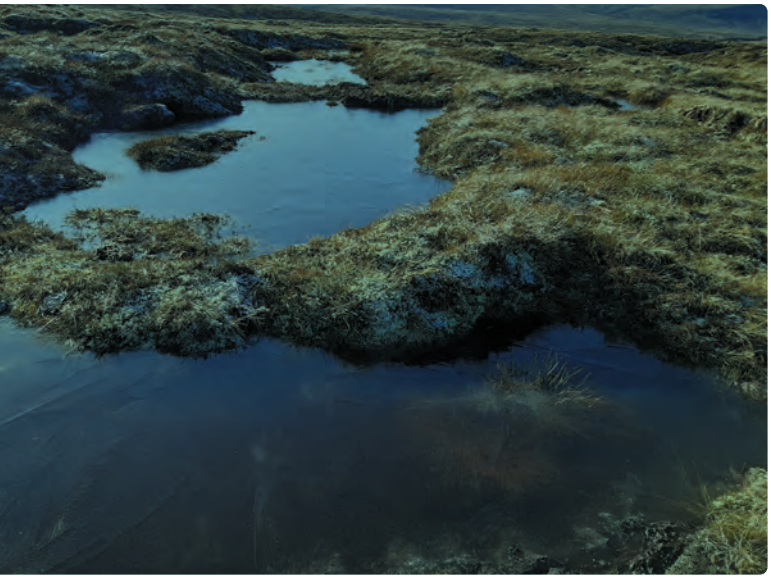
[4] Natural Environment Research Council, Details of Award, 2020-23

[5] NRW Information Note – Peatland: How carbon sinks can turn into carbon emitters, p.1)

In Welsh Government's **Biodiversity Deep Dive** Written Statement (October 2022) there was a commitment to a net zero target of 45,000ha of peatland restoration by 2050, pledging to upscale NPAP to reach the necessary annual rate of peatland restoration by 2030. This means that, from 2030 at least 1600ha of peatland must be restored year on year, demanding a significant increase in funding.

However, committed NPAP funding is only until 2025, risking a decline in peatland restoration. It will therefore be essential for additional capital to maintain existing restoration projects and grow the rate of peatland restoration.

Onshore wind capacity could triple[6] over coming years with the number of projects in the pipeline. Given the expansion in projects, and the fact that onshore wind is often located in proximity to peatlands, onshore wind developers represent important partners to provide a reliable and consistent source of additional funding for peatland restoration.



Future Funding From Onshore Wind

With no committed funding for peatland restoration beyond the 2025, wind developers offer an alternative funding stream, reducing the burden on the taxpayer. To restore peatlands, everyone – the Welsh Government, NRW and the wind industry – needs to work together. The first step is creating **clear and precise advisory guidance** on how to assess and manage peatlands on onshore wind sites across Wales. This document sets out several key recommendations (see page 6) for the Welsh Government and NRW.

[6] https://www.renewableuk-cymru.com/wp-content/uploads/Future-Energy-Wales-The-Critical-Role-of-Welsh-Wind-Power.pdf

[7] Climate Change Committee, Progress Report: Reducing emissions in Wales, June 2023

Net zero target of **45,000ha** of peatland restoration by **2050** - equivalent to half of Wales'peatland.

Currently restored: **1600ha** of peatland.

Peatland Restoration Targets: How Does Wales Compare?:

- *The Scottish Government has committed to restoring 250,000ha of peatland by 2030, with over 30,000ha restored or under restoration at present.*
- *In England, the UK Government aims to restore 35,000ha of peatland by 2025 and 280,000 by 2050, with an annual target of 4,700 per year.*

The UK Climate Change Committee has recommended that the Welsh Government should ensure that 58% of peatland is under restoration by 2035, rising to 79% by 2050. The Welsh Government's current 2050 target represents only 50% of total peatland in Wales and without industry support to achieve and surpass it, Wales risks falling behind the rest of the UK[7].

Assessing Carbon Payback

Welsh developers follow the Scottish model where wind farms built on peatlands are assessed using the Scottish Government's Carbon Calculator to ensure that the carbon payback is taken into account during decision making. A review by the University of Edinburgh has shown that all wind farms included in a number of studies achieved carbon payback within two years.

We recommend the Welsh Government adopt this Carbon Calculator as best practice.

Case Studies

Onshore wind developers are already working to restore damaged peatland, to secure its value as a carbon store and ecological habitat for rare species, and to support the Welsh Government in meeting its net zero targets. With clear guidance, future projects could fill the funding gap for restoration and improve Welsh peatlands.

Pen y Cymoedd Onshore Wind Farm

VATTENFALL

Vattenfall's Pen y Cymoedd wind farm is the largest onshore wind farm in England and Wales, with 76 turbines and an installed capacity of 228MW; operational since 2017, the wind farm funds a 25-year £3million habitat restoration scheme of 1500ha. Of this, 150ha (roughly equivalent to 150 rugby pitches) of peatland is currently being actively restored, with further areas restored each year. Implementation of the plan is being undertaken by NRW and overseen by a steering group of ecologists from local authorities and the RSPB.

Located in Neath Port Talbot and Rhondda Cynon Taf in South Wales, the primary aim of the Pen y Cymoedd restoration scheme is 'forest to bog' restoration, prioritising deeper areas of peat, and returning currently commercial forestry areas to blanket bog, wet and dry heath and marshy grassland. The project will also ensure the natural colonisation of native woodland, the use of wet woodland as a buffer around peatlands, the management of stream corridors and feeding habitats, and improvement of the wider habitat for native plant and animal species.

The work being undertaken at Pen y Cymoedd, combined with the work of **The Lost Peatlands Project (TLPP)** – a National Lottery Heritage Fund project - represents one of the largest peatland restoration projects in southern Britain. TLPP also supports engagement with local schools, inviting schoolchildren to adopt a locally endangered species. Local residents and visitors are also set to benefit, with the enhancement of footpaths and signage to promote better access, heritage awareness, and recreational use.

Pen y Cymoedd and TLPP are working collaboratively to restore peatland within the wind farm's Habitat Management Plan (HMP) area, using restoration techniques trialled at a test site in the wind farm boundary in 2019/20.

A Habitat Management Fund also provides match funding to support and extend the peatland restoration works. An additional £200,000 from Vattenfall's Environmental R&D Programme – BioWins – has also funded a PhD programme at Swansea University to further research into the restoration of afforested peatland (peatland that has subsequently been forested).

With the felling of the existing plantation woodland and working to restore natural water flows and processes, Pen y Cymoedd will return degraded peatlands to health, providing biodiversity enhancements, and creating a learning resource for other projects.

Vattenfall: Peatland at Pen-y-Cymoedd Wind Farm

Mynydd Bwllfa Wind Farm

PENNANT WALTERS

Pennant Walter's Mynydd Bwllfa wind farm is situated at the north end of the Cynon Valley in Rhondda Cynon Taf and consists of 9 wind turbines, operational since 2015, with a capacity of 22.5MW. Spread across a 242ha site, the project's Habitat Management Plan (HMP) identified the presence of a modified blanket bog in a severely degraded state from overgrazing, fires, and a reduction in species-richness and structural diversity.

To implement peatland restoration, the HMP set out numerous interventions within the agreed Management Areas.

First, the site put up fencing along its boundaries to enforce the prescribed grazing regime, replacing sheep with low-density cattle stock to remove invasive vegetation and maintain the bog/heath habitats.

Second, the scheme looked at ways to maintain and improve water retention and movement throughout the areas of blanket bog; such as ditch blocking, culvert reduction, and the creation of dams and other water management features.

Third, the management and proliferation of at least 50ha of species-rich grassland habitats was prioritised as a means of preserving and enhancing native species populations. Finally, the HMP set out a comprehensive monitoring strategy to measure and assess the quality and health of areas of blanket bog and heathland.

Pennant Walters: Works associated with the HMP at Mynydd Bwllfa Wind Farm

What is Blanket Bog?

***Blanket bog comprises** the largest areas of peatland in Wales and are areas where peat has accumulated across the entire landscape, akin to a blanket. These bogs typically form in the uplands where drainage is poor and at the source of river catchments where rainfall is frequent and heavy, and the water table is high.*

*Other types of peatland include **Lowland Fens** (occupying low points in the landscape which collect rainfall and water from the surroundings) and **Lowland Raised Bogs** (domed bogs that form in areas where, historically, there was standing water such as a lake or hollow).*

Clocaenog Forest RWE

RWE's Clocaenog Forest Wind Farm is situated within the Clwyd Hills, south of Denbigh, and consists of 27 turbines, operational since 2021, with a capacity of 96MW, enough to power 63,800 homes. The project is located on the Welsh Government's woodland estate, on land managed by NRW. The total site boundary extends to 1,581ha and is primarily situated in a coniferous forest with some open areas of heather moorland.

The HMP included a Soil and Peat Management Plan with the express aim of establishing and managing heathland and peatland habitat. Currently, c.20ha have been restored, with work underway on further peatland within the site boundary.

RWE: Clocaenog Forest Wind Farm

Key Recommendations

RenewableUK Cymru (RUKC) has engaged proactively with developers, Welsh Government, NRW and other statutory advisors to understand the scope for protecting and managing peatland resources at Welsh wind farms. This work culminated in the **"Onshore Wind Power and Restoring Carbon-rich Peatlands in Wales[8]" report on which this briefing is based.**

There are **four key calls to action for Welsh Government** and its statutory nature conservation advisors.

1. **Provide a clear definition of 'deep peat' that covers both depth and quality of peat.** Guidance from NRW and other consultees is inconsistent and changeable. Without clarity on what is categorised as 'deep peat', clear and consistent approaches to assessment are impossible. There is also a need for planning policy to define and identify the quality of peatland. The Scottish Government's definition on 'deep peat' is instructive, with a clear metric of a soil depth greater than 0.5m, and clear guidance on priority peatlands to be avoided and degraded peatlands to be prioritised for developer-led restoration. Wales requires pragmatic guidance on whether we can develop on peat, and in what context it is acceptable.

2. **Develop and publish detailed planning guidance on peat.** There is a lack of guidance and clear policy framework within which to prepare, consider and approach development in or near peatland areas. Welsh Government should develop a 'peatland strategy', which recognises the contribution the onshore wind industry can make to restoration, and helps inform early-stage discussions.

3. **Develop guidance on 'Best Practice' approaches to managing and restoring peat.** The standardisation of monitoring approaches, both for baseline and post-restoration will assist peat restoration efforts. This must be provided in a consistent framework drawing on recommendations 1 & 2. Clear guidance on best practice measures and the most beneficial restoration techniques will standardise approaches to peatland restoration and ensure rapid and effective action.

4. **Accelerate support and sufficient resource for NRW to assist with the delivery of consistent, and timely, technical advice on peat for developers.** Current resourcing and funding difficulties mean that it is impossible for NRW to work with industry and relevant stakeholders in a timely manner to develop clear and consistent approach to managing peat, which often results in inconsistencies in approach to assessment and advice.

Future Restoration: Methods, Best Practices, and Guidelines

Peatland restoration is generally undertaken post-construction. Some developers have called for the introduction of integrated 'restoration and enhancement plans' to implement a holistic approach to peatlands which deliver benefits beyond mitigation.

Ultimately, with clear guidance, an approach to peatland restoration can be implemented as part of the design process of wind farms, and an improved and consistent approach to peat can help facilitate best practice and much needed additional investment, in support of Welsh Government's 2050 targets for nature restoration and decarbonisation.

If we are to unlock the significant potential of onshore wind[9] to bring forward timely, cost-effective renewable energy, there needs to be a unified approach on peat to inject significant future investment in peatland restoration and protection.

[8] https://www.renewableuk-cymru.com/wp-content/uploads/Onshore-Wind-Power-and-Restoring-Carbon-rich-Peatlands-in-Wales_RUKC-Stakeholder-Advice-Note_Aug-2023.pdf

[9] Future-Energy-Wales-The-Critical-Role-of-Welsh-Wind-Power.pdf (renewableuk-cymru.com)

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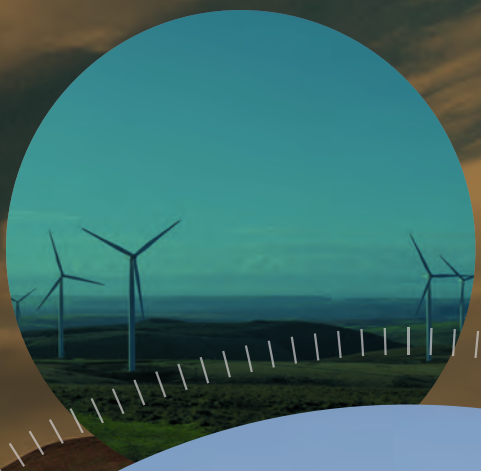
Gwynt ar y Tir a Mawndiroedd yng Nghymru



Dyfodol i fawn iach ac ynni glân

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Gwynt ar y tir: Cyflymu adferiad mawndiroedd yng Nghymru

Rydym yng nghanol argyfwng hinsawdd, bioamrywiaeth a diraddio tir yng Nghymru sy'n bygwth ein hunion ffordd o fyw.

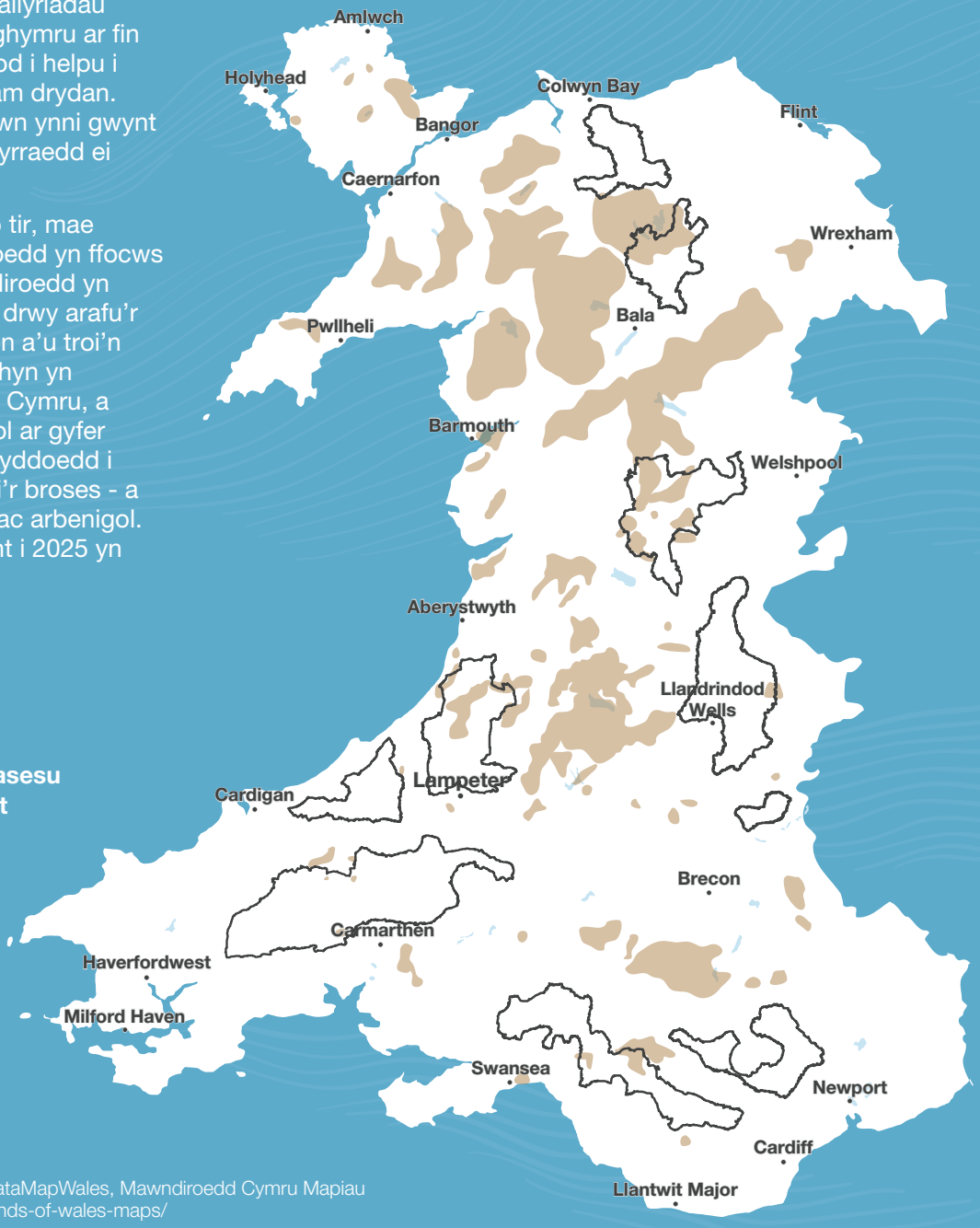
Mae dileu ein dibyniaeth ar danwydd ffosil yn hollbwysig, ond mae'r newid i ynni adnewyddadwy hefyd yn gyfle i fynd i'r afael â'r argyfwng natur, gan weithio law yn llaw i dorri allyriadau tra'n diogelu ein hamgylchedd. Mae angen sicrhau cydbwysedd gofalus er mwyn sicrhau bod y ddwy flaenoriaeth yn gyraeddadwy.

O safbwynt hinsawdd, gwynt ar y tir yw'r ffordd gyflymaf a rhataf o dorri allyriadau carbon, ac mae capasiti yng Nghymru ar fin treblu dros y blynyddoedd i ddod i helpu i ddiwallu ein hangen cynyddol am drydan. Heb y cynnydd cyflym hwn mewn ynni gwynt ar y tir ni fydd Cymru yn gallu cyrraedd ei thargedau sero net.

O ran bioamrywiaeth a diraddio tir, mae gwarchod ac adfer ei mawndiroedd yn ffocws allweddol i Gymru. Mae mawndiroedd yn gweithio fel uned storio carbon drwy arafu'r gwaith o ddadelfennu planhigion a'u troi'n fawn. Mae diogelu'r ardaloedd hyn yn flaenoriaeth uchel i Lywodraeth Cymru, a gosodwyd targedau uchelgeisiol ar gyfer adfer mawndiroedd dros y blynyddoedd i ddod. Fodd bynnag, mae rheoli'r broses - a thalu amdani - yn dasg gostus ac arbenigol. Mae cyllid ar gyfer hyn y tu hwnt i 2025 yn ansicr.

Mae ffermydd gwynt fel arfer wedi'u lleoli ar dir uchel, anghysbell, yn aml ger ardaloedd lle mae dyddodion mawnaidd i'w cael.

Mae'r gorgyffwrdd hwn yn rhoi cyfle. Trwy gytundebau gyda thirfeddianwyr, mae ffermydd gwynt ar y tir yn un o'r ychydig gyfleoedd sydd ar ôl wedi'u hariannu'n gynaliadwy ar gyfer adfer mawn. Mae gan wynt ar y tir yng Nghymru y potensial gwirioneddol i gyflymu'r gwaith o gyflawni amcanion ynghylch cadwraeth natur, ynni glân, llai o berygl llifogydd a mynd yn ddi-garbon.



Mae arolygon datblygwyr yn dangos bod map mawn cenedlaethol Llywodraeth Cymru yn gamarweiniol. Mae dyddodion mawnog yn llawer mwy cyffredin nag a nodir yma, ac fe'u ceir yn aml mewn ardaloedd sydd wedi'u nodi ar gyfer gwynt ar y tir.

Ffynhonnell (map): Llywodraeth Cymru, DataMapWales, Mawndiroedd Cymru Mapiau - https://datamap.gov.wales/maps/peatlands-of-wales-maps/

Pam fod mawn yn bwysig?

Yn eu cyflwr naturiol, mae mawndiroedd yn cronni tua 1mm y flwyddyn o garbon, a'r gallu unigryw hwn i ddal carbon sy'n eu gosod ar wahân[1].

Mae mawndiroedd yn gorchuddio o leiaf 4%[2] o Gymru, ac yn bodoli fel tirwedd ddwrlawn sy'n storio carbon, sy'n cynnal amrywiaeth amrywiol o ecosystemau, rhywogaethau a chynefinoedd hanfodol, ac sy'n rhan hanfodol o dirwedd hanesyddol Cymru. Mae mawndiroedd iach yn cyflawni amrywiaeth o swyddogaethau amgylcheddol gan gynnwys rheoli dŵr a chynefinoedd ar gyfer planhigion ac anifeiliaid. Fel priddoedd carbon-gyfoethog, gall mawndiroedd storio hyd at 30% o garbon pridd Cymru yn unig[3]. Mae Cyfoeth Naturiol Cymru (CNC) yn amcangyfrif bod mawn dwfn Cymru ar hyn o bryd yn storio 196 miliwn o dunelli o garbon – dros 5 gwaith allyriadau carbon blynyddol Cymru[4].

Ochr yn ochr â'i rôl fel storfa garbon, mae mawndir iach hefyd yn helpu i atal llifogydd trwy amsugno dŵr dros ben, tra'n cloi llygryddion i mewn ar yr un pryd. Mae'r buddion bioamrywiaeth yn sylweddol, gyda mawndir yn cynnal ystod amrywiol o rywogaethau planhigion ac anifeiliaid, o fwsoglau sphagnum a gwlithlys i'r cwtiad aur, y gornchwiglen, a'r glöyn byw rhostir mawr. Mae adfer mawndiroedd felly yn cefnogi polisi Llywodraeth Cymru i ryng-gysylltu datgarboneiddio'r sector ynni ag adfer bioamrywiaeth, cadwraeth natur, a rheoli dŵr.

Targedau Llywodraeth Cymru:

Er mwyn mynd i'r afael â diraddio mawndiroedd a'i wrthdroi, creodd Llywodraeth Cymru **Raglen Weithredu Genedlaethol ar gyfer Mawndiroedd (NPAP)**, gyda chyllid ar gyfer 2020 i 2025. Yn ei 3 blynedd gyntaf, mae NPAP wedi adfer tua 1,650ha o fawn (cyfwerth â thua 1,650 o gaeau rygbi).

Ochr yn ochr â'r nod hwnnw mae'r targed cenedlaethol i holl drydan Cymru ddod o ffynonellau adnewyddadwy erbyn 2035. Mae tua 83% o fawndiroedd Cymru dros 200m, sydd yn aml hefyd yr ardaloedd mwyaf gwyntog sy'n ddelfrydol ar gyfer gwynt ar y tir ac yn hanfodol ar gyfer gwireddu'r targed hwnnw. Mae cyfyngiadau data ar fap mawn cenedlaethol Llywodraeth Cymru yn golygu, hyd yn oed mewn ardaloedd sydd wedi'u clustnodi fel rhai addas ar gyfer gwynt ar y tir, efallai y bydd llawer o fawndiroedd o hyd. Mae arolygon cynnar yn aml yn canfod mawn o ansawdd gwaeth a dyna pam y gallai adeiladu ffermydd gwynt yma gyflymu'r gwaith o adfer mawn, gan gyrraedd nodau ar gyfer natur ac ynni adnewyddadwy.

[1] I gael rhagor o wybodaeth am y broses hon, gweler CNC, Nodyn Gwybodaeth Mawndiroedd

[2] https://cdn.cyfoethnaturiol.cymru/media/692545/national-peatlands-action-programme.pdf

[3] https://naturalresources.wales/media/cvwoa5lj/access-eng-npap-y3-accessible.pdf Rhaglen Genedlaethol Gweithredu Mawndiroedd: Adroddiad Blwyddyn 3, 2022/23, t.37

Mawndir diraddiedig

Ni all mawndir diraddiedig ddarparu buddion niferus mawndiroedd iach ac fe all – os na chaiff ei gynnal – ryddhau carbon deuocsid yn ôl i'r atmosffer, gan danseilio'r camau sy'n cael eu cymryd i frwydro yn erbyn yr argyfwng hinsawdd. Mae CNC yn amcangyfrif bod 90% o fawndir dwfn Cymru mewn cyflwr gwael ac yn rhyddhau carbon, gyda chyfanswm allyriadau mawndiroedd tua 510,000 t.CO2 e/yr, gan ddangos pwysigrwydd aruthrol gweithredu adferol cyflym[5].

Mae mawndiroedd wedi diraddio am lawer o resymau. Cafodd ardaloedd mawr eu draenio ar gyfer amaethyddiaeth a choedwigaeth (mae tua 18,000 ha o fawndir yng Nghymru o dan goedwigaeth planhigfeydd), tra bod mawn hefyd wedi'i dorri ar gyfer gwresogi cartrefi. Mae rhai mawndiroedd wedi dioddef o or-bori neu dan-bori, gan alluogi rhywogaethau ymledol i ffynnu, ac mae sychu mawn dan bwysau rheoli amrywiol wedi cynyddu'r risg o danau. Mae llygryddion hefyd wedi bod yn ddinistriol, gyda dyddodion o nitrogen atmosfferig a sylffwr yn lladd mawn gan ffurfio mwsoglau.

Eroding peathag

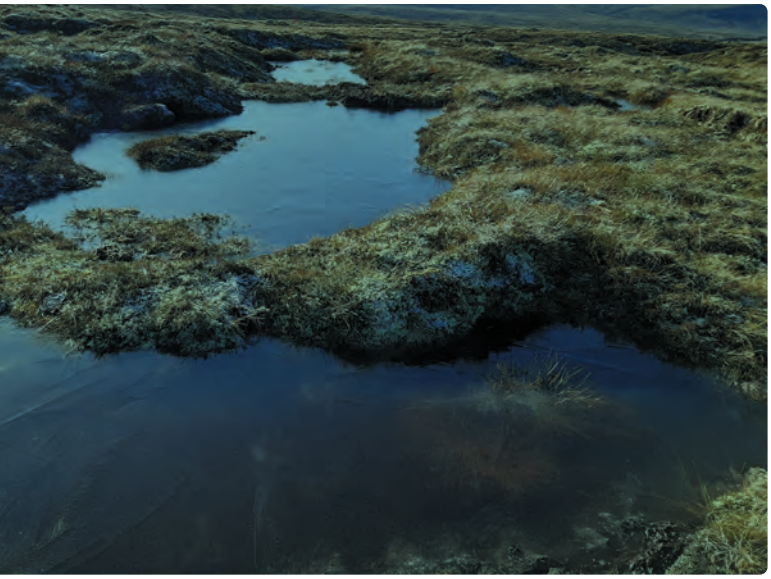
[4] Cyngor Ymchwil yr Amgylchedd Naturiol, Manylion y Dyfarniad, 2020-23

[5] Nodyn Gwybodaeth CNC – Mawndir: Sut gall sinciau carbon droi'n allyrwyr carbon, t.1

Yn Natganiad Ysgrifenedig **Archwiliad Dwfn Bioamrywiaeth** Llywodraeth Cymru (Hydref 2022) roedd ymrwymiad i darged sero net o 45,000ha o adfer mawndiroedd erbyn 2050, gan addo uwchraddio NPAP i gyrraedd y gyfradd flynyddol angenrheidiol o adfer mawndiroedd erbyn 2030. Mae hyn yn golygu, o 2030 ymlaen, bod yn rhaid adfer o leiaf 1600ha o fawndir y flwyddyn.

Fodd bynnag, dim ond tan 2025 y mae cyllid NPAP wedi'i ymrwymo, sy'n peryglu dirywiad mewn adfer mawndiroedd heb gyllid yn y dyfodol. Felly bydd yn hanfodol cael cyfalaf ychwanegol i sicrhau cyfradd gyson a chynyddol o adfer mawndiroedd.

Disgwylir i gapasiti gwynt ar y tir[6] dreblu dros y blynyddoedd nesaf gyda nifer y prosiectau sydd ar y gweill. O ystyried yr ehangu mewn prosiectau, a'r ffaith bod ynni gwynt ar y tir yn aml wedi'i leoli'n agos at fawndiroedd, mae datblygwyr ynni gwynt ar y tir yn cynrychioli partneriaid pwysig i ddarparu ffynhonnell ddibynadwy a chyson o gyllid ychwanegol ar gyfer adfer mawndiroedd.



Targed sero net o **45,000ha** o adfer mawndir erbyn **2050** – sy'n cyfateb i hanner mawndir Cymru.

Wedi'i adfer ar hyn o bryd: **1600ha** o fawndir.

Cyllid yn y dyfodol o ynni gwynt ar y tir

Heb unrhyw gyllid wedi'i ymrwymo ar gyfer adfer mawndiroedd y tu hwnt i'r ddwy flynedd nesaf, mae datblygwyr gwynt yn cynnig ffrwd ariannu amgen, gan leihau'r baich ar y trethdalwr. Er mwyn adfer mawndiroedd, mae angen i bawb – Llywodraeth Cymru, CNC a'r diwydiant gwynt – gydweithio. Y cam cyntaf yw creu **canllawiau cynghori clir a manwl gywir** ar sut i asesu a rheoli mawndiroedd ar safleoedd gwynt ar y tir ledled Cymru. Mae'r ddogfen hon yn nodi sawl argymhelliad allweddol (gweler tudalen 6) ar gyfer Llywodraeth Cymru ac CNC.

[6] https://www.renewableuk-cymru.com/wp-content/uploads/Future-Energy-Wales-The-Critical-Role-of-Welsh-Wind-Power.pdf

[7] Y Pwyllgor Newid Hinsawdd, Adroddiad Cynnydd: Lleihau allyriadau yng Nghymru, Mehefin 2023

Targedau adfer mawndiroedd: Sut mae Cymru'n cymharu?:

- *Mae Llywodraeth yr Alban wedi ymrwymo i adfer 250,000ha o fawndir erbyn 2030, gyda dros 30,000ha wedi'u hadfer neu'n cael eu hadfer ar hyn o bryd.*
- *Yn Lloegr, nod Llywodraeth y DU yw adfer 35,000ha o fawndir erbyn 2025 a 280,000 erbyn 2050, gyda tharged blynyddol o 4,700 y flwyddyn.*

Mae Pwyllgor Newid Hinsawdd y DU wedi argymell y dylai Llywodraeth Cymru sicrhau bod 58% o fawndir yn cael ei adfer erbyn 2035, gan godi i 79% erbyn 2050. Mae targed presennol Llywodraeth Cymru ar gyfer 2050 yn cynrychioli dim ond 50% o gyfanswm mawndir Cymru a heb gymorth gan y diwydiant i'w gyflawni a'i ragori, mae perygl i Gymru ddisgyn y tu ôl i weddill y DU[7].

Asesu Ad-dalu Carbon

Yng Nghymru, ar hyn o bryd nid oes unrhyw fodd o asesu ad-dalu carbon ar brosiectau ffermydd gwynt. Yn yr Alban, mae ffermydd gwynt sy'n cael eu hadeiladu ar fawndiroedd yn cael eu hasesu gan ddefnyddio Cyfrifiannell Carbon Llywodraeth yr Alban i sicrhau bod yr ad-daliad carbon yn cael ei ystyried wrth wneud penderfyniadau. Mae adolygiad gan Brifysgol Caeredin wedi dangos bod pob fferm wynt a gafodd ei chynnwys mewn nifer o astudiaethau wedi sicrhau ad-daliad carbon o fewn dwy flynedd.

Astudiaethau achos

Mae datblygwyr ynni gwynt ar y tir ac ynni adnewyddadwy eisoes yn gweithio i adfer mawndiroedd sydd wedi'u difrodi, i sicrhau eu gwerth fel storfa garbon a chynefin ecolegol ar gyfer rhywogaethau prin, ac i gefnogi Llywodraeth Cymru i gyrraedd ei thargedau sero net. Gyda chanllawiau clir, gallai prosiectau yn y dyfodol lenwi'r bwlch ariannu ar gyfer adfer a gwella mawndiroedd Cymru .

Fferm Wynt ar y Tir Pen y Cymoedd

VATTENFALL

Fferm wynt Vattenfall ym Mhen y Cymoedd yw'r fferm wynt ar y tir fwyaf yng Nghymru a Lloegr, gyda 76 o dyrbinau yn cynhyrchu capasiti o 228MW; yn weithredol ers 2017, mae'r fferm wynt yn ariannu cynllun adfer cynefin gwerth £3 miliwn am 25 mlynedd o 1500ha. O hyn, mae 150ha (sy'n cyfateb yn fras i 150 o gaeau rygbi) o fawndir yn cael ei adfer yn weithredol, gyda CNC yn gweithredu'r cynllun ac yn cael ei oruchwylio gan grŵp llywio o ecolegwyr o awdurdodau lleol a'r RSPB.

Wedi'i leoli ger Pen-y-bont ar Ogwr yn Ne Cymru, prif nod cynllun adfer Pen y Cymoedd yw adfer 'o'r goedwig i'r gors', gan flaenoriaethu ardaloedd dyfnach o fawn, a dychwelyd ardaloedd coedwigaeth fasnachol presennol yn orgors, rhostir gwlyb a sych a glaswelltir corsiog. Bydd y prosiect hefyd yn sicrhau cytrefu naturiol coetir brodorol, y defnydd o goetir gwlyb fel byffer o amgylch mawndiroedd, rheoli coridorau nentydd a chynefinoedd bwydo, a gwella'r cynefin ehangach ar gyfer rhywogaethau planhigion ac anifeiliaid brodorol.

Mae'r gwaith sy'n cael ei wneud ym Mhen y Cymoedd yn cefnogi gwaith **y Prosiect Mawndiroedd Coll (TLPP)** – prosiect Cronfa Dreftadaeth y Loteri Genedlaethol, sy'n bodoli fel un o'r prosiectau adfer mawndiroedd mwyaf yn ne Prydain. Mae TLPP hefyd yn cefnogi ymgysylltu ag ysgolion lleol, gan wahodd plant ysgol i fabwysiadu rhywogaeth sydd mewn perygl yn lleol. Bydd trigolion lleol ac ymwelwyr hefyd yn elwa, o ran gwella llwybrau troed ac arwyddion i hyrwyddo gwell mynediad, ymwybyddiaeth o dreftadaeth, a defnydd hamdden.

Mae Pen y Cymoedd a TLPP yn cydweithio i adfer mawndir a rennir; mae'r ddau yn gweithio ar yr un pryd i adfer 150ha o fawndir o fewn ardal Cynllun Rheoli Cynefin (HMP) y fferm wynt, gan ddefnyddio technegau adfer a dreialwyd ar safle prawf yn ffin y fferm wynt yn 2019/20.

Mae £200,000 ychwanegol gan Raglen Ymchwil a Datblygu Amgylcheddol Vattenfall – BioWins – hefyd wedi ariannu rhaglen PhD ym Mhrifysgol Abertawe i ymchwilio ymhellach i adfer Mawndir Coedwig (mawndir sydd bellach wedi'i goedwigo).

Gyda chwympo'r coetir planhigfa presennol a gweithio i adfer llif a phrosesau dŵr naturiol, bydd Pen y Cymoedd yn dychwelyd mawndiroedd diraddiedig i iechyd, gan ddarparu gwelliannau bioamrywiaeth, a chreu adnodd dysgu ar gyfer prosiectau eraill.

Vattenfall: Mawndir ar Fferm Wynt Pen-y-Cymoedd

Fferm Wynt Mynydd Bwllfa

PENNANT WALTERS

Mae **fferm wynt Mynydd Bwllfa Pennant Walters** wedi'i lleoli ym mhen gogleddol Cwm Cynon yn Rhondda Cynon Taf ac mae'n cynnwys 9 tyrbin gwynt, sy'n weithredol ers 2015, gyda chapasiti o 22.5MW. Wedi'i wasgaru ar draws safle 242ha, nododd Cynllun Rheoli Cynefin (HMP) y prosiect bresenoldeb gorgors wedi'i addasu mewn cyflwr diraddiedig iawn oherwydd gorbori, tanau, a gostyngiad mewn cyfoeth rhywogaethau ac amrywiaeth strwythurol.

Er mwyn gweithredu gwaith adfer mawndiroedd, nododd y Cynllun Rheoli Cynefinoedd nifer o ymyriadau o fewn yr Ardaloedd Rheoli y cytunwyd arnynt.

Yn gyntaf, fe wnaeth y safle osod ffens ar hyd ei ffiniau i orfodi'r drefn bori benodedig, gan ddisodli defaid â stoc gwartheg dwysedd isel i gael gwared ar lystyfiant ymledol a chynnal y cynefinoedd cors/rhos.

Yn ail, edrychodd y cynllun ar ffyrdd o gynnal a gwella'r gallu i gadw a symud dŵr ledled yr ardaloedd o orgors; megis cau ffosydd, lleihau cwlfertau, a chreu argaeau a nodweddion rheoli dŵr eraill.

Yn drydydd, rhoddwyd blaenoriaeth i reoli ac amlhau o leiaf 50ha o gynefinoedd glaswelltir llawn rhywogaethau fel modd o gadw a gwella poblogaethau rhywogaethau brodorol. Yn olaf, gosododd yr HMP strategaeth fonitro gynhwysfawr i fesur ac asesu ansawdd ac iechyd ardaloedd o orgors a gweundir.

Pennant Walters: Gwaith sy'n gysylltiedig â'r CEM yn Fferm Wynt Mynydd Bwllfa

Beth yw gorgorsydd?

***Gorgorsydd** yw'r ardaloedd mwyaf o fawndir yng Nghymru ac maent yn ardaloedd lle mae mawn wedi cronni ar draws y dirwedd gyfan, yn debyg i orgors. Mae'r corsydd hyn fel arfer yn ffurfio yn yr ucheldiroedd lle mae'r draeniad yn wael ac yn ffynhonnell dalgylchoedd afonydd lle mae glawiad yn aml ac yn drwm, a'r lefel trwythiad yn uchel.*

*Mae mathau eraill o fawndir yn cynnwys **Corsydd Iseldir** (yn meddiannu mannau isel yn y dirwedd sy'n casglu glaw a dŵr o'r amgylchoedd) a **Chyforgorsydd Iseldir** (corsydd cromennog sy'n ffurfio mewn ardaloedd lle, yn hanesyddol, roedd dŵr llonydd megis llyn neu bant).*

Coedwig Clocaenog RWE

Mae Fferm Wynt Coedwig Clocaenog RWE wedi'i lleoli o fewn Bryniau Clwyd, i'r de o Ddinbych, ac mae'n cynnwys 27 o dyrbinau, yn weithredol ers 2021, gyda chapasiti o 96MW, digon i bweru 63,800 o gartrefi. Mae'r prosiect wedi'i leoli ar ystâd goetiroedd Llywodraeth Cymru, ar dir a reolir gan CNC, ac mae'n darparu cronfa budd cymunedol blynyddol o £768,000. Mae cyfanswm ffin y safle yn ymestyn i 1,581ha ac mae wedi'i leoli'n bennaf mewn coedwig gonifferaidd gyda rhai ardaloedd agored o rostir grug.

Roedd yr HMP yn cynnwys Cynllun Rheoli Pridd a Mawn gyda'r nod penodol o sefydlu a rheoli cynefinoedd rhostir a mawndir. Ar hyn o bryd, mae tua 20ha wedi'u hadfer, gyda gwaith yn mynd rhagddo ar fawndir pellach o fewn ffin y safle.

RWE: Fferm Wynt Coedwig Clocaenog

Argymhellion Allweddol

Mae RenewableUK Cymru (RUKC) wedi ymgysylltu'n rhagweithiol â datblygwyr, Llywodraeth Cymru, CNC a chynghorwyr statudol eraill i ddeall y cwmpas ar gyfer diogelu a rheoli adnoddau mawndiroedd ar ffermydd gwynt Cymru. Daeth y gwaith hwn i ben gyda'r adroddiad **"Ynni Gwynt ar y Tir ac Adfer Mawndiroedd sy'n Gyfoethog o Garbon yng Nghymru[8]" y mae'r papur briffio hwn yn seiliedig arno.**

Mae pedwar galwad allweddol i weithredu i **Lywodraeth Cymru a Chyfoeth Naturiol Cymru:**

1. **Rhowch ddiffiniad clir o 'fawn dwfn' sy'n cwmpasu dyfnder ac ansawdd mawn.** Mae canllawiau gan CNC ac ymgyngoreion eraill yn anghyson ac yn gyfnewidiol. Heb eglurder ynghylch yr hyn a ddosberthir fel 'mawn dwfn', mae dulliau asesu clir a chyson yn amhosibl. Mae angen polisi cynllunio hefyd i ddiffinio a nodi ansawdd mawndir. Mae diffiniad Llywodraeth yr Alban ar 'fawn dwfn' yn addysgiadol, gyda metrig clir o ddyfnder pridd sy'n fwy na 0.5m, a chanllawiau clir ar fawndiroedd â blaenoriaeth i'w hosgoi a mawndiroedd diraddiedig i'w blaenoriaethu ar gyfer gwaith adfer dan arweiniad datblygwyr. Mae angen arweiniad pragmatig ar Gymru ynghylch a allwn ddatblygu ar fawn, ac ym mha gyd-destun y mae'n dderbyniol.
2. **Datblygu a chyhoeddi canllawiau cynllunio manwl ar fawn.** Mae diffyg canllawiau a fframwaith polisi clir ar gyfer paratoi, ystyried a mynd i'r afael â datblygiadau mewn ardaloedd mawndir neu gerllaw iddynt. Dylai Llywodraeth Cymru ddatblygu 'strategaeth mawndiroedd', gan ei bod yn helpu i lywio trafodaethau cyfnod cynnar hyd at geisiadau cynllunio manwl.
3. **Datblygu canllawiau ar ddulliau 'Arfer Gorau' o reoli ac adfer mawn.** Bydd safoni dulliau monitro, ar gyfer gwaelodlin ac ôl-adfer, yn cynorthwyo ymdrechion adfer mawn. Rhaid darparu hyn mewn fframwaith cyson gan ddefnyddio argymhellion 1 a 2. Bydd canllawiau clir ar fesurau arfer gorau a'r technegau adfer mwyaf buddiol yn safoni dulliau o adfer mawndiroedd ac yn sicrhau gweithredu cyflym ac effeithiol.
4. **Cyflymu cymorth ac adnoddau digonol i Cyfoeth Naturiol Cymru (CNC) helpu i ddarparu cyngor technegol cyson ac amserol ar fawn i ddatblygwyr.** Mae'r anawsterau presennol o ran adnoddau a chyllid yn golygu ei bod yn amhosibl i CNC weithio gyda'r diwydiant a rhanddeiliaid perthnasol mewn modd amserol i ddatblygu dull clir a chyson o reoli mawn, sy'n aml yn arwain at anghysondebau o ran dulliau asesu a chyngor.

Adfer yn y Dyfodol: Dulliau, Arferion Gorau, a Chanllawiau

Yn gyffredinol, gwneir gwaith adfer mawndiroedd ar ôl y gwaith adeiladu, er bod rhai datblygwyr wedi galw am gyflwyno 'cynlluniau adfer a gwella' integredig i roi dull cyfannol o ymdrin â mawndiroedd ar waith sy'n sicrhau manteision y tu hwnt i fesurau lliniaru.

Yn y pen draw, gyda chanllawiau clir, gellir gweithredu dull o adfer mawndiroedd fel rhan o'r broses ddylunio ar gyfer ffermydd gwynt, a gall ymagwedd well a chyson at fawn helpu i hwyluso arfer gorau a buddsoddiad ychwanegol y mae mawr ei angen, i gefnogi targedau 2050 Llywodraeth Cymru ar gyfer adfer natur a datgarboneiddio.

Os ydym am ddatgloi potensial sylweddol gwynt ar y tir[9] i ddod ag ynni adnewyddadwy amserol, cost-effeithiol ymlaen, mae angen ymagwedd unedig ar fawn i ddarparu buddsoddiad sylweddol yn y dyfodol mewn adfer a diogelu mawndiroedd.

[8] https://www.renewableuk-cymru.com/wp-content/uploads/Onshore-Wind-Power-and-Restoring-Carbon-rich-Peatlands-in-Wales_RUKC-Stakeholder-Advice-Note_Aug-2023.pdf

[9] Dyfodol-Ynni-Cymru-Y-Rôl-Birniadol-o-Gwynt-Gwynt-Cymreig.pdf (renewableuk-cymru.com)

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