To: **An Coimisiún Pleanála**
Re: **Observations on the Proposed Lissinagroagh (Dough Mountain) Wind Farm Development.**
Applicant: **FuturEnergy**
Case Reference: **PAX12.324290**

A Chara,

Having reviewed the planning application documents, I wish to strongly object to the proposed Lissinagroagh (Dough Mountain) wind farm development.

Introduction: Dough Mountain, Renewable Energy and Climate Change

Dough mountain is a most beautiful place. The views are outstanding to say the least. Six counties can be seen from its summit, some say seven, claiming to see the lights of Knock airport. Hearing the sounds of birds and insects singing and busily chirping across the vast upland bog on a warm summer's evening is a most sublime experience. Beyond the sounds of contented wildlife there is a sense of a great deepness here. It makes the body sink into a relaxed state as though it knows its home. The air is cool, pure and silken. In my view, Dough mountain is a most unsuitable location for a wind farm. It is not suitable for any construction.

Figure 1. Dough Mountain from Lurganboy

The planning application fails in many areas, particularly with regard to peat stability, the hydrogeology of the subterranean karst mountain interior and its connection to Lough Melvin, Lough Gill and even lower Lough Erne across the border in County Fermanagh, all protected under EU legislation as Special Areas of Conservation (SAC) with the latter also being a Special Protection Area (SPA). Disruption of these aspects has a knock on effect, having a negative impact on water quality, habitat and wildlife with its endangered and rare species. Dough Mountain is a Natural Heritage Area (NHA) with an extraordinary glacial history, and a truly interconnected ecosystem that is also quite vulnerable where any imbalance in one area can have devastating effects in another, even if it is kilometres away. This aspect does not appear to be appreciated in the various study reports of the application.

The Lissinagroagh wind farm is a colossal undertaking. It is estimated to provide an installed capacity of between 77 MW – 100.8 MW. For comparison, County Leitrim to date has a total installed capacity of 95 MW across all its wind farms. The proposed wind farm will comprise of 14 of some of the largest turbines in production for onshore generation with each turbine being in the range of 180 – 185 m tall. These enormous wind turbines, the size of which are difficult to contemplate from numbers on a page, are intended to have the capacity to generate 5.5 -7.2 MW each. (The nearby Faughary wind farm, for comparison, has three smaller turbines of roughly 2 MW each generating a total installed capacity of 6 MW.)

The proposed development also includes a 100 m high meteorological mast, 7.95 km of new internal access tracks, approximately 8.35 km of upgraded tracks, three borrow pits, drainage and sediment-control infrastructure, watercourse crossings, construction compounds, underground cabling from each turbine to a substation, as well grid connection infrastructure and turbine delivery works, as set out in EIAR Chapter 2, Description of the Proposed Project.

I am also surprised by the extent to which the application identifies environmental sensitivity, hydrological complexity, peatland constraints, protected species issues but dismisses these issues as being remedied with a heavy reliance on mitigation and compensation measures. Rather than reassuring me that this is a suitable site, it raises the more fundamental question of whether this location should be considered at all.

In line with this position, it should be pointed out that planning permission for a wind farm with eight smaller wind turbines was denied by An Bord Pleanála in May 2010 (PL.12.234741),[1] with the Inspector having recommended refusal based on the unsuitability of the site for reasons of slope, peat depth and wet ground conditions as well as for posing an unacceptable risk of degradation of priority habitat, surface-water pollution and peat instability. The environmental information was found to be inadequate and the precautionary principle was applied. The mountain hasn't changed since then nor should this decision.

Furthermore, the promotion of tourism on Dough Mountain has been restricted for many in recognition of this habitat and its unique wildlife being adversely affected.

Because of the current proposed wind farm's size, that is, being over 50 MW, its planning application now falls under the Strategic Infrastructure Development rather than the decision making process of local authorities. The SID has big plans and the Lissinagroagh wind farm, which is only part of its goal of supplying 35% of renewable energy for the county – a goal anticipated to be met by 2030. The SID has the authority to overcome bottlenecks and associated delays that heretofore prevented a streamlined rollout of its green energy mandates. This is done, of course, to accelerate the transition to renewable energy so that Ireland will be 80% dependent on renewables by 2050. Originally, this urgency to implement green technology was intended to offset the national carbon footprint and admirably to alleviate the planet's anthropogenic climate demise. However, particularly in the last few years, we find more and more of Ireland's energy production being used by data centres and obfuscating the goal of ever

[1] This was a 24 MW installed capacity wind farm using eight 3 MW turbines, each being 80 m tall. Planning Application: 09260 (Leitrim Conty Council).

reaching a net zero target. It seems these power-hungry centres are offsetting our ability to offset carbon emissions.

Data centres currently consume over 22% of all electricity in Ireland, making them the largest and fastest-growing group of energy users on the national grid. According to the Central Statistics Office (CSO), this amounts to roughly 6,900 Gigawatt hours (GWh) annually, which is more than all of the country's urban homes combined. As a recent phenomenon, energy use by data centres has surged by more than 530% between 2015 and the latest full-year of monitoring. Ireland currently has over 120 operational data centres with an additional 50-60 expected to be up and running by 2030. More renewable energy production, it seems, will be used to accommodate more data centres. The old adage that 'build it and they will come' seems to be more appropriate than ever. It appears we may be blindly rushing to sell out our heritage, wildlife and unique landscapes given that Ireland contributes to only about 0.1% to 0.15% of global greenhouse emissions.

In a rush to curtail a miniscule amount of global carbon emissions, we are essentially turning over our unique wilderness areas with their sensitive bogland ecosystems, rare species of fauna and flora to be sacrificed in the name of meeting renewable energy targets. We are led to believe that this is inevitable and the price we must pay to save the planet from climate disaster.

Perhaps it is only natural for humans to rush for the nearest solution available when presented with an existential dilemma. In such a situation, particularly when it concerns technology being involved, it is easy to forgot that as science and manufacturing methods advance, new technological solutions are found. Sometimes, however, these new technologies don't live up to all they promise.

We may already be seeing the first signs of this with respect to wind farms. With the ever increasing demand for energy, wind farms are being set aside as they are unable to keep up with energy demand. As much as they struggle to replace the current use of fossil fuels and traditional methods of producing energy, wind energy doesn't seem to be up to the task. This is compounded by a world of increasing population that has an ever-evolving dependence on electrical power. The strategy to just build more and more wind farms reflects a lack of foresight. Wind energy is good and should be part of any renewable energy strategy but it is not the Hercules to carry the full burden that it has been made out to be. A balance must be struck between the number of wind farms being rolled out and their impact on the environment. This is especially true in a world where it is becoming increasingly difficult to find untouched, pristine natural wilderness areas.

There appears to be a growing trend to move away from the reliance of wind farms. We see data centres starting to resort to conventional methods of power generation regardless of how polluting or carbon emission intensive they might be. This of course is a step backwards and cancels any efforts to lower global carbon emissions. In the US, for example, many data centres are bringing in tens of gas-powered turbines and/or diesel generators per site just to meet the demand of these power-hungry centres. In fact, it has very recently been announced that Chevron will fuel a massive Microsoft data centre in West Texas using natural gas under a 20-year agreement. Most of the electricity is expected to come from large gas turbines. What's particularly interesting here is that the power is dedicated to the data centre and will ***not*** be connected to the electric grid. A smart strategy to avoid competition with local electricity consumers. To quote directly, “Microsoft’s embrace of natural gas through a partnership with the oil industry shows a willingness to invest in fossil fuels to meet its electricity demands”. Although Microsoft has already invested primarily in renewable energy to offset carbon-dioxide emissions from its data centres, it is increasingly looking for alternative power sources that more reliably meet the 24/7 demand of its data centres. In fact, it turned to nuclear power in 2024 by investing in the restart of Three Mile Island nuclear power plant in Pennsylvania. [2]

New strategies are evolving as necessity becomes the mother of invention. Other permutations see the development of portable shipping container-sized nuclear power plants to supply data centres. The goal to move away from carbon no longer appears to be as urgent as it once was only a few years ago as renewables appear to be unable to meet the demand for more and more energy. Wind farms have their place in contributing to the energy demands of any economy but it seems they have their limits, especially when they can negatively impact the environment in the name of saving the planet. More and more turbines is not the answer.

> *It is difficult to understand the logic of damaging long-term carbon stores to install devices whose purpose it is to reduce emissions.”*[3]

As technology is advancing so quickly nowadays, it is highly likely that new and better forms of ‘green’ energy production will become available well within the lifetime of this proposed wind farm. It would be a shame then to have turned this unique wilderness area with its rare and unique species, and breathtaking landscapes into an energy harvesting industrial park, only to discover in a few years’ time that these fourteen turbines have become obsolete with the advent of new, more efficient and less invasive ‘green’ technologies having come on the market.

Other indications of the trend to move away from wind farms as a renewable energy source is reflected in the stock price of companies that specialise predominantly in wind turbine manufacture. Stock prices have fallen dramatically for such industries since their peak around the beginning of 2021. For example, Greencoat Renewables PLC (GRP) which has an interest in about 33 wind farms in Ireland, has seen its share price decline by 37.6% since January 2021. Vestas Wind Systems A/S (VWS), Europe’s largest manufacturer of wind turbines, has seen its stock price drop by 45.3% from its all-time peak price also in January 2021. Orsted A/S, whose main business is the development, construction and operation of offshore wind farms, has declined 88.8% also from its all-time peak in 2021. China is perhaps one exception but they are building wind farms everywhere without regard.

In addition, many wind farms currently producing electricity in Ireland cannot always feed their power into the national electricity grid, especially during windy periods since the grid is unable to handle the increased surge in power. These grid issues should flag a change in renewable energy strategy where instead of investing in more and more wind farms, as we currently are, infrastructure investment should be, as one solution, directed towards energy storage until such time as the grid is appropriately

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[2] “Chevron to fuel massive Microsoft data center in Texas using natural gas”, CNBC: Stock Market & Business, 22 June 2026.

[3] Wind Farms and Blanket Peat. The Bog Slide of 16th October 2003 at Derrybrien, Co. Galway. R.A. Lindsay and O.M Bragg, (2005), pg. xii

upgraded. An investment in electrical power storage, such as the procurement of large battery units could be installed relatively quickly and because of their much smaller size footprint would have less resistance to being granted planning permission.   Investment in electrical storage would make the grid much more efficient as it would 'iron out the bumps' in power distribution and supply the grid in times when there is no wind. Improvement in distribution efficiencies would be realised almost immediately upon installation. They would also bridge the gap in the longer time it takes to upgrade the grid. It will also help reduce the high cost of electricity by removing the curtailment payments that are currently being passed onto the consumer. Curtailment payments to date are estimated to be in the region of 1 billion euros per annum. Good for the wind farm energy suppliers, bad for the consumers.

Tackling the Lissinagroagh Wind Farm Planning Application

Given the short period of time to consider the many facets of the planning application, this objection submission focusses mainly on the precarious siting of turbines in areas where there is a high susceptibility and historical record of bog slides as confirmed in the EIAR. The combination of tentative peat stability, underlying karst geology and the unique hydro- and hydrogeological nature of the site that is intimately connected to the Lough Melvin, Lough Gill and Lower Lough Erne (SACs) via Lough MacNean (a proposed NHA), makes this consideration particularly important. Dough Mountain drains directly into these wider catchments and protected water systems.

As part of this assessment, this submission questions the Lissinagroagh carbon offset budget in an attempt to understand benefits of the wind farm at the price of disturbing pristine habitats (albeit outside those forested areas planted by An Coillte), and the destruction of natural carbon sinks. It also addresses a number of other concerns such as the plethora of mitigations required to make the proposed project work, the impact on water receptors, water quality, private ground wells and springs, operational turbine noise and flicker, construction-phase disturbance, and health effects. The mitigations presented in the planning application are so numerous they have become a patchwork that holds the whole development plan together. No one wants a product held together with bits of sticky tape.

Stability of the Wind Farm Site

Perhaps the most concerning threat to the mountain and its surrounding Special Areas of Conservation, i.e., Lough Melvin SAC in particular, is the precarious siting of turbines, particularly T1-T7, high up in the northwest of the site. This is an area where deep upland blanket bog and peat soils are clustered on the mountain. Because these turbines are positioned on slopes with deep peat layers they sit closet to the regulatory edge. Estimates of stability in these regions indicate they are very close to any acceptable safety margin despite all turbines and substation footprints being designated with a 'Low' hazard index, determined using a recognised methodology,[4] with the exception of turbines T3, T4, T5, T7 and T8. However, in the individual Tables[5] summarising site properties T1 and Borrow Pit 1 are in the 'High' landslide susceptibly

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[4] Scottish Government's *Peat Slide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments* (2nd ed., 2017)
[5] EIAR Appendix 7-1 Peat Stability, Appendix 3: Peat Stability Risk Register, Individual Tables.

category with a further eight sites in the 'Moderately High' class. Where a chapter and its own supporting evidence diverge on a matter as fundamental as the susceptibility class of the ground beneath a turbine, is reason enough to treat any conclusion with caution.

Interestingly, the Tobin study reports that "there is no recorded history of landslides within the farm site boundary or surrounding area (GSI,2025),"[6] while Ciaran Reilly & Associates provide maps showing five peat slides and two scree landslides from the GSI National Susceptibility Mapping 2021[7] and saying as much in the text. Some of these peat slides appear to be within a few hundred metres of these turbines, i.e., T1, T2 and T3. (T3 also overlooks a high landslide risk area on the northwest flank of Shasmore according to EIAR maps.) The GSI Irish Landslides Database also confirms five shallow peat slides and two scree slides have been recorded in the vicinity of the site. Leitrim County Council are aware of, or in possession of documentation, of over 55 previous landslides/land slippage in the North Leitrim region.

This raises major concerns. If development renders the peat cover unstable, or should the peat display any instability, either as surface erosion or actual collapse, the effects will be felt primarily in downstream watercourses. The Commission's own pre-application inspector's report confirms the downstream hydrological connections to the Natura 2000 sites at Lough Gill and Lough Melvin.[8] Dough Mountain is also hydrologically connected to lower Lough MacNean via Glenfarne, which significantly and scientifically feeds into the lower Lough Erne SAC/SPA in Co. Fermanagh. There is a danger that sites of significant nature conservation interest will be adversely affected. This danger persists for the duration of the development and beyond, not just during construction.

The Tobin study seems to have overlooked, ignored or dismissed this connection to Lough Erne. This omission is a serious flaw. It calls into question the legal standing of the Tobin assessment as it has omitted this important transboundary SAC connection link rendering it noncompliant with the EU Directives and Regulations.

The slim safety margins of peat stability calculated from the data collected at the turbine sites pose a serious and unacceptable risk to the environment, not just the SACs. Bogs, heathlands and their dependent plant and invertebrate communities, as well as the Annex IV, Red Listed species and other biota. The wetlands, pools, watercourses, streams and rivers, and their dependent species such as fish, invertebrates and mollusks etc. would also be greatly impacted. This would invariably include local residents and their homes, properties and farms, as well as degrading their heritage and health, particularly given the hydrological connection to private wells and springs not withstanding issues of noise, flicker and industrial infrastructure encroachment.

In the case of the Shass Mountain bog slide in Drumkeeran, October 2020, where people's meadows and fields were inundated and covered with up to a metre of saturated peat mud, making it impossible to traverse, no remedial action or proper compensation was offered. What was once fertile meadow soil is now irredeemably covered in deep peat mud and remains so. It is vitally important that An Coimisiún

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[6] Chapter 12, Climate, pg. 28.
[7] Figure 8. Planning Stage Peat Stability Risk Assessment. Ciaran O'Reilly & Associates.
[8] Inspector's Report ACP-323048-25, 7 April 2026

Peanála beware of the risk scenario of such devastation being repeated with respect to this wind farm development given the low margins of safety for turbine siting.

As a matter of note, The Fermanagh and Omagh District Council recommended in its scoping report that the EIAR contain both a Peat Landslide Hazard Assessment (PLHA) and a Peatland Heritage Impact Assessment (PHIA). The applicant produced the PLHA but not the PHIA. The PHIA was recommended to “be carried out before any boreholes or trial pitting are undertaken to prevent potential damage to artifacts of archaeological significance, particularly given the close proximity of Shasmore Cairn to the site”.[9] The fact that boreholes and trial pitting *were* carried out without an assessment perhaps shows a lack of understanding of its importance, or simply a lack of respect for the region.

Peat Stability Assessment: Safety Factors

Peat stability is assessed for the turbine sites, borrow pits, temporary compounds and the metrological mast as part of the infrastructure for the proposed wind farm. This is done through the calculation of safety factors such as the Factor of Safety (FOS) and Over Design Factor (ODF). They are calculated for a number of different scenarios such as drained and undrained bog with surcharge loading. Both the FOS and ODF metrics are calculated using the same formula[10] (see Equations 1 and 2), but while the FOS method compares raw, unfactored ultimate strengths, the ODF method applies specific partial safety factors to individual parameters. In this discussion, only the undrained peat with 1 m loading surcharge (simulating the stockpiling of 1 m deep peat layer onto the bog and equivalent to a pressure of ~10 kPa) is used as an indicator of the peat stability.

The FOS for the undrained bog is calculated using peat shear strength c_u, peat depth z, peat weight Y, slope angle α and loading factor λ and given by,

$$FOS = \frac{c_u}{Y(z + \lambda)\sin\alpha\ \cos\alpha} \qquad (1)$$

where λ = 1 for 1 m loading surcharge.

The ODF is analogous to the FOS but uses partial factors, ρ = 1.3, σ = 1.4, according to Eurocode 7(EN 1997-1:2005) and given by,

$$ODF = \frac{c_{ud}/\sigma}{Y\big(z + (\lambda \times \rho)\big)\sin\alpha\ \cos\alpha} \qquad (2)$$

The peat shear strengths c_u and c_{ud} , are calculated differently. Both use many in situ measurements but the data set is used differently. In the FOS calculation the peat shear strength, c_u , is derived by taking the most conservative value to ensure that all peat shear strengths are greater than this value. In ODF calculation, the peat shear

[9] AASR Appendix 2 – Scoping Consultation Response, pg.31
[10] Bromhead, E.N.(1986). The Stability of Slopes

strength uses a more statistical method where the application of the partial factor, σ, yields the term, c_{ud}/σ, to arrive at a value that is within 5% of the lowest peat shear strength value in the data. Prior studies use the FOS method while the Lissinagroagh study uses the ODF method. While the FOS and ODF methods are analogous in many respects, their safety thresholds are different due the way their parameters are handled. For the FOS interpretation, geotechnical standards generally require a safety threshold of **1.3**, while for the ODF interpretation it is **1.0**.

The purpose of this discussion is to compare the peat stability assessments of the Meenbog wind farm (associated with a massive bogslide in Barnesmore Gap, Co. Donegal in 2020) and the Croagh wind farm EIA with that of the proposed Lissinagroagh site. While peat depth, slope angle, peat weight are specific to each turbine, borrow pit etc. within the respective wind farms, the peat strengths used for calculating the safety factors are site specific, that is, the same peat shear strength is generally used for all locations within the wind farm. The Meenbog and Croagh wind farms used undrained peat shear strengths of 5 kPa and 6 kPa respectively while an 'undrained peat shear strength of 13.0 kPa was assessed and assigned to the peat at the (Lissinagroagh) site'.[11] After application of the partial factor σ, this is reduced to 9.3 kPa, which is significantly higher than for the other wind farm sites. (Due to the weaker peat shear strengths near T2, T9 and T10, lower values are applied, i.e., c_{ud} = 9.6 kPa, 12.0 kPa, 9.5 kPa respectively).

It should be pointed out that while there is no doubt that the peat strength data has been acquired in a professional manner, the resulting safety factors are in the end really just crude estimates. They are, of course, very useful for comparing peat stability across a site particularly when their values are significantly above their safety thresholds. However, they are not necessarily a good metric for guaranteeing the safety of a location when their values are close to their thresholds as is the case with the proposed wind farm further substantiating the unsuitability of Dough Mountain.

In a geotechnical report[12] assessing the Derrybrien wind farm bogslide of 2003, the FOS values prior to development indicated that between 10 to 25 percent of turbine locations showed a potential for instability. However, locations with high FOS values (indicating a more stable condition) showed signs of instability whereas some locations with low FOS values showed no such signs, suggesting that the measurements gave only a crude picture of stability. They do not consider the fissured nature of the peat and make no allowance for localized temporary ponding or unsupported peat faces. Also, given the inherent inaccuracies of the shear vane test this is particularly relevant.

Peat shear strength measurements rely on instruments such as the shear vane device. The measurement problem for determining peat strength properties is inherently difficult due to its very low shear strength. The measurement of peat shear strength is complicated by the fact that 97% of peat is water, and that roots and fibres in the acrotelm (i.e., the actively growing upper layers of the bog) can yield higher results than the bulk peat. Since peat has a very low shear strength, instruments designed to measure shear strength invariably influence the measurement. For example, the shear strength vane test is carried out by rotating the vane, but as it does so, it compresses the soft water-logged peat in front of it resulting in higher readings. This is a recognised

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[11] Appendix 7.1.4.1, EIAR vol. 2

[12] Wind Farms and Blanket Peat. The Bog Slide of 16th October 2003 at Derrybrien, Co. Galway. R.A. Lindsay and O.M Bragg, (2005)

and inherent problem such that recommended correction factors of between 40% - 50% are typically applied to the vane shear test readings for peat.

Blanket bog peat in Ireland is characterised by high water content, high compressibility, and critically low shear strength. In situ measurements typically record undrained shear strengths of less than 10 kPa, with typical values ranging from 5 kPa to 15 kPa depending on the depth and degree of humification. This range of peat strengths is due to natural stratification, variable water content and structural difference in the plant fibres across the bog's profile. Because peat is an accumulation of organic matter rather than a mineral soil, its mechanical properties can change drastically from the surface down to the bedrock. It values are also quite sensitive to its degree of saturation and loading pressure. All these factors contribute to complicate the measurement of peat shear strength.

The Croagh wind farm study reported that their hand-held vane results indicated undrained shear strengths in the range 5 to 45 kPa, with an average value of about 18 kPa. The lower bound strengths would be typical of deep weak saturated peat and were recorded in the flatter areas of the site. Peat strength at sites of known peat failures (assuming undrained loading failure) are generally very low, for example, the undrained shear strength at the Derrybrien failure (AGEC, 2004) as derived from essentially back-analysis carried out after the disaster, though some additional testing was carried out, was estimated to be as low as 2.5 kPa.[13] The error bar associated with peat shear strength site determination can be significant.

Table 1 in Appendix A shows the site measurements and the calculation of the ODF for the Lissinagroagh site. It uses for the purposes of this discussion the ODF Case 2 undrained, 1 m surcharge loading from Appendix 2: Peat Stability Calculations in Appendix 7-1. Table 2 and 3 (Appendix A) show FOS values for the Meenbog and Croagh wind farms respectively. Since the thresholds are different for the ODF and FOS methods, that is, 1.0 and 1.3 respectively, the percentage safety margin is calculated for comparison between sites. For ODF the % margin over threshold is calculated by,

$$ODF \text{ \% Margin} = \left(\frac{ODF - 1.0}{1.0}\right) \times 100 \tag{3}$$

and for FOS the % margin over threshold is given by,

$$FOS \text{ \% Margin} = \left(\frac{FOS - 1.3}{1.3}\right) \times 100 \tag{4}$$

This allows a direct comparison and indicates that 9 locations out of 21 are below an additional 50% safety margin for the Lissinagroagh wind farm. The Meenbog data in Table 2 show that only 4 locations out of 19 are below the additional 50% safety margin, while Croagh has 3 out of 10 below this additional safety margin with the remainder being substantially higher. What is striking are the very low margins of safety for T1-T7

[13] McCarthy Keville O'Sullivan, Geotechnical & Peat Stability Assessment Report. Section 6, pg. 23. Croagh Wind Farm.

and Borrow Pit 1 in Table 1. Also, the Meenbog and Croagh data show many locations with substantially higher additional safety margins.

The results for Lissinagroagh in Table 1 indicate low values with margins of safety of only 10% for T2, T4 and Borrow Pit 1 (BP1), 20% for T1 and T6, and 30% for T3. The susceptibility to landslide is also designated as ‘High’ (H) and ‘Moderately High’(MH). Turbines T1, T2 and BP1 have ‘Evidence of previous slips”. Also, turbines T1 through T10 and BP1 are designated as ‘suspected karst nearby’ for evidence of subsurface flow, which has serious implications for hydrological vulnerability.

The result from using the undrained 1 m loading surcharge peat strengths correspond to the temporary construction phases where the bog is particularly vulnerable such as when heavy machinery is brought onto the site. Engineers may argue that these low numbers for safety margin are acceptable because they represent the temporary undrained condition that will be resolved once the drainage network is fully dug and operational and thereby moving the site security into a much safer condition. Nevertheless, the risk of peat slide is increased for this scenario and the threat to the hydrology and its connection to the local SAC remains a worrying consideration. (Even when considering the stability of the loaded and drained peat slopes over the lifetime of the development, we find that the ODF tables in the application show to be marginal at the deepest-peat, highest susceptibility locations.)

Landslides on active construction sites are often triggered by a surcharge load from the massive weight of heavy machinery, stored gravel or excavated peat placed on top of a slope. (The Derrybrien peat slide was triggered during construction of the access road to turbine 7.) Heavy excavating machinery could increase the loading by many orders of magnitude.[14] This is typically avoided by digging down to the bedrock and filling with hardcore as the excavation and machinery advances and/or using bog mats.

Peat Stability and Drainage

Drainage mitigation required during construction can place the bog in a vulnerable position. The moment heavy excavators dig into the slope rainwater can enter an unbounded construction drainage channel allowing water to suddenly spike. This can instantly drop the FOS and ODF values. Given the tendency of drainage to concentrate water flows and the attendant dangers should the drainage system fail, it is not clear that it will produce the desired result in, say, storm conditions. In the case of the Derrybrien peat slide, the slide involved the more stable drained peat and occurred during dry weather.

> *“Various mechanisms have been proposed for bog or peat slides but there is, as yet, no clear understanding of where or how they occur.”*[15]

[14] For a small to medium sized bulldozer the equivalent pressure jumps to between 4 – 9 metric tonnes per m^2 (or 40 – 90 kPa). A JCB with smaller footprint, i.e., tires instead of tracks, this can jump to 10 – 15 metric tonnes per m^2 (or 100 -150 kPa). For comparison, a 1 m^2 area of undrained or fully saturated peat 1m thick can weigh approximately 1 metric tonne (also ~10 kPa).

[15] Wind Farms and Blanket Peat. The Bog Slide of 16th October 2003 at Derrybrien, Co. Galway. R.A. Lindsay and O.M Bragg, (2005),Executive Summary pg. ix.

Excavations for the turbine bases can also cause drainage of the peat in several ways. The development proposal leads us to assume that excavation of turbine bases will not cause drainage or drying of the peat. Such excavations require a hole through the peat and underlying glacial deposits to reach competent bedrock. It is stated that they will not cause drainage of the surrounding area either because they will fill with water or because they will be backfilled with material.

We are told that the excavated area for a turbine base is about 28 m in diameter. In practice, it is much larger, partly because the stable angle of repose for the cut peat faces means that they cannot be vertical. A turbine also requires hardstanding for heavy construction and maintenance vehicles. Most turbines are sited on sloping ground and, even if they are allowed to fill with water, the upslope faces of the excavation will drain. This is true even if they are backfilled because hardcore is much more porous that peat. Normal construction practices for turbine bases involve explicit drainage of the area around the base, partly to ensure that hardstanding does not become waterlogged. It is likely that the peat will undergo significant hydrological disturbance as a result. These considerations are not addressed in the planning application.

Peat Stability and Climate Change

The application fails to adequately account for the predicted increased rainfall and extreme conditions due to future climate change. That is, they fail to properly account for future climate trends where intense bursts of localised rainfall or the dynamic of increased drying and wetting periods during the summer and winter months, which will have an additional significant effect on bog stability.

Extremes of drought in the summer and increased rainfall in the winter results in the augmented shrinking and expansion of the bog. This causes rupturing of the peat bed during dry periods and the acceleration of water through the peat layer during wetter periods, which together undermine peat stability. This vulnerability of the bog due to weather extremes appears to be omitted, with only the proviso that drainage conduits, sedimentation collection ponds and culverts etc. being over designed by a margin of 20% to accommodate for such future trends. This omission is of critical importance given the small margin of safety of peat stability determined for the turbine sites, i.e., T1-T4 in particular, and Borrow Pit 1.

According to climate change models, such as RCP4.5, the temperature in Ireland is expected to increase by 1.6 °C by 2060.[16, 17] This results in a 11% increased moisture carrying capacity of the atmosphere (i.e., 7% increase per 1 °C). Indeed, higher temperatures predicted by other models assert a 3 °C increase in the same time frame placing the increased moisture level at around 21%.[18,19]

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[16] World Metrology Organisation predicts a 70% chance that global temperatures with 5-year averaging will exceed 1.5°C by 2050 with near surface temperatures expected to fluctuate between 1.2 – 1.9 °C higher than pre-industrial levels.

[17] Met Eireann and the Environmental Protection Agency (ES), Ireland's average annual temperature is expected to increase by 1.3 -1.6 °C by mid-century (representing the 2041-2060 period) under a high emissions trajectory like RCP8.5.

[18] The WMO predicts temperatures between 1.6 - 3.0 °C by 2060. A 3.0 °C increase. This would imply a roughly 21% increase in moisture carrying capacity of the atmosphere.

[19] RCP4.5 (a 'moderate' scenario) represents an approximate 2.4 °C increase in global average temperature (1.7 – 3.2 °C). It assumes moderate mitigation efforts leading to stabilising emission by mid-century and is generally aligned with current policies for emissions reduction. RCP8.5 (a 'worst' case/high

For Ireland, change climate is expected to come more in the form of alternate extremes of drier summers and wetter winters, and more intense rainfall events. These extremes have an increasingly negative impact on peat structure while subjecting it to additional erosion and slippage vulnerability. With the impacts of climate change being heralded as significant and urgent, this latest vulnerability of the bog erosion / weathering cannot be underestimated.

The planning application reports that future climate change effects have been addressed. Following the climate change thread in the planning documents we are left hanging with the statement*: "....while climate change under both RCP4.5 and RCP8.5 scenarios may increase landslide risk due to heavier rainfall and drought cycles, their potential impacts have been addressed in this project design. Turbine locations and site layout have been selected to minimise vulnerability."*[20] Perhaps this reflects the fact that other areas on the mountain are even more vulnerable.

"Future increases in rainfall due to climate change may elevate the risk of pluvial and fluvial flooding. Small streams run through and adjacent to the site. However, the elevated location of the site *is likely* to lead to rapid runoff and reduce flooding risk". The excess water may be drained away from the site, as suggested above, but how does it fare further downstream? Does it cause increased erosion, does it enter the subterranean waterways of the underlying karst geology and transfer of peat and sediment to other sensitive areas such as the SACs etc.?

For embedded mitigations such as drainage, silt ponds , culverts, etc. we are informed they have been designed to withstand a 'one-in-a-hundred year' type storm by allowing for a 20% overdesign margin to compensate such events. But with climate change extremes on the horizon with more frequent and intense sudden bursts of rainfall, it is unclear if this overdesign margin is really sufficient to guarantee protection and prevent disaster many decades into the future.

Karst and Hydrogeology

According to the GSI online viewer there are no mapped karst features within the proposed wind farm site. However, from aerial mapping and site walkovers, 76 karst features were identified indicating that this geological investigation was superficial. As Dough Mountain is also designated as a geological heritage site, it has many karst features that reach deep into its interior. The Polldough doline, for example, is a vertical cave carved over millennia out of the karst limestone to a depth of roughly 50 m and whose entrance is blocked by a giant waterfall. (The Seven Rooms in the northwest of the site is also an example of these underground karst hollows with heritage relevance.)

The Peat Stability Risk Register in Appendix 3 of the Peat Stability Risk Assessment records, at every assessment location from T1 to T10 and BP1, the entry 'Evidence of subsurface flow: suspected karst nearby', scored the highest or near-highest pre-control values (16, rising to 20 at T7, T8 and T9) and reduced to 9 after mitigation. Chapter 7, however, concludes that the karst risk is 'negligible' on the single basis that surface infrastructure avoids *mapped* karst features within a 30 m buffer.

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emissions scenario) represents an approximate 4.3 °C in global average temperatures (3.2-5.4 °C) and assumes continued high emissions with minimal mitigation.....this scenario will result in the highest level of physical risk for Ireland and therefore the greatest requirement for adaptation. Volume 2 EIAR Chapter 12 – Climate, 12.6.3

[20] Volume 2 EIAR Chapter 12 – Climate. 12.7.3.2.1

This reasoning does not meet the risk its own documents record. The Karst Assessment (Appendix 7-2) confirms a section of proposed access track immediately south of T3 falls within an area of ‘high’ risk hazard, and that the design relies on piling, grouting and geogrid reinforcement “where encountered” during later investigation. Critically, the Karst Assessment does not establish the hydrological behaviour of the karst system: the geophysical survey at T7 comprised only electrical resistivity tomography and peat probing some 170 m west of the swallow holes, and there is no dye-tracer study within the appendix. Where there was a dye-tracer study to provide evidence of connectivity between Polldough doline and the surface-water network, it only refers to an unattributed, undated and unreferenced qualitative result in Chapter 8.

Figure 2. From Boleyboy looking west with swallow hole in foreground.

Dough mountain is covered by predominantly by blanket bog, which is highly acidic (i.e., with a pH is the 3.5 - 5.5 range). When water seeps down through its organic peat layers to reach the alkaline karst substrate, there is an aggressive reaction with the limestone resulting in the formation of caves, ravines, fissures, voids and seepage cracks. The water becomes acidic as it passes through the peat and dissolves the limestone bedrock forming a massive network of open cracks, underground rivers, sinkholes, voids and caves. Dough mountain can be thought of as a having a cavernous interior, not unlike a Swiss cheese, and is riddled with a plethora of interconnected fissures, hollows and waterways. Being a karst landscape it is extremely permeable and provides no filtering mechanism common to other geologies. This is why the surface water can make its way quickly through the karst to groundwater distant reservoirs and waterways. Heavy rain is known to travel through the underground streams, caves and sinkholes of a karst mountain at up to several kilometres per hour. The lack of filtering that occurs in karst makes its connected downstream waterways, reservoirs and SACs particularly vulnerable. Any pollution, sediment or dislodged peat that enters the mountain’s many interconnected waterways can quickly be transported downstream. The only mechanism regulating the flow of water that falls on Dough mountain is the bog and its surface vegetation.

The EIAR fails to adequately map this subterranean network. Admittedly, it is a difficult undertaking to account for the many fissures, ravines and waterways that have been formed through the interior of the mountain. However, much can be revealed from dye-tracing studies. An undocumented, undated and unreferenced dye-tracing study to show connection from the Polldough doline to local waterways has been reported. However, that is the extent of it and there is no such dye-tracing study attempted to understand the vitally important connection from the northwest of the site to the local waterways and the Lough Melvin SAC, or anywhere else.

The key characteristics of a karst geology which places them in a different category of aquifer, is their rapid flow where water moves quickly through open conduits rather than being filtered through rock pores. This lack of filtration makes karst groundwater particularly devoid of any natural filtration. The aggressive dissolution of rock can also lead to the formation ***of sinkholes and sudden ground subsidence.*** This erosion can be correlated over very small time scales and confirmed by increased turbidity in downstream waterways after heavy rainfalls. This increase in turbidity testifies to the fact that the limestone and karst features are being aggressively eroded in near real-time.

This characteristic may also have severe ramifications for the turbine foundations. As the upper surface of the bog is disturbed by excavations during construction, surface water can be redirected through different subterrain pathways or create new ones. A waterway that was once predominant may become less important in favour of lesser ones. Although these maybe small at first they can widen and expand with continued increase flow and accelerate erosion of the subterranean karst geology to ultimately weaken the understructure of the turbine foundation. This could happen anytime over the lifetime of the wind farm.

It is impossible to properly assess the direction and volume of water or the network of hollows and voids that may form in the karst geology decades into the future due to surface disturbance from excavation and construction. The planning application appears not to acknowledge the presence of existing subterranean waterways or their possible pathways. A comprehensive dye-tracing study involving the whole of Dough Mountain and its broader connections should have been carried out. The fact that it wasn't included reflects a lack of understanding of its importance to the region. It also undermines any confidence in the EIAR.

The study area should have been defined by hydrological, geological and ecological pathways. It should not have been primarily defined by the wind farm site boundary.

Mitigations

It is also unclear how the bog fares after construction although improvements and risk reductions are forecast after proposed installation of wind farm. The application has many proposed mitigations; landscape modification to divert flooding, barrages, burial pits for invasive plant species, decontamination of construction vehicles, use of herbicides, silt collection ponds, spill kits, biotrucks, hydrocarbon filters to remove fuel spillage, land slippage monitoring, etc. The plethora of mitigations suggests that the environment will be pushed to the edge and put in a vulnerable position requiring ongoing intervention whether that is continual monitoring or emergency measures such as implementation of barrages in the hope of reducing the peat slide damage etc. The large number of proposed mitigation measures presented in the EIAR can also be a sign that the project will push the environment to its edge and render the mountain unable to sustain itself without ongoing human management, continual oversight and intervention. This makes it highly unsuitable for development.

TBD Mitigations

Each of the 21 assessment areas reduces its post-control risk rating on the assumption that a future assessment and design will be produced and will succeed. The recommendation requires the client to "develop design stage Peat Stability Risk Assessment," noting that "the geotechnical designer may require additional site investigations to refine the design," and defer "site-specific temporary works design" (re the actual stabilising measures of berms, sheet piling and battering) to the construction stage. The Karst Assessment also refers to deferments where earthworks "will be designed....during the detailed design stage", and 'a similar karst feature inspection protocol will be developed.'

In other words, the very measures on which the 'low' and 'negligible' risk ratings depend are not assessed in the application but are promised for a stage after submission. From a legal perspective an assessment cannot lawfully reach a conclusion of no significant effect on the basis of mitigation whose details are postponed and therefore cannot be evaluated when consent is granted.

Chapter 7 states that placing excavated peat "completely below the existing ground profile on all sides" in the borrow pit deposition areas "eliminates any possibility of a peat stability-related slope failure". This seems to be in contradiction with the applicant's own record where Borrow Pit 1 is situated in a 'high' landslide susceptibility area with 'suspected karst nearby' in its risk register, with the detail for the backfill operation as part of its mitigations is expressly deferred to the design stage of the Peat Stability Risk Assessment.

We find that other mitigation measures are still not finalised reflecting the fact that there is still some doubt as to the extent of what is required to protect against adverse events.[21] How some of these mitigations will be executed remains unclear. For example, one of the duties of the geotechnical supervisor will be to ensure "limiting heights of stockpiling materials to 1.0 m peat or 0.5 m of mineral soils for periods of less than 8 hours". Incidentally, one may ask how is this will actually be implemented given the time required for foundations to be dug, rebar installed and concrete poured, and time for the concrete to set properly.

"Mitigation measures will be put in place during the design and construction of the scheme to reduce the likelihood of an excavation collapsing."[22] However, even with the mitigations in place there is still *no guarantee* that excavation collapsing will occur.

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[21] "Client to appoint an appropriately qualified Geotechnical Engineer for the construction stage to review and update the mitigations proposed in this planning stage PSRA. Detailed design stage PSRA to be developed. At this stage the geotechnical designer may require additional site investigations to refine the design." Appendix 7.1.6.1.,EIAR Vol. 2. Peat Stability Risk Assessment. Recommendations, Construction Phase.

[22] Appendix 7-1 Peat Stability Risk Assessment. Planning Stage Peat Stability Risk Assessment, 4-1. Ciaran Reilly & Associates.

The inability to guarantee successful outcomes becomes increasingly difficult when working with ODFs close to 1.

The applicant also seems unable to predict the magnitude of the impact of a collapse should one occur or reassure us only to say that "...the significance of a collapse in terms of cost and programme is likely to be in the range 'very low effect' to 'extremely high effect' as the affected area due to collapse could range from a very localised area up to a major peat slide event feeding into a watercourse."[23]

Adverse Weather Event Mitigations

Mitigations for excessive rainfall events seem to simply resort to the suspension of work.[24] Once a bog slide, peat slide or bog burst starts there is really nothing one can do until it stops of its own accord. The sensitivity to rainfall and water levels during construction begs the question as to whether the suspension of works is adequate. This is particularly true given the unpredictability of very localised intense rainfall events that are becoming more frequent and having turbines built in regions of 'high risk' landslide susceptibility.[25] Indeed, rainfall on Dough Mountain is above the country's average with observations of the nearby Truskmore area indicating rainfall often reaching up to or over 2 m per square inch annually.[26]

Mitigations for peat slides or bog bursts suddenly occurring in dry weather should also be considered such as in the Derrybrien bog slide of 2020, especially when there is only a mitigation protocol to cease construction operations.

Embedded mitigations requiring intensive drainage will result in the continued release of CO_2 due to the degradation of the peat through, for example, erosion, where the CO_2 release could continue long after the site has been decommissioned. It is also likely to result in increased sedimentation in the freshwater systems that arise in, or are fed by, the watershed. This is likely to have a significant impact on the quality of these systems such as the nearby Special Areas of Conservation (SAC) protected under EU legislation.

The construction of the wind farm will place the mountain with its far reaching interconnected waterways, low peat stability and endangered and rare wildlife, in a much more vulnerable position by requiring a long list of ongoing mitigations, which are intended to go well beyond the decommissioning phase.[27]

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[23] Appendix 7-1 Peat Stability Risk Assessment. Planning Stage Peat Stability Risk Assessment, 4-1. Ciaran Reilly & Associates.

[24] "....works will be suspended if the forecast / weather monitoring suggests any of the following is to occur: (i) 10 mm/hr rainfall (i.e., high intensity local rainfall events), (ii) >25 mm rainfall in a 24-hour period (heavy frontal rainfall lasting most of the day), or (iii) Half the monthly average rainfall in any 7 days."

[25] In Appendix 3: Peat Stability Risk Register of Appendix 7.1. Peat Stability Risk Assessment, Tables are given for each turbine. Under the category 'Topography, Landslide Susceptibility' we find that turbines T1, T2 are labelled as 'High Risk', with T3 , T4, T5, T9, T10, T11, T12 being 'Moderately High'.

[26] An Bord Peanála file 319480.

[27] "Operation and Maintenance Phase the mitigation tasks include: (i) Ongoing monitoring of residual risks and maintenance if required, (ii) regular inspection of drains and culverts to prevent blockages, and (iii) Inspections of settlement ponds, backfilled borrow pits, rock berms, and movement of monitoring posts after significant rainfall events." Appendix 7.1.6.1.,EIAR Vol. 2. Peat Stability Risk Assessment.

Turbine Oil Leakage and Blade Shedding

The application fails to address the leakage of oil from the turbines themselves – only to vehicles and machinery. Because they contain massive moving parts, such as gearboxes and hydraulic systems that require heavy lubrication, seal wear, pipe ruptures, or mechanical failures can sometimes result in oil escaping and dripping down the tower or sprayed onto the surrounding ground.

Turbine gearboxes and bearings rely on hundreds of litres of synthetic or mineral lubricant to reduce friction in the spinning parts and to prevent critical metal components from overheating. After constant operational stress seal rings can degrade allowing oil to escape. Issues like fluctuating oil pressure or blocked filters can also cause ruptures. Hydraulic systems, such as those to control the pitch of the blades or braking systems, can also leak.[28]

While many wind turbine operators are moving towards advanced monitoring systems, such as drip pans and automated sensors to combat leakage spread, minor leaks may still go unnoticed until they cause noticeable staining or environmental impact. To offset this issue, some operators are shifting toward 'green' or biodegradable lubricants, which degrade naturally and are less harmful if released.

There is no mention or risk assessment provided regarding the possibility of turbine leakage or the mitigation measures in place. The issue of paint and material particles being shed from the turbine blades over time, as seen in other wind farms, has not been addressed either.

Carbon Emissions Offset

The proposed Lissinagroagh wind farm has the capacity to deliver 220-290 MWh annually using a 14-turbine wind farm with an installed capacity of between 77 – 100.8 MW. This is projected to provide a carbon emissions offset of just over 2 million tonnes over the 35-year expected lifetime of the farm.[29]

For the full lifetime of 35 years with the lower installed capacity of 77 MW, the offset drops to 1,400,000 equivalent tonnes of carbon emissions offset. The final choice of wind turbine can substantially reduce the carbon offset and the equivalent number of houses that the wind farm could supply. The lifetime of the farm also can also have a significant bearing on carbon offset expectations. For example, if we consider wind farm lifetimes of 25 and 20 years we get the equivalent carbon emission offsets of roughly 990,000 and 790,000 tonnes respectively. Even with the 100 MW installed capacity case, the equivalent carbon emissions offset drops to 1,300,000 and 1,000,000 tonnes respectively. The carbon emissions offset can vary substantially depending on the eventual installed capacity and actual lifetime of the wind farm. (See Appendix B below. These details and tables might be 'overkill' to the argument but were done in my attempt to better understand carbon offset projections based on timelines etc.)

The EIAR addresses the construction phase of carbon emissions that contribute to the budget by including carbon emissions from the manufacture of the turbines, concrete and rebar steel, and also the emissions generated from delivery and

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[28] Large turbines can leak up to 1,400 litres of lubricant in a worst-case catastrophic failure, though typical active leaks range from a few drops to roughly 200 litres. www.lailer.io/use-cases/wind-turbine-oil-leaks

[29] FuturEnergy brochure (March 2026) and the EIAR.

construction etc. to arrive at an estimate of 13,500 equivalent tonnes of carbon emissions.

We are also informed that "the most significant proportion of GHG emission are anticipated to occur during the construction phase as a result of embodied carbon in construction materials and emissions from construction activities......The GHG assessment has highlighted the highest embodied carbon emissions are associated with the building materials used (63%) of construction phase emissions. 55% of material emissions are from the use of concrete, followed by steel (37%) and aggregate (8%). Land use change, through the removal of mixed forest, constitutes approximately 32% of total construction phase GHG emissions." But there is no mention of peat.

The carbon budget assessment suggests that emissions and all carbon-balance issues are favourable. While emissions associated with the construction, operation and decommissioning are cursorily addressed, the most important issue of the release of CO_2 from the peat soil as it oxidises during construction is not. The degree to which the excavated peat, which is removed for later replacement, is assumed to be 100% restored to its former condition. Oxidation of the peat during this removal and replacement can lead to catastrophic failures. The losses from the Derrybrien peat slide of 2003 alone are equivalent to the energy production of three or four turbines for the lifetime of that project.[30]

Peat has been defined as "partly decomposed plant material that has accumulated in situ (rather than being deposited as a sediment) as a result of waterlogging' (Bragg and Lindsay 2003). When peat-forming plants die, they do not decay completely because their remains become waterlogged as a result of constant, regular rainfall. This constant waterlogging excludes air and limits the range of active decomposer organisms. Instead of decomposing entirely to carbon dioxide and water when they die, some of the plant remains from the surface vegetation become incorporated into a layer of partly decomposed vegetation beneath the surface. This 'soil' has been accumulating for thousands of years to become, in places, several metes thick. Its only water supply is rainfall and low permeability of peat means that the water drains away very slowly. The peat remains saturated almost up to the surface, maintaining the anaerobic conditions necessary for its own preservation. Such persistently wet, nutrient-poor conditions favour the growth of the bog-moss Sphagnum, which carpets much of the ground and provides conditions for the majority of the plant material that eventually becomes peat. Sedges, dwarf shrubs and other specialist vascular plants grow rooted in this carpet as though it were the surface of soil."[31]

In the excavation management section, the developer's Spoil and Peak Management Plan indicates that any peat excavated during construction will not be lost or removed from the project boundaries but rather relocated and used dynamically on site for landscaping and habitat restoration.

The proposal fails to include analysis of contributions from the release of carbon from disturbing the bog or the loss of its ongoing ability to sequester greenhouse gases. It is assumed that none of the peat will be lost through mitigation measures that seem to assume that it can be removed, stored and replaced without incident.

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[30] Wind Farms and Blanket Peat. The Bog Slide of 16th October 2003 at Derrybrien, Co. Galway. R.A. Lindsay and O.M Bragg, (2005),Executive Summary, pg. xi
[31] Ibid., pg. 7

An estimate of the amount of the peat lost, or any guarantee of the quantity that might be successfully reintegrated, is not provided. We are not informed of the expected success rate in excavating the peat layer, moving it to a temporary borrow pit, or how well it will regenerate when replaced. We know that the bog resettlement time, or the stabilization phase, where greenhouse land-to-air gas flux can stabilize, usually takes about 6 to 15+ years. In terms of the lifetime of the wind farm, this becomes an important consideration. For a proper assessment we need to know what percentage of the peat will be replaced or restored to its original form. Interestingly, while great efforts to preserve the peat as part of the mitigation procedures are presented, we are nevertheless informed that any 'leftover' peat will be disposed of at the discretion of the developers.

The optimistic carbon emission offset of 2 million tonnes fails to include an estimation of how much the stored carbon, or equivalent carbon emissions, will ultimately be lost to the atmosphere from the peatlands on Dough mountain. No assessment has been provided to put this loss into perspective. In fact the peatland carbon position is internally contradictory and the carbon released by the peat excavation is not quantified anywhere in the EIAR.

In Chapter 7 (Section 7.5.2.5) asserts that the peat "is not active, i.e., not a carbon sink". Yet in Chapter 7 (Section 7.4.1.3) concedes that excavation of the peat "will lead to carbon release, and to the loss of potential carbon storage, due to depletion of the peat bog carbon sink," and states that this "has been further assessed in Chapter 12 – Climate".

Chapter 12 lists "peat removal" among the activities entered into the carbon assessment but its construction-phase emissions total of 13,530 tCO_2e contains no quantified figure for the carbon released by excavating, draining and storing the peat. The only land-use-change figure is for forestry felling, which is then "nulled" by an off-site replanting commitment. This doesn't make sense given that it takes a number of decades for a tree to reach maturity and its full sequestering potential.

An estimation of the equivalent carbon emissions loss from disruption of the bog is outlined below. In doing so, it is admitted that crude assumptions are used given the lack of information provided in the EIAR. However, it serves to illustrate that this consideration can dwarf the carbon emission contributions of the construction phase, i.e., 13,500 tCO_2e, by more than an order of magnitude.[32]

It is difficult to estimate this loss without an explanation of what constitutes the actual footprint of the turbines and their associated infrastructure on the bog. We are informed that 49 hectares[33] will be disturbed as part of the 'land grab' but not sure how this is broken down or if their effect on the surrounding bog has been included. Studies have shown that up to roughly 100 metres surrounding the disturbance of bogland can be negatively impacted.[34] This is particularly important given the extent of the numerous excavations and embedded mitigation structures required for the wind farm construction and operation.

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[32] EIAR Vol.2, 12.7.2.1. Climate. Table 12-8

[33] We are informed that the site contains only 39 hectares of upland blanket bog within its survey boundaries. However, we are assuming that other developments are included in this estimation. Since the following calculations are very approximate, we retain the 49 hectares estimate as the purpose here is to show the order of magnitude of carbon released.

[34] D.R. Nayak et al. Calculating carbon budgets of wind farms on Scottish peatlands. *Mires and Peat*. Vol. 4 (2008-2010).

However, we can make some rudimentary estimates based on the area of disturbed bog and using independent estimates of stored carbon typical of boglands from other studies. For example, between 1.5 -2 m deep peat has a stored capacity of roughly 4,500 tCO_2e per hectare. Other estimates go as high as 8,000 tCO_2e per hectare.[35]

From these two estimates of peatland carbon storage we get, **220,000** tCO_2e (i.e., 49 ha x 4,500 tonnes tCO_2e) and **392,000** tCO_2e (49 ha x 8,000 tCO_2e). Admittedly, these are crude estimates that assume that all the peat is lost and acknowledges that this carbon equivalent is not lost immediately. On the other hand, the amount of bogland could be underestimated. However, the simple calculations show the magnitude of the losses possible and questions the reliability of the carbon offset benefits presented.

Furthermore, we should include the sequestering ability of the bog, which is small compared to other losses if considered only in the short-term, such as the lifetime of the wind farm, but which can add up to become quite significant in the long-term. Also, the fact that this natural carbon sequestering mechanism, which requires no mitigation protocol or human oversight, is lost forever. Of course, this loss also comes with loss of habitat and displacement of the wildlife.

For example, the sequestering ability lost over different periods assuming 1 equivalent tonne of carbon emissions per hectare per year would amount to 49 tCO_2e /yr (1 tCO_2e /ha/yr x 49 ha) or **4,900** tCO_2e for over 100 year period. Other estimates indicate that 1 m^2 of peatland can safely store 0.36 $kgCO_2e$/yr which equates to a sequestering capacity of 176 tCO_2e /yr over the 49 hectares, which in 100 hundred years would amount to **17,600** tCO_2e. With time these numbers can become quite significant.

The carbon emissions offset estimate is sensitive to many factors such as the lifetime of the wind farm. Also, when stored carbon losses are included, in particular those losses from disturbed peat, the benefits may not appear as promising. For example, assuming the lower installed capacity of 77 MWh, a smaller lifetime of 25 years and 49 hectares of peat lost, we arrive at a much lower carbon emissions offset of only around 600 tCO_2e. This illustrates the sensitivity of the carbon emissions offset to these parameters. See Appendix B for other numbers.

Getting a realistic sense of the carbon offset benefits invariably depends on the timescales one is considering. Windfarm lifetimes are in terms of decades whereas natural boglands are in the range of thousands of years. It really depends on the whether one is considering short-term or long-term timeframes.

When considering the short-term horizon, i.e., in the timeframe in which the wind farm is viable, a rosier picture can be painted in comparison to the much slower and natural ability of the bog to absorb carbon. Also, shorter wind farm lifetimes, i.e., those shorter than the 35-year lifetime, can have a weighted influence in reducing the overall carbon offset.

Since the carbon emissions problem is a global problem we need to differentiate the issue of scale, both in time and space. For example, emission rates and atmospheric concentrations of air contaminants are closely related because their lifetimes are short and their concentrations are small. That is, when local emissions are reduced the local pollution concentration drops rapidly, usually within a few days. This is why local policies have had a significant effect in reducing smog in cities etc.

[35] Irish Peatlands Conservation Council.

However, the global average CO_2 concentration behaves very differently since emissions mix globally and the global carbon cycle is vast and slow. Any change in local CO_2 emissions today will only have a very small global effect, and only with a long delay. And even if global emissions were to stop tomorrow, it would take ***decades or centuries*** to see a meaningful reduction in the global CO_2 concentration and hence human influences on the climate.

The scale problem can be illustrated with reference to U.S. motor vehicles. In 2022, the emissions from U.S. cars and light trucks totalled 1.05 billion metric tonnes of carbon dioxide ($GtCO_2$, EPA 2024). Meanwhile global CO_2 emissions from energy use totalled 34.6 $GtCO_2$ (Energy Institute, 2024). Hence U.S. cars and light trucks account for only about 3% of global energy-related CO_2 emissions. To a first approximation we can say that even eliminating ***all*** U.S. vehicle-based emissions would retard the accumulation of CO_2 in the atmosphere by only a year or two over a century.[36]

In the case of the Lissinagroagh wind farm, and using the most optimistic carbon emissions offset of 2 $MtCO_2$ over its lifetime of 35 years (or ~57,000 tonnes carbon emissions offset per year), we find its annual contribution to global carbon emissions offset to be ~0.000165%, and of course, with any resulting effect to occur at least many decades into the future.

To put this into further perspective, if Ireland were to completely eliminate its contribution of CO_2 emissions of between 0.1% – 0.15%, by accomplishing its goal of reaching its net zero target, it would only retard the accumulation of global CO_2 in the atmosphere by only a few weeks over a period of 100 years.

The argument here is not to say that it is pointless to reduce our carbon emission contributions or that wind energy has no place in the production of a country's energy supply, but rather to point out that unless the problem of CO_2 is tackled globally, the sacrifice of our precious land and way of life to save the planet from climate catastrophe becomes a meaningless endeavour. Ireland's current policy of building more and more wind farms at the price of disrupting so many facets of our heritage and way of life, may not be seen as an act of courage and decisiveness on behalf of our government policies, but as being shortsighted and destructive.

Other Observations:
Jobs and Community Benefits

The applicants state that the proposed wind farm will provide employment but this really relates to construction where roughly 100 people will be employed temporarily, whereas after construction only a handful of people are required to monitor and service the site to ensure mitigation measures are maintained.

I wonder if the community benefit fund will offset the depreciation in local property values. Also, "the fact that Revenue has given lower property tax estimates along the route of the high voltage power lines currently being erected by EirGrid to facilitate wind farms is the State's acknowledgement that wind farms and pylons bring down property prices.[37]" FuturEnergy also offers annual payments of €500 and €1,000 to

[36] A Critical Review of Impacts of Greenhouse Emissions on the U.S. Climate. Climate Working Group, Unted States Dept. of Energy, July 23, 2025.
[37] Donegal Daily, 20 June 2026.

residents within 1 -2 km of the wind farm, which testifies to the inconvenience the wind farm poses.

FuturEnergy tells us that the majority of people living near wind turbines approve of wind farms. However, I would point out that the speed at which donations came in to the Save Dough Mountain GoFund Me campaign (June 2026), which reached its target in a matter of days, testifies to a different opinion. It could also be that these poll numbers are unrepresentative in the case of the Lissinagroagh wind farm because the people of North Leitrim realise that Dough Mountain is highly unsuitable for development. (Recall planning permission for a much smaller wind farm was denied in 2010.)

Access to Dough Mountain

The industrialisation of Dough mountain will restrict local access with permanent security barriers installed to block off areas of the mountain. With improved roads and new access routes it will also be easier for unauthorised dumping, vandalization and perhaps even attempts of unauthorised climbing of the turbine towers. Security is inevitable to ensure property monitoring and protection of wind farm infrastructure. The plan states that there will be seven permanent controlled access points put in place on local roads in the townlands of Faughary and Boleyboy. This makes the wind farm indeed a 'land grab' where local access will be restricted.

This will involve site security lighting at night as well as which diminishes any future attempts of designating the area as a 'dark sky' preserve. The current absence of any lighting in the area is also something that makes this wilderness area special. The improved roads and access tracks will also have an effect on the wildlife making it easier for invasive species and predators, such as rats, mice and foxes, to move in causing a greater threat to the native ecology where, for example, bird nests within the bog can be raided.

Wind Turbines and Avoidance

The Faughary wind farm uses turbines (Enercon E82/2000) with 41 m length blades rotating at a minimum of 93km/h to 278km/h maximum. The blades of these turbines sweep out an area of roughly 5,200 m^2. The larger turbines proposed for the Lissinagroagh wind farm on the other hand have a blade length of between 74.5 – 81.5 m sweeping out an area of roughly between 17,000 m^2 – 20,900 m^2 and rotating at a maximum speed in excess of 300 km/h. The area of this blade sweep is roughly four times the area of the Faughary wind turbine models. Sizing up to compare wind farms, the Faughary wind farm blade sweep area in total is roughly 15,600 m^2 whereas the Lissinagroagh wind farm collective blade sweep increases to roughly 238,000 m^2 – 292,600 m^2 (depending on turbine) , i.e., nearly 20 times that of Faughary.

The potential for turbines to pose a hazard to important bird populations, such as the endangered hen harrier is also relevant. These birds have long breeding cycles, relatively low population densities and low absolute numbers. Loss of only one of two individuals can represent a significant impact. Blade strikes are most likely during periods of adverse visibility such as low cloud cover, conditions that regularly prevail around Dough Mountain.

The substantially increased area of wind turbine can only exacerbate the ability of birds and bats to avoid collision. Although the factor of 20 could be argued not to scale linearly, that is, to say the blade kill number will not increase by 20 times to that of

Faughary, because the birds and bats will learn to avoid the area. If that being the case, we are then left with the conclusion that the wind farm would have a very negative impact on their habitat to the extent that the presence of the turbines is changing their behaviour, or worse still, they must resort to leaving the area. This would invariably be classified as a habitat loss, and with the endangered hen harrier in question, the loss of habitat for an endangered species.

Flicker and noise from the turbines can also have adverse effects. The swooshing noise from the blades can drown out important bird warning signals and flicker can interfere with their success in hunting prey amongst other considerations.

Habitat and Residential Disturbance

To compensate for an estimated 140 hectares of foraging habitat predicted to be effectively lost through turbine related displacement the OBMP secures 164 hectares of enhancement lands across the agricultural peat and the mixed habitats all situated within 2 kilometers of at least one NEA[38]. If habitat areas are lost in one area and 'resituated' in another, the question arises as to whether endangered species will also change. This change may affect their behaviour such as altering their migration and hunting grounds and thus subjecting them to new dangers of proximity to the turbines. Also, how does one get the rarely sighted hen harrier to move from its existing nesting area to the new specially allocated biodiversity enhancement area much of which must be deforested first? What is the effect on the hen harrier and other wildlife during the noisy construction phase that can last up to two years?

Given that the foundations require roughly 1,752 m^3 of concrete per turbine (24,528 m^3 in total), and a concrete truck can carry roughly 8 m^3, we get 3,000 delivery trips that use local roads outside the wind farm site. The return trip doubles these numbers to realise that **6,000** trips are required (i.e., ~230 per turbine x 2 two-way x 14 turbines). Each concrete pour must be delivered in a 12-14 hour period amounting to 19 concrete trucks per hour amounting to 38 trips per hour within an extended work day. That's just the concrete delivery! If we include peat removal of 101,911m^3 and using a carrying load of 15 m^3 per truckload, we get, ~6,790 trips within the site and accounting for the return this doubles to ~**13,600** trips. Turbine component deliveries amount to 23-38 trips up the mountain with vehicles weighing as much as 100 tonnes, movement of cranes weighing hundreds of tonnes, the delivery of roughly 1,700 tonnes of rebar steel, ongoing movement of heavy machinery, construction of 16.3 kms of access and temporary roads, widening of roads, drainage conduits, silt ponds, rock blasting in the borrow pits to access up to 248,167 m^3 of source stone for construction – involving up to possibly **16, 000** truck deliveries at 15 m^3 per truckload. This list is not conclusive. In the back of my mind I considered that maybe a few hundred or even a thousand truck deliveries would be involved but I never imagined tens of thousands.

I imagine the wildlife will undergo profound stress during the 24-month construction phase. How does the wildlife cope during this period as their habitat is uprooted. I'm sure they are not comforted by the fact a new special biodiversity enhancement area awaits them. I don't believe these questions or their impact are adequately addressed in the planning application.

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[38] From EIAR vol 3, Appendix 6. Outline Biodiversity Management Plan.

Incidentally, the proposed study area was initially shown as a large circle (FuturEnergy Brochure, 2021) but has evolved into a castellated perimeter in the April 2026 brochure, as though areas that might prove averse to the planning application have been omitted.

Shadow Flicker

According to the Lissinagroagh EIAR, the footprint of the proposed wind farm can. be described as a 49 hectare 'land grab'. It is presented as a two-dimensional acquisition whereas in reality it is better described as a 3-dimensional one given the height of the turbines and the shadows they cast. Even without considering the rotation of their blades, the shadows of the turbine towers will move across the landscape as the sun migrates across the sky in the course of a day. Longer shadows will be cast in the winter months where the sun only reaches about 11 degrees above the horizon as the winter solstice is approached. From the lowest to the highest turbine foundations within the wind farm, their blades tip heights will extend from roughly 100 m below to 100 m above the peak of Dough mountain.

Considering that the sweep area of each turbine is roughly 20,000 m^2 (or 2 hectares) and that their blades heights are close to, and some exceeding, the mountain peak, it is safe to conclude that landscape will be subject to the flickering phenomena all year round. The rotation of the turbine blades will project a cacophony of shadows and pulsations onto the sensitive landscape.

This has ramifications for the wildlife. For example, the hen harrier relies on its keen vision and focus to spot and target prey. A flickering background can be considered a distraction and may make hunting a much more difficult quest. It may also affect its prey, making them even more stressed as every flicker could be mistaken for danger, or they may become habituated over time making them more vulnerable. It is nevertheless not addressed nor considered in the planning application.

Animals, as well as humans, are sensitive to this flicker. For example, we find that there are no wind farms in the vicinity of the Curragh, where the world-famous multimillion euro race horse industry is situated.[39] This is because the flicker negatively impacts the behaviour of these valued horses. We also know that flicker from flashing lights can trigger epileptic seizures in people. Turbine flicker is not that different and may have deeper psychological consequences given that the whole environment is pulsating – continuously and without end. The situation is made worse since the flickering phenomena is coupled with the swooshing noise of the blades moving through the air at speeds that can reach hundreds of kilometres per hour at their tips. None of these potential health hazards are adequately addressed in the EIAR study.

FuturEnergy has assured us that the flicker phenomena is not something to be concerned about as the turbines will be shut down whenever a domicile is subjected to flickering shadows of their turbines. We are assured that this can be programmed into the wind farm as solar angle and its azimuth is quite predictable. However, on further inquiry we find that this prevention of flicker only pertains to the situation where this modulated light enters via a window or other such opening in the building. It does not

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[39] The nearest operational utility-scale wind farm to the Curragh racehorses is the Mount Lucas Wind Farm located ~ 34.3 km away by road.

account for the local surroundings such as when there might be features such as tall trees etc.in the vicinity that are positioned to intercept the wind turbines' shadow.

FuturEnergy also presents the wind farm as something that enhances the area and is beneficial to the community. It's brochure shows new walkways, cycle lanes, benches etc. overlooked by large turbines. One wonders why this landscape would attract anyone with its flickering environment and it's ceaseless noise of swooping turbine blades drowning out the natural sounds of a once pristine environment. I consider it a textbook example of gaslighting at its finest.

Noise and Vibration

Taking noise survey measurements prior to construction is not really useful. However, protocol requires it to establish an upper limit for the wind turbine noise amplitude. It assesses the background noise to set a baseline which would include the Faughary wind farm, local traffic and wind gusts etc.

Regulations that impose limits on the noise from wind farms is set in terms of threshold decibel levels, which vary based on the background levels determined without wind turbines. Knowing the noise generated by a wind turbine is then added to the background level to determine whether or not the allowable noise level will be exceeded once constructed.

Much of the literature on the relationship between wind turbines and adverse health effects is mostly anecdotal and subjective, and therefore no causal relationship to disease or physiological damage is associated. However, these studies and others do acknowledge the annoyance and negative subjective experiences such as sleep disruption, headaches, stress of those living close to wind turbines.

The peer reviewed literature on the effects on health and nearby wind farms, while scarce in the past are becoming more abundant in recent years. Associations between sleep distance, heart arrythmias, exacerbations of symptoms in the chronically ill, etc. are reported.[40] None of this evidence is acknowledged or addressed in the applicant's noise or flicker studies.

The noise from wind turbines may not burst one's ear drums or even cause annoyance in the short term but it acts in a more insidious, chronic manner. Try lightly tapping your collar bone once. Hardly noticeable. Tap gently repeatedly for 5 minutes in the same spot. It becomes annoying. Do it for an hour it becomes torture.

In late of last year it was reported that the High Court deemed wind turbines to be quieter than 'a washing machine'.[41] But try living beside a washing machine that never turns off – in a room with a flickering lightbulb for that matter!

Barely audible noise in terms of loudness or volume but persistent over time can have a deleterious effect. Infrasound, acoustic waves with frequencies less than 20 Hz and generally below the limit of human audibility, can travel incredibly long distances with minimal attenuation and can penetrate biological tissues and buildings. Although technically inaudible, sufficiently loud infrasound can be felt as vibrations often causing symptoms like fatigue, anxiety, nausea, and disorientation. Not just wind turbines but industrial machinery, aircraft, low-speed equipment and data centres all generate infrasound as an environmental product.

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[40] Olson, K., A Review of the Health Impacts of Wind Turbine Exposure, Sept. 2025. DOI:10.13140/RG.2.2.22986.02241
[41] TheCurrencyNews.com, 7 November 2025.

A local farmer living near a wind farm reported to me that he could feel vibrations on the metal gate on opening the entrance to his field. When driving through County Wicklow a few years ago, I stopped my car in the valley at the base of the Raheenleagh wind farm. When I turned the engine off I could not only hear the swoosh of the blades but could feel the vibration. When I got out it was almost unbearable. Why so loud here I wondered? I concluded it must be a combination of wind direction and the fact that surrounding valley mountains acted as a sort of bowl in which the sounds and vibrations were being reinforced and amplified.

Low frequency vibrations such as those mentioned above can also be amplified within a building particularly when they match the resonant frequency of the structure. Infrasound can propagate through the ground and be amplified within a building structure not unlike the hollowbody of a guitar. Other factors that play into this are the proportions, size, orientation with respect to the source, and the building materials used, i.e., brick, cement, wood. The surrounding landscape plays an important role as does the wind speed and direction when discussing wind turbines. Low clouds, being of greater density than air, can reflect sound back down thus making the turbines sound louder. Some people have reported that when they built an extension with a sloping roof the noise problems originating from the adjacent wind farm lessened considerably. The residents closest to the existing Faughary wind farm living at the foot of Shasmore and Lisdarush are in a particularly vulnerably area for noise related disturbance. The residents report the ongoing stress it is causing them, affecting sleep, mood and invasion of their space etc.

A sound survey that deals simply in terms of acoustic volume thresholds within a certain frequency range, i.e., thresholds in terms of decibels, is not really fit for purpose when dealing with health effects. A low volume modulated wave can illicit different responses in biological systems. Frequency as well as duration must be considered for a true assessment on health. This goes for flicker as well as noise. An assessment of the effect of noise should involve modelling of the sound waves propagating through the local environment and topography as well as taking the geometry and location of each dwelling in the locality into account. This would of course be expensive and time consuming but the impact on health and well-being cannot be otherwise dismissed.

What also appears to be overlooked in the asssssment is the accumulative effect of noise and disturbance especially on those closest to the turbines. It's not just the impact of the 14 proposed wind turbines but the collective noise from the existing Faughary wind farm, the 24 month construction-phase, the noise and dust from a borrow pit roughly 550 m away as well as access and works at about 250 m from the nearest residential building, and a sustained increase in heavy goods traffic including night-time movements. The combined and interacting load on the people who live with of all of them simultaneously is never assessed at all.

Water Quality

The issue of water quality extends beyond siltation and sediment from the disturbance of the mountain during construction. The removal of peat has additional ramifications: When organic matter rots in oxygen-starved environments (such as unmanaged landfills or deep waste piles), anaerobic bacteria decompose it producing biogas that consists largely of methane and carbon dioxide. Methane dissolves into the liquid that drains through the waste (i.e., the leachate) and escapes into the atmosphere.

As leachate pools and migrates into surrounding soils and groundwater, dissolved methane bubbles out while other toxic contaminants, such as ammonia and heavy metals, degrade water quality. This severely disrupts local aquatic ecosystems and poses major health risks to surrounding communities using the water.

It is unlikely that with some oxidation and deterioration of the peat surrounding construction areas, as well as its removal and storage, its replacement along road upgrades and construction of turbine foundations, there is an additional threat of poisoning the water that can seriously effect sensitive aquatic ecosystems as well as drinking water aquifers, i.e., local wells, springs etc.

The production of methane from biological breakdown of the peat also contributes to greenhouse gas emissions. Methane is a short-lived but highly potent greenhouse gas. Over a 20 year period it can trap roughly 80 times more heat in the atmosphere than carbon dioxide, making it a critical driver of near-term climate change. It can also act as a precursor to tropospheric ozone, a toxic air pollutant that damages respiratory health and reduces agricultural crop yields. It is also highly flammable and explosive when concentrated thus posing additional danger if it becomes trapped in the peat layers. None of these concerns are addressed in the planning application.

The groundwater is already admittedly quite vulnerable. The Tobin study reports: "Groundwater vulnerability is *extreme* to *high* at T14 and the borrow pit to the south. Groundwater vulnerability is *high* at T2, T7, T8, T13. Groundwater vulnerability is *moderate* at T5, T6, T10 and the borrow pit to the north."[42] The vulnerability of the groundwater to more than half the turbine sites, excluding the borrow pits, stands to jeopardise the quality of water for the whole region. This is quite a revealing statement of fact that underscores the unsuitability of the location for any development, and furthermore, should disqualify it from any future consideration.

Closing Statement

An objection submission is inherently negative as it points out defects, oversights and omissions as part of its observations with respect to the planning application. But it is also worth taking an overview of what is at stake in terms of the cost of uprooting our landscape, disturbing its ecosystems and wildlife, threatening our waterways and SACs, and their associated health concerns even if they are only subjectively felt by the local population. Certainly the psychological effect on the continuing threat to the land and its ecosystems from the many Sitka spruce plantations, gold mining endeavours, fracking and wind farms, have on ongoing and accumulative effect on the state of one's wellbeing. I would contend that this could have, over time, an insidious and pernicious effect on our relationship and connection to the land. The 10-year permission period also plays a part by placing the local residence in a state of suspension.

In this submission, we have addressed the many problems with building an industrial-scale energy harvesting development on Dough Mountain. This included the unsuitability of the area, already designated as a Natural Heritage Area and Geological Heritage Area with unique glacial karst features as well as wildlife with endangered species of fauna and flora. The connection of its waterways to the surrounding lakes, rivers, well and springs is unique due to the mountain's karst subterranean geology where water flows quickly to its distant extents where the only regulator of water flow is

[42] Chapter 5 – Biodiversity, Section 5.6.2.1.2.4, pg. 145. EIAR Vol. 2.

the bog itself. This in itself bears great weight in sizing up the suitability of the site for a wind farm.

The large upheaval of peat and the construction of turbines in regions of high landslide susceptibility seems a dangerous proposition when examining the details. Of course, there is the issue of habitat upheaval and the question of what happens to the wildlife during the two-year period of heavy construction, and of course the long term ramifications. Then there is the heritage aspect where the studies failed to do the proper assessment before drilling holes into the surrounding area adjacent to where ancient artifacts may be situated.

The drive for more and more wind farms and their carbon emissions offset has been examined by interpreting these benefits in terms of time scales, where the lifetime of the wind farm is in decades and where the mountain and it boglands can be measured in millennia. Also, the contribution of these offsets have been considered from a global perspective where it makes little sense to rush in and sacrifice our unique landscapes and wildlife, heritage and way of life, and our connection to the land just to offset a miniscule amount carbon emissions when other industrial countries are resorting to fossil fuels to power the likes of data centres.

We should see Dough Mountain as the national treasure that it is and perhaps more so as a healing place. It is a wilderness place where one can steep themselves in the timeless pace of nature and thus allow the soul to connect to its deeper ancient origins. Such places are becoming more of a rarity and will be sought out in the future as valuable assets for retreat, health and experiencing our deeper connection to the natural world of which we are all a part of.

For all these reasons, I do not consent and respectfully request that An Coimisiún Pleanála refuse permission for the proposed Lissinagroagh wind farm development.

Kind regards,
Karl Moore, Ph.D.
Raheelin
Kiltyclogher, F91 N276
Co. Leitrim

APPENDIX A

Table 1. Lissinagroagh Wind Farm

ODF Case 2 – undrained, 1m surcharge loading

(Landslide susceptibility and groundwater vulnerability also shown)

H =High, MH=Moderately High, ML=Moderately Low, L=Low

	Y	α	c_{ud}	z	ODF Case 2	% margin over 1.0	Slide Suscept.
T1	10	11.2	13.0	2.8	1.2	**20**	H
BP1	10	11.0	13.0	3.3	1.1	**10**	H
T2	10	6.2	9.6	4.5	1.1	**10**	MH
T3	10	12.0	13.0	2.1	1.3	**30**	MH
T4	10	15.4	13.0	2.0	1.1	**10**	MH
TC1	10	5.7	13.0	0.8	4.4	340	L
T5	10	6.0	13.0	2.0	2.7	170	ML
T6	10	16.6	13.0	1.6	1.2	**20**	ML
T7	10	9.0	13.0	3.1	1.4	**40**	MH
T8	10	8.7	13.0	2.8	1.5	**50**	MH
T9	10	7.7	12.0	0.8	3.1	210	MH
T10	10	7.8	9.5	2.0	1.5	**50**	MH
T11	10	6.3	13.0	1.0	3.7	270	L
T12	10	5.9	13.0	1.1	3.8	280	L
TC2	10	6.2	13.0	1.1	3.6	260	L
Mast	10	8.8	13.0	0.8	2.9	190	L
Sub	10	7.9	13.0	0.6	3.6	260	L
BP2	10	7.4	13.0	1.2	2.9	190	MH
BP3	10	9.8	13.0	0.9	2.5	150	L
T13	10	5.2	13.0	1.0	4.4	380	L
T14	10	9.5	13.0	1.2	2.3	130	L

Table 2. Meenbog Wind Farm

FOS undrained, 1m surcharge loading

	Y	α	c_u	z	FOS	% margin over 1.3
T1	10	1.0	5	1.0	14.3	1000
T2	10	1.0	5	2.7	7.7	492
T3	10	1.0	5	4.5	5.2	300
T4	10	1.0	5	2.7	7.7	492
T5	10	1.0	5	4.7	5.0	285
T6	10	15.0	5	0.2	1.7	**31**
T7*	10	5.0	5	1.7	2.1	62
T8	10	5.0	5	2.0	1.9	**46**
T9	10	9.0	5	0.5	2.1	62
T10	10	2.0	5	2.5	4.1	215
T11	10	3.0	5	2.1	3.1	138
T12	10	6.0	5	1.7	1.8	**38**
T13	10	2.0	5	0.3	11.0	746
T14	10	1.0	5	1.3	12.5	861
T15	10	2.0	5	0.2	11.9	815
T16	10	3.0	5	1.0	4.8	269
T17	10	6.0	5	1.5	1.9	**46**
T18	10	3.0	5	1.0	4.8	269
T19	10	3.0	5	0.3	7.4	469

Table 3. Croagh Wind Farm

FOS undrained, 1 m surcharge loading

	Y	α	c_u	z	FOS	% margin over 1.3
T1	11	3.0	6	2.2	3.3	154
T2	11	2.0	6	2.8	4.1	215
T3	11	2.0	6	2.8	4.1	215
T4	11	12.0	6	1.0	1.3	**0**
T5	11	2.0	6	1.3	6.8	423
T6	11	2.0	6	2.4	4.6	254
T7	11	1.1	6	2.8	7.4	469
T8	11	3.7	6	3.9	1.7	**31**
T9	11	3.0	6	4.5	1.9	**46**
T10	11	6.0	6	1.0	2.6	100

Appendix B

For 100 MW installed capacity
Using the maximum proposed installed capacity of 100 MW running at full capacity for 35 years, we get a total electrical energy production of,

100 MW x 8,760 h/yr x 35 yr = 30,660 MW

Since wind is variable it is estimated that he capacity factor for Dough Mountain is 33%[43] of the nameplate installed capacity reducing the electricity production that may be actually realised.[44] (For comparison, Donegal's regional onshore capacity factor sits at roughly 17.7% to 18% in lower wind years, but individual optimal upland sites frequently reach 30% to 35% averages across the entire North West Atlantic[45]).

Using the capacity factor of 33%, we get;

30,660 MW x 0.33 = 10,117 MW

Other factors reducing production are grid constraints. In Ireland another 11%[46] could be lost or 'wasted' due to curtailment where the production of electricity cannot be added to the grid because it is unable to handle it at the time.[47] (This is a conservative estimate with some curtailments peaking at around 20%.) Assuming that such bottlenecks in the grid are not resolved during the lifetime of the farm, we get as an additional loss roughly 1,117 MW, bringing production over 35 years to

10,117 MW – 1,113 MW = **9004 MW**

(Alternatively, a similar estimate can be calculated by multiplying 290 MWh generated annually by 35 years to produce 10,150 MW, and with a curtailment factor of 11% similarly applied we get, 10,150-1,117 = 9,033 MW.)

Furthermore, to arrive at an estimate of the carbon emissions offset, the above estimate must be multiplied by the Grid Emission Factor. For Ireland this is, 0.1978 $KgCO_2/kWh$[48], or roughly 0.20 $KgCO_2/kWh$. This accounts for generation, transmission, and distribution losses within the Irish network.[49] (Because wind and solar output fluctuate constantly, Ireland's daily carbon intensity shifts in real time. EirGrid tracks these fluctuations showing daily averages that usually swing between 0.11 KgCO2/kWh

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[43] 12.7.2.2 Operational Phase
[44] Capacity factor equals the actual energy produced divided by the maximum possible output.
[45] www.climatejargonbuster.ie
[46] www.windenergyireland.com
[47] System rules dictate a minimum number of synchronous gas or oil electricity generation plants must remain online at all times to maintain frequency and voltage, which displaces available wind energy.
[48] Sustainable Energy Ireland.
[49] The GEF also varies from country to country since it is dependent on the 'cleanliness' of the grid in that country. Cleanliness here refers to a measure of the efficiency of converting electricity from fossil fuels. In point of fact, as the grid becomes 'cleaner ' with more and more renewable energy sources coming online, the carbon emission offset will also become less.

(on very windy days) to upwards of 0.24 KgCO2/kWh when gas and fossil fuels dominate[50]).

We then get, 9,004,000 kW x 0.20 $KgCO_2$/kWh = ***1,800,800*** tonnes of carbon emissions offset over 35 years. See Table below for carbon emissions assuming different wind farm lifetimes for the 100 MW installed capacity case.

For 100 MW installed capacity:

Lifetime	35 years	25 years	20 years
Max. Electricity Produced	30,660 MW	21,900 MW	17,520 MW
33% Wind Capacity Factor	10,117 MW	7,227 MW	5,782 MW
11% Curtailment	9,004 MW	6,432 MW	5,146 MW
tCO2 offset w/Grid Emission Factor	1,800,800	1,286,400	1,029,200

For 77 MW installed capacity

Here we use the lower installed capacity estimate of 77 MW from the planning application to get;

77 MW x 8760 h/yr x 35 yr = 23,610 MW

Applying the 33% wind capacity factor;

23,610 x 0.33 = 7,791 MW

And applying the 0.2 $KgCO_2$/kWh Grid Emission Factor;

7,791 MW – (7,791 MW x 0.11) = 7,791 MW – 857 MW = **6,933 MW**

(Alternatively, a similar estimate can be calculated by using the lower 220 MWh generated annually to arrive at a total production of 7,700 MW over 35 years, which becomes 6,853 MW when an 11% curtailment is applied.)

The carbon emissions offset then becomes;

6,933 MW x 0.20 $KgCO_2$/kWh = ***1,386,600*** tonnes of carbon emissions offset over 35 years. (Without grid constraints this be 7,791 MW x 0.20 $KgCO_2$/kWh = ***1,558,000*** tonnes offset.)

These carbon offset numbers are less than with Photoenergy's estimates of just over 2,000,000 tonnes over 35 year period. See Table below for carbon emissions assuming different wind farm lifetimes for the 77 MW installed capacity case.

[50] EirGrid Smart Grid Dashboard.

For 77 MW installed capacity:

Lifetime	35 years	25 years	20 years
Max. Electricity Produced	23,608 MW	16,863 MW	13,490 MW
33% Wind Capacity Factor	7,791 MW	5,565 MW	4,452 MW
11% Curtailment	6,934 MW	4,953 MW	3,962 MW
tCO2 offset w/Grid Emission Factor	1,386,800	991,000	792,000