

## **Barnaderg Cooloo Windfarm Action Collective CLG**

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<b>To</b>	<b>The Secretary, An Coimisiún Pleanála - 64 Marlborough Street, Rotunda, Dublin 1, D01 V902</b>
<b>From</b>	<b>The Secretary, Barnaderg Cooloo Windfarm Collective CLG - Cooloo, Moylough, Co Galway</b>
<b>Your Ref</b>	<b>PAX07.323761 – Cooloo Wind Farm</b>
<b>RE</b>	<b>Submission in objection to proposed development</b>
<b>Date</b>	<b>21 November 2025</b>

A Chara,

The Collective refer to the above planning application and advise that the **Barnaderg Cooloo Windfarm Action Collective CLG** (The Collective) wishes to lodge the following submission in objection to the proposed Cooloo Windfarm development, which is located in County Galway in the townlands of Cloondahamper, Cloonascragh, Elmhill, Cooloo, Lecarrow, Dangan Eighter, Lissavalley and Slievegorm. It is a project consisting of 9 wind turbines with the capacity to generate a max of 64.8 MW of electricity to the national grid.

The Collective is moved to lodge this submission as engaged and concerned citizens, who believe that it is crucial to contribute to the planning process and to ensure that decisions made align with the best interests of the community and the environment.

An Coimisiún Pleanála is to be commended for its commitment to fostering sustainable development while preserving Ireland's natural heritage. The decision-making authority's dedication to striking a balance between progress and environmental stewardship is vital in maintaining the quality of life for present and future generations.

This submission aims to highlight several key considerations related to the project's potential impact on the local community, environment, and infrastructure. It is our intention to contribute constructively to the assessment process by raising pertinent issues and concerns that require careful deliberation.

**The Collective is not against wind energy.** The Collective does however believe that wind energy initiatives should be focused off-shore, or where on-land, in areas that are not in close proximity to established communities or on sensitive/protected habitats as described in EU legislation.

The proposed development is one of 6 Windfarm projects already in the planning process, and which if allowed, will comprise of approx. 61 wind turbines. This is only the start of at least 17 Windfarm projects currently intended for East Galway, which could result in up to 160 plus Wind Turbines! These enormous 180 metre high turbines will be located on agricultural farmlands and raised bogs, which will have significant negative and potentially irreversible impacts on habitats, wildlife, ornithology and the environment.

The communities within these proposed areas represent generations of our families living and working in North East Galway. Communities that value our homes and way of life, and do not wish to be overshadowed by an enormous windfarm.

As members of these communities, The Collective note specifically the

- Fear, worry and anxiety related to our quality of life and the potential negative effect and disturbance from 9 turbines in close proximity to our homes and lives
  - For the health and wellbeing of children attending Brierfield N.S., Cooloo N.S. and Barnaderg N.S.
  - For our personal health, and the need to be able to sleep at night free from the persistent and pervasive noise generated by wind turbines.
  - For our ability as mothers and fathers to work from home, and the need for reliable broadband to do this.
- Death and displacement of birds, bats, insects and other animals if the windfarm is constructed.
- Contamination of water sources during construction.
- Extensive and potentially irreversible damage to a living bog at Cooloo, with the potential to drain the bog and to flood other dwellings/land downstream when thousands of tonnes of concrete are poured into the bog's surface.
- Devaluation of our property, and the prospect that our children will not be able to, nor even want to, obtain planning permission for houses in the future in this area.
- Inability to farm in all areas captured within the Cooloo Windfarm plans due to our cattle and sheep grazing underneath the shadow of the 9 huge wind turbines with unknown effect.

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# 1 Planning Authority Legal Function

An Coimisiún Pleanála will no doubt be aware that it has a number of distinct sets of legal tasks facing it when dealing with this application. In essence what is imposed on An Coimisiún Pleanála is an obligation to reach a conclusion as a matter of certainty.

It must assess the planning merits of the application in accordance with National and EU law, and Directives and rulings of the European Court of Justice, including but not limited to the Planning and Development Act 2000 (as amended) to ensure that the proposed development is in full compliance across all these jurisdictions

The proposed development is contrary to the existing deficiency in the roads network serving the area of the proposed development, and contrary to the proper planning and sustainable development of the Barnaderg/Cooloo area.

The proposed development would be partially located within habitats of high conservation high conservation value, a significant raised bog area, wet heaths, a karstic limestone region, numerous turloughs and watercourses running into Lough Corrib, all part of the County ecological network . The County Development plan of Galway has a stated objective to minimise the impact of new developments on habitats of natural value that are the key features of the ecological network of the County.

The proposed development would materially contravene the County Development Plan and would be contrary to the proper planning and sustainable development of the area .

The proposed development is located within the zone of influence of areas of ecological sensitivity.

In essence what is imposed on APC is an obligation to reach a conclusion, as a matter of certainty, that the proposed development will not adversely affect the integrity of the ecological network of the Cooloo/Barnaderg area. The standard to support such a conclusion is that the planning authority or the board, must satisfy itself on the basis of the complete , precise and definite findings and conclusions that no reasonable scientific doubt remains as to the absence of such effects.

There is a requirement to carry out an EIA in accordance with Irish Law and in particular the obligations imposed by Art 3 of Directive 2011/192 /EU on the assessment of the effects of certain public and private projects on the environment.

There is also a requirement to carry out an appropriate assessment as required by Art 6 ( 3) of the Habitats Directive as implemented by Part x AB of the Planning and Development Act.

The nature and the extent of the obligation imposed by Art 3 was considered by the EJEU in commission v Ireland Case C - 50/09 at Para 372 , “ In order to satisfy the obligation imposed by Art 3 , the competent authority may not confine itself to direct and indirect effects on certain factors , but must also access the in an appropriate manner, in light of each individual case . This obligation involves and examination of the substance of the information gathered as well as a consideration of the expediency of supplementing it , if appropriate with additional data .

In accordance with Art 4 , the direct and indirect effects of the proposed development on

- Human Beings , Flora and Fauna
- Soil, water, air, climate, and landscapes
- Material Assets and cultural heritage.

It is further submitted that the construction of the wind turbines, themselves and the connection to the grid connection and associated works and ancillary projects such as substation and battery station, is a single project and not two separate projects and that before planning consent for the former it is necessary that the cumulative effects of the combined or single project ought to have been carried out. In circumstances where that has not happened no decision to grant permission should be granted.

The developer did not include an assessment of the cumulative effects of stage 2 of the development namely but not limited to the connection to the national grid and the application submitted the EIA in particular as part of its application does not include a statement of the environmental effects associated with the second stage.

“In that way the connection to the National Grid is fundamental to the entire project , and in principle at least the cumulative effect of both must be accessed in to comply with the Directive ( para 27 )

The objective of SEA is to provide a broader or more holistic or systematic approach to environmental assessment of the effects of certain plans and programmes on the environment, which include development plans such as the development plan of Galway County Council.

Art 3 of the SEA directive requires an SEA to be carried out for plans and programmes which are likely to have significant effects. This assessment should be carried out in accordance with Art 4-9 of the directive.

In Thybaut it was held that the fundamental objective of the SEA Directive is to ensure that plans and programmes, which are likely to have significant effects on the environment, are subject to an environmental assessment when they are prepared and prior to their adoption.

The Galway County Development plan 2022 to 2028 contains a “Local Authority Renewable Energy Strategy”

The project sets out detailed provisions for renewable energy development in the County including wind and sets out details of how the county will contribute to and is consistent with national renewable energy policies.

The assessment and detailed spatial distribution of wind energy in the county was developed by reference to a wide range of environmental factors.

The project was not subject to a ministerial direction and therefore must be presumed to comply with applicable national and regional policies

The project was subject to strategic environmental assessment and as such it sets the framework for future development consents under the EIA Directive for projects falling within the sectors set out in Article 3(2)(a) of the SEA Directive which includes energy, industry, and town and country planning.

The current project clearly falls within the scope of the type of development consents which must apply the framework set out in the development plan as a matter of EU law.

Table 11 envisages that no new wind energy projects will be developed in areas designated as “generally discouraged” up to 2030 and that 38 MW of capacity will be permitted for the repowering of existing sites in these areas.

First, while the project may in principle be compatible with national policies, it is not compatible with the development plan.

The development plan is compatible with national policies, since this is a statutory requirement. There was no intervention from the OPR or Minister in relation to the LARES nor did the applicant (or group company Neon in the preparation of the development

plan), neither was there any judicial review of the development plan for being inconsistent with national policy.

Therefore the claim that the project is consistent with national policy is incorrect and/or an irrelevant factor and amounts to a merits based collateral challenge against the development plan and the LARES.

The Board does not have jurisdiction to determine such a matter and is bound by the development plan.

The developer cannot simply state that they disagree with the policies and objectives of a development plan including zoning objectives.

The zoning objectives of the development plan cannot be set aside.

In light of the above the Board is precluded from granting permission since it is contrary to and materially contravenes the Galway County Development Plan 2022 to 2028, including a material contravention of the zoning objective for the area.

The Board is also precluded from granting permission by the SEA Directive and the AA Directive.

It is contrary to the SEA directive to apply a plan or programme which sets the framework for development consents under the EIA Directive which was adopted in breach of the SEA Directive.

The 2006 Wind Energy Guidelines were not subject to SEA and are therefore inapplicable.

The 2019 Draft Revised Wind Energy Guidelines are irrelevant as a matter of Irish law and in any event the conclusion of the SEA remains pending. Therefore these guidelines are also inapplicable.

The Collective wish to direct the Authority's particular attention to two specific obligations imposed on it :

- Obligation to ensure full compliance with the requirements of Directive 2001/42/EC ("the SEA Directive")
- Obligation to ensure full compliance with the requirements of the Habitats Directive

## 1.1 Obligation to ensure full compliance with the requirements of Directive 2001/42/EC (“the SEA Directive”)

### 1.1.1 CJEU CASE 24/19

The decision of the Court of Justice of the European Union (CJEU) in the case *A and Others (C-24/19)* is relevant to the development proposed in this instance, arising from the requirements of Directive 2001/42/ as interpreted by the Court of Justice in June 2020 in this case.

The Court considered the consequences of a failure to carry out a Strategic Environmental Assessment (SEA) prior to the adoption of a plan or programme and the impact this would have on the relevant plan or programme as well as subsequent projects based on that plan or programme

In the particular case, local residents in Belgium challenged a wind farm development project of five turbines which had been permitted based on conditions outlined in a regional government order from 2006 and a circular on the Assessment framework and conditions for the installation of wind turbines.

They argued that the consent granted should be annulled on the basis that the order and the circular should have been preceded by a SEA, and were therefore in breach of Article 2(a) and Article 3(2)(a) of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive).

### 1.1.2 Plans and Programmes

At issue was the interpretation of the above Articles. Article 2(a) defines plans and programmes as:

*“plans and programmes ... which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and .... which are required by legislative, regulatory or administrative provisions”*

Article 3(2)(a) provides that an environmental assessment shall be carried out for all plans and programmes:

*“(a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II to Directive 85/337/EEC”*

The Court of Justice - Grand Chamber had to consider whether the order and the circular amounted to a plan or programme and the implications on a development such as the wind farm development should there be a violation of EU law by a Member State.

The Court found that the order and the circular constituted plans or programmes under the SEA Directive.

It found that a SEA should have been carried out prior to their adoption by the Belgian government in 2006. Both the order and the circular contained various provisions in relation to the installation and operation of wind turbines, including measures on shadow flicker, safety, and noise levels.

### 1.1.3 Consequences of Breach of EU law

The Court outlined the consequences for a Member State and national competent authorities including An Coimisiún Pleanála of a breach of EU law in the following terms:

- a) Member States are “required to eliminate the unlawful consequences” of breaches of EU law. Competent national authorities are “under an obligation to take all the necessary measures, within the sphere of their competence, to remedy the failure to carry out an environmental assessment” which can involve “adopting measures to suspend or annul that plan or program”.
- b) Only the Court of Justice may, in exceptional cases, temporarily suspend the Application of EU law.

The Court concluded that in cases where a SEA is required but is not carried out, the plan or programme, as well as all permissions for projects based on the same, must be annulled. In the instant case, construction of the wind farm development had not yet commenced. The

Court of Justice stated that it was clear that the consent must therefore be annulled as such consent was adopted on the basis of the plan or programme which “was itself adopted in breach of the obligation to carry out an environmental assessment”.

The Court of Justice also held that where installation of a windfarm project “has commenced, or is even completed”, consent can be annulled (para 89).

There were limited circumstances in which projects would not be annulled:

1. Where there is a risk that the annulment “could create a legal vacuum that is incompatible with that Member State’s obligation to adopt measures to transpose another act of EU law concerning the protection of the environment”.
2. If the consequences of such annulment were “a genuine and serious threat of disruption to the electricity supply of the Member State concerned which could not be remedied by any other means or alternatives”; referring to C-411/17 Inter-Environnement Wallonie and Bond Beter Leefmilieu Vlaanderen.

In Case C-411/17, the Court stated that it was permissible to continue the operation of an energy plant, being two nuclear reactors, where this was necessary for the security of energy supply of the Member State as a whole. In the A case, the Court held that the cessation of activity of a limited number of wind turbines was not likely to have significant implications for the supply of electricity for the whole of Belgium, thereby establishing a high threshold.

#### 1.1.4 National Renewable Energy Action Plan (N-REAP) National Energy and Climate Plan (NECP) 2021 – 2030

The Irish policy framework for wind farms is based on the National Renewable Energy Action Plan (N-REAP) which was adopted in 2010, and subsequently on the National Energy and Climate Plan 2021-2030.

The adoption of N-REAP is a direct consequence of Article 4(1) of Directive 2009/28/EC on the promotion of the use of energy from renewable sources, which required national authorities to develop a national renewable energy action plan.

Article 4(2) required Member States to notify their N-REAP to the Commission by 30<sup>th</sup> June 2010. Ireland did so in July 2010.

The N-REAP document is a significant one which “sets out the Government’s strategic approach and concrete measures to deliver on Ireland’s 16% target” under the Directive. It notes that the “development of renewable energy is central to overall energy policy in Ireland.”

Both N-REAP and NECP were adopted without carrying out a Strategic Environmental Assessment under Directive 2001/42/EC. That Directive, as noted above in the A case, makes it a requirement to carry out a SEA prior to the adoption of certain plans and programmes that set the framework for giving permission for projects which have significant effects on the environment.

The Court of Justice noted in the A case that the Belgian Order and 2006 Circular, which fell within the scope of Article 2(a) of the SEA Directive, “contribute to the implementation of the objectives of Directive 2009/28”.

N-REAP also constitutes a ‘plan and programme’ under Article 2(a), and in addition was introduced directly as a consequence of Member States’ obligations outlined in that Directive. N-REAP is a national plan which has resulted in the promotion of, and increase in, the use of renewable energy, including wind energy, to meet the national target.

The failure to carry out any SEA has significant consequences as are clearly outlined in the A decision, as the Court of Justice re-affirmed the rule that project consents are illegal if they are adopted in breach of a Member State’s EU law obligations.

The Court of Justice will allow consent granted in breach of EU law to stand only in limited circumstances, such as where there would be a significant impact on national electricity supply if the project was not undertaken or continued. That would not be the case in this instance. Planning authorities in all EU member states are therefore bound by that decision.

### 1.1.5 Wind Energy Development Guidelines 2006

For similar reasons, the Ministerial Guidelines on Wind Energy Development, issued under s.28 of the PDA 2000, which were expressly published in order to guide planning decisions

in relation to wind energy development planning applications, comprise a plan or programme within the meaning of Directive 2001/42/EC.

The status of the 2006 Wind Energy Development Guidelines as being within the definition of such a plan or programme has been implicitly admitted by the Government. The long running review of the Guidelines eventually produced a set of draft revised Guidelines which the Minister confirmed had to be made subject to SEA precisely because they fell within the definition. As no prior SEA was completed in respect of the 2006 Wind Energy Development Guidelines as required by the ruling of the Court of Justice in Case 24/19, they cannot be relied upon as a valid basis for granting permission in this case.

## 1.2 Obligation to ensure full compliance with the requirements of the Habitats Directive

Where the development has the potential to have a significant effect, either individually or in combination with other plans and projects, on sites of conservation importance Appropriate Assessment screening is required in accordance with Regulation 42 (1) of the European Communities (Birds and Natural Habitats) Regulations 2011 and Article 6(3) of the Habitats Directive.

The nature and purpose of the screening process is well explained in the opinion expressed by Advocate General Sharpston in Case C-258/11 *Sweetman v An Coimisiún Pleanála* at paras 47-49:

47 It follows that the *possibility* of there being a significant effect on the site will generate the need for an appropriate assessment for the purposes of Article 6(3). (20) The requirement at this stage that the plan or project be likely to have a significant effect is thus a trigger for the obligation to carry out an appropriate assessment. There is no need to *establish* such an effect; it is, as Ireland observes, merely necessary to determine that there *may be* such an effect.

The Court at paras 39 to 44 of its judgement further elaborated on Advocate Sharpston's opinion in the following terms: -

39 *Consequently, it should be inferred that in order for the integrity of a site as a natural habitat not to be adversely affected for the purposes of the second sentence of*

*Article 6(3) of the Habitats Directive the site needs to be preserved at a favourable conservation status; this entails, as the Advocate General has observed in points 54 to 56 of her Opinion, the lasting preservation of the constitutive characteristics of the site concerned that are connected to the presence of a natural habitat type whose preservation was the objective justifying the designation of that site in the list of SCIs, in accordance with the directive.*

- 40 *Authorisation for a plan or project, as referred to in Article 6(3) of the Habitats Directive, may therefore be given only on condition that the competent authorities – once all aspects of the plan or project have been identified which can, by themselves or in combination with other plans or projects, affect the conservation objectives of the site concerned, and in the light of the best scientific knowledge in the field – are certain that the plan or project will not have lasting adverse effects on the integrity of that site. That is so where no reasonable scientific doubt remains as to the absence of such effects (see, to this effect, Case C-404/09 Commission v Spain, paragraph 99, and Solvay and Others, paragraph 67).*
- 41 *It is to be noted that, since the authority must refuse to authorise the plan or project being considered where uncertainty remains as to the absence of adverse effects on the integrity of the site, the authorisation criterion laid down in the second sentence of Article 6(3) of the Habitats Directive integrates the precautionary principle and makes it possible to prevent in an effective manner adverse effects on the integrity of protected sites as a result of the plans or projects being considered. A less stringent authorisation criterion than that in question could not ensure as effectively the fulfilment of the objective of site protection intended under that provision (Waddenvereniging and Vogelbeschermingsvereniging, paragraphs 57 and 58).*
- 42 *Such an appraisal applies all the more in the main proceedings, since the natural habitat affected by the proposed road scheme is among the priority natural habitat types, which Article 1(d) of the Habitats Directive defines as ‘natural habitat types in danger of disappearance’ for whose conservation the European Union has ‘particular responsibility’.*
- 43 *The competent national authorities cannot therefore authorise interventions where there is a risk of lasting harm to the ecological characteristics of sites which host priority natural habitat types. That would particularly be so where there is a risk that an intervention of a particular kind will bring about the disappearance or the partial and irreparable destruction of a priority natural habitat type present on the site concerned*

(see, as regards the disappearance of priority species, Case C-308/08 *Commission v Spain*, paragraph 21, and Case C-404/09 *Commission v Spain*, paragraph 163).

44 So far as concerns the assessment carried out under Article 6(3) of the Habitats Directive, it should be pointed out that it cannot have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned (see, to this effect, Case C-404/09 *Commission v Spain*, paragraph 100 and the case-law cited). It is for the national court to establish whether the assessment of the implications for the site meets these requirements.

The ruling in Case C-258/11 *Sweetman v An Coimisiún Pleanála* is quite clear and imposes a very high threshold on the planning authority.

### 1.2.1 Contravention of Galway County Development Plan 2022-2028

The Collective wish to object to the proposed Cooloo Wind Farm on the grounds that it is contravention to the Galway County Development Plan 2022-2028 (the “CDP”), in particular its objectives for the protection of bog/peatland habitats, biodiversity (flora and fauna), and water-dependent ecosystems.

The CDP is the statutory framework for proper planning and sustainable development in the county and has itself undergone the required Strategic Environmental Assessment (SEA), Appropriate Assessment (AA) and flood-risk assessments. All development must comply with its natural heritage and biodiversity objectives.

### 1.2.2 Conflict with Natural Heritage & Biodiversity Objectives (NHB)

The CDP includes a suite of Natural Heritage and Biodiversity (“NHB”) objectives which require:

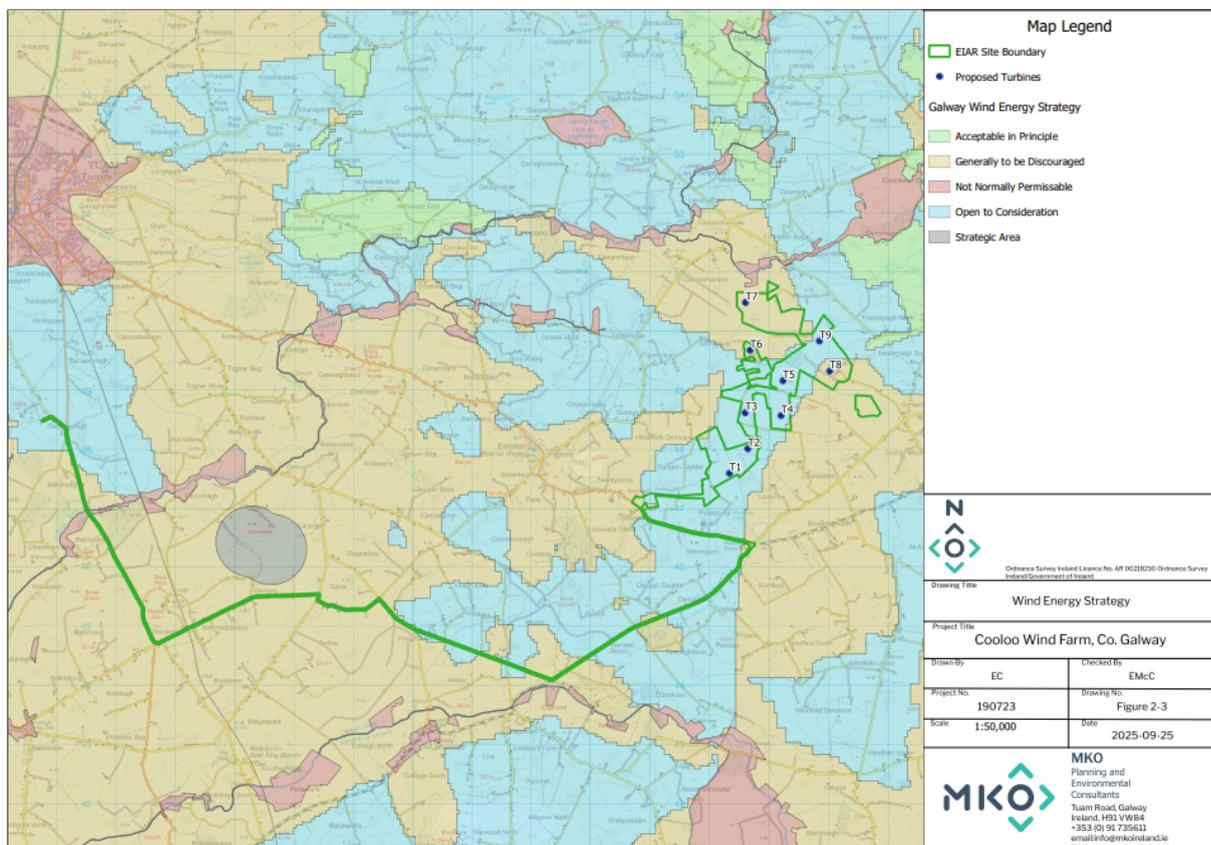
- Protection and where possible enhancement of designated sites, habitats and protected species under the EU Habitats and Birds Directives and national legislation;
- Protection of biodiversity outside designated sites, including habitats and ecological networks such as hedgerows, wetlands and semi-natural habitats;
- Implementation of the National Peatlands Strategy and protection of rare and threatened habitats listed in Annex I of the Habitats Directive (including peatland /

bog habitats).

Yet the application for Cooloo Wind Farm involves excavation of peat and spoil, extensive new tracks and access roads across peatland habitats, and removal of hedgerows and woodland, leading to permanent loss and fragmentation of biodiversity, contrary to the CDP's NHB objectives.

### 1.2.3 Zoning of Turbines in Areas 'Generally to be Discouraged'

The proposed development comprises nine turbines. According to the applicant's Planning Report, six turbines are located in areas zoned 'Open to Consideration' (OTC) under the County's Local Authority Renewable Energy Strategy (LARES), while three turbines (T6, T7, and T8) are located in areas zoned 'Generally to be Discouraged' (GTBD). This zoning is defined as areas where wind energy development is unlikely to be favourably considered due to potential adverse effects on protected landscape, water, ecological resources, and residential amenity. The siting of these turbines in the GTBD zone represents a clear conflict with the CDP and the LARES.



## 1.2.4 Conflict with Water Resource & Wetland Protection (WR Objectives)

The CDP's Water Resources (WR) objectives require the planning authority to protect wetlands, rivers, turloughs, lakes and groundwater, along with the habitats and species that depend on them. The proposed development involves extensive peat extraction and drainage works that would alter peat hydrology, dry out bog habitats, and increase runoff and sediment loads to adjacent watercourses. This is contrary to WR objectives which require the protection of wetlands and natural floodplains.

## 1.2.5 Peatlands/Bogs as Key Heritage & Climate Assets

The CDP and the Galway County Heritage & Biodiversity Plan identify peatlands as key climate and biodiversity assets. These areas are recognised Annex I habitats under the EU Habitats Directive and serve as vital carbon sinks. The Cooloo Wind Farm's proposed works across peatland areas—including zones designated as 'Generally to be Discouraged'—run counter to the CDP's commitment to peatland conservation and climate resilience.

## 1.2.6 Conclusion

For the reasons outlined above:

- The proposal contravenes NHB objectives of the CDP by causing permanent loss and fragmentation of peatland habitats and biodiversity.
- Three turbines (T6, T7, and T8) are located in an area zoned 'Generally to be Discouraged', materially conflicting with the LARES zoning policy.
- The development conflicts with the WR objectives of the CDP due to potential adverse effects on wetlands and peat hydrology.
- It runs contrary to the CDP's strategic treatment of peatlands as heritage and climate assets.

Given that the Strategic Environmental Assessment (SEA) and the County Wind Energy Strategy have zoned this location as an area 'Generally to be Discouraged' due to its sensitive landscape, hydrological vulnerability, and potential impacts on water sources, how can the Board be satisfied that it can make an informed and impartial decision on this application?

**Furthermore, in circumstances where the developer has a clear vested interest in the commercial outcome, what assurance can the Board provide that reliance on the**

**applicant’s own assessments does not compromise the objectivity, accuracy, and independence required for proper evaluation under the Planning and Development Act and EU environmental legislation?”**

Accordingly, we respectfully request that planning permission be refused on the basis that the proposed development would be contrary to the proper planning and sustainable development of the area and would materially conflict with the Galway County Development Plan 2022-2028.

## 2 Public Consultation & Community Engagement

### 2.1 Community Consultation and lack thereof

The community consultation process undertaken by Neoen and their consultants MKO for the proposed Cooloo Wind Farm has been fundamentally inadequate, poorly targeted, and misleading in its presentation of local engagement. The process, as described in *Appendix 2-2 Community Engagement Report (September 2025)*, does not satisfy the requirements or intent of meaningful public consultation as outlined in the **Draft Revised Wind Energy Development Guidelines (2019)** or the **Strategic Infrastructure Development (SID)** protocols of An Coimisiún Pleanála.

The engagement claimed in the report fails to reflect the reality experienced by local residents, community organisations, and sporting bodies within the affected area.

The developer's statutory and public notices were published in the *Irish Examiner* — a Cork-based national newspaper with extremely limited circulation in north-east Galway. This publication choice was inappropriate and ineffective in reaching the local population. The *Irish Examiner* is not purchased by the vast majority of residents in the Moylough, or Killarinerin areas.

Similarly, while the *Connacht Tribune* may occasionally be purchased by some households, it is not the main source of local news. The primary and most widely read newspaper serving the local area is the *Tuam Herald*. The developer's failure to use this paper for statutory notification demonstrates a disregard for genuine local communication and deprived many affected residents of awareness and opportunity to engage at an early stage.

### 2.2 Failure to Engage with Local Community Bodies

Despite assertions in the Community Engagement Report that consultation occurred with "local groups, clubs and schools," it is clear that major community bodies were excluded:

- **Killarinerin Community Council** was not consulted or engaged with in any meaningful capacity, other than being contacted solely for the purpose of booking Barnaderg Community Centre for the Public Information Event. No briefing,

correspondence, or invitation to participate in the design or feedback process was received by the Council.

- **Killiererin GAA Executive Committee** likewise received **no correspondence, letters, or invitations** at any stage of the consultation process, despite the report's claim that local GAA clubs, including Killiererin, were contacted. This misrepresentation undermines the credibility of the consultation record presented in the EIAR documentation.
- Furthermore, while seven of the nine proposed turbines are located within **Moylough Parish**, no information meeting or public event was held in Moylough itself. The sole event was held in **Barnaderg**, several kilometres away, in a different parish. This decision excluded many of the residents and community representatives most directly affected.
- Both Brierfield National school and Barnaderg National school have also confirmed that they received **no correspondence, letters, or invitations** at any stage of the consultation process

These omissions confirm that the developer's engagement was selective and largely administrative rather than inclusive or participatory.

## 2.3 Limited and Ineffective Local Engagement

The developer reports that "door-to-door engagement" was conducted at 55 homes within 1 km of the proposed turbines and that a total of ten written feedback forms were returned. For a project of this scale—nine turbines, each 180 m high—such a small number of responses indicates the failure of the process to reach or involve the wider community.

Residents in the Moylough and Killiererin areas have consistently stated that they were unaware of key project details until after the Public Information Event, and many only became aware through informal networks. This contradicts the developer's claim of a "proactive and transparent consultation process."

The project website, while cited as a major communication tool, is not an adequate substitute for in-person engagement in rural areas with **poor broadband coverage**. The developer's own correspondence (Appendix 1, Q25) acknowledges this deficiency and admits uncertainty about how local residents could access printed versions of the application materials.

In summary, the consultation process for the Cooloo Wind Farm has been narrow, poorly publicised, and exclusionary. Publication in inappropriate media, the failure to hold meetings in the most affected parish, the exclusion of established community bodies such as **Killrerin Community Council** and **Killrerin GAA**, and the overreliance on online materials collectively demonstrate a lack of genuine effort to engage with the community in a transparent and accessible manner.

This process does not meet the requirements of meaningful community consultation as set out in national guidance or the expectations of An Coimisiún Pleanála for Strategic Infrastructure Developments. The Board is therefore respectfully requested to give significant weight to these deficiencies in its assessment of the application's validity and compliance with public participation standards.

## 2.4 Community Engagement Survey

As part of completing this submission, we did a survey of 250 people within a 2km radius of the proposed Cooloo Wind Farm. Only 4% had any direct consultation with the developer Neoen Renewables Ireland or their consultants MKO. For them to have proper meaningful consultation with a community, they should have made it their business to do a meaningful door to door consultation with households when they would be at home. The leaflet drop that was done for the Community Public information Evening in Barnaderg Community centre in January 2024 was done during the day when people were at work, etc. Even in the houses where there were people at home, it was still just a leaflet drop and no engagement with householders. There was no knock on the door or ring of the door bell. It was just a tick box exercise to say they did consultation with the community.

## 3 Land Ownership & Usage

### 3.1 Right to Own / Transfer Property

Article 43.1.2 of *Bunreacht na hÉireann* provides that “the State accordingly guarantees to pass no law attempting to abolish the right of private ownership or the general right to transfer, bequeath, and inherit property.” Granting permission for this wind farm development would effectively undermine this constitutional protection. Landowners and farmers within the affected area would face significant restrictions, as land situated near turbines would become unsuitable for residential development. This would prevent families from transferring land for the purpose of building homes for future generations, thereby eroding their practical rights of ownership and inheritance.

Furthermore, Article 43.2.1 acknowledges that the exercise of property rights must be regulated by the principles of social justice. However, this proposed development cannot be regarded as socially just. It disproportionately burdens local residents while providing little to no direct benefit to the community. Those of us living in the area would experience substantial and lasting impacts — including increased traffic and road closures during construction, ongoing noise pollution, shadow flicker, and significant visual intrusion on our landscape. In addition, there remains insufficient scientific evidence to conclusively demonstrate that large-scale wind farms pose no long-term health risks to nearby residents. In these circumstances, permitting this development would be neither fair nor consistent with the principles of social justice recognised under Article 43.

### 3.2 Right to Peaceful Enjoyment of Own Property

Article 1, Protocol 1 of the *European Convention on Human Rights* (ECHR) safeguards every individual’s right to the peaceful enjoyment of their possessions. It provides that: “Every natural or legal person is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest and subject to the conditions provided for by law and by the general principles of international law.”

Approval of this proposed wind farm would constitute a clear interference with this right.

Land is not only a livelihood but also a home and heritage, and its value lies in its usability, productivity, and tranquillity. If the development proceeds, homeowners, farmers, landowners will be deprived of the peaceful enjoyment of their home and property.

The construction and operation phases would bring significant and continuous disturbance including persistent noise pollution, low-frequency noise (LFN), shadow flicker, and heavy vehicle movements. The tranquillity and visual amenity of the surroundings, which form an intrinsic part of any home environment and well-being, would be irreversibly diminished.

During construction, the constant flow of heavy machinery, road congestion and associated noise would

- cause ongoing disruption and stress, further impacting daily life.
- disturb livestock, damage rural roads, and make normal farm operations significantly harder to carry out.

Once operational, the presence of industrial-scale turbines dominating the landscape would permanently alter the character of the area, stripping residents of the quiet enjoyment of their homes and lands, impacting both animal welfare and the environment in which they work daily.

The cumulative effects of noise, flicker, and visual dominance would deprive local landowners of the peaceful enjoyment and practical use of their land.

Such disruption cannot reasonably be regarded as proportionate or justified in the public interest, and therefore would constitute a breach of the protections guaranteed under Article 1, Protocol 1 of the ECHR.

### 3.3 Impact on Property Value

A study from the University of Galway and international research indicates that homes within 1 km of wind turbines experience adverse effects on property value, with reductions of up to 14.7%. A number of homes fall within this range, and The Collective is deeply concerned about the financial and emotional impact this will have on local families and their future prospects. The planning application does not appear to address or mitigate this issue.

<https://www.universityofgalway.ie/media/researchsites/ceris/files/WP-2023-01.pdf>

### 3.4 Property Devaluation

The 2023 CERIS (Centre for Economic Research on Inclusivity and Sustainability) paper – ‘Wind Turbines and House Prices Along the West of Ireland: A Hedonic Pricing Approach’ – surveyed the prices of houses located near windfarms in seven counties.

The paper states that: ‘The analysis finds a robust and significant reduction in property value of -14.7% within 1km of a turbine’ and that ‘Back-of-the-envelope calculations suggest that the total loss in value for houses within 1km of a turbine in the case counties is approximately €6.8 million.’

There was an even greater devaluation of houses when the turbine height was greater than 125m. The study found that “turbine height is influential on house price within 1km, with turbines taller than 125m incurring a greater discount (-22.9%) compared to medium sized turbines (-14.4%).”(Gillespie et al,2023, pg18)

Table 4: The effect of turbine height on house price.

<90m	0-1km	1-2km	2-3km	3-4km	4-5km	5-15km
<b>Estimate</b>	-0.064	-0.020	-0.017	0.022	0.008	Base
SE	0.072	0.042	0.027	0.027	0.024	
<b>90m-125m</b>						
<b>Estimate</b>	-0.144	0.011	-0.055	-0.046	0.024	Base
SE	0.055	0.036	0.042	0.032	0.027	
	***					
<b>&gt;125m</b>						
<b>Estimate</b>	-0.229	-0.084	-0.034	-0.010	-0.027	Base
SE	0.069	0.068	0.035	0.030	0.021	
	***					
<b>***=99%</b>	<b>**=95%</b>	<b>*=90%</b>				

As depicted above it is quite clear that wind turbines have a significant negative effect on house prices within 1km. The 22% negative offset applies to turbines bigger than 125m. The study highlights a clear negative correlation between wind turbine height and property value. As the proposed turbines for the Cooloo Windfarm are anticipated to be between 180-185m in height it is fair and rational to assume that house well beyond 1km will experience devaluation, and house within 1km will experience a substantial devaluation.

An Coimisiun Pleanála is an agent for the state of the Republic of Ireland and as such is responsible to uphold **Article 40 of the Irish Constitution which states – ‘the state shall in particular by its laws protect as best it may from unjust attack and in the case of injustice done vindicate the life, person, good name, and property rights of every citizen.’**

The Collective is aware that the Clonberne Windfarm Action Group previously spoke to a local auctioneer, who said that he had trouble selling a house in County Mayo because it was close to several wind turbines. The auctioneer was able to cite a specific instance whereby a married couple looked at the house and decided not to buy it. The auctioneer said that the presence of the wind turbines was a crucial factor in the couple's decision not to buy the house. The owners of this house ended up selling for less money than the couple had been initially willing to pay for the house.

### 3.5 Future Planning Restrictions

There are no set guidelines on planning permission for windfarms of the magnitude of the Cooloo Windfarm. This is because wind turbines of this size are unprecedented to Ireland. County Council planning officers use their own discretion when deciding on planning permission for a property close to a wind turbine.

Advice that planning authorities can use when ruling on planning permission being sought within the vicinity of windfarm applications, is said to be contained within the legislation of the 2019 Draft Wind Energy Development Guidelines. **While these guidelines have been drawn up, they have still yet to be signed into law by the Minister for Environment.**

### 3.6 Land Usage - Farming

There are a significant number dairy and dry-stock farmers in Barnaderg, Cooloo and the surrounding areas, both full-time and part-time. Holdings vary in size. Many of these farmers depend on their livestock performing well in order to pay their bills. Also, those who are farming in the area enjoy the work they do, in the absence of shadow flicker, noise or visual pollution. If this development is granted their livelihoods will be impacted.

The 'Importance of Noise Hygiene in Dairy Cattle Farming – A Review' (Published November 1<sup>st</sup> of 2023 by Dimo Dimov, Toncho Penev and Ivaylo Marinov) details how vibration and noise from a milking parlour can negatively impact the milk yield and milk quality of a dairy cow. The paper also discusses how exposing animals to noise from an unfamiliar source can cause them stress. Therefore we can conclude that the noise associated with the wind farm will negatively affect animal and milk production.

It is also important to note that the developer has not taken into account the ways in which farmers depend on the local roads for moving cattle and for access to their land when going about their daily tasks within their farms.

**Reference:**

**Dimov, D., Penev, T., and Marinov, I. (2023)** *'Importance of Noise Hygiene in Dairy Cattle Farming – A Review'*. *Featured Position and Review Papers in Acoustics Science*. Available at: <https://www.mdpi.com/2624-599X/5/4/59>.

# 4 Environmental Impact Assessment Report (EIAR)

## 4.1 Description of the Proposed Project

### 4.1.1 Decommissioning

There are a number of omissions regarding the financial plan for this project which is of concern to the residents but also a concern for the Irish tax payer. There is no estimated cost provided for decommissioning. There is no financial bond or guarantee mechanism described. There is no timeline for financial security review and update. There is also no contingency plan for developer insolvency.

There are decommissioning plans, waste management plans for decommissioning and environmental measures required with included health and safety protocols. However An Coimisiún Pleanála requires applicants to demonstrate financial capacity to decommission. Absence of costings and security mechanisms is a fundamental deficiency in planning applications of this scale. Recent Precedent ABP -310735-21 Clish Valley Wind Farm -Board required detailed decommissioning costs and financial security as a condition of permission.

### 4.1.2 Cooloo Wind Farm Substation and Battery Energy Storage System (BESS) at Dangan Eighter

We, the Collective object to the proposed substation and Battery Energy Storage System (BESS) due to unacceptable risks to public health, fire safety, water contamination, and the rural environment. The developer's own Appendix 12-3 Battery Storage Noise Assessment (Sept 2025) identifies fifteen CATL EnerC+ battery containers – a commercial lithium-ion (LiFePO<sub>4</sub>) system manufactured by CATL – with predicted operational noise levels of up to 31 dB LAeq at homes near the compound, representing an increase of +11 to +14 dB above background levels and classed within the report as a 'significant adverse impact' on residential amenity[2].

Scientific research shows that chronic noise above 30 dB can raise risks of cardiovascular disease and sleep disturbance [3]. Lithium-ion Battery Energy Storage System (BESS) installations worldwide have experienced fires and explosions that release toxic gases such as hydrogen fluoride and hydrogen cyanide [1]. Research shows that fire-water run-off from

lithium-ion battery fires can contain hydrofluoric acid, dissolved metals, and fluorinated organic compounds, which may contaminate nearby soil and waterways if not properly contained [1]. This proposed Substation and BESS would have a major impact on The Lough Corrib Special Area of Conservation, as a nearby stream of the proposed Substation and BESS eventually flow into Lough Corrib which could potentially harm aquatic life and drinking water sources. Based on the absence of any Fire Safety Management Plan within Appendix 12-3 and my own knowledge of local emergency capabilities, it appears that nearby fire services are not equipped or trained to respond effectively to large-scale lithium-ion battery fires [2]. In *Grace & Others v. An Coimisiún Pleanála* (2017), the Supreme Court ruled that a residence within one kilometer of a proposed development site had standing to argue against consent, clarifying the constitutional scope of standing in environmental law.

This case emphasizes the significance of thoroughly evaluating related infrastructure at the Cooloo Wind Farm site, such as the substation and BESS, which ought to be included in the same consenting procedure as the wind farm itself[4].

With homes, farmland, and livestock within a few hundred metres of the proposed site, this industrial-scale development poses an unacceptable risk to community health, safety, and environmental integrity.

Until independent noise, fire-safety, and hydrological risk audits are completed and verified by competent authorities, we urge An Bord Pleanála to refuse this application in accordance with the Precautionary Principle.

#### References :

1. National Fire Protection Association (NFPA) (2020) Hazard Assessment of Lithium-Ion Battery Energy Storage Systems. Fire Protection Research Foundation, Quincy, MA.  
<https://www.nfpa.org/education-and-research/research/fire-protection-research-foundation/projects-and-reports/hazard-assessment-of-lithium-ion-battery-energy-storage-systems>
2. TNEI Ireland (2025). Appendix 12-3 Battery Storage Noise Assessment F (Sept 2025), Vol. 1 & Vol. 3 Environmental Impact Assessment Report, Cooloo Wind Farm.  
<https://www.pleanala.ie/publicaccess/Case%20Documentation/323761/Applicant%20Documents/Application%20Docs/Vol.%201%20and%20Vol.%203%20Environmental%20Impact%20Assessment%20Report/Appendix%2012-3%20Battery%20Storage%20Noise%20Assessment%20F%20-%202025.09.26%20-%20190723.pdf>

3. World Health Organization (WHO) (2018) Environmental Noise Guidelines for the European Region. WHO Regional Office for Europe, Copenhagen.  
<https://iris.who.int/server/api/core/bitstreams/f53c45ba-11d3-4502-a424-c1cf49f5a053/content>
4. Irish Legal News. (2017). Supreme Court: Challenge to wind farm development referred to CJEU.  
<https://www.irishlegal.com/articles/supreme-court-challenge-to-wind-farm-development-referred-to-cjeu>

#### 4.1.3 BESS (Battery Storage ) Fire Safety Assessment Omitted

Chapter 16 Major Accidents does not contain a fire risk assessment regarding BESS battery storage. The EIAR outlines that BESS does not yet form part of the planning application at this stage and will be part of a later application. It is anticipated that a revised NIA will be required. Therefore the purpose of this NIA is to provide the initial assessment.

BESS cannot currently meet fire safety standards because

1. No fire safety protocols exist in Ireland for BESS
2. No environmental licensing framework exists
3. No insurance verification system
4. Decommissioning bond is not stated
5. This does not meet international standards

There are a total of ten fire stations located in population centres around the County - Galway City (HQ), which is a full time station, and nine other unmanned stations in Athenry, Loughrea, Tuam, Ballinasloe, Mountbellew, Portumna, Gort, Clifden, Cill Rónáin & An Cheathrú Rua. The Council will continue to support the provision of a modern and effective fire service for the county. (Source: Galway County Development Plan 2022-28)

The nearest manned fire station is in Tuam, approx 15km, a 17min drive away.

The planning application fails to provide any meaningful assessment of battery-specific fire risk associated with the proposed BESS installation, creating a serious gap in the project's safety evaluation. While Chapter 16 includes a generic reference to fire and explosion hazards, it does not address the well-documented risks unique to battery energy storage systems, such as thermal runaway, toxic smoke emissions, cascading cell failure, or emergency-response requirements. Given that BESS facilities have distinct and potentially severe fire behaviour compared with other wind-farm components, the omission of a

dedicated fire-safety analysis—supported by engineering detail, mitigation measures, and consultation with fire services—means the application does not demonstrate that public health, environmental safety, or emergency-response readiness have been adequately considered. Consequently, approval should not be granted until a full, transparent BESS fire-risk assessment is submitted.

#### 4.1.4 Grid Connection Agreement

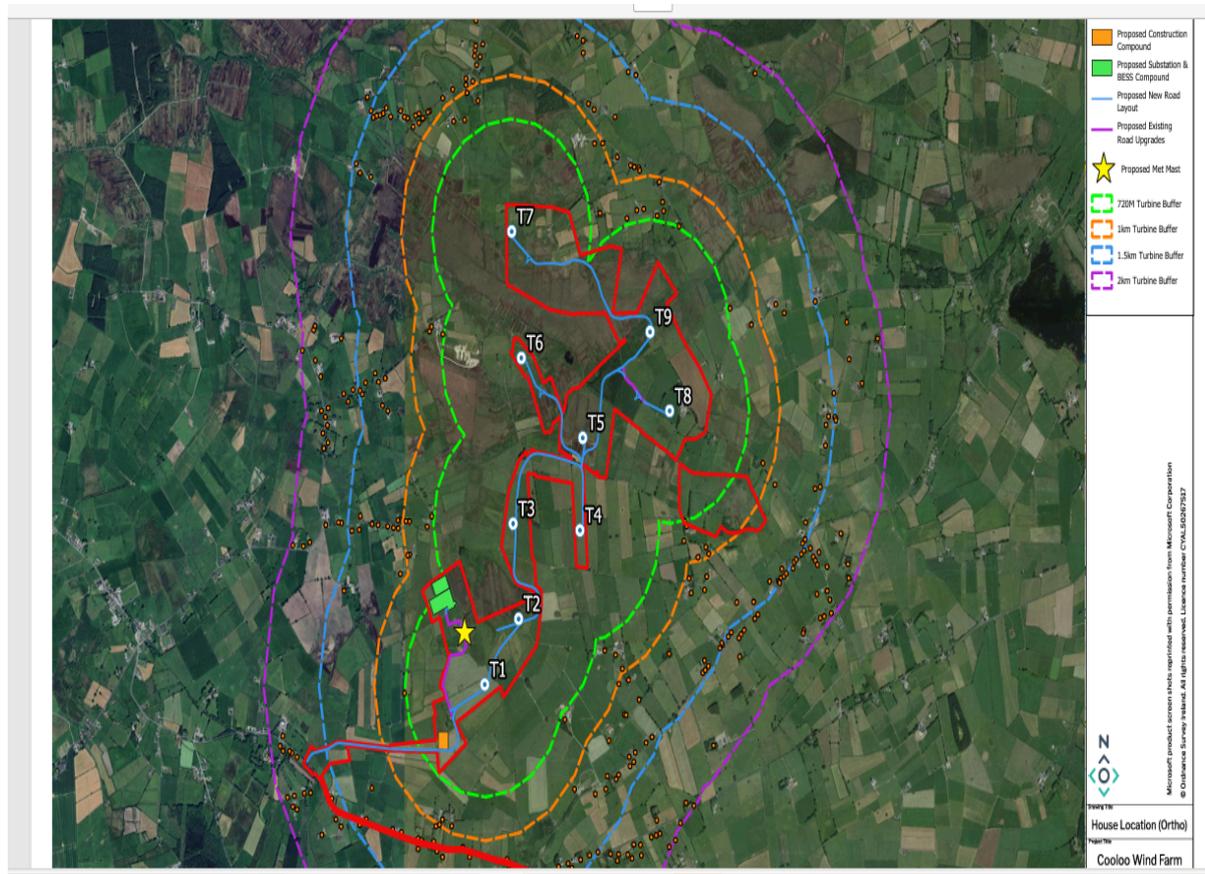
Chapter 4 section 4.3.2.1 States 110KV substation “will remain in situ and form part of the national grid infrastructure” after wind farm decommissioning, however evidence of a Grid connection agreement has not been provided nor an “agreement in principle”. It's unclear if this permanent infrastructure requires separate consent. Is permission being sought for temporary or permanent infrastructure ? If permanent , should assessment differ ? Who maintains this grid post decommissioning. While these questions may have been answered in various meetings they are not answered and clarified in this planning document.

##### Summary

- EIA directive requires that risk for serious accident must be assessed; however, omission of the BESS fire risk assessment from this chapter is a substantive and warranted concern for local residents and a significant gap in EIA compliance.
- Wind Energy Guidelines 2006 requires “financial provisions for eventual decommissioning”;this application does not address this guideline requirement.

## 4.2 Population and Human Health

### 4.2.1 Rural Depopulation



Source: <https://www.coolowindfarm.com/public-information>

The above map is of dwellings within 720m (Green), 1km(Orange), 1.5km(Blue), and 2km (Purple). This was obtained from the Cooloo Windfarm site. This map was not submitted in the application however. There are approximately 400 houses within 2km of this proposed development. It is clearly evident that there are a substantial number of one off houses in the area. This in turn leads to the vibrant rural communities we have in the respective parishes of Killrerin and Mountbellew Moylough.

The communities of Cooloo and Baranderg support the local GAA clubs of Mountbellew/Moylough and Killrerin. There is high social amenity in the respective parishes with many schools, shops, post offices, two Churches, a Gastro Bar in Barnaderg, and 2 pubs in Moylough. All of these organizations and businesses hinge on the existence of a

population in the area. They rely on sustained and replacement population growth levels in the area. This is only achieved through young people setting roots in the area, by accessing planning permission, mortgages and building in the locality. A nine turbine wind farm, with turbine height of between 180m-185m will undoubtedly deter young people from building in the area. It may be that people simply won't live beside wind farms due to a whole myriad of concerns, or it may be that they will not be able to obtain planning permission or mortgages.

#### 4.2.2 National Schools

There are three National Schools in the vicinity of the proposed Cooloo Windfarm, each located within < 3.5kms from the nearest turbine.

- Brierfield NS is 1.35 km away from the nearest wind turbine.
- Cooloo NS is 1.59 km away from the nearest wind turbine.
- Barnaderg NS is located approximately 3.49 km from the nearest wind turbine

The presence of wind turbines near schools can have a range of impacts on students, staff, and the overall learning environment.

Wind turbines produce both audible noise and low-frequency infrasound, which can be noticeable inside buildings, which can cause a distraction. This constant distraction will interfere with children's attention and overall cognitive performance, making it more difficult for students to focus on learning.

In addition, shadow flicker caused by rotating turbine blades can create intermittent light in classrooms, which can be distracting and, in some cases, uncomfortable or stressful for children.

The noise and shadow flicker will also greatly impact on the children in the school who have an additional need. There is a lack of research to state the impacts on these children.

In addition to the above, during the construction phase and while laying the cabling, the roads will experience increased traffic and road closures. This will impact on children travelling to and from school.

While the severity of these impacts depends on distance from the turbines, it is clear that wind turbines in close proximity to schools have the potential to disrupt learning, reduce student wellbeing, and interfere with the overall educational experience.

### 4.2.3 Killereerin GAA Pitch

Killereerin is the home to four All-Ireland winning county footballers, who represented Galway between 1998 and 2001. Killereerin has a rich tradition in Gaelic Football, winning 4 Senior Club County titles between 1999 and 2010.

The club has excellent facilities – a full-size GAA pitch, a training pitch, a walkway with floodlights, a gym, and dressing rooms. It is used by underage county squads, and the Galway ladies' footballers have trained there in the past. Killereerin GAA Grounds is approximately 3.2km away from the nearest wind turbine.

Communities wish to retain the ability of our players, both current and future, from U6 to adult level, to be able to train and play games, trying to score points and make defensive blocks, without the background presence and pervasive noise of a windfarm.

The Collective also wish to ensure that we will have sufficient numbers to sustain the club into the future. This may be put in jeopardy by the development of an adversely large wind farm that will no doubt reduce the population of the area.

### 4.2.4 Health

***“It is health that is real wealth and not pieces of gold and silver.” Mahatma Gandhi***

#### **4.2.4.1 Health Service Executive:**

Please find attached in APPENDIX 2 a letter from Dr. Éamonn J. O'Moore, Director, National Health Protection Office HSE, addressed to Limerick Deputy Niall Collins with a parliamentary question (PQ) for the current Minister for Health Jennifer Carroll MacNeill TD regarding Wind Farms with the following subject matter

***“To ask the Minister for Health if she is aware that the wind energy industry continues to rely on the outdated 2017 HSE Position Paper on Wind Turbines and Public Health, which is contrary to more recent advice issued by the HSE (details supplied); if the 2017 Position Paper has been formally withdrawn; if not, the reason it has not been withdrawn; and if she will make a statement on the matter”.***

Dr Éamonn J. O'Moore also included the following as an appendix to his letter outlining the HSE's updated position on Wind Farms

### **Changes in context and evidence**

The size, nature and location of wind turbine developments have substantially changed since the publication of the 2017 HSE Public Health position paper and the evidence base around any potential health impacts from these developments continues to evolve. The High Court Judgement in 2024 of WEBSTER and ROLLO v MEENACLOGHSPAR (WIND) LIMITED [2024] IEHC 136 [2018 8457 P] examined the protection of health during wind turbine operation and this judgement should be considered in any future wind turbine development.

It is the opinion of the HSE that the changed nature, size and location of wind turbines over the last 10 years warrants a comprehensive review of the current Department of Housing, Local Government and Heritage Wind Energy Development Guidelines (2006), which are the current guidance for assessing likely significant effects on health from wind turbine development. This review should include the most up to date evidence on likely impacts on Population and Human Health and the health protection standards that should be incorporated into any new guidance issued.

#### ***4.2.4.2 Statement of Authority:***

When we first heard of the proposed windfarm development for Cooloo, members of the local community came together, and a meeting was held. Numerous different subgroups were established from this meeting, one being the health committee. This local health committee consists of a dedicated group of concerned local citizens committed to safeguarding the health and well-being of our community. We have come together in response to the proposed wind farm development, which we believe poses significant risks to the health and safety of our residents. We have spent the past 18 months collecting, researching and analysing information in relation to the health effects from wind turbines. Our mission is to ensure that the voices of our community are heard, and that all potential impacts on our health, environment, and quality of life are thoroughly considered before any decisions are made.

Included in our committee are several health care professionals, with vast collective knowledge and experience in the complexities of human health:

Most importantly, the members of this local health group are all parents, who want their children to live healthy and happy lives, fully integrated within the local community. We have consciously chosen to bring our children up in a rural location in the West of Ireland, in the hope of giving them a calm, safe and peaceful childhood, surrounded by nature. We sincerely hope that our concerns regarding the potential health impacts of the proposed windfarm are given due consideration, as we advocate for a healthy and safe future for all families in our locality.

#### **4.2.4.3 Concerns in Relation to the “Experts” used by MKO**

We believe it is inappropriate for the applicant MKO to include the following health review: ‘Wind farms health and review’ (Chapman, 2015). It is not only outdated, but also authored by somebody entirely unqualified in this area of expertise. The individual in question, Simon Chapman, is a professor in sociology and not a qualified or registered medical practitioner or psychiatrist or psychologist or acoustician or audiologist or engineer or physicist. Studies and articles used in the Chapman review are out of date and predate the WHO guidelines ranging in years from 2001 to 2014. The most recent and up to date studies should be used to ensure the planning authority An Comisiún Pleanála can make a fully informed decision.

Simon Chapman has not medically assessed a single person. Questions were presented to him by senator John Madigan on June 29<sup>th</sup> 2015 at a public hearing on energy producing turbines: *“Have you ever visited the home of anyone claiming to be adversely effected by proximity to wind turbines and if not ,why not?” Chapman replied that “ No, I have not visited any such homes. Here is why. There are many people who passionately believe in things that I do not believe in. For example, every week many thousands use lottery number selections systems in the firm belief that this will increase their chances of winning the lottery; 51 per cent of Britons believe in aliens; a majority of the population believe in the supernatural and life after death; and whole religions believe in reincarnation. I do not need to talk personally to any of these people or visit their homes in order to corroborate the information that I can obtain from a variety of sources which tells me clearly that these beliefs are irrational and in fact nonsense or faith- based beliefs”.*

It is entirely inappropriate for MKO to put forward Simon Chapman as an “expert” in the field, simply to suit their own narrative. He is unqualified, and his assertions are based solely on his own opinions, which is completely at odds with best practice in healthcare.

#### **4.2.4.4 Growing Evidence of Health Impacts**

Within their application, the planners stated that *“the proposed project will have no effects in terms of health and safety and There is no credible scientific evidence to link wind turbines with adverse health effects”*. However, in Ireland, there have been numerous high profile court cases which will be highlighted in this submission.

In 2017, a Cork-based wind energy company, Enercon wind farm services Ireland Ltd, accepted in the high court that its wind farm ‘Carrigannon windfarm ltd’ has caused nuisance damage to 7 neighbouring families, and formally admitted liability to the court.

More recently, in 2022, there was a case in Cork where 2 young siblings became ill while they were forced to live near a wind farm. The siblings claimed they and their parents had to leave their family home in Cork, several months after a 10 turbine wind farm went into operation.

They claimed the noise, vibrations and shadow flicker from the turbines resulted in them suffering from various illnesses, and the case was subsequently settled outside of court.

In a landmark decision in Ireland on the 8<sup>th</sup> of March 2024 a high court judge Ms Justice Emily Egan found that levels of noise generated at certain times of the day by a wind farm constitutes a nuisance to the occupants of neighbouring properties. This being the two turbine Ballyduff windfarm at Kilcomb near Enniscorthy co Wexford. Meenacloghspar Wind Limited owned the turbines. Ms Justice Egan stated it amounted to “unreasonable interference” with the enjoyment of the couple’s property and they were therefore entitled to damages. Judge Justice Emily Egan also visited the turbine site and the properties and stated that it is *“widely acknowledged to be associated with high levels of annoyance”* and have *“a characteristic known to lead to adverse reaction in the community”* She also accepted that in this case such noise levels from this wind farm *“occurs commonly and for sustained periods”*. Judge Egan also stated: *“I find that the plaintiffs’ complaints are objectively justified in that the noise interferes with the ordinary comfort and enjoyment of their homes, when it occurs, this interference is a substantial interference”*.

With regards to the proposed Cooloo wind farm, we are concerned that the guidance followed in this application shows the likely potential for the occurrence of nuisance, considering there will be 9 turbines instead of 2 as in the Ballyduff high court case.

The Collective have genuine fear and anxiety about the health effects of the windfarms, Barnaderg/ Moylough). Reports of nausea, headaches, tinnitus, high blood pressure, and vertigo from people living close to wind farms are common in Ireland and other countries. This is further exacerbated by the cumulative impact of both audible and inaudible sound from the turbines.

In November of 2023, the Midland Tribune newspaper published an article detailing the troubling experiences with noise and shadow flicker for residents living close to the Cloghan Wind Farm in County Offaly, a windfarm which first started operating 12 months previous. The article stated how three children living near the windfarm have sensory issues and are being badly affected by the shadow flicker from the wind turbines. One resident in the article said that “Even having a cup of tea in your garden is no longer a pleasure because of the flicker and the noise.”

The words of another resident from the article should scare the living daylights out of us all – “Some nights, the noise from the turbines is brutal. It’s keeping us awake and we are not getting proper sleep. Our experience of the farm has been negative from day one. If we had known this would happen then we wouldn’t have allowed it to go ahead: we would have blocked the road.”

<https://www.offalyexpress.ie/news/midland-tribune/1350950/cloghan-residents-say-local-wind-farm-is-affecting-their-physical-and-mental-health.html>idents say local Wind Farm is affecting their physical and mental health - Offaly Live

#### **4.2.4.5 Key Points**

- No quantitative baseline for health, air, or well-being indicators; human health is treated as derivative of physical effects, contrary to EPA §3.5.4.
- Noise thresholds rely on WEDG 2006/ETSU-R-97, not WHO 2018  $\leq 40$  dB Lnight.
- Traffic-phase exposure near both schools unquantified; no pedestrian risk modelling.
- Peat stability and emergency scenarios lack human safety risk modelling.
- No cumulative or equity (vulnerable group) analysis provided

## 4.2.5 Air Quality

The EIAR claims the following:

- Dust generation will be “slight to moderate.”
- Construction traffic emissions can be screened out
- No significant air-quality impacts on human health.
- No effects on ecological receptors or European Sites.
- No monitoring required beyond “visual checks.”

None of these statements is supported by evidence. The EIAR presents zero measured data and zero modelling, so its conclusions are unfounded and non-compliant.

Sensitive Receptors Omitted - Cooloo and Brierfield National Schools lie within the dust impact zone and directly on the haul route. No air-quality assessment is provided for:

- Schoolgrounds
- Play areas
- Indoor infiltration
- Neurodivergent or photosensitive children
- Households with migraine sufferers

This is a clear breach of EPA EIAR §3.4.2 and WHO 2021 guidance.

Chapter 10 fails to assess impacts on children, elderly persons, individuals with asthma, migraine conditions, ADHD, or sensory sensitivities and persons with pre-existing respiratory issues.

EPA 2023 emphasises that vulnerable populations experience disproportionate health impacts at lower pollution levels.

Construction heavy-vehicle emissions (diesel PM<sub>2.5</sub>, NO<sub>2</sub>) were not modelled for these sensitive receptors:

- Barnaderg National School School catchment
- Moylough NS School catchment
- Brierfield NS
- Cooloo NS
- Bus stop areas where children gather

## 4.2.6 Electromagnetic Fields (EMFs)

The presence of electromagnetic fields generated by wind turbines has raised concerns about potential health effects.

Although scientific evidence regarding the adverse health impacts of EMFs is inconclusive, it is essential to address these concerns by conducting thorough studies and adhering to precautionary principles. Monitoring and mitigation measures, in line with relevant international standards, should be implemented to ensure the safety of nearby residents.

In addition to these concerns, it is crucial to consider the relevant EU case law regarding wind farms and their potential health impacts. The European Court of Justice has addressed similar concerns in various cases, emphasizing the importance of a precautionary approach and the need for a comprehensive assessment of potential health effects.

## 4.2.7 Light Pollution

The red lights atop each wind turbine are put in place to alert passing aircraft and pilots at night of their presence.

The red-light beacons on wind turbines are a significant concern for the people living in close proximity to the proposed Wind Farm, which is a light pollution-free zone in the middle of the peaceful countryside of County Galway.

The intermittent flashing of 9 beacons as the blades pass by would be out of character for our area and create a nuisance for people living both near and far. Additionally, these beacons can disrupt local wildlife, including birds and bats, which may be attracted to or disoriented by the lights. This can lead to the deaths of such animals.

Below is a screenshot taken from a video that was recorded by a member of the Clonberne Windfarm Action Group in 2023.

The wind turbine in the screenshot is part of the Cloghan Wind Farm in County Offaly. These wind turbines are 169 metres at the blade tip height.



## 4.3 Biodiversity

### 4.3.1 General

As residents and landowners in Cooloo and Barnaderg, the Collective are opposed to the proposed Cooloo Wind Farm because of its significant and permanent impact on biodiversity. The project's Environmental Impact Assessment Report (EIAR) acknowledges a residual adverse effect on Degraded Raised Bog (habitat 7120), a habitat of County Importance with capacity for natural regeneration (EIAR Ch. 6, SEC 6.5.2.1.2). Construction of the proposed floating access road between turbines T7 and T9 will directly remove approximately 0.18 ha of this sensitive peatland and disrupt its hydrological balance (EIAR Ch. 6, Sec. 6.5.2.1.2), contrary to the conservation obligations set out under the EU Habitats Directive (92/43/EEC).

The site also supports cutover bogs (PB4) and Marsh Fritillary (*Euphydryas aurinia*), an Annex II species protected under European law. Breeding webs were recorded near turbine T5 within metres of proposed construction works (EIAR Ch. 6, Sec. 6.4.3.3). The disturbance, dust, and drainage changes associated with turbine and road construction threaten the species' survival locally, directly conflicting with Ireland's duty to maintain favourable conservation status for Annex II species.

Further, the EIA highlights potential effects on hydrology and connected wetland systems that could degrade otter (*Lutra lutra*) habitat and aquatic fauna (EIA Ch. 6, Sec. 6.5.2.1.1 and 6.2.2). These outcomes are inconsistent with the objectives of the National Biodiversity Action Plan 2023–2030, which seeks to prevent net biodiversity loss.

## References

- An Coimisiún Pleanála -. (2022). 323761. Available at: <https://www.pleanala.ie/en-ie/case/323761>

### 4.3.2 Flora & Fauna

The Collective captured a range of photographs and videos since the start of 2024 which were taken and recorded in Cooloo Bog and the surrounding Townlands [REF USB No1 and USB No2]

The photos capture the diverse flora and fauna present in the area directly impacted by the proposed development. The images provide visual evidence of the ecological sensitivity of the site, including plant life, wildlife habitats, and biodiversity features that may be disrupted by construction activities.

These videos document real-time observations of the local wildlife, environmental conditions, and natural behavior patterns within the bog ecosystem. They show the presence of protected and sensitive species that may be affected by turbine installation and the construction of a floating road.

The photographs and videos collectively demonstrate the ecological significance of Cooloo Bog. They highlight:

- The presence of native and potentially protected species.
- The natural habitat that will be disrupted by heavy machinery, construction traffic, turbine installation, and road engineering.
- The importance of preserving the intact bog ecosystem and local biodiversity.

This evidence is submitted to support concerns regarding the environmental impact of the proposed wind farm and associated infrastructure, and to reinforce the need for careful ecological consideration in planning decisions.

### 4.3.3 Wildlife and Nature

**The National Parks and Wildlife Act, 1976 and the Wildlife (Amendment) Act 2000** provide legal protection for various species of wildlife including butterflies and their habitats. The purpose of this legislation is to protect individual species and to ensure that their habitats are preserved to maintain biodiversity.

Irish Case law has recognized the importance of protecting vulnerable species such as butterflies. According to the **Irish Biodiversity Act 2002**, *“every person has a duty to protect biodiversity”* and the **EU Habitats Directive recognizes the importance of protecting bees and their habitats**, which are considered to be protected species and habitats.

**The Wind Energy Development Guidelines 2014, which are based on EU Directive 2009/28/EC, state that “an assessment of impacts on biodiversity, including impacts on habitats, species and their specific requirements, shall be carried out and measures proposed to avoid, reduce and, if necessary, offset the impacts”.**

The countryside in County Galway is populated by many animals and plant species.

The pine marten, Marsh Fritillary butterflies, whooper swans, snipes, hen harriers, bats, bees, otters, badgers and other animals frequent the site of the Cooloo Windfarm.

Plants like sphagnum moss, bog bean, bog cotton, foxglove, ling heather furze and yellow brain can be found around the site.

Many species that nest in Lavally Lough, Lakeview Lough and Glenamaddy Lake regularly fly onto and over the windfarm site. These species are all protected by the EU Habitats Directive and the EU Birds Directive.

All three aforementioned watercourses are designated SACs (Special Area of Conservation). There is an abundance of perfect habitat for various species of birds, from bog to wet grasslands, located on the site of the proposed windfarm. Much of this will be destroyed during both construction and operation of the windfarm.

## 4.3.4 *Inadequate Assessment of Bat Mortality Risk and Acoustic Monitoring Standards*

### 4.3.4.1 *Introduction*

Wind turbines are well-documented sources of bat mortality, primarily through collision and barotrauma. The accuracy and reliability of bat impact assessments depend critically on the monitoring methods and standards employed.

Recent peer-reviewed research has clarified that only standardised and validated acoustic monitoring systems can provide reliable estimates of bat fatalities at wind energy sites. This evidence, summarised below, has direct implications for the adequacy of the Environmental Impact Assessment (EIA) and mitigation commitments for the Cooloo project.

### 4.3.4.2 *Scientific Evidence*

#### **Reference:**

Behr, O., Brinkmann, R., Mages, J., Niermann, I., Korner-Nievergelt, F., & Voigt, C. C. (2023). Standardised and referenced acoustic monitoring reliably estimates bat fatalities at wind turbines. *Mammal Review*, 53(1), 65–71.

<https://doi.org/10.1111/mam.12302>

### 4.3.4.3 *Key Findings:*

- Bat fatalities at wind turbines are a major conservation issue, requiring accurate and standardised monitoring.
- Traditional carcass searches significantly underestimate actual mortality due to scavenger removal, weather, and limited detectability.
- Acoustic monitoring (recording bat calls near the nacelle or turbine hub) provides a reliable and continuous method of estimating bat fatalities — but only when standardised and referenced models are used.
- The authors confirm that properly implemented acoustic monitoring (e.g. using the ProBat system, based on 65,000 detector-nights of data) accurately predicts bat fatalities and supports effective curtailment strategies.
- Each new turbine type and site must be individually validated, as turbine height, rotor diameter, and local conditions can alter the relationship between acoustic activity and actual collisions.

- The study concludes that standardised acoustic monitoring is both scientifically valid and essential for responsible wind energy development.

#### **4.3.4.4 Relevance to the Cooloo Wind Farm Proposal**

The Cooloo Wind Farm EIA does not demonstrate that monitoring or mitigation measures meet the scientific standards described by Behr et al. (2023). Specifically:

- There is no evidence of standardised, referenced acoustic monitoring being undertaken at nacelle level prior to or planned after construction.
- Ground-level acoustic surveys and short-term transects, if relied upon, are insufficient and cannot predict turbine-specific collision risk.
- The turbines proposed for Cooloo are tall and large-rotor models — conditions under which collision risk and monitoring uncertainty increase, as acknowledged by Behr et al. (2023).
- The EIA does not commit to the use of validated curtailment systems (such as ProBat or similar), which have been shown to substantially reduce bat mortality.

In the absence of site-specific validation and continuous monitoring, bat fatalities may be severely underestimated, leading to breaches of obligations under the EU Habitats Directive (Articles 12 and 16) and national biodiversity protection requirements.

#### **4.3.4.5 Policy and Compliance Context**

Under the Habitats Directive and the Wildlife Acts 1976–2018, all Irish bat species are strictly protected. Developers and planning authorities have a legal duty to ensure that projects do not result in the deliberate killing or disturbance of bats or the deterioration of their breeding or resting sites.

The absence of a scientifically robust, standardised acoustic monitoring plan therefore represents a significant procedural and ecological shortcoming in the current proposal.

#### **4.3.4.6 Recommendations to An Coimisiún Pleanála**

*In line with the findings of Behr et al. (2023) and the relevant EU and Irish biodiversity legislation, the Collective respectfully request that An Coimisiún Pleanála require the following conditions prior to any decision on Planning Application 323761:*

- The developer must undertake standardised, referenced acoustic monitoring following international best practice (as defined by Behr et al., 2023).

- Nacelle-mounted, calibrated detectors must be installed to monitor bat activity continuously throughout operation.
  - Validated curtailment systems (e.g. ProBat or similar) must be implemented to automatically shut down turbines during periods of high bat activity.
  - All monitoring protocols and data should be independently reviewed and publicly reported as part of ongoing environmental compliance.
  - A precautionary approach should be applied — including temporary curtailment during high-risk seasons — until adequate local reference data are available.
- Example Policy Basis - Recent peer-reviewed research (Behr et al., 2023, Mammal Review, 53: 65–71) confirms that bat fatalities at wind turbines can be reliably estimated only where referenced, standardised acoustic monitoring protocols are applied and continuously validated. The Cooloo Wind Farm application does not demonstrate that such validated systems will be used. Given the turbine size and likely bat activity in the area, this constitutes a serious deficiency in the Environmental Impact Assessment. An Coimisiún Pleanála should therefore require:
- The use of calibrated nacelle-mounted acoustic detectors and referenced models as described by Behr et al. (2023);
  - Implementation of real-time curtailment systems (e.g. ProBat); and
  - Independent verification of the acoustic data and mitigation effectiveness during operation.

#### **4.3.4.7 Conclusion**

The findings of Behr et al. (2023) make clear that accurate bat mortality estimation and mitigation depend on scientifically standardised acoustic monitoring. The current EIA for the Cooloo Wind Farm fails to demonstrate compliance with this requirement.

Given the potential for significant bat mortality and legal non-compliance with the Habitats Directive, it is essential that An Coimisiún Pleanála require robust, validated acoustic monitoring and adaptive curtailment measures as a precondition for any consent.

## 4.3.5 Impacts of Wind Turbine-Induced Vibrational Noise on Soil Biodiversity and Ecosystem Function

### 4.3.5.1 Introduction

A significant environmental concern that is not adequately addressed in the current Environmental Impact Assessment (EIA) documentation is the effects of subterranean vibrational noise from wind turbines on soil biodiversity and soil ecosystem function.

Recent peer-reviewed scientific research has demonstrated that wind turbine-induced vibrations transmitted through the ground can have substantial ecological consequences, particularly for soil organisms that are vital to maintaining healthy and productive land. These impacts are of direct relevance to both local landowners and the wider environment in the Cooloo area.

### 4.3.5.2 Scientific Evidence

#### Reference:

Velilla, E., Collinson, E., Bellato, L., Berg, M.P., & Halfwerk, W. (2021). Vibrational noise from wind energy turbines negatively impacts earthworm abundance. *Oikos*, 130(7), 1033–1047. <https://doi.org/10.1111/oik.08166>

#### Key Findings:

- **Wind turbines generate continuous low-frequency vibrations (< 500 Hz)** that travel considerable distances through soil.
- In the study, **vibrational noise decreased by only  $23 \pm 7$  dB over 200 metres**, showing that measurable vibration extends well beyond the turbine base.
- **Earthworm abundance declined by approximately 40% near turbines** compared to sampling points further away.
- **Smaller soil fauna** were unaffected, indicating a **body-size-dependent impact** that is especially harmful to earthworms and other large soil invertebrates.
- **Soil compaction and crop type were ruled out** as influencing factors, confirming that **vibrational noise was the primary cause** of the observed decline.

### 4.3.5.3 Ecological and Agricultural Implications

Earthworms are recognised as **critical “ecosystem engineers”** essential to soil health and agricultural productivity. A decline in their populations can lead to:

- Reduced **soil aeration and water infiltration**, increasing flooding and erosion risks.
- Disruption of **nutrient cycling and carbon sequestration**, undermining soil fertility and climate regulation.
- Deterioration of **soil structure and microbial balance**, impacting crop performance and long-term land viability.

These functions are especially important in **productive agricultural soils** such as those in the Cooloo area. A 40% decline in earthworm abundance, as demonstrated in the cited study, represents a serious ecological and agricultural risk.

#### ***4.3.5.4 Relevance to the Cooloo Wind Farm Proposal***

The Cooloo site shares characteristics with the farmland studied by Velilla et al. (2021) — **organically managed, rural, and composed of active agricultural soils**. The findings indicate that:

- **Vibrational impacts extend beyond 200 metres** from turbine bases, potentially affecting a large area of surrounding land.
- **Earthworm declines are not mitigated by soil type or land management**, meaning that standard farming practices cannot offset the effects.
- The **Environmental Impact Assessment submitted for Cooloo** does not address **subsurface vibrational noise** or its potential to degrade soil ecosystems.

This represents a **significant omission** in the assessment of environmental and agricultural impacts associated with the development.

#### ***4.3.5.5 Recommendations to An Coimisiún Pleanála***

Given the scientific evidence and the direct relevance of these findings to the Cooloo Wind Farm proposal, the Collective respectfully request that **An Coimisiún Pleanála require the following actions prior to any approval** of Planning Application 323761:

- ***Comprehensive assessment of soil-borne vibrational noise impacts, including baseline vibration monitoring and modelling of operational impacts.***
- ***Specific evaluation of effects on soil macrofauna, especially earthworms, across the affected area.***
- ***Establishment of protective buffer zones of at least 200–250 metres from turbine bases to high-value agricultural soils, wetlands, and sensitive habitats.***

- *Review of turbine design and foundation specifications to incorporate vibration-dampening measures.*
- *Inclusion of soil biodiversity indicators in post-construction environmental monitoring and compliance reporting.*

#### **4.3.5.6 Conclusion**

The evidence provided by Velilla et al. (2021) demonstrates that vibrational noise from **wind turbines significantly reduces earthworm abundance**, with likely cascading effects on soil health, water regulation, nutrient cycling, and carbon storage.

Given the agricultural nature and ecological importance of soils in the Cooloo area, these findings are highly relevant and warrant detailed assessment before any decision to grant permission. The Collective therefore urge **An Coimisiún Pleanála** to ensure that **subsurface vibrational impacts on soil biodiversity and ecosystem function** are fully examined and mitigated as part of the planning process for this development.

## 4.4 Land, Soils and Geology

### 4.4.1 Peatlands

Raised bogs can store carbon for thousands of years. When considering climate action and sequestering carbon, the West of Ireland has thousands of ready-made storage facilities for carbon in our peatlands. Cooloo is no different. There are several raised bogs, one of which is located right beside one of the proposed turbines for the Cooloo Windfarm. Parts of the bog will be dug up during the construction of these wind turbines and carbon released into the atmosphere.

The ground under the Bogs are made up of karst limestone, a type of landscape where the dissolving of the bedrock has created sinkholes, sinking rivers, springs and caves.

Thousands of tonnes of peat and trees were displaced during a peat slippage close to Meenbog Windfarm in Donegal (image below) in 2020. The Collective do not want this to happen in Cooloo, because there is a very real chance it will happen if the windfarm project goes ahead.



Source for above image – Irish Farmers Journal. (2020) Watch: thousands of tonnes of peat and trees slide downstream in Donegal. Available at:

<https://www.farmersjournal.ie/news/news/watch-thousands-of-tonnes-of-peat-and-trees-slide-downstream-in-donegal-584016>

Please note that Video of the bog slide is also on USB No2 submitted as part of this submission.

#### 4.4.2 Floating roads on peat are recognised internationally as high-risk and failure-prone

Independent guidance prepared for Scottish Natural Heritage and the wind energy industry (“Floating Roads on Peat – A Report into Good Practice in Design, Construction and Use of Floating Roads on Peat with particular reference to Wind Farm Developments”, Forestry Civil Engineering, 2010) was commissioned specifically to review “successes and failures” of floating roads on peat. Its very existence acknowledges that such roads have a record of instability and failure, not just success.

Similarly, the “Guidelines for the Risk Management of Peat Slips” (MacCulloch, 2006) make clear that:

- The characteristics of peat vary enormously at short distances.
- A risk-free, low-cost road over peat is unrealistic.
- All parties constructing roads over peat should expect failure and plan to manage it.

International guidance therefore does not support the idea that floating roads on peat are a low-risk mitigation measure; they are inherently high-risk engineering interventions in sensitive environments.

#### 4.4.3 Floating roads tend to subside and become drains, damaging bog hydrology

The IUCN UK Peatland Programme briefing on tracks across peatlands notes that, over time, “floating roads” frequently settle into the peat mass, becoming “sunken roads.” These then act as linear drains across the bog and form distinct shear planes, even if they later overgrow. This threatens the hydrological integrity of intact raised bogs that depend on diffuse surface flows, not on linear drainage channels.

The Cooloo EIA itself admits that the proposed floating road to T7 crosses approx. 0.6 km of intact raised bog, and will cause significant alteration of surface water flowpaths and long-term hydrological effects within 50–100 m of the road alignment.

Yet elsewhere (Chapter 18), the same EIA presents the floating road as a “mitigation by design” measure that “minimises impact on the peat, particularly peat hydrology.” These positions are inconsistent and contradict both independent guidance and the EIA’s own analysis.

#### 4.4.4 Intact raised bog is a highly sensitive, irreplaceable receptor

The EIAR describes the road crossing an area of intact raised bog, with semi-intact bog habitats adjacent. Intact or near-intact raised bogs are:

- Priority habitats under EU legislation.
- Long-term carbon stores and active carbon sinks.
- Increasingly rare and under restoration across Ireland and the EU.

Guidance emphasises that even bogs without formal designation remain highly sensitive to track construction. The proposed floating road will directly and permanently damage an irreplaceable bog system.

#### 4.4.5 Design and risk assessment lack sufficient detail

The EIAR and Schedule of Mitigation defer detailed drainage and road design until post-consent. Experience from Ireland and the UK shows floating roads are often empirically designed and still experience localised peat movement and instability, which climate change will likely worsen. This approach lacks the transparency and assurance required for such high-risk development.

#### 4.4.6 Alternatives have not been adequately considered

Given the acknowledged significant and long-term impacts on intact raised bog and the wealth of guidance cautioning against roads in peatlands, alternatives should be fully explored. The application does not demonstrate that alternative routes or turbine positions were considered to avoid the intact bog entirely.

#### 4.4.7 Conclusion and requested outcome

The proposed floating access road presents an unacceptable risk of peat instability, long-term hydrological damage, and loss of carbon and biodiversity. The EIAR's reliance on "floating road design" as mitigation is inconsistent with independent research and best practice, which consider such roads inherently unstable and damaging over time.

The Collective therefore request that the planning authority refuse permission for any floating road or permanent access track across intact raised bog in this location, or require a fundamental redesign of the project layout to avoid this area entirely.

#### 4.4.8 References

- Forestry Civil Engineering (2010). "Floating Roads on Peat – A Report into Good Practice in Design, Construction and Use of Floating Roads on Peat." Scottish Natural Heritage. Available at: <https://www.roadex.org/wp-content/uploads/2014/01/FCE-SNH-Floating-Roads-on-Peat-report.pdf>
2. MacCulloch, F. (2006). "Guidelines for the Risk Management of Peat Slips." Scottish Executive.
  3. IUCN UK Peatland Programme (2014). "Tracks across Peatlands – Key Findings." Available at: <https://www.iucn-uk-peatlandprogramme.org>
  4. Roadex Network (2012). "Roads on Peat: Engineering Insights." Available at: <https://www.roadex.org/wp-content/uploads/2014/01/3.-Roads-on-Peat-R-Munro.pdf>
  5. Forest Research (2013). "Overlay roads... unstable and may settle or subside." Forestry Commission Technical Note 20.

#### 4.4.9 Relevant EU Case Law: Derrybrien Wind Farm (C-215/06 and C-261/18)

The risks associated with constructing major wind farm infrastructure – including floating roads – on peatlands are well-documented in EU case law.

In Case C-215/06, Commission v Ireland (Derrybrien Wind Farm), the Court of Justice of the European Union (CJEU) held that Ireland breached the Environmental Impact Assessment (EIA) Directive (85/337/EEC) by allowing a large wind farm on peat-covered slopes at Derrybrien, Co. Galway to proceed without an adequate EIA. A catastrophic peat slide occurred in October 2003 during road construction, mobilising approximately 450,000 cubic metres of peat and killing an estimated 50,000 fish. The European Commission described this event as "environmentally devastating."

In Case C-261/18, Commission v Ireland (Derrybrien Wind Farm), the CJEU again found Ireland in breach for failing to comply with the 2008 ruling and imposed a €5 million lump-sum fine and a daily penalty of €15,000 until compliance was achieved.

Subsequent geotechnical documentation for the Derrybrien project (in the revised EIAR for substitute consent) explicitly acknowledges that "failures of floating road resulting in peat slides have occurred on the project." Independent analysis (Lindsay, 2004) also highlights

that floating “undrained” roads and associated drainage were contributing factors in destabilising the peat mass that led to the slide. If drainage were to be used as a mitigation measure it would result in increased emissions of Carbon from peatland and thus impact on LULUCF sectoral emissions. as described in section 4.5.

These judgments illustrate the significant environmental and legal consequences of inadequate assessment and risk management when constructing floating roads on peat. Ireland has already been sanctioned twice by the CJEU for such failures. Approving a similar floating road across intact raised bog at Cooloo would be inconsistent with the precautionary principle and contrary to the objectives of the EIA and Habitats Directives.

#### **4.4.9.1 References (EU Case Law)**

1. Court of Justice of the European Union, Case C-215/06, Commission v Ireland (Derrybrien Wind Farm), Judgment of 3 July 2008. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62006CJ0215>
2. Court of Justice of the European Union, Case C-261/18, Commission v Ireland (Derrybrien Wind Farm), Judgment of 12 November 2019. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62018CJ0261>
3. Lindsay, R. (2004). “Wind farms and blanket peat – The Derrybrien Bog Slide.” Report to Friends of the Irish Environment.
4. Revised EIAR for Substitute Consent, Derrybrien Wind Farm (2018), Chapter 7: Geology, Soils and Land – noting “failures of floating road resulting in peat slides.”
5. Video clip on USB No2 of a Bog depth Test carried out on 25/10/2025

## **4.5 Carbon Impact**

The proposed Cooloo Wind Farm would damage Ireland’s ability to meet its climate targets under the Climate Action and Low Carbon Development Act 2021.

Under Section 6A (2) of the Climate Action and Low Carbon Development (Amendment) Act 2021, all public bodies, including planning authorities and An Coimisiún Pleanála, are required to “perform their functions in a manner consistent with the most recently approved carbon budgets and sectoral emission ceilings.” These ceilings apply equally to the Energy and Land Use, Land Use Change and Forestry (LULUCF) sectors. The Act does not permit the State or any of its agencies to prioritise one sectoral target over another.

The proposed development would involve extensive peat excavation, drainage, and the permanent removal of carbon-dense soils and forestry. Such activities fall under the LULUCF sector, which currently represents a net national source of approximately 7.4 Mt CO<sub>2</sub>e per year (EPA National Inventory Report, 2024). Any further increase in LULUCF emissions would undermine Ireland's ability to comply with its obligations under Regulation (EU) 2018/841 (the LULUCF Regulation), which establishes the legally binding "no-debit rule" (Article 4) requiring that emissions from land use must not exceed removals.

Furthermore, Regulation (EU) 2021/1119 (the European Climate Law) and the Climate Action and Low Carbon Development Act 2021 require that all sectors contribute proportionately toward the legally binding target of net zero by 2050 and a 51 percent reduction by 2030. There is no legal mechanism allowing renewable-energy expansion to offset increased land-use emissions. The Planning and Development Act 2000 also obliges decision-makers to consider consistency with national climate law and EU environmental directives.

Approval of a project that increases LULUCF emissions without demonstrable mitigation (e.g., full peat rewetting and long-term carbon recovery) would therefore be contrary to Section 6A(2) of the 2021 Act and inconsistent with Ireland's obligations under Articles 4–5 of Regulation (EU) 2018/841 and Article 4 of Regulation (EU) 2021/1119.

The deforestation of a mature forest in the process of developing this wind farm will increase the emissions from the LULUCF sector and although this will be partially mitigated by establishment of native woodland, it will increase the sectoral emissions by 2030 and result in Climate change related fines and penalties. Additionally, it will place a greater burden on landowners to meet these targets and may result in a reduction in their rights through future mandatory rewetting of peatlands or reduction in livestock numbers impacting on farm succession and viability for example.

## References

- Climate Action and Low Carbon Development (Amendment) Act 2021, ss. 6A–6C, Government of Ireland.
- Regulation (EU) 2018/841, on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, Arts. 4–5.
- Regulation (EU) 2021/1119, European Climate Law, Art. 4.

- Environmental Protection Agency (2024), Ireland's National Inventory Report 1990–2022, Chapter 6 (LULUCF sector emissions).
- Planning and Development Act 2000 (as amended), Part X and s. 34(2)(aa).
- Court of Justice of the European Union:
  - a. Case C-323/17 — People Over Wind and Peter Sweetman v. An Coimisiún Pleanála (Judgment of 12 April 2018).
  - b. Case C-457/18 — Inter-Environment Wallonie and Bond Beter Leefmilieu Vlaanderen ASBL v. Council of Ministers (Judgment of 25 June 2019)

## 4.6 Hydrology and Hydrogeology

### 4.6.1 Impact on Water Schemes

There are three Water Schemes within the proposed Cooloo Windfarm

- **Mid Galway Public Water Scheme**
- **Brierfield Group Water Scheme**
- **Barnaderg Gortbeg Group Water Scheme**

Brierfield and District GWS's Spring at Pollifrin is considered to be part of the same zone of contribution (ZOC) as the Mid Galway PWS and Barnaderg Gortbeg GWS as they all form part of the same groundwater flow system. EPA report Establishment of Groundwater Source Protection Zones - Mid Galway Public Water Supply Scheme (May, 2012).

However, there is no mention of the Brierfield and District GWS in Chapter 9 section 9.3.15.1 Public/Group Water Schemes.

The water is currently of excellent quality, and the Collective is very concerned that pollution of various types such as silt, sediment and other contaminants will enter the water source, causing families harm.

With the location of two turbines and the proposed construction compound within the Source Protection Area (SPA) the Cooloo Windfarm should not be granted permission whatsoever, especially in such a highly karstified and hydrologically sensitive area.

It should be noted that 50ha of the proposed windfarm is within this Source Protection Area (SPA) for the above named schemes

## 4.6.2 River Pollution

It is expected that there will be considerable runoff of sediment and other contaminants from the construction of this wind farm into the rivers.

Suspended solids can float a large distance downstream, clog fish gills and completely destroy spawning beds.

The IUCN (International Union for Conservation of Nature) has classified Atlantic Salmon as endangered and on its red list. These are very productive spawning beds and there is no doubt that this development will lead to their destruction and form a blanket of sediment that will cover them for quite a long distance.

Drilling chemicals such as bentonite destroy watercourses. Bentonite can smother aquatic habitats by settling on the bottom of water bodies. Sedimentation can cover fish eggs, macroinvertebrates, and aquatic plants, disrupting the life cycles of these organisms and reducing biodiversity.

Various mitigations have been provided but research states that they are often ineffective and often poorly maintained. The water status of our rivers is under great scrutiny currently and needs to be improved not worsened.

Therefore, if permitted as proposed, the development has the potential to adversely affect the qualifying interests and conservation objectives of protected European sites for flora and fauna and would materially contravene Policy Objectives NHB1, NHB2 and NHB3 of the Galway County Development Plan 2022-2028 and the requirements of the EU Habitats Directive.

The Collective is concerned about the integrity of salmon spawning beds located on and close to this proposed site on the Lavally stream and Grange River.



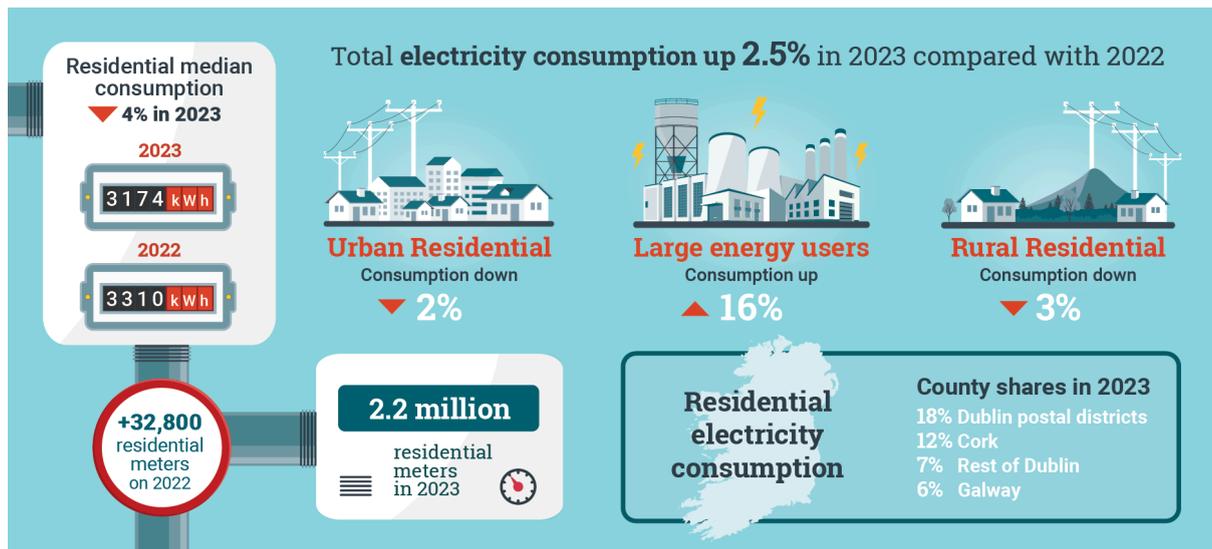
Plate 3.4 Atlantic salmon parr (top right) and mixed-cohort brown trout recorded from site B1 on the Lavally Stream, August 2021

## 4.7 Climate

In terms of Ireland energy sectoral emissions a large proportion is ascribed to large energy users such as data centers. The carbon emissions created by this sector can be accredited to the global citizen through large multinational social media companies but it's Ireland's citizens which must pay the societal cost. The CSO infographic below demonstrates that Ireland's urban and Rural residential consumption had dropped from 2022 to 2023, while its large energy users increased dramatically by a whopping 16%. In a society which is about to undergo exponential growth in the use of artificial intelligence and the associated demand for energy it seems futile that Ireland will ever meet its targets using wind energy and in the process decimate any remaining habitats in the middle of a biodiversity crisis.



## Metered Electricity Consumption 2023/2022



## 4.8 Noise and Vibration

### 4.8.1 One of 5 Windfarms within a 25km radius

There are more than 300 onshore windfarms in Ireland. The CSO stated that data centres consumed 21% of the electricity produced in Ireland in 2023, more than all urban Irish households combined. Wind farm projects within 25km of the Proposed Wind Farm are summarised in Table 7-12. This table includes details of their planning status, number of turbines and distance from the Proposed Wind Farm site.

*Table 7-12 Wind energy applications within 25km of the Proposed Wind Farm site*

Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)
Clonberne Wind Farm	Proposed	11	~5.2km
Cloonascragh Single Turbine	Permitted	1	~10.4km
Clooncon East Single Turbine	Existing	1	~16.2kmm
Cloonlusk Wind Turbines	Existing	2	~7.8km
Gannow Wind Farm	Proposed	8	~18.4km
Laurclavagh Wind Farm	Proposed	8	~17.4km
Park Athenry Single Turbine	Existing	1	~18.6km
Shancloon Wind Farm	Proposed	11	~21.3km

These are only the developments in planning or currently operational. There is a lot more windfarms anticipated to go into planning for East Galway. The cumulative effect of having all of these proposed windfarms located within miles of one another will be negative, in terms of exposure to noise and the associated health issues that can arise.

### 4.8.2 Noise

***“Infrasound and Low Frequency Noise Low frequency noise is noise that is dominated by frequencies less than 200 Hz. It is audible to the human ear, can travel large distances and is difficult to attenuate. Infrasound is typically described as sound at frequencies below 20 Hz. This is below the threshold of human hearing.” – Dr***

Mariana Alves Periera, Associate Professor at Lusófona University teaching Biophysics and Biomaterials in health science programs (nursing and radiology), as well as Physics and Hygiene in workplace safety & health programs.

The low frequency part of the ear is very sensitive to infrasound, which is a low frequency noise that travels through the air. It cannot be heard and is not related to the loudness of the sound that you hear.

Large commercial wind turbines are responsible for the strongest infrasound. The blades of a wind turbine sweep an area bigger than a football field. As the wind turbines get bigger, the amount of low-frequency noise they generate gets higher.

The 'swhoosh' sound a wind turbine creates can be highly detrimental to a person who has a home downwind from it. One of the main ways to affect a person's health is to disrupt their sleep pattern.

Infrasound can lead to many ailments in adults and children, such as: tinnitus, vertigo, migraines, nausea, vomiting, insomnia, changes in blood pressure, breathing issues, and balance. Infrasound can cause a person's anxiety to heighten.

***“When windfarms are next to people’s homes, there definitely are problems associated with the infrasound they make. It is wrong to dismiss those problems and not do anything about it”.*** – Alec Salt, PhD, scientist in the Department of Otolaryngology at Washington University School of Medicine.

The High Court judgement of Judge Emily Egan last March was significant and positive. The Judge ruled that the Ballyduff Windfarm in Wexford had caused noise disturbance to two couples who had lived close to it. One of the couples had been living 359 metres away from the windfarm.

#### 4.8.3 Huson & Associates - Peer Review of Proposed Ballyinsky Windfarm

Included in APPENDIX 1 is a report carried out by Huson & Associates for the Coolcappa Community Action Group in relation to the proposed Ballynisky Windfarm in County Limerick. Consent has been granted from the Coolcappa Community Action Group for inclusion in this submission. While the report is not directly done for Cooloo Windfarm, the issues identified are applicable to all windfarms.

## 4.9 Shadow Flicker

**Chapter 5 of the EIAR ('Population and Human Health') states that the nearest occupied residential property is 726 metres away from the closest wind turbine.**

The Wind Energy Guidelines of 2006 advise a setback distance between a wind turbine and a house of 500metres. These guidelines are 19 years old.

The 2019 Draft Wind Energy Development Guidelines suggest a mandatory minimum setback distance of 500 metres between a wind turbine and the nearest residential property, and 4 times the tip height, whichever is greater.

Shadow flicker, caused by the rotating blades of wind turbines casting intermittent shadows, can have a significant impact on nearby residents. Prolonged exposure to these flickering shadows can cause visual discomfort, headaches, and even trigger migraines in susceptible individuals. Adequate setback distances and screening measures should be implemented to minimize the potential health effects associated with shadow flicker.

The shadow flicker from the 9 wind turbines of the Cooloo Windfarm would extend to 1.8kms, or 10 times the blade tip height of 180metres. It would take in many homes along with the GAA Grounds, the National School and other amenities.



(Source for above image) – Energy Live News. (2011) *DECC sheds light on turbine shadow*. Available at: <https://www.energylivenews.com/2011/03/16/decc-sheds-light-on-turbine-shadow/>

## 4.9.1 Impact of Wind Turbines on the Neurodiverse within the Community

It has been noted in many studies and by senior planning inspectors working for An Coimisiún Pleanála that wind turbines have negative impacts on those who are neurodiverse. I am concerned that children and adults living in the community with pre-existing medical conditions would be disproportionately impacted by the noise and shadow flicker from wind turbines.

A study by Howell (2015) on the noise impact on persons with autism claims that these vulnerable individuals are more affected than the general population. *'The introduction of a new noise source into the environment, such as that from industrial wind turbines, has resulted in complaints relating to sleep disruption'*. It is also noted that *'chronic sleep loss can lead to neuronal and cognitive loss in children although this is generally unrecognized by the medical profession and the public.'* It also found that *'The additional noise and low-frequency sound produced by the wind turbines may add to the burden of environmental noise that the ASD population is already coping with, including exposures at home and at school.'*

The neurodiverse community are less able to filter noises than the neurotypical, and as a result noise and LFN will impact on them. The neurodiverse can exhibit pain and panic reactions related to sound and living with this daily would, no doubt, result in loss of quality of life and difficulty concentrating. This would then have an impact on the children within the community in particular as it would impact their education as a number of the local schools have children who are neurodiverse. In particular one school, Brierfield NS, has a special class for children with Autism. A senior planner for ACP stated in 2015 that there are significant impacts on facilities catering for children with additional educational needs, rendering some unviable as a result and a large-scale windfarm would undermine the therapeutic benefits of facilities providing support to the neurodiverse.

In relation to shadow flicker Cristina Becchio, Morena Mari, Umberto Castiello (2010) states that those on the autistic spectrum can fixate on spinning items and may be impacted, disproportionately so, by shadow flicker. It was also noted by senior planners in 2015 that shadow flicker may impact on those with pre-existing conditions, such as epilepsy, and those visiting family in the community.

In addition to the above, Ireland is a signatory to the UN Convention on the Rights of Persons with Disabilities (UNCRPD) 2006, which is 'to promote, protect and ensure full and

equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities and to promote respect, for their inherent dignity'. Living near a windfarm will impact on these people in their everyday lives, which is not in line with the UNCRPD. A.16(1) requires the state to 'take all appropriate legislative administrative, social, educational and other measures to protect persons with disabilities both within and outside the home, from all forms of exploitation, violence and abuse'. This means that the state, through ACP, should not allow the daily lives of the neurodiverse within our community to be negatively impacted by this windfarm development.

In a previous planners report (2015) Councillor O'Reilly is noted to have said that 'where there are inconsistencies in the research into the effects of wind turbines on autistic children, the onus should be on the applicant to disprove any such effect. ' It is also stated that the department of health has stated that more research is needed to assess the impact of wind turbines on the health of autistic people.

The Collective are aware of the limited high-quality research into the negative impacts on the neurodiverse community, but think it should be acknowledged there is an equal lack of scientific research to demonstrate that wind turbines are safe and do not impact on the day to day life of the neurodiverse community.

The absence of evidence is not evidence of absence.

#### **References:**

- *An Coimisiún Pleanála. (2016). PA0041 – Assisting report to Senior Inspector [PDF]. <https://www.pleanala.ie/anbordpleanala/media/abp/cases/reports/pa0/rpa0041a.pdf>*
- *An Coimisiún Pleanála. (2015). Inspector's report: ABP-PA0038 [PDF]. <https://www.pleanala.ie/anbordpleanala/media/abp/cases/reports/pa0/rpa0038.pdf>*
- *Howell, G. (2015). Autism and the effect of introducing a new noise source into quiet rural communities: risk factor from industrial wind power generation.*
- *Becchio C, Mari M, Castiello U (2010) Perception of Shadows in Children with Autism Spectrum Disorders. PLoS ONE 5(5): e10582. <https://doi.org/10.1371/journal.pone.0010582>*

#### **4.9.2 Shadow Flicker EIAR Review**

An EIAR review of Chapter 5 – Population & Human Health and Chapter 13 – Shadow Flicker, contains serious and material deficiencies. These deficiencies mean the competent

authority cannot reach a lawful, reasoned conclusion under the EIA Directive, the Planning and Development Regulations, and the EPA EIAR Guidelines (2022).

- Over-reliance on a purely numerical threshold (30 minutes / 30 hours). The EIAR shadow flicker assessment relies entirely on the outdated “30 minutes per day / 30 hours per year” threshold. This approach is no longer defensible in Irish planning practice. The EPA EIAR Guidelines (2022) require assessment of health pathways, including stress, annoyance, sleep disruption, and daily living impacts—none of which are evaluated in the EIAR.
- Failure to assess shadow flicker impacts on vulnerable groups, including children. The EIAR does not assess the two nearby schools—Brierfield National School and Scoil Bríde—for shadow flicker, despite their proximity. No assessment is made of impacts on classrooms, outdoor play, or children’s concentration. This violates EPA requirements to assess vulnerable receptors.
- False assumption that turbine shutdown fully eliminates shadow flicker. The EIAR assumes perfect performance of turbine shadow flicker control systems. It does not examine the likelihood of system failure, malfunctions, override errors, or enforcement. This assumption is not evidence-based.
- EIAR does not consider the character or pattern of flicker. The EIAR fails to assess flicker intensity, frequency, repetitive sequences, winter clustering, or early morning impacts. These are critical factors with known health and amenity implications, ignored in the EIAR.
- Failure to integrate shadow flicker into Population & Human Health assessment. Chapter 5 does not provide a health-based analysis of shadow flicker. It relies solely on the 30-minute rule and does not consider stress, annoyance, sleep, or disproportionate burdens on certain households.
- Relevance of Wexford nuisance case law. Recent High Court cases in Wexford (Webster & Rollo; Byrne & Moorhead) demonstrate that planning compliance does not prevent nuisance findings. Courts now focus on real impacts on amenity and wellbeing. These principles apply equally to shadow flicker, yet the EIAR does not address them.

### **Overall conclusion**

Given the shortcomings—omission of schools, failure to assess vulnerable groups, outdated thresholds, lack of health pathway analysis, absence of system reliability review and ignorance of modern case law—the EIAR fails to meet EPA EIAR Guidelines (2022) or EIA Directive standards.

The collective request that the competent authority:

- Deem the EIAR inadequate regarding shadow flicker.
- Require Further Information, including:
  - Full modelling at all receptors including both schools,
  - Assessment of intensity, character, and health pathways,
  - System reliability and enforcement analysis,
  - Cumulative modelling,
  - Revised PHH chapter using EPA 2022 criteria.
  - Legally binding, enforceable and mitigation rules.
- Refuse permission if significant adverse effects cannot be ruled out.

## 4.10 Landscape and Visual

The proposed turbines would be highly intrusive and visually dominant, overwhelming the existing rural character of the local landscape. Their visibility from multiple vantage points would transform a natural and agricultural setting into an industrial-scale development.

The proposal is out of scale with the surrounding environment. The turbines' extreme height and size would cause visual clutter and a loss of scenic amenity, remaining visible even at long distances and creating continuous visual intrusion.

When combined with existing or approved wind farms in the region, this development would lead to visual saturation and skyline dominance, further eroding the landscape's character and reducing its recreational value.

The developer's visual impact assessment understates the visibility and significance of the turbines. Photomontages appear selective and fail to represent the true extent of visual intrusion likely to be experienced by residents and visitors.

The proposal would diminish the rural amenity, tranquillity, and identity of the local region. It threatens the area's sense of place and the quality of life for residents who value the natural and agricultural landscape.

The local wind farm's size and visual impact are excessive and inconsistent with the character of the area. While supporting renewable energy, developments must respect the local landscape — this project does not. The proposal should therefore be refused on the grounds of unacceptable visual and landscape impacts.

Croagh Patrick and the mountain region off the west coast are visible on a clear day from both Trasternagh and Ballinastack. These views are not only a source of personal enjoyment, but are also significant cultural and historical landmarks, revered by many. The current untouched view will be obscured by the 9 wind turbines towering at a maximum 185 metres high, if approved. The wind turbines also have a red light flashing on the top of them when it is dark. This disturbance is a deeply troubling prospect for the community who value the unspoilt beauty of this part of Ireland.

Additionally, as per the pre-planning consultation with ACP, the developer was instructed to notify Roscommon County Council as the proposed Cooloo Windfarm development will be visible from South Roscommon.

## 4.11 Cultural Heritage

Historic monuments and Archaeological sites.

### **Historic significance**

Children's Burial grounds within 100m of T4 and T7, Kelly Fort, with the family buried on the Hill on the site of T6, and Monk's burial within 100m of T7.

In October-2025 local historians discovered pre-famine road through the bog that pre-dates the 1832 maps.

The Cooloo, Barnaderg area is rich in heritage and like most areas in rural Galway attracts significant tourism during the Summer months – especially from people whose ancestors hailed from the locality.

The Collective want to draw to your attention many historical sites of interest which are located in close proximity to the proposed development, but which are not marked on the maps produced by the developer.

These include the former hedge school located at 53.5111716 – 8.6734016, which is located 0.7km from turbine number 7. It is not marked in the Developers map, but is marked in older ordnance survey maps. The burial plot of a monk, who according to local knowledge died on a day when there was heavy snow and couldn't be transported to the graveyard so was

buried at 53.5044248 – 8.6700220 known as the ‘Bráthar’s Grave’ which is a mere 640 meters from turbine number seven.

There is a Children’s Burial Ground located in Cloondahamper, a plaque remembering the children buried there is displayed on the grounds of St.Marys Church Killereerin. This burial ground consists of a hollow in a hill with each grave marked by stones. It is located at 53.5067704 – 8.6731834, some 0.4km from turbine seven but is not marked in the developer’s map. There are people alive in the village today who have siblings buried in that burial ground.

There is a further Children’s Burial Ground known as the Killaughan which is located 53.5061189 – 8.6587611 which is 0.59km from turbine 9. This is located within a ring fort (centre point 53.5063568 – 8.6591638). According to local oral history a group of monks during the penal times buried their gold chalices, etc on this site, and it is considered haunted ground, with locals for centuries refusing to interfere with it.

In close proximity to this structure there exists a hill fort at 53.5072892 – 8.6572725 which consists of a hill with two hawthorn bushes on top of it. A stone wall runs up through the middle of the fort. This fort has been subject to inspections by archaeologists in the past, though the Collective do not believe excavation has ever been undertaken. This is 0.67km from turbine 9. Only one of these forts is marked in the developer’s map.

The remnants of a famine road exist in Cooloo bog, which is barely identifiable today, but very visible in older ordnance survey maps. It is located at 53.4988926 – 8.6496624, some 0.43 km from turbine 9. This is not marked in the developer’s map.

Given the intensity of local historical sites in this general area, and the vast amount of undisturbed bog which will be disturbed by this development, the Collective is concerned that an adequate archaeological survey has not been conducted of the area, nor has the developer outlined what steps they are taking to ensure that no historical sites, such as the ones listed above, will face any destruction or damage as part of the construction of this development. The Collective do not have confidence that adequate care will be taken to ensure no damage to these structures, especially in the context where they are not marked on the developer’s map, and perhaps the developer does not know of their existence.

## 4.12 Material Assets

### 4.12.1 Roads - Disruption during construction

The Collective wish to object to the proposed development on the grounds of significant traffic and road safety impacts during construction, particularly in relation to abnormal load deliveries. The Traffic Management Plan (Appendix 15-2) lacks essential detail, including the number, timing and routing of heavy goods and turbine loads, and commitments to off-peak scheduling. Without clear and enforceable mitigation, there is a risk of damage to narrow rural roads, verges and drainage, along with conflicts between construction vehicles, farm traffic and school transport. No robust plan has been presented for road strengthening, maintenance or reinstatement. The absence of detailed community-specific measures leaves local access, amenity and safety inadequately protected. Until comprehensive information and binding commitments are provided, the proposal represents an unacceptable risk to road infrastructure and rural community wellbeing. Having roads closed for a combined 210 days (at a minimum) is unacceptable. It is also unacceptable for locals to have diversions of up to 13.7km per journey for the duration of this project.

### 4.12.2 Lack of detailed traffic management plan.

This submission objects to the proposed development due to insufficient traffic management and risk assessment in Appendix 15-2 (Traffic Management Plan). The plan omits essential quantitative data—such as expected abnormal load numbers, peak-phase traffic volumes, and route-specific scheduling—required to evaluate construction impacts. Narrow rural roads near Barnaderg and Cooloo lack the capacity for large turbine transport without pre-works strengthening or verge reinforcement. No detailed programme for road condition monitoring or reinstatement is provided. The TMP also fails to model cumulative or worst-case haulage scenarios, nor does it include enforceable mitigation measures for school transport, farm access or local business continuity. In the absence of these specifics, the project's potential impacts on road safety, infrastructure integrity and rural amenity remain unacceptably high. The application states that locals will be kept informed about traffic construction. Judging by how poorly locals were informed about the windfarm initially, the Collective would be very sceptical as to whether we would be kept informed once construction commences. The Board should refuse permission or impose strict, verifiable traffic and haulage conditions.

Furthermore, the traffic survey at Horseleap Cross was carried out on Tuesday, 8 July 2025 when all schools are closed. Therefore this does not accurately reflect the amount of traffic used throughout the year and in particular during school terms.

According to the planning application there is an estimated total truckloads of 19,356. This equates to an initial 38,712 traffic journeys, which are unacceptable on rural roads not intended for these volumes.

### 4.12.3 Telecommunications

The Collective submits this objection on technical telecommunications grounds. In support, we refer to the applicant's Appendix 15-4 Telecommunications Impact Assessment (Ai Bridges Ltd., April 2024) and quote key passages. The Collective requests that the Board refuse permission or impose stringent conditions to safeguard existing critical radio links.

#### ***4.12.3.1 Key quoted evidence from Appendix 15-4***

Below are relevant excerpts from Appendix 15-4, with page / section references (based on the PDF).

1.1 Three Ireland PTP concern, further consultations required:

Page 31: "The Three Ireland radio network has been modelled in 3D and the Clearance Distances between the Fresnel Zone(s) of the radio link(s) and the blade-tip of the nearest turbine(s) have been calculated. The results of this 3D network analysis are presented in Section 6.2.1."

Page 32: "Sections 7.1 and 7.2 ... describe the mitigation measures available to the wind farm developer to offset the potential impact of the proposed turbines on the ESB and Three Ireland Networks."

Page 8: "Consultations are commenced with telecom operators who are requested to raise any concerns they have regarding the impact of the proposed wind farm on their networks."

1.2 ESB antenna / link listings and concerns:

Page 9: "Table 3 lists the telecom operators who raised concerns during the consultation

process. The responses received from each of the Telecom Operators (ESB and Three Ireland) are provided in Section 3.1 and Section 3.2.”

Page 10: “02/11/21 – ESB Response ‘I have carried out an initial impact analysis of proposed Windfarm development and can confirm we do have Point-to-Multipoint radio links crossing the outlined site boundary ...”

1.3 Turbine design and tip height:

Page 5: “The wind farm proposal consists of 9 turbines with a maximum turbine tip-height of 180 meters.”

#### ***4.12.3.2 Objection: Technical deficiencies & risk of harm***

Based on the quoted evidence, the following points are raised:

1. Unresolved Three Ireland PTP clearance — the TIA does not confirm acceptable clearances.
2. Lack of binding operator sign-off or enforceable mitigation plans.  
Multiple ESB Point-to-Multipoint (UHF) radio links cross the site and require confirmed protection.
3. Missing data on first-Fresnel zone clearance (percent clearance, link budgets, assumptions).
4. No post-construction verification or remediation framework.  
Risk to critical infrastructure (ESB telemetry, mobile backhaul, etc.).

#### ***4.12.3.3 Relief and conditions requested***

The Collective respectfully request An Bord Pleanála to refuse permission for Cooloo Wind Farm until robust, operator-approved mitigations are secured. If permission is granted, the Collective request the following pre-conditions:

1. Binding, written technical sign-off from each affected operator (Three Ireland, ESB, others).
2. Publication of full radio link budgets and Fresnel zone calculations for each affected link.
3. Independent engineering review of the TIA and mitigations prior to any grant.
4. Pre- and post-construction signal verification with remediation obligations.
5. Compliance with ITU-R P.530 guidelines ( $\geq 60$  % first-Fresnel clearance).

#### **4.12.3.4 Conclusion**

Granting permission for turbines with 180 m tip heights without resolved technical safeguards would pose an unacceptable risk to licensed radio networks. The applicant's own TIA confirms that further consultation with Three Ireland and ESB is required. Until all operators have formally accepted the mitigations, permission should be refused or conditioned as above.

#### **4.12.3.5 Technical Annex – Telecommunications Impact Summary**

##### **1. Fresnel Zone Clearance:**

Radiolinks rely on a clear Fresnel zone (elliptical region between antennas). ITU-R P.530 and ComReg guidance recommend at least 60 % of the first Fresnel zone remain obstruction-free to prevent diffraction losses. A turbine intruding into this zone can cause reflection, diffraction, or scattering, resulting in signal fading and loss of availability.

##### **2. Wind Turbines and Radio Links:**

Large turbines (tip heights > 150 m) can block or reflect line-of-sight paths used by microwave, UHF, or point-to-point links. Effects include increased bit-error rate, intermittent dropouts, and complete link outage, particularly under wet or foggy conditions where reflection losses intensify.

##### **3. Cooloo Wind Farm Specific Risks:**

Appendix 15-4 acknowledges both Three Ireland and ESB links traverse the development area, with only ~11.4 m clearance from the second Fresnel zone at one turbine. Without detailed first-Fresnel clearance data, there is no assurance that 60 % clearance is achieved. Moreover, mitigation measures (e.g., relays) remain subject to further consultation, providing no current protection guarantee.

##### **4. Mitigation Measures:**

Typical mitigations include turbine micro-siting, rerouting affected links, installing relay stations, or antenna re-alignment. These must be designed, costed, and approved by the licence holders (Three Ireland, ESB, others) before construction. Post-construction verification ensures no degradation of link quality.

##### **5. Recommendation:**

An independent telecommunications engineer should verify link clearances and mitigation

adequacy per ITU-R P.530 and ComReg standards. All results should be part of enforceable planning conditions, with remediation funding guaranteed by the developer.

#### 4.12.4 TETRA - Terrestrial Trunked Radio

The planning application fails to adequately assess the potential telecommunications impacts of the proposed Cooloo Wind Farm on critical emergency-services communications, including TETRA, which is the backbone radio system for Gardaí, fire services and ambulance services. Large wind turbines and associated electrical infrastructure can cause signal reflection, shadowing and electromagnetic interference, yet the applicant has not provided a dedicated RF/telecoms impact study, modelling of potential effects on nearby masts or links, or evidence of consultation with the emergency services' network operators. In the absence of robust, independent technical analysis demonstrating that TETRA and other key telecommunications systems will not be degraded in coverage, reliability or audio quality, the proposal is premature and fails to ensure the protection of public safety. Permission should therefore be refused, or at a minimum deferred, pending a comprehensive telecommunications impact assessment specifically addressing emergency-services communications.

#### 4.12.5 Broadband Issues

Given the number currently working from home now, strong broadband is a necessity. There are concerns that the signal, and therefore working from home capabilities will be negatively affected by this proposed windfarm. This is due to the fact that the windfarm is situated exactly within line of sight to the mast. It is unacceptable that broadband signal and mobile phone services utilizing this mast will be degraded, and potentially to such a degree that it will be unusable. This may be worsened by the width of the wind turbine needed to support the weight, and the blades which can create periodic drops in signal level and variable amounts of reflection.

Ofcom in 2008 looked more closely into this, and concluded for a single turbine that if the turbine is in the signal path, a 2dB drop in signal level will increase considerably when there are more turbines.

The Collective is aware that the Clonberne Windfarm Action Group has discussed this issue with residents who live beside a windfarm in County Galway and who have lost their

broadband connection on occasions due to the wind turbines. They experienced similar issues with a number of providers. This loss of service occurred where there were only two wind turbines, in Cooloo there are 9 proposed.

#### 4.13. Major Accidents and Natural Disasters

The Collective object on the grounds that Chapter 16 of the Cooloo Wind Farm EIAR fails to provide a robust assessment of major accident and natural disaster risks. The report's references to peat instability and raised-bog cutover are inadequate given the known susceptibility of peat landscapes to movement and sediment release during heavy rainfall or storm surge events. The EIAR's reliance on generic statements about low geological risk neglects the amplified high-wind, flood and peat-fire hazards forecast for County Galway under the local authority climate plan. The lack of detailed modelling of flood-pathways or worst-case scenario storm events undermines the precautionary principle embedded in Irish planning law. This is a serious deficiency given the scale of the proposed development and the sensitivity of the peat landscape. No explicit contingency or evacuation measures are detailed for the community along the grid-route corridor — a serious omission when tall turbines and infrastructure could present hazard in extreme events. The assessment is incomplete and fails to satisfy the legislative requirements of an EIAR insofar as it must identify, describe and assess direct and indirect effects of the development on the environment and human beings.

The Collective call on An Coimisiún Pleanála to require an independent supplementary risk assessment, specific to peat-hazard, flood-modelling and major-accident scenarios, before any decision is made on this application.

#### References:

- Galway County Council (2024) Local Authority Climate Action Plan 2024-2029
- Environmental Protection Agency (EPA) (2022) Guidelines on the Information to be Contained in
- Environmental Impact Assessment Reports (EIAR)
- European Commission (2024) Environmental Impact Assessment: Overview of EU Rules

### 4.13.1 Lightning

Buildings or structures with an average height of 100 metres or more, at flat and elevated locations, have a higher risk of being struck by lightning. Between 4% and 8% of all wind turbines will suffer lightning strikes on a yearly basis, according to statistics from the IEC (International Electrotechnical Commission) 61400-24 document.

A lightning strike can cause severe structural damage to a wind turbine. It can lead to a wind turbine going up in flames. The local fire services in Tuam and Mountbellew are not equipped to deal with a fire on top of a wind turbine 180 metres in the air.

- Lightning strikes have occurred in the past in the vicinity of the proposed windfarm site.
- A number of cattle were killed in Lomaunaghroe due to a lightning strike, and a house was burned down in the townland before because of a lightning strike.
- Below is a picture of a wind turbine on fire off the coast of Arklow in County Wicklow in October of 2022.



(Source for above image) – Kinsella, A. (2022) (Twitter) October 19. Available at: [https://x.com/Amy\\_M\\_Kinsella/status/1582710176733630464/photo/1](https://x.com/Amy_M_Kinsella/status/1582710176733630464/photo/1)

## 4.14 Non-Technical Summary

### 4.14.1 Project Splitting

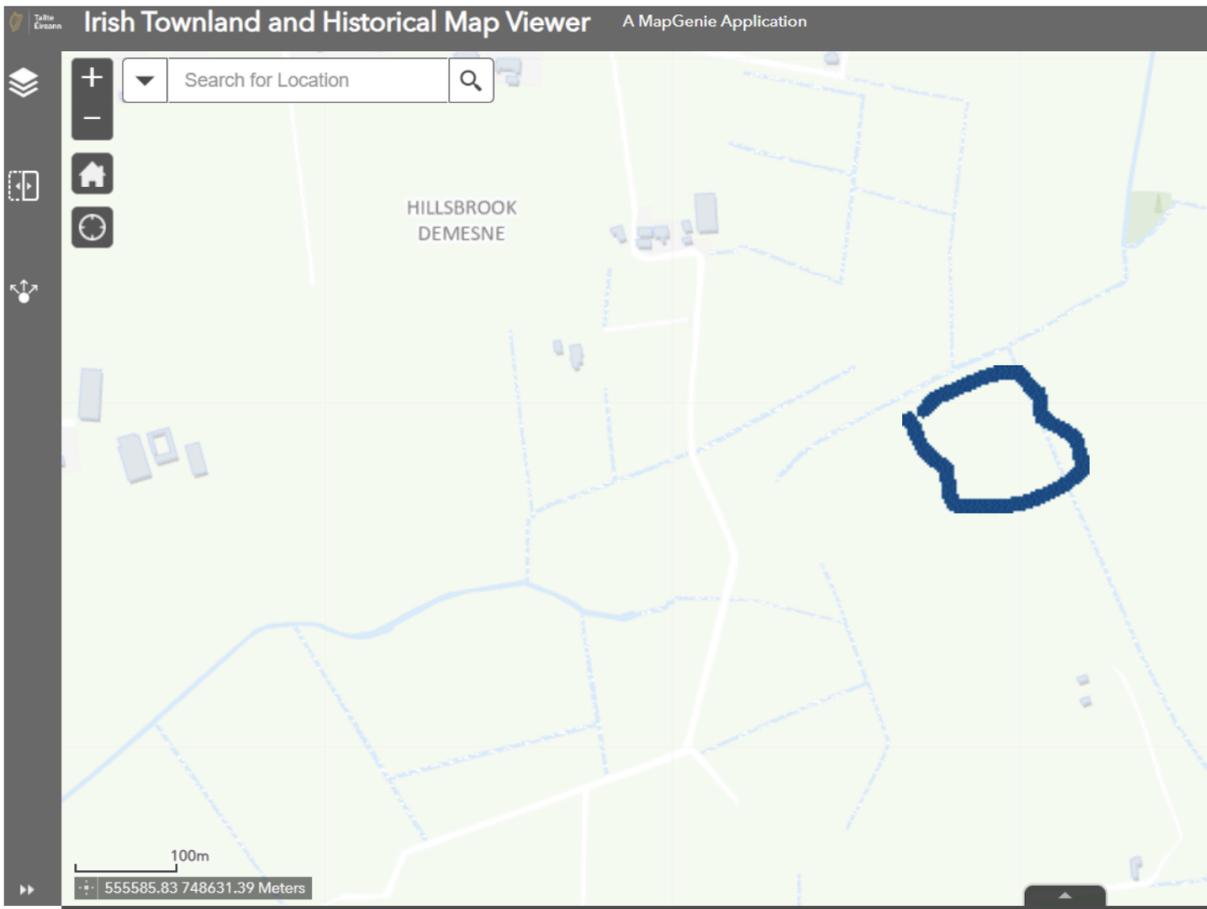
If the wind-farm, substation and the BESS are part of one project (e.g., using the same grid connection, access roads, site infrastructure, landholding), then submitting the BESS and Substation separately may fragment the overall development, making it difficult for the planning authority (and the public) to assess the full environmental and cumulative impacts together.

- The guidance for BESS in Ireland notes that many storage installations are co-located with renewable generation and form part of the same planning application.
- In the case of separate submission, there is a risk that the BESS will avoid proper assessment of its connection to the wind-farm, shared infrastructure (access, cabling, grid export, transformers) and combined impacts (noise, traffic, visual, ecology).
- Therefore, the BESS should be considered together to ensure transparency, avoid “piecemeal” consent and allow full public participation and assessment of cumulative effects.
- Because the BESS may generate additional environmental/health/safety impacts (for example fire risk, chemical hazards, large battery bank), it’s important these are considered in context of the wind farm’s infrastructure.
- In one case the inspector’s report for a BESS application flagged concerns about inefficiency, safety (fire/explosion), and lack of full assessment when it was treated separately. Excerpt from inspectors report below:
  - Clarification (ii) of this information was sought with respect to the following:
    - A construction environment management plan,
    - A hazard analysis and risk assessment,
    - Fire suppression systems,
    - Firewater run-off assessment,
    - Site layout and fire spread risk, and
    - On-site fire-fighting water supplies.
  - Reference on Coimisiun Pleanala 305739.

In terms of the points from the above-mentioned case, it is of paramount importance that these issues are addressed from the outset. The proposed location is elevated as can be seen below in the photo (marked blue) and falls into a water course which flows in multiple

directions as can be seen on the OSI map. The pollution risk is extremely high in this area due to the elevated site and the sensitive nature of the surrounding peatlands and waterways. Additionally, ensuring chemical spills are contained using bunding from massive battery installations is no mean feat, notwithstanding issues in containing polluted water from fire fighting if necessary.





- If the wind farm application does not include the BESS, then the wind-farm application cannot assess the additional BESS impacts. If the BESS is submitted later, it may be harder to assess how the landscape, ecology, hydrology, visual, noise, traffic, grid impacts have changed.
- Submitting the BESS separately may reduce the opportunity for meaningful public consultation on the full scheme. The community may believe the wind-farm was “the project” and not realise that a major BESS and substation is to follow.

#### 4.14.2 Actual Energy Output vs. Nominal Capacity

A critical flaw exists in how this project's energy generation has been presented. The application relies on a theoretical installed capacity of up to 64.8MW. However, wind energy generation is inherently variable—turbines operate at a fraction of their nameplate rating due to fluctuating wind conditions.

The developer's own meteorological data records an average wind speed of 8.5 m/s across the proposed site. When cross-referenced with the manufacturer's power curve specifications for the turbine models under consideration, this wind regime translates to approximately 3.5MW actual output per turbine under typical operating conditions—substantially below the 6-7.2MW nameplate specification. Across the nine proposed turbines, this yields a practical generating capacity of roughly 31.5MW.

This has significant implications for the accuracy of the Environmental Impact Assessment Report. All climate benefit projections, carbon offset timelines, and environmental justifications appear to have been calculated using full nameplate capacity rather than realistic generation figures. If the carbon payback analysis assumes 64.8MW of continuous clean energy production when actual output averages 31.5MW, the payback timeline would need to be roughly doubled. Given the carbon-intensive construction phase—particularly involving peat excavation, concrete production, and heavy vehicle movements—this recalculation may fundamentally undermine the project's claimed environmental credentials.

#### 4.14.3 Key Points:

Savings methodology lacks published annual MWh (capacity factor), curtailment, and a declining Irish grid intensity time series; payback not shown as a range.

##### **Electricity decarbonisation:**

Savings should use a time-varying Irish grid factor (declining to 2030 and beyond) and reflect marginal/operational displacement. The EIAR does not publish these trajectories, risking overstatement of avoided emissions.

## 5 EIAR NON-Technical report Analysis

The proposed grid connection is an integral part of the wind farm project and is assessed in this EIAR however, it will be subject to a separate, future application. This is illegal and should be submitted as one application to access the project as a whole.

In this application it mentions the model being installed and the generating capacity, but it does not state the actual model being used.

There is no legal requirement for the developer to provide a Community Benefit Fund outside of RESS participation.

### 5.1 Key issues:

- Neoen repeatedly states that commitments “will be confirmed before the application is lodged,” yet no binding commitments appear in the documentation.
- Seven of the nine turbines are located in Moylough Parish; yet, the funding model does not prioritise Moylough.
- Administration fees of up to 10% will be deducted from the fund.
- The lack of enforceable guarantees renders the proposed community fund unreliable.

On page 5, there is an error where it states there are six turbines going into an area that is "open to consideration" and two located in areas classified as "generally to be discouraged." The number of turbines is actually 3.

In Chapter 3, the telecommunications operators were contacted to determine whether links were traversing the site or in close proximity to the proposed windfarm site. The report includes copies of responses, but evidence suggests minimal response, and local providers received no contact. If all the proposed wind farms in the area require mitigation regarding telecommunications, then improved communication among relevant parties is necessary.

Active raised bog habitat has been identified through assessments of available resources and comprehensive multi-season site surveys. The proposed wind farm has been designed to minimise this sensitive area as much as possible. In the section on biodiversity, they use the wording “it is likely that this habitat is a degraded bog” (the photos included with this submission will confirm that the area in question is actually an active living bog). Further

down, in this section on biodiversity, they state that the floating road will likely affect the hydrology of this habitat. This floating road is a token gesture, as when they dig to do the foundation for turbines 4, 7 and 9, this will affect the water levels, which in turn will cause the active raised bog surrounding it to die.

## 5.2 Alternative Turbine layout and development design

The design process has also considered the recommendations and comments from relevant statutory and non-statutory organisations, nearby neighbours, the local community, and local authorities. The Collective dispute this because the only near neighbours consulted were the landowners who were signing up for and benefiting from the project. When the community learnt about the plans during the January 2024 information night, they had already almost finalised the layout.

## 5.3 Description of the proposed project

The wind farm is designed by software (that is not named in the planning documents) to get the maximum number of turbines to fit into the ground available. But based on our research and an objection completed by chartered land surveyor Con Sheehan, the proposed wind farm didn't follow the official guideline of 7 rotor diameters between turbines.

One of the principal concerns during the development process is that human beings as individuals or communities should experience no significant diminution of their quality of life from the direct, indirect or cumulative effects arising from the construction, operation and decommissioning of a development.

If they follow this principle through the full submission, the project should be rejected. Currently, there is no credible scientific evidence linking wind turbines to adverse health effects; however, the absence of evidence does not constitute proof of safety.

The submission refers to the potential for site visits in the event that daily shadow flicker exceedances have been predicted for buildings by the modelling software; this will be too late.

## 5.4 Biodiversity

The loss of 0.18ha of raised bog corresponds to a loss of 0.54% of the total raised bog habitat area within the proposed project. This is considered a significant effect at a county scale. HOWEVER, any loss of an active raised bog will cause the remaining 99.46% to degrade.

The proposals include reference to providing 1.23kms of permanent fencing and riparian hedgerow planting along the sections of rivers/drains to prevent livestock poaching. HOWEVER, as per agricultural regulations, this has been in place for the last 20 years, and all rivers in that vicinity are double fenced, i.e., on both sides to prevent cattle entry.

The proposal states that no residual significant effects on surface and groundwater quality, or the hydrological and hydrogeological regimes, were identified during the construction, operation, or decommissioning phases. HOWEVER, how could this be determined for a future event that has not transpired yet?

The proposal includes reference to cutting down hedges for mitigation of bats, but the issue is that bats do not feed off hedges. Instead, they feed on rivers and streams, which are located at the centre of the proposed wind farm.

The proposal states that there is no evidence of badgers; however, badger runs have been observed in Elm Hill and in the forest next to turbine 9. Additionally, badgers only come out at nighttime. During this time, MKO did not monitor the area.

The proposal mentions evidence of Marsh Fritillary larvae in a standalone field; however, butterflies do not recognise boundaries, and MKO has provided a map showing the distribution of these butterflies throughout the proposed site.

Additionally, the feeding source of the Marsh Fritillary butterfly is devil's bit scabious, and this is present all over Cooloo bog, as can be evidenced in the photographs provided.

Turbines are sited over 700 metres away from the hen harrier roost at Cloonboo More bog. HOWEVER, hen harriers will fly through the wind farm to get to Horseleap Lough.

The proposal indicates that if the wind farm is constructed, operated, and decommissioned according to the design, best practice mitigation measures, and bird mitigation plan outlined

in the application, significant negative effects are not expected. The question remains as to how this will be ensured and observed by the local community.

## 5.5 Land, Soils and Geology

The proposal includes reference to the peat thickness, which ranges from 0 m to 7.1m, with an average of 1.3. The Collective has provided video evidence that the upper end of the range may in fact be 8.5m to 10.5m. [REF USB No 2]

## 5.6 Water

The proposals include reference to several activities which will take place at the proposed site, some of which will have the potential to significantly affect the hydrological water quality at the proposed site or downstream of the proposed site. These significant potential effects generally arise from sediment inputs from runoff and other pollutants, such as hydrocarbons and cement-based compounds. This is confirmation that the water is highly likely to be polluted.

The proposal also states that the proposed project does not alter downstream surface water flows and will not contribute to downstream flooding. HOWEVER, this is not possible to guarantee, as this bog is the source of two rivers – i.e., Grange and Abbart.

## 5.7 Climate

The proposal states that the web-based version of the carbon calculator, which supersedes the web-based tool, was released in 2016.

Given that the proposed project is sited in and around Cooloo bog - it is difficult to understand the statement by MKO that the carbon loss calculations were discounted due to the absence of peat in a peatland environment.

Additionally, the calculations of 145,705 tonnes of CO<sub>2</sub> generated from the proposed project fail to recognise the carbon loss from digging up the peat bog.

## 6 Conclusion

The evidence presented throughout this submission demonstrates, beyond doubt, that the proposed Cooloo Wind Farm fails to meet the minimum legal, environmental, planning, safety, and community-protection standards required under Irish and EU law.

The deficiencies are not minor or technical, they are fundamental, structural, and impossible to remedy through conditions. They go to the heart of the planning process, the protection of vulnerable habitats, the rights and wellbeing of residents, and the legal obligations placed on An Coimisiún Pleanála as a competent authority.

The application is grounded in an environmental and planning framework that is itself invalid under EU law, including reliance on national and ministerial policies that were never subject to the mandatory Strategic Environmental Assessment required by Directive 2001/42/EC. The CJEU could not be clearer: where the underlying plan or programme is unlawful, consents based on that plan must also be annulled. No exception applies here.

Separately, the development cannot be reconciled with the Galway County Development Plan 2022–2028, which has full statutory force and which clearly zones substantial portions of this site—and three of the turbines in particular as areas where wind energy development is “Generally to be Discouraged.”

These zones reflect the exceptional ecological sensitivity of the raised bog, the hydrological vulnerability of the landscape, and the proximity to protected species and water-dependent habitats. To approve a wind farm in direct conflict with these policies would materially contravene the Development Plan and undermine the integrity of the plan-led system on which Irish planning relies.

The public consultation process has been shown to be inadequate, selective, and in several cases demonstrably misleading. Key community bodies including Killarerin Community Council, Killarerin GAA, and local national schools received no engagement whatsoever, despite the applicant’s claims to the contrary.

The choice of obscure media for statutory notices, the failure to meet affected households, and the near-total absence of consultation within the parish most impacted underscore the lack of genuine community engagement. A process so limited and exclusionary cannot be considered valid under national consultation standards, let alone the expectations for Strategic Infrastructure Development.

The human health, safety, and wellbeing concerns are significant and well-documented. From the absence of a fire-safety assessment for the proposed BESS installation, to the cumulative noise, vibration, shadow flicker, traffic, dust, and mental-wellbeing impacts—especially on children and vulnerable groups—the EIAR repeatedly fails to meet the standards of completeness, scientific certainty, and precaution required under the Habitats Directive and Irish environmental law. The recent High Court rulings finding turbine noise to constitute actionable nuisance, coupled with documented health impacts and resident testimonies from similar wind farms, show that these risks are real, foreseeable, and unacceptable.

In addition to these impacts, the development poses long-term economic harm through the devaluation of homes, restrictions on future planning, and the undermining of agricultural activity—the backbone of the local community. The constitutional rights to property, to home, and to peaceful enjoyment are placed in jeopardy by an industrial-scale project located in the heart of a rural, residential, and agricultural landscape that was never intended to host infrastructure of this magnitude.

## 6.1 Project Splitting

A further and deeply troubling concern is the clear evidence of project splitting, contrary to Irish planning law, EU environmental law, and long-established CJEU case-law. The developer has attempted to treat the wind farm, substation, Battery Energy Storage System (BESS), and the 110 kV grid connection as separate undertakings, despite openly acknowledging that these components are operationally and functionally inseparable. EU jurisprudence is explicit: a development that forms a single project cannot be artificially divided to avoid full Environmental Impact Assessment or to limit scrutiny of cumulative impacts.

The grid connection is fundamental to the project's viability, yet it is omitted from the EIAR's cumulative impact assessment, in direct contravention of Directive 2011/92/EU and Irish transposing legislation. The deliberate fragmentation of the project results in a materially incomplete assessment and denies both the public and the competent authority a full understanding of the true scale, risks, and environmental consequences.

In such circumstances, the only lawful response under EU and Irish law is to refuse permission until the full, indivisible project is assessed as a single entity. Taken together, the legal inadequacies, environmental risks, procedural failures, and significant impacts on human

health and community wellbeing present a single, inescapable conclusion: **this development is incompatible with proper planning and sustainable development.** It is incompatible with the rights of the community. It is incompatible with the County Development Plan. It is incompatible with Ireland's obligations under EU law.

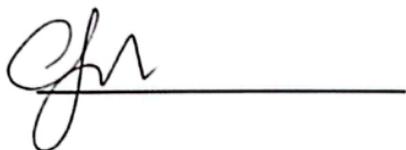
For these reasons—rooted in science, law, planning policy, and lived community experience, the **Barnaderg Cooloo Windfarm Action Collective CLG** respectfully submits that the only lawful and just outcome is for An Coimisiún Pleanála to **refuse permission** for the proposed Cooloo Wind Farm in its entirety.

## 6.2 Oral Hearing

Given the scale of the proposed development, the unprecedented level of public concern, the complex legal issues raised (including SEA non-compliance, Appropriate Assessment deficiencies, project-splitting concerns, and Development Plan contraventions), and the extensive expert evidence submitted by the community, the Collective respectfully requests that **An Coimisiún Pleanála convene an Oral Hearing** under Section 134 of the Planning and Development Act. An Oral Hearing is essential to allow full examination, clarification, and cross-questioning of the substantial issues at stake, to ensure transparency, and to uphold public confidence in the integrity of the planning process. In a case with such significant consequences for human health, environmental protection, and the rights of an established rural community, an Oral Hearing is not only justified, it is necessary.

We also welcome you to come and visit the proposed site, the surrounding townlands and the villages of Barnaderg and Moylough.

*Mise le Meas,*

A handwritten signature in black ink, appearing to be 'Orla', written over a horizontal line.

**Orla McKeogh, Secretary**  
**Barnaderg Cooloo Windfarm Action Collective CLG**

## 7 Full Bibliography

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# Appendix

1. Huson and Associates - Ballynisky Wind Farm Peer Review
2. HSE Letter
3. Case Law Files

HUSON & ASSOCIATES

## **Peer Review of Proposed Ballynisky Wind Farm Planning Application**

W Les Huson BSc(Hons) MSc CPhys MInstP MIOA MAAS

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Ballynisky Wind Farm Review.docx  
NOVEMBER 2025

## INTRODUCTION

Huson & Associates has been commissioned by the Coolcappa Community Action Group to review an Environmental Impact Assessment Report (EIAR) dated September 2025 prepared by MWP, Engineering and Environmental Consultants for Ballynisky Green Energy Ltd (a subsidiary of Greensource Ltd) containing Chapter 11 ‘Noise and Vibration’ (NVA) prepared by Enfonc Ltd to support Planning Application: 2561003 (Limerick County Council) for the Ballynisky Wind Farm.

The proposed wind farm development (see Figure 1) is not a Strategic Infrastructure Project that is suitable for assessment by An Coimisiun Pleanála. The application is to be assessed by the Limerick County Council.

This review has been prepared by W Les Huson BSc(Hons) MSc CPhys MInstP MIOA MAAS (brief CV in Appendix A). Referenced papers can be made available on request.

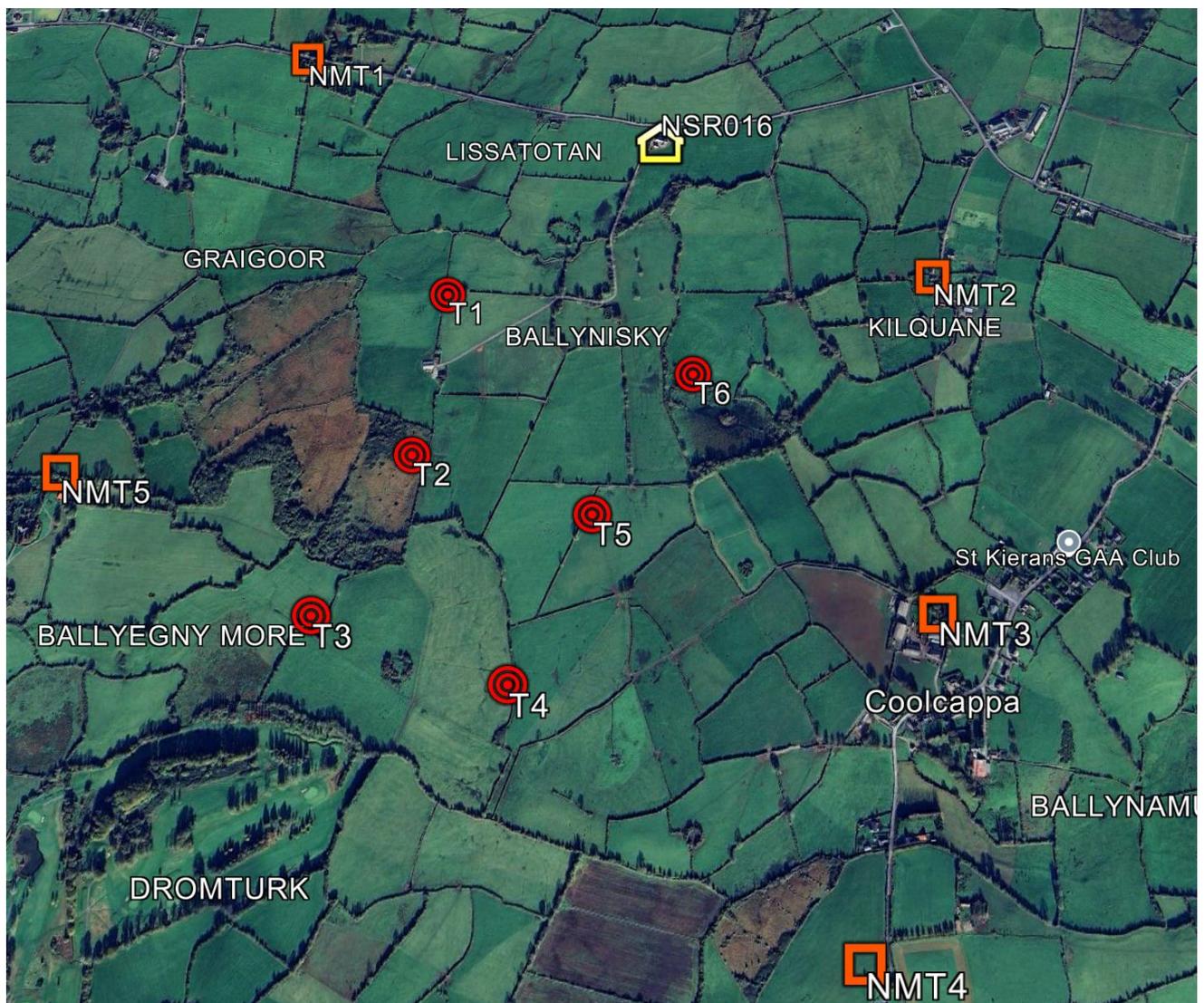


Figure 1

Location of nearest dwelling (NSR016), wind turbines (T) and background measurement locations (NMT)

## SUMMARY

Limerick County Council would be justified in refusing the Ballynisky Wind Farm Application for the following reasons:

- The minimum recommended setback of 10 times the rotor diameter, a best practice setback distance of 1.36 km for the proposed wind turbine rotor diameter of 136m, has not been applied with one dwelling (NSR016) less than 650m from the nearest wind turbine.
- The wind turbines are located too close to each other that will result in increased wake turbulence that in turn will increase noise emission and the characteristic of amplitude modulation. The NVA has not considered these effects.
- Noise compliance with WEDG 2006 should have been completed at 6 m/s, not 7 m/s. All wind speeds references in this report refer to standardised height of 10 m above ground level.
- WEDG 2006 target noise limits have been misinterpreted in the NVA to produce higher proposed noise limits.
- Target day time noise limits should be lower at 36 dB(A) in 6 m/s wind speed at standardised height.
- Predicted sound levels in the NVA are too low.
- When more conservative noise model inputs are used the predicted noise levels shown in the NVA will be at least 2 dB higher.
- The current WEDG 2006 does not reflect best practice and is outdated, but if applied properly, shows that this proposed wind farm would be non-compliant.
- The NVA should not rely on guidelines used to underpin ETSU-R-97 because those guidelines are currently under review and the WEDG 2006 does not refer to them.
- The requirement from WEDG 2006 that *‘that there is no significant increase in ambient noise levels at any nearby noise sensitive locations’* has not been addressed in the NVA.
- Ambient sound levels are shown at times to be below the 17 dB(A) instrument noise floor in wind speeds up to 5 m/s (10m AGL) at NMT1 compared with sound levels optimistically predicted to be more than 40dB(A) for one of the nearest dwellings (NSR016).
- The soundscape in the area will change dramatically for the surrounding Community if the wind farm is approved and this is contrary to the requirement of the WEDG 2006.
- Using the impact assessment procedures suggested in section 11.2.1 and Table 11.3 of the NVA the impact of the proposed development when operational will cause a ‘Very Substantial Effect’ according to IEMA Guidelines and ‘Very Significant’ and ‘Profound’ effect according to ‘Guidelines on the Information to be contained in Environmental Impact

Assessment Reports’ (EPA, 2022). Accordingly, the development application presents an unacceptable impact and should be refused.

- The layout of the six wind turbines is such that excessive amplitude modulation will arise but the NVA has not accounted for any penalty due to this or other special audible characteristics (tonality, impulsive sound).
- Current best practice in assessing wind farm noise should be reflective of target noise limits set in Germany and the Australian States of New South Wales and Tasmania.
- Low frequency noise impact has not been assessed, despite this being a requirement of the Limerick County Council (Danish low frequency noise limits).
- With noise model inputs used in the NVA and no consideration of special audible characteristics there will be 40 dwellings that will exceed the correct noise limit target at 6 m/s.
- With more conservative noise model inputs and no special audible characteristics 87 dwellings will exceed the correct noise limit target at 6 m/s.
- If special audible characteristics were to warrant a 5 dB penalty with the correct noise model inputs, then all 153 dwellings considered as NSRs in the NVA will exceed the correct noise limit target at 6 m/s.
- The NVA does not refer to any noise predictions for the substation and states that there will be no tonal noise emissions. It is common knowledge that substation noise has tonal characteristics.

## **NVA PROPOSED NOISE LIMITS**

The NVA has mentioned in the introduction that the nearest dwelling is more than four times the maximum tip height away without any suggestion to indicate if this situation is good or bad.

The NVA has referred to the Health Service Executive (HSE) Position Paper on Wind Turbines and Public Health (2017) but only about published scientific evidence being inconsistent. This means that some published research supports there being adverse health effects and other research that does not support there being adverse health effects from wind turbines.

The HSE position paper also refers to best practice for setback distance from any turbine to a dwelling of 10 times the rotor diameter. This equates to a best practice setback distance of 1.36 km for the proposed candidate wind turbine rotor diameter of 136m.

Wind turbines are proposed to be less than 650 m from the nearest dwelling so best practice according to the HSE position paper has not been applied.

The 2018 World Health Organization (WHO) Environmental Noise Guidelines for the European Region suggests a provisional outdoor target noise limit for wind farm noise of <45 L<sub>den</sub>. This

roughly equates to 37.3 dB, LAeq<sup>1</sup> and supports the lower noise level target of 35.3 dB(A), L90 (37.3 dB LAeq – 2 dB), not that proposed in the NVA.

Based on ambient measurements reported in the NVA at 6 m/s the target noise limit should be 36 dB(A) in the day time.

Again, the NVA is not applying best practice.

Chapter 11, section 11.3.3.1 of the NVA outlines a rationale for the choice of noise limits that are used in the NVA.

The rationale to adopt a 43 dB(A), L90 or *Background plus 5 dB, whichever is the higher* noise limit at night has been correctly identified to be a less stringent target than WEDG 2006 recommends.

The proposed night time noise limit in the NVA is too lenient by allowing night time noise limits greater than 43 dB(A), L90.

Reference is made to the EPA document ‘Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)’ for guidance on setting an appropriate noise limit for day and night periods.

NG4 suggests that a daytime noise criterion of 45dB(A) applies in ‘areas of low background noise’. The parameter referenced in NG4 is a rating value (LAr), based on LAeq.

The NVA author has neglected to state that in the Evening this reduces to 40 dB(A), LAr or that at night the criterion reduces to 35 dB(A), Leq.

NG4 also has recommended criteria for Quiet Areas and properties surrounding this development comply with a designation of ‘Quiet Areas’ for their location. Under these circumstances the criteria changes to noise from the licensed site to be at least 10dB below the average daytime, evening and night time background noise level measured during the baseline noise survey.

If the author of section 11.3.3.1 wishes to use NG4 as a reference point then the suggested noise criteria for the proposed wind farm are at least 10 dB higher than NG4 recommends at night for both Quiet Areas and ‘areas of low background noise’.

Likewise, the proposed daytime noise limit of 40 dB(A), L90 is 7 dB higher than the evening period for ‘areas of low background noise’ and at least 10 dB higher than the NG4 criteria for Quiet Areas.

If WEDG 2006 is to apply to this proposed development then the lower day time noise limit of 35 dB(A), L90 should apply and a consideration must be given to any significant increase in ambient noise levels.

NVA Section 11.2.1 describes an assessment approach based on the increase in ambient noise levels and applies this to assess impact for construction activities.

However, section 11.6.4.3 of the NVA that assesses the effect on the community for the operating phase of the development, does not apply the assessment approach described and ignores the significant increase in ambient noise caused by the development.

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<sup>1</sup> Davy, J.L., Burgemeister, K., Hillman, D. *et al.* A Review of the Potential Impacts of Wind Turbine Noise in the Australian Context. *Acoust Aust* **48**, 181–197 (2020). <https://doi.org/10.1007/s40857-020-00192-4>

In the NVA, Chapter 11, section 11.3.3.1 it has been incorrectly interpreted that when background sound levels become greater than 30 dB(A) at higher wind speeds that the lower range of noise limits suggested in WEDG 2006 (35 to 40 dB(A), L90) do not apply and the limit suddenly reverts to 45 dB(A) L90. This is incorrect.

The test of a quiet area is made at lower wind speeds (below 5 m/s according to BS4142 where wind-induced noise on a microphone is minimised) and once determined applies at all higher wind speeds.

As wind farms operate 24/7 the limiting criterion for this development should be 36 dB(A), L90 during the day time and predicted noise levels must be compared to this limit to assess if the development acceptable. This is based upon a day time background level of 31 dB(A), L90 plus 5 dB at 6 m/s.

In summary, the noise criterion suggested in the NVA for the proposed development is too high by at least 4 dB if the WEDG 2006 limits are to be applied.

Under these circumstances the predicted sound levels from the NVA at many dwellings exceed the appropriate recommended noise limit and Limerick County Council will be justified in refusing the proposed development.

The predicted sound levels for this development are overly optimistic. With appropriately set noise model inputs to reflect a conservative assessment the degree of non-compliance would be greater by at least another 2 dB.

### **Noise Predictions**

Predictions in the NVA are made for the 7 m/s wind speed case. For the 6 m/s wind speed case the predictions are typically 1 dB lower.

Appendix 11E lists predicted sound levels at different NSRs under various integer wind speeds. However, the column representing a wind speed of 10 m/s must be an error. It is not possible for the predicted sound levels at 10 m/s to be lower than those predicted at lower wind speeds.

Background sound levels that set target noise limits increase with wind speed above 6 m/s so the critical wind speed to test compliance is at 6 m/s, not 7 m/s.

The test from WEDG 2006 for a low noise environment is not separated into that during the Day or Night.

At 6 m/s the 24-hour average envelope background noise level is less than 30 dB(A) from NVA Table 11-11 that justifies the area to be classified as a 'low noise environment'. The noise limit at this wind speed is 35 dB(A), not 45 dB(A).

A lower limit from the range 35 to 40 dB(A) from WEDG 2006 is recommended as it matches recommendations in NG4 for the evening.

At 7m/s the NVA is suggesting that because the Day envelope noise level is 34 dB(A) that a higher noise limit of 45 dB(A) should apply. I strongly disagree.

Above 6m/s the NVA is suggesting a target noise limit of 45 dB(A) during the Day and 43 dB(A) at night. Again, I disagree.

The target noise limit during the day should be 36 dB(A) at 6 m/s, not 45 dB(A) as claimed in the NVA for all noise sensitive locations.

The NVA predicts a sound level at NSL016 of 40.1 dB(A) at 6 m/s, when applying the noise model inputs used in the NVA.

However, if more conservative noise model inputs are used where the receiver height is 1.5m and the ground absorption value, G, is 0 then the predicted sound level for this dwelling becomes 42.2 dB(A).

Under both circumstances the predicted sound level at NSL016 exceed the 36 dB(A) noise limit at 6m/s.

The NVA has used very optimistic noise modelling and assumed that the sound from the proposed wind farm will not be tonal, impulsive or have any significant amplitude modulation characteristics that, in my experience, often occur.

The NVA does not refer to any noise predictions for the substation and states that there will be no tonal noise emissions. It is common knowledge that substation noise has tonal characteristics.

The planning process cannot direct there to be contractual arrangements (guarantees) between the wind turbine or substation transformer manufacturers and wind farm owners/operators.

## **PLANNING GUIDANCE ON NOISE FROM WIND FARMS**

The Irish Government Department of Environment Heritage and Local Government document ‘*Wind Energy Development Guidelines, 2006*’ (WEDG 2006) detail the current guidelines to set noise limits for wind energy developments.

The NVA has adopted the principles of WEDG 2006 but has added interpretations contained in UK wind farm noise guidance using ETSU-R-97 ‘The Assessment and Rating of Noise from Wind Farms’ with further guidance from the Institute of Acoustics in 2013; ‘A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise’ (GPG).

It should be recognised that the scope of the GPG was not to examine noise limits described in ETSU-R-97. The GPG states that “The approval of this guide by the IoA Council should not be seen as an endorsement of the noise limits within the ETSU-R-97 document since the setting of these limits is a policy matter for Government.”

Furthermore, the GPG is only applicable for those involved in the assessment and rating of wind turbine noise when applying ETSU-R-97 assessment procedures. The GPG may not be appropriate guidance if other assessment procedures are used.

WEDG 2006 requires updating and a DRAFT WEDG 2019 was prepared but not formally adopted as it remains under review.

The limits proposed in the WEDG 2006 broadly align with the UK guidance found in ETSU-R-97 that reflects WHO guidance in 1997. However, noise limits to protect sleep were reduced by 5 dB in subsequent WHO guidance in 1999 that remain current.

WEDG 2006 does not require that ETSU-R-97 be used to assess wind turbine noise.

WEDG 2006 states that “*Good acoustical design and carefully considered siting of turbines is essential to ensure that there is no significant increase in ambient noise levels at any nearby noise sensitive locations.*” This requirement is a test that has not been addressed in the NVA.

WEDG 2006 has been drafted to balance the objectives of providing renewable power with acoustic amenity and for quiet areas states; “*in low noise environments where background noise is less than 30 dB(A), it is recommended that the daytime level of the LA90, 10min of the wind energy development noise be limited to an absolute level within the range of 35-40 dB(A).*”

Justice Richards observed the following in a recent Supreme Court nuisance noise case (Uren v Bald Hills Wind Farm S ECI 2020 00471) 25 March 2022 in Australia:

“*The generation of renewable energy by the wind farm is a socially valuable activity, and it is in the public interest for it to continue. However, there is not a binary choice to be made between the generation of clean energy by the wind farm, and a good night’s sleep for its neighbours. It should be possible to achieve both.*”

A recent court case in Ireland (Ms Justice Emily Egan) echoes this observation:

“*There is not a binary choice to be made between the generation of clean energy by the wind farm and a good night’s sleep for its neighbours. It should be possible to achieve both.*”

The WEDG 2006 does not set fixed noise limits. The guideline provides advice for local authorities (Councils) to develop their own planning guidelines for noise that can differ from those suggested in WEDG 2006. In this regard, for example, the Limerick County Council has set low frequency noise guidelines that are not contained within the WEDG 2006 and allow a night time noise limit of 38 dB(A), L90, or Background plus 5 dB. Many other local councils have set noise criteria for wind farms that differ from those in the WEDG 2006.

The NVA, Table 11.29, has chosen to set lenient target noise limits in the daytime at 45 dB(A) L90 or background plus 5 dB, whichever is the greater, where *average* background noise levels were >30 dB(A) from five residences around the proposed development. These background levels have been used as proxies for all other dwellings.

The test for low noise environments (<30dB(A)) in the NVA has been based on the minimum envelope of average trend line analysis from background measurements at 5 locations separated into Day and Night with an assumption that these measurements are representative of many other properties.

Trend line background sound levels to test for a low noise environment according to WEDG 2006 does not separately consider Day and Night. When the Day and Night envelope background levels are averaged from Table 11-11 it is found that background levels remain below 30 dB(A) up to 6 m/s standardised wind speed.

However, background sound levels regularly fall below 30 dB(A) during the daytime at wind speeds higher than 7 m/s and when consideration is given to the compression of sound level measurements close to the noise floor of the sound level meter instruments<sup>2</sup> the real average background sound levels at many noise measurement locations (NMLs) above 6 m/s will be below 30 dB(A) and a lower target absolute noise limit between 35 dB(A) and 40 dB(A) is justified at these higher wind speeds too, if the interpretation of WEDG 2006 in the NVA is to be accepted.

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<sup>2</sup> Huson, W. Les. “Constraints imposed by and limitations of IEC61672 for the measurement of wind farm sound emissions” 6<sup>th</sup> International Conference on Wind Turbine Noise, Glasgow 20-23 April 2015

Day and night time sound levels show that the sound measurement equipment regularly recorded sound levels at or near the noise floor of the instruments. Sound monitoring equipment is classified under IEC61672. The sound level meters used have a noise floor of typically 17 dB(A).

However, the lowest sound level at which the instrument is linear and compliant with Class 1 is quoted by the manufacturer of the instruments used by Enfonic (B&K2250) to be 24.8 dB(A).

Thus, sound levels shown in the background charts between 24.8 dB(A) and 17 dB(A) are compressed. This means that real background sound levels are often much lower than 17 dB(A) and the average background levels in the NVA are artificially elevated.

This effect is also highlighted in BS 4142:2014+A1:2019, section 8.1 which notes: “Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which may be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system.”

The NVA states that extraneous noise was removed from the background noise measurement dataset but has not shown the removed data points on the Background scatter charts.

The Background measurement data contains sound from the Grouse Lodge and Carrons wind farms and the Background sound levels used to set proposed target noise limits will produce higher noise limit targets than would otherwise be the case if these wind farms were not operating when measurements were taken.

‘Guidance Note for Noise Assessment of Wind Turbine Operations at EPA Licensed Sites (NG3)’ has been referenced about infrasound but the NVA has not mentioned that it also provides compliance limits in the daytime between 35 dBA and 40 dBA for quiet daytime environments of less than 30 dBA that echoes the lower limits in WEDG 2006.

For situations where the *average* background noise level is <30 dB(A) the NVA has elected to apply the least stringent noise limit of 40 dB(A) and no noise sensitive locations (NSLs) have been assigned the 35 dB(A) base noise limit.

The NVA has suggested hopefully and naïvely that:

*A warranty will be provided by the manufacturers of the selected turbine to ensure that the noise output will not require a tonal noise correction under best practice guidance.*

And;

*.. a warranty will be sought from the supplier of the 38kV transformer for the onsite substation.*

### **LA90 statistic or LAeq**

Use of the LA90 statistic does not capture short term noise events that are often observed from wind farms. Such noise events are often referred to as ‘whump’ or ‘thump’ type sounds thought to be caused by wind flow delamination across the rotor blades when wind conditions change.

The benefit of a condition requiring the LAeq is that such events can reflect the extent of intermittent louder sounds that the LA90 statistic cannot.

However, if an LA90 level is specified as a noise condition then an added provision to prevent impulsive noise or tonality could be applied.

Such a condition was applied for the Cloghan Wind Farm in Offaly, as follows:

*Noise levels emanating from wind farm noise when measured at the nearest noise sensitive properties, i.e. dwelling houses, shall not exceed 43 dB(A) LA90(10 minutes). There shall be no tonal or impulsive noise and measurements shall be made in accordance with ISO recommendations R1996-1 (Acoustics-description and measurement of environmental noise, part 1; basic qualities and procedures).*

## **BEST PRACTICE**

WEDG2006 is outdated and not currently ‘best practice’.

The most recent (29 July 2025) review of best practice in setting wind farm noise limits has been completed by the EPA of Tasmania, Australia, that has revised its wind farm noise guideline limit and set 35 dB(A), Leq as the appropriate base noise limit to be met. A copy of the Policy is in Appendix D.

Current best practice in wind farm noise guidance is also provided in the Australian States of New South Wales and Queensland where night time target noise limits are set at 35 dB(A) Leq or background plus 5 dB with additional penalties for special audible characteristics such as tonality, impulsiveness, and amplitude modulation.

Germany also has for a long time had a night time noise level limit of 35 dB(A) Leq.

Wind farms have been approved under these target noise limits and a good balance has been struck to provide renewable energy and protect the nearby population.

A target noise limit of 35 dB(A), Leq approximates to 33 dB(A), L90 that lies 2 dB below the lowest recommended day-time absolute limits in WEDG 2006 for quiet areas and reflects modern expectations for the protection of a nearby community.

## **NOISE MODEL**

The NVA has used the ISO 9613-2 noise model that includes ground absorption.

It is unclear if the NVA predictions have used octave band sound power data in the noise model as this data has not been supplied for the candidate V136 wind turbine.

ISO 9613-2 prediction results are sensitive to the value of ground absorption/attenuation effect, G, that can range between 0 and 1. G=0 indicates no ground absorption and G=1 represents full ground absorption of sound.

A paper by Brittain and Charalampous<sup>3</sup> shows the inadequacy of the ground effect calculations in ISO 9613-2 for a source height of 100m, which conveniently approximates the hub height of the proposed candidate wind turbines in the NVA.

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<sup>3</sup> Brittain, F., Charalampous, P: ‘Assessing Accuracy of ISO 9613-2 for Calculating Ground Effects of Stack Height and Distance Using Olive Tree Labs OTL Suite’. NOISE-CON 2016, Providence, Rhode Island, 13-15 June, 2016

The NVA has used a value of  $G=0.5$  in the ISO 9613-2 noise model for all the ground between the wind turbines and all noise sensitive receivers with an artificial receiver height of 4m (in practice all sound level surveys are completed at a height of between 1.2m to 1.5m).

The peculiarities of the ground effect calculation in ISO 9613-2 show that predicted sound levels for a receiver height of 4m there is a 2 dB difference in predicted sound levels depending on whether  $G=0$  or  $G=0.5$  is used.  $G=0$  produces typically 2 dB higher predicted sound levels than when  $G=0.5$  is used and 4 dB higher compared to  $G=1$ .

It is best practice to err on the side of conservatism and use  $G=0$  when using ISO 9613-2.

This point was made by Eric Sloth, one of the authors of the JOULE<sup>4</sup> study in his presentation (Appendix B) where he advises that if ISO 9613-2 is to be used for wind farm noise predictions, then  $G=0$  should be used with additional corrections to account for site effects such as inflow turbulence.

The NVA has not accounted for any site effects that can increase wind turbine sound power levels.

Furthermore, the NVA *assumes* that there will be no special audible characteristics from whatever wind turbine is chosen to be used in the wind farm. Only test results can confirm this assumption but none have been supplied in the NVA.

The ISO 9613-2 noise model has a stated limitation for its calculations in conditions where the source to receiver average height does not exceed 30m and when average propagation enhancement from vector wind does not exceed 1m/s to 5m/s measured at a height above ground between 3m and 11m.

ISO 9613-2 for this wind farm application is being applied well outside of its intended use.

The NVA has not commented on the uncertainty associated with the use of ISO 9613-2. The preferred IEA method recommended in the JOULE report suggests a standard deviation uncertainty of 0.004dB/m.

For a propagation distance of 1000m this translates to +/-4 dB (+/- one standard deviation). ISO 9613-2 predictions are estimated in Table 5 of the standard to have an uncertainty of +/-3dB at 1000m if all inputs are accurate but notes that:

*“The estimates of accuracy in table 5 are for downwind conditions averaged over independent situations (as specified in clause 5). They should not necessarily be expected to agree with the variation in measurements made at a given site on a given day. The latter can be expected to be considerably larger than the values in table 5.”*

The JOULE study also noted the following:

“As a result of the measurements just described it has been concluded that:

- Noise levels at all distances from the source do vary, even if the source of sound has a constant power level.
- The measured variation in noise levels increases with increasing distance from the source.

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<sup>4</sup> Bass, J., Sloth, E., Bullmore ‘Development of a Wind Farm Noise Prediction Model,’ JOULE project JOR3-CT95-0051, 1998

- Based on typical wind speed ranges of between  $0\text{ms}^{-1}$  and  $10\text{ms}^{-1}$  encountered during the experimental measurements, the one standard deviation spread of noise levels either side the mean level was found to increase at a rate of approximately  $0.004\text{dB(A)}$  per meter increase in the source to receiver separation distance.”

The fact that wind farm sound levels vary with increasing distance (assuming all wind turbines emit a constant sound level) suggests that the use of the L90 statistic underestimates the true impact of noise from a wind farm.

Whilst it is advantageous to use an L90 statistic to reduce extraneous noise effects on a measurement it unfortunately underestimates the true higher levels of noise caused by the wind farm.

This underestimation can be compensated for by adding the standard deviation of  $0.004\text{dB/m}$  measured in the JOULE study, in which case the predictions in the NVA would be increased by about 3 dB for the nearest dwellings.

A more realistic estimation of the higher sound levels from a wind farm is the predicted sound level using the simple IEA model (cut down ISO 9613-2 with corrections) plus the addition of one standard deviation uncertainty.

For a dwelling 1000m away the prediction should use the IEA model output plus 4dB ( $0.004\text{dB/m}$  at 1000m).

## WIND TURBINE LAYOUT

It is customary in the design of a wind farm to take account of the distances between wind turbines to minimise noise emissions and to maximise efficiency. An outline of such design considerations can be found in ‘NSW Wind Energy Handbook 2002’: Sustainable Energy Development Authority of NSW (SEDA).

From page 53 of the SEDA document:

*“A wind-farm layout must take into account that turbines have substantial ‘wakes’, which interfere with each other depending on wind direction and spacing. The general rule of thumb for spacing (the ‘5r-8r rule’) is five times rotor diameter abreast and eight times rotor diameter downwind.”*

Appendix B of the IEC61400-11 standard indicates that at high wind speeds, wind turbulence becomes the primary source of sound. It suggests that these effects should be minimized during testing and optionally reported.

A general outline of site layout considerations has been provided by Suzlon Energy. A summary of site effects from Suzlon is provided in Appendix C that suggests the *minimum* wind turbine separations to be  $3r$ - $5r$ , depending on wind direction. For a wind turbine layout that is exposed to wind from multiple directions the design limit is  $5r$ .

In the current layout of the Ballynisky Wind Farm, the distance between the nearest neighbouring wind turbine towers is typically less than 420 m.

The V136 wind turbines have a rotor diameter, ‘r’, of 136 m. The spacing between the turbines is 3.1 times the rotor diameter ( $3.1r$ ), which is significantly less than the recommended  $8r$  spacing to reduce wake turbulence effects from SEDA and  $5r$  spacing suggested by Suzlon.

An increase in wake turbulence from the wind turbines will lead to higher noise emissions and lower efficiency of the wind farm.

The NVA has not considered the potential increase in sound power caused by wake effects.

### **AMPLITUDE MODULATION (AM)**

The NVA discusses AM at length in the NVA (pp. 14 and 15, section 11.3.3.9) but reaches no conclusion on a penalty scheme to account for this special audible characteristic.

However, NG3 describes AM under the heading of ‘Temporal Characteristics’ and states for AM that:

*“The mechanism behind this is not clearly understood. However, features which are thought to enhance this effect are:*

- close spacing of turbines in linear rows*
- tower height to rotor diameter ratio less than approximately 0.75*
- stable atmospheric conditions*
- topography leading to different wind directions being seen by the blades at different points in their rotation”*

Note that the tower height (90m) to rotor diameter (136m) ratio is 0.66. (V136)

It can safely be assumed that AM *will* be an observable effect at NSLs because the turbine spacing is too close, the tower height to rotor diameter ratio is 0.66 (less than 0.75), and stable atmospheric conditions will occur from time to time.

Limerick County Council should consider that AM is to be expected for this wind farm configuration that would warrant an additional penalty to predicted sound levels that have not been applied in the NVA.

ETSU-R-97 incorrectly addressed amplitude modulation and made a sweeping assumption that such a characteristic was rare in modern wind farms. The NVA echoes this with the statement: “It should also be noted that these are rare events associated with a limited number of wind farms.”

This is not the case and it is now recognised that amplitude modulation is the most intrusive sound characteristic of wind turbines and that tonality and impulsiveness also occur at many wind farms.

The current GPG refers in section 7.2 to ongoing research. Since the publication of the GPG in 2013 there has been much ongoing research and amplitude modulation is known to be a significant concern for residents near modern wind farms.

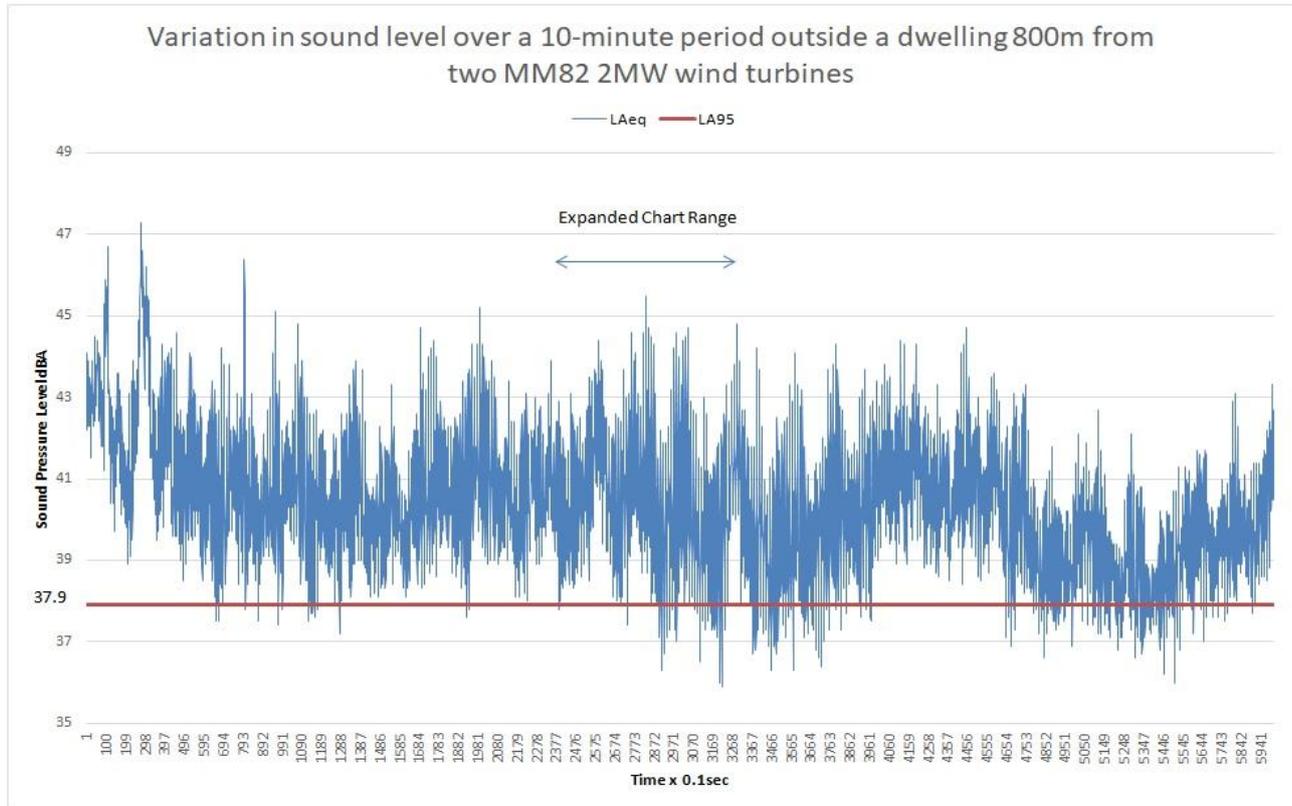
The following figures illustrate A-weighted sound levels over a 10-minute period that were recorded at a rate of ten samples per second 800 m from two MM82 2MW wind turbines outside a dwelling.

The measurement was taken when the wind turbines were operating in the early hours of the morning when there was no extraneous insect, bird or animal sound but there was sound from wind in trees and foliage. This was confirmed by listening to the audio recordings taken at the same time.

Figure 2 shows the 100ms ‘short’ LAeq values and a single LA95,10min level for the data.

LA95 was calculated for this figure because the limit for this wind farm is in terms of LA95.

However, the LA90 would only be slightly higher at approximately 38 dB(A).



**Figure 2**

An expanded range from Figure 2 is shown in Figure 3 to provide more detail.

The repetitive variation in sound level is caused by sound from the two wind turbines as the blades rotate.

Sound caused by wind in trees and foliage is random, not repetitive as shown in these two charts.

Each peak and trough repetition can be linked to each time a blade passes through a part of the swept area.

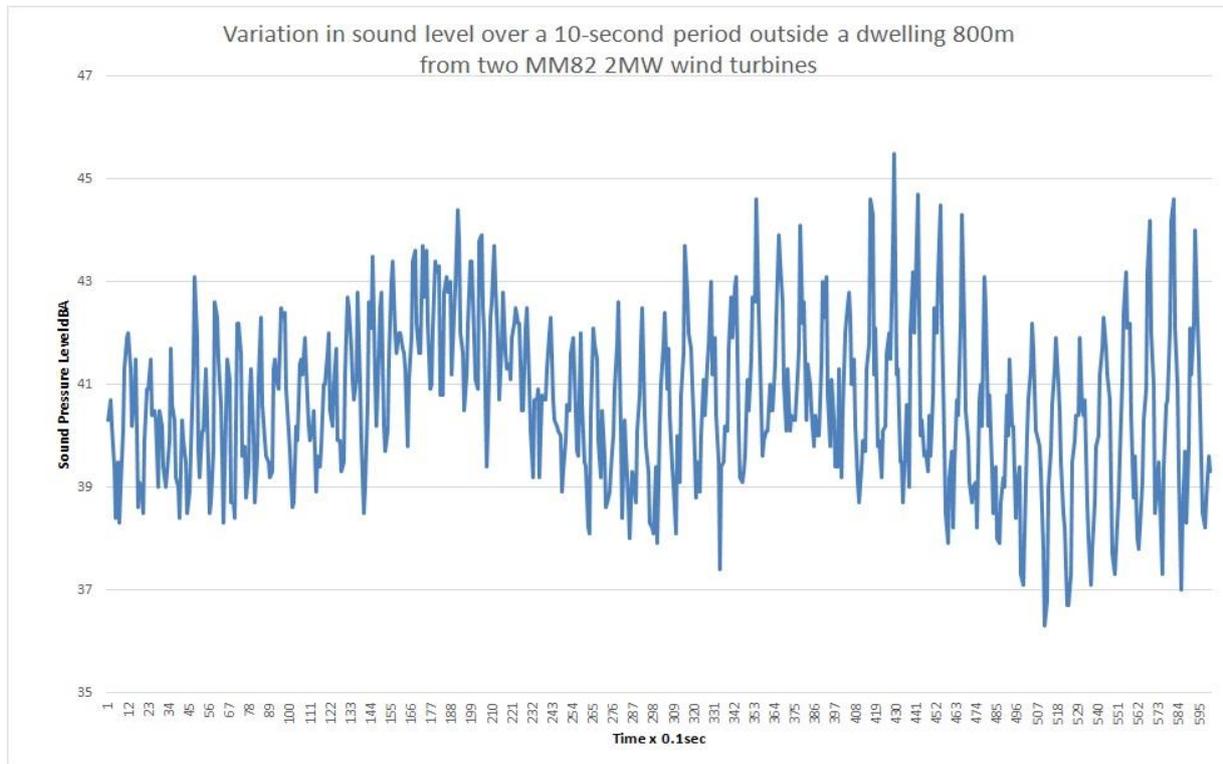
As each wind turbine operates independently of others the small difference in rotation speed between these two wind turbines is causing the peak and trough repetitions to combine yielding a trace that can appear to synchronise at blade passing repetition to the time when the blades are out of synchronisation yielding an apparent doubling of the blade passing repetition.

For a wind farm containing many wind turbines the peak and trough level and repetitions vary randomly.

However, when synchronised the sound levels add together to produce an overall higher sound level compared to when the individual turbine blades lose synchronisation.

Figure 2 shows the interacting effect for two wind turbines where the first part of the 10-second chart shows the turbines to be out of synchronisation with a generally lower sound level variation peak to trough compared to later in the chart where the turbine blade rotations synchronise causing higher overall peak to trough sound level changes.

An unfortunate disadvantage in using the L90 statistic is that the character of sound level changes during any 10-minute measurement are lost and sound level variations are greatly underestimated.



**Figure 3**

A common observation of unusual sound level change occurs when ‘whump’ or ‘thump’ is described by observers.

Whump and thump are thought to originate from the aerodynamic sound of wind turbine blades when they encounter wind turbulence or are incorrectly adjusted for the incoming wind that causes a blade to stall temporarily. Placing wind turbines too close to each other will increase wind turbulence and increase AM<sup>5,6</sup> and the instances of ‘whump and thump’ sounds.

The occasional whump and thump sounds are much louder than normal wind turbine sounds and the fact that they would not occur for more than 9 minutes in any 10-minute recording means that the LA90 centile would not identify such events.

Sound levels vary throughout the measurement period in the 10-minute duration of the chart above (Figure 1) ranging from a maximum level of just over 47 dB(A) to a minimum level of about 36 dB(A). From the 6000 sound level samples the single statistical L95 parameter obtained from this chart is 37.9 dB(A), shown as a red line across the chart.

<sup>5</sup> Sinayoko, S. ‘On predicting wind turbine noise and amplitude modulation’ 6<sup>th</sup> Int. conf. wind turbine noise, 2015

<sup>6</sup> Buck, S. et al ‘Experimental validation of a wind turbine turbulent inflow noise prediction code’, AIAA Journal 2016

The L90 centile is only sensitive to the lowest 10 % of sound levels within any 10-minute sample. For example, in the chart above there could be sound levels that reached 100 dB(A) for up to 9 minutes that would have no bearing on the calculated L95 value of 37.9 dB(A) or L90 of 38 dB(A).

The IoA AM Preferred Method fails to correctly evaluate AM from just two wind turbines and fares even worse when more than two wind turbines combine to produce AM.

A report<sup>7</sup> was prepared for DEFRA that outlines a wind farm noise statutory nuisance complaint methodology. Section 5.4.5 of this report (NAN-R-277) explains the difference between a centile statistical noise metric such as an L90 and the energy averaging Leq as follows:

#### “5.4.5 Noise Indices

By convention wind farm noise in the UK is measured using the LA90,10-minute noise index, as it is argued that this index minimises the influence of extraneous noise. However, excepting ETSU –R-97, there are few if any standards that set noise limits using this index. Additionally, it is argued that because the LA90,10min index focuses on the quietest periods in the measurement period it is relatively insensitive to rapid fluctuations in noise level where the noise varies rapidly over a short period e.g. as with aerodynamic/amplitude modulation, and the impact of such characteristics can be underestimated using the LA90,t noise index.

However, elsewhere in the world the LAeq,t index is preferred for wind turbine noise. Use of the LAeq,t or derivatives for environmental noise measurement is recommended by international standards and bodies e.g. ISO 1996 and the WHO, and British Standards such as BS 4142, BS 7445 and BS 8223. Additionally, there are a range of standards and guidance that offer guideline and recommended values of LAeq,T noise levels against which to weigh any measurement. The energy averaging nature of this index means it tends to be biased towards the highest noise levels that occur during a measurement. The figure below shows an indicative sound pressure level trace of a time varying noise signal (SPL) and the approximate LAeq,t and LA90,t values.

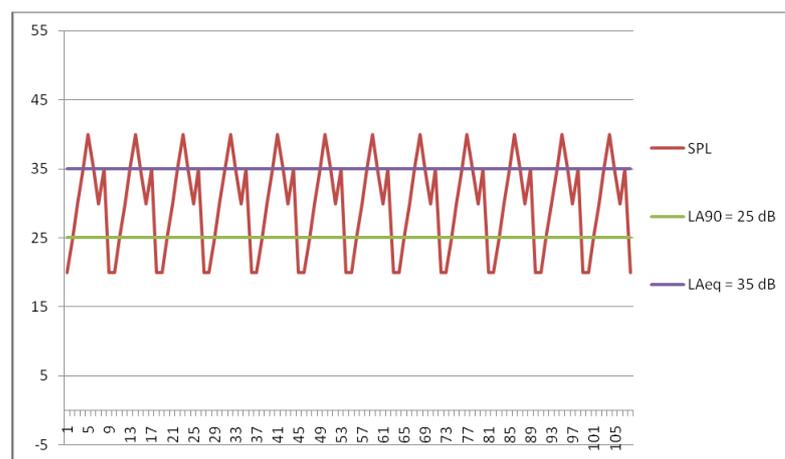


Figure 13 LAeq,t and LA90,t values of an indicative time varying noise signal”

The current GPG also explains in section 7.1 that the guide cannot provide a definitive set of AM conditions for a wind farm, despite suggesting some options.

<sup>7</sup> NANR277 “Wind farm noise statutory nuisance complaint methodology DEFRA (2011)

There is a current noise condition in force for the Denbrook Wind Farm that addresses AM limits, which has been accepted by the High Court in the UK, as follows:

“Condition 20

At the request of the local planning authority following receipt of a complaint the wind farm operator shall, at its expense, employ a consultant approved by the local planning authority, to assess whether noise immissions at the complainant’s dwelling are characterised by greater than expected amplitude modulation. Amplitude modulation is the modulation of the level of broadB(A)nd noise emitted by a turbine at blade passing frequency. These will be deemed greater than expected if the following characteristics apply:

- (a) A change in the measured  $L_{Aeq, 125 \text{ milliseconds}}$  turbine noise level of more than 3 dB (represented as a rise and fall in sound energy levels each of more than 3 dB) occurring within a 2 second period.
- (b) The change identified in (a) above shall not occur less than 5 times in any one minute period providing the  $L_{Aeq, 1 \text{ minute}}$  turbine sound energy level for that minute is not below 28 dB.
- (c) The changes identified in (a) and (b) above shall not occur for fewer than 6 minutes in any hour.

Noise immissions at the complainant’s dwelling shall be measured not further than 35 m from the relevant building, and not closer than within 3.5 m of any reflecting building or surface, or within 1.2 m of the ground.”

Limerick County Council may wish to consider Condition 20 of the Denbrook Wind Farm as a model AM condition for any future wind farm that they approve.

Conditions referencing the IoA AM Preferred Method should be avoided for wind farms.

### INFRASOUND, LOW FREQUENCY NOISE (ILFN) AND HEALTH EFFECTS

The NVA has cited several references prior to 2013 generally supporting the idea that low frequency and infrasound from modern wind farms are insignificant and that there is a lack of available data to demonstrate adverse effects on health.

However, it is now recognised that infrasound and low frequency sound is emitted from wind turbines and that the infrasonic pulses are unlike any other environmental sound source.

Figure 4 shows the change in infrasound levels near to the Cape Bridgewater wind farm measured inside a nearby stone dwelling during changes in operation from stopped to 15% and 45% power generation.

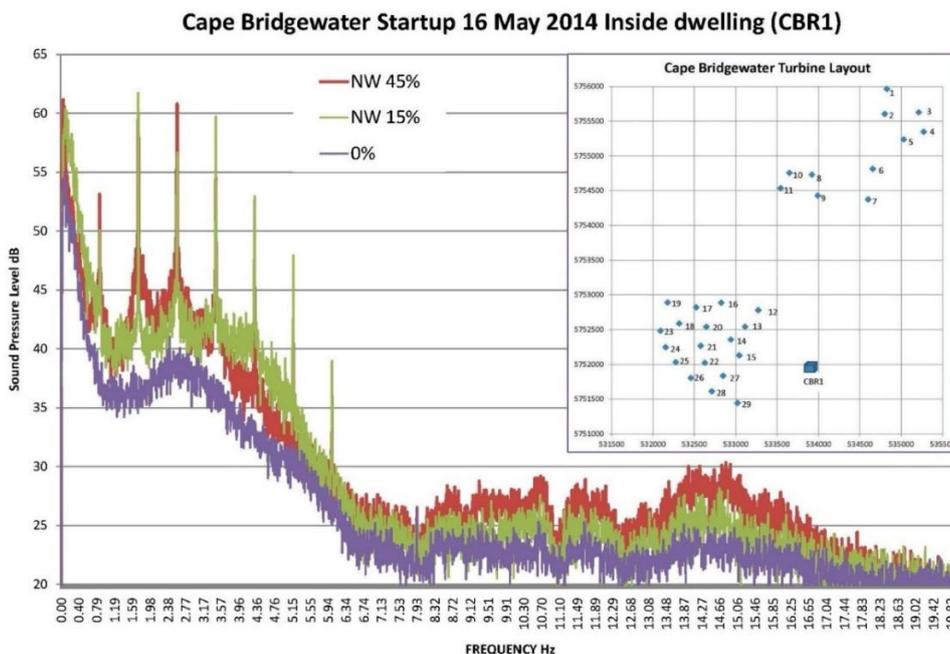


Figure 4

The NVA references two studies in page 15 and page 16 (11.3.3.9 (1)) that have used the dB(G) filter to assess wind farm ILFN. However, the G-weighting filter attenuates the blade pass pulses and the harmonics associated with those pulses (<5Hz).

The NVA considers health effects due to noise from wind farms in section 11.3.3.10 and like considerations of infrasound and low frequency note the lack of evidence based on research prior to 2013.

The Australian National Health and Medical Research Council (NHMRC) awarded a study to two Australian universities, one in South Australia and the other in New South Wales to investigate wind farm infrasound. This study was awarded in the value of AUD \$3,300,000 after the NHMRC reference in the NVA that was based on data available in 2013.

Obviously, this recognises the fact that there was a lack of research in this area to use as a base to draw any firm conclusions.

The WHO 2018 Environmental Noise Guidelines is also of the same opinion that states: “Five low-quality systematic reviews of wind turbine noise effects on mental health and well-being have been carried out (Ellenbogen et al., 2012; Kurpas et al., 2013; Merlin et al., 2013; Onakpoya et al., 2015; Schmidt & Klokke, 2014 ). These reviews differed in their conclusions and delivered inconsistent evidence that wind turbine noise exposure is associated with poorer quality of life, well-being and mental health.”

Because there were differences of opinion from the research that was cited the WHO rated this work of low quality: “Therefore, the evidence for no substantial effect of wind turbine noise on quality of life, well-being or mental health was rated very low quality”.

However, it is incorrect to suggest that there is *no* evidence that wind farm noise can cause adverse health effects. The WHO rate the research demonstrating no adverse health effects as low quality.

The meaning embedded in the WHO’s phrasing is critical to how its guidance is interpreted.

The WHO refers to a lack of evidence for no adverse effect, not a lack of evidence for an adverse effect.

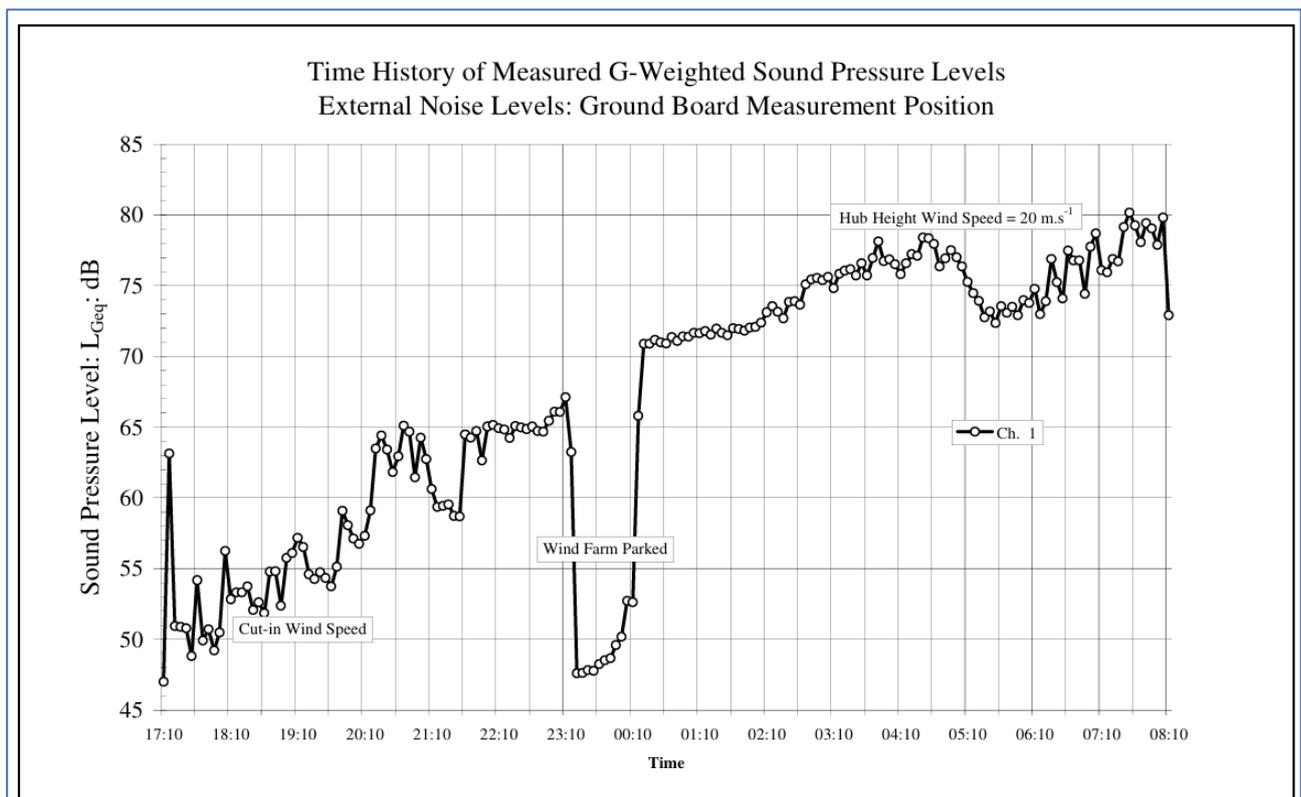
Research is ongoing but one of the published papers in 2019 by researchers at Flinders University (Nguyen, D. P., Hansen, K. et al. Wind farm infrasound detectability and its effects on the perception of wind farm noise amplitude modulation, Acoustics 2019) stated in its conclusions that: “Overall these preliminary results suggest that WF noise complaints could potentially be governed to some degree by the presence of infrasound” and that “ We found that self-reported noise sensitive individuals can detect the presence of low-level infrasound ( $48 \pm 2$  dB(G)) above chance.”

The finding that infrasound at levels of  $48 \pm 2$  dB(G) can be observed by individuals is in stark contrast to the generally used limit of perception of 85 dB(G).

Although the G-weighted filter significantly attenuates the blade pass and associated harmonics from a wind turbine it is worth noting that reference to the 2006 Hayes McKenzie report neglected to show the result of an on/off test in that report, shown below (Figure 12 from reference).

An extract from this report explains that “Wind turbine noise may result in internal noise levels within a dwelling that is just above the threshold of audibility,” that was assumed to be 85 dB(G).

The 2019 Flinders University research changes the threshold of audibility of wind farm noise to 48 +/- 2 dB(G) which would change the conclusion in the Hayes McKenzie DTI report; ‘The measurement of low frequency noise at three UK wind farms’, URN no. 06/1412 from 2006.



**Figure 12: Time History Figure of G-Weighted Sound Pressure Levels for a Wind Farm**

Much of the recent research into human response to wind farm generated infrasound has been based on *synthesised* wind farm sound played to subjects in a laboratory”

A paper by Cooper, S. (“The use of synthesised or actual wind turbine noise for subjective evaluation purposes” PROCEEDINGS of the 23rd International Congress on Acoustics 2019) is critical of the use of synthesised wind farm infrasound signals and has noted that it was the change in amplitude of the infrasound signal that was observed to be a significant factor in subject disquiet.

Unfortunately, the issue of adverse health effects from wind farm generated infrasound remains contentious and authorities may wish to consider an appropriate condition when approving future wind farm developments if ongoing Australian, or other relevant international research, finds adverse health effects from infrasound.

My own measurements at the Cape Bridgewater Wind Farm, also confirmed by S Cooper in his 2014 study<sup>8</sup>, showed that low frequency sound from the output shaft of the gearboxes to the generators exceeded DEFRA NAN-R-45 indoor recommended guideline values at 32 Hz.

Furthermore, the 32 Hz tones were modulated in frequency and random in level.

<sup>8</sup> Cooper, S. “The results of an acoustic testing program - Cape Bridgewater Wind Farm” The Acoustic Group Report 44.5100.R7MSC, Nov 2014

The NVA has not considered low frequency noise impacts. The A-weighting filter significantly attenuates low frequency noise, which is why DEFRA NAN-R-45 uses unweighted one third octave sound levels in the frequency range from 10 Hz through to 200 Hz.

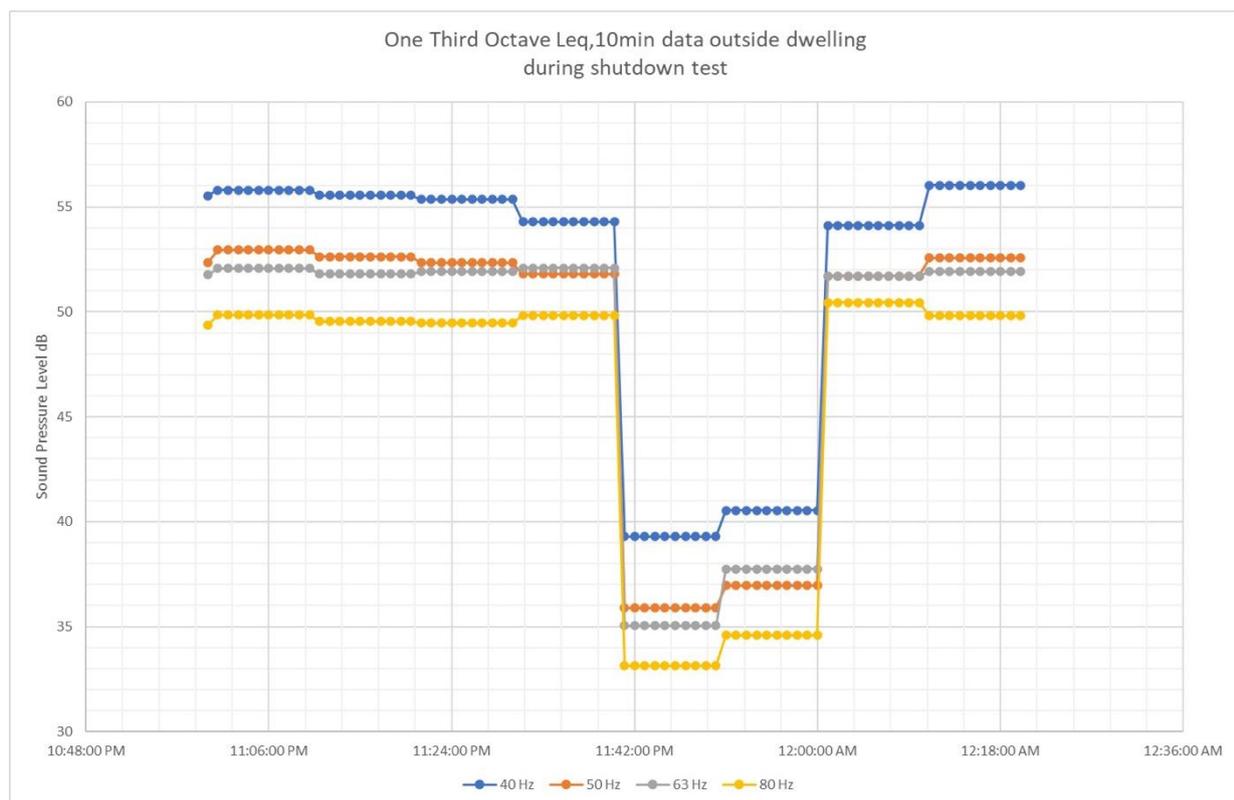
Low frequency sound is an important issue that should be reported in an EIAR and is a requirement of the Limerick County Council that applies the Danish low frequency guideline limits.

I have recently measured low frequency sound outside a dwelling during on/off testing near to a recently constructed wind farm. Figure 5 shows the results of measurements at the dwelling that is approximately 2 km from the nearest 3.6 MW wind turbine.

Measurements of the 40 Hz, 50 Hz, 63 Hz and 80 Hz one third octave unweighted sound levels before, and after the shutdown period, just prior to midnight, show that the threshold values of DEFRA NAN-R-45 were exceeded. Outside measurements were corrected to indoor levels for typical building façade attenuation according to Downey and Parnell (2017).

The occupants of the dwelling had complained about low frequency noise nuisance from the nearby wind farm and in this instance, the complaints were justified.

The NVA has mistakenly completely dismissed ILFN.



**Figure 5**

It would be advisable to measure current ambient ILFN at the NSLs to supplement A-weighted Background survey results.

Low frequency noise predictions should also be completed in frequencies below that which ISO9613-2 allows. ISO9613-2 is only applicable for the octave bands from 63 Hz through to 8 kHz.

The NVA is deficient in the assessment of ILFN.

## **CONCLUSIONS**

The NVA does not provide any confidence that an acceptable noise impact will result from the proposed development.

Limerick County Council should refuse the Ballynisky Wind Farm Application.

The NVA within the EIAR does not consider site effects or audible characteristics such as low frequency, tonality or amplitude modulation.

The assessment methodology adopted in the NVA follows guidelines that have been shown to be deficient and are currently under review.

The WEDG 2006 guidelines recommend a range of acceptable sound levels during the day but the NVA has elected to choose the highest noise limit in the range that could be applied, based upon what I consider to be an incorrect evaluation of the test for a low noise environment.

The NVA predicts optimistic sound levels that demonstrate increases in the ambient noise environment greater than 10 dB.

The impact assessment approach referenced in the NVA for operational noise from the development has not been applied.

If it was applied then the development would have an impact described as ‘Very Substantial Effect’ according to IEMA Guidelines and ‘Very Significant’ and ‘Profound’ effect according to ‘Guidelines on the Information to be contained in Environmental Impact Assessment Reports’ (EPA, 2022). This is contrary to the suggestion in the NVA that operational noise is ‘not significant’.

# Appendix A

## CV of William Leslie Huson

### QUALIFICATIONS

BSc (Hons) Applied Physics, UK 1975

MSc Sound and Vibration Studies, Institute of Sound and Vibration Research, Southampton, UK  
1977

### PROFESSIONAL AFFILIATIONS

Chartered Physicist, UK

Member of the Institute of Physics, UK

Member of the Institute of Acoustics, UK

Member of the Australian Acoustical Society

Member of the AV0001acoustics working group for Standards Australia

Australian representative for the International Institute of Noise Control Engineers (I-INCE)

Technical Study Group 5 *A GLOBAL APPROACH TO NOISE CONTROL POLICY* (Now disbanded after completion of the scope of work defining this group – see <http://www.i-ince.org/data/iince061.pdf>)

### EXPERIENCE

Since graduating I have been involved in several scientific areas of research and development. My early experience was in constructing a microwave device to measure the temperature of plasma inside a nuclear fusion experimentation device at the UKAEA, Culham Laboratory in the UK. I then worked in research and development of thermal imaging devices prior to completing a Masters in Sound and Vibration Studies. My work since then (1977) has been primarily associated with acoustics and vibration both terrestrial and underwater.

Prior to 1991 I worked as a Sound and Vibration consultant in the UK for 12 years with involvement in a wide range of industries.

For the past 35 years I have worked in Australia as a noise and vibration consultant and have operated through my own consultancy firm for the past 29 years. I am experienced in modelling acoustic propagation from a variety of sources such as railways, roads, aircraft, underwater ordnance, wind farms, pile driving, blasting and numerous types of industry.

I have also prepared the Brisbane Noise Survey in 1998 for the Brisbane City Council and was the author of the Noise Impact Assessment Planning Scheme Policy for Brisbane City Council's City 2000 Planning Scheme.

Of relevance to wind farm related assessment is the work I completed for the Toora Wind Farm in 2002 which involved detailed analysis of pre and post construction noise data using NZS6808 1998

to check compliance with license conditions. NZS6808 is based upon ETSU-R-97. My experiences in the analysis of wind farm noise data led to a paper that was presented at the joint Australia and New Zealand Acoustics conference in 2006; “Review of the Application of NZS6808 to wind farms in Australia.” This paper highlighted the sources of error that were implicit and allowed in the NZS6808, 1998 standard and ETSU-R-97. The latest version of the NZS6808 standard (2010) addresses a number, but not all, of the data analysis error concerns described in my paper. ETSU-R-97 and the Institute of Acoustics Good Practice Guide to the Assessment and Rating of Wind Turbine Noise is regularly referenced when interpreting parts of NZS6808 in Australia and I am familiar with this document and the supporting Supplementary Guidance Notes (GPG).

Over the past twelve years I have been independently gathering sound data in the audible and infrasound parts of the acoustic spectrum at numerous wind farms in Australia, the UK and Ireland. A summary of some of this research work on infrasound was presented in a peer reviewed paper: Huson, W. Les. “Stationary wind turbine infrasound emissions and propagation loss measurements.” 6th International Conference on Wind Turbine Noise, Glasgow 20-23 April 2015. I have investigated the Preferred IoA Method for the assessment of amplitude modulation (AM) in detail and applied it to several wind farm measurements taken outside dwellings near to numerous wind farms in Australia and the UK. The findings of this work are the realisation that the Preferred IoA Method is only suitable for assessing a single wind turbine, that the resulting AM values greatly underestimate short term peak to trough amplitude modulation levels observed, and that the Method is wholly unsuitable to assess AM (peak to trough amplitude modulation) from multiple wind turbines.

Detailed analysis of AM from wind farms has revealed that many AM events also exhibit impulsiveness when evaluated according to BS 4142:2014+A1:2019.

# **Appendix B**

Presentation by E Sloth

# Problems related to the use of the existing noise measurement standards when predicting noise from wind turbines and wind farms.

Erik Sloth Vestas

Niels Christian Møller Nielsen VESTAS  
Ejler Kristensen BONUS Energy  
Bo Søndergaard DELTA

# Overview

- Noise Measurements (IEC 61400-11:2002)
  - Short description of the measurement method
  - Use of measurement results, including influence on inaccuracy.
- Noise prediction
  - Terrain and meteorology influence on the actual emitted sound
  - Methods used in noise calculations
- Noise assessment
  - Descriptors
  - Noise limits
  - Further investigations needed

# Noise Measurements (IEC 61400-11:2002)

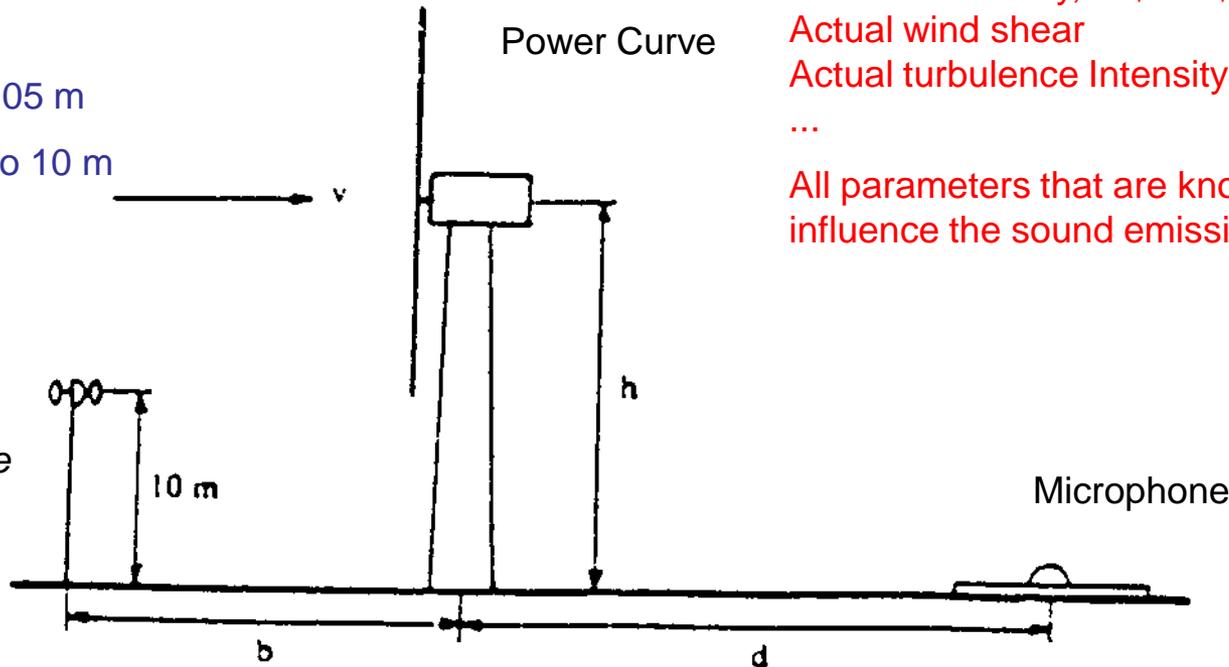
We correct for:

Air pressure  
Air temperature

Standard terrain  
roughness  $z = 0.05$  m

All recalculated to 10 m  
wind speed

Anemometer  
*For background noise  
only*



We do not correct for

Actual inflow angles  
Actual air density, *except in the power curve*  
Actual wind shear  
Actual turbulence Intensity

...

All parameters that are known to  
influence the sound emission

# Noise Measurement

- The results are standardized noise levels, which are fairly comparable from measurement to measurement on a given turbine type.
- The wind turbine is used as a wind speed meter through a power curve measured on an ideal site (IEC 61400-12) OBS impossible if actual terrain does not fulfill conditions
- Other parameters influence the noise level: relative humidity, turbulence, inflow angle, wind shear, turbine pitching are not accounted for.
- The result is a fairly good tool for verification of warranties, but not a good tool for predicting noise at imission points where people actually can get annoyed.
- The Sound Power Level related to the produced power or at least the sound power level as a function of hub height wind speed could be a more basic relationship

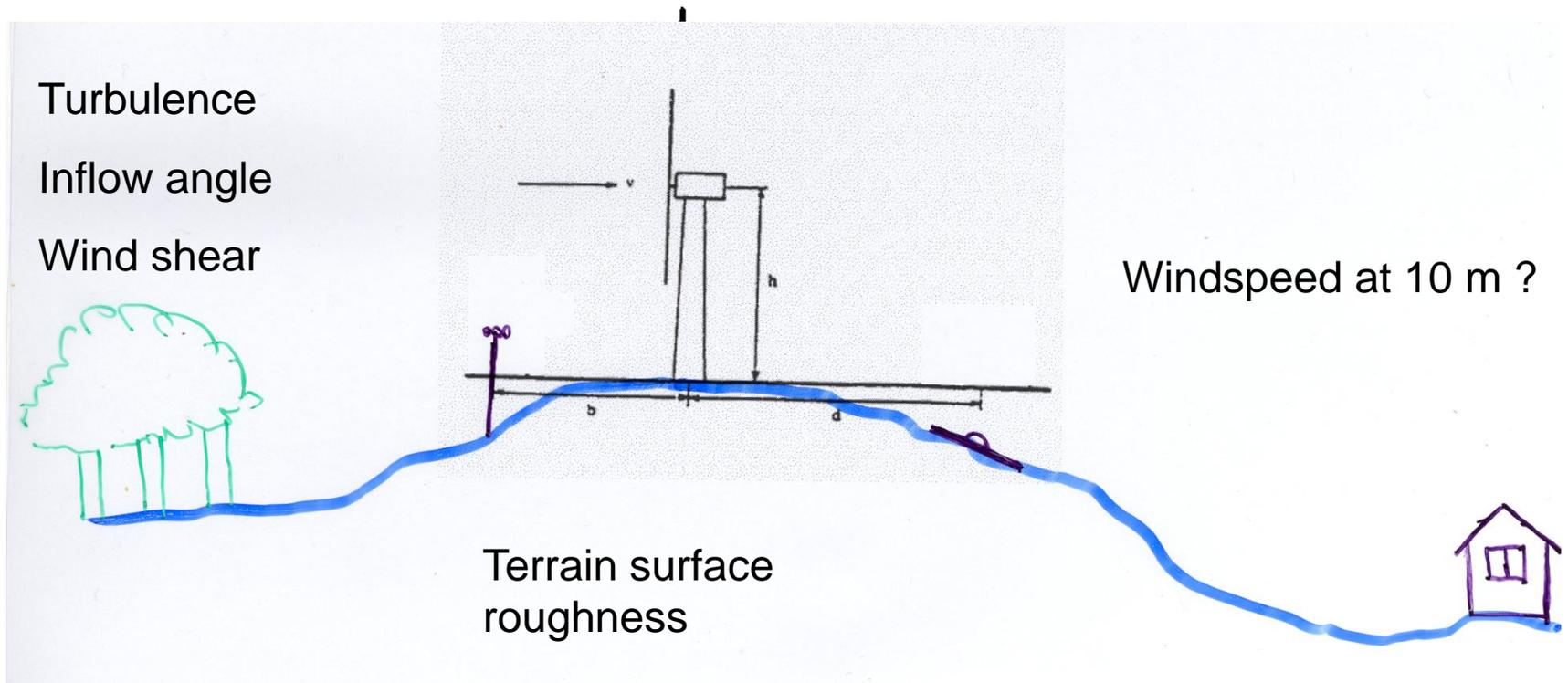
# Typical problems in using the measurement results

- Where do we see the major deviations from standardized conditions during actual use of measurement results
- The wind turbines are almost always raised at sites where roughness differ from the standardized completely flat measurement site.
- Further we see different air density
  - different wind shear
  - different turbulence in inflow air
  - different inflow angles
- Finally we often see other hub heights than used during documentation

# Use of measurement results

For noise control measurements

For noise level calculations



# Conclusion on measurement results

- The differences in site conditions creates differences in emitted sound power level.
- The differences could be both increased and decreased emitted sound power levels in real life applications
- The differences will transfer directly to the imitted sound power levels, and may thereby create increased annoyances in real life
- Therefore – site specific sound power levels should be used unless a good safety margin is present using standardized emission levels.

# Uncertainty

- According to IEC 61400-11:2002 the standard deviation of a measurement results is app. 0.9 – 1.5 for an ideal site
- If the measurements are made at a site with considerable turbulence intensity or wind shear the standard deviation can be app. 2.0 dB
- The result is that when used for calculating the noise from a wind farm at an imission point, some WTG will be higher than the expected level and some will be lower.
- To correct for this, the measured inaccuracy cannot be placed upon the total calculated level, but must be included in the calculations.
- The result is that the higher the number of WTG's in the project is, the smaller the resulting inaccuracy.
- If the results are used for calculating the noise from a wind farm the standard deviation should be calculated as the weighted standard deviation

$$\sigma_{res} = \sigma_{method} + \sigma_{source} = \sigma_{method} + \frac{\sqrt{\sum (\sigma_i \cdot 10^{L_i/10})^2}}{\sum 10^{L_i/10}}$$

# Solution to the outlined problems

- Accept that different sound power levels should be used in predictions and warranties.
- Avoid using sound power levels that include inaccuracy in predictions unless there is a good safety margin.
- The inaccuracy should be included in the calculation – the higher the number of WTG's the less the probability that all are in the high end of the uncertainty interval
- Use sound power levels that at least are corrected for: hub height, wind shear, air density, turbulence, inflow angle
- Be careful to make sure that the background noise measurements and wind conditions at the turbine positions uses the same reference position.

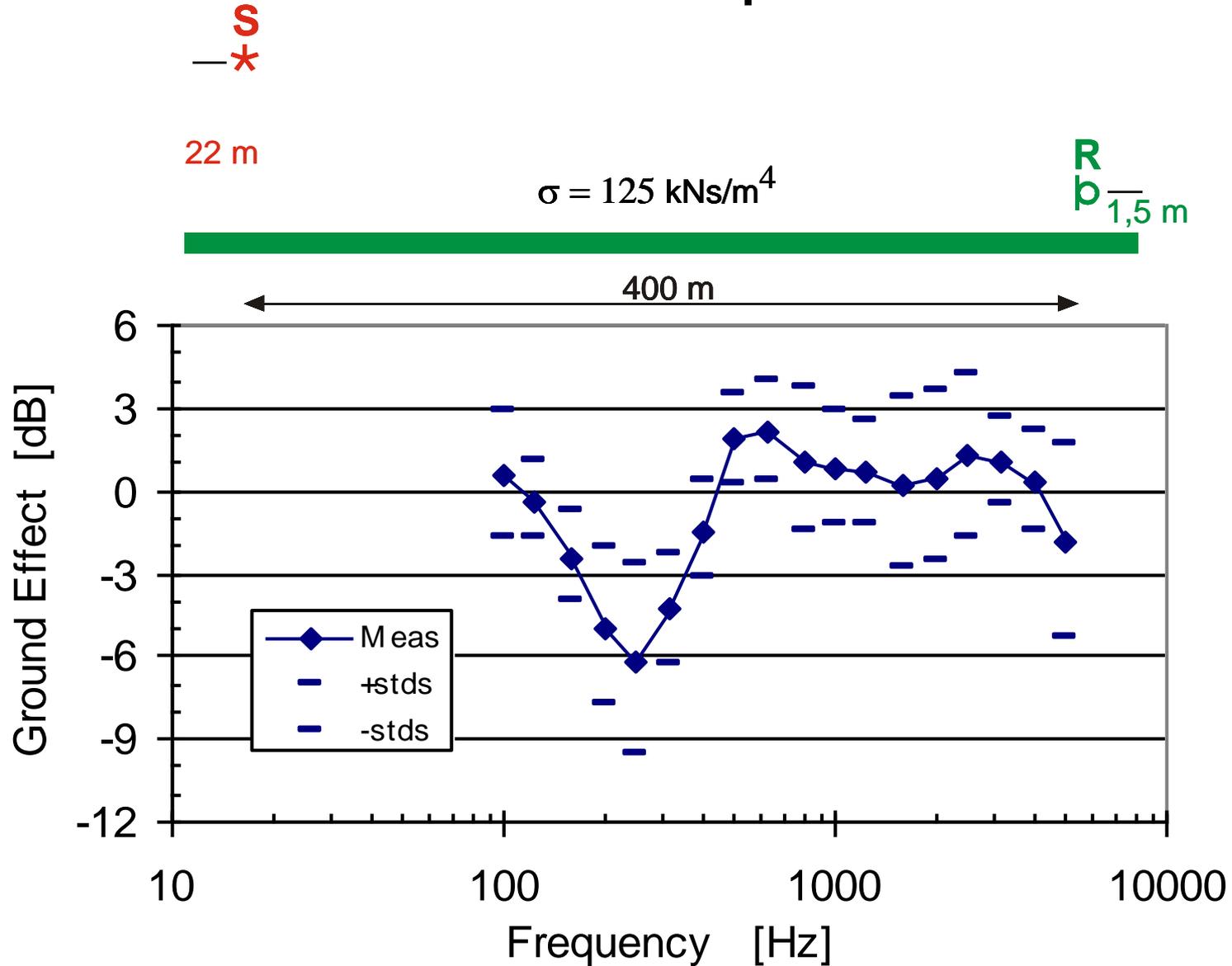
# Noise level calculation models

- There are lots of different noise level calculation models:
  - ISO 9613-2 which is the model that we see the most
  - VDI 2714
  - Concawe
  - BS 5228
  - General Prediction Method (Danish)
  - Danish EPA Guidelines
  - Netherlands Guidelines 1999
  - Swedish method (land/sea)
  - .....
  
- Most of the methods are developed for noise from Industry, wind speeds below 5 m/s and standard meteorological conditions and must be suspected to give poor results at larger distances.
- ISO 9613-2 is known sometimes to overestimate the terrain effects if soft ground is used
- Manufacturers, developers, consultants and authorities have an interest in a noise level calculation model developed specifically for wind turbine noise

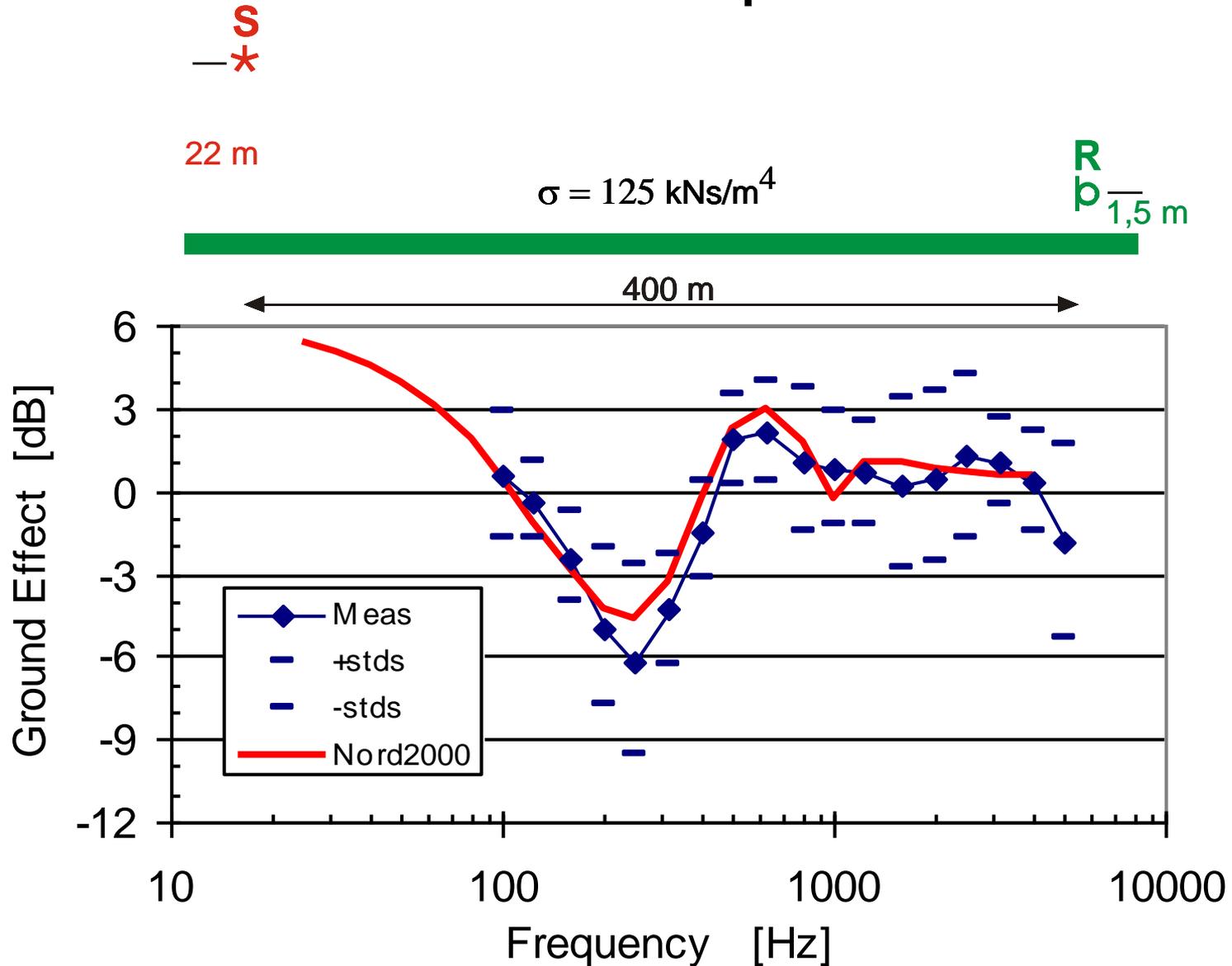
# Noise calculation models

- In an EU project JOR3-CT95-0065 a model for wind turbine noise propagation (WiTuProp) was developed giving good results
- The WiTuProp model takes into account
  - meteorological conditions:
    - Wind speed / terrain surface roughness and direction
    - Air temperature and air temperature gradient
    - Relative air humidity
  - The ground type
    - Flow resistivity for grassland and harder surfaces
  - Screening (by terrain or screens / barriers)
- WiTuProp is a special case of a more comprehensive model developed later:  
*NORD2000*

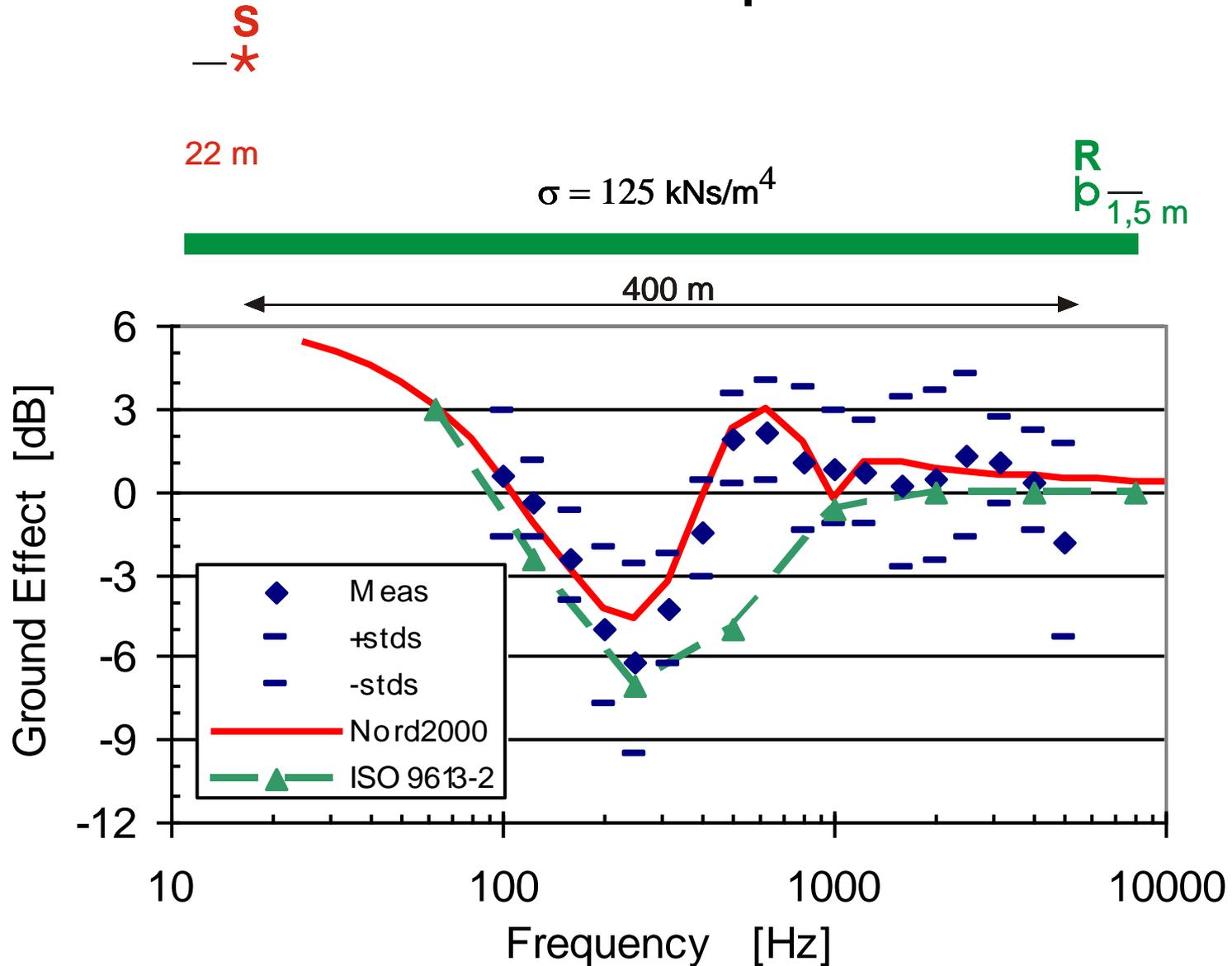
# Nord2000 / WiTuProp vs. ISO 9613-2



# Nord2000 / WiTuProp vs. ISO 9613-2



# Nord2000 / WiTuProp vs. ISO 9613-2



# Nord2000 model

- Meteorological conditions are better covered
- Complex terrain profiles (hill/valley)
- Mixed ground
- Terrain roughness
- Improved screen modelling
- 1/3 octave-band results
- Physical model – NOT empirical

Recommendation if the advanced model is not used:

- Use ISO 9613-2
- Make sure that hard terrain is used
- Be careful when defining screening effects from terrain - specially edge effects can be difficult to model

# Noise Assessment

- The noise level at the emission points are normally given as an A-weighted noise level at different wind speeds.
- A tonality evaluation is normally included for the receiving points.

What do we know of the annoyance of the noise:

- We know that noise from wind turbines sometimes annoys people even if the noise is below the noise limits.
- Often people complaints on low frequency noise which many investigations often show in not present
- The noise limits are usually adapted from industrial noise limits and are based upon the principle that a given percentage of the population will feel annoyed when the limit is exactly fulfilled.
- Evaluation of tonality in the turbine noise is more based on the reproducibility of the results than on pure knowledge on what is actually annoying

# Noise assessment

- Other descriptors need to be investigated to understand the annoyance caused by wind turbines
  - Low frequency noise and Infrasound – we cannot see it in our measurements
  - Modulation – may be the parameter that is heard as low frequency noise
  - Masking – which noise can mask noise from wind turbines
  - Other characteristics
  - ..
- This mean that tape recordings should me made on all sites in order to enable later analysis of up till now unrecognized parameters.
- In order to enable listener tests, artificial head investigations should be made
- We as a producer cannot cover this alone, since the local rules always need to be followed

# Our recommended research program

- Artificial head measurements on real turbines of different sizes
- Background noise measurements on real sites
- Listener tests on obtained results
- These measurements are being made on a test basis during our Danish measurements
  
- General Research that is needed in this area includes
  - Psychoacoustic experiments
  - Listener test
  - Measurements at low frequencies
  - Analysis for other characteristics
  - ..

Questions ?

# **Appendix C**

Suzlon Energy – Site effects

## Siting of Wind Farms: Basic Aspects

When searching the internet for the definition of the word "layout" I came across following:

*Layout in word processing and desktop publishing refers to the arrangement of text and graphics. The layout of a document can determine which points are emphasised and whether the document is aesthetically pleasing. While no computer program can substitute for a professional layout artist, a powerful desktop publishing tool can make it easier to lay out professional looking documents (source: [www.webopedia.com](http://www.webopedia.com))*

In principle the same is valid for wind farm planning: The term layout in wind industry is used for choosing optimal locations for wind turbines. Tools like flow models help to identify the best positions, but cannot replace the engineer making the final decision by balancing interests.

So what is that engineering experience, what factors influence the decision?



Jessica Rautenstrauch, wind energy consultant from Anemos, Germany, at work.  
© Paul Langrock ([www.unendlich-viel-energie.de](http://www.unendlich-viel-energie.de))

## Wind resource

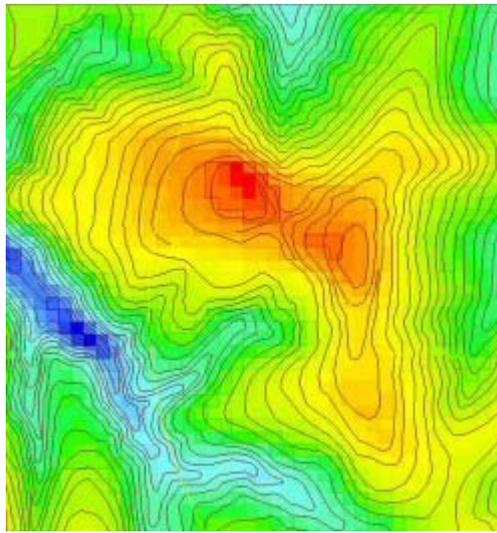
The wind resource is the most obvious factor to concentrate on when choosing a wind turbine location. We have a wide range of options to determine the wind resource of the site. The quality of the tools varies significantly and so does their price.

Common sense is a good starting point. Nature itself helps to guide us to suitable sites. Flagging of trees – permanent flagging and not the temporary bending in the wind – shows us the prevailing wind direction and is a good indicator for the strength of the wind.

However because of the uncertainty involved, using common sense as the only tool is of course insufficient. For any bankable estimate of the energy yield on-site wind speed measurements are required. The number of measurement masts required for a specific site depends next to the size of the project mainly on the complexity of the terrain. The measurement height should be minimum 2/3 of the expected future hub height. An increase in measurement height beyond this leads to a reduction of the uncertainty in the energy estimate. The measurement period must be one year or more to avoid any seasonal bias. Since the wind speed varies also inter-annually typically up to +/-12% a long-term correction is highly recommended.

The measured wind regime is extrapolated across the site to derive a resource map of the site using different flow models /4, 5/. A wind map like the one in Graph 1 can then be used to identify the windiest locations.

However additionally technical constraints should be taken into account when developing a layout /3/. A number of site specific wind load parameters can be extracted from the wind speed measurement. They are used to optimize the technical suitability of the chosen layout and the wind turbine type for the site specific wind regime.



Graph 1: Example Wind Resource Map. The colours denote the energy content of the wind, red high and blue low energy content.

## Technical restrictions

Wind turbines are designed for specific conditions. During the construction and design phase assumptions are made about the wind climate that the wind turbines will be exposed to. In rough terms: For very complex sites with high wind speeds “heavy-duty” versions of wind turbines are available, which are sturdier but also more costly. Low wind speed sites in flat terrain do not put so high demands on the on the wind turbine structure, hence the construction can be more light-weight and hence cheaper. The different turbines have been classified by the IEC, class 1 being the highest wind speed class. The following table is a simplified summary of the IEC classification /1/.

IEC class	I	II	III	IV
$V_{ave}$ (m/s) annual average wind speed at hub height	10	8.5	7.5	5
$V_{ref}$ (m/s) 50-year maximum 10-minute wind speed	50	42.5	37.5	30

Table 1: IEC classes

But not only the wind speed but also other parameters play a role and have to be checked, when developing a layout for a specific turbine.

One of the most important parameters is the turbulence intensity. Turbulence intensity quantifies how much the wind varies typically within 10 minutes. Because the fatigue loads of a number of major components in a wind turbine are mainly caused by turbulence, the knowledge of how turbulent a site is of crucial importance.

We have to distinguish between two different sources of turbulence. Turbulence is generated by terrain features – which is referred to as ambient turbulence intensity - as well as by neighbouring wind turbines – which referred to as induced turbulence (Figure 1). Sources of ambient turbulence are for example forests, hills, cliffs or thermal effects. Thus ambient turbulence can be reduced by avoiding critical terrain features. But the wake-induced turbulence has far more impact than the ambient turbulence intensity /2/. Decreasing the spacing increases the turbulence induced by the wakes of neighbouring wind turbines meaning that there are limits to how close you can space the turbines. As a general rule the distance between wind turbines in prevailing wind direction should be a minimum of the equivalent of five rotor diameters. The spacing inside a row perpendicular to the main wind direction should be a minimum of three rotor diameters.

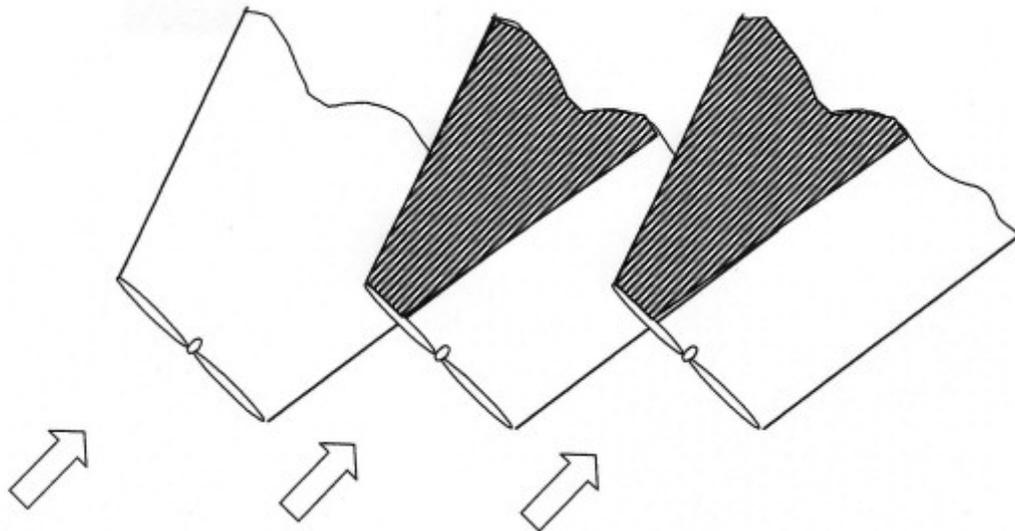


Figure 1: Shadowing in wind farm

If a layout is too close the resulting fatigue loads might be too high. In order to then ensure the lifetime of the main components wind sector management might have to be applied, meaning that some wind turbines might have to be switched off when they are operating in the wake of the neighbouring wind turbine.

Another parameter which has to be checked when developing a layout is the flow inclination, velocity tilt or in-flow angle. When wind turbines are to be placed on steep slopes or cliffs the wind might hit the rotor not perpendicular but at an angle. This angle is related to the terrain slope. With increasing height above ground level the effect of the terrain slope is normally reduced such that the terrain slope is only of indicative use to estimate the velocity tilt. A large in-flow angle will not only reduce the energy production but will also lead to an increased level of fatigue of some of the mayor components.

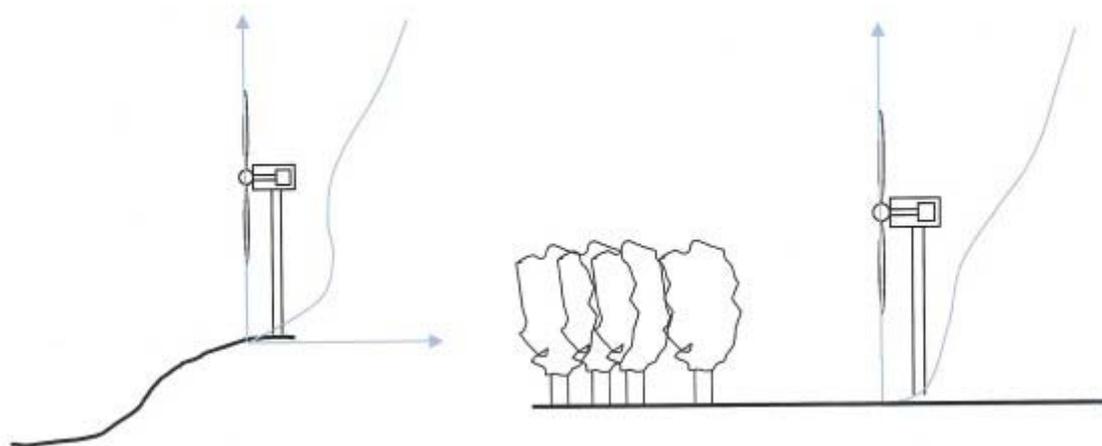


Figure 2: Distorted wind profile at steep slope (left) and behind a forest (right)

Furthermore a steep slope might cause a negative gradient across some parts of the rotor (Figure 2).

Normally the wind speed increases with increasing height. In flat terrain the wind speed increases logarithmically with height. In complex terrain the wind profile is not a simple increase and additionally a separation of the flow might occur, leading to heavily increased turbulence. The resulting wind speed gradients across the rotor lead to high fatigue loads particularly on the yaw system.

Obstacles like forest can have a similar effect on the wind profile and should be thus avoided.

## Planning constraints

Next to the wind resource and technical considerations a good layout should also take planning constraints into account. The visual impact is course the most obvious. A layout that follows the shape of the terrain rather than straight rows of wind turbines appears to be less intrusive. Noise is another important parameter to take into account. Next to noise also the impact due to flicker at the nearest inhabited houses should be estimated. The accepted levels vary from country to country.

Electro-magnetic interference can cause problems. Hence placing wind turbines in a transmission corridor should be avoided.

Some areas on site might have to be excluded from development due to other factors related to fauna, flora and archaeology.



Jessica Rautenstrauch, wind energy consultant  
from Anemos, Germany, at work.  
© Paul Langrock ([www.unendlich-viel-energie.de](http://www.unendlich-viel-energie.de))

## Summary

A large number of parameters have to be taken into account when developing a layout. Some work can be done using tools, but in the end the balance between financial, technical and planning constraints can be best done by an experienced engineer.

## Literature

- /1/ IEC 61400-1, Ed.2 – Wind Turbine Generator Systems – Part 1: Safety Requirements, FDIS 998
- /2/ S. Frandsen, St.; L. Thøgersen, L.;: Integrated Fatigue Loading for Wind Turbines in Wind Farms by Combining Ambient Turbulence and Wakes; Wind Engineering, Vol. 23 No. 6, 1999
- /3/ K. Kaiser, W. Langreder: Site Specific Wind Parameter and their Effect on Mechanical Loads, Proceedings EWEC, Copenhagen, 2001
- /4/ E.rik L. Petersen, N. G. Mortensen, L. Landberg, J. Højstrup and H. Frank: (, Wind Power Meteorology Part I: Climate and Turbulence, Wind Energy, 1, 25-45 (1998), Risø-I-1206, 1997
- /5/ E. L. Petersen, N. G. Mortensen, L. Landberg, J. Højstrup and H. Frank: Wind Power Meteorology Part II: Siting and Models, Wind Energy, 1, 55-72 (1998)

Wiebke Langreder  
Suzlon Energy: [www.suzlon.com](http://www.suzlon.com)

# **Appendix D**

EPA Tasmania wind farm noise policy

### Application

This policy is adopted by the Board of the Environment Protection Authority (EPA Board) for the purpose of assessing wind energy projects and requiring conditions or restrictions in respect to wind farm noise under the *Environmental Management and Pollution Control Act 1994* (EMPCA).

This policy supersedes any previous policy of the EPA Board in respect to operational noise criteria for wind energy projects. This policy does not apply to construction noise.

This policy applies from 31 July 2025 and will apply to all wind energy projects currently under assessment. It remains in place until revoked.

### Technical terms

$L_{Aeq}$  means the A-weighted equivalent continuous sound level.

$L_{A90}$  means the A-weighted sound level that is exceeded for 90% of the measurement period.

**dB** means decibel.

**dB(A)** means decibel when stating A-weighted sound pressure level.

### Design Criteria

**The predicted equivalent noise level at any noise sensitive premises should not exceed the greater of:**

- a) **35 dB(A)  $L_{Aeq, 10 \text{ min}}$ ; or**
- b) **Background ( $L_{A90}$ ) + 5 dB(A).**

This design criteria applies to all noise emissions from the activity, inclusive of wind turbines and all ancillary infrastructure. It has been set for the protection of sensitive receivers during periods of low background noise.

The background noise for day, evening and night-time must be calculated separately to determine the applicable (lowest) background level, and is not to be averaged across a 24-hour period.

For predictive purposes, a difference of ~2 dB between measured  $L_{A90, 10 \text{ min}}$  levels and  $L_{Aeq, 10 \text{ min}}$  emissions from the activity must be noted. The predicted noise levels should be adjusted for special audio characteristics and/or the applicable adjustment factors must be discussed.

The EPA South Australia *Wind farms environmental noise guidelines 2021* (or the most recent revised version of that document) is to be used for assessing whether a wind farm can meet this design criteria, except where that guideline may be inconsistent with this policy.

### Noise Measurements

If approved, wind energy projects will contain conditions and restrictions to enforce the design criteria. The following guidance is provided for the interpretation of EPA Board wind energy project noise requirements:

1. It is generally acceptable for wind turbine noise to be measured in  $L_{A90}$ , but note that alternative techniques may be required (including measuring in  $L_{Aeq}$ ) to better detect special audible characteristics (dominant and intrusive characteristics) and noise fluctuations or intermittent noise.
2. An appropriate conversion factor must be added to the measured  $L_{A90}$  level to derive the representative  $L_{Aeq}$  noise level. To be representative of  $L_{Aeq}$ , generally applying +2 dB(A) conversion factor to the measured  $L_{A90}$  level is acceptable.





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12<sup>th</sup> November 2025

Deputy Niall Collins,  
Dáil Éireann,  
Kildare Street,  
Dublin 2

**Re:**

**To ask the Minister for Health if she is aware that the wind energy industry continues to rely on the outdated 2017 HSE Position Paper on Wind Turbines and Public Health, which is contrary to more recent advice issued by the HSE (details supplied); if the 2017 Position Paper has been formally withdrawn; if not, the reason it has not been withdrawn; and if she will make a statement on the matter.**

Dear Deputy Collins,

At the time it was developed, the 2017 HSE Public Health Medicine Environment and Health Group Position Paper on Wind Turbines and Public Health provided a succinct account of the evidence regarding risks to public health from wind turbines. In the intervening time, the context has changed, and evidence-base has been developed further (See **Appendix**) and the HSE is reviewing its advice. Therefore, the 2017 HSE Public Health Position Paper is now under review and thus, has been withdrawn whilst this review is being undertaken.

The HSE role in the Planning and Development process is as a statutory consultee and HSE is consulted by planning authorities on planning applications that are likely to have a significant effect on public health.

The HSE has no role in the consenting or conditioning of any development or in deciding on the merits of any planning application.

If you require any further information or clarification, please do contact us.

Yours sincerely,

Dr. Éamonn J. O'Moore,

Director,

National Health Protection Office HSE.



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## **Appendix**

### *Changes in context and evidence*

The size, nature and location of wind turbine developments have substantially changed since the publication of the 2017 HSE Public Health position paper and the evidence base around any potential health impacts from these developments continues to evolve. The High Court Judgement in 2024 of WEBSTER and ROLLO v MEENACLOGHSPAR (WIND) LIMITED [2024] IEHC 136 [2018 8457 P] examined the protection of health during wind turbine operation and this judgement should be considered in any future wind turbine development.

It is the opinion of the HSE that the changed nature, size and location of wind turbines over the last 10 years warrants a comprehensive review of the current Department of Housing, Local Government and Heritage Wind Energy Development Guidelines (2006), which are the current guidance for assessing likely significant effects on health from wind turbine development. This review should include the most up to date evidence on likely impacts on Population and Human Health and the health protection standards that should be incorporated into any new guidance issued.

3. Where special audible characteristics (dominant and intrusive characteristics) are detected from any wind farm noise, a correction factor must be applied in accordance with the *Tasmanian Noise Measurement Procedures Manual*.
4. The EPA South Australia *Wind farms environmental noise guidelines 2021* (or the most recent revised version of that document) is to be used for all wind farm noise measurements, except where that guideline may be inconsistent with this policy.

29 July 2025



Andrew Paul  
**Chair**  
**Environment Protection Authority Board**