

File With Section

SECTION 131 FORM

Appeal NO: PL 03,239378.Defer Re O/H ☐

To: SPO

Having considered the contents of the submission dated/ received 5/9/11 fromJ. Kruse

I recommend that section 131 of the Planning and Development Act, 2000

☒ not be invoked at this stage for the following reason(s): No new issues

E.O.:

And Turner

Date:

9/11

To: PO:

Section 131 not to be invoked at this stage. ☐Section 131 to be invoked allow 2/4 weeks for reply. ☐

E.O.:

Date:

A.M.:

Date:

M:

Please prepare BP _____ - Section 131 notice enclosing a copy of the attached submission

to: _____

Allow 2/4 weeks - BP _____

E.O.:

Date:

A.M.:

Date:

File with _____

OBSERVER FORM

Appeal No: PL 03.239778

S.37

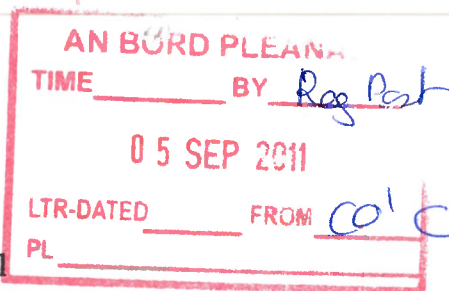
Received: <u>5/9/4</u>	Date Appeal Lodged: <u>8/8/2011</u>
	Date Last Appeal Lodged:
	Date of E.I.S. Publication:

Name: <u>Jutta Kruse</u>
Address/A gent <u>Shenaway, Mc Lane Melbay,</u> <u>Ca. Clave.</u>
Status: Invalid – (insert reason):

VALID	INVALID
Mr. <u>J</u>	1. RETURN TO SENDER with BP _____
1. Acknowledge with BP <u>40</u>	2. Keep envelope ☐
2. Keep copy of Board's letter ☐	3. Keep copy of Board's letter ☐
3. Prepare refund form ☐	4. Prepare refund form ☐

Attach to file	RETURN TO EO ☐
(a) R/S ☐	(d) Screening ☐
(b) Mapping ☐	(e) Inspectorate ☐
(c) Processing ☐	

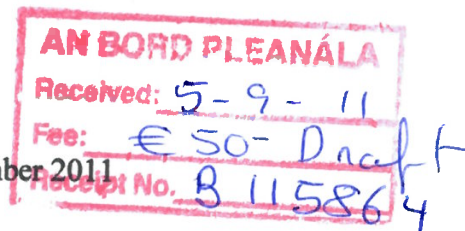
EO: <u>[Signature]</u>	AA: <u>Liana Stacy</u>
Date: <u>5/9/4</u>	Date: <u>05/09/11</u>
Comments:	



Jutta Kruse
Shanaway
Miltown Malbay
County Clare
juttak@gmail.com

By registered post and email

The Secretary
An Bord Pleanála
64 Marlborough Street
Dublin 1



2 September 2011

Name of Observer: Jutta Kruse, Shanaway, Miltown Malbay, County Clare.

I make this observation in relation to Appeal PL03.239378. This is a planning application to construct a 6-turbine industrial wind energy plant at Coor West, Shanavogh, Co. Clare (P11/360). *1 ENCLOSE €50.- FEE.*

My observation supports Clare County Council's decision to refuse planning permission on several points:

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John Kruse
Shannaway
Milltown Malabar
County Clare
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By registered post and email

The Secretary
An Bord Pleanála
64 Marlborough Street
Dublin 2

2 September 2011
An Bord Pleanála
64 Marlborough Street
Dublin 2

Name of Observer: John Kruse, Shannaway, Milltown Malabar, County Clare.

I make this observation in relation to Appeal P103.239378. This is a planning application to construct a 6-turbine industrial/wind energy plant at Coor West, Shannaway, Co. Clare. (P111360)

My observation supports Clare County Council's decision to refuse planning permission at several points:

Contents

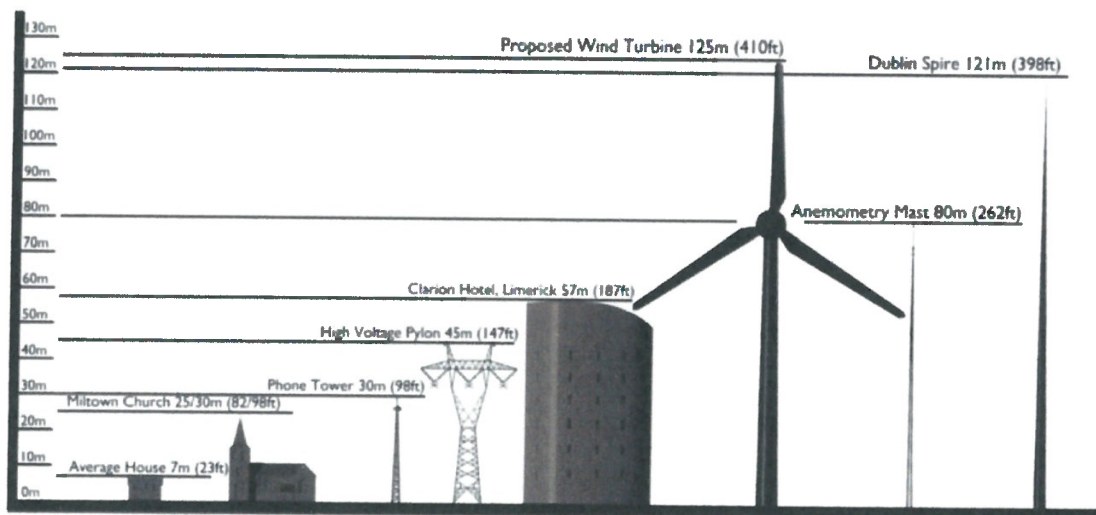
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Distance to homes

The purpose of the 400m buffer zone between homes and industrial turbines seems to be misunderstood by the developers' consultants. It was used by Clare County Council to inform the determination of Clare Wind Energy Strategy's 'strategic' zones, the areas prioritised for wind energy development. It is not the minimum distance permitted between homes and industrial turbines in relation to planning applications.¹

Clare County Council, in their decision to refuse permission for this development, fulfilled their obligation to protect the health of residents and property values within the county. Population health is statutorily safeguarded in the Clare Development Plan 2011-17: 'Applications must have regard to the thresholds, limits and buffer zone in the *Planning Guidelines for Wind Energy Development for Planning Authorities 2006* in order to mitigate against potential impacts on human health in terms of shadow flicker, visual impact and noise.'² Although these factors are more relevant than ever, the set-back distances are out-dated. Newer turbines are substantially taller than the older ones and thereby the set-back distances must be adjusted (see Fig. 1)

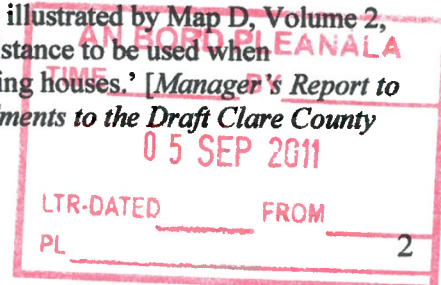
Fig. 1- Height comparison of modern industrial wind turbines and houses, high voltage pylons etc.



Furthermore, there is a large volume of scientific research now available regarding the public health effects of wind turbine noise (for the latest research, see **Appendix 7 - Bulletin of Science, Technology & Society**). A former Professor of public health at University of Alberta draws the conclusion that there are no known preventives other than distance between homes and industrial turbines: 'our current knowledge indicates that there are

¹ 'I wish to reiterate that the distance of 400m was part of the methodology for identification of 'Strategic Areas' in the context of 'Wind Energy Designations' (as illustrated by Map D, Volume 2, Draft Clare County Development Plan, 2011-2017) rather than a distance to be used when establishing a minimum separation distance from turbines to dwelling houses.' [Manager's Report to Elected Members on submissions received on the Proposed Amendments to the Draft Clare County Development Plan 2011-2017 (26 November 2010)]

² Clare CDP 2011-17, Vol. 5, 6.7



distance to homes. The purpose of the 400m buffer zone between homes and industrial turbines seems to be misunderstood by the developer's consultants. It was used by Clare County Council to inform the determination of Clare Wind Energy Strategy's 'strategic' zones. The area provided for wind energy development. It is not the minimum distance permitted between homes and industrial turbines in relation to planning applications.

Clare County Council, in their decision to refuse permission for this development, fulfilled their obligation to protect the health of residents and property values within the county. Population health is statutorily safeguarded in the Clare Development Plan 2011-17. Applications must have regard to the threshold limits and buffer zone in the Planning Guidelines for Wind Energy. Assessment for Planning, including 500m in order to mitigate against potential impacts on human health in terms of shadow flicker, visual impact and noise. Although these factors are more relevant than ever, the set-back distance, the sound level, power turbines are substantially taller than the older ones and thereby the set-back distance must be adjusted (see Fig. 1).

Fig. 1 - Illustration comparing modern industrial wind turbines and houses, high voltage pylons etc.



Furthermore, there is a large volume of scientific research now available regarding the public health effects of wind turbine noise (for the latest research see Appendix 7 - Review of Science, Technology & Society). A former Professor of public health at University of Alberta draws the conclusion that there are no known pathways other than distance between homes and industrial turbines; our current knowledge indicates that there are

¹ It is worth to reiterate that the distance of 1000m was part of the methodology for identification of 'strategic areas' in the context of Wind Energy Designations (as illustrated by WEPD, Volume 2, Draft Clare County Development Plan 2011-2017) rather than a distance to be used when establishing a minimum separation distance from turbines to dwelling houses. [Advocate's Reply to Aisling's Affidavit on submissions received in the Proposed amendments to the Draft CC Development Plan 2011-2017 (20 November 2010)]

substantial health risks from the existing exposure, and we do not know how to reduce those risks other than by keeping turbines several kilometres away from homes.’³

The minimum distance between homes and industrial turbines recommended by the *French Academy of Medicine* is 1.5km.⁴ However most recent recommendations, informed by increased turbine height, are for 2km. For example:

- The Scottish Highland Council, in their planning guidelines for wind farms, established in May 2010: ‘A 2km separation distance between the edge of cities, towns and villages and the broad areas of search, will be put in place in line with national policy to encourage developers to locate windfarms away from these communities.’⁵
- The *Wind Turbines (Minimum Distances from Residential Premises) Act 2010* is presently proposed for debate in England and Wales. The necessary minimum distance between the wind turbine generator and residential premises, if the height of the wind turbine generator is greater than 100m, but does not exceed 150m, is proposed as 2000m.⁶
- ‘In Australia, the New South Wales parliament has recommended a “minimum 2km setback” of windfarms from residential areas.’⁷

None of the turbines in the proposed development are at even the lesser recommended distance of 1.5km from homes. Following the recent granting of planning permission to the adjacent Mount Callan wind energy development, there will be approximately fifteen or twenty industrial wind turbines operational within 2km – and at greatly higher elevations than existing houses - of ca 350 homes. Potential emissions of operational industrial wind generation this close to homes will include noise pollution (see paragraph **Wind Turbine Noise**) and shadow flicker (see paragraph **Shadow flicker**).

Wind Turbine Noise

Wind Turbine Noise is an accepted scientific fact. The international conference dealing with all aspects of the problem was held in Rome in April of this year. For the list of papers given at the conference, see

Appendix 4. The Wind Turbine Noise post-conference report states that:

‘The main effect of daytime wind turbine noise is annoyance. The night time effect is sleep disturbance. These may lead to stress related illness in some people. Work is required in understanding why low levels of wind turbine noise may produce affects which are greater than might be expected from their levels. Noise from IWTs is found to be more annoying than other sources of noise at

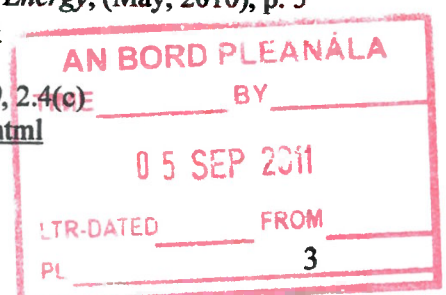
³ Carl V. Phillips, ‘Properly Interpreting the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents’, *Bulletin of Science, Technology & Society*, 31:4 (2011), p. 312

⁴ http://www.academiemedecine.fr/sites/thematiques/EOLIENNES/chouard_rapp_14mars_2006.htm

⁵ The Highland Council, *Planning Policy and Guidance for Onshore Wind Energy*, (May, 2010), p. 5 <http://www.highland.gov.uk/NR/rdonlyres/9091A4B2-FBB0-4217-9CAD-81FFF40C60A9/0/Item13PED4310.pdf>

⁶ *Wind Turbines (Minimum Distances from Residential Premises) Act 2010*, 2.4(c) <http://www.publications.parliament.uk/pa/ld201011/ldbills/017/11017.1-i.html>

⁷ Guy Rogers, ‘Residents reject wind farm’, *The Herald*, 7 June 2010, <http://www.seacc.org.za/posts/66>



comparable sound pressure levels (Pedersen, Bakker, Bouma, & van den Berg, 2009).⁸

These impacts are being reported world-wide: 'There are global reports of adverse health effects correlated with the onset of operations of IWTs [Industrial Wind Turbines] (Harry, 2007; Krogh, Gillis, & Kouwen, 2011; Nissenbaum, 2009; Pierpont, 2009; Phipps, Amati, McCoard, & Fisher, 2007).'⁹

Cutting-edge research was published in the *Bulletin of Science, Technology & Society* just some weeks ago. For a summary of this research, see Appendix 7. Carl V. Phillips, former Professor of Public Health at University of Alberta, argues that 'that there is ample evidence that turbines cause a constellation of health problems, and attempts to deny this involve claims that are contrary to proper methods of scientific inference.'¹⁰ He summarises the ways in which the wind energy industry denies or minimises adverse health impacts of operational industrial wind turbines and insists that scientists and government officials are required to question these self-serving claims:

'Proponents of wind turbines have claimed, often simultaneously, that the physical models show there is no possible problem, that there is no problem if some particular rule is obeyed, that there is no evidence of health effects, that the reported evidence of health effects does not count because it is in the wrong format, that there is evidence of effects but they are not real diseases, and that the diseases are really the victims' own fault. They also sometimes argue that the benefits outweigh the costs [...]. We can perhaps excuse lawyers who work for the industry for making this contradictory mélange of arguments [...] But there is no such defense available to consulting scientists who are supposedly writing reports as independent experts, or to government officials.'¹¹

Considering all above, permission for this development under appeal would likely be in contravention of CDP 10.3(b): 'To strike an appropriate balance between facilitating wind energy development and protecting the residential amenity of neighbouring property in respect of noise proliferation and visual impact'. I respectfully request The Board to seriously investigate the claims of the wind energy developers, in particular in relation to the effects of wind turbine noise on public health prior to making a decision in this case.

Wind Turbine Noise - deficient modelling

The noise modelling in the EIS for P11/360 is presented in an unclear manner. Noise receptors were apparently chosen at random rather than being representative of public health concerns.

AN BORD PLEANÁLA	
TIME _____	BY _____
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PL _____	

⁸ Carmen M. E. Krogh, 'Industrial Wind Turbine Development and Loss of Social Justice?', *Bulletin of Science, Technology & Society*, 31:4 (2011), p. 323

⁹ Carmen M. E. Krogh, 'Industrial Wind Turbine Development and Loss of Social Justice?', *Bulletin of Science, Technology & Society*, 31:4 (2011), p. 322

¹⁰ Carl V. Phillips, 'Properly Interpreting the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents', *Bulletin of Science, Technology & Society*, 31:4 (2011), p. 303

¹¹ Carl V. Phillips, 'Properly Interpreting the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents', *Bulletin of Science, Technology & Society*, 31:4 (2011), pp 311-12

(2001), pp. 111-17.

¹⁰ C. and A. Phillips, 'Property Interfering the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents', *Wilmetts of Science & Society*, 31:4.

(2001), p. 333.

¹¹ C. and A. Phillips, 'Property Interfering the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents', *Wilmetts of Science & Society*, 31:4.

¹² C. and A. Phillips, 'Property Interfering the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents', *Wilmetts of Science & Society*, 31:4 (2001), p. 333.

¹³ C. and A. Phillips, 'Industrial Wind Turbine Development and Loss of Social Justice', *Wilmetts of Science & Society*, 31:4 (2001), p. 127.

¹⁴ C. and A. Phillips, 'Industrial Wind Turbine Development and Loss of Social Justice', *Wilmetts of Science & Society*, 31:4 (2001), p. 127.

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Wind Turbine Noise - definition modelling

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effects correlated with the onset of operations of WTs [Industrial Wind Turbines] (1997).

These impacts are being reported *world-wide*. There are no doubt reports of adverse health

2004.

some credible sound pressure levels (e.g. Black, Brown & van der Horst

Predicted noise impact at noise sensitive locations, based on background noise assessment over at least 12 weeks, must form part of the EIS.¹² As the points at which noise readings were taken and for which noise models were created do not coincide with noise sensitive receptors¹³, the noise modelling is substantially deficient. Night noise emission in excess of *L_{night,outside} 30 dB*, has been proven to be detrimental to human health, especially to pregnant women, children, the elderly and those suffering from cardio-vascular problems.¹⁴ Noise models must be developed for each occupied dwelling, workplace, school and church within at least 2km. That sound can constitute noise at even this remove was recognised recently by the Highland Council when they enforced cessation of operations at a Sutherland wind farm due to excessive noise at homes 2km distant (see Appendix 5).

Furthermore, the Clare Development Plan 2011-17 obliges the Planning Section to make decisions so as 'to strike an appropriate balance between facilitating wind energy development and protecting the residential amenity of neighbouring property in respect of noise, proliferation and visual impact'.¹⁵ In relation to settled landscapes – the category for the Coore/Shanavogh area – objective 16.2 of CDP 2011-17 demands of development that it sustains and enhances quality of life and residential amenity.¹⁶ The proposed development would clearly contravene the objectives of the CDP in this regard.

I respectfully request The Board to uphold the Decision by Clare County Council to refuse permission in the interest of public health. In the event of The Board requesting further information in relation to noise impact on public health, a complete, relevant and accessible noise prediction model must be submitted so as to protect the health of residents at noise sensitive locations.

Additional public health concerns

Additional public health concerns arise from the loss of social justice experienced by neighbours of industrial wind energy developments. Their experience of fair process during the statutory planning process leaves them with an impaired sense of social justice.

Leventhal's definition of fair process is widely accepted:

'Leventhal (1980)¹⁷ proposes six key criteria that people use wittingly or otherwise in judging to what extent a decision-making procedure or process is just or fair:

- **Consistency:** Equal treatment of persons across time and place
- **Bias suppression:** Avoiding self-interest or ideological preconceptions
- **Accuracy:** Using good, accurate information and informed opinions



¹² '... noise or ecological baselines may require observations over a monthly or even a seasonal basis. [...] Experience suggests that a period of less than twelve weeks generally creates challenges for all participants, even on smaller projects, and should be avoided if possible.' [EPA, *Guidelines on the information to be contained in Environmental Impact Statements* (March, 2002), section 2.3.1]

¹³ P11/360 EIS, Noise Measurement Locations, App. 9, Figure 9.2

¹⁴ World Health Organization, *Night Noise Guidelines (NNGL) For Europe, Final Implementation Report* (2007), pp 308-309

¹⁵ Clare CDP 2011-17, Vol. 1, 10.3.(b)

¹⁶ Clare CDP 2011-17, Vol. 1, 16.2

¹⁷ Leventhal, G. S. (1980). What should be done with equity theory? New approaches to the study of fairness in social relationships. In K. Gergen, M. Greenberg, & R. Willis (Eds.), *Social exchange* (pp. 27-55) New York, NY: Plenum.

Excessive noise impact in noise sensitive locations based on background noise assessment over a least 12 weeks must form part of the L12.¹² As the points are high noise readings were taken and for which noise model assessment does not coincide with noise sensitive aspects,¹³ the noise modelling is substantially deficient. Night-time noise in excess of 50 dBA has been proven to be detrimental to human health especially in program chronic children the elderly and those suffering from cardiovascular problems.¹⁴ Noise models must be developed for each occupied dwelling, workplace, school and church within least 3km. That sound can contribute noise in even the remotest areas recognised recently by the Highways Council when they enforced cessation of operations at a published wind farm due to excessive noise at homes 2km distant (see Appendix 5). Furthermore, the Clare Development Plan 2011-15 obliges the Planning Section to make decisions so as to strike an appropriate balance between facilitating wind energy development and protecting the essential amenity of neighbouring property in respect of noise, protection and visual impact.¹⁵ In relation to scaled land-caps - the category for the 2006 Shannonagh area - specifies 10.2 of EDP 2011-15 demands of development that it sustains and enhances quality of life and residential amenity.¹⁶ The proposed development would clearly contravene the objectives of the CDP in this regard.

I respectfully request the Board to uphold the Decision by Clare County Council to refuse permission in the interests of public health. In the event of the Board requesting further information in relation to noise impact on public health a complete, relevant and accessible noise prediction model must be submitted so as to protect the health of residents in noise sensitive locations.

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- * Consistency: Equal treatment of persons across time and place
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- * Accuracy: Using good accurate information and informed opinions

¹² "... noise or ecological baselines may require observation over a monthly or even a seasonal basis [...] Experience suggests that a period of less than twelve weeks generally creates challenges for all participants even on smaller projects and should be avoided if possible." [EPA, Guidelines on the information to be contained in Environmental Impact Statements (March 2002) section 2.1.1]

¹³ P110300 L12, Noise Measurement Locations, App. 9, Figure 9.2.

¹⁴ World Health Organisation, *Urban Noise Guidelines* (WHO) For Europe, Final Public consultation Report (2007) pp 308-309

¹⁵ Clare CDP 2011-15, Vol 1, 10.2 (b)

¹⁶ Clare CDP 2011-15, Vol 1, 10.2

¹⁷ Eventual, G. S. (1980) *What should be done with equity theory? New approaches to the study of fairness in social relationships*. In: K. Gergen, M. Gergen & R. Willis (Eds.), *Self and society*, pp 27-55. New York, NY: Free Press

- **Correctability:** Opportunities for review and amendment
- **Representativeness:** Everyone is involved in decision making who has a material interest in the outcome
- **Ethicality:** Compatible with fundamental moral and ethical values

These criteria collectively amount to a definition of fair process.¹⁸

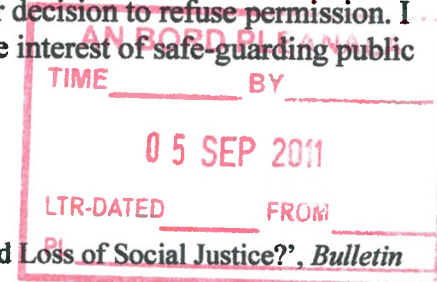
All of the above six criteria are frequently experienced by the public to be degraded during the planning process. The problem of public participation in Ireland was acknowledged by Yvonne Scannell, Professor at the School of Law, Trinity College, Dublin:

‘Extensive and generous provision is made for access to information, the right to participate in decision-making, and the right to appeal against initial decisions on environmental authorisations, but only when these are made by local authorities and appellate administrative tribunals.’¹⁹

‘The position with respect to access to information and rights to participate in policy-making, programmes and action plans or in the legislative process is less favourable. Although there are rights to information in these instances, public bodies do not encourage public participation (except when obliged to do so by statute) and are reluctant to involve the public in scrutinising their policy-making, activities and their performance.’²⁰

Social well-being is recognised as a determinant of health by the World Health Organization: ‘Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (World Health Organization [WHO], 1948).’²¹ In 2008 the World Health Organization acknowledged the crucial public health role of social justice²²: ‘Social justice is a matter of life and death. It affects the way people live, their consequent chance of illness, and their risk of premature death.’²³

It is apparent that the location of additional industrial turbines in close proximity to residential properties would aggravate public health problems by exacerbating perceptions of social injustice. Clare County Council recognised this in their decision to refuse permission. I respectfully request The Board to uphold their Decision in the interest of safe-guarding public health.



¹⁸ Carmen M. E. Krogh, ‘Industrial Wind Turbine Development and Loss of Social Justice?’, *Bulletin of Science, Technology & Society*, 31:4 (2011), pp 321-2

¹⁹ Yvonne Scannell, ‘Access to Information, Public Participation and Access to Justice in Environmental Matters in Ireland’, *Human Rights, the Citizen and the State* (Dublin, 2001), p. 141

²⁰ Yvonne Scannell, ‘Access to Information, Public Participation and Access to Justice in Environmental Matters in Ireland’, *Human Rights, the Citizen and the State* (Dublin, 2001), p. 141

²¹ Carmen M. E. Krogh, ‘Industrial Wind Turbine Development and Loss of Social Justice?’, *Bulletin of Science, Technology & Society*, 31:4 (2011), p. 322

²² World Health Organization. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health* (Final report of the Commission on Social Determinants of Health), p. 3. Retrieved from http://www.searo.who.int/LinkFiles/SDH_SDH_FinalReport.pdf

²³ Quoted in: Carmen M. E. Krogh, ‘Industrial Wind Turbine Development and Loss of Social Justice?’, *Bulletin of Science, Technology & Society*, 31:4 (2011), p. 322

Shadow flicker

In terms of shadow flicker, all turbines in the development would severely impact homes located on the Shanaway road, as the turbines will be between homes and the sun for most of the day. Failure to provide predicted impact figures for individual homes shows a casual attitude to the impact of the proposed development on public health. DEHLG guidelines set 10 times rotor diameter from a turbine as the distance at which the potential for shadow flicker is very low.²⁴ This DEHLG guideline indicates a distance of 820m for this proposal. Many of the concerned residents' homes are located within less than 600m of at least one of the turbines, thereby increasing their apprehension of the uncertain impact on their families' health.

The results of the shadow flicker modelling are presented in a completely inaccessible format. Additional to several methodological shortcomings of this study, outlined below, there are no maps which would clearly illustrate the predicted impact for each residential property. The report comprises many pages of columns of figures which are meaningless to any third party with an interest in this important section of the EIS.

Furthermore, the predicted results of this study only work to the developers' advantage if a very restrictive range of conditions applies. For example, calculations were based on conditions 'only when more than 20 % of sun is covered by the blade'.²⁵ This very specific restriction is unrealistic and impossible to predict, as the turbines adjust their aspect continuously depending on wind direction.

Impact was calculated for probable daily sunshine hours rather than worst case scenarios. This results in assessment of a very narrow range of daily sunshine hours. For example less than one and a half hours in December or less than three hours in March.²⁶ These figures are unrealistic and distort predicted impact, especially at seasons of high expected shadow flicker impact due to the seasonally low position of the sun at mid-day.

Furthermore, the study states: 'non visible Wind Turbine Generators do not contribute to calculated flicker values'.²⁷ This statement is ambiguous as it defines visibility 'from any part of the receiver window'²⁸, yet the consultants do not place their receptors at any locations at which windows could be found.²⁹ It appears that shadow receptors for the developers' study were chosen to reflect low visibility rather than realistic potential exposure of residential properties and thereby the study does not constitute either independent or scientific assessment. It is at best disingenuous to assess the impact on non-existent windows of non-existent homes. Major impact is to be expected at properties located west, east and north of the turbines and this is where shadow receptors must be placed. The relevance of this ominous comment by MosArt is unclear: '... the sense of visual intrusion would be noticeably increased by the view of perhaps eight to ten turbines rather than the six currently proposed'.³⁰

Even accepting the unrepresentative shadow receptor locations, the worst case scenario predicts annual shadow flicker exposure at extremely high levels of between 54.56 and 143.12 hours. These levels exceed the recommended upper exposure limit (30 minutes per

²⁴ DEHLG, *Planning Guidelines for Wind Energy Developments*, 5.12

²⁵ P11/360 EIS, App. 10, p. 12-4-2011 11:40 / 1

²⁶ P11/360 EIS, App. 10, p. 12-4-2011 11:40 / 1

²⁷ P11/360 EIS, App. 10, p. 12-4-2011 11:40 / 1

²⁸ P11/360 EIS, App. 10, p. 12-4-2011 11:40 / 1

²⁹ P11/360 EIS, App. 10, p. 12-4-2011 11:40 / 1

³⁰ Richard Barker, Director MosArt Ltd. LANDSCAPE, to INIS Environmental Consultants Ltd. (25 July 2011). This communication is part of this Appeal's documentation as received by An Bord Pleanála on 8 August 2011



Shadow flicker
 In terms of shadow flicker, all turbines in the development would severely impact homes located on the highway road, as the turbines will be between homes and the sun for most of the day. Failure to provide predicted impact figures for individual homes shows a casual attitude to the impact of the proposed development on public health. DfHAG guidelines set 10 times rotor diameter from a turbine as the distance at which the potential for shadow flicker is 'very low'.²⁴ This DfHAG guideline indicates a distance of 820m for this proposal. Many of the concerned residents' homes are located within less than 600m of at least one of the turbines, thereby increasing their apprehensions of the imminent impact on their families' health.

The results of the shadow flicker modelling are presented in a completely inaccessible format. Additional to several methodological shortcomings of this study, outlined below, there are no maps which would clearly illustrate the predicted impact for each residential property. The report comprises many pages of columns of figures which are meaningless to any third party with an interest in this important section of the EIS.

Furthermore, the predicted results of this study only 'work' to the developers' advantage in a very restrictive range of conditions applied. For example, calculations were based on conditions 'only when more than 20% of sun is covered by the blade'.²⁵ This very specific restriction is unrealistic and impossible to predict as the turbines adjust their aspect continuously depending on wind direction.

Impact was calculated for probable daily sunshine hours rather than worst case scenarios. This results in assessment of a very narrow range of daily sunshine hours, for example less than one and a half hours in December or less than three hours in March.²⁶ These figures are unrealistic and distort predicted impact especially at seasons of high expected shadow flicker impact due to the seasonally low position of the sun at mid-day.

Furthermore, the study states: 'non visible Wind Turbine Obstructions do not contribute to calculated flicker values'.²⁷ This statement is ambiguous as it defines 'visibility' from any part of the receptor 'window', yet the consultants do not place their receptors at any locations at which windows could be found.²⁸ It appears that shadow receptors for the developers' study were chosen to reflect low visibility rather than realistic potential exposure of residential properties and thereby the study does not constitute either independent or scientific assessment. It is at best disingenuous to assess the impact on non-existent windows of non-existent homes. Major impact is to be expected at properties located west, east and north of the turbines and this is where shadow receptors must be placed. The relevance of this omission/comment by Moser is unclear, "... the sense of visual intrusion would be noticeably increased by the view of perhaps eight to ten turbines rather than the six currently proposed".²⁹

Even accepting the anticipated shadow receptor locations, the worst case scenario predicts annual shadow flicker exposure at extremely high levels of between 54.56 and 143.12 hours. These levels exceed the recommended upper exposure limit (30 minutes per 143.12 hours). These levels exceed the recommended upper exposure limit (30 minutes per

²⁴ DfHAG Planning Guidelines for Wind Energy, March 2000, 2.12.
²⁵ P11360 EIS, App. 10, p. 12-4-2011 11:40:11
²⁶ P11360 EIS, App. 10, p. 12-4-2011 11:40:11
²⁷ P11360 EIS, App. 10, p. 12-4-2011 11:40:11
²⁸ P11360 EIS, App. 10, p. 12-4-2011 11:40:11
²⁹ P11360 EIS, App. 10, p. 12-4-2011 11:40:11
³⁰ Richard Barker, Director Moser Ltd, 17/02/2011, comments EIS 1.7, Feb. 2011. This communication is part of this applicant's documentation as received by the EIA.
 Proposed on 8 August 2011

day or 30 hours per year) by between nearly 200 per cent to over 400 per cent.³¹ These levels are detrimental to neighbouring residential amenity.

Taken all examples of above shadow flicker study short comings into consideration, the consultants' conclusion must be dismissed: 'The results of the shadow flicker modelling indicate that there is no potential for shadow casting from Coor Shanavogh Wind Farm, and so mitigation measures are not required.'³² In the event of The Board requesting further information in relation to shadow flicker impact on neighbouring properties, a complete, relevant and accessible shadow flicker prediction model must be submitted so as to protect the residential amenity at sensitive locations.

Data from unauthorised anemometry mast

It is legally questionable how permissible the use of data from an unauthorised anemometry mast is. This mast was erected by McMahon Finn Wind Acquisitions Ltd. on the site of the development of this Appeal.³³ Clare Planning Department recognised it as unauthorised development and pursued the developers within the statutory planning process over a period of 11 months to March 2011. Retention and planning permission were applied for by the developers but not granted by Clare Planning Department. The mast was removed in March 2011. As the mast was erected in breach of planning regulations, the data collected while it was in operation should not be permitted to be used in any part of the planning process.

However, wind speed data collected by the equipment on the mast was used in the preparation of shadow flicker modelling: 'Based on the meteorological data from the on-site measurement mast, the average operational hours will be 8,713 per year.'³⁴

I respectfully request The Board to disregard the shadow flicker assessment as it is based on illegally gathered data.

Prior to further decisions being made in regard to the proposed project, I respectfully ask The Board to request a complete, relevant, scientific, independent and accessible report in relation to shadow flicker to be furnished in the interest of fair evaluation of impact on neighbouring residential amenity and public health.

Depreciation and expropriation

Mr McGrath, environmental consultant for the developers, questions Clare County Council's reference to objective CDP 10.3 which requires any development to strike an appropriate balance between facilitating wind energy development and protecting the residential amenity of neighbouring property in respect of noise proliferation and visual impact. However, as visual obtrusion and noise emissions are going to result from the proposed development at existing holdings, these were appropriately considered by Clare County Planning Section in their decision to refuse permission. Thereby Clare County Planning Section, in having regard to Clare CDP, followed their statutory obligation.

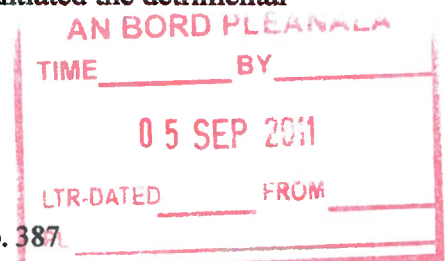
The importance of balancing commercial development with human rights has been proven repeatedly before diverse authorities. The right to respect for the home, the right to defend the value of one's property and the infringement of these rights through noise nuisance have all been tested in the European Court of Human Rights. Furthermore, the Irish High Court, An Bord Pleanála as well as English council tax tribunals have substantiated the detrimental

³¹ P11/360 EIS, App. 10, p. 12-4-2011 11:40 / 2

³² P11/360 EIS , Vol. II, 3.24.8

³³ Clare Count Planning Refs.: P/10686, P/10720, P/101041, P/119

³⁴ Coor Shanavogh Wind Farm EIS, Volume II: Assessment Chapters, p. 387



day or 38 hours per year) by between nearly 100 per cent to over 400 per cent.¹¹⁷ These levels are detrimental to neighbouring residential amenity.

Taken all examples of above shadow flicker study shall coming into consideration, the consultants' conclusion must be dismissed. The results of the shadow flicker modelling indicate that there is no potential for shadow flicker arising from Cor Shannagh W and Farm, and so mitigation measures are not required.¹¹⁸ In the event of the Board requesting further information in relation to shadow flicker impact on neighbouring properties, a complete, relevant and accessible shadow flicker prediction model must be submitted so as to protect the residential amenity at sensitive locations.

Data from unauthorised anonymity mast

It is legally questionable how permissible the use of data from an unauthorised anonymity mast is. This mast was erected by McMichael Farm Wind Applications Ltd on the site of the development of this Appeal.¹¹⁹ Clare Planning Department recognised it as unauthorised development and pursued the developer within the statutory planning process over a period of 14 months to March 2011. Retention and planning permission were applied for by the developer but not granted by Clare Planning Department. The mast was removed in March 2011. As the mast was erected in breach of planning regulations, the data collected whilst it was in operation should not be permitted to be used in any part of the planning process.

However, wind speed data collected by the equipment on the mast was used in the preparation of shadow flicker modelling. Based on the meteorological data from the on-site measurement mast, the average operational hours will be 8,713 per year.¹²⁰ (respectfully) request the Board to disregard the shadow flicker assessment as it is based on illegally gathered data.

Prior to further decision being made in regard to the proposed project, I respectfully ask the Board to request a complete, relevant, scientific, independent and accessible report in relation to shadow flicker to be furnished in the interest of fair evaluation of impact on neighbouring residential amenity and public health.

Dispensation and expropriation

Mr McGrath, environmental consultant for the developer, questions Clare County Council's reference to objective CDP 10.3 which requires any development to strike an appropriate balance between facilitating wind energy development and protecting the residential amenity of neighbouring property in respect of noise pollution and visual impact. However, as visual obstruction and emissions are going to result from the proposed development on existing holdings, these were appropriately considered by Clare County Planning Section in their decision to refuse permission. Thereby Clare County Planning Section in having regard to Clare CDP, followed their statutory obligation.

The importance of balancing commercial development with human rights has been proven repeatedly before diverse authorities. The right to respect for the home, the right to defend the value of one's property and the infringement of these rights through noise nuisance have all been tested in the European Court of Human Rights. Furthermore, the Irish High Court, as Bord Pleanála as well as English council tax tribunals have substantiated the detrimental

¹¹⁷ B11-700 EIS, App. 10, p. 12-7-2011, 11-40-12

¹¹⁸ B11-700 EIS, Vol. II, 3-24-8

¹¹⁹ Clare County Planning Refs. P.10686, P.10720, P.10761, P.1119

¹²⁰ Cor Shannagh W and Farm EIS, Volume II, Appendix A, page 3-387

effects of noise nuisance and visual obtrusiveness on residential amenity, property values and human health.

Matters relating to amenity are recognised by the courts as a legitimate planning consideration. The High Court in *Maier v An Bord Pleanála* ([1993] 1 IR 439) held that it was clear that potential depreciation in value of property in the vicinity of a development was a valid reason for refusing planning permission.

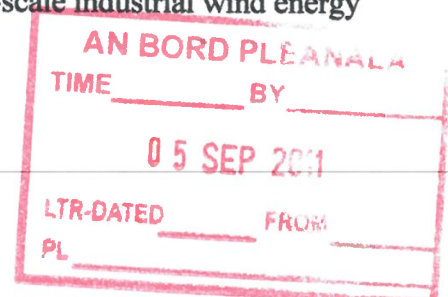
The significance of this consideration was illustrated by An Bord Pleanála decisions in the recent past. In a 2010 case the Board refused a grant for a service stop partially on the grounds of potential depreciation in the value of adjoining property.³⁵ In the Order for this case, the Board stated: 'The proposed development would seriously injure the amenities of adjoining property by reason of loss of privacy, visual obtrusion and depreciate the value of the property.' Not only depreciation but partial expropriation due to noise nuisance was proven in *S v France* (1990) 65 Dec. & Rep. 250 at 722.³⁶

Clare County Planning Section considered the potential impact from this proposed development in addition to other permitted projects on residential amenity and property values to be significant. Their decision to refuse permission is in accord with the CDP and international noise emission recommendations. I respectfully request The Board to uphold their Decision in the interest of safe-guarding human rights and health.

Cumulative visual impact on landscape and scenic route

Visual landscape protection is a significant concern of the CDP 2011-17. It provides for 'selection of appropriate sites in the first instance within this landscape, together with consideration of the details of siting and design which are directed towards minimising visual impacts'.³⁷ Scenic routes, upland regions and views of shorelines enjoy particular protection: 'Regard being given to avoiding intrusions on scenic routes and on ridges or shorelines'³⁸ and developments in this area will be required to demonstrate 'that sites have been selected to avoid visually prominent locations'³⁹ and 'that site layouts avail of existing topography and vegetation to reduce visibility from scenic routes, walking trails, water bodies, public amenities and roads'.⁴⁰ The proposed development would contravene all above objectives of the CDP 2011-17 (see Figures 0.1-0.3 and Figure 0.4 below).

The cumulative visual impact of this proposed development in addition to all other industrial wind energy installations in the area is excessive in relation to visual impact. For example, the adjacent permitted 28-turbine Mount Callan industrial wind energy development by West Clare Renewable Energy Ltd. (WCRE) will substantially add to this impact. See Fig. 2 below for a view of the existing Mount Callan area landscape, Fig. 3 for the visual impact of the six turbines of this Appeal on the same landscape and Fig. 4 for the cumulative visual impact of the permitted Mount Callan large-scale industrial wind energy development in addition to that of this Appeal..



³⁵ An Bord Pleanála, case reference: PL 24.235956

³⁶ Yvonne Scannell, *Environmental and Land Use Law* (Dublin, 2006), p. 899

³⁷ CDP 2011-17, Vol. 1, 16.2 (ii)

³⁸ CDP 2011-17, Vol. 1, 16.2 (iii)

³⁹ CDP 2011-17, Vol. 1, 16.2 (iv)

⁴⁰ CDP 2011-17, Vol. 1, 16.2 (v)

Fig. 2 – Aerial view of the existing Mount Callan area landscape.⁴¹ The development subject of this Appeal (P11360/PL03.239378) is proposed to stretch diagonally from the centre foreground of this image towards the top right corner.



Fig. 3 - Visual impact of this Appeal (P11360/PL03.239378) in isolation.⁴²



Fig. 4 - Cumulative visual impact of this Appeal (P11360/PL03.239378) and the 28-turbine Mount Callan wind farm (P10109/PL03.237524).⁴³



⁴¹ Aerial view submitted as part of the EIS for P11360 (EIS, Appendix 13, Aerial Plates)

⁴² Photomontage submitted as part of the EIS for P11360 (detail). This view from Mullagh village, ca. 7km distant.

⁴³ Photomontage submitted as part of the EIS for P11360 (detail). This view from Mullagh village, ca. 7-12km distant.

Fig. 2 - Aerial view of the existing Mount Callaghan landscape. The development subject of this Appeal (P113604112) is proposed to stretch diagonally from the centre foreground of this image towards the top right corner.



Fig. 3 - Visual impact of this Appeal (P113604112) in isolation.⁴⁵



Fig. 4 - Cumulative visual impact of this Appeal (P113604112) and the 28-tonne Mount Callaghan wind farm (P101094107.2.13224).⁴⁶



⁴⁵ Aerial view submitted as part of the P113604112 Appeal (P113604112).
⁴⁶ Photomontage submitted as part of the P113604112 Appeal (P113604112).
⁴⁷ Photomontage submitted as part of the P113604112 Appeal (P113604112).
⁴⁸ Photomontage submitted as part of the P113604112 Appeal (P113604112).

It is clear from Figures 2-4 that the visual impact of any further industrial wind energy development in this area is going to be significant considering the open and settled landscape character of this area. Mitigation in the form of screening is plainly impossible.

Furthermore, the visual impact of the proposed development from the R474 scenic route has not been assessed in the EIS photomontages. The importance of such designations is highlighted in the *Wind Energy Planning Guidelines*:

‘They [the photo locations] should reflect local designations as might be relevant from the County Development Plan or Local Area Plan, including Views and Prospects and other scenic amenity designations.’⁴⁴

The R474 is designated a ‘Scenic Route’ in Clare CDP 2011-17.⁴⁵ In relation to Scenic Routes, the CDP seeks to ‘protect sensitive areas from inappropriate development’.⁴⁶ The R474 runs through the right-hand side of Fig. 4. If both developments (PL03.239378 and PL03.237524) as modelled in Fig. 4 were permitted, there would be about ten 125m-high industrial wind turbines imposing on Atlantic Ocean views from the R474 Scenic Route. The exact cumulative impact on this sensitive landscape is difficult to visualise without professional photomontages. See Fig. 5 for an existing view of the Atlantic Ocean from R474 Scenic Route.

Objective 16.6(b) of Clare CDP 2011-17 focuses on the ‘effects on views from the public road towards scenic features or areas’.⁴⁷ Objective 16.2(a)iii) of the CDP states: ‘Particular regard should be given to avoiding intrusions on scenic routes and on ridges or shorelines’ and it must be shown in development proposal ‘that sites have been selected to avoid visually prominent locations.’ Panoramic views of the rural landscape and the Atlantic Ocean from this Scenic Route will be substantially compromised by the proposed development as all six turbines in addition to several turbines of the permitted - and appealed - Mount Callan development (P10/109, PL03.237524) will be prominently visible.



⁴⁴ DEHLG, *Wind Energy Planning Guidelines*, p. 95

⁴⁵ *Clare CDP 2011-17*, Vol. 1, p. 236

⁴⁶ *Clare CDP 2011-17*, 16.6 (a)

⁴⁷ *Clare CDP 2011-17*, 16.6 (b)

It is clear in Figures 3-4 that the visual impact of any further industrial wind energy development in this area is going to be significant considering the open and settled landscape character of this area. Wind energy in this form of development is plainly inappropriate.

Furthermore, the visual impact of the proposed development from the R474 scenic route has not been assessed in the EIS photographs. The importance of such designations is highlighted in the Wind Energy Planning Guidelines:

“The photo locations [should] reflect local designations that might be relevant from the County Development Plan or Local Authority, including Views and Prospects and other scenic amenity designations.”⁴⁸

The R474 is designated a ‘scenic route’ in Clare CDP 2011-17.⁴⁹ In relation to scenic routes, the CDP seeks to ‘protect sensitive areas from inappropriate development’.⁵⁰ The R474 runs through the right-hand side of Fig. 4. If both developments (P103.237524 and P103.237524) as modelled in Fig. 4 were permitted, there would be around ten 1.5m-high industrial wind turbines imposing on Atlantic Ocean views from the R474 Scenic Route. The exact cumulative impact on this sensitive landscape is difficult to visualise without professional photographs. See Fig. 5 for an existing view of the Atlantic Ocean from R474 Scenic Route.

Objective 10.6(b) of Clare CDP 2011-17 focuses on the effects on views from the public road towards scenic features or areas.⁵¹ Objective 10.2(a)(ii) of the CDP states: ‘Particular regard should be given to avoiding intrusions on scenic routes and on ridges or shorelines’ and it must be shown in development proposals that sites have been selected to avoid visually prominent locations. Panoramic views of the rural landscape and the Atlantic Ocean from this Scenic Route will be substantially compromised by the proposed development as all six turbines in addition to several turbines at the permitted - and proposed - Wilson Galban development (P10.109, P103.237524) will be prominently visible.

⁴⁸ DEHLG Wind Energy Planning Guidelines p. 93

⁴⁹ Clare CDP 2011-17, Vol. 1, p. 236

⁵⁰ Clare CDP 2011-17, 10.2(a)

⁵¹ Clare CDP 2011-17, 10.6(b)

Fig. 5 – Existing view of Atlantic Ocean from R474 at approximately N 675472, E 513681



This view of the Atlantic Ocean from the Scenic Route R474 will probably encompass turbines nos 1, 31, 29 and 30 from the Mount Callan wind energy development, as well as all six turbines from this Appeal. In the event of The Board requesting further information in relation to this Appeal, I suggest that future photo locations are based on these recommendations:

‘They should always present the worst case (most open) available view from any given location.’⁴⁸ and ‘Care should be taken so as not to place an object such as vegetation or structures between the wind energy development site and the camera.’⁴⁹

A study from 1994 found that visual dominance tended to abate at about 2km: FROM

- ‘In most situations turbines dominated the view up to a distance of 2 km.
- Turbines appear visually intrusive at distances between 1 and 4.5 km in average to good visibility.
- Turbines are noticeable, but not intrusive, at distances between 2 and 8 km, depending on atmospheric conditions and other factors.’⁵⁰

Considering the greatly increased height of new generation industrial wind turbines since the time of this study, these figures will need revising. Even so, a distance of 2km might be an acceptable compromise - in relation to visual impact - for the location of industrial structures in inhabited regions. The distance from homes in relation to wind turbine noise is addressed in paragraph Distance to homes.

The proposed development would certainly be in contravention of the above objectives of the CDP 2011-17. I thereby respectfully request The Board to uphold Clare County Council’s decision to refuse permission on the grounds of excessive visual intrusion.

⁴⁸ DEHLG, *Wind Energy Planning Guidelines*, p. 96

⁴⁹ DEHLG, *Wind Energy Planning Guidelines*, p. 97

⁵⁰ Stevenson, Ruth, Griffiths, Susan, *The Visual Impact of Windfarms: Lessons from the UK Experience* (1994), quoted in: University of Newcastle, *Visual Assessment of Windfarms Best Practice. Scottish Natural Heritage Commissioned Report F01AA303A* (2002), p. 14

Fig. 2 - Existing view of Atlantic Ocean from R474 at approximately N 63°47' E
213681



This view of the Atlantic Ocean from the Scenic Route R474 will probably encompass turbines nos 1, 31, 29 and 30 from the Mount Galian wind-energy development as well as all six turbines given this Appeal. In the event of the Board requesting further information in relation to this Appeal, I suggest that future photo locations are based on the recommendations:

They should always present the worst case (most open) available view from any given location, and 'C' are should be taken so as not to place an object such as vegetation or structures between the wind energy development site and the camera.⁹⁰

A study from 1994 found that visual dominance tended to abate at about 2km. The most situations turbines dominated the view up to a distance of 2 km. Turbines appear visually intrusive at distances between 1 and 4.5 km in average to good visibility. Turbines are noticeable, but not intrusive, at distances between 5 and 8 km, depending on atmospheric conditions and other factors.⁹¹

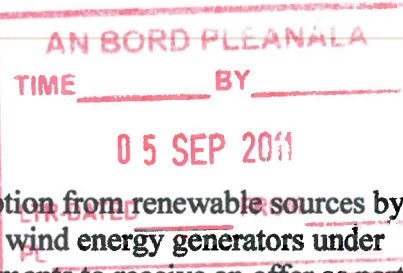
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The proposed development would certainly be in contravention of the above objectives of the CDP 2011-17. I therefore respectfully request the Board to uphold Clack County Council's decision to refuse permission on the grounds of excessive visual intrusion.

⁹⁰ DELHEG, B and Energy Planning Guidelines, p. 90

⁹¹ DELHEG, B and Energy Planning Guidelines, p. 97

⁹² Stevenson, Robb-Guthrie, Simon. The Visual Impact of Wind Turbines: A Review from the UK. Expertise (1998), quoted in University of Newcastle Visual Assessment of Wind Turbines Report Practice, Scottish Natural Heritage, Commissioned Report P01A/2002, p. 11



Speculative development

'The Government has set a target of 40% electricity consumption from renewable sources by 2020.'⁵¹ This target is being fully met by completed offers to wind energy generators under Gate 3 of Group Processing: 'The 3900MW of wind developments to receive an offer as part of Gate 3 provides for the 40% renewable generation target.'⁵² The offer process as part of the Gate 3 programme is now complete.⁵³

As the development under Appeal has not received any such offer, connection to the grid is neither currently possible nor in prospect. Although relocation, splitting and mergers of connection offers is theoretically provided for in the CER's decision paper on Connection Offer Policy Principles⁵⁴, there is little scope for this within the 121MW issued for area D under Gate 3.⁵⁵ As there are no plans for further connection offers prior to 2020 or even 2025 - the year that EirGrid's GDS is planning to - it is difficult to comprehend why the expensive process of industrial wind energy development planning continues.

While EirGrid and ESB Networks continue to accept applications for future connections, these applications are placed in a queue until further notice.⁵⁶ Currently there are about 500 applications in this queue.⁵⁷ The majority of these date from between 2004 to 2008. McMahon Finn Wind Acquisitions Ltd applied for a grid connection (34.5MW) for their Coore East (1) project in April 2009.⁵⁸ Thereby the likelihood of a connection offer, even if the national target of 40% renewables should be extended at some future point, is doubtful in the short or medium term. Unless this matter can be clarified by the developers, the planning of this industrial wind energy development under Appeal could be construed to be unsupported speculation.

Substantial depreciation in near-by residential and other property is a direct consequence of such speculation as the health consequences of living in proximity of industrial wind energy generators is universally accepted. The weight of evidence has prompted a former Professor of Public Health at University of Alberta to state: 'Many people report expending substantial resources - retrofitting their houses to reduce noise, selling their properties at a loss, or even abandoning their homes without being able to sell them - in order to try to reduce the health impacts.'⁵⁹ This results in considerable loss of assets for the owners of such property (see paragraph on **Depreciation and expropriation**).

I respectfully request The Board to require clarification by the developers on this matter.

⁵¹ National Renewable Energy Action Plan IRELAND, Submitted under Article 4 of Directive 2009/28/EC, p. 4 <http://www.dcenr.gov.ie/NR/rdonlyres/03DBA6CF-AD04-4ED3-B443-B9F63DF7FC07/0/IrelandNREAPv11Oct2010.pdf>

⁵² <http://www.eirgrid.com/gate3/>

⁵³ <http://enviroireland.com/?tag=gate-3>

⁵⁴ <http://www.cer.ie/en/electricity-distribution-network-current-consultations.aspx?article=f60275f5-1442-4330-93f3-895a68f861b3>

⁵⁵ <http://www.eirgrid.com/media/EirGrid%20TSO%20Gate%203%20Email%2013%2004%2011.pdf>

⁵⁶ <http://www.eirgrid.com/customers/completedgenerationapplications/>

⁵⁷ <http://www.eirgrid.com/media/Connection%20Offers%20Disclosure%20of%20Applications%20-%202022%20Mar%202011.pdf>

⁵⁸ <http://www.eirgrid.com/media/Connection%20Offers%20Disclosure%20of%20Applications%20-%202022%20Mar%202011.pdf> p. 37

⁵⁹ Carl V. Phillips, 'Properly Interpreting the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents', *Bulletin of Science, Technology & Society*, 31:4 (2011), p. 306

Appropriate Assessment

If the event that The Board decides to request further information, Appropriate Assessment might be included in this. Appropriate Assessment 'comprises a comprehensive ecological impact assessment of a plan or project; it examines the direct and indirect impacts that the plan or project might have on its own or in combination with other plans and projects, on one or more Natura 2000 sites in view of the sites' conservation objectives.'⁶⁰ And 'implicit in Article 6(3) is an obligation to put concern for potential effects on Natura 2000 sites at the forefront of every decision made in relation to plans and projects at all stages.'⁶¹ Appropriate Assessment is a requirement for this development as the effects of the proposed development might impact down-river SPAs and SACs due to possible contamination of water courses.

This is made quite clear in the Environmental Report for P11/360 by Senior Executive Chemist Mary Burke. She has concerns on the separation distance between the development and water courses. Her conclusion on this point is that 'the separation distance is totally inadequate between the stream and the various elements of the proposed development.'⁶² And '... there is simply no room to provide adequate retention for storm water settlement, prior to discharge.'⁶³ Furthermore, Ms Burke concludes that in relation to the effect on surface waters the development, as proposed, would 'contravene the statutory requirements of Articles 4 and 5 of the Environmental Objectives (Surface Water) Regulations, S.I. 272 of 2009.'⁶⁴

Therefore Appropriate Assessment will be crucial to a decision on the environmental impact of the proposed development.

Hen Harrier

Significance of West Clare Uplands Area

Four areas in Ireland were surveyed by UCC and NPWS to establish the 'relationship between breeding habitat and breeding success of Hen Harriers in Ireland for the first time'. Three of these had been part of an earlier study. The fourth, West Clare Uplands Area, 'which has recently been discovered to be important for Hen Harriers'⁶⁵ encompasses the site of this Appeal, the site of the permitted adjacent Mount Callan industrial wind energy development as well as sites of numerous other wind farms in the area, most of which have grid connection offers and are likely to be constructed in the near future. (See Appendix 1 for the West Clare Uplands Area)

This recent research as part of the PLANFORBIO research programme, jointly funded by COFORD and the NPWS and conducted by UCC, highlights the crucial importance of the newly established West Clare Uplands Area for the protection of the Hen Harrier, a Birds Directive Annex 1 protected species. As the West Clare Uplands Area was shown to be one of the five most important breeding areas for Hen Harrier in Ireland and simultaneously other

⁶⁰ 'Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities' (10 December 2009), 2.4

⁶¹ 'Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities' (10 December 2009), Exec. Summ.

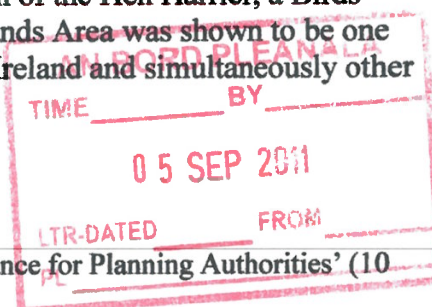
⁶² Environmental Report for P11/360 by Senior Executive Chemist Mary Burke, point (c)

⁶³ Environmental Report for P11/360 by Senior Executive Chemist Mary Burke, point (b)

⁶⁴ Environmental Report for P11/360 by Senior Executive Chemist Mary Burke, conclusion

⁶⁵ Mark Wilson, Sandra Irwin, Barry O'Donoghue, Tom Kelly and John O'Halloran, 'The use of forested landscapes by Hen Harriers in Ireland', *Environment* 10 (2010), p. 7

<http://www.coford.ie/iopen24/pub/COFORD-Connects/env10.pdf>



Appropriate Assessment

It is noted that the Handbook to assist in the preparation of Appropriate Assessment might be included in this. Appropriate Assessment comprises a comprehensive ecological impact assessment of a plan or project, examines direct and indirect impacts that the plan or project might have on its own or in combination with other plans and projects on one or more Natura 2000 sites in view of the sites' conservation objectives.¹⁰⁰ And, in Article 6(3), it is an obligation to put concerted potential effects on Natura 2000 sites at the forefront of any decision made in relation to plans and projects.¹⁰¹ Appropriate Assessment is a requirement for the development as the effects of the proposed development might impact directly or indirectly on Natura 2000 sites due to possible contamination of water courses. This is made quite clear in the Environmental Report for P11360 by Senior Executive Christine Mary Burke. She has concerns on the separation distance between the development and water courses. Her conclusion on this point is that "the separation distance is totally inadequate between the stream and the various elements of the proposed development". And "... there is simply no room to provide adequate retention for storm water sediment prior to discharge".¹⁰² Furthermore, Ms Burke concludes that in relation to the effect on surface waters the development as proposed would contravene the statutory requirements of Articles 4 and 5 of the Environmental Objectives (Surface Water) Regulations 2010 (SI 272 of 2010).¹⁰³

Therefore Appropriate Assessment will be crucial to a decision on the environmental impact of the proposed development.

Hen Harrier

Significance of West Clare I phalanx Area

Four areas in Ireland were surveyed by ICC and NPWS to establish the relationship between breeding habitat and breeding success of Hen Harriers in Ireland for the first time. Three of these had been part of an earlier study. The fourth, West Clare I phalanx Area, which has recently been discovered to be important for Hen Harriers,¹⁰⁴ encompasses the site of this Appeal, the site of the permitted adjacent Niamh O'Sullivan industrial wind energy development as well as sites of numerous other wind farms in the area, most of which have grid connection offers and are likely to be constructed in the near future. (See Appendix 1 for the West Clare I phalanx Area.)

This recent research as part of the P11360/ORBIO research programme, jointly funded by ORBIO and the NPWS and conducted by ICC, highlights the crucial importance of the newly established West Clare I phalanx Area for the protection of the Hen Harrier a Birds Directive Annex I protected species. As the West Clare I phalanx Area was shown to be one of the five most important breeding areas for Hen Harriers in Ireland and simultaneously other

¹⁰⁰ Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities' (10 December 2009) 2.4.

¹⁰¹ Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities' (10 December 2009) Exec. Summary.

¹⁰² Environmental Report for P11360 by Senior Executive Christine Mary Burke, point (c).

¹⁰³ Environmental Report for P11360 by Senior Executive Christine Mary Burke, point (b).

¹⁰⁴ Environmental Report for P11360 by Senior Executive Christine Mary Burke, conclusion.

¹⁰⁵ Mark Wilson, Sandra Power, Barry O'Donoghue, Tom Kelly and John O'Donnell, 'The use of forested landscapes by Hen Harriers in Ireland', *Environment* 10 (2010), p. 7.

<http://www.birds.ie/forests/ORBIO-connections.aspx>

SPAs in the region appear to be declining in the numbers of breeding Hen Harriers they support, an SPA designation for the West Clare Uplands Area must be a priority.^{66 67}

The NPWS outlines the process for protected site designation. 'SPAs are chosen if they are: 1. regularly used by 1% or more of the all-Ireland population of a listed [...] species'.⁶⁸ The PLANFORBIO team, who form part of leading Hen Harrier research in Ireland, point out that 'Hen Harriers are listed, along with 32 other rare and vulnerable bird species, on Annex 1 of the Birds Directive (79/409/EEC). This instrument legally requires Ireland to ensure their protection and to designate a suite of the most important sites for this species as SPAs, or else face heavy fines in the European Court.'⁶⁹

Furthermore, they state that '... the most recent national survey estimated that only 150 breeding Hen Harrier pairs remain in Ireland today (Barton et al. 2006).'⁷⁰ 'The earlier surveys recorded a maximum of two territorial pairs for western Clare in 2000, increasing to five between 2000 and 2005. The present study recorded ten nests in this area in 2007 and 12 in 2008.'⁷¹ 'Recent research and monitoring of the area by National Parks & Wildlife Service and University College Cork staff located at least 10 pairs in 2009 (B. O'Donoghue, pers. comm. to BirdWatch Ireland-see Appendix 6 – BirdWatch Ireland comment).'⁷² Taking the more conservative figure of 10 pairs, this represents 6.7% of the Irish Hen Harrier population, thereby more than adequately qualifying the West Clare Uplands area for SPA proposal.

European legislation - Designation of additional lands

Furthermore, it is a legal requirement that additional lands which represent listed species habitats must be protected under the Birds and Habitat Directive where insufficient designated areas are present.⁷³ This is the case in the West Clare Uplands area, 'which has recently been discovered to be important for Hen Harriers.'⁷⁴ It is a site that is one of the top 5 in the country for breeding Hen Harriers and thereby qualifies as an Important Bird Area

⁶⁶ 'There is a lot of variation between sites, with the Slieve Aughties being the least productive site and Kerry and West Clare being the most productive.' (Mark Wilson, Sandra Irwin, Barry O'Donoghue, Tom Kelly and John O'Halloran, 'The use of forested landscapes by Hen Harriers in Ireland', *Environment* 10 (2010), p. 8)

⁶⁷ BirdWatch Ireland comment on planning application CCC P10/109, 8 March 2010

⁶⁸ NPWS, 'Stages in the Site Designation Process', p. 1

<http://www.npws.ie/en/media/Media.6318.en.pdf>

⁶⁹ Mark Wilson, Sandra Irwin, Barry O'Donoghue, Tom Kelly and John O'Halloran, 'The use of forested landscapes by Hen Harriers in Ireland', *Environment* 10 (2010), p. 2

<http://www.coford.ie/iopen24/pub/COFORD-Connects/env10.pdf>

⁷⁰ Mark Wilson, Sandra Irwin, Barry O'Donoghue, Tom Kelly and John O'Halloran, 'The use of forested landscapes by Hen Harriers in Ireland', *Environment* 10 (2010), p. 2

<http://www.coford.ie/iopen24/pub/COFORD-Connects/env10.pdf>

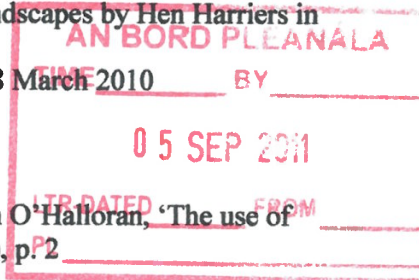
⁷¹ Irwin, S., Wilson, M., Kelly, T.C., O'Donoghue, B., O'Mahony, B., Oliver, G., Cullen, C., O'Donoghue, T. and O'Halloran, J. 2008. Aspects of the breeding biology of Hen Harriers *Circus cyaneus* in Ireland. *Irish Birds*. Vol 8(3), p. 333

⁷² BirdWatch Ireland comment on planning application CCC P10/109, 8 March 2010, see App. 6

⁷³ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, article 4, section 4 : 'Outside these protection areas, Member States shall also strive to avoid pollution or deterioration of habitats.' and An Taisce Appeal to PL03.237524 (15 September 2010)

⁷⁴ Mark Wilson, Sandra Irwin, Barry O'Donoghue, Tom Kelly and John O'Halloran, 'The use of forested landscapes by Hen Harriers in Ireland', *Environment* 10 (2010), p. 7

<http://www.coford.ie/iopen24/pub/COFORD-Connects/env10.pdf>



SPA in the region appears to be declining in the number of breeding Hen Harriers there.⁶⁶ support an SPA designation for the West Clare Cliffs. Area must be a priority.⁶⁷

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Furthermore, they state that "...the most recent national survey estimated that only 150 breeding Hen Harrier pairs remain in Ireland today (Hannon et al. 2000).⁷⁰ The earlier surveys recorded a maximum of two territorial pairs for Western Clare in 2000, increasing to five between 2000 and 2005. The present study recorded ten nests in this area in 2007 and 12 in 2008.⁷¹ Recent research and monitoring of the area by National Parks & Wildlife Service and University College Cork since 2009 (B. O'Donoghue, pers. comm. to BirdWatch Ireland see Appendix 6 - BirdWatch Ireland comment).⁷² Taking the more conservative figure of 10 pairs, this represents 6.7% of the Irish Hen Harrier population thereby more than adequately qualifying the West Clare Cliffs area for SPA proposal.

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Furthermore, it is a legal requirement that additional lands which represent listed species habitats must be protected under the Birds and Habitats Directives where justification designated areas are present.⁷³ This is the case in the West Clare Cliffs area, which has recently been discovered to be important for Hen Harriers.⁷⁴ It is a site that is one of the top 5 in the country for breeding Hen Harriers and thereby qualified as an important bird area

⁶⁶ There is a lot of variation between sites, with the Slieve Donard being the least productive site and Kerry and West Clare being the most productive. (Mark Wilson, Sandra Irvine, Barry O'Donoghue, Tom Kelly and John O'Halloran, "The use of forested landscapes by Hen Harriers in Ireland", www.birdwatchireland.com/planing-application/CCLP10109_8March2010, p. 8)

⁶⁷ BirdWatch Ireland comment on planning application CCLP10109_8 March 2010

⁶⁸ NPWS, "stages in the SPA Designation Process", p. 1

<http://www.npws.ie/enmedia/2418/en.pdf>

⁶⁹ Mark Wilson, Sandra Irvine, Barry O'Donoghue, Tom Kelly and John O'Halloran, "The use of forested landscapes by Hen Harriers in Ireland", www.birdwatchireland.com/planing-application/CCLP10109_8March2010, p. 2

<http://www.npws.ie/enmedia/2418/en.pdf>

⁷⁰ Mark Wilson, Sandra Irvine, Barry O'Donoghue, Tom Kelly and John O'Halloran, "The use of forested landscapes by Hen Harriers in Ireland", www.birdwatchireland.com/planing-application/CCLP10109_8March2010, p. 2

<http://www.npws.ie/enmedia/2418/en.pdf>

⁷¹ Mark Wilson, Sandra Irvine, Barry O'Donoghue, Tom Kelly and John O'Halloran, "The use of forested landscapes by Hen Harriers in Ireland", www.birdwatchireland.com/planing-application/CCLP10109_8March2010, p. 2

⁷² BirdWatch Ireland comment on planning application CCLP10109_8 March 2010, see App. 6

⁷³ Directive 2000/60/EC of the European Parliament and of the Council of 23 November 2000 on the conservation of wild birds, article 4, section 1. "Outside these protection areas, Member States shall also strive to avoid pollution or deterioration of habitats", and An Tánaiste Appeal to B1.03.237524 (12 September 2010)

⁷⁴ Mark Wilson, Sandra Irvine, Barry O'Donoghue, Tom Kelly and John O'Halloran, "The use of forested landscapes by Hen Harriers in Ireland", www.birdwatchireland.com/planing-application/CCLP10109_8March2010, p. 2

<http://www.npws.ie/enmedia/2418/en.pdf>

(IBA).⁷⁵ This new West Clare Uplands IBA was proposed to BirdLife International in November 2009.⁷⁶ The site extends to 28,381 ha encompassing Slieve Callan in the north and Lissycasey in the south (see map in Crowe, O. Tierney, N. & Wheeldon, R. 'Distribution, Extent and Status of Ireland's Important Bird Areas.' BirdWatch Ireland Report to the Heritage Council.).⁷⁷ I could not access this report, but presume from above description, that the map in John O'Halloran's 'Monitoring biodiversity in Irish forests'⁷⁸ corresponds to this area (see Appendix 1). It clearly identifies the approximate West Clare area used by Hen Harrier for foraging - and thereby deserving of protection until more formal designation is decided - with that of the site for this Appeal.

Cumulative impact

The Hen Harrier habitat in this West Clare Uplands Area is already under threat from several wind farms that received planning permission and retention from Clare County Council prior to recognition of its importance (see Appendix 2, located within 7km of this Appeal site). Also, see illustrative map at:

<http://maps.google.ie/maps/ms?msid=216010133968113187921.0004a3c96bc528831dcfd&msa=0&ll=52.7471,-9.433136&spn=0.407338,1.229095>

Clare County Council Heritage Officer's recommendations to refuse permission for the two turbine extension to existing 13-turbine industrial wind energy development at Booltiagh make clear that these were based on the cumulative impact of further wind farm development in this Hen Harrier habitat. This site is adjacent to the permitted 28-turbine Mount Callan industrial wind energy development (P10/109, PL03.237524) and within 7km of this Appeal site. Clare County Council Heritage Officer emphasised the importance of foraging and transit areas.

'This proposed development site is used extensively and on a daily basis by Hen Harrier for foraging and 'forms an important foraging and transit area' [...]. This proposal will 'mean the destruction of viable foraging habitat and the fragmentation of the remainder rendering it useless for Hen Harrier' [...]. Recent studies have shown that Hen Harriers are displaced by wind turbines and this proposal will have a significant negative effect on breeding Hen Harriers in the area. [...] This proposed extension is the second proposed extension to the original application for 13 wind turbines. An extension of 6 turbines to the north and east of this site has already received planning permission. Six Wind Farm applications have been granted in the vicinity and as a result 60 turbines are either built or planned for within 5km of this proposed extension to Booltiagh wind farm. All these turbines will have a cumulative impact on Hen Harriers in the area. Mitigation measures are not suggested or possible in this case and the

⁷⁵ Important Bird Areas were selected on the basis of internationally agreed standard criteria. In Europe, the criteria takes into account the requirements of regional conservation treaties such as the Emerald Network under the Bern Convention, the Helsinki Convention, the Barcelona Convention, as well as, the Wild Birds Directive of the European Union. Hence, Important Bird Areas are priority sites for conservation that should be protected by these conservation instruments.

(http://www.birdlife.org/action/science/sites/european_ibas/index.html)

⁷⁶ BirdWatch Ireland comment on planning application CCC P10/109, 8 March 2010

⁷⁷ BirdWatch Ireland comment on planning application CCC P10/109, 8 March 2010

⁷⁸ John O'Halloran & PLANFORBIO, 'Monitoring biodiversity in Irish forests' (2010), slide 31
<http://www.coford.ie/iopen24/pub/Seminars/kelly-t.pdf>

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proposal does not compensate for the high loss of biodiversity. To put this in context this proposal for two wind turbines will have a significant negative impact on four pairs of Hen Harriers (out of an estimated Irish population of just over 200 pairs).⁷⁹

Within five months of Clare County Council's Decision to refuse permission for the two-turbine extension - confirmed by An Bord Pleanála - based on above recommendations, 28 turbines of the Mount Callan industrial wind energy development were granted planning permission by Clare County Council. 46 more turbines were proposed for the townlands of Shragh and Mountrivers, Doonbeg.⁸⁰ Thus, well in excess of 100 industrial turbines could shortly be operative in this region, which is one of the five most significant Hen Harrier breeding areas in Ireland, has been proposed as 'West Clare Uplands IBA'^{81, 82, 83} to BirdLife International in November 2009⁸⁴ and may shortly qualify as a 'Special Protection Area for Hen Harrier'⁸⁵.

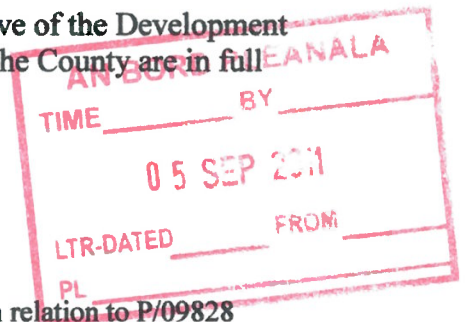
On 11 July 2011, Dr Julie Fossitt in her recommendations for another near-by proposed wind energy development (P11/361), stressed the importance of the projected cumulative impact of this Appeal, the Mount Callan project (P10/109, PL03.237524) and the Kilmaley (P11/361) proposal: 'Cumulative effects include proposed Slieve Callan [...] and Coor/Shanavogh (11/360) windfarms in consideration of potential cumulative effects on Hen Harrier'.⁸⁶

Please consider the crucial cumulative impact of these developments on the viable foraging habitat and possible fragmentation of the remaining Hen Harrier habitat in the West Clare Uplands Area in making your Decision.

Clare County policy, Department of Arts, Heritage and the Gaeltacht policy, Board precedent and recent research on habitat protection

Clare County's policy on habitat protection

In relation to habitat protection, CDP 2011-17 states: It is an objective of the Development Plan 'To ensure that all proposals for wind energy development in the County are in full compliance with the requirements of the Habitats Directive.'⁸⁷



⁷⁹ CCC Heritage Officer to CCC Planning Department on 21 April 2010 in relation to P/09828 (Booltiagh extension)

⁸⁰ Consultancy being considered by An Bord Pleanála (PL03.PC0099)

⁸¹ DEHLG to CCC planning department in regard of P/10109 on 25 February 2010.

⁸² Important Bird Areas [IBAs] were selected on the basis of internationally agreed standard criteria.

In Europe, the criteria takes into account the requirements of regional conservation treaties such as the Emerald Network under the Bern Convention, the Helsinki Convention, the Barcelona Convention, as well as, the Wild Birds Directive of the European Union. Hence, Important Bird Areas are priority sites for conservation that should be protected by these conservation instruments.

(http://www.birdlife.org/action/science/sites/european_ibas/index.html)

⁸³ John O'Halloran & PLANFORBIO, 'Monitoring biodiversity in Irish forests' (2010), slide 31

⁸⁴ BirdWatch Ireland comment on planning application CCC P10/109, 8 March 2010, App. 6

⁸⁵ BirdWatch Ireland comment on planning application CCC P10/109, 8 March 2010, App. 6

⁸⁶ Julie Fossitt to Gareth Ruane re Wind Farm at Kilmaley (P11/360), 11 July 2011

⁸⁷ CDP 2011-17, Vol. 1, 10.3(c)

Department of Arts, Heritage and the Gaeltacht

The Department of Arts, Heritage and the Gaeltacht stresses their concerns in regard to the cumulative impact on Hen Harrier habitat and the deficiencies of the bat study.⁸⁸

Board precedent

The importance of the Hen Harrier has been recognised by the Board and its inspectors in a number of recent cases involving wind farms. The potential effects of a wind farm on the population of Hen Harriers have been sufficient for the Board to refuse permission in Case references PL04 .235947⁸⁹, PL04 .235949, PL04 .205254⁹⁰ and PL04 .207910.⁹¹ This latter Case is very similar to this Appeal development in that the site is in an area that is under consideration for designation as a Special Protection Area for Hen Harrier and that there is expected cumulative effect from a number of other permitted wind farms in the area.

⁸⁸ Department of Arts, Heritage and the Gaeltacht, submission to P11/360 (5 July 2011)

⁸⁹ 'Several other wind farm projects, many of which have yet to be constructed, have already been permitted in and about the Special Protection Area. Having regard to the submissions made in connection with the application and Appeal and in the absence of more definitive, scientific evidence, the Board is not satisfied that the cumulative effect of the proposed development together with other existing and permitted wind farms in the area would not have a significant, adverse impact on the hen harrier population in this particular Special Protection Area, by reason of disturbance / displacement. The proposed development would, therefore, conflict with a development objective indicated in the development plan for the conservation and preservation of a European site, insofar as the proposed development may adversely affect a species of bird or its habitat, namely the hen harrier, specified in Article 4 of the Birds Directive, which formed the basis of the classification of the European site.

The proposed development would therefore be contrary to the proper planning and sustainable development of the area.' (ABP Direction, 235947: Rockchapel, Co. Cork. (08/10249))

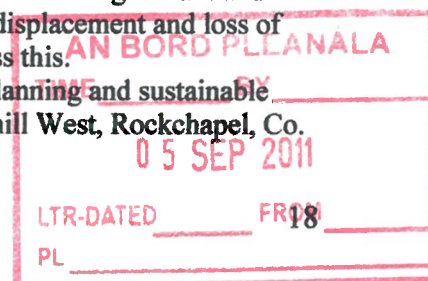
⁹⁰ 'The proposed development is located on a site identified as a nesting and foraging habitat of the hen harrier, an Annex 1 species listed for protection in the Birds Directive (Council Directive 79/409/EEC on the conservation of wild birds). Furthermore, the site is in an area that is under consideration for designation as a Special Protection Area for this species. Having regard to the size and scale of the proposed windfarm in an area of national importance for the conservation of the hen harrier and to the number of already permitted windfarms in this area, the Board is not satisfied, on the basis of the information submitted in the planning application and the Appeal, that the proposed development would not have significant and adverse impacts on the hen harrier by reason of disturbance displacement and loss of foraging habitat (without any compensatory habitat proposals).

The proposed development would, therefore, be contrary to the proper planning and sustainable development of the area.' (ABP Direction, 205254: Meentiny West & East, Tooreennagrena, Tooreen Donnell, etc. Co Cork (N/03/3220))

⁹¹ 'The proposed development is located on a site identified as a foraging habitat and is also in close proximity to identified nesting sites of the hen harrier, an Annex 1 species listed for protection in the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds).

Furthermore the site is in an area that is under consideration for designation as a Special Protection Area for this species. Having regard to the scale of this development and the associated development adjoining the site in an area of national importance to the conservation of the hen harrier and also to the number of other permitted wind farms in the area An Bord Pleanála is not satisfied on the basis of the information submitted that the proposed development potentially will not have significant and adverse on the habitat of the Hen Harrier species by reason of disturbance displacement and loss of foraging habitat in the absence of compensatory habitat proposals to address this.

The proposed development would therefore be contrary to the proper planning and sustainable development of the area.' (Inspector's Report, 207910: Rockhill and Rockhill West, Rockchapel, Co. Cork. (03/6946))



Precedent in neighbouring townland

Recently a proposed two turbine extension to Booltiagh wind farm was refused permission by The Board (Board Reference: PL03.236950). Booltiagh townland is located in the same West Clare Uplands Area and within 7km of the site of this Appeal. The Board decision is thereby relevant. The cumulative impact of permitted but yet un-built wind farms in the vicinity will affect the Hen Harrier population at Coore/Shanavogh just as it will that at Booltiagh. The importance of Hen Harrier in this area is evidenced by the fact that both Clare County Council and the Board Decisions to refuse permission were based on the potential negative impact on this species:

‘The potential impact of the development on the hen harrier is the sole reason for refusal in this instance. The hen harrier is a species identified for protection under Annex I of the Birds Directive. The Appeal site is not located within an SPA identified in this regard, however, under Article 4 of the Directive, Member States are still required to strive to avoid pollution or deterioration of habitats of interest in areas outside specifically identified protection areas. [...] The proposal would mean the destruction of viable foraging habitat and the fragmentation of the remainder rendering it useless for the harrier.’⁹²

It would be inconsistent to refuse permission for a two-turbine extension to an existing industrial wind farm in the West Clare Uplands Area while granting permission to a six-turbine development in the same prime Hen Harrier habitat.

Recent research

Recently published research in relation to Hen Harrier conservation shows that wind farms can negatively impact on this species through displacement. Data from a 22-year Irish study shows that nesting distance between turbines and nesting sites increased following construction of a wind farm, foraging range may be restricted, sky dancing and food passes appear to have ceased entirely and – most pertinent to the Mount Callan Uplands Area - breeding productivity significantly dropped.

‘A 22-year study of a Kerry hen harrier territory in which a wind farm was built in 2000 has monitored nest location and breeding productivity, and concurrent observations of sky dancing, foraging and food passes were made. [...]’⁹³

Nesting distance

‘The distance that hen harriers nest from what is now the edge of the wind farm site has increased significantly from a pre-construction median of 140m to a post-construction median of 537.5m (Wilcoxon two-sample test: $W = 77.5$, $P = 0.025$). An apparent decrease in nesting distance in recent years (2004–2010) is not attributed to habituation to the wind farm but to an extension of the wind farm further towards the traditional nest site. Whitfield and Madders (2006) and Scott and McHaffie (2008) also referred to

⁹² Inspector’s Report, Booltiagh Board Decision, PL03.236950, 12.3.2.1

⁹³ O’Donoghue, Barry, O’Donoghue, Timothy A. and King, Frank, ‘The hen harrier in Ireland: conservation issues for the 21st century.’ *Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 111B (15 June 2011), p. 7



Presented in neighbouring townland.
 Recently proposed two turbine extension to Broomagh wind farm was refused permission by the Board (Board Decision: PI 03.08.2017). Broomagh townland is located in the same *Habitat* Clinaliffs Area, within 7km of the site of this Appeal. The Board decision is that it is relevant. The cumulative impact of permission for two further wind farms in the vicinity will affect the Hen Harrier population at Gortashinnagh and as it will affect Broomagh. The importance of the Hen Harrier in this area is evidenced by the fact that both Wick County Council and the Board Decisions to refuse permission were based on the potential negative impact on this species.

The potential impact of the development on the Hen Harrier is the sole reason for refusal in this instance. The Hen Harrier is a species identified for protection under Annex 1 of the Birds Directive. The Appeal site is not located within an SPA. Identified in this regard, however, under Article 4 of the Directive. Member States are still required to strive to avoid pollution or deterioration of habitats of interest in areas outside specifically identified protection areas. [...] The proposal would mean the destruction of visible foraging habitat and the fragmentation of the landscape. [...] Therefore it is necessary for the Harrier.¹⁰

It would be inconsistent to refuse permission for a two-turbine extension to an existing industrial wind farm in the West Glenties Area while granting permission to a new turbine development in the same prime Hen Harrier habitat.

Recent research

Recently published research in relation to Hen Harrier conservation shows that wind farms can negatively impact on the species through displacement. Data from a 22-year Irish study shows that nesting distance between turbines and nesting sites increased following construction of a wind farm. Foraging range may be restricted, sky dancing and food passes appear to have ceased entirely and – most pertinent to the Glenties Clinaliffs Area – breeding productivity significantly dropped.

A 22-year study of a Kerry Hen Harrier territory in which a wind farm was built in 2000 has monitored nest location and breeding productivity, and concurrent observations of sky dancing, foraging and food passes were made. [...] ¹¹

Nesting distance

The distance that Hen Harriers nest from what is now the edge of the wind farm site has increased significantly from a pre-construction median of 140m to a post-construction median of 237.5m (Wilcoxon W-sample test: $W = 77.5$, $P = 0.023$). An apparent decrease in nesting distance in recent years (2004–2010) is not attributed to habitation to the wind farm but to an extension of the wind farm further towards the traditional nest site. Whitefield and Kildale (2000) and Scott and McIlhenny (2008) also not mention

¹⁰ Impact > Report, Broomagh Board Decision, PI 03.08.2017, 12.3.2.
¹¹ O'Donoghue, Eamonn, O'Donoghue, Eamonn, and Eamonn, Eamonn. "Hen Harrier." *Hen Harrier*. 2017. 12.3.2.
 O'Donoghue, Eamonn, O'Donoghue, Eamonn, and Eamonn, Eamonn. "Hen Harrier." *Hen Harrier*. 2017. 12.3.2.

nest displacement. The harriers abandoned the site in 2000, the year of construction of the original wind farm.⁹⁴

Hunting rates

'While hunting rates cannot be directly compared between pre- and post-construction stages, foraging was regularly noted on-site before construction of the wind farm, but there have been a number of years since the construction of the wind farm when foraging was not recorded at all.'⁹⁵

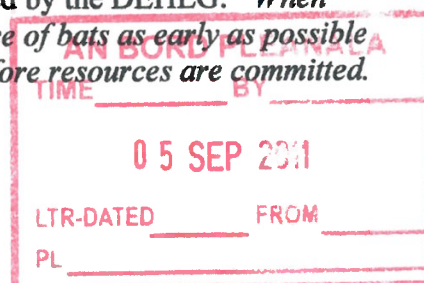
Conclusion - Hen Harrier

Having regard to all above, Clare County Council's Decision to refuse planning permission to six further turbines in the West Clare Uplands Area is in accord with the European Habitats Directive, Department of Arts, Heritage and the Gaeltacht policy, Clare County Development Plan and An Bord Pleanála precedent. I respectfully request The Board to uphold Clare County Council's Decision in the interest of Hen Harrier habitat protection.

Bats

Bats are abundant in the area of the proposed development and can be seen foraging near trees and hedgerows on most summer evenings (not in November). Some bats were identified within 500m of the proposed development last year. They belonged to Brown Long-Eared Bat (*Plecotus auritus*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*) species. These two species were also recorded in 2008 during an Anabat survey on nearby Slieve Callan.⁹⁶ As many bat species have a foraging range in excess of 2km, roosting sites and transects must be surveyed within this distance of the proposed development.

The importance of early and specialist surveys is emphasised by the DEHLG: '*When planning a development it is advisable to check for the presence of bats as early as possible so that any planning and licensing issues can be addressed before resources are committed. Bat surveys require specialist knowledge and equipment.*'⁹⁷



⁹⁴ O'Donoghue, Barry, O'Donoghue, Timothy A. and King, Frank, 'The hen harrier in Ireland: conservation issues for the 21st century.' *Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 111B (15 June 2011), p. 7

⁹⁵ O'Donoghue, Barry, O'Donoghue, Timothy A. and King, Frank, 'The hen harrier in Ireland: conservation issues for the 21st century.' *Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 111B (15 June 2011), p. 7

⁹⁶ P10/109 EIS, F 5, 4.2.1.2

'The most commonly recorded species was Soprano Pipistrelle (*Pipistrellus pygmaeus*). Other species recorded were Common Pipistrelle (*Pipistrellus pipistrellus*), Brown Long-eared Bat (*Plecotus auritus*), Natterer's Bat (*Myotis nattereri*) and Leisler's Bat (*Nyctalus leisleri*). Some recordings were identifiable to the genus *Myotis* (the 'mouse-eared' bats), but were not identifiable to species level. Members of this genus known to be present in Ireland are: Natterer's Bat, Daubenton's Bat (*Myotis daubentoni*), Whiskered Bat (*Myotis mystacinus*) and Brandt's Bat (*Myotis brandtii*).'

⁹⁷ Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland., p. 4

The crucial role of the planning authority is stated: 'Planning authorities may refuse planning permission solely on grounds of the predicted impact on protected species like bats.'⁹⁸

The NPWS's determination is clear: 'Should cases come to light where consultants appear to have wilfully or negligently misrepresented a situation or site details, the NPWS will consider bringing its concerns to the attention of the relevant client and, if applicable, the professional body. The Irish Government has emphasised its obligations under international wildlife legislation by making it an offence under Section 69 of the Wildlife Act 1976 (& amendment 2000) to knowingly or recklessly make false statements for the purpose of obtaining a licence, whether for oneself or for another.'⁹⁹

The bat survey methodology employed for the EIS was not as relevant as it might have been if the following most pertinent European and national guidelines in relation to the impact of wind energy development on bats had been considered:

- Rodrigues, L., L. Bach, M.-J. Dubourg-Savage, J. Goodwin & C. Harbusch (2008): *Guidelines for consideration of bats in wind farm projects*. EUROBATS Publication Series No. 3
- Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Additionally, relevant material from this bibliography of studies might have been consulted:

- Johnson, Gregory D., Arnett, Edward B., *A Bibliography of Bat Fatality, Activity, and Interactions with Wind Turbines* (1 September 2010)
<http://www.batsandwind.org/pdf/bibliography%209-1-10.pdf>

Further research could be supported by studies from the Bats and Wind Energy Cooperative:
<http://www.batsandwind.org>

In order to comply with local authority, national, European and international regulation and best practice, a thorough and dedicated survey must be completed prior to further planning progress.

Mount Callan represents prime foraging habitat for bats. During summer nights, there is a proliferation of moth species (for an example of species and numbers caught in a moth trap in Coore townland in June 2010, see Appendix 3 - List of moths caught in a moth trap in Coore on 23 June 2010) and these provide important foraging for bats. Local residents are perfectly aware of the wide-spread presence of bats on summer evenings. Unless a complete bat survey has been carried out, there will be no scientific data in relation to foraging habitat on which to base a planning decision.

⁹⁸ Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland., p. 10

⁹⁹ Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland., P. 11

Guidelines for effective pre-planning surveys are provided by EUROBATS¹⁰⁰ (Ireland is signee of *The Agreement on the Conservation of Populations of European Bats* and is obliged to abide by its pledge.¹⁰¹):

a) 'Search for new nurseries

- within, for example, a 5 km radius to help assessing the stages (iii) and (iv) (see above) of bat activity (May to August).

b) Ground surveys

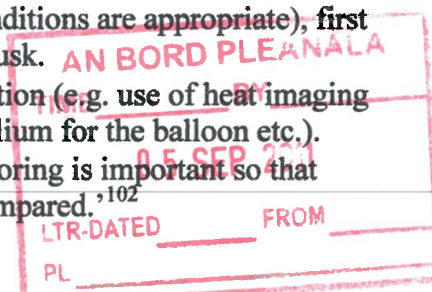
- Bat detector surveys (manual and automatic from the ground) for all stages of bat activity to determine an activity index for each habitat in the study area (1 km radius around the planned siting of the wind farm) and for each planned siting of wind turbines (activity index = number of bat contacts per hour). However, in the results the percentage of feeding buzzes should also be noted.
- preferably the species or groups of species (see above).
- Infrared camera (or the more expensive thermal imaging camera whenever available).

c) Height surveys

- Automatic surveys with a bat detector on a balloon, kite, weather tower or any other suitable structure (for activity index and groups of species, at all stages of activity cycle). [...]

d) Timing of survey

- Depending on the local geographical conditions and on the presence of species with a very short hibernation period, the stages (i) to (vi) should be investigated in the following periods:
- 15 Feb - 30 Mar (stage i): once a week, first half of night for 2 hours starting half an hour before dusk;
- 15 Mar - 15 May (stage ii): once a week, first half of night from sunset for 4 hours and include 1 whole night in May for stage iii;
- 1 Jun - 15 Jul (stage iii): four times, always a whole night;
- 1 - 31 Aug (stage iv): once a week, first half of night from sunset for 4 hours including 2 whole nights;
- 1 Sep - 31 Oct (stage v): once a week first half of night from sunset for 4 hours including 2 whole nights in September. During this stage one should also search for mating roosts and territories. At the end of September and October on the European continent, *Nyctalus noctula* has been noted in large numbers hunting in the afternoon from 5 to 100 m above the ground. Therefore the survey should start 3-4 hours before sunset where this behaviour of *Nyctalus noctula* is suspected.
- 1 Nov -15 Dec (stage vi): once a week (if climatic conditions are appropriate), first half of night for 2 hours starting half an hour before dusk.
- It is necessary to take cost implications into consideration (e.g. use of heat imaging cameras, of hiring radar with its technician, cost of helium for the balloon etc.).
- Standardisation of post-installation surveys and monitoring is important so that impacts from turbines in different countries can be compared.¹⁰²



The developer consultants' original bat survey and additional observations are not in accord with above recommendations. Residents who permanently live in the area are aware of the

¹⁰⁰ http://www.eurobats.org/publications/publication%20series/pubseries_no3_english.pdf

¹⁰¹ http://www.eurobats.org/documents/pdf/Agreementtexts/FCO_Agreement_Text_engl.pdf

¹⁰² Rodrigues, Bach, Dubourg-Savage, Goodwin, Harbusch, *Guidelines for consideration of bats in wind farm projects* [EUROBATS Publication Series No. 3] (Germany, 2008), 3.2.4.1

Guidelines for efficient pre-planning surveys are provided by IJWRA 12¹⁰⁰ (Richard L. signs of the above on the observation of V is given below and is obliged to be followed by the planning¹⁰¹).

- a) Search for new habitats
 - Within for example a 5 km radius to help assess the stages (ii) and (iv) (see above) of the survey (May to August)
- b) Ground surveys
 - Bat detector surveys (manual and automatic from the ground) for all stages of bat activity to determine an activity index for each habitat in the study area (1 km radius around the planning of the wind farm) and for each planned wing of wind turbines (activity index = number of bat contacts per hour). However, in the results the percentage of feeding boxes should also be noted.
 - preferably the species or groups of species (see above).
 - Infrared camera for the more expensive thermal imaging camera whenever available.
- c) Height survey
 - Automatic surveys with a bat detector on a balloon, kite, weather tower or any other suitable structure (for activity index and groups of species) at all stages of activity system [...]
- d) Timing of survey
 - Depending on the local geographical conditions and on the presence of species within very short hibernation periods, the stages (i) to (iv) should be estimated in the following periods:
 - 15 Feb - 30 Mar (stage i): once a week, first half of night for 2 hours starting half an hour before dusk;
 - 15 Mar - 15 May (stage ii): once a week, first half of night from sunset for 4 hours and include 1 whole night in May for stage iii;
 - 1 Jan - 15 Jul (stage iii): four times, always a whole night;
 - 1 - 31 Aug (stage iv): once a week, first half of night from sunset for 4 hours including 2 whole nights;
 - 1 Sep - 31 Oct (stage v): once a week, first half of night from sunset for 4 hours including 2 whole nights in September. During this stage, it should also search for mating roosts and territories. At the end of September and October on the European mainland, *Nyctalus noctula* has been noted in large numbers hibernating in the afternoon from 2 to 100 m above the ground. Therefore the survey should start 3-4 hours before sunset where this behaviour of *Nyctalus noctula* is suspected.
 - 1 Nov - 15 Dec (stage vi): once a week if climatic conditions are appropriate, first half of night for 2 hours starting half an hour before dusk.
 - It is necessary to take cost implications into consideration (e.g. use of heat imaging cameras, of timing radar with its technician, cost of balloon for the balloon etc.).
 - Standardisation of post-installation surveys and monitoring is important so that impact-from turbines in different countries can be compared.¹⁰²

The developer considers "original bat survey and additional observations are not in accord with above recommendations. Residents who permanently live in the area are aware of the

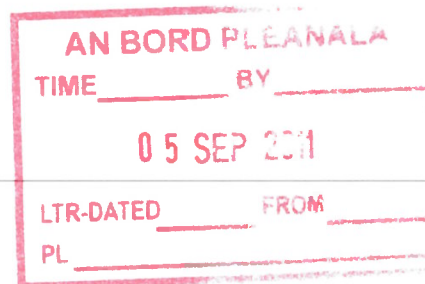
¹⁰⁰ http://www.iwra.org/publications/publication/2008/01/2008_01_english.pdf
¹⁰¹ http://www.iwra.org/publications/publication/2008/01/2008_01_english.pdf
¹⁰² Residents should be informed of the results of the survey and the results of the survey should be made available to the public.

presence of bats throughout the summer months and will not accept any consultants' findings that challenge this knowledge. Furthermore, all bats are protected - not only the horseshoe bats - and must therefore be surveyed. In order to protect bats at this location, a thorough pre-planning survey by an independent agency at the appropriate seasons must be commissioned. This will provide the necessary data to which reference should be made in any surveys at pre-commencement and post-construction stages. DEHLG *Bat Mitigation Guidelines for Ireland* set out the process.¹⁰³

I respectfully request The Board to consider my observations in relation to distance to homes, wind turbine noise, shadow flicker impact, Hen harrier and bat habitat in their decision making and to uphold Clare County Council's decision to refuse permission.

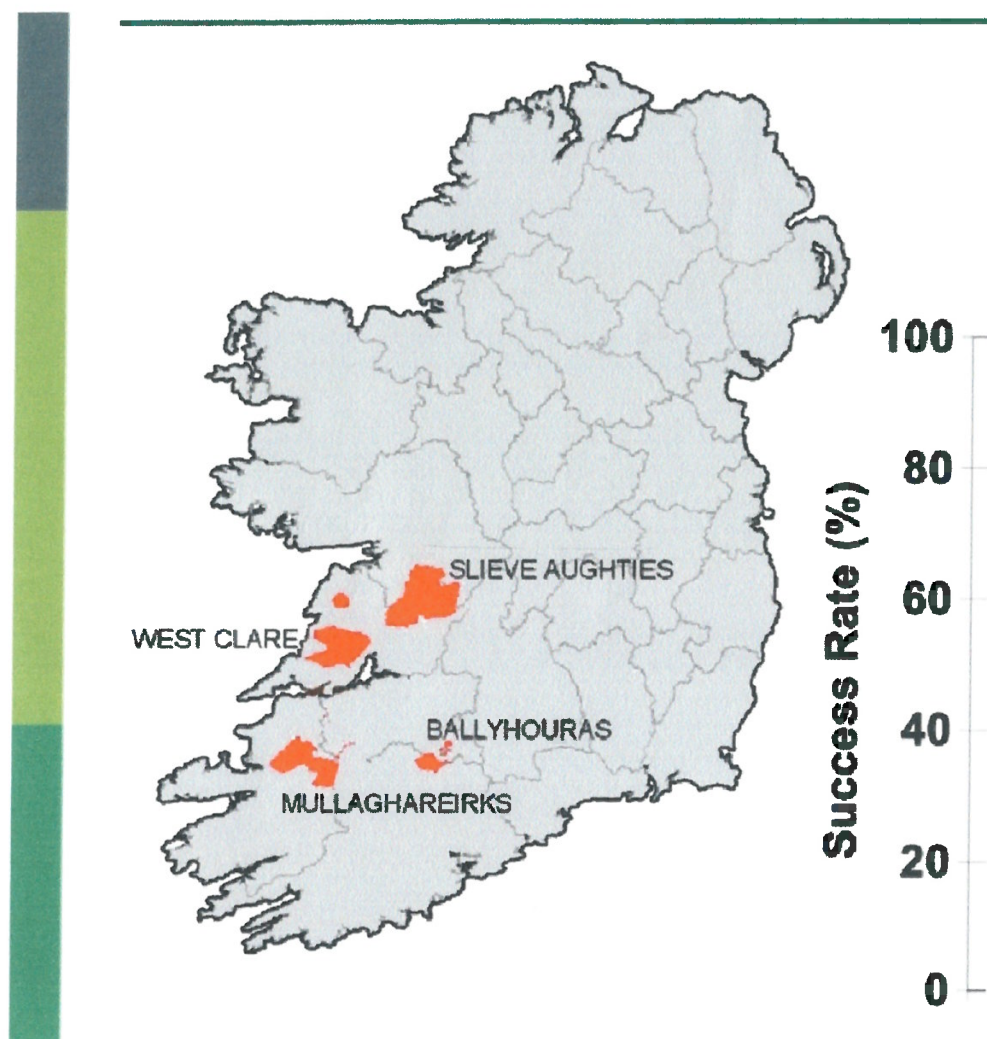
Yours sincerely,

Jutta Kruse



¹⁰³ Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland., p. 5

Appendix 1 - Map of West Clare Uplands Area

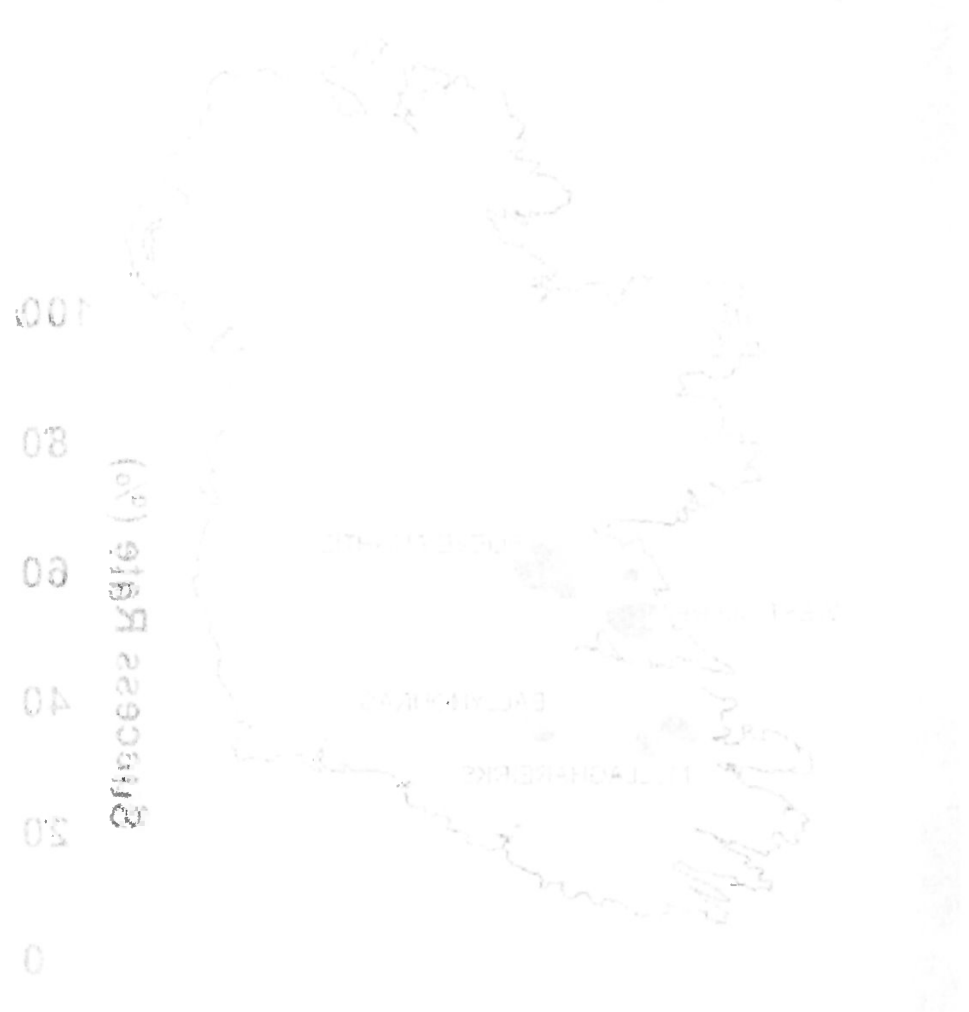


John O'Halloran & PLANFORBIO, 'Monitoring biodiversity in Irish forests' (2010), slide 31(detail) [Breeding success of Hen Harrier]
<http://www.coford.ie/iopen24/pub/Seminars/kelly-t.pdf>





Figure 1 - Map of New York State showing the location of the study area.

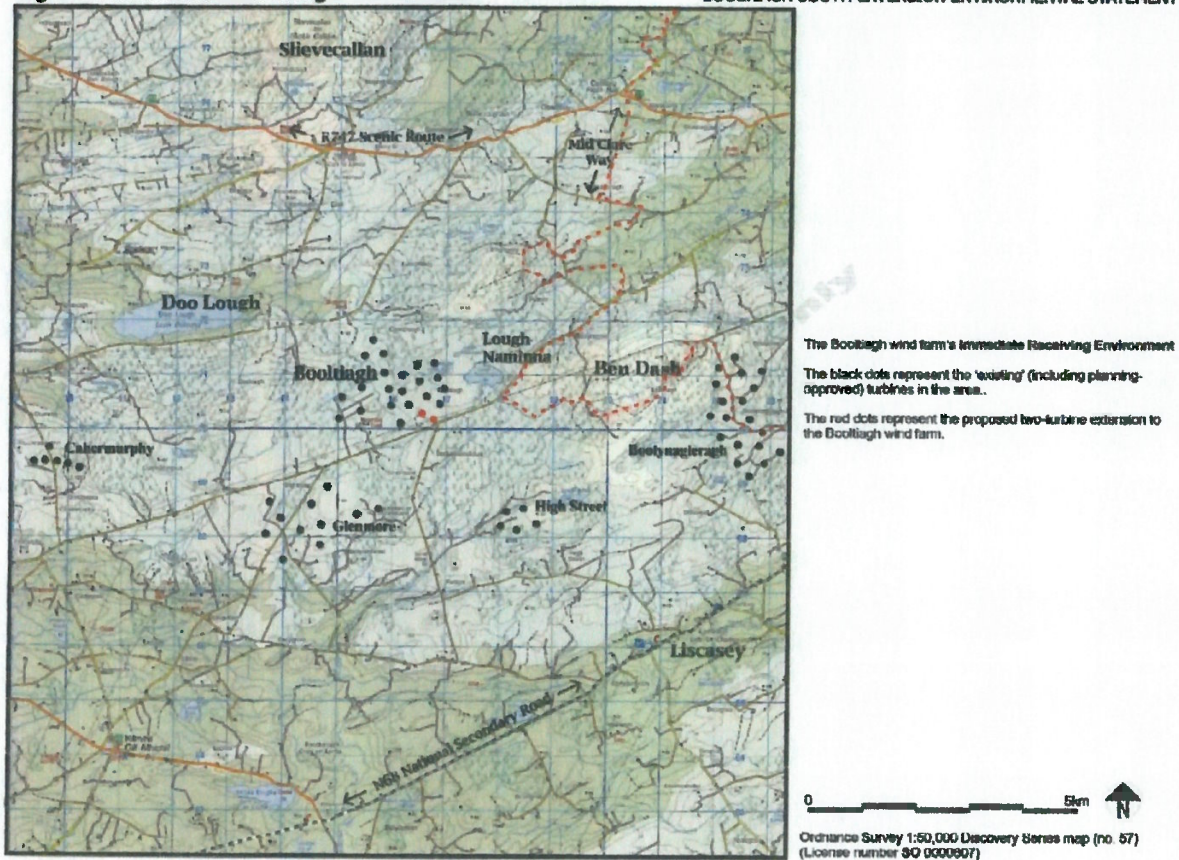


John O'Hara & P. A. O'Hara, 2000. Breeding success of the Herring Gull (*Larus argentatus*) in the Hudson River, New York. *Journal of Great Lakes Research*, 26(1): 1-10.

Appendix 2 - Map of receiving environment

Fig. 7.2 Immediate Receiving Environment

BOOLIAGH SOUTH EXTENSION ENVIRONMENTAL STATEMENT



Map submitted as part of the EIS for a two-turbine extension to the existing Booliahgh industrial wind energy development (P09828/ PL03.236950), located within 7km of this Appeal site. This map does not show the 28 turbines of the permitted Mount Callan development which will be located near the top of this map.

Also see:

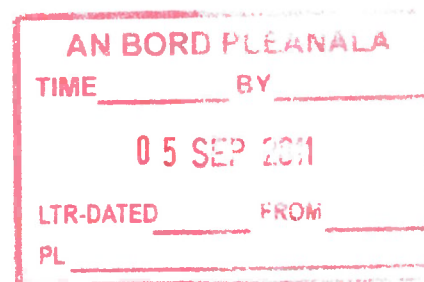
<http://maps.google.ie/maps/ms?msid=216010133968113187921.0004a3c96bc528831dcfd&msa=0&ll=52.7471,-9.433136&spn=0.407338,1.229095>

AN BORD PLEANALA	
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LTR-DATED _____	FROM _____
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1552 WELB

Appendix 3 - List of moths caught in a moth trap in Coore on 23 June 2010
List of moths caught in a moth trap in Coore on 23 June 2010

Angle Shades	1	<i>Phlogophora meticulosa</i>
Beautiful Golden Y	28	<i>Autographa pulchrina</i>
Bright-line Brown-eye	3	<i>Lacanobia oleracea</i>
Brimstone Moth	1	<i>Opisthograptis luteolata</i>
Broom Moth	4	<i>Melanchra Pisi</i>
Buff Arches	13	<i>Habrosyne pyritoides</i>
Buff Ermine	53	<i>Spilosoma luteum</i>
Buff-tip	10	<i>Phalera bucephala</i>
Burnished Brass	8	<i>Diachrysia chrysitis</i>
Campion	2	<i>Hadena rivularis</i>
Cinnabar	4	<i>Tyria jacobaeae</i>
Clay	3	<i>Mythimna ferrago</i>
Clouded Border	1	<i>Lomaspilis marginata</i>
Clouded Silver	1	<i>Lomographa temerata</i>
Clouded-bordered Brindle	57	<i>Apamea crenata</i>
Common Marbled Carpet	1	<i>Chloroclysta truncata</i>
Dark Arches	25	<i>Apamea monoglypha</i>
Dot Moth	1	<i>Melanchra persicariae</i>
Drinker	5	<i>Euthrix potatoria</i>
Dusky Brocade	38	<i>Apamea remissa</i>
Elephant Hawk-moth	16	<i>Deilephila elpenor</i>
Eyed Hawk-moth	1	<i>Smerinthus ocellata</i>
Flame	4	<i>Axylia putris</i>
Flame Shoulder	24	<i>Ochropleura plecta</i>
Garden Grass Veneer	1	<i>Chrysoteuchia culmella</i>
Garden Tiger	11	<i>Arctia caja</i>
Gold Spot	7	<i>Plusia festucae</i>
Grey Dagger	5	<i>Acronicta psi</i>
Grey Pine Carpet	4	<i>Thera obeliscata</i>
Grey Pug	1	<i>Eupithecia subfuscata</i>
Heart and Dart	6	<i>Agrotis exclamationis</i>
Ingrailed Clay	20	<i>Diarsia mendica</i>
Knot Grass	4	<i>Acronicta rumicis</i>
Lackey	2	<i>Malacosoma neustria</i>
Large Yellow Underwing	14	<i>Noctua pronuba</i>
Light Arches	3	<i>Apamea lithoxyloae</i>
Light Emerald	1	<i>Campaea margaritata</i>
Marbled Coronet	2	<i>Hadena confusa</i>
Marbled Minor agg.	6	<i>Oligia strigilis agg.</i>
Middle-barred Minor	1	<i>Oligia fasciuncula</i>
Mottled Beauty	3	<i>Alcis repandata</i>
Muslin Footman	3	<i>Nudaria mundana</i>
Pale Prominent	1	<i>Pterostoma palpina</i>
Pale Tussock	4	<i>Calliteara pudibunda</i>
Peach Blossom	7	<i>Thyatira batis</i>
Pebble Prominent	9	<i>Notodonta ziczac</i>
Peppered Moth	15	<i>Biston betularia</i>

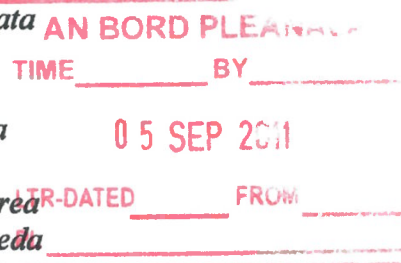




Appendix 3 - List of moths caught in a moth trap in Cove on 23 June 2019
 List of moths caught in a moth trap in Cove on 23 June 2019

1	<i>Agrotis ypsilon</i>	Angle Shades
28	<i>Agrotis ypsilon</i>	Beautiful Golden-Y
7	<i>Agrotis ypsilon</i>	Bright-line Brown-eye
1	<i>Agrotis ypsilon</i>	Brimstone 2-belt
4	<i>Agrotis ypsilon</i>	Broom Moth
13	<i>Agrotis ypsilon</i>	Bull Archer
23	<i>Agrotis ypsilon</i>	Bull Ermine
10	<i>Agrotis ypsilon</i>	Bull-tip
8	<i>Agrotis ypsilon</i>	Burnished Brass
2	<i>Agrotis ypsilon</i>	Campan
4	<i>Agrotis ypsilon</i>	Cinnabar
3	<i>Agrotis ypsilon</i>	Clay
11	<i>Agrotis ypsilon</i>	Clouded Border
1	<i>Agrotis ypsilon</i>	Clouded Silver
27	<i>Agrotis ypsilon</i>	Cloud-bordered Brimble
1	<i>Agrotis ypsilon</i>	Common Mottled Taper
25	<i>Agrotis ypsilon</i>	Dark Archer
5	<i>Agrotis ypsilon</i>	Dot Moth
5	<i>Agrotis ypsilon</i>	Drinker
28	<i>Agrotis ypsilon</i>	Dusky Brimble
16	<i>Agrotis ypsilon</i>	Elephant Hawk-moth
1	<i>Agrotis ypsilon</i>	Eyed Hawk-moth
4	<i>Agrotis ypsilon</i>	Flame
24	<i>Agrotis ypsilon</i>	Flame Shoulder
1	<i>Agrotis ypsilon</i>	Garden Grass Viceroy
17	<i>Agrotis ypsilon</i>	Garden Tiger
7	<i>Agrotis ypsilon</i>	Gold Spot
5	<i>Agrotis ypsilon</i>	Grey Dagger
4	<i>Agrotis ypsilon</i>	Grey Pine Carpet
1	<i>Agrotis ypsilon</i>	Grey Pug
6	<i>Agrotis ypsilon</i>	Heart and Dart
26	<i>Agrotis ypsilon</i>	Ingrailed Clay
4	<i>Agrotis ypsilon</i>	Knot Grass
2	<i>Agrotis ypsilon</i>	Lackey
14	<i>Agrotis ypsilon</i>	Large Yellow Underwing
7	<i>Agrotis ypsilon</i>	Light Archer
1	<i>Agrotis ypsilon</i>	Light Brimble
7	<i>Agrotis ypsilon</i>	Mottled Cornet
6	<i>Agrotis ypsilon</i>	Mottled Moorag
1	<i>Agrotis ypsilon</i>	Mottled-bordered Minor
2	<i>Agrotis ypsilon</i>	Mottled Peony
3	<i>Agrotis ypsilon</i>	Mottled Peony
1	<i>Agrotis ypsilon</i>	Pale Prominent
4	<i>Agrotis ypsilon</i>	Pale Tussock
7	<i>Agrotis ypsilon</i>	Peach Blossom
9	<i>Agrotis ypsilon</i>	Peppermint
12	<i>Agrotis ypsilon</i>	Peppered Moth

Plain Golden Y	2	<i>Autographa jota</i>
Poplar Hawk-moth	2	<i>Laothoe populi</i>
Puss Moth	1	<i>Cerura vinula</i>
Shark	1	<i>Cucullia umbratica</i>
Sharp-angled Carpet	2	<i>Euphyia unangulata</i>
Silver-ground Carpet	4	<i>Xanthorhoe montanata</i>
Small Angle Shades	4	<i>Euplexia lucipara</i>
Small Fan-foot	3	<i>Herminia grisealis</i>
Small Magpie	4	<i>Eurrhynx hortulana</i>
Small Square-spot	7	<i>Diarsia rubi</i>
Smoky Wainscot	2	<i>Mythimna impura</i>
Spectacle	6	<i>Abrostola tripartita</i>
Spruce Carpet	1	<i>Thera britannica</i>
True Lovers Knot	5	<i>Lycophotia porphyrea</i>
White Ermine	109	<i>Spilosoma lubricipeda</i>



Appendix 4 - List of Papers, conference on 'Wind Turbine Noise 2011', Rome, 11-14 April 2011

List of Papers Accepted and Classified by Topic of the conference
'Wind Turbine Noise 2011', Rome, 11-14 April 2011
<http://www.windturbinenoise2011.org/>

EFFECTS OF WIND TURBINE NOISE AND VIBRATION ON INDIVIDUALS AND COLLECTIVE BEHAVIOUR

1. Wind turbine noise in sheltered dwelling area. Appelqvist P and Almgren M (Sweden)
2. Why turbine noise annoys. Bowdler D (UK)
3. Description of wind turbine noise by hearing related parameters. Brambilla G and Gallo V (Italy)
4. Ear training on wind turbine noise emissions. Dutilleul P (France)
5. Selection of outcome measures in assessing sleep disturbance from wind turbine noise. Hanning C and Nissenbaum M (UK)
6. A note on the debate about health effects from low frequency noise (LFN) from modern large wind turbines. Hessler GF (USA)
7. Wind turbine noise and morning blood pressure. Laurie S and Hanning C (Australia)
8. The influence of vision on noise annoyance evaluation of wind farms. Masullo M, Iannace G, Basturk S, Ruotolo F, Senese VP, Maffei L (Italy)
9. Adverse health effects of industrial wind turbines. Nissenbaum M, Arimini J and Hanning C (USA)
10. Evidence based study of noise impacting annoyance. Palmer WKG (Canada)
11. Responses of the inner ear to infrasound. Salt AN (USA)
12. The audibility of low frequency wind turbine noise. Swinbanks MA (UK)
13. Ambient underwater noise in high and low energy flow. Willis MR, Broudic M and Masters I (UK)
14. Perception of noise from large wind turbines. von Hunerbein S, King A, Hargreaves J, Moorhouse A, Plack C and Pedersen TH (UK)

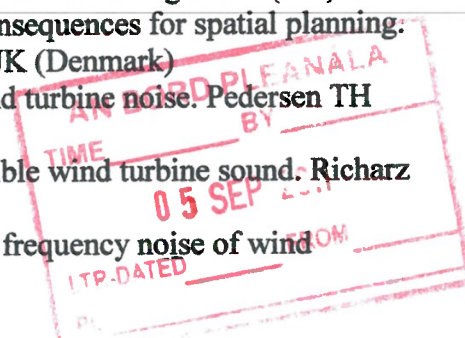
15. An overview of residential health effects in relation to wind turbine noise. van den Berg F (The Netherlands)

NOISE GENERATION FROM WIND TURBINES: AIRFOILS MODELING, LOCALISATION OF SOURCES, DEPENDENCE ON ATMOSPHERIC CONDITIONS

1. Computational aeroacoustics for rotating systems. Becker S, Grabinger J, Kaltenbacher M and Scheit C (Germany)
2. Enhanced wind turbine noise prediction tool SILANT and validation against measurements. Boorsma K, Schepers JG and Verhoef JP (The Netherlands)
3. Numerical prediction of self-generated noise of NACA 0012 aerofoil. Caridi D, De Gennaro M, Wade AS, Kuehnelt H and de Nicola C (Austria)
4. CFD analysis of the influence of central shaft on vertical-axis wind turbine noise emission. Castelli MR, Villa A and Benini E (Italy)
5. Implementation and verification of an aeroacoustic wind turbine blade analysis tool. Kamruzzaman M, Lutz Th, Nubler K and Kramer E (Germany)
6. Time domain modeling of aerodynamic noise from wind turbines. Lee S and Lee S (Korea)
7. Wind turbine blade noise mitigation technologies. Petitjean B, Drobiez R and Kinzie K (Germany)
8. Analysis and optimisation of wind turbine noise under uncertainty. Petrone G, Iaccarino G, de Nicola C, Barbarino M, Quagliarella D and Wittenveen J (USA)
9. Trailing edge noise reduction of wind turbine airfoils by active flow control. Wolf A, Lutz Th, Wurz W, Stalnov O and Seifert A (Germany)
10. Integrated airfoil/blade aeroacoustics modeling and validation. Xue S and Wu J (USA)
11. Aerodynamics and aeroacoustics of unsteady moving airfoils. Yang B and Xu J (China)

LOW FREQUENCIES AND INFRASOUNDS, AMPLITUDE MODULATION

1. Fundamental research in amplitude modulation - a project by RenewableUK. Bass J, Bowdler D, McCaffery M and Grimes G (UK)
2. Wind turbine amplitude modulation: Research to improve understanding as to its cause and effect. Bullmore A, Jiggins M, Cand M, Smith M, Wright M, Davis R and Oerlemans S (UK)
3. Long distance amplitude modulation of wind turbine noise. Di Napoli C (Finland)
4. Low frequency indoor sound from wind turbines. Lindkvist P and Almgren M (Sweden)
5. Measurement and analysis of swish noise. A new method. Lundmark G (Sweden)
6. Noise from large wind turbines - an update on low frequency noise. Madsen KD and Pedersen TH (Denmark)
7. Detection and quantification of amplitude modulation in wind turbine noise. McCabe JN (Canada)
8. Measurement of amplitude modulation frequency spectrum. McLaughlin D (UK)
9. Low-frequency noise from large wind turbines and consequences for spatial planning. Pedersen CS, Pedersen S, Moller H and Staunstrup JK (Denmark)
10. Methods for assessment of the characteristics of wind turbine noise. Pedersen TH and Von-Hunerbein S (Denmark)
11. Correlating very low frequency sound pulses to audible wind turbine sound. Richarz W, Richarz H and Gambino T (Canada)
12. The use of improved noise descriptors to assess low frequency noise of wind turbines. Siponen D and Eurasto R (Finland)



13. Monitoring and mitigation of low frequency noise from wind turbines to protect comprehensive test ban seismic monitoring stations. Styles P, Westwood RF, Toon SM, Buckingham M-P, Marmo B and Carruthers B (UK)
14. The case for spectral measurements of ambient noise levels in the assessment of wind farms. Terlich M (Australia)

SMALL WIND TURBINES AND ALTERNATIVE DESIGNS

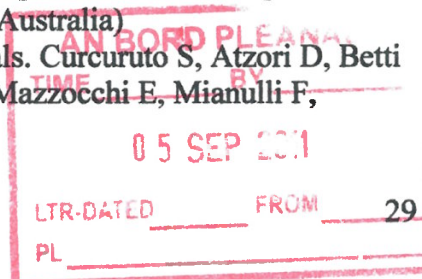
1. Planning for small wind turbines in the U.S.: A case study. Bennett J (USA)
2. Appropriate resolution models for MINI wind turbine. Carley M and Bonsignori M (UK)
3. Evaluation of noise in small wind turbines. Monteiro CA, Carvalho APO and Gomes JAFF (Portugal)
4. Acoustic analysis of wind turbines with a vertical axis according to ISO 61400-11. Szulczyk J, Cempel C and Golec Z (Poland)

PROPAGATION AND PREDICTION OF WIND TURBINE NOISE OVER LAND AND WATER

1. Wind turbine noise exposure in a complex terrain. Bolin K and Karasalo I (Sweden)
2. Comparison of predicted wind farm noise emission and measured post-construction noise levels at the Portland Wind Energy Project in Victoria, Australia. Delaire C, Griffin D and Walsh D (Australia)
3. 400 MW on-shore wind park NOP The Netherlands. Dijkstra M and Vrolijk D (The Netherlands)
4. Comparison of different noise propagation prediction methods against measured wind farm noise levels. Evans T, Cooper J and Stead M (Australia)
5. On the propagation of wind turbine noise. Guarnaccia C, Lenza TLL and Quartieri J (Italy)
6. Wind turbine sound amplifying forest. Johansson E and Almgren M (Sweden)
7. Measurements of sound from wind turbines. Larsson C and Ohlund O (Sweden)
8. The assessment of noise impact of a wind farm installed in a complex terrain: A case-study in Tuscan hills. Palazzuoli D, Gallo P, Licitra G, Balsini F and Fredianelli L (Italy)
9. Coherence issues in wind turbine noise assessment. Walker BE (USA)

MEASUREMENTS OF WIND TURBINE NOISE AND VIBRATIONS: STANDARDS FOR NOISE EMISSION AND IMMISSION, SOUND POWER ASSESSMENT, LONG TERM MEASUREMENTS, MONITORING

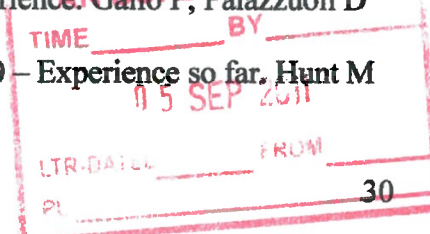
1. Characterisation of the emergence of a wind turbine noise source in the environment. Amadasi G, Notini C, Thomas S, Bullmore A, Freneat C and Aujard C (Italy)
2. Towards a national standard to support the assessment of the noise impact of wind farms. Artom F, Betti R, Carmagnini A, Lenzuni P, Lodi Rizzini L, Marchisio A, Marsico G and Ziliani R (Italy)
3. Analysis of noise immission levels measured from wind turbines. Ashtiani P and Titus S (Canada)
4. Long term measurements: A way to minimize uncertainties on acoustic impact control of wind farm. Bigot A, Farotto G and Delafosse F (France)
5. Lessons learned from long-term noise monitoring at Project West Wind. Botha P (New Zealand)
6. Influence of wind induced aerodynamic noise on microphones from atmospheric measurements. Cooper J, Leclercq D and Stead M (Australia)
7. Wind farm noise: Experiences and regulatory proposals. Curcuruto S, Atzori D, Betti R, De Rinaldis L, Lago R, Lanciotti E, Marsico G, Mazzocchi E, Mianulli F, Sacchetti F and Silvaggio R (Italy)



8. Sound monitoring wind turbines. Dijkstra M and Kerkers T (The Netherlands)
9. Long term hydro sound measurements at the Alpha Ventus offshore wind farm focussing on pile driving noise. Gabriel J, Lubben A and Neumann T (Germany)
10. Wind turbines noise's French regulations - advantages and inconveniences. Gamba R and Garrigues S (France)
11. SODAR wind measurements as a mean to refine acoustic analysis of wind projects. Gianni M, Bartolazzi A, Mariani M and Imperato L (Italy)
12. Accounting for background noise when measuring operational sound levels from wind turbine projects. Hessler D (USA)
13. Measuring method of wind turbine noise at residential area - consideration by using various noise indices. Ishibashi M, Imaizumi H, Ochiai H, Inoue Y and Yamada S (Japan)
14. Sound power level assessment. Is a reference position really reference?. Jiraska A (Czech Republic)
15. A long term noise measurement system for wind farms. McDonald P, Geraghty D and Humphreys I (USA)
16. Municipal wind turbine community complaints and noise measurement evaluation. Menge C (USA)
17. Case studies of wind farm's noise in Tuscany: A proposal for a methodology to identify noise emitted by wind turbines. Nencini L and Alfinito L (Italy)
18. Recent field measurements of wind turbine noise in Japan. Ochiai H, Inoue Y, Imaizumi H and Yamada S (Japan)
19. Test bed for acoustic assessment of small wind turbine drive-trains. Raman G, Krishnamurthy M, Ramachandran RC, Pereira C, Shi X and Jiang Y (USA)
20. Microseismic noise from wind turbines in the vicinity of the Virgo Gravitational Wave Observatory. Saccorotti G, Piccinini D, Cauchie L, Fiori I and Paoletti F (Italy)
21. Application of IEC 61400-11 in Italian land. Serpilli F, Cesini G and Lori V (Italy)
22. Testing the new version of IEC 61400-11. Sondergaard B (Denmark)
23. Investigation of the variation of measured turbine sound power levels, with particular focus on the ground board. Stead M, Cooper J and Evans T (Australia)
24. Prediction, validation, assessment and compliance of wind farm noise in Australia. Teague P and Leonard A (Australia)
25. Development of a new noise immission measurement protocol in Ontario. Titus S and Ashtiani P (Canada)
26. Wind farm noise assessments in Australia. Turnbull C and Turner J (Australia)
27. Monitoring and modelling the vibrational effects of small (<50 kW) wind turbines on the Eskdalemuir IMS station. Westwood RF, Styles P and Toon SM (UK)

REGULATIONS, POLICIES, PLANNING REQUIREMENTS AND DECISION-MAKING

1. Wind energy in Catalonia trends. Environmental compatability. Arnau J, Escobar JJ and Deltell A (Spain)
2. Italian regulations on wind farm noise. A state of the art. Bartolazzi A and Mariani M (Italy)
3. Review of noise conditions from planning permits recently approved in Victoria, Australia. Delaire, C and Griffin D
4. The compliance checking with the environmental noise limits in authorization process of wind farms: A critical approach in the Tuscan experience. Gallo P, Palazzuoli D and Licitra G (Italy)
5. Assessment of wind turbine noise using NZS6808:2010 – Experience so far. Hunt M and Chiles S (New Zealand)



- 2 Sound monitoring wind turbines. Dijkstra, J. and Kerkhof, F. (The Netherlands)
- 9.1 Long term noise measurements at the Vents-Oshon wind farm (abstract)
- 9.2 Long term noise measurements at the Vents-Oshon wind farm (abstract)
- 10 Wind turbines noise: regulations - advantages and disadvantages. Gombi, R. and Gombi, A. (France)
- 11 SGEAR wind measure: a new tool to define accurate noise levels for projects. Gombi, R. and Gombi, A. (France)
- 12 Accounting for background noise when measuring environmental noise levels from wind turbine projects. Gombi, R. (France)
- 13 Measuring method of wind turbine noise in residential areas - consideration by using various noise indices. Ishihara, M., Ishihara, H., Inoue, Y. and Yamada, S. (Japan)
- 14 Sound power level measurement in a reference position using reference. Inoue, Y. (Japan)
- 15 A long term noise measurement system for wind farms. McDonald, B. (Germany)
- 16 Municipal wind turbine community complaints and noise measurement evaluation. Metzger, C. (USA)
- 17 Case studies of wind farm noise in Texas. A proposal for a methodology to identify noise emitted by wind turbines. Nemes, L. and Albin, J. (Italy)
- 18 Recent field measurements of wind turbine noise in Japan. Ochiai, H., Inoue, Y., Imazumi, H. and Yamada, S. (Japan)
- 19 Test bed for acoustic assessment of small wind turbine drive-trains. Raman, G., Krishnamoorthy, M., Ramachandran, R., Perera, C., Shi, X. and Jiang, Y. (USA)
- 20 Microseismic noise from wind turbines in the vicinity of the Virgo gravitational wave observatory. Saccoccio, G., Paccini, D., Gaudenzi, P., Jinnah and Paccini, F. (Italy)
- 21 Application of IEC 61400-11 in Italian land. Scipillo, T., Corsi, G. and Pini, V. (Italy)
- 22 Testing the new version of IEC 61400-11. Sondergaard, B. (Denmark)
- 23 Investigation of the variation of measured turbine sound power levels with particular focus on the ground board. Sted, M., Cooper, J. and Evans, T. (Australia)
- 24 Prediction, validation, assessment and compliance of wind farm noise in Australia. Sted, M. and Brown, A. (Australia)
- 25 Development of a new noise emission measurement protocol in Spain. Turi, S. and Aslani, P. (Canada)
- 26 Wind farm noise assessment in Australia. Tumbell, C. and Turi, S. (Australia)
- 27 Monitoring and modelling the vibrational effects of small (2-3 MW) wind turbines on the 1.5-MHz seismic station. Westwood, R., Styles, P. and Turi, S. (UK)

REGULATIONS, POLICIES, PLANNING, RESEARCH, STANDARDS AND DECISION-MAKING

- 1 Wind energy in Catalonia: towards environmental compatibility. Arnan, A., Escobar, J. and Delgado, A. (Spain)
- 2 Italian regulations on wind farm noise: A state of the art. Baniak, A. and Baniak, V. (Italy)
- 3 Review of noise conditions from planning permits recently approved in Victoria. Australia. Baniak, V. and Griffin, D.
- 4 The compliance checking with the new international noise limits in authorization process of wind farms: A critical approach in the Italian experience. Gallo, P., Palazzoni, D. and Licitia, G. (Italy)
- 5 Assessment of wind turbine noise using N2008-2010 - Experience so far. Hunt, M. and Gillett, S. (New Zealand)

6. Application of policy by local authorities to wind turbine noise applications in England. Perkins RA and Parry GA (UK)
7. Health based guidelines for wind turbine noise in the Netherlands. van den Berg M (The Netherlands)

Appendix 5 - EXASPERATED PLANNERS SHUT WIND FARM DOWN

EXASPERATED PLANNERS SHUT WIND FARM DOWN

EXCLUSIVE by Caroline McMorran reporter@northern-times.co.uk

AN BORD PLEANNALA

THE BY

05 SEP 2011

LTR-DATED FROM

THE LOCAL authority has forced Scottish and Southern Electricity to shut down a Sutherland wind farm after the company breached planning controls by failing to deal with excessive noise from the development.

People living close to the Achany wind farm near Rosehall are claiming their lives are being made a misery by the constant noise, and are angry that their complaints are being ignored. In an unprecedented move, Highland Council issued a temporary stop notice on the 23-turbine wind farm at 3pm on Monday.

The turbine blades at the £55 million, 40MW windfarm, which came on stream in July last year, stopped turning that night.

The stop notice will remain in place for a month, until July 4, with the shut down representing a huge financial loss to the power company.

Highland Council's principal planner Gordon Moonie confirmed yesterday (Thursday) that it was the first time the authority had issued a notice of this type.

He said he was unaware of any other council taking similar action.

"This temporary stop notice was introduced under a 2006 Act and it hasn't been used very often, but it is quite an effective way of dealing with a breach of planning control. In a sense it affects the company where it hurts - in their pocket," he said.

Mr Moonie revealed that the problems with Achany had been ongoing for about a year, with constant complaints to planners about noise.

"We were getting complaints from the local people and the community and we weren't getting any action from SSE, so we decided that the best way forward was to serve this temporary stop notice," he said.

"It means that the windfarm has to cease operating and we can then get round the table and agree a way forward that is in everyone's interest."

According to the stop notice, SSE breached planning controls by failing to provide a scheme for mitigating noise levels prior to the development coming on stream.

They also failed to comply with a request to measure noise levels at two local properties - Rosehall Cottage and a home at Dura - when specifically asked to do so following complaints from the householders.

The Dura property is just 2km away from some of the turbines.

The company has further breached planning controls by failing to notify the local authority of the date the development first supplied electricity to the National Grid.

Local resident Andy Simpson is the chairman of Kyle of Sutherland Against Braemore (KoSAB), the group protesting against a proposed wind farm at Braemore, near Lairg.

He told the Northern Times: "The householder at Dura has been complaining bitterly about the noise in certain weather conditions and said it has made life unbearable at times.

"Therefore, I'm really pleased that Highland Council have done the right thing.

"However, it gives me grave concern that a developer appears to have dismissed a genuine noise complaint once a wind farm has been constructed.

"This surely shows scant care or empathy for local communities from these large corporates." He added: "An even greater cause for concern is the proposal for Braemore windfarm which KoSAB estimate is within 2km of 83 houses."

Rosehall resident Colin Gilmour, who chaired the Achany Windfarm Liaison Group said:

"When Achany became operational in July 2010, we closed the liaison group down because in effect we did not really have any more to do with the development and we were not aware at the time that SSE had not met these conditions.

"However, the issue of noise from Achany has come up at the liaison group set up for the Rosehall Hill wind farm which is being constructed by E.ON.

"There is now a worry that houses at Durcha could be affected by noise from both wind farms and that one operator will blame the other.

"They need to sort out the Achany issue before Rosehall Hill wind farm becomes operational."

Mr Gilmour continued: "The householder at Durcha is particularly affected when the wind is coming from the north-east or in certain weather conditions. But he will be even closer to some of the Rosehall Hill turbines.

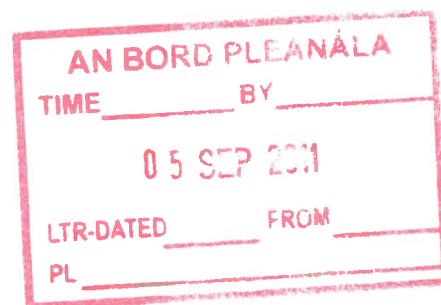
"Highland Council became a bit exasperated in the end with SSE over Achany because they just didn't meet the conditions.."

1 When asked for a comment, a spokesman for SSE yesterday (Thursday) responded:

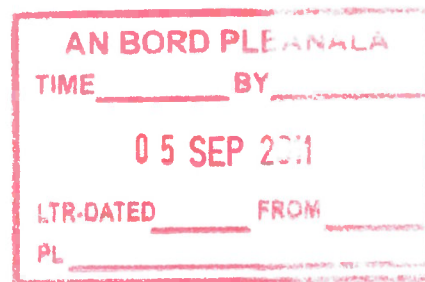
"Following a request from the Higland Council, we have temporarily suspended generation at our Achany wind farm, near Lairg. We are working closely with council officials and will be meeting representatives later today. We are confident that we can reach an agreement with the council very quickly."

<http://www.northern-times.co.uk/News/Exasperated-planners-shut-wind-farm-down-6934757.htm>

Published: 09/06/2011 23:59 - Updated: 09/06/2011 23:58



Appendix 6 – BirdWatch Ireland comment





Protecting birds and their habitats

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Uachtarán na hÉireann

BirdWatch Ireland
Cairde Sanaidh Éireann

Senior Planning Officer
Planning Department
Clare County Council
New Road
Ennis
County Clare

Dear Sir/Madam

**Re. PROPOSED SLIEVECALLAN WIND ENERGY PROJECT, CO. CLARE
PLA REF. 109**

We have a number of significant concerns relating to the proposal and potential impacts on wild birds of conservation concern and of national and European importance, in particular Hen Harrier, for which the site has been identified as being of significance. We wish to alert you and others to our concerns in relation to this proposal. BirdWatch Ireland was not in a position to make a submission relating to this proposal within the timeframe provided due to our limited staff resources.

In the first National Hen Harrier Survey 1998-2000 the site supported a single pair but by the second survey (in 2005) numbers had risen to 5 pairs. Recent research and monitoring of the area by National Parks & Wildlife Service and University College Cork staff located at least 10 pairs in 2009 (B. O'Donoghue, pers. comm.). On these grounds the site becomes one of the top 5 in the country for breeding Hen Harriers and thereby qualifies as an Important Bird Area (IBA). This new West Clare Uplands IBA was proposed to BirdLife International in November 2009. The site extends to 28,381 ha encompassing Slieve Callan in the north and Lisseycasey in the south (see map in Crowe, O., Tierney, N. & Wheeldon, R. 2009. Distribution, Extent and Status of Ireland's Important Bird Areas. BirdWatch Ireland Report to the Heritage Council.)

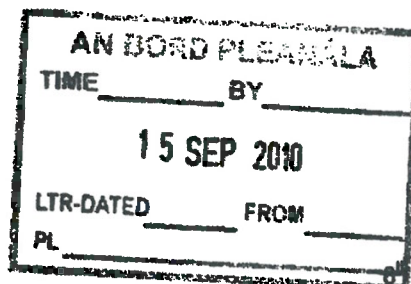
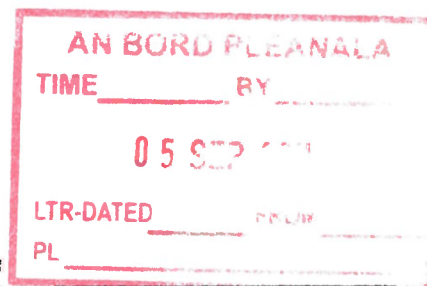
As such, it is our view that this site qualifies for and should be designated as a Special Protection Area for Hen Harrier. It should therefore be afforded protection as determined by existing European Case Law against Ireland under the EU Birds Directive and EU Habitats Directive. Please inform us of the status of this proposal, and of work that has been carried out that would inform an Appropriate Assessment as required under the EU Habitats Directive for interests of such sites.

The importance of avoiding adverse impacts on wild birds in designated areas, in areas qualifying for designation but not yet designated, and in the wider countryside has been highlighted by the European Court of Justice ruling against Ireland in December 2007 for failing to fully implement the EU Birds Directive and EU Habitats Directive. As required under the EU Habitats Directive, adverse impacts on priority species (including Annex 1 species) need to be fully considered in the decision-making process. We recommend that prior to any decision being made, potential adverse impacts of the proposal are fully considered, ensuring informed decision-making regarding the protection of wild birds.

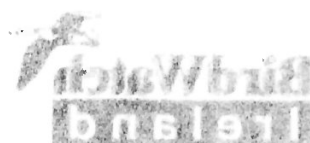


BirdLife International is the world's largest conservation organization of its kind.

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05 March 2010



Protecting birds and their habitats

P.O. Box 112
Greystones
Co. Wick

Senior Planning Officer
Planning Department
Clare County Council
New Road
Ennis
County Clare

Phone
Fax
Email
Website

Dear Sir/Madam

Re: PROPOSED GLEVECCA LANE WIND ENERGY PROJECT, CO CLARE
(RA REF: 108-10)

Submission Ref: 108-10
Submission Date: 10/03/2009

We have a number of significant concerns relating to the proposal and potential impacts on wild birds of conservation concern and of national and European importance. In particular, the Hen Harrier, for which the site has been identified as being of significance. We wish to ask you and others to our concerns in relation to this proposal. BirdWatch Ireland was not in a position to make a submission relating to this proposal within the timeframe provided due to our limited staff resources.

In the first National Hen Harrier Survey 1998-2000 the site supported a single pair but by the second survey (in 2005) numbers had risen to 5 pairs. Recent research and monitoring of the area by National Parks & Wildlife Service and University College Cork staff located at least 10 pairs in 2008 (B. O'Donoghue, pers. comm.). On these grounds the site becomes one of the top 5 in the country for breeding Hen Harriers and thereby qualifies as an important Bird Area (IBA). This new West Clare Uplands IBA was proposed to BirdLife International in November 2008. The site extends to 28,387 ha encompassing Gleevea in the north and Lisacrossy in the south (see map in Crowe, O., Tierney, N. & Whelan, R. 2009. Distribution, Extent and Status of Ireland's Important Bird Areas. BirdWatch Ireland Report to the Heritage Council).

As such, it is our view that this site qualifies for and should be designated as a Special Protection Area (SPA). Hen Harrier should therefore be afforded protection as determined by existing European Game Law against disturbance under the EU Birds Directive and EU Habitats Directive. Please inform us of the status of the proposal and of work that has been carried out that would inform an Appropriate Assessment as required under the EU Habitats Directive for interests of such sites.

The importance of avoiding adverse impacts on wild birds in designated areas, in areas designated for designation but not yet designated, and in the wider countryside has been highlighted by the European Court of Justice ruling against Ireland in December 2007 for failing to fully implement the EU Birds Directive and EU Habitats Directive. An appeal under the EU Habitats Directive against impacts on priority species (including Annex 1 species) need to be fully considered in the decision-making process. We recommend that prior to any decision being made potential adverse impacts of the proposal are fully considered, ensuring informed decision-making regarding the protection of wild birds.



P.O. Box 12
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Patron
Mary McAleese
President of Ireland

Éireannach
Máire Mhic Giolla Íosa
Uachtarán na hÉireann

BirdWatch Ireland
Cairde Éireannach Éireann

Of particular concern to us are potential adverse impacts on:

- Species listed on Annex 1 of the EU Birds Directive and migratory wetland bird species which are afforded particular protection in the wider countryside as well as in areas identified as Special Protection Areas.
- Red-listed and amber-listed bird species as identified in 'Birds of Conservation Concern' (refer to our website for details).
- Priority habitats for wild birds including uplands, wetlands, hedgerows, machair, coastal habitats, semi natural woodlands, and riparian habitats in addition to those habitats specified under Annex 1 of the EU Habitats Directive.
- Designated sites. Appropriate protection and buffering of sites identified as being important for wild birds and the habitats is important to ensure that conservation objectives can be achieved.

It is our view that a *complete Appropriate Assessment of the potential impacts of the proposal on wild birds should take place in accordance with the requirements of the EU Habitats Directive (Appendix 1)*. This is recommended in order to ensure informed decision-making and due consideration of wild birds and their habitat requirements as required under the EU Birds Directive and EU Habitats Directive, such as wild birds listed as Birds of Conservation Concern in Ireland¹, as well as Annex 1 species listed under the EU Birds Directive. This has not adequately been addressed.

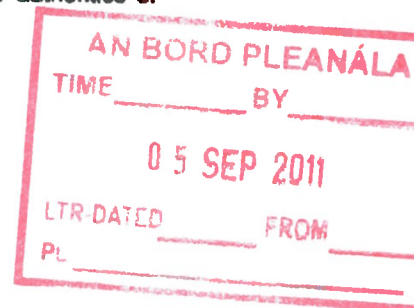
We would be happy to discuss our concerns with your staff, other authorities or third parties as appropriate.

Yours sincerely

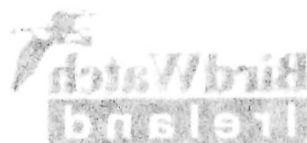
Siobhán Egan
Senior Conservation Officer
Policy & Advocacy Team

Cc.

Congella McGuire, Heritage Officer, Clare County Council,
Brigid Barry, Biodiversity Officer, Clare County Council,
Minister of Environment Heritage and Local Government
National Parks and Wildlife Trust
An Bord Pleanála
Minister of Communications Energy and Natural Resources
Irish Wildlife Trust
Camilla Keane, An Taisce



¹ Lynas P, Newton S & Robinson JA (2007). The Status of Birds in Ireland: an analysis of conservation concern 2008 – 2013. Irish Birds (8).



Permitting birds and their habitats

Project Officer: BirdWatch Ireland, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

P.O. Box 12
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Co. Wicklow

Of particular concern to us are potential adverse impacts on

- Species listed on Annex I of the EU Birds Directive and migratory wildland birds species which are afforded particular protection in the wider countryside as well as in areas identified as Special Protection Areas.
- Red-listed and amber-listed bird species as identified in Birds of Conservation Concern (refer to our website for details).
- Priority habitats for wild birds including boglands, wetlands, hedgerows, meadows, coastal habitats, semi-natural woodlands, and riparian habitats in addition to those habitats specified under Annex I of the EU Habitats Directive.
- Designated sites. Appropriate protection and buffering of sites identified as being important for wild birds and the habitats is important to ensure that conservation objectives can be achieved.

It is our view that appropriate Appropriate Assessment of the potential impacts of the proposal on wild birds should take place in accordance with the requirements of the EU Habitats Directive (Appendix 1). This is recommended in order to ensure informed decision-making and due consideration of wild birds and their habitat requirements as required under the EU Birds Directive and EU Habitats Directive, such as wild birds listed as Birds of Conservation Concern in Ireland, as well as Annex I species listed under the EU Birds Directive. This has not adequately been addressed.

We would be happy to discuss our concerns with your staff or other authorities or third parties as appropriate.

Yours sincerely,

Stephen Egan
Senior Conservation Officer
Policy & Advocacy Team

Ms. Catherine M. Byrne, Heritage Officer, Clare County Council
Ms. Brenda Barry, Biodiversity Officer, Clare County Council
Minister of Environment, Heritage and Local Government
National Parks and Wildlife Trust
An Bord Pleanála
Minister of Communications, Energy and Natural Resources
Irish Wildlife Trust
Camilla Keane, An Fórsa

1. Lysbeth Newton & Rebecca JA (2007) The Status of Birds and their Habitats in the context of conservation.



P.O. Box 12
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Co. Wicklow

Patron
Mary McAuleo
President of Ireland

Éarlaimh
Maire Mhic Giolla íosa
Uachtarán na hÉireann

BirdWatch Ireland
Ceirte Éireannach Éireann

Appendix 1

Under the Habitats and Birds Directives, listed habitats and species are afforded special protection through the designation of sites and other means. Where designated sites, or the features for which they are designated, may be threatened by development, the competent authority must undertake an appropriate assessment under Article 6.3 of the Habitats Directive:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. ...the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned...

In addition, Article 4.1 of the Bird Directives states:

The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution

While Article 4.2 states:

Member states shall take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their need for protection in the geographical sea and land area where this directive applies, as regards their breeding, moulting and wintering areas and staging posts along their migration routes.

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TIME _____ BY _____
15 SEP 2010
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Protection Birds and their Habitats

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Appendix 1

Under the Habitats and Birds Directives, Member States and species are afforded special protection through the designation of special areas. Where designated sites, or the features for which they are designated, may be threatened by development, the competent authority must undertake an appropriate assessment under Article 6 of the Habitats Directive. Any plan or project not directly connected with or necessary to the management of the site but likely to have significant effects thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. The competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned.

In addition, Article 4 of the Birds Directive states: The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction within areas of distribution.

While Article 4.2 states: Member States shall take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their need for protection in the geographical area and land where this directive applies as regards their breeding, moult and wintering areas and staging posts along their migration routes.

12 SEP 2010

12 SEP 2010

12 SEP 2010



Appendix 7 - Bulletin of Science, Technology & Society

All articles below were published in the *Bulletin of Science, Technology & Society*, August 2011, vol. 31, no. 4

Wind Turbine Noise

John P. Harrison

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Abstract

Following an introduction to noise and noise regulation of wind turbines, the problem of adverse health effects of turbine noise is discussed. This is attributed to the characteristics of turbine noise and deficiencies in the regulation of this noise. Both onshore and offshore wind farms are discussed

<http://bst.sagepub.com/content/31/4/256>

Industrial Wind Turbine Development and Loss of Social Justice?

Carmen M. E. Krogh

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Abstract

This article explores the loss of social justice reported by individuals living in the environs of industrial wind turbines (IWTs). References indicate that some individuals residing in proximity to IWT facilities experience adverse health effects. These adverse health effects are severe enough that some families have abandoned their homes. Individuals report they welcomed IWTs into their community and the negative consequences were unexpected. Expressions of grief are exacerbated by the emotional and physical toll of individuals' symptoms, loss of enjoyment of homes and property, disturbed living conditions, financial loss, and the lack of society's recognition of their situation. The author has investigated the reported loss of social justice through a review of literature, personal interviews with, and communications from, those reporting adverse health effects. The author's intention is to create awareness that loss of social justice is being associated with IWT development. This loss of justice arises from a number of factors, including the lack of fair process, the loss of rights, and associated disempowerment. These societal themes require further investigation. Research by health professionals and social scientists is urgently needed to address the health and social impacts of IWTs operating near family homes.

<http://bst.sagepub.com/content/31/4/321>

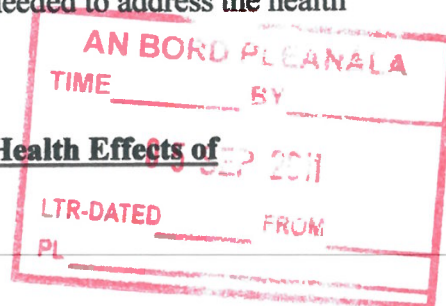
Properly Interpreting the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents

Carl V. Phillips

Populi Health Institute, Wayne, PA, USA, cvphilo@gmail.com

Abstract

There is overwhelming evidence that wind turbines cause serious health problems in nearby residents, usually stress-disorder-type diseases, at a nontrivial rate. The bulk of the evidence takes the form of thousands of adverse event reports. There is also a small amount of systematically gathered data. The adverse event reports provide compelling evidence of the seriousness of the problems and of causation in this case because of their volume, the ease of observing exposure and outcome incidence, and case-crossover data. Proponents of turbines have sought to deny these problems by making a collection of contradictory claims including



There is overwhelming evidence that wind turbines cause serious health problems in nearby residents, usually stress-related-type diseases at a mortality rate. The bulk of the evidence takes the form of thousands of adverse event reports. There is also a small amount of systematically gathered data. The adverse event reports provide compelling evidence of the seriousness of the problem and of causation in this case because of their volume, the ease of observing exposure and onset of incidence, and case-control data. Proponents of turbines have sought to deny these problems by making a collection of contradictory claims including

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Carl V. Phillips

Industrial Wind Turbines on Nerve Systems

Properly Interpreting the Epidemiologic Evidence About the Health Effects of

<http://bst.sagepub.com/content/31/4/321>

and social impacts of *WT* opening new family homes

Research by health professionals and social scientists is urgently needed to address the health rights, and associated disempowerment. These social themes require further investigation. Loss of justice arises from a number of factors, including the lack of the process, the loss of create awareness that loss of social justice is being associated with *WT* development. This communications from these reporting adverse health effects. The author's intention is to reported loss of social justice through a review of literature, personal interviews with, and loss, and the lack of society's recognition of their situation. The author has investigated the symptoms, loss of enjoyment of homes and property, disturbed living conditions, financial expressions of grief are exacerbated by the emotional and physical toll of individuals. *WT* is welcomed *WT* into their community and the negative consequences were unexpected. severe enough that some families have abandoned their homes. Individuals report they proximity to *WT* facilities experience adverse health effects. These adverse health effects are industrial wind turbines (*WT*). References indicate that some individuals residing in This article explores the loss of social justice reported by individuals living in the environs of

Abstract

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Gannon M. E. Krugly

Industrial Wind Turbine Development and Loss of Social Justice?

<http://bst.sagepub.com/content/31/4/320>

farms are discussed

turbine noise and vibrations in the regulation of this noise. Both onshore and offshore wind adverse health effects of turbine noise is discussed. This is attributed to the characteristics of following an introduction to noise and noise regulation of wind turbines, the problem of

Abstract

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Wind Turbine Noise

2011, vol. 31, no. 4

All articles below were published in the *Journal of Science, Technology & Society*

Appendix 2 - *Journal of Science, Technology & Society*

that the evidence does not “count,” the outcomes are not “real” diseases, the outcomes are the victims’ own fault, and that acoustical models cannot explain why there are health problems so the problems must not exist. These claims appeared to have swayed many nonexpert observers, though they are easily debunked. Moreover, though the failure of models to explain the observed problems does not deny the problems, it does mean that we do not know what, other than kilometers of distance, could sufficiently mitigate the effects. There has been no policy analysis that justifies imposing these effects on local residents. The attempts to deny the evidence cannot be seen as honest scientific disagreement and represent either gross incompetence or intentional bias.

Environmental and Economic Impacts of Integrating Photovoltaic and Wind-Turbine Energy Systems in the Canadian Residential Sector

Ali M. Syed

Dalhousie University

Alan S. Fung

Ryerson University

V. Ismet Ugursal

Dalhousie University

Abstract

The Canadian residential sector contributes approximately 80 megatons of GHGs to the environment yearly. With the ratification of Kyoto Protocol, Canada has committed to reduce its 1990 GHG emission levels by at least 5% between 2008 and 2012. To meet this target, Canada must evaluate and exploit all feasible means to reduce fossil fuel energy consumption and GHG emissions. Test-case Canadian houses were modeled in the building-energy simulation software ESP-r. Requisite housing stock data were extracted from Canada's residential end-use energy surveys. Photovoltaic and wind-turbine energy systems were assessed for their contribution to electricity generation and GHG savings. Typical household electrical consumption versus renewable electricity generation was assessed to estimate the GHG reduction, cost saving in electricity, and the impact of these technologies on single detached houses. With the use of net-metering, 100% of electricity requirements can be met by these technologies in certain cases, resulting in significant reductions in GHG emissions.

<http://bst.sagepub.com/content/28/3/210>

Infrasound From Wind Turbines Could Affect Humans

Alec N. Salt

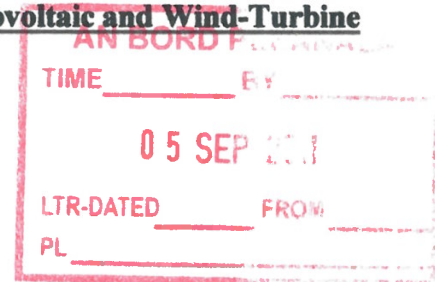
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James A. Kaltenbach

Lerner Research Institute/Head and Neck Institute, Cleveland, OH, USA

Abstract

Wind turbines generate low-frequency sounds that affect the ear. The ear is superficially similar to a microphone, converting mechanical sound waves into electrical signals, but does this by complex physiologic processes. Serious misconceptions about low-frequency sound and the ear have resulted from a failure to consider in detail how the ear works. Although the cells that provide hearing are insensitive to infrasound, other sensory cells in the ear are much more sensitive, which can be demonstrated by electrical recordings. Responses to infrasound



that the evidence does not "confirm" the outcomes are not "real" diseases – the outcomes are the victims' own fault, and that statistical models cannot explain why there are health problems so the problems must not exist. These claims appeared to have sway on many newspaper observers, though they are easily debunked. Moreover, though the failure of models to explain the observed problems does not deny the problems, it does mean that we do not know what other than kilometers of distance could sufficiently mitigate the effect. There has been no policy analysis that justifies imposing these effects on households. The attempts to deny the evidence cannot be seen as honest scientific disagreement; they represent either gross incompetence or intentional bias.

Environmental and Economic Impacts of Integrating Windmill and Solar PV within Energy Systems in the Canadian Residential Sector

Vol 171 27-46
 Dalhousie University
 Adam S. Wang
 Ryerson University
 V. Jansz-Bogard
 Dalhousie University

Abstract

The Canadian residential sector contributes approximately 80 megatons of GHG to the environment yearly. With the ratification of Kyoto Protocol, Canada has committed to reduce the 1990 GHG emission levels by at least 2% between 2008 and 2012. To meet this target, Canada must evaluate and exploit all feasible means to reduce fossil fuel energy consumption and GHG emissions. Test-case Canadian houses were modeled in the building energy simulation software ESP-r. Residential housing stock data were extracted from Canada's residential end-use energy surveys. Photovoltaic and wind-turbine energy systems were assessed for their contribution to electricity generation and GHG savings. Typical household electrical consumption versus renewable electricity generation was assessed to estimate the GHG reduction cost saving in electricity, and the impact of these technologies on single detached houses. With the use of net-metering, 100% electricity requirements can be met by these technologies in certain cases, resulting in significant reductions in GHG emissions.

<http://dx.doi.org/10.1016/j.enbuild.2012.07.010>

Information from Wind Turbines: Correlation with Weather Patterns

Vol 171 27-46
 Dalhousie University, St. John's, NL A1B 4X6
 James A. Kalkanbach
 Center for Research in Wind and Wave Systems, Dalhousie University, St. John's, NL A1B 4X6

Abstract

Wind turbines generate low-frequency sounds that affect the car. The car is responsible for similar to a microphone, converting mechanical sound waves into electrical signals, but does this by complex physiologic processes. Serious misconceptions about low-frequency sound and the car have resulted from a failure to consider in detail how the ear works. Although the cells that provide hearing are insensitive to infrasound, other sensory cells in the ear are much more sensitive, which can be demonstrated by electrical recordings. Responses to infrasound

reach the brain through pathways that do not involve conscious hearing but instead may produce sensations of fullness, pressure or tinnitus, or have no sensation. Activation of subconscious pathways by infrasound could disturb sleep. Based on our current knowledge of how the ear works, it is quite possible that low-frequency sounds at the levels generated by wind turbines could affect those living nearby.

<http://bst.sagepub.com/content/31/4/296>

Properly Interpreting the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents

Carl V. Phillips

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Abstract

There is overwhelming evidence that wind turbines cause serious health problems in nearby residents, usually stress-disorder-type diseases, at a nontrivial rate. The bulk of the evidence takes the form of thousands of adverse event reports. There is also a small amount of systematically gathered data. The adverse event reports provide compelling evidence of the seriousness of the problems and of causation in this case because of their volume, the ease of observing exposure and outcome incidence, and case-crossover data. Proponents of turbines have sought to deny these problems by making a collection of contradictory claims including that the evidence does not "count," the outcomes are not "real" diseases, the outcomes are the victims' own fault, and that acoustical models cannot explain why there are health problems so the problems must not exist. These claims appeared to have swayed many nonexpert observers, though they are easily debunked. Moreover, though the failure of models to explain the observed problems does not deny the problems, it does mean that we do not know what, other than kilometers of distance, could sufficiently mitigate the effects. There has been no policy analysis that justifies imposing these effects on local residents. The attempts to deny the evidence cannot be seen as honest scientific disagreement and represent either gross incompetence or intentional bias.

<http://bst.sagepub.com/content/31/4/303>

Public Health Ethics, Legitimacy, and the Challenges of Industrial Wind Turbines: The Case of Ontario, Canada

Martin Shain

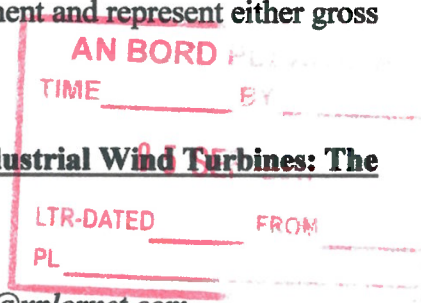
University of Toronto, Caledon, Ontario, Canada, martinshain@xplornet.com

Abstract

While industrial wind turbines (IWTs) clearly raise issues concerning threats to the health of a few in contrast to claimed health benefits to many, the trade-off has not been fully considered in a public health framework. This article reviews public health ethics justifications for the licensing and installation of IWTs. It concludes that the current methods used by government to evaluate licensing applications for IWTs do not meet most public health ethical criteria. Furthermore, these methods are contrary to widely held fundamental principles of administrative law and governmental legitimacy. A set of decision-making principles are suggested to address this situation that are derived from existing and emerging legal principles in Canada and elsewhere. These include the Precautionary Principle, the Least Impactful Means (Proportionality) Test, and the Neighbor Principle.

<http://bst.sagepub.com/content/31/4/346>

The Noise From Wind Turbines: Potential Adverse Impacts on Children's Well-Being



reach the brain through pathways that do not involve consciousness but nevertheless produce sensations of pressure or tingling or have no sensation. Activation of subconscious pathways by infrasound could disturb sleep. Based on our current knowledge of how the ear works, it is quite possible that low-frequency sounds in the 16-17 Hz generated by wind turbines could affect those living nearby.
<http://best.sagepub.com/content/3/4/200>

Project Cleanup: The Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines and the Challenges of Addressing Them

Carl W. Phillips
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Abstract
 There is overwhelming evidence that wind turbines cause serious health problems in nearby residents, usually stress-related-type diseases, at a non-trivial rate. The bulk of the evidence takes the form of thousands of adverse event reports. There is also a small amount of systematically gathered data. The adverse event reports provide compelling evidence of the seriousness of the problems and of causation in this case because of their volume, the ease of observing exposure and outcome incidence, and case-crossover data. Proponents of turbines have sought to deny these problems by making a collection of contradictory claims including that the evidence does not "count," the outcomes are not "real" diseases, the outcomes are the victims' own fault, and that anecdotal models cannot explain why there are health problems so the problems must not exist. These claims appeared to have swayed many non-peer observers, though they are easily debunked. Moreover, though the failure of models to explain the observed problems does not deny the problems, it does mean that we do not know what other than kilohertz of distance could sufficiently mitigate the effects. There has been no policy analysis that justifies imposing these effects on local residents. The attempts to deny the evidence cannot be seen as honest scientific disagreement and represent either gross incompetence or intentional bias.
<http://best.sagepub.com/content/3/4/203>

Public Health Ethics, Justice, and the Challenges of Addressing Wind Turbine: The Case of Ontario, Canada

Martin Shain
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Abstract
 While industrial wind turbines (IWTs) clearly raise issues concerning threats to the health of a few in contrast to claimed health benefits to many, the trade-off has not been fully considered in a public health framework. This article reviews public health ethics justifications for the licensing and installation of IWTs. It concludes that the current methods used by government to evaluate licensing applications for IWTs do not meet most public health ethical criteria. Furthermore, these methods are contrary to widely held fundamental principles of administrative law and governmental legitimacy. A set of decision-making principles are suggested to address this situation that are derived from existing and emerging legal principles in Canada and elsewhere. These include the Precautionary Principle, the First Impact Means (Proportionality) Test, and the Neighbor Principle.
<http://best.sagepub.com/content/3/4/240>

The Effect of Wind Turbine Noise on Children's Health

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Abstract

Research linking loud sounds to hearing loss in youngsters is now widespread, resulting in the issuance of warnings to protect children's hearing. However, studies attesting to the adverse effects of intrusive sounds and noise on children's overall mental and physical health and well-being have not received similar attention. This, despite the fact that many studies have demonstrated that intrusive noises such as those from passing road traffic, nearby rail systems, and overhead aircraft can adversely affect children's cardiovascular system, memory, language development, and learning acquisition. While some schools in the United States have received funds to abate intrusive aircraft noise, for example, many schools still expose children to noises from passing traffic and overhead aircraft. Discussion focuses on the harmful effects of noise on children, what has to be done to remedy the situation, and the need for action to lessen the impacts of noise from all sources. Furthermore, based on our knowledge of the harmful effects of noise on children's health and the growing body of evidence to suggest the potential harmful effects of industrial wind turbine noise, it is strongly urged that further studies be conducted on the impacts of industrial wind turbines on their health, as well as the health of their parents, before forging ahead in siting industrial wind turbines.

<http://bst.sagepub.com/content/31/4/291>

Toward a Case Definition of Adverse Health Effects in the Environs of Industrial Wind Turbines: Facilitating a Clinical Diagnosis

Robert Y. McMurtry

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Abstract

Internationally, there are reports of adverse health effects (AHE) in the environs of industrial wind turbines (IWT). There was multidisciplinary confirmation of the key characteristics of the AHE at the first international symposium on AHE/IWT. The symptoms being reported are consistent internationally and are characterized by crossover findings or a predictable appearance of signs and symptoms present with exposure to IWT sound energy and amelioration when the exposure ceases. There is also a revealed preference of victims to seek restoration away from their homes. This article identifies the need to create a case definition to establish a clinical diagnosis. A case definition is proposed that identifies the sine qua non diagnostic criteria for a diagnosis of adverse health effects in the environs of industrial wind turbines. Possible, probable, and confirmed diagnoses are detailed. The goal is to foster the adoption of a common case definition that will facilitate future research efforts.

<http://bst.sagepub.com/content/31/4/316>

Wind Power in Ontario

Its Contribution to the Electricity Grid

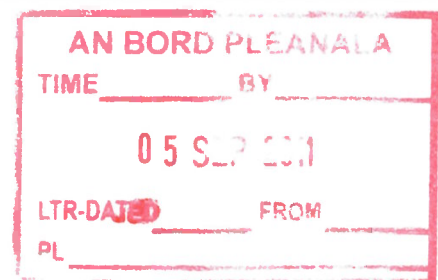
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Abstract



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Abstract

Research linking loud sounds to hearing loss in youngsters is now widespread, resulting in the issuance of warnings to protect children's hearing. However, studies assessing the adverse effects of intrusive sounds and noise on children's overall mental and physical health and well-being have not received similar attention. This, despite the fact that many studies have demonstrated that intrusive noises such as those from passing road traffic, nearby rail systems, and overhead aircraft can adversely affect children's cardiovascular system, memory, language development, and learning acquisition. While some schools in the United States have received funds to abate intruder's aircraft noise, for example, many schools still expose children to noises from passing traffic and overhead aircraft. Discussion focuses on the harmful effects of noise on children, what has to be done to remedy the situation, and the need for action to lessen the impact of noise from all sources. Emphasis is based on our knowledge of the harmful effects of noise on children's health and the growing body of evidence to suggest the potential harmful effects of industrial wind turbine noise. It is strongly urged that further studies be conducted on the impact of industrial wind turbines on their health, as well as the health of their parents, before forging ahead in silencing industrial wind turbines.

<http://jst.sagepub.com/content/31/4/291>

Ground-based Definition of Adverse Health Effects in Children of Industrial Wind Turbines: Facilitating a Clinical Diagnosis

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Abstract

Internationally, there are reports of adverse health effects (AHE) in the environs of industrial wind turbines (WT). There was multidisciplinary confirmation of the key characteristics of the AHE as the first international symposium on AHE-WT. The symptoms being reported are consistent internationally and are characterized by crossover findings or a predictable appearance of signs and symptoms present with exposure to WT sound energy and amelioration when the exposure ceases. There is also a reported preference of victims to seek restoration away from their homes. This article identifies the need to create a case definition to establish a clinical diagnosis. A case definition is proposed that identifies the signs and diagnostic criteria for a diagnosis of adverse health effects in the environs of industrial wind turbines. Possible, probable, and confirmed diagnoses are detailed. The goal is to foster the adoption of a common case definition that will facilitate future research efforts.

<http://jst.sagepub.com/content/31/4/316>

Wind Power in Ontario: Its Contribution to the Electricity Grid

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Abstract

The purpose of this article is to investigate wind turbine production, the variability of that production, and the relationship between output and system-wide demand. A review of the literature reveals that a variety of measures (and methods) to explore the variability of wind power production exist. Attention then turns to the province of Ontario (Canada), and the performances of four wind farms are examined for 2006 and 2007. Key conclusions include that the wind farms' capacity factors vary from 27.6% to 35.6%, with higher values in winter as compared to summer; wind power performs better than the seasonal average during peak periods; wind is a better "partner" for the Ontario electricity system in the winter as opposed to the summer; and the increased geographic distribution of wind farms decreases their collective variability.

<http://bst.sagepub.com/content/28/6/436>

WindVOiCe, a Self-Reporting Survey: Adverse Health Effects, Industrial Wind Turbines, and the Need for Vigilance Monitoring

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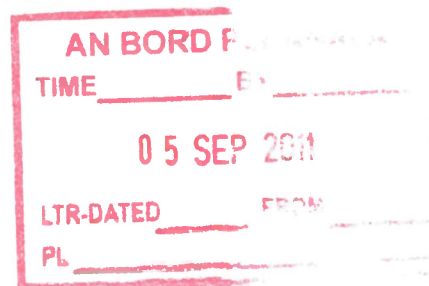
Abstract

Industrial wind turbines have been operating in many parts of the globe. Anecdotal reports of perceived adverse health effects relating to industrial wind turbines have been published in the media and on the Internet. Based on these reports, indications were that some residents perceived they were experiencing adverse health effects. The purpose of the WindVOiCe health survey was to provide vigilance monitoring for those wishing to report their perceived adverse health effects. This article discusses the results of a self reporting health survey regarding perceived adverse health effects associated with industrial wind turbines.

<http://bst.sagepub.com/content/31/4/334>

A summary of the most recent research can be found here:

<http://epaw.org/documents/Summary%20of%20new%20evidence%20August%202011%20FINAL.pdf>



The purpose of this article is to investigate wind turbine production and the variability of that production, and the relationship between output and system-wide demand. A review of the literature reveals that a variety of measures (and methods) to explore the variability of wind power production exist. Attention then turns to the power factor of Canada and the performance of four wind farms are examined for 2006 and 2007. Key conclusions include that the wind farms' capacity factors range from 27.6% to 35.6%, with higher values in winter as compared to summer. Wind power performs better than the seasonal average during peak periods; wind is a better "partner" for the Ontario electricity system in the winter as opposed to the summer and the increased geographic distribution of wind farms decreases their collective variability.

<http://dx.doi.org/10.1016/j.encon.2008.04.004>

WindVOC: A Self-Reporting Survey to Assess Health Effects of Industrial Wind Turbines and the Need for Vigilance Monitoring

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Abstract

Industrial wind turbines have been operating in many parts of the globe. Anecdotal reports of perceived adverse health effects relating to industrial wind turbines have been published in the media and online Internet. Based on these reports, indications were that some residents perceived they were experiencing adverse health effects. The purpose of the WindVOC health survey was to provide vigilance monitoring for those wishing to report their perceived adverse health effects. This article discusses the results of a self-reporting health survey regarding perceived adverse health effects associated with industrial wind turbines.

<http://dx.doi.org/10.1016/j.encon.2008.04.004>

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IN 11-04