

Common Wind Farm Q&A

1. Will there be noise from the wind turbines?

Commercial scale wind farms have been operating in Ireland since 1992. Until the original wind farm planning guidelines were published in 2006, there was no minimum setback distance from a wind turbine to a property, which resulted in some turbines being built relatively close (~200m) to properties. Older wind turbine models generally produce more noise than current models and there were more lenient noise limits in place. The combination of all of these factors meant that unfortunately there has been some complaints of noise from wind farms in the past, and this stigma remains.

However, there has been important developments in this area over the years. There is now a minimum setback distance from houses of 500m. It is stated in the 2006 guidelines that “in general, noise is unlikely to be a significant problem where the distance from the nearest turbine to any noise sensitive property is more than 500 metres”¹. There has also been great advancements in turbine design and technology which means that wind turbines are significantly quieter than previously, and continue to improve with every new model that comes onto the market.

In 2019, the Department of Housing, Planning, Community and Local Government published the draft revised wind energy development guidelines which proposes noise restriction limits consistent with World Health Organisation standards, proposing a relative rated noise limit of 5dB(A) above existing background noise within the range of 35 to 43dB(A), with 43dB(A) being the maximum noise limit permitted, day or night².

At very quiet locations where existing background noise levels are measured at less than 30 dB, it is proposed that a maximum 35 dB (A) noise limit will be imposed at lower wind speeds. To put these numbers into context, 40 decibels would be the noise level in a quiet office.³

Noise limits are a condition of the wind farm planning permission and must be complied with over the full lifetime of the wind farm.

2. Will there be shadow flicker from the wind turbines?

Shadow flicker occurs when the shadows cast by the blades of a wind turbine fall over a residential home. For the people inside the house the natural light coming in a window facing the turbine can be blocked by the shadow of the blades.

¹ <https://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownload%2C1633%2Cen.pdf>

² https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_revised_wind_energy_development_guidelines_december_2019.pdf

³ <http://hcchearing.org/noise/common-environmental-noise-levels/>

Since the blades are turning rapidly this creates a flicker effect with the natural light being blocked and unblocked every couple of seconds. This only happens in rare circumstances where the sun is shining at a low angle – just after dawn and before sunset – and where the turbine is directly between the residential home and the sun.

Under the draft revised wind energy planning guidelines, no shadow flicker is permitted and wind turbines will need to shutdown during the short periods where there is potential to cause shadow flicker.⁴ This is easily controlled by installing shadow flicker modules in the wind turbines.

3. Do wind farms cause negative health impacts?

Some reports have described a range of health effects claimed to be stemmed from wind turbine operation i.e. noise, infrasound, electromagnetic fields (EMF) and shadow flicker. Reported symptoms include headaches, sleep disturbance, annoyance and anxiety to name a few.

A number of studies have been carried out in this area. One study carried out in North America in 2014⁵ reviewed the evidence from 60 peer reviewed scientific articles on the topic. The authors found that the available evidence suggests that EMF, shadow flicker, low frequency noise and infrasound from wind turbines are not likely to affect human health. They noted that some studies found that audible noise can cause annoyance to some people, however when sited properly with adequate setbacks to alleviate annoyance from noise, wind turbines are not related to adverse health.

Studies on health effects from wind turbine noise have also been carried out by national health bodies such as Health Canada⁶ and the National Health and Medical Research Council⁷ in Australia. Both of these studies found no consistent evidence that wind turbine noise was related to self-reported human health effects.

In Ireland, the HSE published a position paper in 2017 on wind turbines and public health and concluded that “published scientific evidence is inconsistent and does not support adverse effects of wind turbines on health”⁸

The HSE does however recommend adequate setback distances and meaningful engagement with local communities in order to address public concern.

In order to address public concern in Australia, a National Wind Farm Commissioner was established in November 2015 to handle complaints from residents in relation to wind farms in their area. In the three

⁴ https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_revised_wind_energy_development_guidelines_december_2019.pdf

⁵ Knopper et al (June 2014) Wind turbines and human health. Published in *Frontiers in public health*. Available at <https://www.frontiersin.org/articles/10.3389/fpubh.2014.00063/full>.

⁶ Health Canada (2016) Exposure to wind turbine noise: Perceptual responses and reported health effects. Available at <https://www.ncbi.nlm.nih.gov/pubmed/27036283>.

⁷ NHMRC (2015) Expert review of the evidence on wind farms and human health. Available at <https://www.nhmrc.gov.au/about-us/publications/expert-review-evidence-wind-farms-and-human-health>.

⁸ HSE Public Health Medicine Environment and Health Group (2017) Position paper on wind turbines and public health. Available online at <http://hdl.handle.net/10147/621467>. Accessed October 2019.

year period from November 2015 to the end of December 2018, a total of just 65 complaints had been received in relation to the 94 wind farms in operation across Australia⁹.

4. Will the wind farm have an impact on property values in the area?

There is no definitive evidence either way that wind farms lower property prices or that they have no impact on property prices.

An enormous amount of research, some of which is summarised below, has been carried out in this area. While the vast majority of studies have found no evidence that wind farms have a negative impact on property prices, there is research that contradicts this.¹¹

No relevant studies have been carried out in Ireland to date, however there has been some studies carried out in the UK. A major piece of research was published by Renewable UK and the Centre for Economics and Business Research which looked at more than a million house sales from 1995 to 2013 and compared the 82,000 which took place within five kilometres of a wind farm with the others. It found no indication that the presence of a wind farm had any effect on house prices.¹²

In April 2014, the London School of Economics Spatial Economic Research Centre published a report based on 125,000 house sales in England and Wales between 2000 and 2012. The study found an average reduction in the value of the house of between 5 and 6 per cent within 2 km of very large wind farms.¹³

This study obviously disagrees substantially with the findings from Renewable UK and the Centre for Economic and Business Research and so this led to further research which was published in Scotland in 2016.¹⁴

This, again, found no evidence of a negative impact from wind turbines on house prices and suggests that “generally speaking the effect is either positive...or not distinguishable from zero”.

Ultimately, it is highly subjective. It is understandable that for people who do not like wind turbines, they will not want to live near them. There are however other people who do not mind or even like them, and are happy to live in a community which receives some benefit from the development which can provide funding for their children’s schools, local clubs and amenities etc.

5. Will my TV signal or Wifi be impacted by the wind farm?

A wind farm can be designed to avoid interference with signals from the equipment used by mobile telecommunications operators or with local television reception.

⁹ Office of the National Wind Farm Commissioner (2019) Annual Report to the Parliament of Australia. Available at <https://www.nwfc.gov.au/sites/default/files/nwfc-annual-report-2018.pdf?v=1560410110>

¹⁰ <https://arena.gov.au/renewable-energy/wind/>

¹¹ Centre for Sustainable Energy, Common Concerns about Wind Power, June 2017

¹² <https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/reports/ruk-cebr-study.pdf>

¹³ <http://eprints.lse.ac.uk/62880/>

¹⁴ https://www.climatexchange.org.uk/media/1359/cxc_wind_farms_impact_on_house_prices_final_17_oct_2016.pdf

A telecommunications impact assessment will form part of the Environmental Impact Assessment Report. All the relevant mobile, tv and broadband providers in the area will be contacted with the proposed turbine locations.

It is very rare that a wind farm causes signal interference but if the telecommunications provider believes that it is a risk, a protocol agreement can be put in place between the wind farm and the provider. This sets out in writing the obligations of the wind farm operator to fix any issues that may arise at their own cost and as quickly as possible.

6. Will there be a community benefit fund in place?

Yes, in accordance with recent proposals set out under the Renewable Electricity Support Scheme (RESS)¹⁵, a RESS supported project will be putting in place a community benefit fund worth €2/MWh per year for the period of support (usually 15 years).

An average size wind farm project (20MW) in Ireland can generate in the region of 60,000 MWh per year which would result in a community benefit fund of €120,000 per year.

ABO Wind will consult with the local community on potential funding ideas. These could range from electricity discount schemes for near neighbours to donations to local clubs and schools. The fund will begin to distribute funds after the project has been commissioned.

7. Will there be an opportunity to invest in the wind farm?

Yes, in accordance with recent proposals set out under the Renewable Electricity Support Scheme (RESS), a RESS supported project is required to offer individuals in the vicinity of the wind farm the opportunity to invest in the project. Further details will be made available once all the necessary consents are in place and when the project is nearing its financing and construction phases.

8. Do wind turbines kill birds?

Studies have reported the numbers of birds reported to be killed by turbines is not higher than deaths from other causes such as predation, poachers, aircraft and collision with structures such as communication towers, power lines and buildings (Erickson et al., 2005, Sovacool, 2013, Tabassum et al., 2014).

Many of the early reports of negative impacts of wind turbines on bird species came from wind farms such as the Altamont Pass in California (Thelander & Smallwood, 2007, Smallwood & Thelander, 2008) and Tarifa in southern Spain (de Lucas et al., 2004), where extensive wind energy developments were poorly sited in areas where high densities of migrating birds were channelled by geography into the wind farm.

¹⁵ <https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/electricity/renewable-electricity-supports/ress/Pages/default.aspx>

Two years of bird surveys are typically carried out before an application for planning permission for a wind farm is made. These surveys inform the layout and design of the project. They are also an essential part of the Environmental Impact Assessment Report.

9. Why are wind turbines white?

Wind turbines are generally painted white for two main reasons.

Firstly, a key safety issue is that wind turbines need to be visible from the air for aircraft like planes, helicopters and gliders. Painting them white means that they stand out against the green, yellow or brown colours of the ground.

Secondly, when a member of the public is looking at a turbine, particularly when it is located on land higher than the person, the background against which they are seeing the turbine is not the ground but the sky which is generally a blue, grey or white background. Painting them a white colour makes them less likely to stand out.

10. Where does the electricity go that is generated on the wind farm?

Every wind farm has an electricity substation. This collects the electricity from the turbines on the wind farm.

The substation is connected to the electricity distribution or transmission system which is operated by ESB Networks or Eirgrid and serves all consumers of electricity in the all-island electricity market.

In 2018, 30% of Ireland's electricity was generated by wind energy - it is the second greatest source of electricity generation in Ireland after natural gas¹⁶.

11. Is the electricity grid restricted in how much wind energy it can take?

The electricity transmission system is operated by Eirgrid. One of Eirgrid's main responsibilities is to ensure that the Irish power system operates in a safe and secure manner.

Synchronous generation such as coal and gas produces the same amount of electricity all the time. Non-synchronous generation such as wind and solar produces varying amounts of electricity depending on the resource available.

In recent years Eirgrid has been working to increase the amount of non-synchronous generation on our power system. Eirgrid has already increased levels of renewable generation on the system from 50% to 65% and aims to increase this to 75% over the coming years¹⁷. This will help Ireland reach its target of producing 70% of its electricity from renewable sources by 2030.

¹⁶ <https://www.seai.ie/technologies/wind-energy/>

¹⁷ <http://www.eirgridgroup.com/how-the-grid-works/ds3-programme/>

Greater levels of interconnection e.g. the Celtic Interconnector which will link Ireland and France, will also help to keep the Irish power system secure and stable, and support further development of renewables resources.¹⁸

12. Why can't we just have offshore wind instead?

In order to meet the target set out in the Climate Action Plan of 70% of electricity to come from renewable sources by 2030¹⁹, we need an additional 12GW of renewable energy capacity. This will require deployment of a diverse range of technologies including onshore wind, offshore wind, solar and battery storage.

Currently, onshore wind is the lowest cost renewable energy technology and as such will form an important part of the renewable energy mix.

13. What happens after the 25-30 year operational period?

After the operational period, the wind farm can either apply for a new planning permission for 'repowering' the project (repeating the same process as at the beginning) or the project will be decommissioned.

When a wind farm is decommissioned the turbines are removed and the land/site is restored to its original state or as close as practicable. The wind turbine parts are removed from site for onward reuse or recycling. The main constituent material of a wind turbine is steel which is the most recycled metal worldwide.

It is a condition of every planning permission for a wind farm that a bond is put in place with the local planning authority which covers the cost of decommissioning the wind turbines and site restoration. The developer is not authorised to start construction of the wind farm until this is in place.

14. There have been reports that wind energy emits a gas – Sulphur Hexafluoride (SF6) – is this true?

Sulphur hexafluoride is a gas commonly used in electricity transmission equipment as an insulator to prevent short circuits and accidents. It is used in both fossil fuel and renewable electricity generation where it is used in the switchgear in many wind turbines.

The wind industry carefully manages its use of SF₆ and takes measures to reduce its use, and where this is not practicable, to mitigate any potential adverse consequences that might arise from it leaking.

Data from leading European energy company Vattenfall suggests leakage emissions from Europe's 100,000 wind turbines were about 900kg of SF₆ over the last six years. This is equivalent to 3,525 tonnes of CO₂ a year.²⁰

¹⁸ <http://www.eirgridgroup.com/newsroom/funding-secured/>

¹⁹ <https://assets.gov.ie/10206/d042e174c1654c6ca14f39242fb07d22.pdf>

²⁰ <https://windeurope.org/newsroom/news/wind-energy-and-sf6-in-perspective/>

This includes the release of gases during the reclamation and recycling process. At end-of-life the turbine switchgears are collected and the sulphur hexafluoride gas is reclaimed and reused in new equipment.

By comparison wind energy avoids the emission of 255 million tonnes of CO₂ in Europe a year by generating 336 TWh of electricity displacing fossil fuels. The SF₆ leakage therefore represents around 0.001 per cent of the emissions avoided thanks to wind energy every year.

Several alternatives are currently being investigated, for example, Siemens has recently developed SF₆ free switchgear which will be used in the 102 turbines that make up the East Anglia ONE offshore wind farm.²¹

15. What is the carbon payback period of a wind farm?

Electricity generated by a wind turbine does not produce any CO₂ emissions but there are some associated carbon emissions caused by construction, transport, installation and decommissioning of wind turbines.

Numerous studies have been carried out to examine the life cycle costs of carbon emissions from wind farms.

A 2017 review of multiple studies on wind turbine lifecycles found that:

“Published studies on typical modern wind turbines (capacities of 0.5 MW to 4.5 MW) show the Energy Payback Time ranges from as little as three-and-a-half months to just over ten months.”²²

²¹ <https://www.offshorewind.biz/2018/07/06/ea1-turbines-to-feature-sulfur-hexafluoride-free-switchgear/>

²² Centre for Sustainable Energy. Common concerns about wind power. Second Edition.