

Environmental Priorities to Meet Climate Action Plan Targets

Noise Pollution Management for Renewable Energy



OVERVIEW OF COMMON RENEWABLE ENERGY SYSTEMS

Renewable energy projects are being delivered across Ireland at pace, and each technology type carries its own acoustic profile. The systems most commonly encountered are:

- Wind farms
- Solar
- Battery energy storage systems (BESS)
- Air source heat pumps (ASHP)
- Bioenergy



KEY ISSUES AND CONSTRAINTS FOR NOISE CONTROL

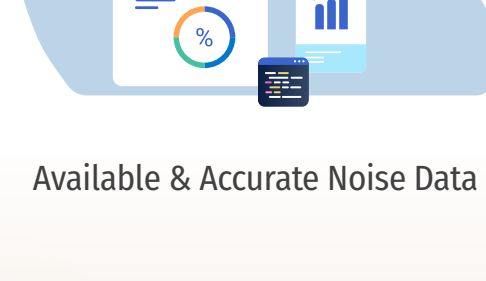
Three constraints recur across almost every renewable energy project assessed:



Standards & Guidelines



Quiet & Rural Environments



Available & Accurate Noise Data

STANDARDS AND GUIDELINES

Guidance on environmental noise is among the least regulated areas in Ireland when compared with other environmental disciplines.

- Noise is highly subjective: different sources, characteristics, environments and individual sensitivities all provoke different responses
- Irish practice typically looks to UK and international guidance and criteria, largely built on a combination of community response studies and international research
- As the relationship between noise and health becomes better understood through developing research, more stringent criteria are being applied to some environmental noise sources
- Compliance with the applicable noise criteria does not always mean that a development will avoid triggering a noise nuisance



QUIET AND RURAL ENVIRONMENTS

Good baseline noise data is critical to establishing criteria and assessing potential impacts.

- Selecting suitable and representative locations for noise monitoring equipment requires experience and professional judgement
- Wind farms, solar, BESS and some bioenergy developments are often sited in rural areas with low background noise environments, where anthropic sources are largely absent
- This can result in very stringent criteria being applied to operational sources in order to avoid significant impacts, requiring noise control and mitigation measures

AVAILABLE AND ACCURATE NOISE DATA

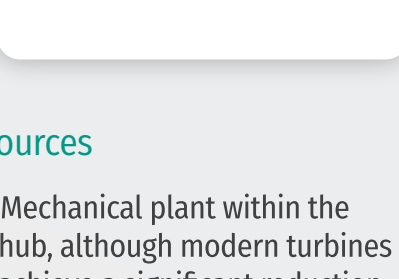
Noise modelling and calculation depend on good source data if potential impacts are to be properly understood. Guiding clients through the early stages when data may be lacking is one of AWN's areas of expertise.

- Projects at early design stage can lack the detail needed to confirm plant selection
- Manufacturers' data can be unreliable
- Operational modes, time periods, temperature profiles, low noise unit options and wind direction all influence the noise output of a source
- The absence of suitable data can lead to the underestimation of impacts, and potential complaints down the line, or to the overestimation of impacts and over-designed mitigation



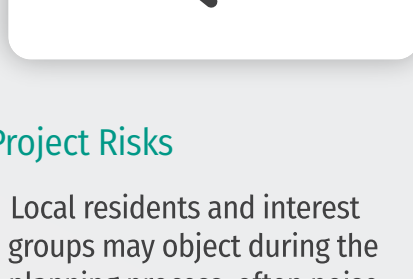
WIND FARMS – KEY CONSIDERATIONS

Wind energy is the most mature of the renewable technologies in Ireland, and its acoustic considerations are correspondingly well defined.



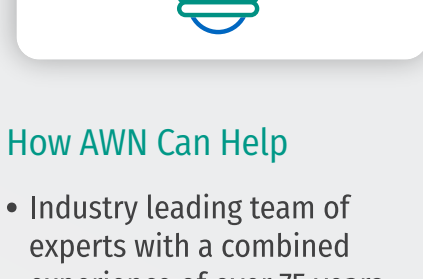
Sources

- Mechanical plant within the hub, although modern turbines achieve a significant reduction in mechanical noise compared with older models
- Aerodynamic noise from blade rotation across the range of wind speeds, with units continuing to increase in size in terms of both hub height and blade diameter
- Source data is normally available and of good quality



Project Risks

- Local residents and interest groups may object during the planning process, often noise concerns are a major worry for them, this can delay or derail the project
- Objectors can pursue judicial review or appeals to An Bord Pleanála if valid grounds for objection are identified
- More recently civil actions alleging noise nuisance have emerged, potentially leading to damages, operational restrictions or costly mitigation
- Persistent noise can contribute to sleep disturbance, stress and annoyance, and public concern over perceived health effects can strengthen opposition and attract regulatory scrutiny

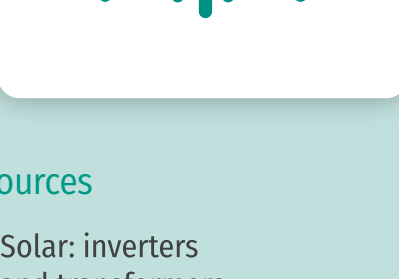


How AWN Can Help

- Industry leading team of experts with a combined experience of over 75 years assessing wind farm projects in Ireland
- Practical and proportional mitigation and control measures ensure compliance and minimise cost and risk to our clients
- Experience of assessing cumulative impacts and compliance from planning through to operation for over 25 years

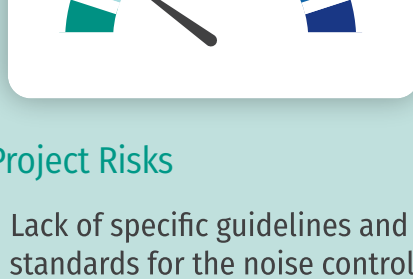
SOLAR AND BESS – KEY CONSIDERATIONS

Solar and battery storage schemes are being brought forward in a wide range of settings, many of them quiet, which places early emphasis on layout and unit selection.



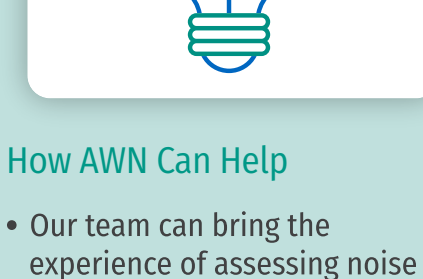
Sources

- Solar: inverters and transformers
- BESS: battery containers (HVAC), inverters and substations
- Often co-located resulting in 24/7 operation
- Data availability is mixed, so site layout, unit types, temperature related outputs, unit layout, hours of operation and mitigated models should be established at the outset



Project Risks

- Lack of specific guidelines and standards for the noise control of Solar & BESS
- Incorrect assumptions that these developments do not generate noise
- Low background noise levels at the often rural development locations can result in greater noise impacts on communities
- Potential for tonal noise sources associated with transformers and inverters

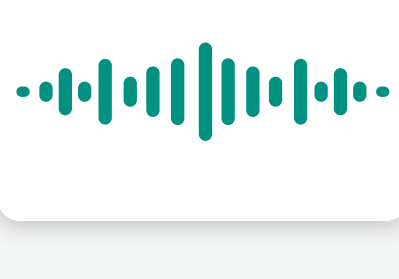


How AWN Can Help

- Our team can bring the experience of assessing noise impacts for the most complex projects in Ireland to Solar and BESS projects
- Minimising project risk and costs by providing technical input during the site selection or early site layout phases to minimise noise impacts and reduce physical mitigation to a minimum
- Ireland's only acoustic consultancy registered as members of the Association of Noise Consultants ensures up to date knowledge on emerging guidelines and best practice

ASHP – KEY CONSIDERATIONS

Air source heat pumps sit closer to receptors than any other renewable technology, which makes early assessment essential.



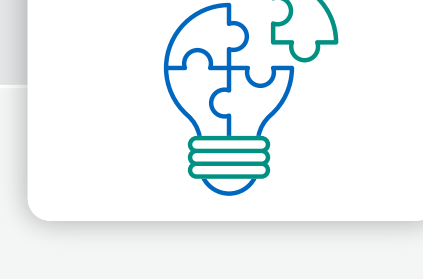
Sources

- Individual units: small residential air source heat pumps
- Large installations: ASHP units operating in heating and cooling modes, where the fans and units produce high noise outputs
- Data availability is mixed, sound data can be unreliable, and outputs vary with temperature and operational mode



Project Risks

- Cumulative impact of multiple ASHP units located in urban and suburban locations can be overlooked leading to higher noise impacts
- Mitigation measures if required can often require larger footprints and may require amendments to planning permissions
- Can require an increase in externally located noise generating equipment that in urban locations will often be overlooked by neighbouring properties

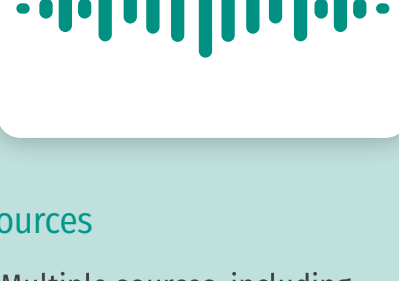


How AWN Can Help

- Access to state of the art modelling tools to predict noise impacts for complex sites
- Strong working relationship with key MEP design team members to allow close collaboration and practical solutions
- Early stage input can assist to risk assess potential site locations and avoid costly physical mitigation

BIOENERGY – KEY CONSIDERATIONS

Bioenergy facilities combine many individual noise sources on one site, typically operating continuously.



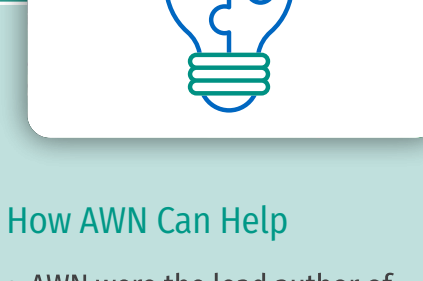
Sources

- Multiple sources, including stacks, odour control units, pumps, fans, driers and CHP plant.
- Operation tends to be 24 hours a day, seven days a week
- Additional sources such as HGV traffic on the local road network depend on the raw product



Project Risks

- Often new facilities will need both planning approval and an Industrial Emissions license from the EPA
- EPA license includes noise limits to be achieved which must be balanced with the often low background noise environment
- Interaction with traffic, ecology and human health assessments can increase risk of delay



How AWN Can Help

- AWN were the lead author of the EPA noise guidelines for licensed sites and have deep knowledge and experience of progressing license applications to the EPA
- AWN's wider environmental team have successfully delivered EPA licenses for the largest and most complex facilities in Ireland
- Our noise experts are members of the Institute of Acoustics and this satisfies the EPA requirement for competency

Meeting the Climate Action Plan targets means delivering renewable energy projects in the very environments where noise is hardest to control. Early, well-informed acoustic input keeps schemes on programme, avoids over-designed mitigation and protects communities living alongside them. If your project needs support with baseline noise surveys, noise modelling, impact assessment, mitigation design or compliance monitoring, contact AWN's experts today.