

The Secretary
An Coimisiún Pleanála

3 July 2026

Dear Sir/Madam,

Re: Proposed Ballincor Wind Farm and Associated Infrastructure

Case Reference: PAX92.324279

I wish to make the following observation on the above planning application. I am making this submission in my capacity as Chair of the Council of the Low Frequency Array European Research Infrastructure Consortium (LOFAR ERIC), the organisation responsible for operating Europe's distributed low-frequency radio telescope, and as Head of Astronomy & Astrophysics at the Dublin Institute for Advanced Studies.

I wish to emphasise at the outset that I strongly support Ireland's transition to renewable energy and fully recognise the importance of wind energy in addressing climate change and meeting Ireland's national and European climate obligations. My concern relates to the potential impact of the proposed Ballincor Wind Farm on the Irish Low Frequency Array (I-LOFAR) radio telescope located at Birr Castle, County Offaly.

I-LOFAR is Ireland's only international radio astronomy facility and forms an integral part of LOFAR ERIC, a European Research Infrastructure Consortium established under Council Regulation (EC) No. 723/2009. The LOFAR ERIC represents an investment of approximately €300 million by European Member States and is recognised as the world's largest and most capable low-frequency radio telescope. Ireland is a founding member of this consortium, and the Birr station is a critical component of the European telescope.

I-LOFAR was constructed with an investment in 2017 of €2 million and was recently upgraded with a further €600,000 in 2026, the majority of which is tax-payer funding from Research Ireland. The Department of Further and Higher Education, Research, Innovation and Science represents Ireland on the LOFAR ERIC Council and pays the annual €95,000 membership fee to the LOFAR ERIC. There has therefore been substantial public investment in these national and internal efforts for over a decade.

Unlike conventional telescopes, LOFAR operates as a single scientific instrument by combining observations from LOFAR stations distributed across Europe. The Irish station is therefore not simply a local observatory, it is part of a continent-wide research infrastructure whose scientific performance depends upon the quality of observations from every participating station. Any degradation in the performance of the Irish station has implications for researchers across Europe.

I-LOFAR is also used extensively in stand-alone mode by researchers and students from universities in Ireland and Northern Ireland to observe extremely weak astronomical objects, and indeed to train scientists, computer scientists and engineers for careers in research, education and industry. Even a very small amount of local electromagnetic interference from wind turbines or other man-made

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technological infrastructures could negatively impact the ability of LOFAR to operate, and in the worst case, render it useless.

Radio astronomy is uniquely sensitive to interference from man-made radio emissions. The radio signals detected by I-LOFAR originate from distant galaxies, pulsars, the Sun and the early Universe and are many millions of times weaker than the signals produced unintentionally by everyday electronic equipment. Maintaining an exceptionally quiet radio environment is therefore fundamental to the operation of the telescope.

Modern wind turbines contain sophisticated electrical and electronic systems including power converters, inverters, transformers, switching equipment, communications systems and control electronics. While all of these systems are designed to comply with normal electromagnetic compatibility standards, those standards are intended to protect conventional communications systems rather than scientific instruments capable of detecting extraordinarily weak cosmic radio signals.

In addition to direct emissions, rotating turbine blades can reflect and scatter existing radio transmissions, creating complex and time-varying interference. International research has demonstrated that these effects require careful site-specific assessment wherever major wind energy developments are proposed near highly sensitive radio astronomy facilities.

Similar issues have arisen elsewhere within the international LOFAR network, particularly in the Netherlands, where extensive engineering studies were undertaken before nearby wind farms were permitted. Those projects demonstrated that coexistence between wind energy and radio astronomy is possible, but only after detailed electromagnetic compatibility studies, close collaboration between developers and observatory operators, and the implementation of specific mitigation measures and operational controls.

The lesson from international experience is therefore clear. Wind farms and radio astronomy are not necessarily incompatible, but compatibility should never be assumed. It must instead be demonstrated through rigorous scientific assessment.

Having reviewed the planning documentation associated with this application, I am concerned that insufficient consideration appears to have been given to the potential effects of radio-frequency interference on I-LOFAR. In particular, I question whether the environmental documentation adequately addresses:

- potential electromagnetic emissions from the proposed turbines and associated electrical infrastructure;
- the effects of reflected and scattered radio transmissions from rotating turbine blades;
- cumulative radio-frequency impacts arising from the complete wind farm;
- the implications for low-frequency radio astronomy; and
- appropriate monitoring and mitigation measures should interference arise during operation.

These matters require specialist expertise in radio astronomy and electromagnetic compatibility. General assessments of telecommunications or electromagnetic compatibility prepared for conventional infrastructure cannot necessarily be relied upon to assess impacts on one of the world's most sensitive radio telescopes.

The planning system routinely recognises the need to protect nationally important infrastructure such as roads, electricity networks, airports and communications facilities. I respectfully suggest that internationally significant scientific research infrastructure deserves similar consideration. Ireland has invested substantially in I-LOFAR over many years, and the facility supports cutting-edge scientific research, postgraduate education, international collaboration and technological innovation. It is also an important element of Ireland's contribution to European research and enhances the country's international scientific reputation.

The issue before the Commission is therefore not whether renewable energy should proceed, but whether sufficient evidence has been provided to demonstrate that this development can coexist with an internationally significant scientific facility without compromising its operation.

In my view, the precautionary approach is appropriate. Where there remains uncertainty regarding potentially irreversible impacts on strategic national research infrastructure, it is reasonable to require robust technical evidence before permission is granted.

Accordingly, I respectfully request that An Coimisiún Pleanála:

- give appropriate weight to the national and European significance of the I-LOFAR facility;
- consider whether the planning application adequately assesses potential radio-frequency impacts on the telescope;
- require an independent electromagnetic compatibility assessment by experts with experience in radio astronomy if such information has not already been provided; and
- ensure that any permission granted includes appropriate safeguards to protect the continued scientific operation of I-LOFAR.

If the Commission cannot be satisfied, on the basis of the evidence before it, that the proposed development will not adversely affect the operation of I-LOFAR, I respectfully submit that further information should be sought before any decision is made.

Thank you for considering this observation.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'P. Gallagher', with a stylized, flowing script.

Professor Peter T. Gallagher FRAS, FInstP, MRIA

Chair, LOFAR ERIC Council

Head of Astronomy & Astrophysics, DIAS