

## ACEI Design Excellence Awards 2018 Nomination Form

**Entry Category:**      **Category (2) Other Civil Projects**

### Company Details

**Contact Name:**      **Conor McCarthy**

**Firm:**      **Jennings O'Donovan & Partners Limited**



**JENNINGS O'DONOVAN**  
— & PARTNERS LIMITED  
CONSULTING ENGINEERS

**Address:**      **Finisklin Business Park, Sligo**

**Tel:** (071) 9161416      **Email:** [cmccarthy@jodireland.com](mailto:cmccarthy@jodireland.com)

### Categories/Groups:

**Project Category:** Bridges ☐      Other Civil Projects ☒      Innovation ☐      Overseas ☐

**Project Group:**

**SMALL Project** (under €2.5m) ☐      **MEDIUM Project** (€2.5m - €10m) ☐      **LARGE Project** (over €10m) ☒

### Project Information:

**Name of Project:**      **Meenadreen Extension Wind Farm**

**Location:**      Straness, Leghawny, Barnesyneilly, Croaghnakern, Croaghnameal, Meenabrock, Meenadreen, Lough Cuill & Cullionboy Townlands, County Donegal.

**Commencement date:** January 2015      **Completion Date:** June 2017

**Client:**      **Energia Renewables**

*Contact:*      Peter Baillie      Tel: +44 78 8782 7202

**Design Team:**

**Owners Engineer**      **Jennings O'Donovan & Partners Limited**

*Contact*      Email: [dkiely@jodireland.com](mailto:dkiely@jodireland.com) (David Kiely)      Tel: 086 1704 280

**Contractor**      **Denis Moriarty The Kerries Limited (Civil)**

*Contact*      Email: [cws@moriarty.ie](mailto:cws@moriarty.ie) (Colin Scott)      Tel: 087 2604 762

**Contractor**      **Kirby Group Engineering (Electrical)**

*Contact*      Email: [jkirby@kirbygroup.com](mailto:jkirby@kirbygroup.com) (Jimmy Kirby)      Tel: 01 454 0411

**Contractor**      **Nordex (Turbine Supplier)**

*Contact*      Email: [IDunn@nordex-online.com](mailto:IDunn@nordex-online.com) (Ian Dunn)      Tel: +44 7720 095 112

**Authorisation to contact above:**      Yes ☒      No ☐

## Project Details:

### (1) Provide a brief outline of the project (Max 200 words):

The new Meenadreen Wind Farm, opened in June 2017, is Ireland's largest ever wind farm. Located in an area of outstanding natural beauty in south east Donegal, the wind farm consists of 38 turbines producing 95 Megawatts (MW) of electricity. Each turbine stands 115 metres high with a rotor diameter of 90 metres generating power from strong wind pathways in the area. Constructed at a cost of €145 million, Meenadreen alone can power up to 50,000 homes using wind energy which will reduce Ireland's carbon dioxide emissions by up to 100,000 tonnes each year.

The Meenadreen Extension Wind Farm Contract consisted of:

- 25km of 4.5m wide internal site roads
- Upgrade of 5.35km of public roads
- 38 crane hardstands and turbine component assembly areas
- 38 wind turbine foundations and sub formations works including piling and upfilling
- 2 Substations – Clogher 110kV GIS Substation and Mulreavy 33/110kV Substation
- 7.5km of 110kV underground grid connection cable between the 110kV substations
- 33km of 33kV MV Wind Farm site collector cable and associated trenching and ducting
- 3.1km of watermain upgrade and installation of a booster pumping station
- Erection of 4 110kV 15m high lattice tower end masts and associated 110kV loop in works
- Wind Farm Administration and Operations Buildings





**(2) Provide a statement regarding why this project might be considered award winning: (Max 300 words):**

**Scale & Output**

With a maximum export capacity of 95MW, equivalent to 3% of the average daily demand in Ireland, Meenadreen can harness an indigenous sustainable green energy resource to generate enough energy to provide power to 50,000 homes. The clean energy generated by the Wind Farm displaces 100,000 tonnes of carbon dioxide and other emissions per annum produced by traditional fossil fuel generating power plants.



**Innovative**

The Meenadreen Extension Wind Farm project is innovative in many ways. The planning layout of the wind farm was developed being mindful of the various ecological and geological development constraints and potential visual impact from both a local and transboundary perspective. The final layout of the wind farm fits harmoniously into the existing landscape. This was achieved through the careful siting of turbines and completion of computer generated photomontages and topographical 3-dimension virtual wireframes from selected viewpoints including Lough Derg (Donegal) Special Protection Area.

During construction phase, innovative techniques were adopted to overcome the logistical task of constructing a wind farm of this scale on a site with undulating terrain ranging in elevation from 320m A.O.D. to 480m A.O.D. along with ground conditions consisting of a mixture of deep peat, glacial till and schist bedrock.

**Need for the Development & Benefit to Society**

Security of energy supply is particularly important due to Ireland's lack of indigenous fossil fuel resources and subsequent dependency on fuel imports. Meenadreen, with its capability of generating 255 Gigawatt hours (GWh) each year, will provide a sustainable reliable power supply for the North West of Ireland. The development will also contribute significantly towards Ireland's binding 2020 targets with respect to climate change and the generation of energy from sustainable green renewable energy sources.

A significant aspect of the project from a regional point of view was the development of Clogher 110kV Substation. This substation development will be utilised to facilitate the upgrade of the existing transmission system network and improve the transmission of electricity throughout the North West of Ireland, strengthening the electrical infrastructure making it more secure.



A benefit fund was established by Energia Renewables to support community based projects. Grants were allocated to groups who sought to develop projects that promoted community development, safety, energy efficiency and energy awareness. Local projects received grants including the provision of defibrillators, CCTV cameras for local amenity centres, upgrade of the local GAA pitch, installation of water loggers, provision of a new playground, upgrade of insulation at the local school, and tarmac surfacing at the community hall.





- (3) Provide further details of the project such as: design elements / procedures; complexities involved; innovation aspects; site management and supervision; health & safety issues; project cost controls and any other relevant information (Max 500 words):

**Design Elements / Procedures**

The primary design elements of the Wind Farm were the site access roads, crane hardstands, drainage and wind turbine foundations. Robust procedures were put in place for design approval including the requirement for the foundation design to undergo an independent 3<sup>rd</sup> party Category 3 design check. Clogher Substation, which utilises Gas Insulated Switchgear (GIS), was the first contestable 110kV GIS substation built in Ireland. As the Substation is an EirGrid asset, design approval had to be obtained from both EirGrid and ESB Networks.





### **Complexities involved**

There were several complexities involved with this project, not least the expanse of the site. During the construction phase of the project, innovative construction techniques were adopted to overcome the logistical task of constructing a wind farm of this size on a site with undulating terrain, varying ground conditions, surround environmental designated areas along with the fact that no construction works were permitted during the bird breeding season from April to July.

To put the development undertaken in numbers; 120,000m<sup>3</sup> of peat was excavated, 600,000 tonnes of rock was used on site, 1,520 tonnes of reinforcement was placed, 13,300m<sup>3</sup> of concrete was poured. These works were undertaken in parallel with 120Ha of turbulence tree felling.

At Clogher Substation, the complexities arose from the fact that the 110kV loop in works could only be carried out during specific outage periods allocated by EirGrid. For this reason, careful monitoring of the programming of the construction works was essential.

### **Site Management & Supervision**

Due to the scale of the site, two Resident Engineers (RE) were engaged on this project. One RE was tasked with monitoring works on the wind farm site while the other RE was responsible for monitoring the construction of the two substation sites along with the 110kV grid connection works between these substations. The most critical element of supervision undertaken on this project was in relation to the wind turbine foundations. 115 inspections were carried out by Jennings O'Donovan in relation to the wind turbine foundations, including formation, pre-pour steel inspection and the witnessing of the concrete pours which typically lasted up to 11 hours per foundation. These inspections were critical to make sure that the foundations were fit for the purpose for which they were designed.



### **Health & Safety Issues**

Jennings O'Donovan fulfilled the role of PSDP for the project. This was a demanding role given the scale of the overall project. We prepared a Preliminary Safety and Health Plan along with Design Risk Assessments at tender stage. On behalf of our client, we validated the competence of the PSCS. During design stage, we organised co-operation between designers through the establishment of weekly conference calls and monthly site meetings. On completion of the project we prepared the three separate project Safety Files for handover to the client.

### **Project Cost Controls**

Funding for this project was obtained from NORD/LB bank. No costs overruns were acceptable as the facility agreement was for a finite funding amount. Jennings O'Donovan were responsible for assessing the Contractors payment applications and processing payment certificates in line with the drawdown calendar. The overall project was completed on time and within budget.



**Entries should highlight where possible the particular influence or benefit the project engineering design has on society and the wider environment.**

**Please confirm by electronic or written signature that:**

- (a) The supplied text may be used in any marketing material issued in connection with the awards.
- (b) Agreement has been received from the client and other stakeholders that the project can be inspected by the adjudicator and provide contact details as requested above for the relevant person to be contacted in this regard.

**Signed:**   
**Firm:** Jennings O'Donovan & Partners Limited

**Entry details:**

**Note: Applicants are encouraged to review the Awards Regulations and Procedures before submitting nominations.**

Send the completed entry form and supporting photos / images altogether in **one PDF document** (one pdf document per project nomination) by email to: [info@acei.ie](mailto:info@acei.ie) with a subject line: ACEI Design Awards 2018.

**Note:** Closing date for receipt of nomination forms: **17:00, Friday 12<sup>th</sup> January 2018**

**Enquiries:** ACEI office [info@acei.ie](mailto:info@acei.ie) 01 6425588