

Ballykett Wind Farm Grid Technical Report

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Unit 4
Village Court
Lucan
Co. Dublin
Tel: +353 1 621 9069
Email: info@mullangrid.ie

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1	Original	11/11/2022	<i>Conor Forde</i>	<i>Ray Mullan</i>	<i>Ray Mullan</i>
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1 Introduction

GreenSource has requested MullanGrid to prepare a Technical Report on the grid connection for Ballykett wind farm. MullanGrid's review focuses on the grid connection aspects of the proposal and MullanGrid also provide comment on the wind farm's contribution towards renewable targets. Ballykett wind farm has applied for planning permission for four wind turbines with an expected electrical capacity of 18MW.

MullanGrid Consulting is one of Ireland's leading grid connection consultancies with experience of advising on the connection of renewable generators in Ireland and Northern Ireland.

2 Local Network and Generation

Ballykett wind farm is expected to have a maximum export capacity (MEC) of 18MW. Typically, a wind farm of this size connects at 38kV connection voltage to the nearest 110/38kV substation.

The nearest 110/38kV substation is located at Tullabrack and referred to as Tullabrack 110kV substation, see Figure 1. This substation contains one existing 31.5MVA 110/38kV transformer. The substation is connected to the wider 110kV network via a 'T-connection' to a circuit that connects Moneypoint 400kV substation to Ennis 110kV substation via Booltiagh 110kV substation. This 110kV circuit has a minimum circuit rating of 178MVA and is not considered a candidate for uprating to a higher capacity.

There are three existing wind farms connected at Tullabrack 110kV substation. These are Carrownaweellaun 4.6MW, Moanmore 12.6MW and Tullabrack 13.8MW wind farms. In addition, there are two solar farms planning to connect to Tullabrack 110kV substation. These include the Einagh Solar (previously Moanmore Solar) 17MW ECP-2.2 project and Doughkil Solar Farm 5.9MW project that was granted planning and is in the queue for the next ECP batch. Please note that the MEC of Doughkil Solar Farm has been estimated by MullanGrid based on publicly available information (County Council Planning Portal) and the capacity should only be treated as indicative. See Figure 2 for a map of the existing and future generation.

There is a significant volume of connected (mainly wind) and contracted generation (c.184MW) associated with this part of the 110kV network. The circuit connecting Tullabrack to Booltiagh cannot be uprated further and as such alternative solutions may be required to connect additional generation in the area. An example of these solutions could be implementing dynamic line rating technology on the 110kV circuit or moving new generation to the 220kV or 400kV networks/substations in the area. Therefore, Moneypoint 400kV substation could be an alternative viable connection option for Ballykett wind farm.

3 Connection Method

The most likely connection method for the proposed Ballykett wind farm appears to be a 38kV connection to the existing Tullabrack 110kV substation via a 110/38kV transformer upgrade from 31.5MVA to 63MVA.

An alternative connection point could be a MV connection to Moneypoint 400kV substation. A new 110kV/MV transformer would be required in Moneypoint substation. EirGrid confirmed in a customer clinic that there appears to be a spare 110kV bay in Moneypoint for the connection of new generation.

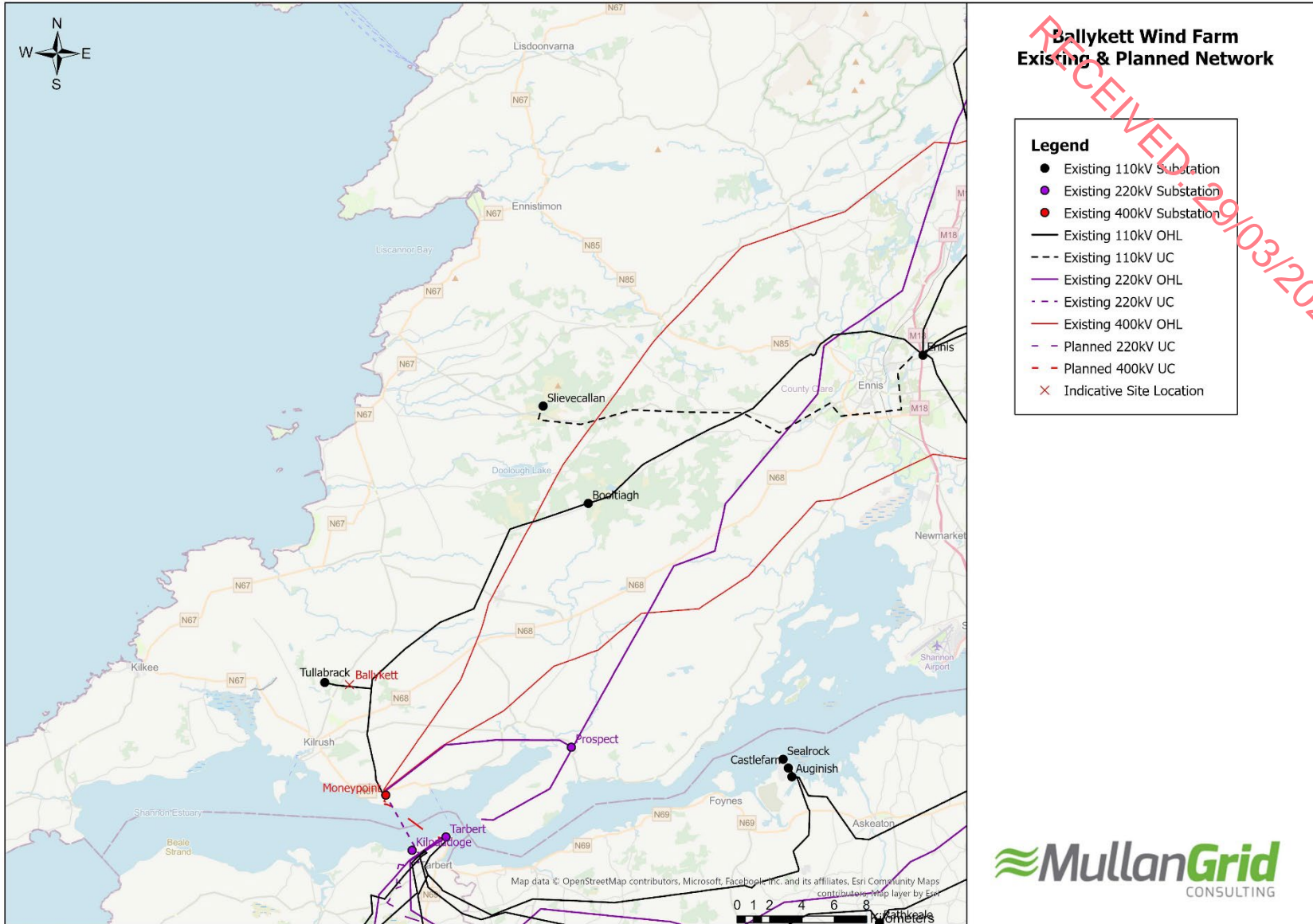
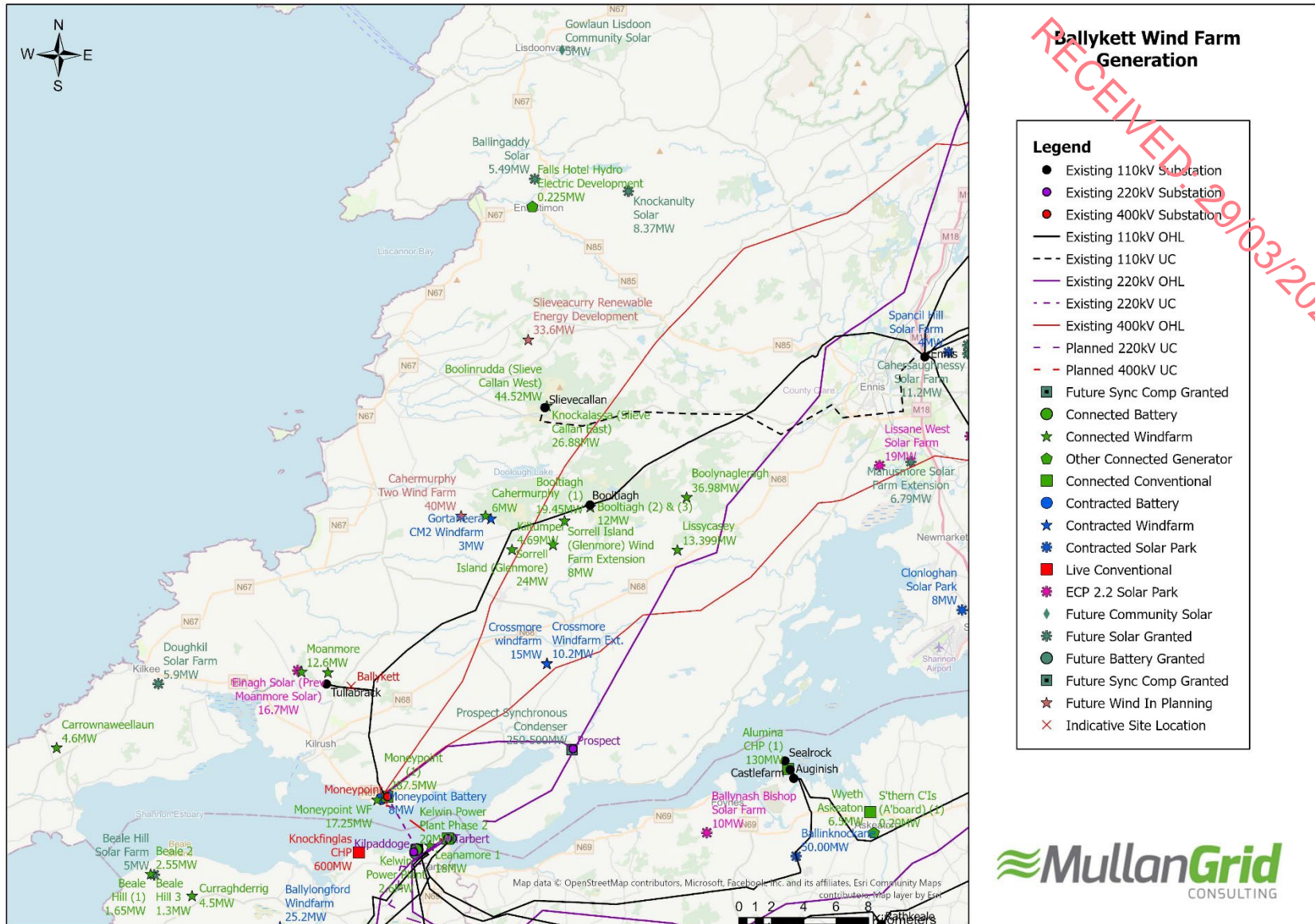


Figure 1 Existing & Planned Network



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Figure 2 Connected & Contracted Generation

4 Renewable Energy Targets

The Irish Government published the Climate Action Plan 2021¹ in November of that year. The plan sets a roadmap to cut emissions by 51% by 2030 and reach net zero by at least 2050.

Among the metrics listed to deliver emissions abatement in the electricity sector by 2030 were:

- Up to 80% share of renewable electricity (RES-E)
- Up to 8GW of onshore wind capacity

The plan also details a number of enabling targets to ensure emissions reductions are achieved, this includes a target to expand and reinforce the grid through new lines, substations and new technologies.

The European Union's Clean Energy Package requires Ireland to meet interim targets between 2020-2030. Based on Article 4 of the Governance of the Energy Union² and considering Ireland's 80% RES-E target for 2030, the interim RES-E targets are estimated to be 47.2% in 2022, 57.2% in 2025 and 66% in 2027.

The proposed Ballykett wind farm with an estimated connection date of 2024/2025, if connected could contribute to delivering upto 8GW onshore wind capacity. Thereby contributing to the interim 2025, 2027 RES-E targets and also the Climate Action Plan 2021 target for 80% RES-E in 2030.

5 Conclusion

MullanGrid have prepared a technical report on the grid connection for Ballykett wind farm.

The most likely connection method appears to be a 38kV connection to Tullabrack 110kV substation. The proposed wind farm is in close proximity to the substation. An update of the existing transformer in Tullabrack substation will likely be required. This uprating can likely be completed within the footprint of the existing Tullabrack substation.

The Moneypoint 400kV substation could be an alternative option to Tullabrack 110kV substation. The connection method for this option would be an MV connection to Moneypoint via a new 110/MV transformer. The new transformer can likely be connected within the existing Moneypoint facility.

Ballykett wind farm can apply for a grid connection once planning consent is achieved. Assuming a connection offer is issued in 2023 and based on the timeline to complete either the MV or 38kV works, the wind farm could be energised in 2024/25.

The electrification of Ireland's energy system could drive significant demand growth across the transport, residential, industrial and commercial sectors. Connecting as much renewable generation capacity as possible will be vital to ensuring Ireland's interim and 2030 RES-E targets are achieved to deliver the necessary emissions reductions on the pathway to net zero emissions. Ballykett wind farm with an estimated connection date of 2024/25 could make an important contribution to Ireland meeting its renewable energy targets.

¹ <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999&from=EN>