

# Enduring Connection Policy 2.3

## Solar and Wind Constraints Report: Results for Area D

Version 1.0

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[info@eirgrid.com](mailto:info@eirgrid.com)

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The Oval, 160 Shelbourne Road, Ballsbridge, Dublin 4, D04 FW28, Ireland

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# Document Structure

This document is for customers wishing to see the estimated Total Dispatch Down for Area D. For information on the study assumptions, methodology, abbreviations and terms used for the Constraint Analysis reports, please see the area non-specific Assumptions and Methodology report found on the ECP-2.3 webpage<sup>1</sup>.

This document contains two main sections:

**Section 1: Results for Area D:** outlines the area covered by this report. This section provides a network diagram of Area D and an overview of the results for Area D.

**Section 2: Area D Node Results:** provides a table of results for every node in the area. This table documents the installed capacity, available energy, surplus, curtailment and constraint for every node in Area D.

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<sup>1</sup> <https://www.eirgridgroup.com/customer-and-industry/general-customer-information/ecp-2.3-constraint-report/index.xml>

# Important Note

This ECP-2.3 constraints report presents an estimate of the reduction in available solar and wind generation based on the study assumptions described. The reduction in available generation has been split into three categories for the purposes of this study: surplus, curtailment and constraint.

The treatment of renewable generation under these three categories of generation reduction will be determined by the implementation of Articles 12 and 13 of the EU Regulation 2019/943<sup>2</sup>.

The SEMC decision on the 22<sup>nd</sup> of March 2022<sup>3</sup> (SEM-22-009 Decision Paper on Dispatch, Redispatch and Compensation Pursuant to Regulation EU 2019/943) has been successfully challenged in the High Court ([2023] IEHC 629). Therefore, the detailed design of the implementation of Articles 12 and 13 has yet to be finalised, and may differ from the implementation for constraints used in this study. Therefore, an assumed interpretation has been included in this study, as detailed in this report.

This report uses the term “Total Dispatch Down” to refer to the total reduction in available solar and wind generation i.e. the sum of surplus, curtailment and constraint, and is considered the key indicator for the results. However, it is important to note that the term “dispatch down” is more correctly applicable only to TSO instructions to reduce generation output from a market position, as is the case for curtailment and constraint, and is not necessarily applicable to a generator reducing its own output from its availability to a market position so that supply and demand are balanced, as is the case for surplus.

The term “non-priority” and “not-priority” generators are used synonymously in the report.

The results presented in this report are based on the simulation and modelling assumptions described. The findings are indicative only and this report should in no way be read as a guarantee as to future levels of surplus, curtailment and constraint.

For wind and solar generation, values of Total Dispatch Down that are less than 5% are rounded up to 5% by adjusting the constraints for that generator. This is consistent with the approach used in the ECP-2.1 and ECP-2.2 constraints reports. However, in the ECP-2.3 constraints report, this adjustment to constraints is applied only to non-priority generation and not to priority generation.

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<sup>2</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=NL>

<sup>3</sup> <https://www.semcommittee.com/publications/sem-22-009-decision-paper-dispatch-redispatch-and-compensation-pursuant-regulation-eu>

# 1 Results for Area D

## 1.1 Introduction

This section provides the surplus, curtailment and constraint results for Area D that are estimated by this analysis. There is a total of eight core ECP-2.3 studies and seven sensitivity studies (including without maintenance) presented in this report. The study scenarios and the associated assumptions can be found in the Assumptions and Methodology report. An overview and discussion of the results is provided in this Section. The surplus, curtailment and constraint results for each node in Area D are provided in Section 2 of this report.

## 1.2 Study Notes

A list of the major study assumptions is provided in the Assumptions and Methodology report. For Area D, there are several key assumptions which drive the results, including network outages and capacity factors. These are thus reiterated here. Similarly, it is worth highlighting again the differences between the various components of Total Dispatch Down.

### 1.2.1 Network Outages

The scenarios in this report are intended to give a view of average long-term levels of surplus, curtailment and constraint, subject to installed generation, demand, interconnection, operational constraints and reinforcement delivery.

The ECP-2.3 constraints forecast analysis applies a similar transmission outage schedule to the ECP-2.2 constraints analysis. This was kept consistent with last year's schedule following positive feedback from industry. This schedule allows a representation of outage impact in each geographical area to be included in the studies.

This representative transmission outage schedule is given in Appendix A of the Assumptions and Methodology report. However, at times, longer duration outages may be required for certain connections, reinforcement works or forced outages, these are not considered in this analysis and may result in higher wind and solar constraints.

### 1.2.2 Benefit of Capacity Factor

In practice, a specific windfarm may be located at a site with higher wind speeds or may have a better performing type of wind turbine; the result is a higher capacity factor than neighbouring windfarms. This report does not reflect this localised diversity between windfarm sites. In reality, a windfarm with a higher capacity factor may see lower percentage surplus, curtailment or constraint levels than an adjacent windfarm with a lower capacity factor. This is because at times of medium or low wind speed, the high-capacity factor windfarm can generate power when the low-capacity factor windfarm cannot.

### 1.2.3 Notes on Surplus, Curtailment and Constraint Modelling

#### 1.2.3.1 Surplus

During generation reduction for surplus, a distinction is made between the treatment of priority and non-priority renewable generators, with non-priority generators being dispatched down ahead of priority generators. Within these two categories of generation, surplus is applied pro-rata across the all-island system for all renewable generators in the category.

For any hour of the study, the surplus level will depend on system demand and interconnector flow capacity. In general, surplus is expected to increase with increasing installed renewable capacity.

It is expected that the further interconnection of the all-Ireland network with mainland UK and Europe will decrease the frequency of surplus conditions occurring.

In general, increased interconnector capacity with mainland UK through the EWIC & LiriC projects will not necessarily eliminate surplus generation as solar and wind profiles in mainland UK will largely be in line with those in Ireland. In the Future Grid study year however, when both the Celtic and 2<sup>nd</sup> Ireland-France interconnectors are connected, there will be a greater export capacity during times of abundant renewable generation to mainland Europe where similar wind and solar generation in Ireland and mainland Europe is not expected.

Therefore, dispatch down due to surplus generation is not expected to occur as frequently once both the Celtic and 2<sup>nd</sup> Ireland-France interconnectors are connected.

#### 1.2.3.2 Curtailment

In this report, for each hour of the study, the curtailment is shared pro-rata on a system-wide basis with no distinction made between priority and non-priority generators. This means that both curtailment reductions and curtailment increases are shared system wide.

Solar generation has different reported levels of curtailment compared to wind due to different capacity factors and annual profile shapes.

The applied curtailment is broadly constant across the system. However, due to differences in wind and solar profiles and capacity factors between areas, the percentage average curtailment differs between areas.

#### 1.2.3.3 Constraints

During the constraint of renewable generation, a distinction is made between priority and non-priority generators, with non-priority generators being dispatched down ahead of priority generators across the relevant transmission nodes within the subgroup. More details on the approach assumed in this study for the application of constraints on priority and non-priority renewable generation can be found in the main ECP 2.3 Assumptions and Methodology report.

In general, there is a tendency for renewable bulk power to flow towards the demand in Dublin and the interconnectors. These flow patterns are relevant when seeking to understand constraint apportionment in the simulation.

When presented as percentage values, the constraint results look different for solar and wind, as they have a low correlation due to different profile shapes driven by weather patterns.



## 1.3 Generation Overview

A detailed system-level overview of the renewable generation scenarios used in these studies is given in Section 2 of the area non-specific Assumptions and Methodology report. The distribution of generation in each scenario based on technology, area and node is given in Appendix B of the Assumptions and Methodology report. The node-level installed wind and solar generation for Area D in the “ECP” scenario is given in Table 1-1.

Node	SO	Status	Solar	Wind
Ardnacrusha	DSO	due to connect	9	
Ardnacrusha	TSO	due to connect		91
Ardnacrusha	DSO	connected		8
Booltiagh	DSO	connected		88
Booltiagh	DSO	due to connect		28
Booltiagh	TSO	connected		31
Booltiagh	DSO	connected		5
Derrybrien	TSO	connected		60
Drumline	DSO	due to connect	12	
Ennis	DSO	due to connect	32	
Ennis	TSO	due to connect	60	
Slievecallan	TSO	connected		72
Tullabrack	DSO	connected		14
Tullabrack	DSO	connected		17
<b>Total</b>			<b>113</b>	<b>414</b>

Table 1-1 Wind and Solar Generation Summary in Area D for Generation Scenario “ECP”

Table 1-2 and Table 1-3 show installed solar and wind generation for Ireland and Area D, and the available solar and wind generation for Area D for each generation scenario.

Solar	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
<b>Installed Ireland (MW)</b>	3052	4542	6031	6031	6031
<b>Installed Area D (MW)</b>	38	76	113	113	113
<b>Installed Controllable Area D (MW)</b>	38	76	113	113	113
<b>Available Controllable Area D (GWh)</b>	44	89	133	133	133

Table 1-2- Installed MW and Available GWh for Area D - Solar

Wind	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Ireland (MW)	5104	5678	6253	6827	9901	11827
Installed Area D (MW)	313	346	380	414	414	414
Installed Controllable Area D (MW)	291	324	358	392	392	392
Available Controllable Area D (GWh)	909	1014	1120	1217	1217	1217

Table 1-3 - Installed MW and Available GWh for Area D - Wind

## 1.4 Network Overview

Area D, in the west of the country, includes a mix of wind and solar generation. A summary of this generation is given in Table 1.1.

The transmission network in Area D and the surrounding area is shown in Figure 1-1. The 400 kV circuits are shown in red, the 220 kV circuits in green and the 110 kV circuits in black. Possible future transmission stations and lines for the connection of new generation are also shown on the map below.



Figure 1-1 Network Map for Area D

At times of high renewable generation, there is a net export of power from Area D, and the dominant power flows tend to be from Area D towards the load centres on the east coast and the interconnectors. These flow patterns are relevant when seeking to understand constraint apportionment in the simulation.

Constraints in Area D can be caused both by local and wider system issues. Constraints in the model are optimised on a system-wide basis so, in theory, an increase in the installed generation in another area can increase constraints in Area D.

In addition to the power flows out of Area D, there are also power flows across or through Area D. The generators within Area D have access to the 220 kV stations at Shannonbridge, Cashla, Moneypoint and Killonan through the 110 kV circuits, and thus, the power flowing out of Area D meets and joins with other power flows from areas connected to these 220 kV stations. The contingencies affecting this area are mainly due to the loss of 220 kV circuits or station transformers. Additionally, the transmission bottlenecks between Area D and the east coast are shared within Area D and power flows coming from other areas.

## 1.5 Future Grid Sensitivity Scenario

In line with the ECP-2.1 and ECP-2.2 studies, and in response to feedback from industry, the Future Grid scenario is included in the analysis. All reasonable efforts have been made to align the network assumptions in the Future Grid scenario to the Shaping Our Electricity Future (SOEF) 1.1 Roadmap. The network projects included in the study are given in Appendix A of the Assumptions and Methodology report found on the ECP-2.3 webpage. Additionally, any project that has progressed to stage three of the six stage project planning process after the publication of the SOEF 1.1 Roadmap are also included in the Future Grid studies. Note however, that the wind and solar generation portfolio in the ECP-2.3 Future Grid scenario differs from the wind and solar portfolio considered in the SOEF 1.1 Roadmap. This is done to maintain alignment with the ECP-2.3 process. The ECP study scenario includes all wind and solar projects which have applied through connection processes, whereas the SOEF 1.1 study includes generators up to and including ECP-2.3 applicants and then scaled renewable generation capacity to achieve the capacity volumes stated in the Climate Action Plan 23.

The Future Grid study includes a base renewable generation scenario (ECP), along with three sensitivity generation scenarios (ECP + 3.1 GW offshore, ECP + 5 GW offshore and a maintenance sensitivity study). The scenarios with additional offshore wind have been included to show the potential impact of increasing offshore wind on Total Dispatch Down levels.

The demand modelled for the Future Grid scenario is based on the medium demand scenario for 2030 as published in the All-Island Generation Capacity Statement 2023-2032.

The purpose of the Future Grid scenario is to provide insights on the potential impact of the SOEF 1.1 Roadmap network reinforcement portfolio on the dispatch down of wind and solar generators. This study is not intended to be exhaustive; it is not intended to remove all transmission constraints and it does not give individual generators guarantee that their Total Dispatch Down will change to the estimated levels.

## 1.6 Area D - Average Results

The Total Dispatch Down results for Area D are provided below in Table 1-5 to Table 1-7 and Figure 1-3 to Figure 1-5. These include the breakdown between surplus, curtailment and constraint. The Total Dispatch Down percentages are based on the total available energy. The Total Dispatch Down is the sum of surplus, curtailment and constraint. The node level breakdown of surplus, curtailment and constraint are given in Section 2. The results show that the system level Total Dispatch Down increases with additional installed capacity due to a significant increase in surplus. However, the Total Dispatch Down reduces when the 2028 studies are compared with 2026 and there is a further reduction in the Future Grid scenario owing to increased demand, network reinforcement, interconnection and relaxed system level operational limits.

For each generation type in Area D (solar non-priority, wind non-priority and wind priority), the total installed capacity in MW and total available generation in GWh are given in Table 1-5, Table 1-6 and Table 1-7. The total generation in GWh after dispatch down and the corresponding percentage Total Dispatch Down are also included in the tables for each scenario. Details on the generation and network scenarios are given in Section 2 of the Assumptions and Methodology report.

### 1.6.1 Offshore Wind Sensitivity Studies

Results for the offshore wind-based sensitivity studies are included, along with results for the core scenarios. The general trend is that with increasing levels of offshore wind, Total Dispatch Down increases due to significant increases in the available wind energy, which in turn leads to increased levels of surplus.

### 1.6.2 Impact of Article 12 and 13

Higher Total Dispatch Down is observed for non-priority generators due to the impact of the implementation of Article 12 and 13 in the studies, which results in non-priority generators being reduced ahead of priority generators for surplus and constraint reasons. More detail on the Article 12 clause is available in Section 3.6 of the Assumptions and Methodology report.

Another factor that contributes to the higher total dispatch down for non-priority wind and solar units is the proportion of priority to non-priority units within a subgroup. If a subgroup has a high volume of priority wind/solar units to non-priority wind/solar units, this can result in the constraints that would usually be allocated to the priority units only allocated to the non-priority units (due to the grandfathering of constraints). This can result in high constraints for non-priority units within a subgroup.

### 1.6.3 Future Grid Sensitivity Study

The results of the Future Grid scenario show a notable reduction in Total Dispatch Down over the core study years (2026 and 2028) due to the impact of the SOEF 1.1 Roadmap network reinforcements, increased demand levels, increased interconnection, and the relaxation of operational constraints. However, increases in installed wind and solar generation, as seen in the offshore wind scenarios, result in rising surplus levels, causing an increase in Total Dispatch Down levels. A detailed breakdown of the Total Dispatch Down components for Area D under the Future Grid scenarios and associated sensitivity case is given in Table 1-5 to Table 1-7. Further node level details can be viewed in Section 2.

### 1.6.4 Area Subgroups

The constraint forecast study, which is performed using PLEXOS software, applies mathematical optimisation to find the lowest cost generator dispatch schedule to meet demand, subject to a number of system and transmission level constraints. To ensure the model is impartial, the assumptions on the cost of renewable generators remain the same, irrespective of technology or location, and are always lower than that of conventional plants. This ensures renewable generators are given priority in the PLEXOS optimisation. However, due to network congestion caused by line limits and N-1 contingency security checks, the power flows in certain lines are limited, causing dispatch down in RES generators which may affect one generator or multiple generators chosen by PLEXOS' internal logic. During various initial studies, it was observed that PLEXOS may repeatedly choose the same generator(s) to dispatch down to manage an issue in a region shared by multiple generators.

There is often a post-processing step between the PLEXOS simulation and this report to ensure an appropriate allocation of constraints among generators sharing the bottlenecks. This is done by creating constraint subgroups within an area or spanning multiple different areas. The subgroups are selected based on an assessment of the raw PLEXOS results and based on our experience of dispatch down on the real system. The subgroups are chosen to group those generators into a constraint group that are expected to experience similar constraint levels. The subgroups are selected on the basis that they share a common transmission bottleneck, or they are electrically close to a congested area within the network.

The power flow from Area D is towards the load centres in Dublin and the interconnectors. The generators on the meshed 110kV network in Area D would be affected by contingencies in the area as well as outside the area. The contingencies and overloaded lines associated with the area are included in Appendix C of the Assumptions and Methodology report. The generators in Area D, alongside some generators in the north of Area E, are included in a single subgroup, D and E North. The main contingency in the north of Area E (included in D and E North subgroup) is the loss of the transformer at Moneypoint in 2026, which is relaxed by the addition of a new transformer at Moneypoint in the 2028 study. The subgroup nodes for Area D are

given in Table 1-4. The constraints are shared on a pro-rata basis amongst the non-priority generators in the subgroup ahead of priority generators. The individual node level dispatch down is given in Section 2.

This subgroup arrangement represents a change from the ECP-2.2 constraint forecast study where the whole of Area D formed one single subgroup.

Subgroup	Nodes
D and E North	Ardnacrusha
	Booltiagh
	Derrybrien
	Drumline
	Ennis
	Slievecallan
	Tullabrack

Table 1-4 Area D generators nodes and their subgroups



Figure 1-2 Subgroup D & E North (subgroup outlined by blue dashed line)

The solar non-priority data is given in the following table.

Area D (D and E North)	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026		38	76	113		
Installed Capacity (MW)	2028		38	76	113	113	
Installed Capacity (MW)	2030				113	113	113
Available Energy (GWh)	2026		44	88	133		
Available Energy (GWh)	2028		44	89	133	133	
Available Energy (GWh)	2030				133	133	133
Generation (GWh)	2026		42	82	116		
Generation (GWh)	2028		42	84	123	113	
Generation (GWh)	2030				126	123	117
Surplus (%)	2026		2%	5%	9%		
Surplus (%)	2028		<1%	2%	5%	11%	
Surplus (%)	2030				2%	6%	10%
Curtailement (%)	2026		1%	2%	4%		
Curtailement (%)	2028		1%	1%	2%	3%	
Curtailement (%)	2030				1%	1%	1%
Constraint (%)	2026		1%	<1%	<1%		
Constraint (%)	2028		4%	2%	<1%	<1%	
Constraint (%)	2030				2%	<1%	<1%
Total Dispatch Down (%)	2026		5%	8%	13%		
Total Dispatch Down (%)	2028		5%	5%	7%	15%	
Total Dispatch Down (%)	2030				5%	7%	12%

Table 1-5 Surplus, Curtailment and Constraint for Solar Non-Priority in Area D (D and E North)

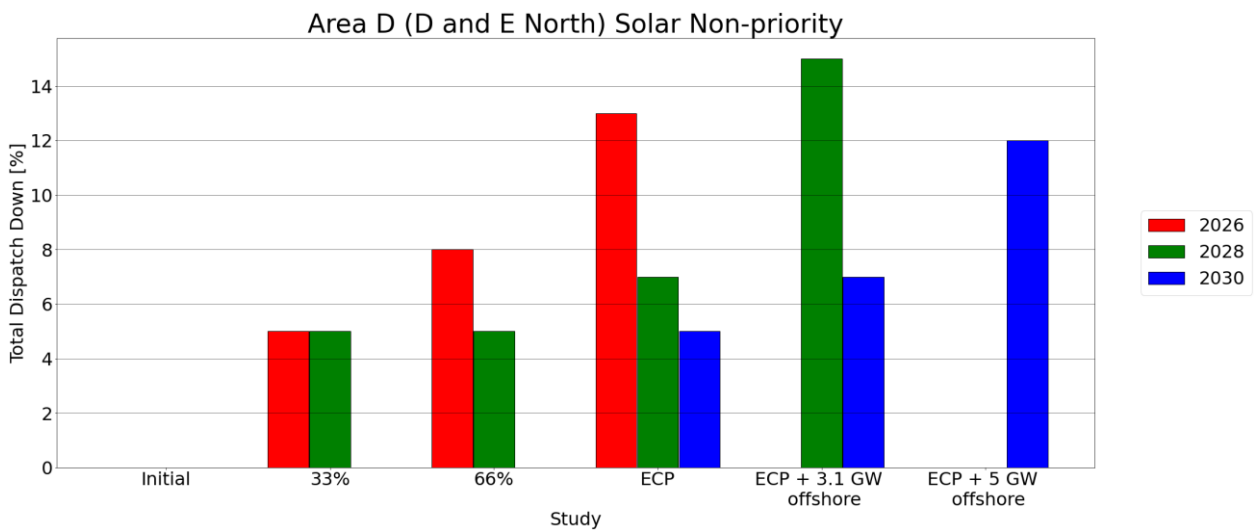


Figure 1-3 - Results Solar Non-priority Area D (D and E North)

The wind non-priority data is given in the following table.

Area D (D and E North)	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	106	140	174	208		
Installed Capacity (MW)	2028	106	140	174	208	208	
Installed Capacity (MW)	2030				208	208	208
Available Energy (GWh)	2026	330	435	540	645		
Available Energy (GWh)	2028	333	439	544	650	650	
Available Energy (GWh)	2030				645	645	645
Generation (GWh)	2026	304	396	468	530		
Generation (GWh)	2028	316	417	517	598	488	
Generation (GWh)	2030				613	569	488
Surplus (%)	2026	2%	5%	8%	13%		
Surplus (%)	2028	<1%	1%	2%	5%	20%	
Surplus (%)	2030				2%	10%	20%
Curtailed (%)	2026	2%	3%	4%	4%		
Curtailed (%)	2028	<1%	1%	2%	3%	5%	
Curtailed (%)	2030				<1%	2%	2%
Constraint (%)	2026	5%	2%	1%	<1%		
Constraint (%)	2028	5%	3%	1%	<1%	<1%	
Constraint (%)	2030				3%	<1%	2%
Total Dispatch Down (%)	2026	8%	9%	13%	18%		
Total Dispatch Down (%)	2028	5%	5%	5%	8%	25%	
Total Dispatch Down (%)	2030				5%	12%	24%

Table 1-6 - Surplus, Curtailment and Constraint for Wind Non-priority in Area D (D and E North)

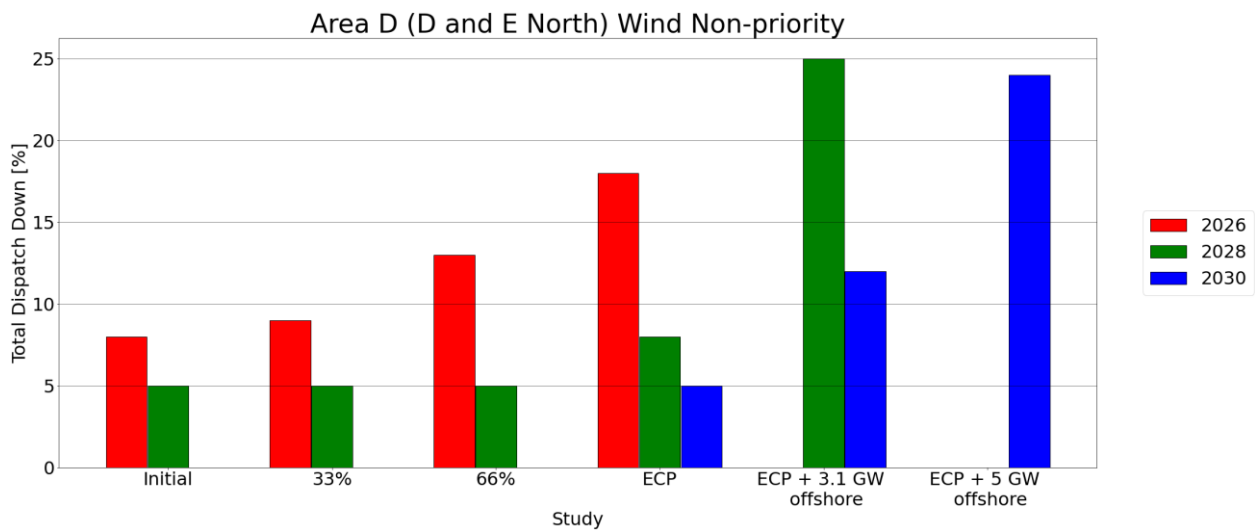


Figure 1-4 - Results Wind Non-priority Area D (D and E North)

The wind priority data is given in the following table.

Area D (D and E North)	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	184	184	184	184		
Installed Capacity (MW)	2028	184	184	184	184	184	
Installed Capacity (MW)	2030				184	184	184
Available Energy (GWh)	2026	572	572	572	572		
Available Energy (GWh)	2028	576	576	576	576	576	
Available Energy (GWh)	2030				572	572	572
Generation (GWh)	2026	560	552	543	535		
Generation (GWh)	2028	575	570	564	557	535	
Generation (GWh)	2030				569	542	553
Surplus (%)	2026	<1%	<1%	<1%	<1%		
Surplus (%)	2028	<1%	<1%	<1%	<1%	<1%	
Surplus (%)	2030				<1%	<1%	<1%
Curtailement (%)	2026	2%	4%	5%	6%		
Curtailement (%)	2028	<1%	1%	2%	3%	7%	
Curtailement (%)	2030				1%	5%	3%
Constraint (%)	2026	<1%	<1%	<1%	<1%		
Constraint (%)	2028	<1%	<1%	<1%	<1%	<1%	
Constraint (%)	2030				<1%	<1%	<1%
Total Dispatch Down (%)	2026	2%	4%	5%	6%		
Total Dispatch Down (%)	2028	<1%	1%	2%	3%	7%	
Total Dispatch Down (%)	2030				1%	5%	3%

Table 1-7 - Surplus, Curtailement and Constraint for Wind Priority in Area D (D and E North)

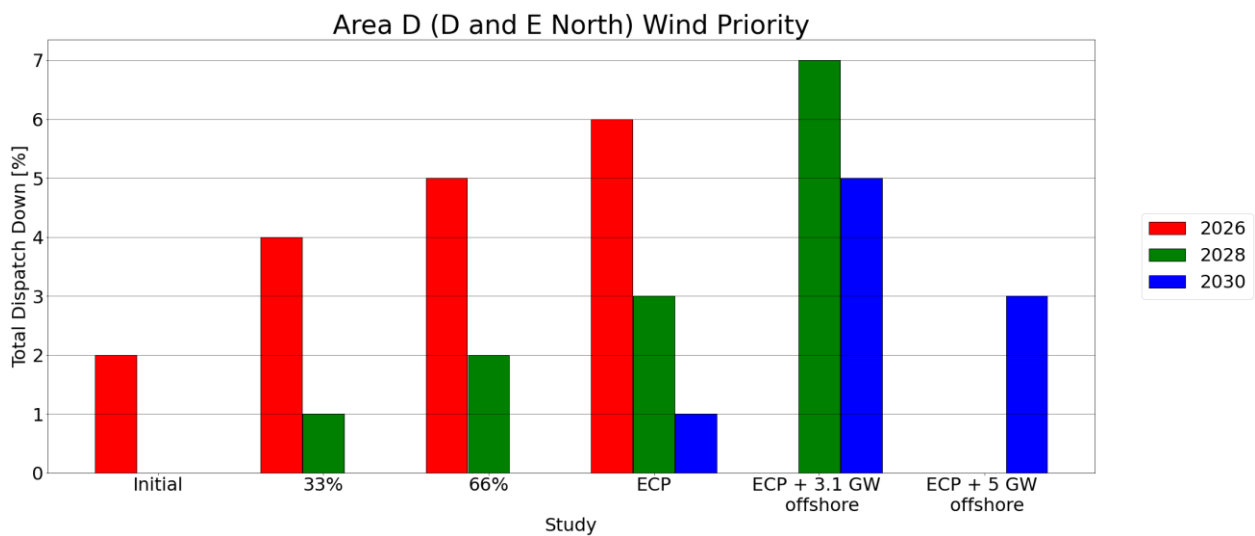


Figure 1-5 - Results Wind Priority Area D (D and E North)



## 1.7 Conclusion - Results for Area D

This section provides an overview of the estimated surplus, curtailment and constraint values for Area D for a range of scenarios based on a number of installed generation assumptions (generation scenarios) and the study year (network and demand assumptions). The results highly depend on the study assumptions, which are described in the Assumptions and Methodology report.

Section 2 contains the detailed results consisting of available energy (GWh) and percentage surplus, curtailment, and constraint values for each node for both solar and wind in Area D.

## 2 Area D Node Results

This section presents the results of the modelling analysis for Area D. The levels of surplus, curtailment and constraint that controllable solar and wind generators in Area D might expect to experience are reported on a nodal basis for the study scenarios. Details on the generation capacity at each node are also provided along with the assumed amount of controllable generation.

This section also presents a list of the generators at each node that are included in the study.



Figure 2-0 Area D

## 2.1 Ardnacrusha



Figure 2-1 - Location of node Ardnacrusha

Generator	SO	Capacity	Type	Status
Dromsallagh Solar	DSO	4.0	solar non-priority	due to connect
Garrynacurra Solar Farm (Cratloe Community Solar)	DSO	4.99	solar non-priority	due to connect
Knockastanna (1)	DSO	7.5	wind priority	connected
Carrownagowan Wind Farm	TSO	91.2	wind non-priority	due to connect

Table 2-1 - Generation Included in Study for Node Ardnacrusha

The solar non-priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026		3	6	9		
Installed Capacity (MW)	2028		3	6	9	9	
Installed Capacity (MW)	2030				9	9	9
Available Energy (GWh)	2026		4	7	11		
Available Energy (GWh)	2028		4	7	11	11	
Available Energy (GWh)	2030				11	11	11
Generation (GWh)	2026		3	6	9		
Generation (GWh)	2028		3	7	10	9	
Generation (GWh)	2030				10	10	9
Surplus (%)	2026		2%	5%	9%		
Surplus (%)	2028		<1%	2%	5%	11%	
Surplus (%)	2030				2%	6%	10%
Curtailement (%)	2026		1%	2%	4%		
Curtailement (%)	2028		1%	1%	2%	3%	
Curtailement (%)	2030				1%	1%	1%
Constraint (%)	2026		1%	<1%	<1%		
Constraint (%)	2028		4%	2%	<1%	<1%	
Constraint (%)	2030				2%	<1%	<1%
Total Dispatch Down (%)	2026		5%	8%	13%		
Total Dispatch Down (%)	2028		5%	5%	7%	15%	
Total Dispatch Down (%)	2030				5%	7%	12%

Table 2-2 - Surplus, Curtailement and Constraint for Solar non-priority in Area D

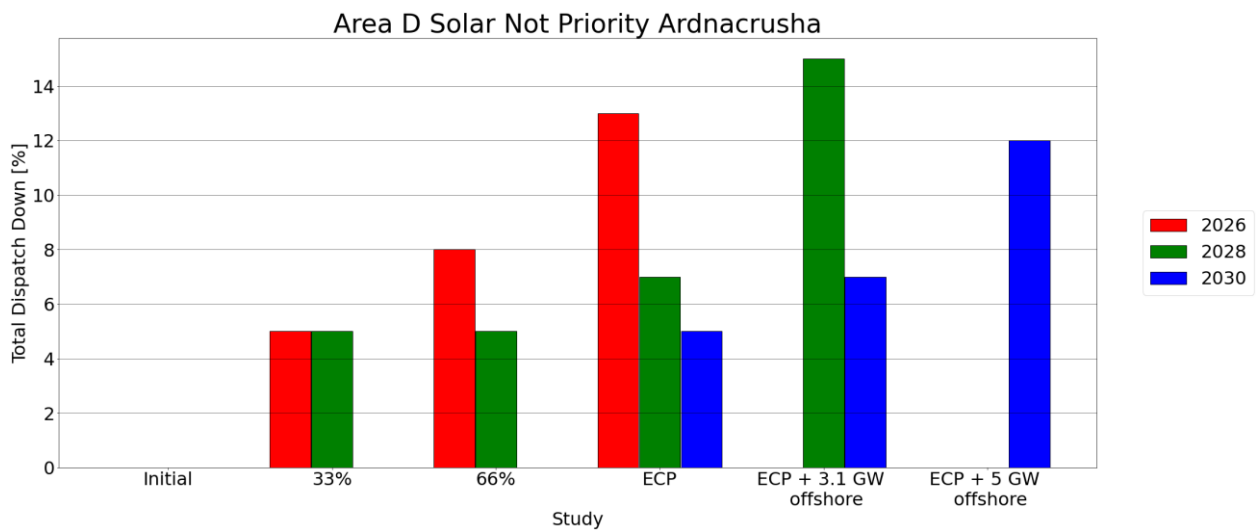


Figure 2-2 - Total Dispatch Down for Solar non-priority for Node Ardnacrusha

The wind non-priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026		30	61	91		
Installed Capacity (MW)	2028		30	61	91	91	
Installed Capacity (MW)	2030				91	91	91
Available Energy (GWh)	2026		94	189	283		
Available Energy (GWh)	2028		95	190	285	285	
Available Energy (GWh)	2030				283	283	283
Generation (GWh)	2026		86	164	233		
Generation (GWh)	2028		90	181	263	214	
Generation (GWh)	2030				269	250	214
Surplus (%)	2026		5%	8%	13%		
Surplus (%)	2028		1%	2%	5%	20%	
Surplus (%)	2030				2%	10%	20%
Curtailed (%)	2026		3%	4%	4%		
Curtailed (%)	2028		1%	2%	3%	5%	
Curtailed (%)	2030				<1%	2%	2%
Constraint (%)	2026		2%	1%	<1%		
Constraint (%)	2028		3%	1%	<1%	<1%	
Constraint (%)	2030				3%	<1%	2%
Total Dispatch Down (%)	2026		9%	13%	18%		
Total Dispatch Down (%)	2028		5%	5%	8%	25%	
Total Dispatch Down (%)	2030				5%	12%	24%

Table 2-3 - Surplus, Curtailment and Constraint for Wind non-priority in Area D

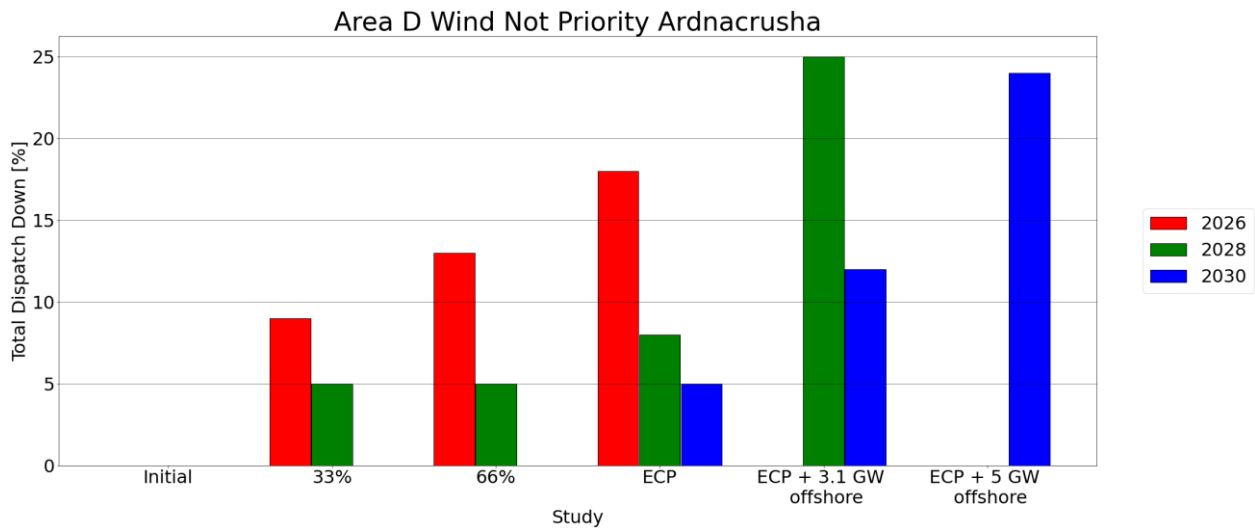


Figure 2-3 - Total Dispatch Down for Wind non-priority for Node Ardnacrusha

The wind priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	8	8	8	8		
Installed Capacity (MW)	2028	8	8	8	8	8	
Installed Capacity (MW)	2030				8	8	8
Available Energy (GWh)	2026	23	23	23	23		
Available Energy (GWh)	2028	23	23	23	23	23	
Available Energy (GWh)	2030				23	23	23
Generation (GWh)	2026	23	22	22	22		
Generation (GWh)	2028	23	23	23	23	22	
Generation (GWh)	2030				23	22	23
Surplus (%)	2026	<1%	<1%	<1%	<1%		
Surplus (%)	2028	<1%	<1%	<1%	<1%	<1%	
Surplus (%)	2030				<1%	<1%	<1%
Curtailed (%)	2026	2%	4%	5%	6%		
Curtailed (%)	2028	<1%	1%	2%	3%	7%	
Curtailed (%)	2030				1%	5%	3%
Constraint (%)	2026	<1%	<1%	<1%	<1%		
Constraint (%)	2028	<1%	<1%	<1%	<1%	<1%	
Constraint (%)	2030				<1%	<1%	<1%
Total Dispatch Down (%)	2026	2%	4%	5%	6%		
Total Dispatch Down (%)	2028	<1%	1%	2%	3%	7%	
Total Dispatch Down (%)	2030				1%	5%	3%

Table 2-4 - Surplus, Curtailment and Constraint for Wind priority in Area D

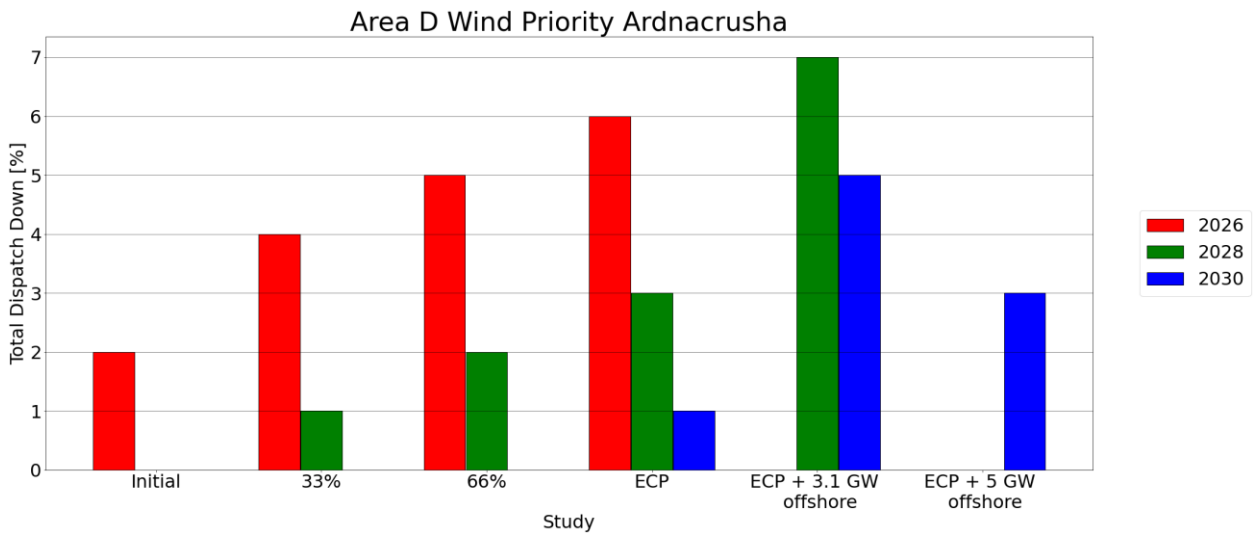


Figure 2-4 - Total Dispatch Down for Wind priority for Node Ardnacrusha

## 2.2 Booltiagh

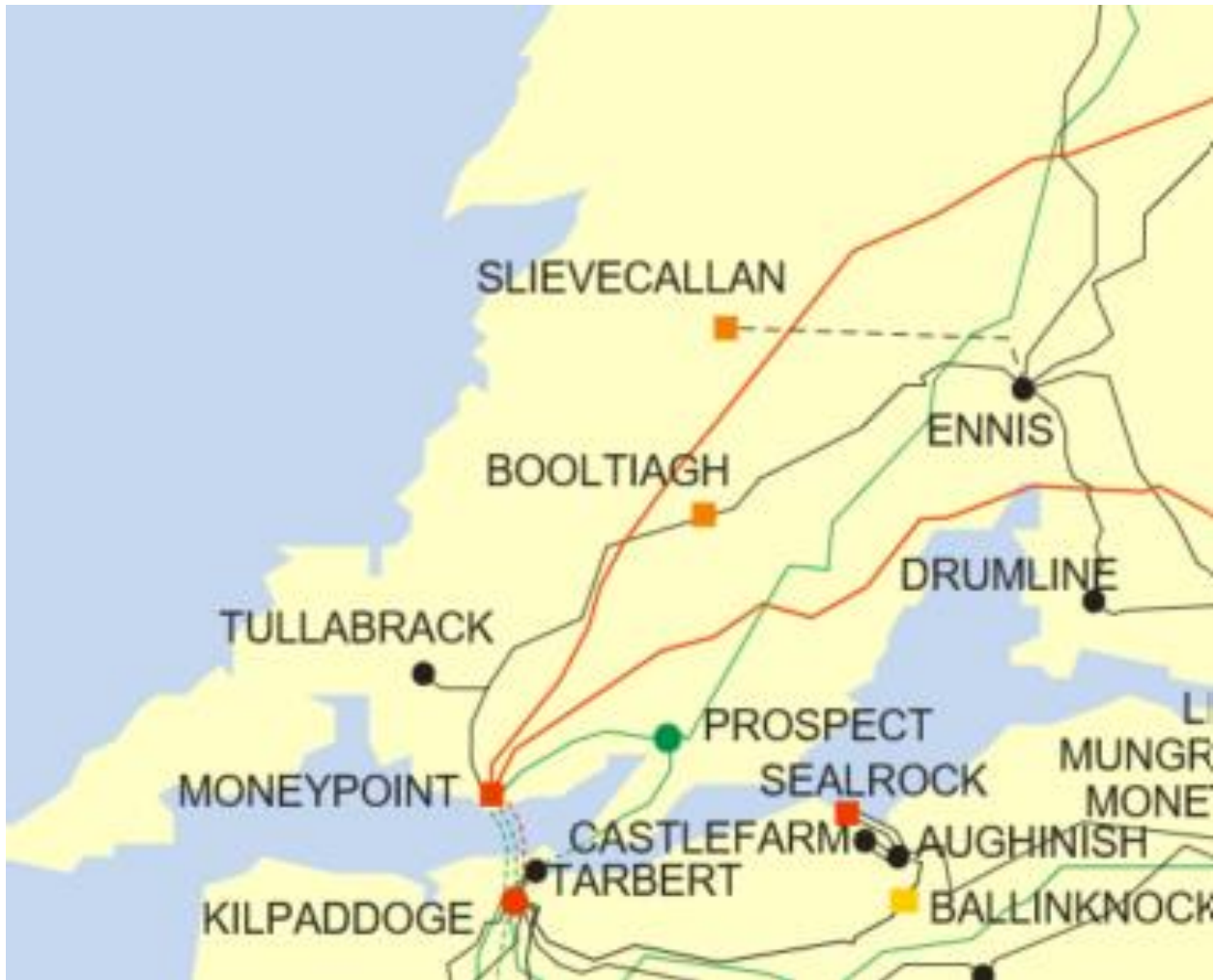


Figure 2-5 - Location of node Booltiagh

Generator	SO	Capacity	Type	Status
<b>Booltiagh (1)</b>	TSO	19.45	wind priority	connected
<b>Booltiagh (2)</b>	TSO	3.0	wind priority	connected
<b>Booltiagh (3)</b>	TSO	9.0	wind priority	connected
<b>Boolynagleragh (1)</b>	DSO	36.98	wind non-priority	connected
<b>Cahermurphy (1)</b>	DSO	6.0	wind non-priority	connected
<b>Crossmore (1)</b>	DSO	15.0	wind non-priority	due to connect
<b>Crossmore (2)</b>	DSO	10.2	wind non-priority	due to connect
<b>Gortaheera CM2 Windfarm</b>	DSO	3.0	wind non-priority	due to connect
<b>Kiltumper</b>	DSO	4.99	wind uncontrolled	connected
<b>Lissycasey (1)</b>	DSO	13.399	wind non-priority	connected
<b>Sorrell Island (Glenmore) WF Ext</b>	DSO	8.0	wind non-priority	connected
<b>Sorrell Island (prev Glenmore) (1)</b>	DSO	24.0	wind non-priority	connected

Table 2-5 - Generation Included in Study for Node Booltiagh

The wind non-priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	106	110	113	117		
Installed Capacity (MW)	2028	106	110	113	117	117	
Installed Capacity (MW)	2030				117	117	117
Available Energy (GWh)	2026	330	341	352	362		
Available Energy (GWh)	2028	333	343	354	365	365	
Available Energy (GWh)	2030				362	362	362
Generation (GWh)	2026	304	310	305	297		
Generation (GWh)	2028	316	326	336	336	274	
Generation (GWh)	2030				344	319	274
Surplus (%)	2026	2%	5%	8%	13%		
Surplus (%)	2028	<1%	1%	2%	5%	20%	
Surplus (%)	2030				2%	10%	20%
Curtailement (%)	2026	2%	3%	4%	4%		
Curtailement (%)	2028	<1%	1%	2%	3%	5%	
Curtailement (%)	2030				<1%	2%	2%
Constraint (%)	2026	5%	2%	1%	<1%		
Constraint (%)	2028	5%	3%	1%	<1%	<1%	
Constraint (%)	2030				3%	<1%	2%
Total Dispatch Down (%)	2026	8%	9%	13%	18%		
Total Dispatch Down (%)	2028	5%	5%	5%	8%	25%	
Total Dispatch Down (%)	2030				5%	12%	24%

Table 2-6 - Surplus, Curtailement and Constraint for Wind non-priority in Area D

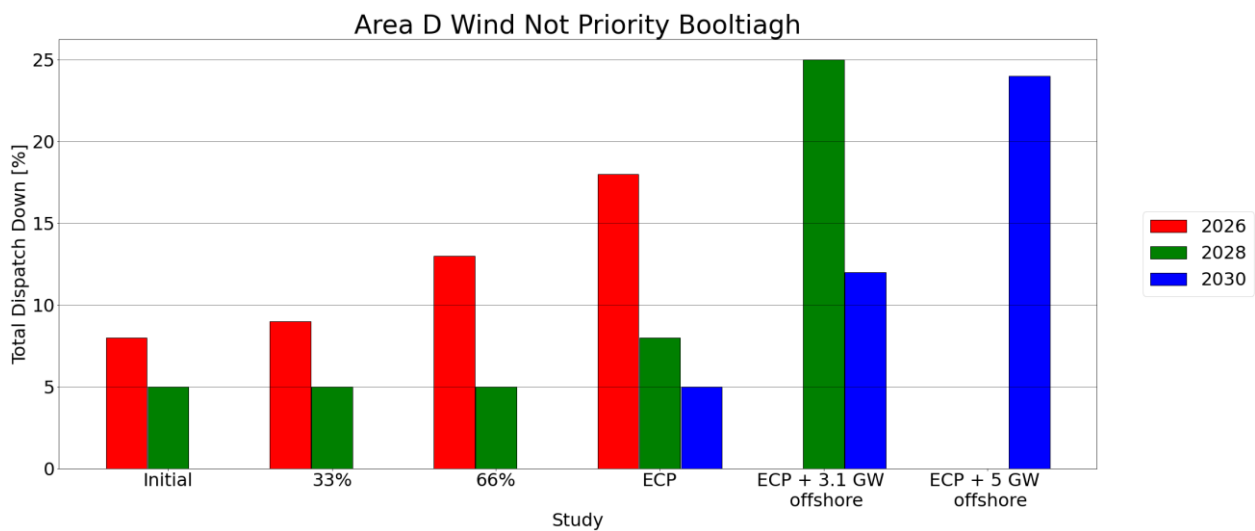


Figure 2-6 - Total Dispatch Down for Wind non-priority for Node Booltiagh



The wind priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	31	31	31	31		
Installed Capacity (MW)	2028	31	31	31	31	31	
Installed Capacity (MW)	2030				31	31	31
Available Energy (GWh)	2026	98	98	98	98		
Available Energy (GWh)	2028	98	98	98	98	98	
Available Energy (GWh)	2030				98	98	98
Generation (GWh)	2026	96	94	93	91		
Generation (GWh)	2028	98	97	96	95	91	
Generation (GWh)	2030				97	93	94
Surplus (%)	2026	<1%	<1%	<1%	<1%		
Surplus (%)	2028	<1%	<1%	<1%	<1%	<1%	
Surplus (%)	2030				<1%	<1%	<1%
Curtailed (%)	2026	2%	4%	5%	6%		
Curtailed (%)	2028	<1%	1%	2%	3%	7%	
Curtailed (%)	2030				1%	5%	3%
Constraint (%)	2026	<1%	<1%	<1%	<1%		
Constraint (%)	2028	<1%	<1%	<1%	<1%	<1%	
Constraint (%)	2030				<1%	<1%	<1%
Total Dispatch Down (%)	2026	2%	4%	5%	6%		
Total Dispatch Down (%)	2028	<1%	1%	2%	3%	7%	
Total Dispatch Down (%)	2030				1%	5%	3%

Table 2-7 - Surplus, Curtailment and Constraint for Wind priority in Area D

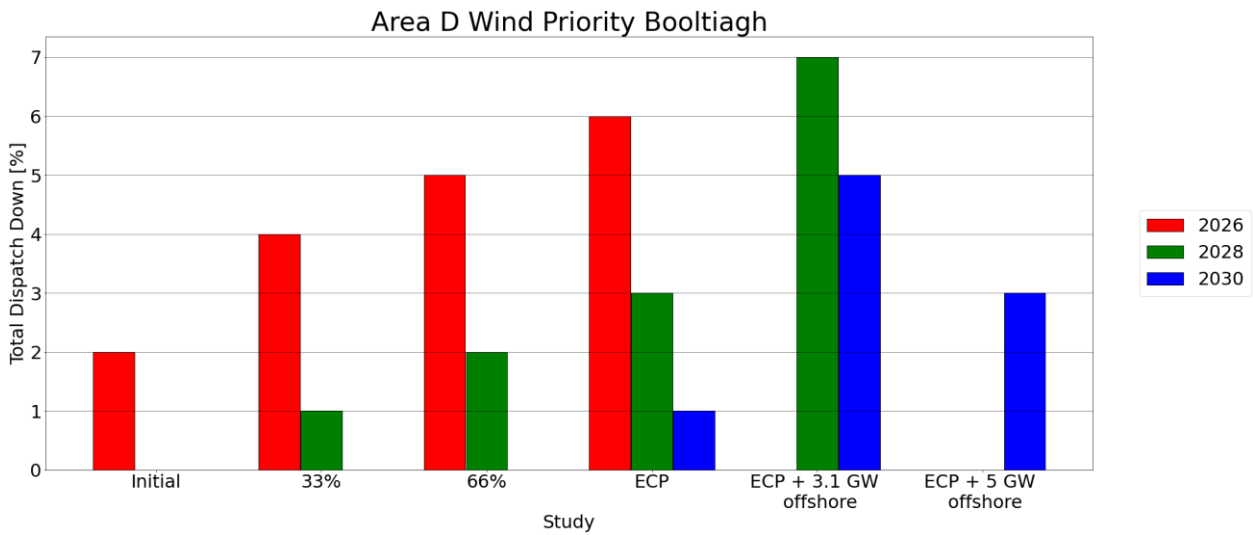


Figure 2-7 - Total Dispatch Down for Wind priority for Node Booltiagh

## 2.3 Derrybrien

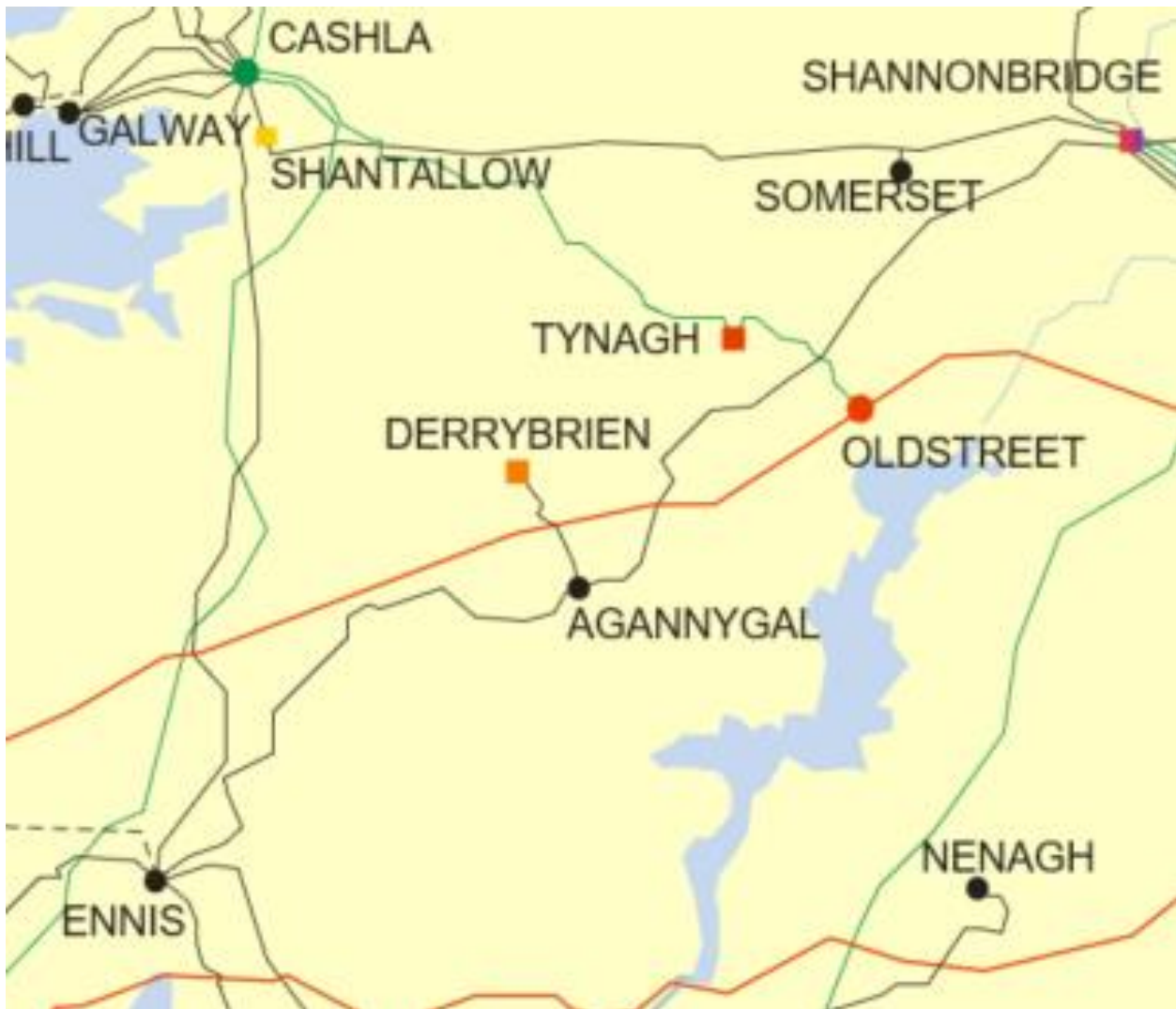


Figure 2-8 - Location of node Derrybrien

Generator	SO	Capacity	Type	Status
Derrybrien (1)	TSO	59.5	wind priority	connected

Table 2-8 - Generation Included in Study for Node Derrybrien

The wind priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	60	60	60	60		
Installed Capacity (MW)	2028	60	60	60	60	60	
Installed Capacity (MW)	2030				60	60	60
Available Energy (GWh)	2026	185	185	185	185		
Available Energy (GWh)	2028	186	186	186	186	186	
Available Energy (GWh)	2030				185	185	185
Generation (GWh)	2026	181	178	175	173		
Generation (GWh)	2028	186	184	182	180	173	
Generation (GWh)	2030				184	175	179
Surplus (%)	2026	<1%	<1%	<1%	<1%		
Surplus (%)	2028	<1%	<1%	<1%	<1%	<1%	
Surplus (%)	2030				<1%	<1%	<1%
Curtailement (%)	2026	2%	4%	5%	6%		
Curtailement (%)	2028	<1%	1%	2%	3%	7%	
Curtailement (%)	2030				1%	5%	3%
Constraint (%)	2026	<1%	<1%	<1%	<1%		
Constraint (%)	2028	<1%	<1%	<1%	<1%	<1%	
Constraint (%)	2030				<1%	<1%	<1%
Total Dispatch Down (%)	2026	2%	4%	5%	6%		
Total Dispatch Down (%)	2028	<1%	1%	2%	3%	7%	
Total Dispatch Down (%)	2030				1%	5%	3%

Table 2-9 - Surplus, Curtailement and Constraint for Wind priority in Area D

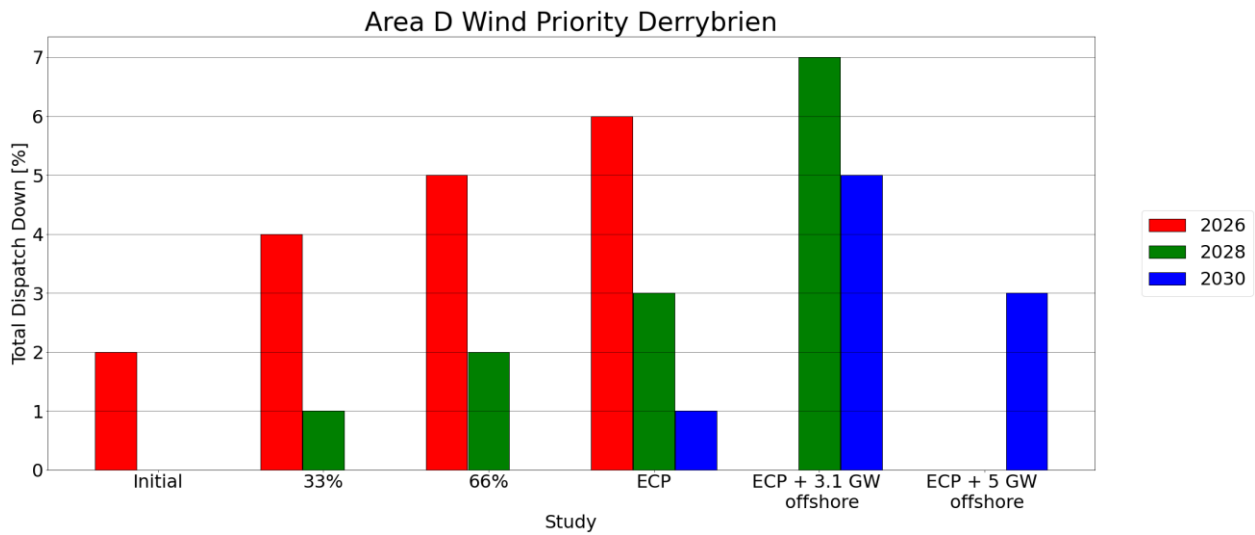


Figure 2-9 - Total Dispatch Down for Wind priority for Node Derrybrien

## 2.4 Drumline

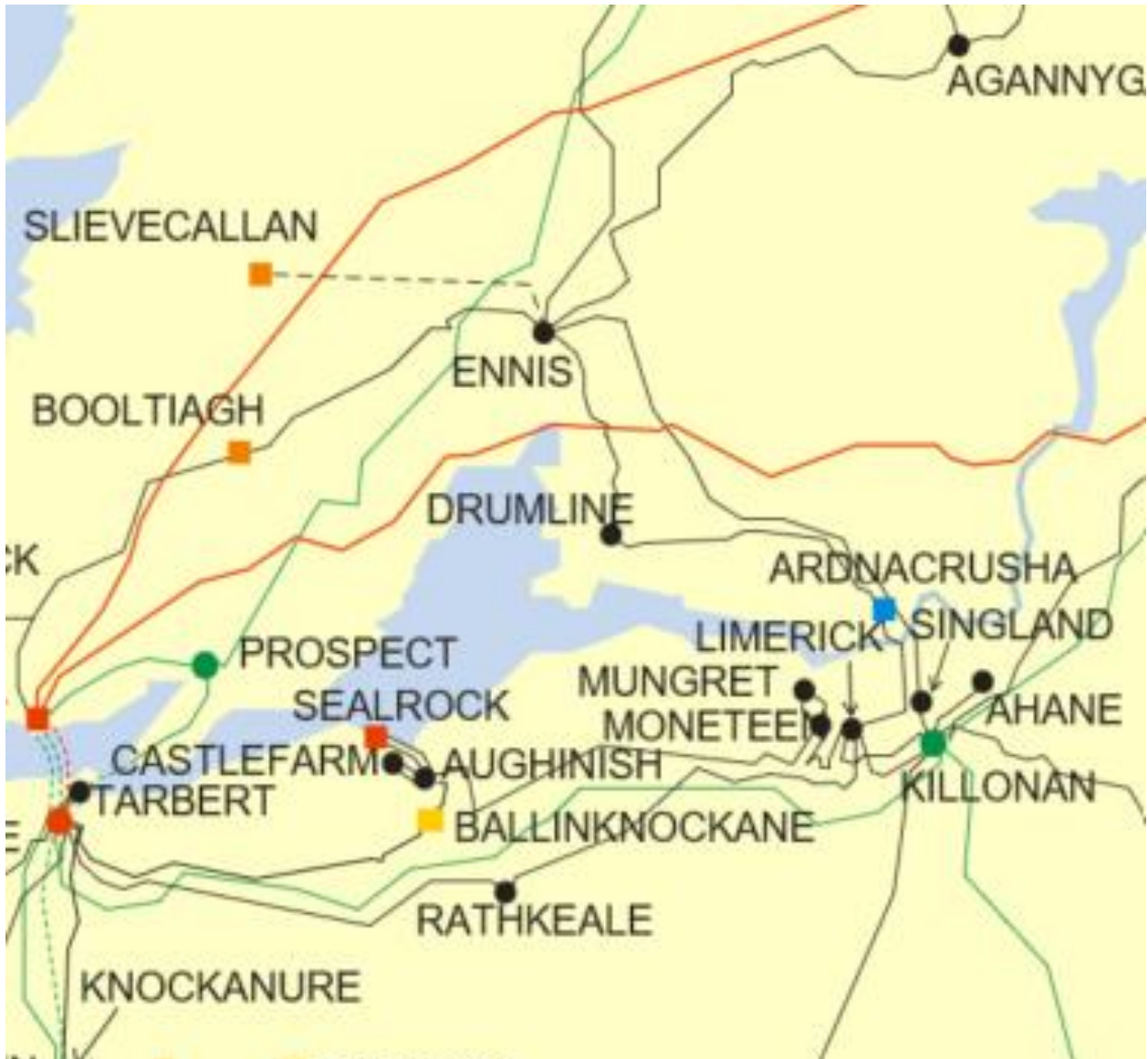


Figure 2-10 - Location of node Drumline

Generator	SO	Capacity	Type	Status
Clonloghan 2 Solar Park	DSO	8.0	solar non-priority	due to connect
Firgrove Solar Park	DSO	4.0	solar non-priority	due to connect

Table 2-10 - Generation Included in Study for Node Drumline

The solar non-priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026		4	8	12		
Installed Capacity (MW)	2028		4	8	12	12	
Installed Capacity (MW)	2030				12	12	12
Available Energy (GWh)	2026		5	9	14		
Available Energy (GWh)	2028		5	9	14	14	
Available Energy (GWh)	2030				14	14	14
Generation (GWh)	2026		4	9	12		
Generation (GWh)	2028		4	9	13	12	
Generation (GWh)	2030				13	13	12
Surplus (%)	2026		2%	5%	9%		
Surplus (%)	2028		<1%	2%	5%	11%	
Surplus (%)	2030				2%	6%	10%
Curtailement (%)	2026		1%	2%	4%		
Curtailement (%)	2028		1%	1%	2%	3%	
Curtailement (%)	2030				1%	1%	1%
Constraint (%)	2026		1%	<1%	<1%		
Constraint (%)	2028		4%	2%	<1%	<1%	
Constraint (%)	2030				2%	<1%	<1%
Total Dispatch Down (%)	2026		5%	8%	13%		
Total Dispatch Down (%)	2028		5%	5%	7%	15%	
Total Dispatch Down (%)	2030				5%	7%	12%

Table 2-11 - Surplus, Curtailment and Constraint for Solar non-priority in Area D

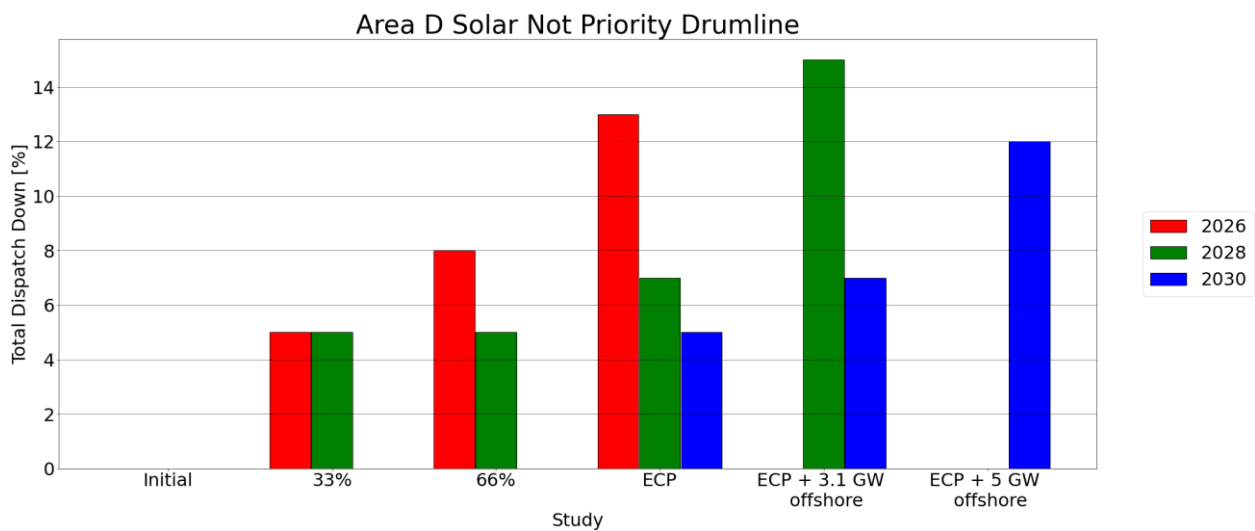


Figure 2-11 - Total Dispatch Down for Solar non-priority for Node Drumline

## 2.5 Ennis

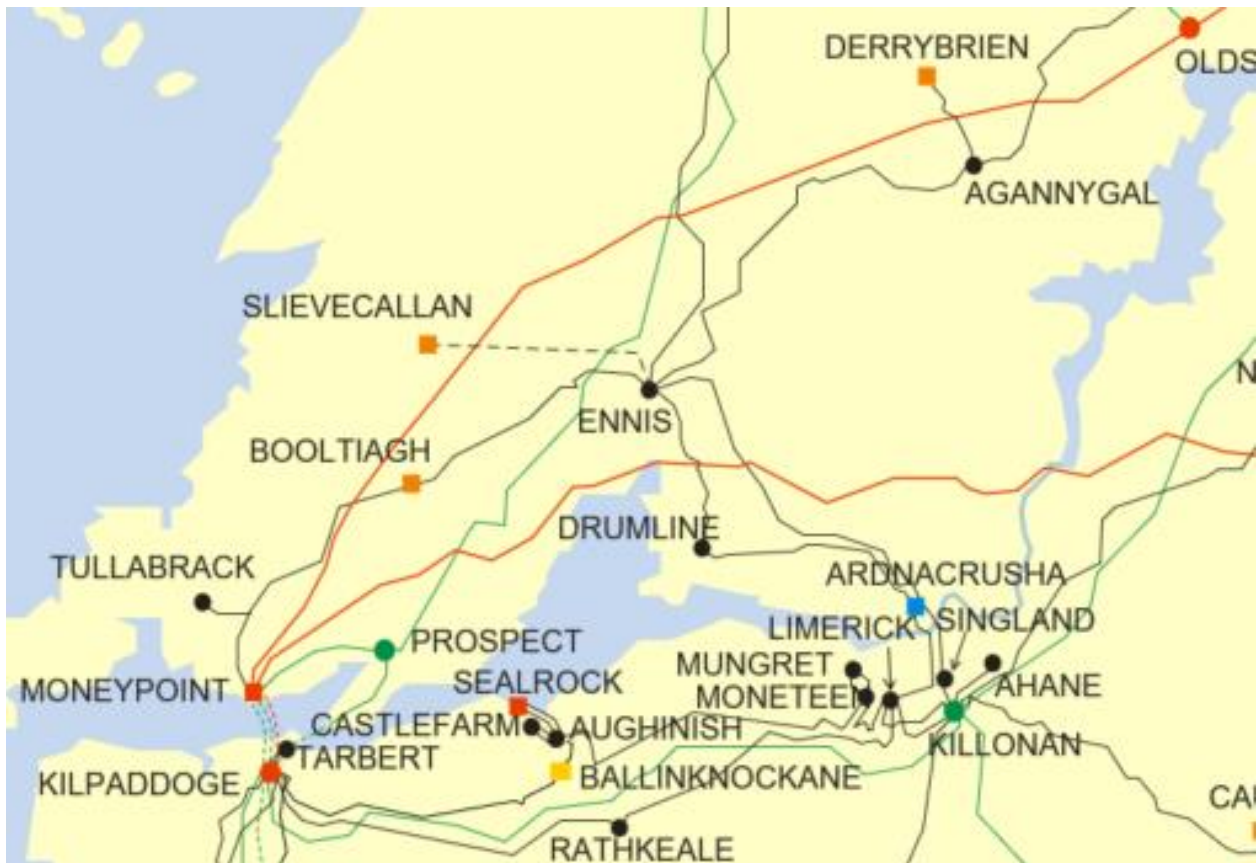


Figure 2-12 - Location of node Ennis

Generator	SO	Capacity	Type	Status
Lissane West Solar Farm	DSO	18.3	solar non-priority	due to connect
Manusmore Solar Park	TSO	60.0	solar non-priority	due to connect
Ballingaddy Solar	DSO	5.0	solar non-priority	due to connect
Cahershaughnessy Solar	DSO	9.0	solar non-priority	due to connect

Table 2-12 - Generation Included in Study for Node Ennis



The solar non-priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026		31	62	92		
Installed Capacity (MW)	2028		31	62	92	92	
Installed Capacity (MW)	2030				92	92	92
Available Energy (GWh)	2026		36	72	108		
Available Energy (GWh)	2028		36	72	108	108	
Available Energy (GWh)	2030				108	108	108
Generation (GWh)	2026		34	66	94		
Generation (GWh)	2028		34	69	101	92	
Generation (GWh)	2030				103	100	95
Surplus (%)	2026		2%	5%	9%		
Surplus (%)	2028		<1%	2%	5%	11%	
Surplus (%)	2030				2%	6%	10%
Curtailement (%)	2026		1%	2%	4%		
Curtailement (%)	2028		1%	1%	2%	3%	
Curtailement (%)	2030				1%	1%	1%
Constraint (%)	2026		1%	<1%	<1%		
Constraint (%)	2028		4%	2%	<1%	<1%	
Constraint (%)	2030				2%	<1%	<1%
Total Dispatch Down (%)	2026		5%	8%	13%		
Total Dispatch Down (%)	2028		5%	5%	7%	15%	
Total Dispatch Down (%)	2030				5%	7%	12%

Table 2-13 - Surplus, Curtailment and Constraint for Solar non-priority in Area D

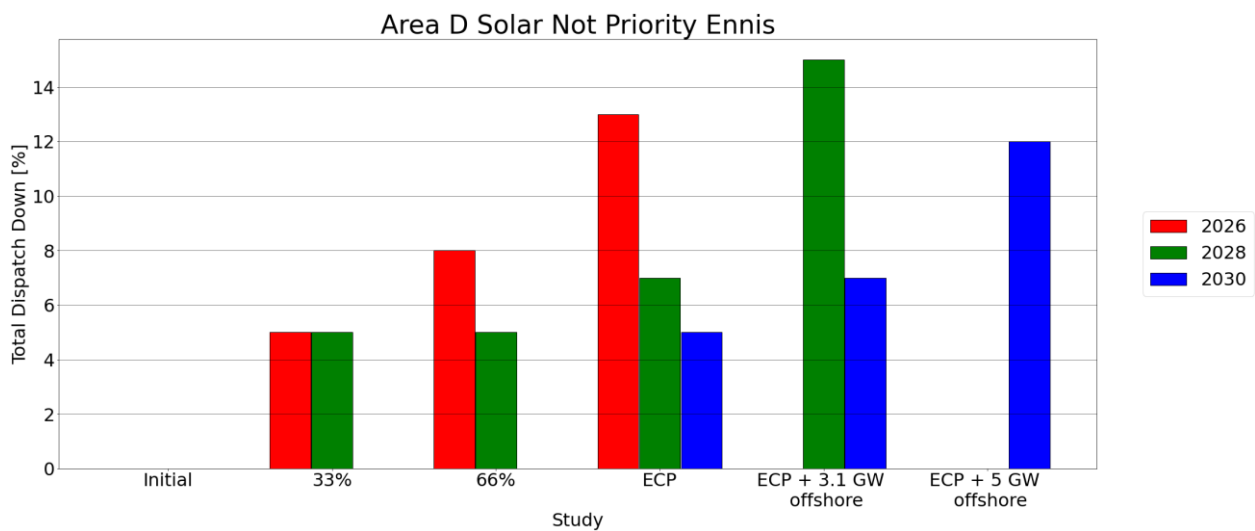


Figure 2-13 - Total Dispatch Down for Solar non-priority for Node Ennis

## 2.6 Slievecallan



Figure 2-14 - Location of node Slievecallan

Generator	SO	Capacity	Type	Status
<b>Boolinrudda (formerly Loughaun North)</b>	TSO	45.0	wind priority	connected
<b>Knockalassa (formerly Keelderry)</b>	TSO	26.875	wind priority	connected

Table 2-14 - Generation Included in Study for Node Slievecallan



The wind priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	72	72	72	72		
Installed Capacity (MW)	2028	72	72	72	72	72	
Installed Capacity (MW)	2030				72	72	72
Available Energy (GWh)	2026	223	223	223	223		
Available Energy (GWh)	2028	225	225	225	225	225	
Available Energy (GWh)	2030				223	223	223
Generation (GWh)	2026	219	215	212	209		
Generation (GWh)	2028	224	222	220	217	209	
Generation (GWh)	2030				222	212	216
Surplus (%)	2026	<1%	<1%	<1%	<1%		
Surplus (%)	2028	<1%	<1%	<1%	<1%	<1%	
Surplus (%)	2030				<1%	<1%	<1%
Curtailement (%)	2026	2%	4%	5%	6%		
Curtailement (%)	2028	<1%	1%	2%	3%	7%	
Curtailement (%)	2030				1%	5%	3%
Constraint (%)	2026	<1%	<1%	<1%	<1%		
Constraint (%)	2028	<1%	<1%	<1%	<1%	<1%	
Constraint (%)	2030				<1%	<1%	<1%
Total Dispatch Down (%)	2026	2%	4%	5%	6%		
Total Dispatch Down (%)	2028	<1%	1%	2%	3%	7%	
Total Dispatch Down (%)	2030				1%	5%	3%

Table 2-15 - Surplus, Curtailement and Constraint for Wind priority in Area D

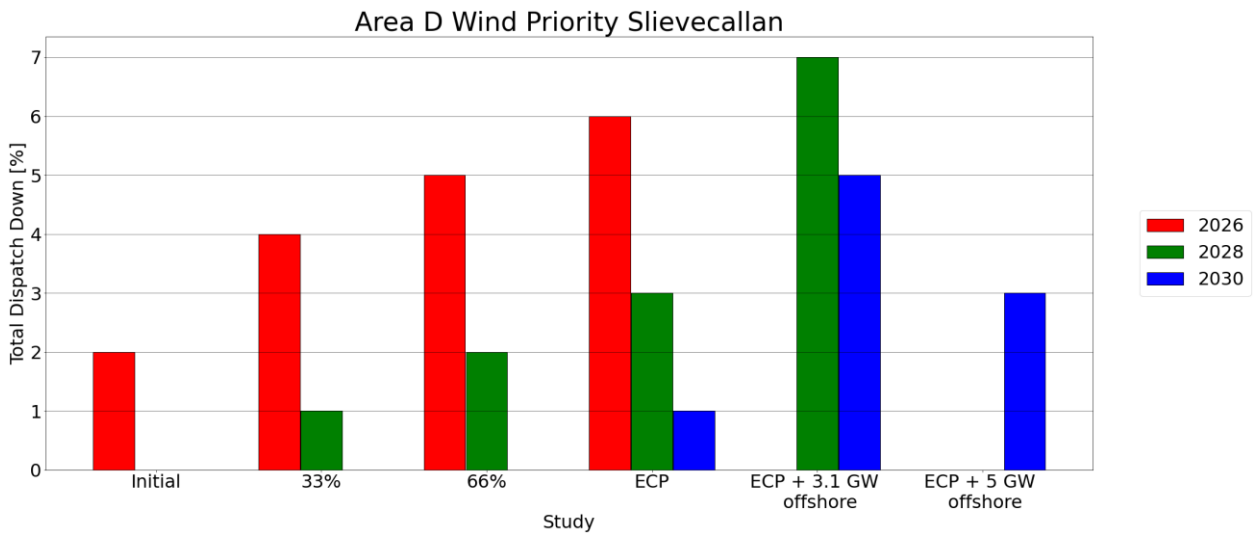


Figure 2-15 - Total Dispatch Down for Wind priority for Node Slievecallan

## 2.7 Tullabrack



Figure 2-16 - Location of node Tullabrack

Generator	SO	Capacity	Type	Status
<b>Carrownawelaun (1)</b>	DSO	4.6	wind uncontrolled	connected
<b>Moanmore (1)</b>	DSO	12.6	wind uncontrolled	connected
<b>Tullabrack (1)</b>	DSO	13.8	wind priority	connected

Table 2-16 - Generation Included in Study for Node Tullabrack

The wind priority data is given in the following table.

Area D	Year	Initial	33%	66%	ECP	ECP + 3.1 GW offshore	ECP + 5 GW offshore
Installed Capacity (MW)	2026	14	14	14	14		
Installed Capacity (MW)	2028	14	14	14	14	14	
Installed Capacity (MW)	2030				14	14	14
Available Energy (GWh)	2026	43	43	43	43		
Available Energy (GWh)	2028	43	43	43	43	43	
Available Energy (GWh)	2030				43	43	43
Generation (GWh)	2026	42	41	41	40		
Generation (GWh)	2028	43	43	42	42	40	
Generation (GWh)	2030				43	41	41
Surplus (%)	2026	<1%	<1%	<1%	<1%		
Surplus (%)	2028	<1%	<1%	<1%	<1%	<1%	
Surplus (%)	2030				<1%	<1%	<1%
Curtailed (%)	2026	2%	4%	5%	6%		
Curtailed (%)	2028	<1%	1%	2%	3%	7%	
Curtailed (%)	2030				1%	5%	3%
Constraint (%)	2026	<1%	<1%	<1%	<1%		
Constraint (%)	2028	<1%	<1%	<1%	<1%	<1%	
Constraint (%)	2030				<1%	<1%	<1%
Total Dispatch Down (%)	2026	2%	4%	5%	6%		
Total Dispatch Down (%)	2028	<1%	1%	2%	3%	7%	
Total Dispatch Down (%)	2030				1%	5%	3%

Table 2-17 - Surplus, Curtailment and Constraint for Wind priority in Area D

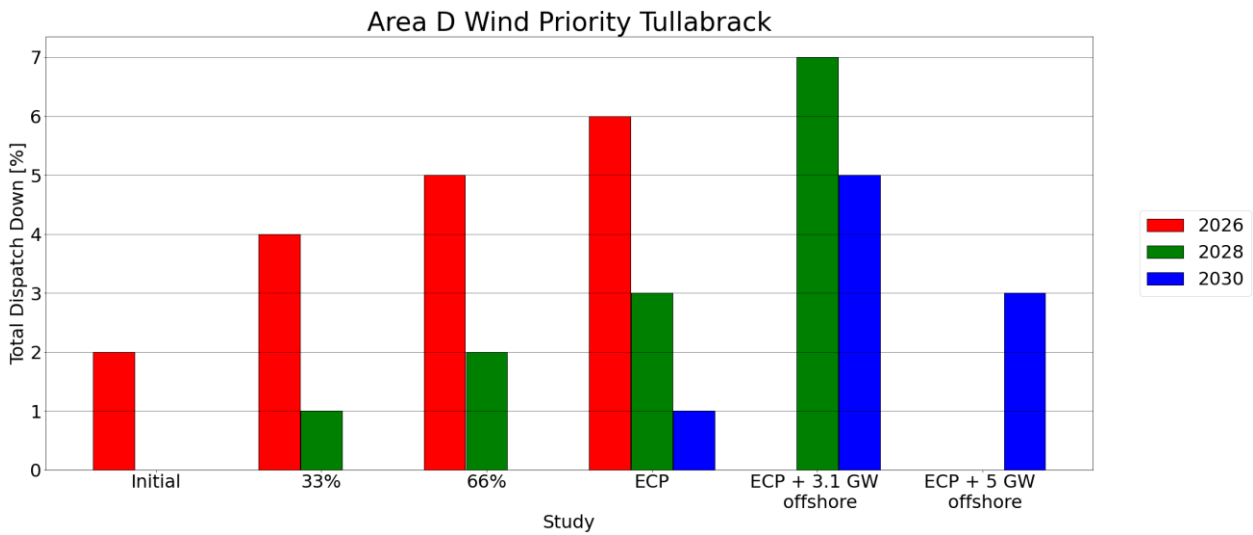


Figure 2-17 - Total Dispatch Down for Wind priority for Node Tullabrack