

Enduring Connection Policy 1 Ireland Summary Constraints Report for Solar and Wind

August 2020

Version 1.0



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1 Important Note for Customers

The results presented in this report are based on the simulation and modelling assumptions described. This information is provided to help inform generation developers in decisions that they may make in terms of locating new generation in the future and such decisions are made in the knowledge that there are areas of high constraint currently that may well remain at high levels in the medium to longer term. The findings are indicative only and this report should in no way be read as a guarantee as to future levels of curtailment and constraint.

1.1 Results valid for these Study Assumptions

The results presented in these ECP-1 Constraint Reports are only valid for the study assumptions used in the analysis. There are a number of factors which could result in different levels of curtailment and constraint than are presented here. These include installed generation, reinforcement delivery, intact network, and other issues. While these aspects are covered already in the original constraint reports, it is worth noting the more relevant ones again.

1.2 Relevant Study Assumptions

The following is a brief note on key study assumptions.

Installed Generation

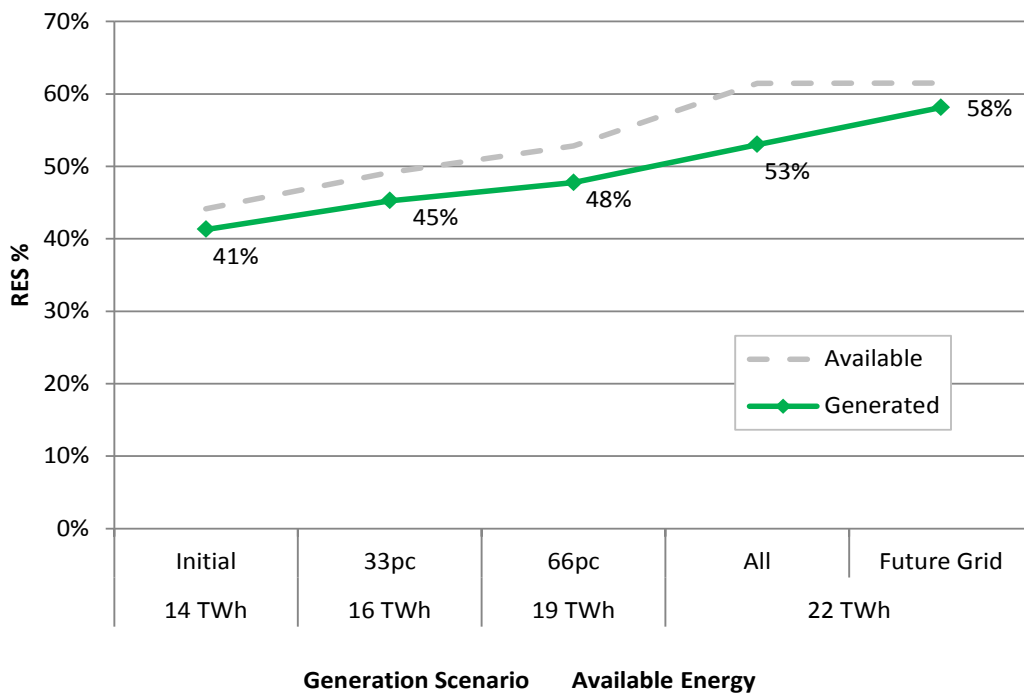


Figure 1 Renewable Percentage in these Constraint Reports

These studies cover the generators that will receive connection offers up to and including ECP-1. Some of these generators may not connect. On the other hand, Ireland has a key target of meeting 70% of electricity demand from renewable sources by 2030. This target is set out in the Government's Climate Action Plan, published in June 2019.

The 70% target means more renewable generators than are studied in this report. This will mean higher curtailment (unless measures to reduce curtailment are found), and depending on the location of the additional generators, higher constraints in some locations for existing and new generation.

Reinforcement Delivery

The ECP-1 Constraint Reports use a significant number of indicative transmission reinforcements in the different scenarios.

It is important to note that these are not all capitally approved projects. Future reinforcements are subject to comprehensive technical, economic and environmental evaluation before they will be approved. Consequently, some of the reinforcements in this report may not be progressed.

After a project is approved, then a timeline for delivery can be scheduled. Project delivery is subject to a number of considerations including achieving planning permission in a challenging consenting environment, finding an appropriate outage slot to do the work in a congested workplan, challenges gaining access to land, etc.

These reports should not be interpreted as giving a commitment on project delivery dates, especially in the Industry and Future Grid scenarios.

Intact Network

A basic premise of this constraints analysis is that the existing network is available and that all the existing circuits are available to be in service. Given that every item of transmission equipment is expected to be available for the majority of its life, then this assumption is reasonable over the life of a solar or wind generator. However, in any given year, one transmission circuit or another may be unavailable for periods of time. This may be due to scheduled maintenance or a forced outage (e.g. transformer failure), or for reinforcement reasons on circuits (e.g. circuit uprate which requires the conductor and some towers to be replaced) or reinforcement in stations (e.g. outage for busbar upgrade).

As such, for any part of the network, there will be years when constraints may be higher than predicted in this report, due to outages of existing equipment. This is quite likely to happen in areas where the possible reinforcements include a large number of uprates of existing overhead lines.

Constraints that Move Around

As studied, and for the quantities of generation included in the analysis, the studies show multiple transmission bottlenecks.

When one transmission bottleneck is removed, a generator that was on the right side of that bottleneck, can now find itself on the wrong side of the next most binding bottleneck. In some cases, it can even find itself unlucky to become the most effective generator to constrain to manage the new bottleneck. Therefore, even though overall system wide constraints reduce, the constraints for this generator can increase. These local constraints can remain high until another (or several other) reinforcements are delivered.

At this point in time, neither the sequence of future generator connections nor the sequence of future reinforcements is known.

In this report, there are large numbers of reinforcements assumed between the 2022 study year and either the Industry Scenario or the Future Grid scenario. It is possible (though unlikely in most cases), that some unusual sequence of generator connection and reinforcement delivery could cause higher constraints in the middle years for some generators.

Other

EirGrid publish these reports to inform and to provide assistance to generator developers. A large number of study assumptions had to be made to perform these studies, and these assumptions were discussed with industry representatives. However, it is a fact that the power system continues to evolve. As such, it is likely that some of these input assumptions will be updated in the future.

These include, but are not limited to, the following.

As renewable generator technology continues to improve, the capacity factor of some solar and wind generators may be higher than is assumed in this analysis.

These constraint reports make an assumption about what fraction of interconnector capacity can be used to export spare renewable energy. As Britain (and France) continue to develop their own renewable generation, then this fraction may change. Interconnection brings benefits in curtailment, but the quantities assumed in this report will be reviewed for future studies.

In this analysis, the identification of which generators to constrain is not an exact match for the Wind Dispatch Tool Constraint Groups used in real time system operation. An exact match is not possible because these reports are studying large numbers of future combinations of additional generation and network conditions.

The analysis in this report is based on a DC loadflow analysis. In the future, it is possible that losses, transient stability or voltage will affect constraints apportionment.

The modelling of batteries in this report is on the basis that they are for the provision of system services. It looks likely now that batteries will also be energy trading. This may (or may not) affect the apportionment of local network capacity, and may (or may not) impact on constraints.

The ongoing clarification process in relation to priority dispatch in the Clean Energy Package may (or may not) impact curtailment and constraints.

2 Introduction

2.1 Objective

It is a requirement of CRU's ECP-1 decision, CRU/18/058, that system operators carry out system studies to inform applicants about possible constraint levels. EirGrid has completed this requirement across twelve regional reports. This document collates that information into one single report. The purpose of this report is to provide future generation connection applicants with information on the possible levels of generation output reduction for a range of scenarios so the location of new projects can be made on an informed basis.

It presents the results of studies for a range of generation scenarios and these indicate the levels of transmission curtailment and constraint that solar and wind generation might experience in the future.

The curtailment and constraint results are included in Chapter 2.

2.2 Background

The background to this constraints report covers ongoing changes in generation, demand, network and DS3. All of these have an impact on the constraints evaluation.

More details of the study assumptions are provided in Section 3.

Generation

Since Gate 3, EirGrid has issued an additional 2 GW of connection offers under the Non-GPA (Non-Group Processing Approach) ruleset CER/09/099. In line with government policy and regulator direction, another 2 GW of connection offers have been issued, referred to as the Enduring Connection Policy (ECP).

It is not clear at this stage which of these generators will be successful in future renewable support auctions or may be successful through other funding mechanisms. It is therefore not clear which generators will build or when. This uncertainty has an impact on the approach to this constraint analysis. For this reason, this report uses multiple generation scenarios, so that generators can take a view on the range of curtailment and constraint for different generator build-outs.

Demand

Demand has been growing in Ireland for the past few years and demand has an impact on curtailment. Higher demand means lower curtailment. The system growth forecasts used are the median forecasts from the Generation Capacity Statement 2018.

Network

The analysis concentrates on 2020 to 2022 where the network development is reinforced with existing approved projects and where the predicted network is relatively certain.

DS3

The DS3 programme, led by EirGrid in co-operation with the electricity industry, is expected to continue to successfully deliver improvements in system operation and allow more wind and solar to generate more of the time. This includes improvements to SNSP, ROCOF, inertia and DS3 service provision. DS3 delivery assumptions are part of the study assumptions for this report.

2.3 Definition of Curtailment and Constraint

The terms 'curtailment' and 'constraint' are sometimes used interchangeably to refer to changes in the output of generators in order to maintain the operation of a safe, secure and reliable power system. For the purposes of this report, these terms are used to refer to changes in generator output under different specific circumstances.

EirGrid must dispatch generators in such a way as to provide a range of system services in order to operate a safe and secure electricity system. The types of system services required include the following:

- Frequency control,
- Provision of reserve,
- Voltage control,
- Load following,
- Ability to withstand disturbances,
- Inertia.

As these factors are not accounted for in the SEM, the system operators must deviate from the market schedule and change the output of generators in order to ensure that sufficient quantities of the system services outlined above are made available at all times. The real-time dispatch can change from the market schedule also because of demand and wind forecast errors and unexpected trippings of plant.

Curtailment

Most system services, such as frequency control and reserve, can be located anywhere on the transmission system, whereas services such as voltage control are location specific. Curtailment can arise at times when solar and wind generation levels are a high percentage of system demand as it may be necessary to reduce output from solar and wind powered generators in order to retain the necessary amount of conventional generation online to provide all the required system services. A main component of this is the limit on System Non Synchronous Penetration (SNSP). For the purposes of this report, we classify the changes in generator output which are required by EirGrid for system reasons as 'curtailment'.

Constraint

The output of generators may also need to be changed from the market schedule due to transmission network limitations, specifically the overloading of transmission lines, cables and transformers. This can happen for an intact network but typically occurs for network contingencies. In other words, a line may become overloaded if another line were to trip. In order to avoid this, generation is dispatched so that if the tripping were to occur there would not be any contingency overloads. Changes in generator output for this reason are referred to in this report as 'constraint'. The constraining of generation is location-specific and can be significantly reduced by transmission network reinforcements. The model accounts for N-1 contingencies which is the usual security criteria used for dispatching the power system. In other words the transmission system will be dispatched in such a way that any single contingency will not cause overloads, or will not exceed circuit short term overload capabilities.

Some transmission constraints might only exist temporarily due to transmission lines being taken out of service for maintenance or uprating. Maintenance is not covered in this report. Also, as the focus of this report is on levels of output reduction, the costs associated with constraints and curtailment are not covered here.

3 Study Overview

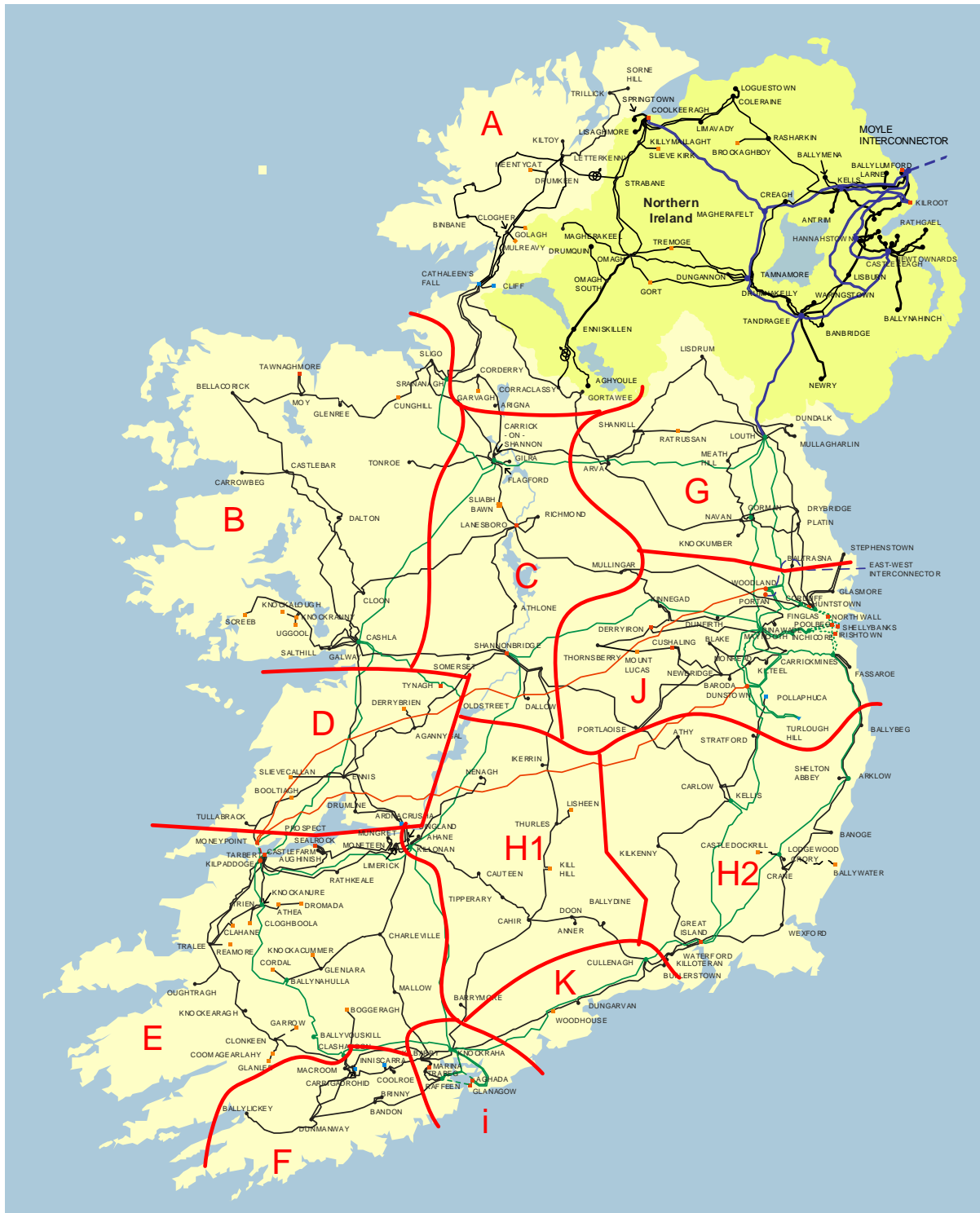


Figure 3-1 Areas Designated for Preparing Wind Energy Profiles, Generation Scenarios and Reporting Results

This chapter presents an overview of the curtailment and constraints assessment. A description is provided of the study scenarios, which in turn are a combination of generation scenarios and study years.

It provides an overview of the study areas. These are fundamental to understanding the contents of the individual area reports. It also provides an overview of the demand, generation and network assumptions that are used in the study. Taken together, this information provides an overview of this constraints analysis.

3.1 Study Areas

The areas shown in Figure 3-1 are used for preparing wind energy profiles, for setting up generation scenarios and for reporting results. These areas are similar to those used for the Gate 3 constraints analysis.

3.2 Study Scenarios

The study scenarios are made up of a combination of generation scenarios with scenarios for network and demand. The scenarios cover multiple combinations of generation scenario and network-year scenario.

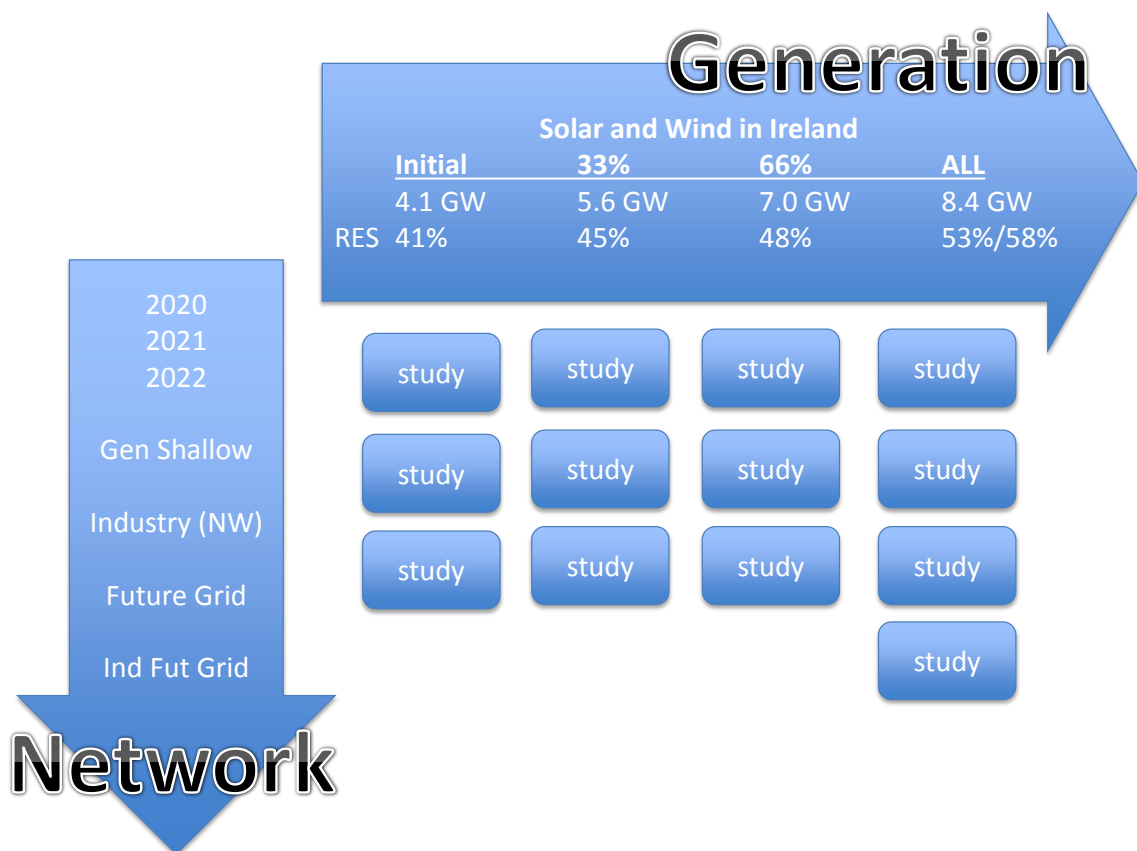


Figure 3-2 Study Scenarios: a Matrix of Generation Scenarios and Network Scenarios

		Generation Scenario				
Network and Demand	2020 March	Initial	33%	66%	All up to 2022 study	All with Gen Shallow
	4.1 GW	4.2 GW	5.6 GW	7.1 GW	8.4 GW	8.6 GW
2020						
2021						
2022	X	X	X	X	X	X
Gen Shallow						X
Industry	X	X	X	X	X	X
Future Grid						X
Industry Future Grid						X

Table 3-1 Scenarios Presented in this Report

For this overview report, only a subset of the network scenarios is presented. This is done to simplify the message in the report.

The study scenarios in this report are shown in Table 3-1. The generation scenarios and the network scenarios are described in the following sections.

3.3 Generation Scenarios

This overview report presents the results for five different generation scenarios. The "initial" scenario represents the 2020 generation, as was predicted when the studies started. The "all" scenario includes all the generators which will have connection offers at the end of ECP-1. Then, the two intermediate scenarios are the steps between "initial" and "all". These are the "33%" and the "66%" scenarios.

In the north west, there is an approx. 50 MW mismatch between the generators connected in 2020, and the generation in the "initial" scenario. For this reason, an additional scenario called "March 2020" is added. This reflects the actual installed generation at the start of 2020.

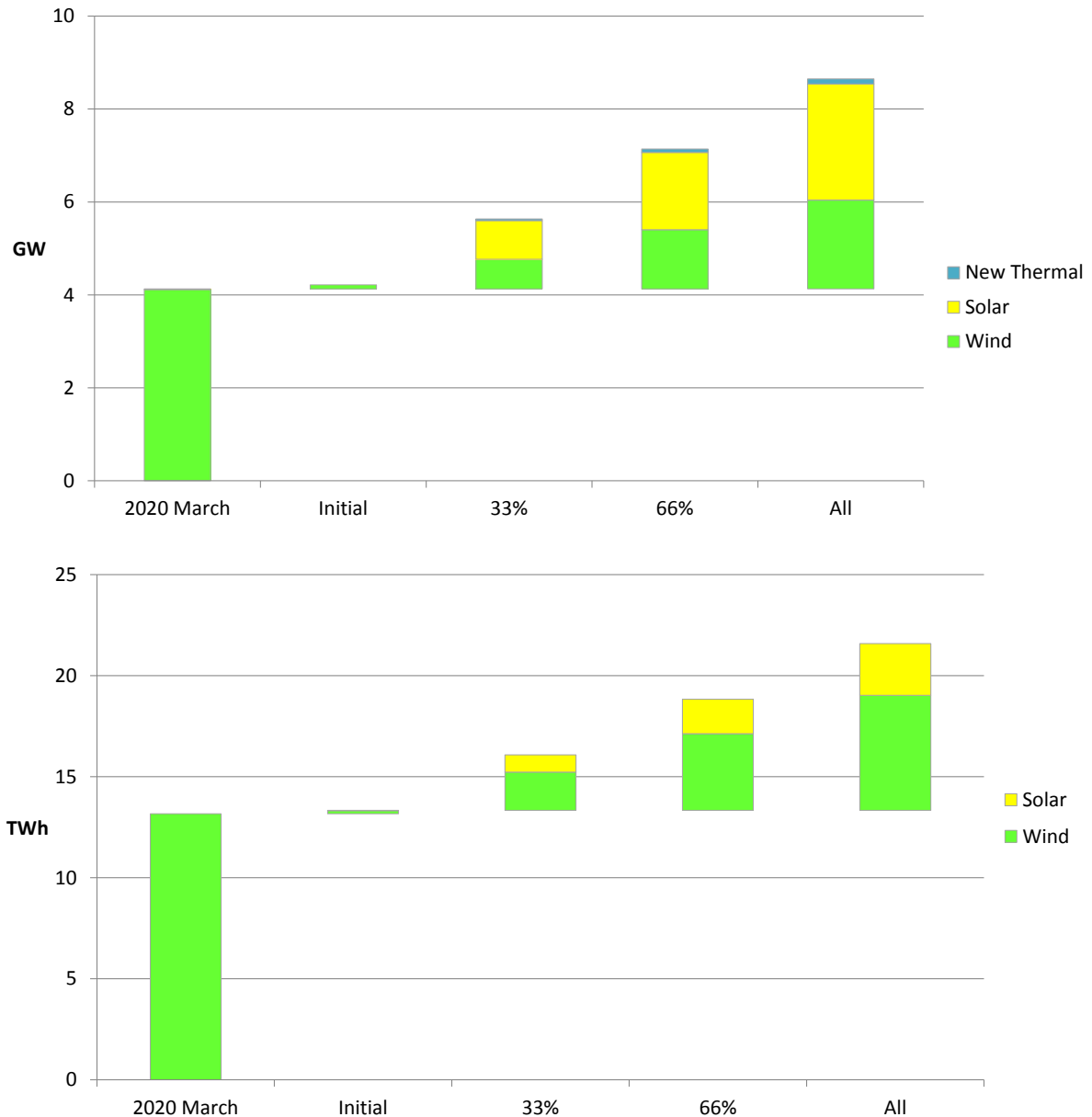


Figure 3-3 Generation Scenarios: Installed GW and Available Energy TWh

To repeat, the generation scenarios are as follows.

- The Initial scenario has the generation scheduled to be connected in 2020, as estimated for these studies. There are no ECP-1 generators in this scenario.
- The 33% scenario is 33% of the way between the Initial scenario and the All scenario.
- The 66% scenario is 66% of the way between the Initial scenario and the All scenario.
- The All scenario has all the Gate 3, the Non GPA and the ECP-1 generation connection applications in the study.

3.3.1 Connection Works and Generators

In the north west of the network, there is 220 MW of generation that is not permitted to connect until certain wider system works are complete. These works will not be in place by 2022, and so, the works are not included in the 2022 study. Consequently, the generators that need these works are also not included in the 2022 study. In the connection contract, these are included in the Site Related Connection Equipment, and are sometimes referred to as “shallow reinforcements”.

See table below.

Shallow Works	Quantity of Generation
Galway New 110kV Station	30 MW
Uprate Binbane – Cathaleen’s Fall 110	30 MW
North Connaught Reinforcement Of which approx. 50 MW must also wait for Uprate of Glenree Moy 110 circuit.	<u>160 MW</u>
	TOTAL: 220 MW

Table 3-2 Shallow Works and Quantities of Generation

Because this generation is not permitted to connect before these works are complete they are not included in the 2020, 2021 and 2022 network studies.

An additional study called Gen Shallow is performed with these works and with the generation that can connect after they are delivered. This study is otherwise similar to study “2022 All”.

3.4 Network Scenarios (Study Year, Demand and Reinforcements)

3.4.1 Network Reinforcement

The study years are chosen to achieve a balance between expected progress in the medium term (predicted DS3 improvements, transmission reinforcements and forecast demand increase) and focusing on the near time to remain realistic and accurate.

This is achieved by studying the years 2020, 2021 and 2022. The reinforcements assumed for the various study years are listed in Appendix A.

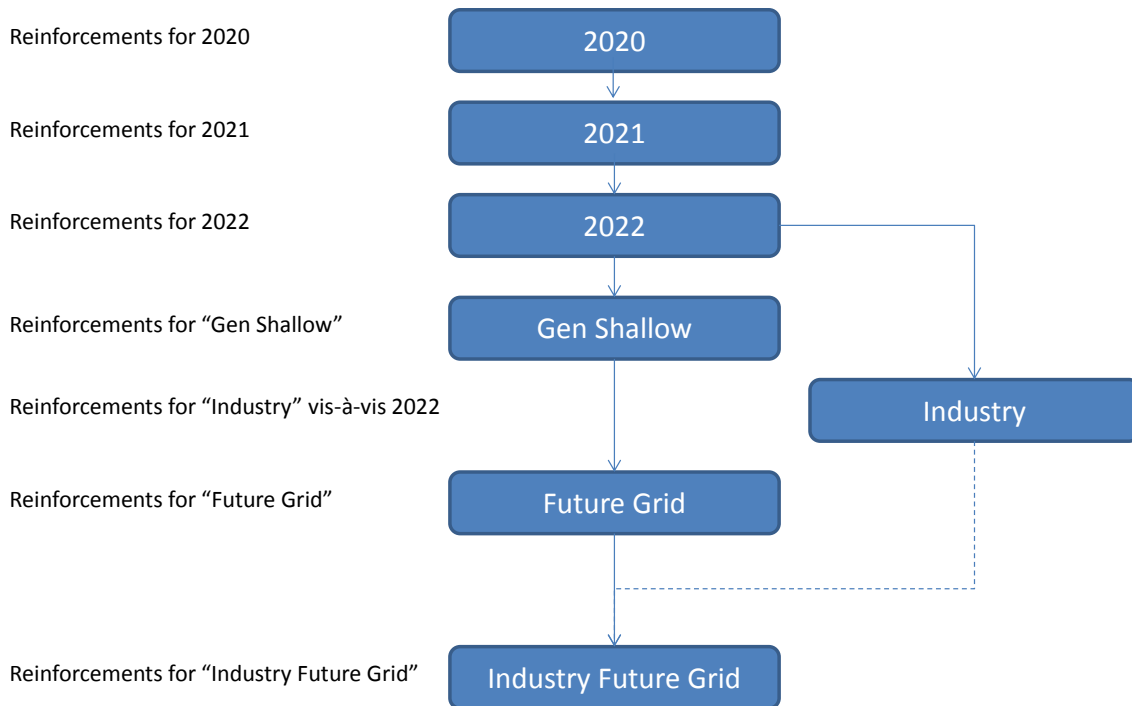


Figure 3-4 Reinforcements are Added for Different Scenarios

In addition to 2020, 2021, 2022, there are four other network scenarios; Gen Shallow, Industry, Future Grid and Industry Future Grid. Of these four, only Future Grid was in the first reports. Gen Shallow was added for the Area A, B and C reports in their first iteration. Extra studies were agreed For the updated Area A, B and C reports, and this gives us Industry and Industry Future Grid.

An overview of these scenarios is as follows.

Firstly, these four have the same system demand as the 2022 scenario. The only differences between the scenarios are transmission reinforcements, interconnection increases and changes to DS3 rules such as SNSP (System Non Synchronous Penetration limit), etc.

Gen Shallow

A small number of generators have connection agreements from EirGrid where they may not connect until some additional wider system works are complete. In some cases, these works are not presumed in place for the 2022 study year. As such, the works are not included in the 2022 study, and neither are the relevant generators.

Hence, the Gen Shallow scenario adds these works to the 2022 scenario, and also adds the relevant generators.

Future Grid

This network scenario is in the original reports. Its purpose is to show the combined impact of a moderate number of additional projects beyond 2022. The projects include North-South 400 kV, Celtic interconnector, Greenlink interconnector, series compensation of the 400 kV network, Project 966, North Connaught 110 kV, major DS3 improvements and several 110 kV uprates. The transmission reinforcements and DS3 initiatives included in the study years are listed in the appendix to this report.

Industry and Industry Future Grid

After publication of the original Area A, B and C reports, EirGrid met with industry representatives and it was agreed to perform an additional set of studies.

The industry scenario is a list of reinforcements selected by industry. The list includes some but not all of the Gen Shallow reinforcements. Also, the list includes four reinforcements which are not in the Future Grid study, but which are EirGrid Associated Transmission Reinforcements (ATR).

In addition then, the Industry Future Grid scenario was analysed. This is similar to the original Future Grid but it has included these four additional ATR line upgrades.

3.4.2 Demand

The demand forecast used is the median forecast from EirGrid’s Generation Capacity Statement 2018-2027.

It is worth comparing the annual available energy (TWh) from solar and wind for the different studies with the system demand (TWh). This information is provided above in Table 3-3.

Network and Demand		Demand TWh	Generation Scenario		Available Energy from Solar and Wind TWh
2020		32.2	Initial		13.3
2021		33.8	33%		14.9
2022		36.2	66%		16.5
Future Grid		36.2	All		18.1

Table 3-3 Annual Demand (TWh) from Generation Capacity Statement 2018 and, for comparison, the Available Energy (TWh) from Solar and Wind

3.5 Notes on Curtailment and Constraint Modelling

Curtailment

In this report, in each hour of the study, the curtailment is shared pro-rata on a system wide basis. This means that both curtailment reductions (as demand increases, as interconnection increases, or with the DS3 programme) and curtailment increases (when new generators connect) are shared system-wide.

Solar sees different reported levels of curtailment than wind. This is because the generator types have different capacity factors and they generate at different times.

The forecast curtailment is broadly constant within each area. To be precise, curtailment is calculated as an average for each subgroup within an area. There can be small variations in curtailment within an area, due to the use of node wind profiles. Comparing between areas, if there is a large quantity of wind generation in a given area, then that area can see relatively high curtailment.

Constraints in 2020, 2021 and 2022

In most study years, there is a tendency for renewable power to flow toward the demand at Dublin and toward the interconnector at EWIC. 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 for wind, but that is because the solar and wind have different forecast energy profiles.

4 Ireland Summary

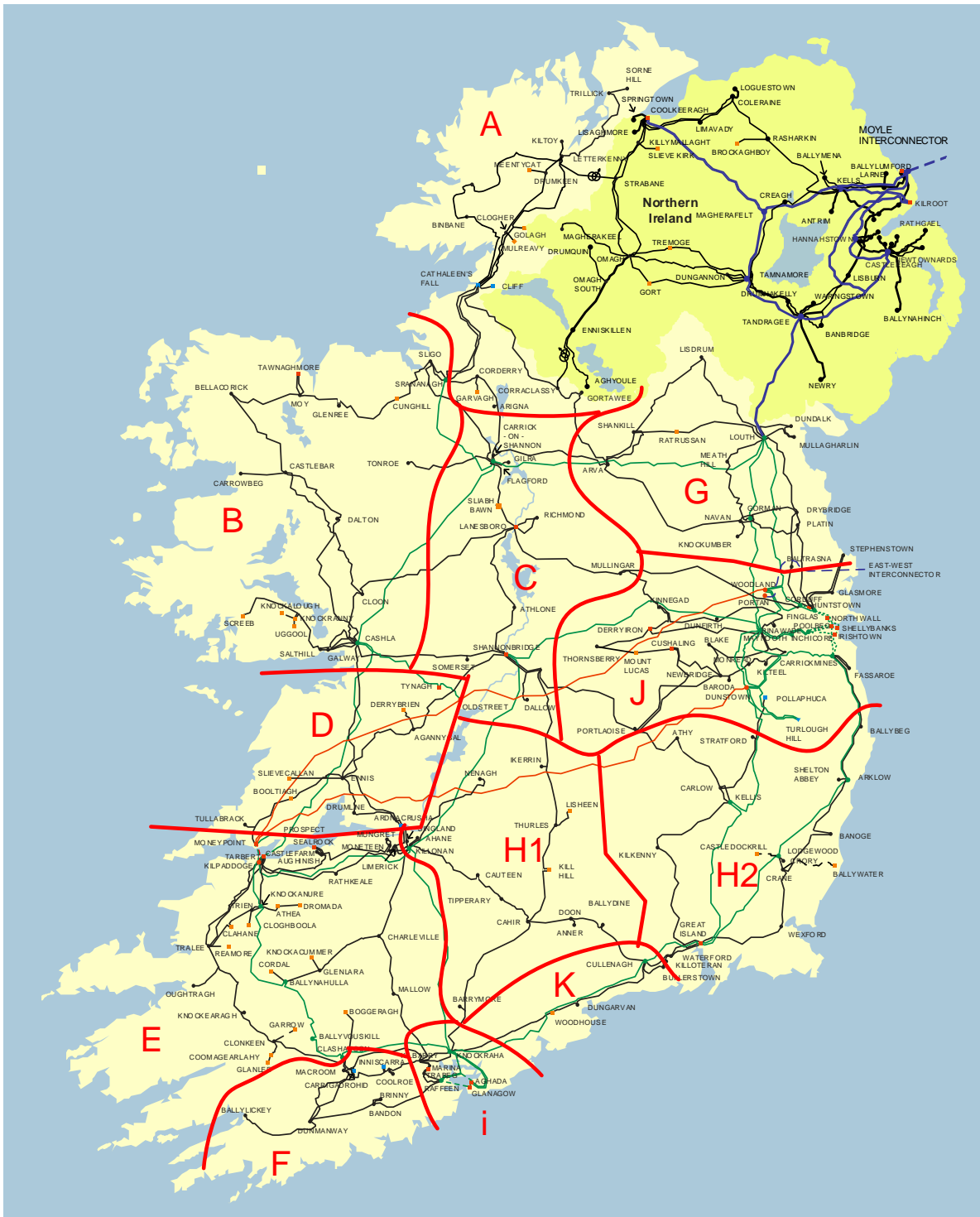


Figure 4-1 Network map showing All Areas

4.1 Introduction

EirGrid has performed constraint analysis studies for ECP-1 and has published detailed reports for each area of the network. The areas used are shown in Figure 4-1.

The ECP-1 Constraint Reports for each area are available at:

<http://www.eirgridgroup.com/customer-and-industry/general-customer-information/constraint-reports-solar/index.xml>

This chapter provides a comparison of the performance of different parts of the network.

4.2 Some Technical Notes

The individual area reports contain a lot of detail about how the studies are performed. For brevity, that detail is not repeated here. The following points are relevant however.

Security Constrained – Operated Safe for N-1

The meshed electricity transmission system is operated to be safe, at all times, against the possible loss of any circuit. For large power flows out of an area, this means that power transfer capability depends on the network capacity after the outage of any large circuit.

Optimised on a System Basis

For this report, constraints in the model are optimised on a system basis. This means that the constraints in any area are caused both by local and by wider system considerations. So, in theory, an increase in the installed generation in one area can increase constraints in another.

Typical Flow Patterns

The following power flow patterns are useful to understanding the issues with to power transfer in the studies. At times of high renewable generation, and due to the assumptions in the study, there is a tendency for power to flow toward the demand at Dublin and toward the EWIC interconnector. Some studies assume additional future interconnection for Celtic (at Knockraha) and Greenlink (at Great Island). It is assumed that these interconnectors will also facilitate the export of renewable energy. This means power flow towards these interconnectors at times of high renewable generation.

Solar and Wind

In the simulations, it is assumed in every individual hour that both curtailment and constraint are shared pro-rata between solar and wind. However, the presented results look different for solar and wind. This is because the solar and wind have available energy at different times (no solar at night), and have different capacity factors.

4.3 Areas and Subgroups

The Constraint Reports are prepared and published on an area basis, with a constraints report for each area. For some areas, the findings are such that all generators of a given type demonstrate similar constraints and are presented as such.

For other areas, the studies show different constraints even for generators in the same area. This can happen when the transmission boundary is inside an area. Generators on one side will see more constraints, and generators on the other side will see less. In such cases, the area is divided into subgroups. Generators within each subgroup are presented as having the same levels of constraint.

The third situation is for Areas A, B and C, where the identified subgroups did not respect area boundaries. Generators in the same subgroup are presented as having the same constraints.

4.4 Renewable Percent

The National Energy and Climate Plan aims to achieve 70% renewable electricity in Ireland by 2030.

For illustrative purposes, the approximate levels of renewables in this report are shown in Figure 4-2. The values include generation from biomass, hydro, solar, waste, wave, and wind. The figure shows the amount of Renewable Available Energy and Generation as a percentage of the demand on the system.

The generation scenarios presented are Initial (14 TWh of available renewable energy), 33% (16 TWh), 66% (19 TWh) and All (22 TWh). The percentage results are calculated using the forecast 2020 demand (Initial), the 2021 demand (33%), and the 2022 demand (66%, All, and Future Grid).

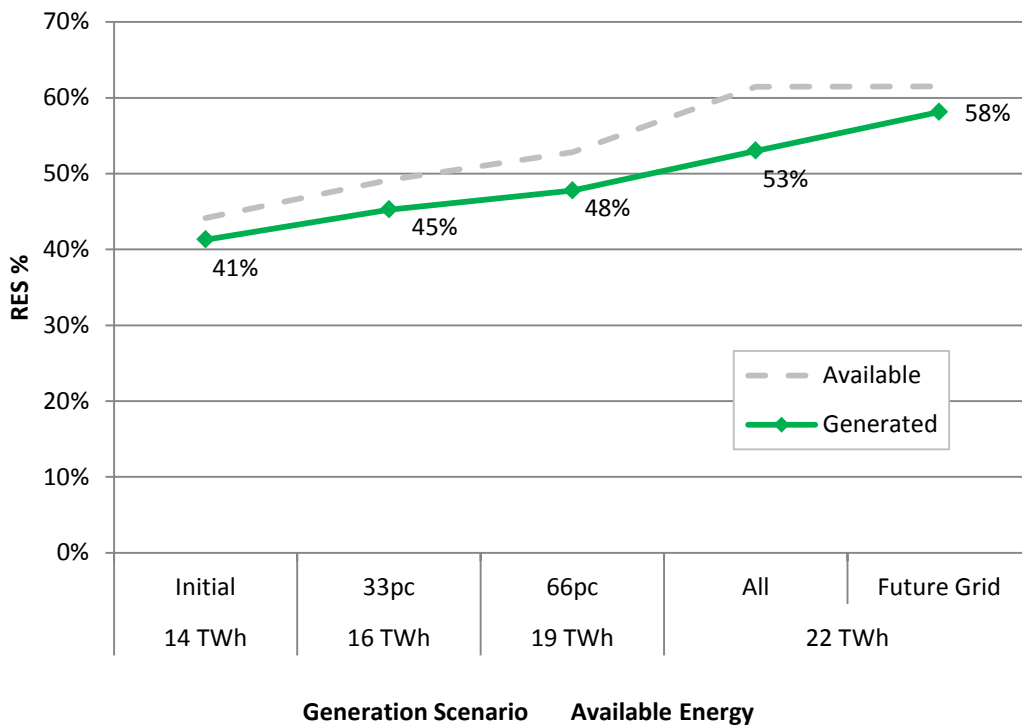


Figure 4-2 Renewable Percent (Available and Generated)

The dotted line in Figure 3-4 shows the available energy from renewables. The green line shows the generated energy. The percentage of generated energy from renewables increases from 41% to 58% from the Initial to the Future Grid study scenarios.

The scenarios "All" and "Future Grid" have the same demand and the same available generation. It can be seen how the Future Grid projects allow extra renewable electricity to be generated.

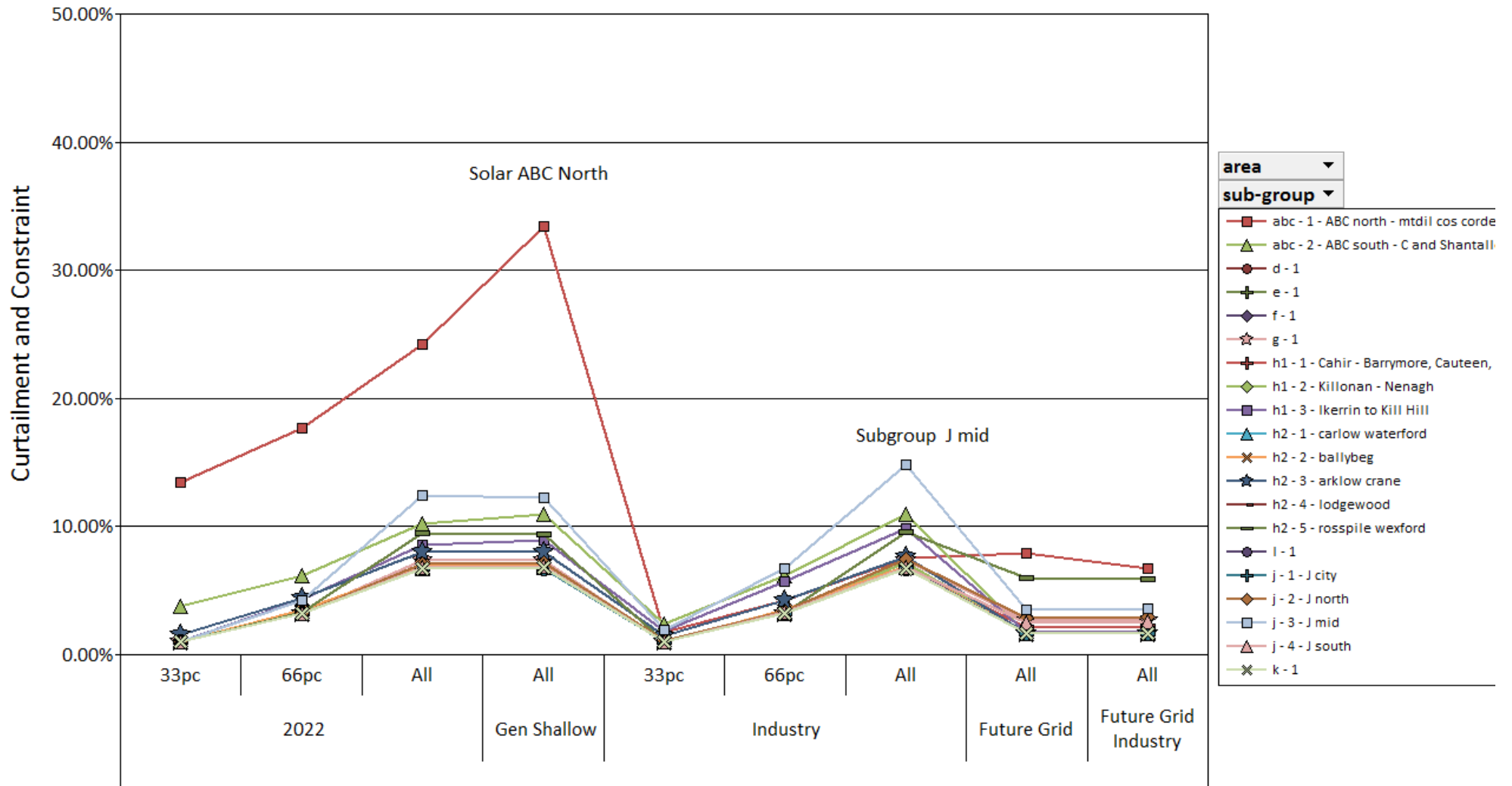


Figure 4-3 Curtailment and Constraint for SOLAR showing all Subgroups

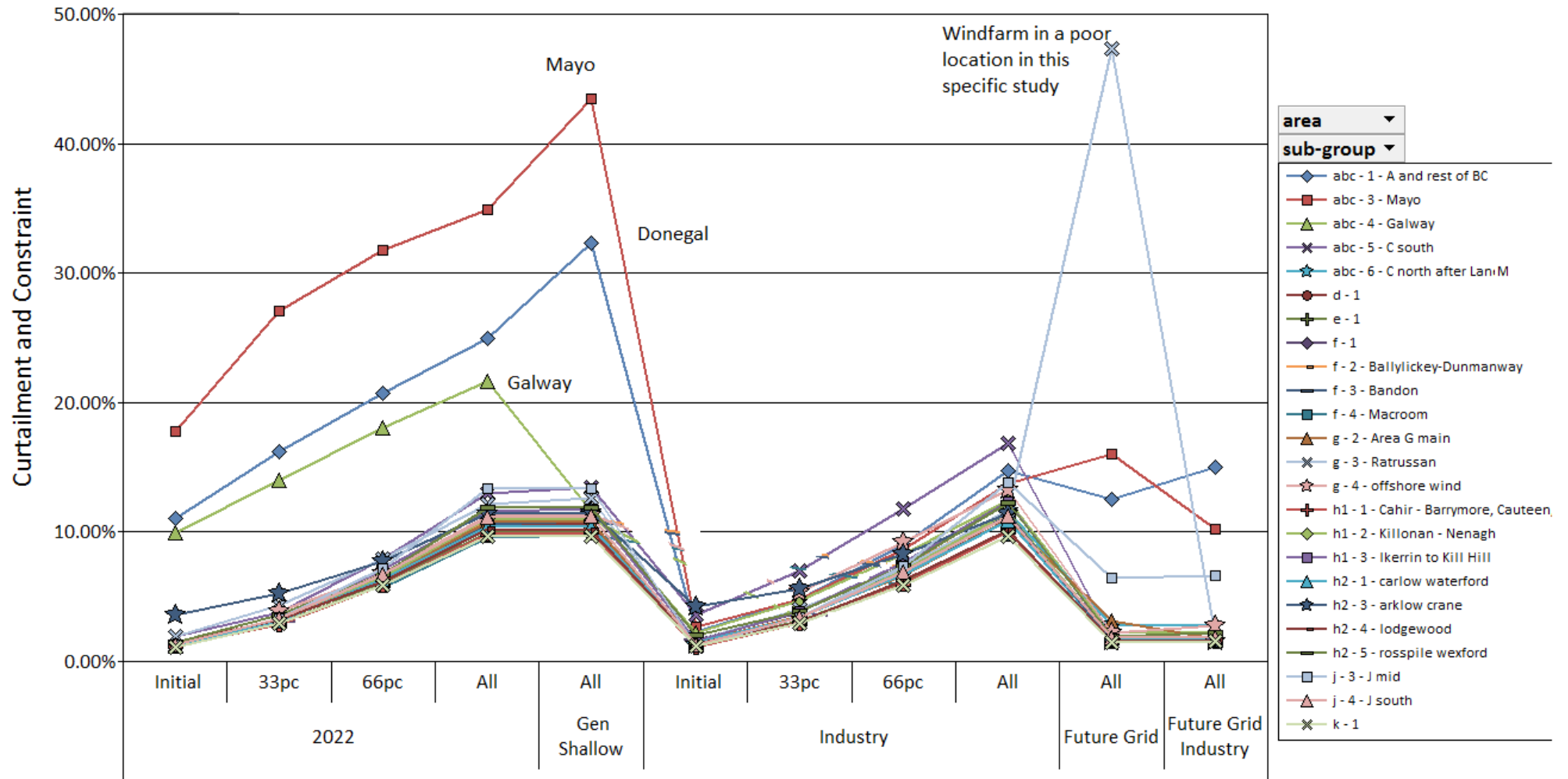


Figure 4-4 Curtailment and Constraint for WIND showing all Subgroups

4.5 Results

An overview of the results is shown in Figure 4-3 and Figure 4-4.

Description of Graphs

Each graph plots the combined curtailment and constraint for every subgroup. Figure 4-3 shows the results for solar and Figure 4-4 shows the results for wind.

The values shown on the graphs are "Curtailment and Constraint %".

The x-axis of each graph tracks network scenario, and generation scenario. The network scenarios shown are 2022, Gen Shallow, Industry, Future Grid, and Industry Future Grid. These network scenarios are described in Chapter 3 and the reinforcements in each scenario are listed in Appendix A. The 2020 and 2021 scenarios are not shown on this graph.

The generation scenarios shown are Initial, 33pc, 66pc, All. For simplicity, solar is not presented in generation scenario Initial.

General Trend

For a given network scenario, it can be seen that curtailment and constraint increase with increase in installed generation.

Moving from one network scenario to the next, with the addition of transmission reinforcements, additional interconnection, and DS3 improvements, the curtailment and constraints reduce for the same level of installed generation.

It is noticeable that the results from some subgroups are noticeably higher. These are for areas with large quantities of installed and applicant generation and where the transmission network is not presently designed to export these quantities of energy. These results are discussed further below.

Industry Scenario designed for Areas A, B and C

The industry scenario is relevant for Areas A, B and C. However, the results in this scenario are less valid for the other areas. This is because the scenario includes a lot of extra reinforcements in the north west, but none extra (beyond the 2022 study year) in other parts of the network. As such, the Industry scenario results are relevant only for Areas A, B and C.

Wind - North West

The reported constraints are high for generators exporting power out of the north west. In the figure, the terms "Mayo" and "Donegal" are used. These labels are broadly correct but they also cover some generators in nearby counties. The exact subgroup membership is set out in Appendix C and in the relevant area reports.

If and when the reinforcements in the Industry and Future Grid scenarios are delivered, then the constraints would improve considerably.

Node at a Poor Location in This Specific Study

In one study, the specific combination of generator location, reinforcements delivered, reinforcements not yet delivered and generator connections means that one node sees very high constraints.

In this case, the possible uprate of one additional 110kV circuit would solve the constraints again. This can be seen when this uprate is added to the Industry Future Grid scenario, and the constraints for this windfarm are reduced.

The high level of constraint at this location happens only for a moderately specific combination of reinforcements and generator connections.

Wind - Galway

The constraints in Galway are quite high but there is a reinforcement, a new 110kV station, that resolves constraints here. This can be seen in the way that the Galway constraints improve in the Gen Shallow scenario.

Solar - ABC North

The forecast high constraints on solar generators in the north west of the network are due to the same issues that affect the wind generators. Similarly, the same reinforcements would also benefit solar constraints.

Area J – Solar and Wind

In a few scenarios, the constraints for Area J are a little higher than for other areas.

For solar, the high constraints, which appear in the 2022 study, are resolved for the Future Grid and Industry Future Grid scenarios. The Industry scenario is not really relevant for Area J as it assumes lots of reinforcement in the north west but none additional in any other part of the network.

For wind, the Area J constraints are a little higher than for other areas in the Future Grid scenarios. This indicates that there may be need for additional reinforcement in this area if the generation and network evolves as set out in this analysis

4.6 Network Reinforcements – Future Grid and Industry Future Grid

While preparing for this report, the wind and solar developers requested the inclusion of a study including a number of projects beyond the time horizon of this report. For this reason, a Future Grid scenario is performed which includes a variety of projects that are well beyond the timeframe of this report. The study uses Generation Scenario All and takes the 2022 year as a starting point before adding additional reinforcements and future DS3 assumptions.

The Industry Future Grid scenario includes an additional four 110kV circuit uprates in the north west.

These scenarios are not intended as an indication to individual generators that their curtailment and constraints will change to the indicated levels. Rather, it is a signal of the types and variety of projects which would be required to reduce curtailment and constraints for the Generation portfolio in this

report. In addition, this study is not intended to be exhaustive and it is not intended to remove all transmission constraints.

The reinforcements included in Future Grid / Industry Future Grid are listed in Appendix A.

The study finds that the cumulative impact of these reinforcements and projects is a noticeable reduction in the curtailment and constraint. It should be noted that this analysis has not studied each project individually, so it is not possible to comment on the individual impact of each project.

A lot of the improvement is due to the interconnector projects; Celtic, Greenlink, and the forecast capacity increase on Moyle. As modelled in this report, the interconnectors reduce curtailment. The modelling assumption is that the countries on the other side of the interconnectors will normally be able to take the surplus renewable power from Ireland. Curtailment is also reduced by the expected DS3 improvements. The line upgrades, the series compensations, the new circuits and the forecast system demand also contribute to reducing curtailment and constraint.

5 Conclusion

The studies for this analysis began in late 2018. It is hoped that this analysis will be useful for generator developers, and for other interested parties.

We would like to acknowledge the support and assistance that we received from the solar and wind industry for these reports. We are grateful for the data provided, the feedback and the suggestions received.

The forecast values in this report are an indication of constraints based on a given set of assumptions and inputs, rather than any form of assurance or guarantee. The report is useful in comparing the expected performance in different locations and informing developers in locating future projects.

The numbers in this report are valid for the study assumptions. As mentioned in Chapter 1, there are some areas where these assumptions may be overtaken by events, or by continuous improvement in the modelling approach. There are a number of modelling assumptions listed in Chapter 1. Two of the more significant of these are that the 70% target means more generation than studied in these reports, and that the export quantities taken by neighbouring countries may not match that assumed in this report. But the other modelling details could have a future impact too.

Constraint reports will be provided for ECP-2.1. These are expected to be published in 2021.

Appendix A Network Reinforcement

A.1 Introduction to Reinforcement List

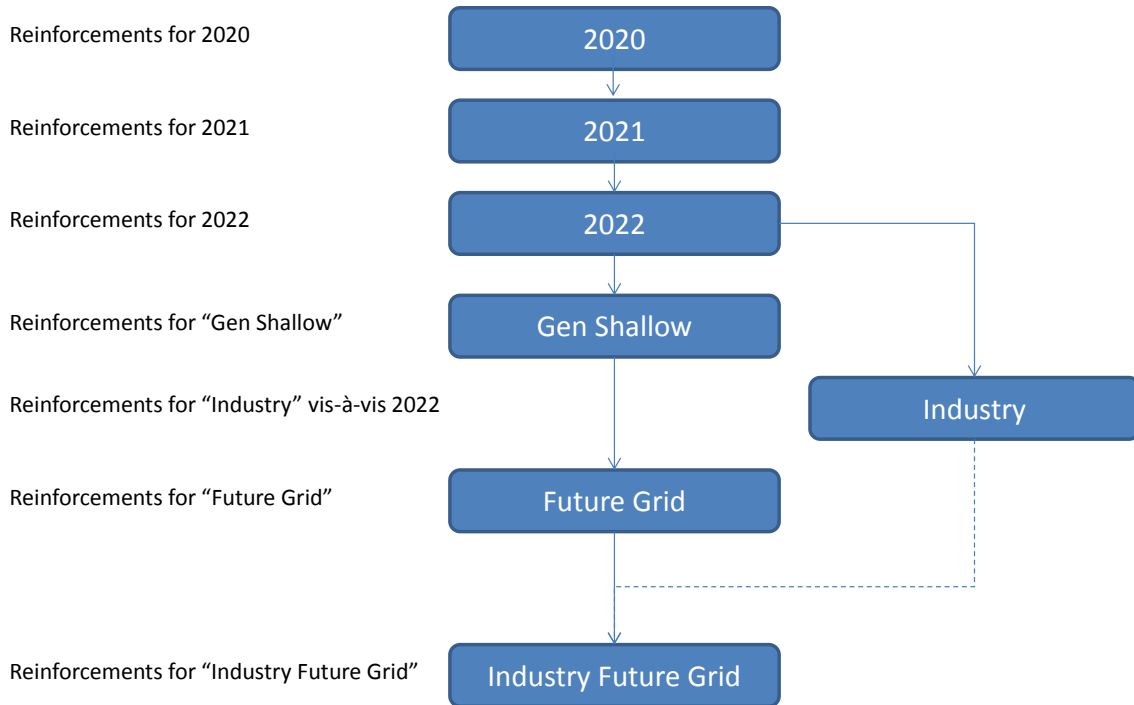


Figure 5 Reinforcement Overview

An overview of the reinforcements is shown in Figure 5.

Please note that the 2020 and 2021 results have not been recalculated for this report.

A.2 Reinforcements in 2020

Project Type	Project
	Included in Model from 2020
DS3 Programme	SNSP 75% 65% at present.
DS3 Programme	Inertia 17500 23000 at present
New Build	Belcamp 220 kV station
New Build	Castlebaggot 220 kV station
New Build	Clashavoon Macroom 110 circuit 2
New Build	Mount Lucas – Thornsberry 110
New Build	Loop Kilpaddoge into Tarbert Tralee 110 circuit 1
Uprate	Dunstown T4202 to 528 MVA
Uprate	Clashavoon T2101 to 278 MVA
Uprate now complete	Great Island – Wexford 110 to 178 / 194 / 209 MVA
Uprate	Corduff Ryebrook 110 to 184 / 198/ 198 MVA
Station	Thornsberry busbar and bay conductor uprate To give Derryron Thornsberry uprate to 104 / 113 / 122 MVA

Table A-0-1 Reinforcements for 2020

A.3 Reinforcements in 2021

Project Type	Project
	Included in Model from 2021
New Build	Kilpaddoge Knockanure 220 circuit 2
New Build	Belcamp Shellybanks 220
New Build	Loop Kilpaddoge into Killonan Tarbert 220
New Build	Clashavoon Dunmanway 110
Uprate	Ballynahulla Knockanure 220 to 513 / 643 / 716 MVA
Uprate	Ballynahulla Ballyvouskil 220 to 519 / 643 / 716 MVA
Uprate	Bellacorick Moy 110 to 178 / 197 / 197 MVA
Uprate	Corderry Srananagh 110 to 178 / 197 / 197 MVA
Uprate	Laois Portlaoise 110 to 178 / 197 / 197 MVA
Uprate	Ardnacrusha Singland to 110 178 / 193 / 210 MVA <i>uprate in Ardnacrusha station</i>
Uprate	Arklow Ballybeg 110 to 133 / 148 / 159 MVA <i>uprate in Arklow station</i>
Uprate	Cloon Lanesboro 110 to 99 / 111 / 122 MVA <i>restore rating on this circuit</i>
Uprate	Flagford Louth 220 to 433 / 473 / 513 MVA <i>restore rating on this circuit</i>
Station	Castlebar busbar uprate
Station	Moy busbar uprate For uprate Glenree Moy to 104/113/122 MVA
Station	Wexford busbar uprate
Reactive Support	Thurles STATCOM
Special Protection Scheme	Galway temporary SPS until new Galway 110 station
Transformer	Retire Knockraha T2103

Table A-0-2 Additional Reinforcements for 2021

A.4 Reinforcements in 2022

Project Type	Project
	Included in Model from 2022
New Build	Laois 400 kV station (Coolnabacky)
New Build	Ballyragget Kilkenny 110
New Build	Ballyragget Laois 110
Uprate	Great Island – Kilkenny 110 to 178 / 197 / 197 MVA
Uprate	In Maynooth station, uprate the Derryiron bay conductor, dropper, etc. To give Derryiron Maynooth uprate to 103 / 132 / 156 MVA Timahoe North new station will loop into this circuit.
Station	Knockraha station reconfiguration and short circuit mitigation
Station	Kilkenny busbar uprate
Special Protection Scheme	Bellacorick SPS

Table A-0-3 Additional Reinforcements for 2022

A.5 Reinforcements in Gen Shallow

Project Type	Project
	Included in "Generation Shallow"
New Build	North Connaught
New Build	New 110 kV station at Galway
Uprate	In Maynooth station, uprate the Derryiron bay conductor, dropper, etc. To give Derryiron Maynooth uprate to 103 / 132 / 156 MVA Timahoe North new station will loop into this circuit.
Uprate	Glenree Moy 110 to 178 / 197 / 197 MVA
Uprate	Binbane – Cathaleen's Fall 110 to 178 / 197 / 197 MVA
Uprate	Cashla Salthill 110 (overhead line portion) to 178 / 197 / 197 MVA Overload capability to 196 / 217 / 217 MVA

Table A-0-4 Additional Reinforcements for Gen Shallow

A.6 Reinforcements in Future Grid

Project Type	Project
	Included in Future Grid scenario in Addition to Gen Shallow
Demand	2022 Demand used for this study
DS3 Programme	Reserve provided from alternative sources (batteries, etc.)
DS3 Programme	SNSP 80%
DS3 Programme	Large Generator Must Run (4 in Ireland, 2 in Northern Ireland) Before this (5 in Ireland, 3 in Northern Ireland)
New Build	North-South 400 kV interconnector
New Build	Project 966 For this study, modelled as a Dunstown Woodland 400 kV circuit.
New Build	Srananagh T2101
Station	Sectionalise Knockranny 110 station
Interconnector	Celtic 700 MW to France
Interconnector	Moyle export capability of 500 MW
Interconnector	Greenlink 500 MW to Britain
Series Compensation	Dunstown Laois 400
Series Compensation	Moneypoint Laois 400
Series Compensation	Oldstreet Woodland 400
Uprate	Flagford Sligo 110 to 178 / 197 / 197 MVA
Uprate	Lanesboro – Sliabh Bawn 110 to 178 / 197 / 197 MVA
Uprate	Gorman Platin 110 to 178 / 197 / 197 MVA
Uprate	Lisheen Thurles 110 to 178 / 197 / 197 MVA
Uprate	Dunmanway Bandon 110 to 178 / 197 / 197 MVA
Uprate	Bandon Raffeen 110 to 178 / 197 / 197 MVA
Station	Bandon busbar uprate
Station	Maynooth station reconfiguration

Project Type	Project
Station	Letterkenny busbar uprate For Drumkeen Letterkenny, no change For Letterkenny – Golagh T uprate to 103/113/122
Station	Lanesboro busbar uprate
Reactive Support	Ballynahulla STATCOM
Reactive Support	Ballyvouskil STATCOM
Reactive Support	Knockanure reactor
Uprate	Arklow Ballybeg 110 to 178 / 197 / 197 MVA
Uprate	Ballybeg Carrickmines 110 to 178 / 197 / 197 MVA
Uprate	Aghada Knockraha 220 circuit 1 to 433/ 472 / 512 MVA
Uprate	Aghada Knockraha 220 circuit 2 to 433/ 472 / 512 MVA
Uprate	Gorman Maynooth 220 to 433/ 472 / 512 MVA
Uprate	Maynooth – Blake T to 134 / 148 / 159 MVA
Uprate	Maynooth Woodland 220 to 434 / 472 / 472 MVA
Uprate	Arva – Carrick on Shannon 110 to 178 / 197 / 197 MVA
Uprate	Lanesboro Mullingar 110 to 178 / 197 / 197 MVA
Uprate	Derryiron Maynooth 110 to 178 / 197 / 197 MVA

Table A-0-5 Additional Reinforcements for Future Grid scenario

There are projects beyond the time frame for this study that will reduce curtailment and constraints. The more significant of these projects are already being progressed (DS3 Programme, Celtic Interconnector, North South Interconnector, Series Compensation of 400 kV network, new Galway 110 kV station, North Connaught, etc.) and others are in preparation. Information about approved reinforcements is available on the EirGrid website.

For the Future Grid scenario, there are three types of project included for a future well beyond the timeframe of this report. These include DS3 projects, interconnection and transmission reinforcement.

SNSP, Conventional Must Run, Etc.

For this study, SNSP was increased to 80%, it is assumed that reserve was provided from alternative sources the number of must run large conventional units was reduced. These modelling assumptions go beyond the present programme for DS3.

Interconnection

There are three interconnector projects assumed. The first is that the export capacity of Moyle would increase to 500 MW. The second is an assumption of a Celtic interconnector to France and the third is the assumption of a Greenlink interconnector to Britain.

Transmission Reinforcement

There are twenty nine extra transmission reinforcements included in the Future Grid scenario compared with the 2022 Year. The study uses a mix of approved projects (albeit due beyond 2022) and a limited number of other projects which, from the constraint analysis only, appear to warrant inclusion.

As a simplification for the modelling in this scenario only, it is assumed that where a 110 kV circuit rating is the constraint, that the project to resolve it is to uprate the existing circuit. The uprate of a 110 kV circuit is frequently a major and expensive undertaking and these projects may not be implemented in this way. Customers should recognise that the reinforcements listed will be subject to a full economic analysis and optimisation process before a decision is made to proceed with them.

Also, this Future Grid scenario is not intended to be a plan to identify all the reinforcements necessary to solve all the transmission constraints in an area. Consequently, even with the reinforcements selected, there are still some new transmission constraints and these are visible in the findings.

A.7 Reinforcements in Industry

Project Type	Project
	Included in "Industry" scenario
	These are in addition to the reinforcements in 2022. A lot (but not all) the reinforcements from Gen Shallow and from Future Grid are included here. In addition, some reinforcements here are not in Gen Shallow or Future Grid.
Uprate	Arva - Carrick on Shannon 110 to 178 / 197 / 197 MVA
Uprate	Flagford Sligo 110 to 178 / 197 / 197 MVA
Uprate	Lanesboro - Sliabh Bawn 110 to 178 / 197 / 197 MVA
Uprate	Lanesboro Mullingar 110 to 178 / 197 / 197 MVA
Uprate	Glenree Moy 110 to 178 / 197 / 197 MVA
Uprate	Uprate the overhead line portion of Cashla Salthill 110 to give A line rating for Cashla Salthill of 97 / 97 / 97 MVA And a significant overload capability as per the cable overload capability
Uprate	Castlebar Cloon 110 to 178 / 197 / 197 MVA
Uprate	Castlebar Dalton 110 to 178 / 197 / 197 MVA
Uprate	Cashla Dalton 110 to 178 / 197 / 197 MVA
Uprate	Flagford - Sliabh Bawn 110 to 178 / 197 / 197 MVA
Uprate	Binbane – Cathaleen’s Fall 110 to 178 / 197 / 197 MVA
Uprate	Louth Ratrussan 110 to 178 / 197 / 197 MVA
New Build	New 110 kV station at Galway
New Build	Srananagh T2101
Station	Letterkenny busbar uprate For Drumkeen Letterkenny, no change For Letterkenny – Golagh T uprate to 103/113/122
Station	Lanesboro busbar uprate For Lanesboro Mullingar (see above) For Lanesboro – Sliabh Bawn (see above)
Station	Sectionalise Knockranny 110 station

Table A-0-6 Additional Reinforcements for Industry Scenario

A.8 Reinforcements in Industry Future Grid

Project Type	Project
	Included in "Industry Future Grid" scenario
	These are in addition to the reinforcements in "Future Grid".
Uprate	Castlebar Cloon 110 to 178 / 197 / 197 MVA
Uprate	Castlebar Dalton 110 to 178 / 197 / 197 MVA
Uprate	Cashla Dalton 110 to 178 / 197 / 197 MVA
Uprate	Flagford Sliabh Bawn 110 to 178 / 197 / 197 MVA
Uprate	Louth Ratrussan 110 to 178 / 197 / 197 MVA
New Build	Srananagh T2101

Table A-0-7 Additional Reinforcements for "Industry Future Grid" scenario

Appendix B Generator

Generator information is in this Appendix as follows.

- Overview by Type
- Generator Type by Node for All Offers
- Generator List by Name
- Generation Type by Node for each Study Scenario

B.1 Generator Type for each Generation Scenario

	Initial	north west	south	north east	33%	66%	All
battery		278	141	210	210	420	629
inertia				4	1	3	4
solar		322	1023	1049	798	1597	2395
new thermal	20	76	63	68	68	119	167
wave	10	10	15	10	12	14	15
wind	4212	4891	4805	4761	4820	5424	6035
Total	4242	5577	6047	6102	5909	7577	9245

B.2 Generator Type by Area for each Generation Scenario

	Initial	north west	south	north east	33%	66%	All
battery		278	141	210	210	419	629
B		15			5	10	15
C		263			88	175	263
E			46		15	31	46
G				143	48	95	143
H2			95		32	63	95
J				67	22	45	67
inertia				4	1	3	4
J				4	1	3	4
solar		322	1023	1049	798	1597	2395
A		40			13	26	40
B		67			22	44	67
C		215			71	142	215
D			24		8	16	24
E			221		74	147	221
F			24		8	16	24
G				290	96	192	290
H1			167		55	110	167
H2			399		133	266	399
I			66		22	44	66
J				759	250	506	759
K			122		40	80	122

	Initial	north west	south	north east	33%	66%	All
new thermal	20	76	63	68	68	119	167
B		51			17	34	51
C		5			2	3	5
E			2		1	1	2
F	16	16	18	16	16	18	18
G				20	7	13	20
H2			33		11	22	33
I			4		1	3	4
J	4	4	4	32	13	23	32
K			2		1	1	2
wave	10	10	15	10	12	14	15
B	10	10	10	10	10	10	10
D			5		2	4	5
wind	4212	4891	4805	4761	4820	5424	6035
A	638	882	638	638	718	799	882
B	616	992	616	616	743	869	994
C	91	150	91	91	111	130	150
D	262	262	309	262	278	293	309
E	1400	1400	1550	1400	1452	1500	1552
F	147	147	250	147	181	215	250
G	174	174	174	578	308	444	578
H1	441	441	680	441	520	599	680
H2	322	322	342	322	329	336	342
I	6	6	6	6	6	6	6
J	88	88	88	233	136	184	233
K	27	27	61	27	38	49	61

B.3 Generator Type by Node for All Offers

	battery	inertia	solar	Thermal new	wave	Wind	Total
A			40			882	922
Ardnagappary						18	18
Arigna						16	16
Binbane						81	81
Carrickaduff and Carrickalangan						138	138
Cathaleen's Fall						23	23
Corderry			40			63	103
Garvagh						82	82
Golagh						15	15
Gortawee						3	3
Lenalea						31	31
Letterkenny						90	90
Meentycat						85	85
Mulreavy						95	95
Sorne Hill						67	67
Tievebrack						30	30
Trillick						45	45
B	15	0	67	51	10	994	1137
Bellacorick	3				10	310	323
Castlebar						44	44
Cloon			24			4	28
Cunghill						35	35
Dalton	12		4			43	59
Firlough (was Carrowleagh-Kilbride)						48	48
Glenree						78	78
Knockranny						156	156
Moy			4			6	10
Salthill						44	44
Shantallow into Cashla Somerset T			35				35
Sligo						14	14
Tawnaghmore				49		30	79
Tonroe				2		12	14
Uggool						170	170
C	263		215	5		150	633
Athlone			12				12
Carrick on Shannon			8			4	12
Dallow			8			24	32
Lanesboro			4			10	14
Lumcloon	100					34	134
Mount Dillon into Lanesboro Sliabh Bawn			90				90
Mullingar			12				12

	battery	inertia	solar	Thermal new	wave	Wind	Total
Richmond			12	5			17
Shannonbridge			65				65
Shannonbridge 220	163						163
Sliabh Bawn						58	58
Somerset			4			20	24
D			24		5	309	338
Ardnacrusha			8			8	16
Booltiagh						140	140
Derrybrien						60	60
Drumline			12				12
Ennis			4				4
Slievecallan						71	71
Tullabrack					5	31	36
E	46		221	2		1552	1821
Athea						102	102
Aughinish			50				50
Boggeragh						169	169
Charleville			30	2		70	102
Clahane			34			52	86
Cloghboola						101	101
Coomagearlahy						81	81
Coomataggart						178	178
Cordal						148	148
Dromada						29	29
Drombeg loop into Kilpaddoge Tralee 2			50				50
Garrow						74	74
Glanlee						30	30
Glenlara			5			26	31
Glenlara_wind connected via Ballynahulla 220						41	41
Kilpaddoge	30					60	90
Knockacummer						100	100
Knockearagh			9			14	23
Limerick			4				4
Mallow			19				19
Moneypoint	8					17	25
Oughtragh			4			9	13
Rathkeale			4			32	36
Reamore	8					98	106
Tralee			8			48	56
Trien			4			27	31
Trien_wind connected via Knockanure 220						46	46

	battery	inertia	solar	Thermal new	wave	Wind	Total
F			24	18		250	292
Ballylickey						60	60
Bandon			20	17		13	50
Dunmanway						153	153
Macroom			4	1		24	29
G	143		290	20		578	1028
Baltrasna			20				20
Drybridge			19	3		6	28
Dundalk			4			34	35
Gaskinstown into Drybridge Hawkinstown			85				85
Gillinstown into Gorman Platin			95				95
Gorman	50					120	170
Hawkinstown into Baltrasna-Dry			50				50
Lisdrum	60					33	93
Meath Hill	33			4		69	106
Navan			13	13			26
Oriel						210	210
Ratrussan						79	79
Shankill			4			28	32
H1			167			680	847
Ahane			8				8
Ballydine			7				7
Barrymore			10			32	42
Cahir			36				36
Cauteen						182	182
Doon			8			17	25
Ikerrin			30			36	66
Kill Hill						36	36
Killonan						141	141
Lisheen						127	127
Mothel into Ballydine Cullenagh			60				60
Nenagh			4			62	66
Thurles						42	42
Tipperary			4			5	9
H2	95		399	33		342	869
Arklow			14			80	94
Ballybeg			8				8
Ballywater						42	42
Banoge	9		8				17
Bullockhill into Ballyragget-KK			50				50
Carlow			8			55	63
Castledockrell						41	41
Crane	16		13			7	36
Croy			16			60	76

	battery	inertia	solar	Thermal new	wave	Wind	Total
Great Island	30		17	33			80
Kilkenny	40		24				64
Rosspile into GI-Wex			95				95
Stratford			4				4
Tullabeg into Banoge Crane			50				50
Waterford			4			19	23
Wexford			88			39	127
I			65	4		6	75
Barnahely			5			5	10
Castleview				4			4
Coolroe			20				20
Cow Cross			5				5
Kilbarry			10				10
Midleton			17			2	19
Trabeg			9				9
J	67	4	759	32		233	1095
Athy	8		9				17
BLAKE			86				86
Blundelstown into Cdu-Mul			80				80
Clonfad into Kinn-Mul			100				100
College Park		4					4
Coolnabacky			55				55
Cushaling						100	100
Derryiron	20			18			38
Dunfirth			18				18
Finglas			20	4			24
Gallanstown Muckerstown into Corduff Platin			119				119
Glasmore			4				4
Grange Castle			16				16
Griffinrath			45				45
Harristown			42				42
Kilteel	30		15				45
Monread			8				8
Mount Lucas						79	79
Newbridge			16				16
Portlaoise			8			54	62
Stephenstown	9		5				14
Thornsberry			8	10			18
Timahoe North into Maynooth Derryiron			70				70
Treascon into Bracklone Portlaoise			40				40
K			122	2		61	185
Butlerstown			4	2		2	8
Dungarvan			23			5	28

	battery	inertia	solar	Thermal new	wave	Wind	Total
Rathnaskilloge into Cullenagh Dungarvan			95				95
Woodhouse						54	54

B.4 Generator Type by Node for each Generation Scenario

node	type	area	Gen Installed Scenarios						
			Initial	north west	south	north east	33%	66%	ALL offers
Ahane	solar	H1			8		3	5	8
Ardnacrusha	solar	D			8		3	5	8
Ardnacrusha	wind	D	8	8	8	8	8	8	8
Ardnagappary	wind	A	18	18	18	18	18	18	18
Arigna	wind	A	16	16	16	16	16	16	16
Arklow	solar	H2			14		5	9	14
Arklow	wind	H2	80	80	80	80	80	80	80
Athea	wind	E	34	34	102	34	57	79	102
Athlone	solar	C		12			4	8	12
Athy	battery	J				8	3	5	8
Athy	solar	J				9	3	6	9
Aughinish	solar	E			50		17	33	50
Ballybeg	solar	H2			8		3	5	8
Ballydine	solar	H1			7		2	5	7
Ballylickey	wind	F	60	60	60	60	60	60	60
Ballywater	wind	H2	42	42	42	42	42	42	42
Baltrasna	solar	G				20	7	13	20
Bandon	solar	F			20		7	13	20
Bandon	thermal	F	16	16	17	16	16	17	17
Bandon	wind	F	13	13	13	13	13	13	13
Banoge	battery	H2			9		3	6	9
Banoge	solar	H2			8		3	5	8
Barnahely	solar	I			5		2	3	5
Barnahely	wind	I	5	5	5	5	5	5	5
Barrymore	solar	H1			10		3	7	10
Barrymore	wind	H1	32	32	32	32	32	32	32
Bellacorick	battery	B		3			1	2	3
Bellacorick	wave	B	10	10	10	10	10	10	10
Bellacorick	wind	B	115	310	115	115	180	245	310
Binbane	wind	A	79	81	79	79	79	80	81
Blake	solar	J				86	29	56	86
Blundelstown into Cdu-Mul	solar	J				80	27	53	80
Boggeragh	wind	E	143	143	169	143	152	160	169
Booltiagh	wind	D	93	93	140	93	109	124	140
Bullockhill into Ballyragget-KK	solar	H2			50		17	33	50
Butlerstown	solar	K			4		1	3	4
Butlerstown	thermal	K			2		1	1	2
Butlerstown	wind	K	2	2	2	2	2	2	2
Cahir	solar	H1			36		12	24	36
Carlow	solar	H2			8		3	5	8
Carlow	wind	H2	35	35	55	35	42	48	55

node	type	area	Gen Installed Scenarios						
			Initial	north west	south	north east	33%	66%	ALL offers
Carrick on Shannon	solar	C		8			3	5	8
Carrick on Shannon	wind	C		4			1	3	4
Carrickaduff and Carrickalangan	wind	A		138			46	92	138
Castlebar	wind	B	44	44	44	44	44	44	44
Castledockrell	wind	H2	41	41	41	41	41	41	41
Castleview	thermal	I			4		1	3	4
Cathaleen's Fall	wind	A	23	23	23	23	23	23	23
Cauteen	wind	H1	178	178	182	178	179	181	182
Charleville	solar	E			30		10	20	30
Charleville	thermal	E			2		1	1	2
Charleville	wind	E	70	70	70	70	70	70	70
Clahane	solar	E			34		11	23	34
Clahane	wind	E	52	52	52	52	52	52	52
Cloghboola	wind	E	101	101	101	101	101	101	101
Clonfad into Kinn-Mul	solar	J				100	33	67	100
Cloon	solar	B		24			8	16	24
Cloon	wind	B	4	4	4	4	4	4	4
College Park	inertia	J				4	1	3	4
Coolnabacky	solar	J				55	18	37	55
Coolroe	solar	I			20		7	13	20
Coomagearlahy	wind	E	81	81	81	81	81	81	81
Coomataggart	wind	E	178	178	178	178	178	178	178
Cordal	wind	E	148	148	148	148	148	148	148
Corderry	solar	A		40			13	27	40
Corderry	wind	A	63	63	63	63	63	63	63
Cow Cross	solar	I			5		2	3	5
Crane	battery	H2			16		5	11	16
Crane	solar	H2			13		4	9	13
Crane	wind	H2	7	7	7	7	7	7	7
Crory	solar	H2			16		5	11	16
Crory	wind	H2	60	60	60	60	60	60	60
Cunghill	wind	B	35	35	35	35	35	35	35
Cushaling	wind	J				100	33	67	100
Dallow	solar	C		8			3	5	8
Dallow	wind	C	21	24	21	21	22	23	24
Dalton	battery	B		12			4	8	12
Dalton	solar	B		4			1	3	4
Dalton	wind	B	43	43	43	43	43	43	43
Derrybrien	wind	D	60	60	60	60	60	60	60
Derryiron	battery	J				20	7	13	20
Derryiron	thermal	J				18	6	12	18
Doon	solar	H1			8		3	5	8
Doon	wind	H1			17		6	11	17
Dromada	wind	E	29	29	29	29	29	29	29

node	type	area	Gen Installed Scenarios						
			Initial	north west	south	north east	33%	66%	ALL offers
Drombeg loop into Kilpaddoge Tralee 2	solar	E			50		17	33	50
Drumline	solar	D			12		4	8	12
Drybridge	solar	G				19	6	13	19
Drybridge	thermal	G				3	1	2	3
Drybridge	wind	G	6	6	6	6	6	6	6
Dundalk	solar	G				4	1	3	4
Dundalk	wind	G	16	16	16	34	22	28	34
Dunfirth	solar	J				18	6	12	18
Dungarvan	solar	K			23		8	15	23
Dungarvan	wind	K	5	5	5	5	5	5	5
Dunmanway	wind	F	50	50	153	50	84	119	153
Ennis	solar	D			4		1	3	4
Finglas	solar	J				20	7	13	20
Finglas	thermal	J	4	4	4	4	4	4	4
Firlough	wind	B		48			16	32	48
Gallanstown Muckerstown into Corduff Platin	solar	J				119	40	79	119
Garrow	wind	E	74	74	74	74	74	74	74
Garvagh	wind	A	82	82	82	82	82	82	82
Gaskinstown into Drybridge Hawkinstown	solar	G				85	28	57	85
Gillinstown into Gorman Platin	solar	G				95	32	63	95
Glanlee	wind	E	30	30	30	30	30	30	30
Glasmore	solar	J				4	1	3	4
Glenlara	solar	E			5		2	3	5
Glenlara	wind	E	26	26	26	26	26	26	26
Glenlara_wind	wind	E	27	27	41	27	32	36	41
Glenree	wind	B	65	78	65	65	69	74	78
Golagh	wind	A	15	15	15	15	15	15	15
Gorman	battery	G				50	17	33	50
Gorman	wind	G				120	40	80	120
Gortawee	wind	A	3	3	3	3	3	3	3
Grange Castle	solar	J				16	5	11	16
Great Island	battery	H2			30		10	20	30
Great Island	solar	H2			17		6	11	17
Great Island	thermal	H2			33		11	22	33
Griffinrath	solar	J				45	15	30	45
Harristown	solar	J				42	14	28	42
Hawkinstown into Baltrasna-Dry	solar	G				50	17	33	50
Ikerrin	solar	H1			30		10	20	30
Ikerrin	wind	H1	36	36	36	36	36	36	36
Kilbarry	solar	I			10		3	7	10

node	type	area	Gen Installed Scenarios						
			Initial	north west	south	north east	33%	66%	ALL offers
Kilkenny	battery	H2			40		13	27	40
Kilkenny	solar	H2			24		8	16	24
Kill Hill	wind	H1	36	36	36	36	36	36	36
Killonan	wind	H1			141		47	94	141
Kilpaddoge	battery	E			30		10	20	30
Kilpaddoge	wind	E	60	60	60	60	60	60	60
Kilteel	battery	J				30	10	20	30
Kilteel	solar	J				15	5	10	15
Knockacummer	wind	E	100	100	100	100	100	100	100
Knockearagh	solar	E			9		3	6	9
Knockearagh	wind	E	14	14	14	14	14	14	14
Knockranny	wind	B	37	156	37	37	76	116	156
Lanesboro	solar	C		4			1	3	4
Lanesboro	wind	C	5	10	5	5	7	8	10
Lenalea	wind	A		31			10	20	31
Letterkenny	wind	A	52	90	52	52	65	77	90
Limerick	solar	E			4		1	3	4
Lisdrum	battery	G				60	20	40	60
Lisdrum	wind	G				33	11	22	33
Lisheen	wind	H1	99	99	127	99	108	118	127
Lumcloon	battery	C		100			33	67	100
Lumcloon	wind	C		34			11	23	34
Macroon	solar	F			4		1	3	4
Macroon	thermal	F			1		0	1	1
Macroon	wind	F	24	24	24	24	24	24	24
Mallow	solar	E			19		6	13	19
Meath Hill	battery	G				33	11	22	33
Meath Hill	thermal	G				4	1	3	4
Meath Hill	wind	G	46	46	46	69	54	61	69
Meentycat	wind	A	85	85	85	85	85	85	85
Midleton	solar	I			17		6	12	17
Midleton	wind	I	2	2	2	2	2	2	2
Moneypoint	battery	E			8		3	5	8
Moneypoint	wind	E	17	17	17	17	17	17	17
Monread	solar	J				8	3	5	8
Mothel into Ballydine Cullenagh	solar	H1			60		20	40	60
Mount Dillon into Lanesboro Sliabh Bawn	solar	C	0	90	0	0	30	60	90
Mount Lucas	wind	J	79	79	79	79	79	79	79
Moy	solar	B		4			1	3	4
Moy	wind	B	6	6	6	6	6	6	6
Mullingar	solar	C		12			4	8	12
Mulreavy	wind	A	95	95	95	95	95	95	95
Navan	solar	G				13	4	9	13
Navan	thermal	G				13	4	9	13

node	type	area	Gen Installed Scenarios						
			Initial	north west	south	north east	33%	66%	ALL offers
Nenagh	solar	H1			4		1	3	4
Nenagh	wind	H1	14	14	62	14	30	46	62
Newbridge	solar	J				16	5	11	16
Oriel	wind	G				210	70	140	210
Oughtragh	solar	E			4		1	3	4
Oughtragh	wind	E	9	9	9	9	9	9	9
Portlaoise	solar	J				8	3	5	8
Portlaoise	wind	J	9	9	9	54	24	39	54
Rathkeale	solar	E			4		1	3	4
Rathkeale	wind	E	32	32	32	32	32	32	32
Rathnaskilloge into Cullenagh Dungarvan	solar	K			95		32	63	95
Ratrussan	wind	G	79	79	79	79	79	79	79
Reamore	battery	E			8		3	5	8
Reamore	wind	E	60	60	98	60	73	85	98
Richmond	solar	C		12			4	8	12
Richmond	thermal	C		5			2	3	5
Rosspile into GI-Wex	solar	H2			95		32	63	95
Salthill	wind	B	44	44	44	44	44	44	44
Shankill	solar	G				4	1	3	4
Shankill	wind	G	28	28	28	28	28	28	28
Shannonbridge	solar	C		65			22	43	65
Shannonbridge 220	battery	C		163			54	109	163
Shantallow into Cashla Somerset T	solar	B		35			12	23	35
Sliabh Bawn	wind	C	58	58	58	58	58	58	58
Slievecallan	wind	D	71	71	71	71	71	71	71
Sligo	wind	B	14	14	14	14	14	14	14
Somerset	solar	C		4			1	3	4
Somerset	wind	C	8	20	8	8	12	16	20
Sorne Hill	wind	A	62	67	62	62	64	65	67
Stephenstown	battery	J				9	3	6	9
Stephenstown	solar	J				5	2	3	5
Stratford	solar	H2			4		1	3	4
Tawnaghmore	thermal	B		49			16	33	49
Tawnaghmore	wind	B	30	30	30	30	30	30	30
Thornsberry	solar	J				8	3	5	8
Thornsberry	thermal	J				10	3	7	10
Thurles	wind	H1	42	42	42	42	42	42	42
Tievebrack	wind	A		30			10	20	30
Timahoe North into Maynooth Derryiron	solar	J				70	23	47	70
Tipperary	solar	H1			4		1	3	4

node	type	area	Gen Installed Scenarios						
			Initial	north west	south	north east	33%	66%	ALL offers
Tipperary	wind	H1	5	5	5	5	5	5	5
Tonroe	thermal	B		2			1	1	2
Tonroe	wind	B	12	12	12	12	12	12	12
Trabeg	solar	I			9		3	6	9
Tralee	solar	E			8		3	5	8
Tralee	wind	E	48	48	48	48	48	48	48
Treascon into Bracklone Portlaoise	solar	J				40	13	27	40
Trien	solar	E			4		1	3	4
Trien	wind	E	27	27	27	27	27	27	27
Trien_wind	wind	E	40	40	46	40	42	44	46
Trillick	wind	A	45	45	45	45	45	45	45
Tullabeg into Banoge Crane	solar	H2			50		17	33	50
Tullabrack	wave	D			5		2	3	5
Tullabrack	wind	D	31	31	31	31	31	31	31
Uggool	wind	B	169	169	169	169	169	169	169
Waterford	solar	H2			4		1	3	4
Waterford	wind	H2	19	19	19	19	19	19	19
Wexford	solar	H2			88		29	59	88
Wexford	wind	H2	39	39	39	39	39	39	39
Woodhouse	wind	K	20	20	54	20	31	43	54

B.5 Generator List by Name

Area	Node	Type	Name	SO	Status	MEC
H1	Ahane	solar	Clyduff Solar Park	DSO	offer	4
H1	Ahane	solar	Laghtane Solar Farm	DSO	offer	4
D	Ardnacrusha	solar	Ballymorris Solar Park	DSO	offer	4
D	Ardnacrusha	solar	Clooncarhy Solar Farm	DSO	offer	4
D	Ardnacrusha	wind	Knockastanna (1)	DSO	connected	7.5
A	Ardnagappary	wind	Cronalaght (2)	DSO	offer	17.96
A	Arigna	wind	Corrie Mountain (1)	DSO	connected	4.8
A	Arigna	wind	Kilronan (1)	DSO	connected	5
A	Arigna	wind	Seltanaveeny (1)	DSO	connected	4.6
A	Arigna	wind	Spion Kop (1)	DSO	connected	1.2
H2	Arklow	solar	Templeraíne East Solar Farm	DSO	ECP	4
H2	Arklow	solar	Tiglin Solar	DSO	ECP	4
H2	Arklow	wind	Arklow Bank (1)	DSO	connected	25.2
H2	Arklow	wind	Ballycumber (1)	DSO	offer	18
H2	Arklow	solar	Knockadosan Solar (formerly Springfarm Wind Farm)	DSO	offer	6
H2	Arklow	wind	Raheenleagh (1)	DSO	connected	36.5
E	Athea	wind	Athea (1)a	TSO	connected	34.35
E	Athea	wind	Beenanaspock and Tobertooreen Wind Farm	TSO	offer	34.15
E	Athea	wind	Knockathea	DSO	offer	33.9
C	Athlone	solar	Ballinamudda Solar Farm	DSO	offer	4
C	Athlone	solar	Rooaun Solar Farm	DSO	ECP	4
C	Athlone	solar	Shannagh Beg Solar Farm	DSO	offer	4
J	Athy	battery	Moatstown Battery Energy Storage	DSO	ECP	8
J	Athy	solar	Moatstown Solar	DSO	offer	4
J	Athy	solar	Woodstock North Solar Farm	DSO	offer	4.99
E	Aughinish	solar	Ballinknockane Solar Farm	TSO	offer	50
H2	Ballybeg	solar	Ballymerrigan PV	DSO	offer	4
H2	Ballybeg	solar	Millvale PV	DSO	offer	4
H1	Ballydine	solar	Ballyrichard Solar Park	DSO	offer	3
H1	Ballydine	solar	Carrick Solar	DSO	offer	4
F	Ballylickey	wind	Ballybane (2a)	DSO	connected	11.5
F	Ballylickey	wind	Ballybane (Glanta Commons) Wind Farm	DSO	connected	19.55
F	Ballylickey	wind	Ballybane 2 (Glanta Commons) Wind Farm	DSO	connected	8.4
F	Ballylickey	wind	Ballybane 2A (Glanta Commons) Wind Farm Extension	DSO	connected	1.55
F	Ballylickey	wind	Ballybane 3 (Glanta Commons) Wind Farm	DSO	connected	4.45
F	Ballylickey	wind	Derreenacrinnig West (prev Kilvinane 2 WF)	DSO	offer	5.82
F	Ballylickey	wind	Kealkil (Curraglass) (1)	DSO	connected	8.5
H2	Ballywater	wind	Ballywater (1)	TSO	connected	31.5
H2	Ballywater	wind	Ballywater (2)	TSO	connected	10.5

Area	Node	Type	Name	SO	Status	MEC
G	Baltrasna	solar	Hilltown PV	DSO	offer	10
G	Baltrasna	solar	Painestown Hill Solar Farm	DSO	offer	9.99
F	Bandon	solar	Callatrim South Solar PV Farm	DSO	ECP	5.95
F	Bandon	solar	Currabea	DSO	ECP	4.95
F	Bandon	solar	Enniskeane PV	DSO	ECP	3.99
F	Bandon	solar	Garryndruig	DSO	ECP	4.95
F	Bandon	thermal	GP Wood CHP	DSO	offer	16.3
F	Bandon	thermal	Timoleague Agri Gen	DSO	offer	1.1
F	Bandon	wind	Garranereagh (1)	DSO	connected	8.75
F	Bandon	wind	Kilvinane (1)	DSO	connected	4.5
H2	Banoge	battery	Gorey Battery Energy Storage	DSO	ECP	9
H2	Banoge	solar	Courtown Solar Farm (previously Coolnastudd)	DSO	offer	4
H2	Banoge	solar	Gorey Solar	DSO	ECP	4
I	Barnahely	solar	Leacht Cross Solar	DSO	offer	4.95
I	Barnahely	wind	DePuy	DSO	connected	2.5
I	Barnahely	wind	Wind Energy Project (Janssen)	DSO	connected	2
H1	Barrymore	solar	Farran South	DSO	ECP	9.9
H1	Barrymore	wind	Barranafaddock (1)	DSO	connected	32.4
B	Bellacorick	battery	Shranakilla Energy Park	DSO	ECP	3
B	Bellacorick	wave	AMETS Belmullet (1)	DSO	offer	10
B	Bellacorick	wind	Bellacorick (1)	DSO	connected	6.45
B	Bellacorick	wind	Bunaveala (Keenagh) (1)	DSO	offer	9.2
B	Bellacorick	wind	Bunnahowen (1)	DSO	offer	2.55
B	Bellacorick	wind	Dooleeg More (1)	DSO	ECP	2.5
B	Bellacorick	wind	Corvoderry (was Gortnahurra (1))	DSO	offer	33.9
B	Bellacorick	wind	Oweninny (5)**	TSO	offer	50
B	Bellacorick	wind	Oweninny Power (1)	TSO	offer	89
B	Bellacorick	wind	Oweninny Power (2)	TSO	offer	83
B	Bellacorick	wind	Sheskin Windfarm (formerly Ederglen Windfarm)	DSO	offer	16.8
B	Bellacorick	wind	Tawnaghmore 1 2 and 3 Merge	DSO	offer	16.1
A	Binbane	wind	Clogheravaddy (1)	DSO	offer	20
A	Binbane	wind	Corkermore (1)	DSO	connected	9.99
A	Binbane	wind	Corkermore (2)	DSO	offer	9.4
A	Binbane	wind	Killin Hill (1)	DSO	connected	6
A	Binbane	wind	Killybegs (1)	DSO	connected	2.55
A	Binbane	wind	Loughderryduff (1)	DSO	connected	7.65
A	Binbane	wind	Maas Wind Farm (Loughderryduff 2)	DSO	offer	9.35
A	Binbane	wind	Meenachullalan (1)	DSO	connected	11.9
A	Binbane	wind	Meenachullalan (2)	DSO	offer	1.9
A	Binbane	wind	Shannagh (1) previously Kilcar	DSO	connected	2.55
J	Blake	solar	Timahoe South	TSO	ECP	81
J	Blake	Solar	Kishavanna	DSO	ECP	5
J	Blundelstown into Cdu-Mul	solar	Blundlestown	TSO	offer	80
E	Boggeragh	wind	Boggeragh (1)	TSO	connected	57

Area	Node	Type	Name	SO	Status	MEC
E	Boggeragh	wind	Boggeragh 2	TSO	connected	47.7
E	Boggeragh	wind	Boggeragh 2 (Killavoy (1))	TSO	connected	18
E	Boggeragh	wind	Carriggannon (1)	DSO	connected	20
E	Boggeragh	wind	Carriggannon (2)	DSO	ECP	3
E	Boggeragh	wind	Esk (1)	DSO	offer	5.4
E	Boggeragh	wind	Esk Wind Farm (sub metered Gneeves 2 Merge)	DSO	offer	5.4
E	Boggeragh	wind	ESK Wind Farm Phase 2	DSO	ECP	12
D	Booltiagh	wind	Booltiagh (1)	TSO	connected	19.45
D	Booltiagh	wind	Booltiagh (2)	TSO	connected	3
D	Booltiagh	wind	Booltiagh (3)	TSO	connected	9
D	Booltiagh	wind	Boolynagleragh (1)	DSO	offer	36.98
D	Booltiagh	wind	Cahermurphy (1)	DSO	offer	6
D	Booltiagh	wind	Crossmore (1)	DSO	ECP	15
D	Booltiagh	wind	Glenmore (1)	DSO	offer	24
D	Booltiagh	wind	Kiltumper	DSO	offer	4.99
D	Booltiagh	wind	Lissycasey (1)	DSO	offer	13.399
D	Booltiagh	wind	Sorrell Island (Glenmore) Wind Farm Extension	DSO	ECP	8
H2	Bullockhill into Ballyragget-KK	solar	Bullockhill Solar Park	TSO	ECP	50
K	Butlerstown	solar	Coolnagapogue Solar Farm Phase 1	DSO	ECP	3.95
K	Butlerstown	thermal	Ormonde Organics	DSO	ECP	1.9
K	Butlerstown	wind	Beallough (1)	DSO	connected	1.7
H1	Cahir	solar	Ballyfowloo Solar Farm	DSO	ECP	4
H1	Cahir	solar	Ballymacadam Solar	DSO	ECP	24
H1	Cahir	solar	Clonmel Road Solar	DSO	offer	4
H1	Cahir	solar	Lawclon Solar Farm	DSO	ECP	4
H2	Carlow	solar	Kilcarrig Solar PV Farm	DSO	ECP	4
H2	Carlow	solar	Loan PV	DSO	ECP	3.99
H2	Carlow	wind	Ballyshonog (1)	DSO	offer	5
H2	Carlow	wind	Bilboa (1)	DSO	ECP	15
H2	Carlow	wind	Cronelea (1)	DSO	connected	4.99
H2	Carlow	wind	Cronelea (2)	DSO	connected	4.5
H2	Carlow	wind	Cronelea Upper (1)	DSO	connected	2.55
H2	Carlow	wind	Cronelea Upper (2)	DSO	connected	1.7
H2	Carlow	wind	Gortahile (1)	DSO	connected	21
C	Carrick on Shannon	solar	Lisdadnan Solar Farm	DSO	offer	4
C	Carrick on Shannon	solar	Rathleg Solar Farm	DSO	offer	4
C	Carrick on Shannon	wind	Derryknockeran (1)	DSO	offer	4.25
A	Carrickaduff and Carrickalangan	wind	Carrickaduff Wind Farm (1)	TSO	offer	33
A	Carrickaduff and Carrickalangan	wind	Carrickaduff Wind Farm (2)	TSO	offer	33.1
A	Carrickaduff and Carrickalangan	wind	Croaghonagh 1	TSO	ECP	72

Area	Node	Type	Name	SO	Status	MEC
B	Castlebar	wind	Cuillalea (1)	DSO	connected	3.4
B	Castlebar	wind	Cuillalea (2)	DSO	connected	1.59
B	Castlebar	wind	Lenanavea (2) - Lenanavea Burren	DSO	connected	4.65
B	Castlebar	wind	Raheen Barr (1)	DSO	connected	18.7
B	Castlebar	wind	Raheen Barr (2)	DSO	connected	8.5
B	Castlebar	wind	Raheen barr Extension (formally Lenanavea (3))	DSO	offer	6.8
H2	Castledockrell	wind	Castledockrell (1)	TSO	connected	20
H2	Castledockrell	wind	Castledockrell (2)	TSO	connected	2
H2	Castledockrell	wind	Castledockrell (3)	TSO	connected	3.3
H2	Castledockrell	wind	Castledockrell (4)	TSO	connected	16.1
I	Castleview	thermal	Hoffman Renewable Bioenery Plant	DSO	offer	4
A	Cathaleen's Fall	wind	Anarget (1)	DSO	connected	1.98
A	Cathaleen's Fall	wind	Meenadreen (1)	DSO	connected	3.4
A	Cathaleen's Fall	wind	Spaddan (1)	DSO	connected	17.5
H1	Cauteen	wind	Cappagh White (1)	DSO	connected	13.2
H1	Cauteen	wind	Cappagh White 2 & 3 & 4 Merge	DSO	connected	49.08
H1	Cauteen	wind	Cappawhite A (merger of Cappagh White 3, 2 & 4)	DSO	connected	2.92
H1	Cauteen	wind	Garracummer (1)	DSO	connected	36.9
H1	Cauteen	wind	Garracummer (2)	DSO	connected	1
H1	Cauteen	wind	Glencarbry (1)	DSO	connected	33
H1	Cauteen	wind	Glenough (1)	DSO	connected	33
H1	Cauteen	wind	Holyford (1)	DSO	connected	9
H1	Cauteen	wind	Ring Hill Wind Farm	DSO	offer	4
E	Charleville	solar	Fiddane Solar	DSO	offer	29.9
E	Charleville	thermal	Evaporator Upgrade	DSO	offer	1.5
E	Charleville	wind	Boolard Wind Farm (Charleville)	DSO	offer	4.45
E	Charleville	wind	Castlepook (1)	DSO	connected	33.1
E	Charleville	wind	Kilbereherth (1)	DSO	connected	4.799
E	Charleville	wind	Kilmeedy (1)	DSO	connected	4.7
E	Charleville	wind	Knocknatallig	DSO	connected	18.3
E	Charleville	wind	Rathnacally (1)	DSO	connected	4.45
E	Clahane	solar	Banemore Solar Farm	TSO	offer	34
E	Clahane	wind	Clahane (1)	TSO	connected	37.8
E	Clahane	wind	Clahane (2)	TSO	connected	13.8
E	Cloghboola	wind	Cloghanaleskirt (1)	DSO	connected	12.55
E	Cloghboola	wind	Glanaruddery 1 (formerly Dromadda More Wind Farm)	DSO	connected	20
E	Cloghboola	wind	Glanaruddery 2 (formerly Dromadda More 2)	DSO	connected	12
E	Cloghboola	wind	Glantaunyalkeen Windfarm(Cloghboola (2) Ext)	DSO	offer	10
E	Cloghboola	wind	Knocknagashel Wind (Cloghboola (1))	TSO	connected	46
J	Clonfad into Kinn-Mul	solar	Clonfad Solar	TSO	ECP	100
B	Cloon	solar	Barnderg Solar Farm	DSO	offer	4

Area	Node	Type	Name	SO	Status	MEC
B	Cloon	solar	Cloonascragh Solar	DSO	ECP	20
B	Cloon	wind	Cloonlusk (1)	DSO	connected	4.25
J	College Park	inertia	Data Electronics Services Ltd	DSO	offer	4
J	Coolnabacky	solar	Loughteague	TSO	offer	55
I	Coolroe	solar	Carrigyknaveen Solar Park	DSO	offer	10
I	Coolroe	solar	Garravagh 1 Solar Park	DSO	offer	10
E	Coomagearlahy	wind	Coomagearlahy (1)	TSO	connected	42.5
E	Coomagearlahy	wind	Coomagearlahy (2)	TSO	connected	8.5
E	Coomagearlahy	wind	Coomagearlahy (3)	TSO	connected	30
E	Coomataggart	wind	Cleanrath (1)	DSO	offer	42.64
E	Coomataggart	wind	Grousemount WF	TSO	offer	114.2
E	Coomataggart	wind	Lettercannon (1)	DSO	offer	21.6
E	Cordal	wind	Coollegrean (1)	DSO	connected	18.5
E	Cordal	wind	Cordal (1)	TSO	connected	35.85
E	Cordal	wind	Cordal (2)	TSO	connected	54
E	Cordal	wind	Scartaglen (1)	DSO	connected	35.45
E	Cordal	wind	Scartaglen (2)	DSO	connected	3.8
A	Corderry	solar	Glen Solar	TSO	ECP	40
A	Corderry	wind	Altagowlan (1)	DSO	connected	7.65
A	Corderry	wind	Black Banks (1)	DSO	connected	3.4
A	Corderry	wind	Black Banks (2)	DSO	connected	6.8
A	Corderry	wind	Carrane Hill (1)	DSO	connected	3.4
A	Corderry	wind	Carrane Hill (2)	DSO	connected	1.598
A	Corderry	wind	Geevagh (1)	DSO	connected	4.95
A	Corderry	wind	Moneenatieve (1)	DSO	connected	3.96
A	Corderry	wind	Tullynamoyle (1)	DSO	connected	9
A	Corderry	wind	Tullynamoyle 2 Wind Farm	DSO	connected	10.225
A	Corderry	wind	Tullynamoyle 3	DSO	connected	11.98
I	Cow Cross	solar	Ballynacrusha	DSO	ECP	4.95
H2	Crane	battery	Avonbeg BESS	DSO	ECP	16
H2	Crane	solar	Cherryorchard Solar Farm	DSO	ECP	4
H2	Crane	solar	Macallian Solar	DSO	ECP	9
H2	Crane	wind	Greenoge (1)	DSO	connected	4.99
H2	Crane	wind	Kilbranish (1)	DSO	offer	2.5
H2	Crory	solar	Ballycarney PV	DSO	ECP	3.99
H2	Crory	solar	Ballylough	DSO	ECP	3.999
H2	Crory	solar	Ballymacsimon Solar Farm	DSO	offer	3.99
H2	Crory	wind	Ballaman formerly (Kennystown) (1)	DSO	connected	3.6
H2	Crory	wind	Ballycadden (1)	DSO	connected	14.45
H2	Crory	wind	Ballycadden (2)	DSO	connected	9.762
H2	Crory	wind	Ballyduff (1)	DSO	connected	4
H2	Crory	wind	Ballynancoran (1)	DSO	connected	4
H2	Crory	wind	Gibbet Hill (1)	DSO	connected	14.8
H2	Crory	wind	Knocknalour (1)	DSO	connected	5
H2	Crory	wind	Knocknalour (2)	DSO	connected	3.95
H2	Crory	solar	The Dell Solar Farm	DSO	ECP	3.99

Area	Node	Type	Name	SO	Status	MEC
B	Cunghill	wind	Kingsmountain (1)	TSO	connected	23.75
B	Cunghill	wind	Kingsmountain (2)	TSO	connected	11.05
J	Cushaling	wind	Cloncreen Wind farm	TSO	ECP	100
C	Dallow	solar	Clonoghil Solar Farm	DSO	offer	4
C	Dallow	solar	Lacka Solar Park	DSO	ECP	3.99
C	Dallow	wind	Carrig (1)	DSO	connected	2.55
C	Dallow	wind	Leabeg (1)	DSO	connected	4.25
C	Dallow	wind	Meenwaun WF	DSO	connected	9.99
C	Dallow	wind	Meenwaun Windfarm Ext.	DSO	ECP	3.3
C	Dallow	wind	Skehanagh (1)	DSO	connected	4.25
B	Dalton	battery	MCB Battery Storage	DSO	ECP	12
B	Dalton	solar	Lisduff Solar Park (Claremorris)	DSO	offer	4
B	Dalton	wind	Mace Upper (1)	DSO	connected	2.55
B	Dalton	wind	Magheramore (1)	DSO	connected	40.8
D	Derrybrien	wind	Derrybrien (1)	TSO	connected	59.5
J	Derryiron	battery	Rhode 20 MW ESS	TSO	ECP	20
J	Derryiron	thermal	Rhode Biomass Extension	DSO	offer	1.74
J	Derryiron	thermal	Rhode Biomass Plant (1)	DSO	offer	14.56
J	Derryiron	thermal	Rhode Biomass Plant (2nd Ext of DG793)	DSO	offer	1.2
H1	Doon	solar	Horsepasture Solar Farm (Grian PV)	DSO	ECP	8
H1	Doon	wind	Boolabrien Upper (1)	DSO	offer	17
E	Dromada	wind	Dromada (1)	TSO	connected	28.5
E	Drombeg loop into Kilpaddoge Tralee 2	solar	Drombeg Solar Park	TSO	offer	50
D	Drumline	solar	Clonloghan 2 Solar Park	DSO	offer	4
D	Drumline	solar	Clonloghan Solar Park	DSO	offer	4
D	Drumline	solar	Firgrove Solar Park	DSO	ECP	4
G	Drybridge	solar	Cluide Solar	DSO	ECP	4
G	Drybridge	solar	Balgeen Solar formerly Dardistown	DSO	ECP	3.5
G	Drybridge	solar	Grangegeeth Solar	DSO	offer	4
G	Drybridge	solar	Newtown PV	DSO	offer	3.99
G	Drybridge	solar	Stamullen Solar Park	DSO	ECP	3.99
G	Drybridge	thermal	Rathdrinagh Biogas	DSO	offer	3
G	Drybridge	wind	Collon Wind Power	DSO	connected	2.3
G	Drybridge	wind	Dunmore (1)	DSO	connected	1.7
G	Drybridge	wind	Dunmore (2)	DSO	connected	1.8
G	Dundalk	solar	Willville Solar Park	DSO	ECP	3.99
G	Dundalk	wind	Old Mill was Grove Hill (1) formerly Tullynageer	DSO	connected	16.1
G	Dundalk	wind	Old Mill extension	DSO	ECP	3
G	Dundalk	wind	Slievenaglogh (1)	DSO	offer	15
J	Dunfirth	solar	Hortland PV	DSO	offer	4
J	Dunfirth	solar	Knockanally Solar Park	DSO	offer	10
J	Dunfirth	solar	Ovidstown Solar	DSO	offer	4
K	Dungarvan	solar	Clashnagoneen Solar Farm	DSO	ECP	4
K	Dungarvan	solar	Drumroe East Solar Farm	DSO	ECP	15

Area	Node	Type	Name	SO	Status	MEC
K	Dungarvan	solar	Foxhall PV	DSO	ECP	3.99
K	Dungarvan	wind	Ballycurreen (1)	DSO	connected	4.99
F	Dunmanway	wind	Carrigdangan (formerly Barnadivine)	TSO	offer	60
F	Dunmanway	wind	Carrigdangan Wind Farm Ext.	TSO	ECP	7.95
F	Dunmanway	wind	Coomatallin (1)	DSO	connected	5.95
F	Dunmanway	wind	Coomatallin (2)	DSO	offer	3.05
F	Dunmanway	wind	Coomleagh (1)	DSO	offer	5.95
F	Dunmanway	wind	Coomleagh Wind Farm (extension)	DSO	offer	2
F	Dunmanway	wind	Currabwee (1)	DSO	connected	4.62
F	Dunmanway	wind	Derryvacorneen (1)	DSO	connected	17
F	Dunmanway	wind	Dromleena (1)	DSO	ECP	9.9
F	Dunmanway	wind	Killaveenoge (formerly Barrboy (1))	DSO	connected	7.8
F	Dunmanway	wind	Knockeenbui Wind Farm	DSO	ECP	13.8
F	Dunmanway	wind	Lahanaght Hill (1)	DSO	connected	4.25
F	Dunmanway	wind	Milane Hill (1)	DSO	connected	5.94
F	Dunmanway	wind	Reenascreena (1)	DSO	connected	4.5
D	Ennis	solar	Spencil Hill Solar Farm	DSO	offer	4
J	Finglas	solar	Bullstown Solar Extension	DSO	offer	3.96
J	Finglas	solar	Bullstown Solar Farm	DSO	offer	3.96
J	Finglas	solar	Darthogue Solar	DSO	ECP	12
J	Finglas	thermal	Huntstown Renewable Bioenergy Plant	DSO	offer	4
B	Firlough	wind	Firlough (was Carrowleagh Kilbride)	DSO	ECP	48.3
J	Gallanstown Muckerstown into Corduff Platin	solar	Gallanstown Solar	TSO	offer	85
J	Gallanstown Muckerstown into Corduff Platin	solar	Muckerstown Solar Park	TSO	offer	34
E	Garrow	wind	Caherdowney (1)	DSO	connected	10
E	Garrow	wind	Clydaghroe (1)	DSO	connected	4.99
E	Garrow	wind	Coomacheo (1)	TSO	connected	41.225
E	Garrow	wind	Coomacheo (2)	TSO	connected	18
A	Garvagh	wind	Derrysallagh Wind Farm (Formerly Kilronan 2)	DSO	offer	34
A	Garvagh	wind	Garvagh - Glebe (1a)	TSO	connected	26
A	Garvagh	wind	Garvagh - Tullynahaw (1c)	TSO	connected	22
G	Gastkinstown into Gorman Platin	solar	Gaskinstown Solar Farm	TSO	ECP	85
G	Gillinstown into Gorman Platin	solar	Gillinstown Solar	TSO	ECP	95
E	Glanlee	wind	Glanlee (1)	TSO	connected	29.8
J	Glasmore	solar	Featherbed Lane Solar	DSO	offer	4
E	Glenlara	solar	Dromalour	DSO	offer	4.95
E	Glenlara	wind	Taurbeg (1)	DSO	connected	26

Area	Node	Type	Name	SO	Status	MEC
E	Glenlara_wind	wind	Dromdeeveen (1)	DSO	connected	10.5
E	Glenlara_wind	wind	Dromdeeveen (2)	DSO	connected	16.5
E	Glenlara_wind	wind	Mauricetown (Glenduff) Wind Farm	DSO	offer	13.8
B	Glenree	wind	Black Lough (1)	DSO	ECP	12.5
B	Glenree	wind	Bunnyconnellan (1)	DSO	offer	28
B	Glenree	wind	Carrowleagh (1)	DSO	connected	34.15
B	Glenree	wind	Carrowleagh (2)	DSO	offer	2.65
A	Golagh	wind	Golagh (1)	TSO	connected	15
G	Gorman	battery	Gorman (Graigs) Energy Storage Station	TSO	ECP	30
G	Gorman	battery	Gorman Energy Storage Station - Extension	TSO	ECP	20
G	Gorman	wind	Castletownmoor	TSO	offer	120
A	Gortawee	wind	Coreen (1)	DSO	connected	3
J	Grange Castle	solar	Furryhill Solar	DSO	ECP	16
H2	Great Island	battery	Kilmannock Battery Storage Facility	TSO	ECP	30
H2	Great Island	solar	Ballycullane Solar Park	DSO	offer	4.99
H2	Great Island	solar	Ballygowny Solar Farm	DSO	ECP	12
H2	Great Island	Thermal	Great Island CCGT in ECP-1	TSO	ECP	33
J	Griffinrath	solar	Confey Solar Park	DSO	ECP	9.5
J	Griffinrath	solar	Dollanstown Stud Solar Farm	DSO	offer	4
J	Griffinrath	solar	Taghadoe Solar Farm	DSO	offer	25
J	Griffinrath	solar	Tower Hill Solar Farm	DSO	ECP	6
G	Hawkinstown into Baltrasna-Dry	solar	Hawkinstown Solar Park re-submission	TSO	offer	50
H1	Ikerrin	solar	Doonane Solar	DSO	offer	29.9
H1	Ikerrin	wind	Monaincha Bog (1)	DSO	connected	35.95
I	Kilbarry	solar	Coolyduff	DSO	offer	4.95
I	Kilbarry	solar	Drumgarriff South	DSO	offer	4.95
H2	Kilkenny	battery	Nore Power G&S	TSO	ECP	40
H2	Kilkenny	solar	Ballytobin Solar PV	DSO	offer	4
H2	Kilkenny	solar	Castlekelly Solar PV Farm	DSO	offer	4
H2	Kilkenny	solar	Clashmagrath PV	DSO	ECP	3.99
H2	Kilkenny	solar	Derrynahinch Solar Farm	DSO	ECP	4
H2	Kilkenny	solar	Keatingstown Solar Farm	DSO	ECP	4
H2	Kilkenny	solar	Kiltorcan Solar Farm	DSO	ECP	4
H1	Kill Hill	wind	Kill Hill (1) - phase 1	TSO	connected	36
H1	Killonan	wind	Bunkimalta (1)	DSO	offer	46.5
H1	Killonan	wind	Cureeny (1)	DSO	offer	94
E	Kilpaddoge	battery	Glencloosagh Phase 3	TSO	ECP	30
E	Kilpaddoge	wind	Kelwin Power Plant	TSO	connected	41.6
E	Kilpaddoge	wind	Leanamore (1) (formerly Tarbert (1))	DSO	connected	18
J	Kilteel	battery	Porterstown Battery Storage Facility	TSO	ECP	30
J	Kilteel	solar	Threecastles Solar Farm	DSO	offer	15

Area	Node	Type	Name	SO	Status	MEC
J	Kinnegad	solar	Harristown Solar PV	TSO	offer	42.3
E	Knockacummer	wind	Knockacummer (1)	TSO	connected	100
E	Knockearagh	solar	Ballynamaunagh Solar Park	DSO	ECP	4.99
E	Knockearagh	solar	Madam's Hill Solar Park	DSO	offer	4
E	Knockearagh	wind	Gneeves (1)	DSO	connected	9.35
E	Knockearagh	wind	WEDcross (1)	DSO	connected	4.5
B	Knockranny	wind	Ardderoo 2 (Formerly Buffy)	TSO	offer	64.2
B	Knockranny	wind	Ardderoo Wind Farm	TSO	offer	27
B	Knockranny	wind	Knockalough (1)	TSO	offer	33.6
B	Knockranny	wind	Rossaveel Wind	DSO	offer	3
B	Knockranny	wind	Galway Ph3	TSO	ECP	28.8
C	Lanesboro	solar	Creevy Solar	DSO	offer	4
C	Mount Dillon into Lanesboro Sliabh Bawn	solar	Mountdillon Solar	TSO	ECP	90
C	Lanesboro	wind	Roxborough	DSO	ECP	4.95
C	Lanesboro	wind	Skrine (1)	DSO	connected	4.6
A	Lenalea	wind	Lenalea WF	TSO	ECP	31
A	Letterkenny	wind	Cark (1)	DSO	connected	15
A	Letterkenny	wind	Carrick Wind Farm (Garrymore)	DSO	offer	4.3
A	Letterkenny	wind	Cronalaght (1)	DSO	connected	4.98
A	Letterkenny	wind	Culliagh (1)	DSO	connected	11.88
A	Letterkenny	wind	Garrymore WF	DSO	offer	4.4
A	Letterkenny	wind	Glenalla (Garrymore)	DSO	offer	2.1
A	Letterkenny	wind	Lettergull (1)	DSO	offer	20
A	Letterkenny	wind	Lurganboy (1)	DSO	connected	4.99
A	Letterkenny	wind	Meenanilta (1)	DSO	connected	2.55
A	Letterkenny	wind	Meenanilta (2)	DSO	connected	2.45
A	Letterkenny	wind	Meenanilta (3)	DSO	connected	3.4
A	Letterkenny	wind	Newtownfore (1)	DSO	offer	14.4
E	Limerick	solar	Kilcolman Solar Farm	DSO	offer	4
G	Lisdrum	battery	Lisdrumdoagh Energy Storage Facility	TSO	ECP	60
G	Lisdrum	wind	Coolberrin Wind Farm (formerly Bragan Wind Farm)	DSO	offer	33.1
H1	Lisheen	wind	Bruckana (1)	DSO	connected	39.6
H1	Lisheen	wind	Lisheen (1)	TSO	connected	36
H1	Lisheen	wind	Lisheen (1a)	TSO	connected	23
H1	Lisheen	wind	Lisheen 3	TSO	ECP	28.8
C	Lumcloon	battery	Lumcloon ESS (Derrycarney)	TSO	offer	100
C	Lumcloon	wind	Cloghan	TSO	ECP	34
F	Macroom	solar	Knockglass Solar Farm	DSO	offer	4
F	Macroom	thermal	Cork Green Energy Biomass CHP Plant	DSO	offer	1.2
F	Macroom	wind	Bawnmore (1) formerly Burren (Cork)	DSO	connected	24
E	Mallow	solar	Carrigoon Solar Farm	DSO	offer	4
E	Mallow	solar	Crossfield	DSO	offer	4.95

Area	Node	Type	Name	SO	Status	MEC
E	Mallow	solar	Kilcummer Upper Solar Farm	DSO	ECP	10
G	Meath Hill	battery	Ardagh South Energy Storage Facility	DSO	ECP	33
G	Meath Hill	thermal	College Proteins CHP	DSO	ECP	3.99
G	Meath Hill	wind	Gartnaneane (1)	DSO	connected	10.5
G	Meath Hill	wind	Gartnaneane (2)	DSO	connected	4.5
G	Meath Hill	wind	Mullananalt (1)	DSO	connected	7.5
G	Meath Hill	wind	Raragh (2)	DSO	offer	11.5
G	Meath Hill	wind	Taghart (1)	DSO	ECP	23.06
G	Meath Hill	wind	Teevurcher	DSO	connected	9
G	Meath Hill	wind	Tullynamalra (1)	DSO	offer	2.638
A	Meentycat	wind	Meentycat (1)	TSO	connected	70.96
A	Meentycat	wind	Meentycat (2)	TSO	connected	14
I	Midleton	solar	Gortacruie Solar Park	DSO	offer	3.99
I	Midleton	solar	IQ Solar Farm	DSO	ECP	4
I	Midleton	solar	Malapardas	DSO	ECP	4.95
I	Midleton	solar	Tead More Solar (Meelshane)	DSO	ECP	3.95
I	Midleton	wind	Crocane (1)	DSO	connected	1.7
E	Moneypoint	battery	Moneypoint Battery Storage	TSO	offer	7.5
E	Moneypoint	wind	Moneypoint WF	TSO	connected	17.25
J	Monread	solar	Bodenstown Solar Farm	DSO	offer	4
J	Monread	solar	Kerdiffstown PV	DSO	offer	4
H1	Mothel into Ballydine Cullenagh	solar	Mothel PV	TSO	offer	60
J	Mount Lucas	wind	Mount Lucas (1)	TSO	connected	79.2
B	Moy	solar	Carrowgarve Solar	DSO	offer	4
B	Moy	wind	Lackan (1)	DSO	connected	6
C	Mullingar	solar	Liss Solar Farm (prev Lands at Liss)	DSO	offer	4
C	Mullingar	solar	Marlinstown Solar Farm (prev Russellstown)	DSO	offer	4
C	Mullingar	solar	Tullynally Estate	DSO	ECP	4
A	Mulreavy	wind	Mulreavy (Mulreavy (1))	TSO	connected	82
A	Mulreavy	wind	Mulreavy Ext (Croaghnameal (1))	TSO	connected	4.25
A	Mulreavy	wind	Mulreavy Ext (Meenadreen South (1))	TSO	connected	3.6
A	Mulreavy	wind	Mulreavy Ext (Meenadreen South (2))	TSO	connected	5.4
G	Navan	solar	Friarspark Solar	DSO	ECP	4
G	Navan	solar	Kilkeelan Solar Farm	DSO	offer	4
G	Navan	thermal	Shamrock Renewable Fuels formerly Farelly Brothers	DSO	offer	13
G	Navan	solar	Martinstown Solar formerly Crowinstown Great wind	DSO	offer	4.999
H1	Nenagh	solar	Lisbrien Solar Farm	DSO	offer	4
H1	Nenagh	wind	Ballinlough (1)	DSO	connected	2.55
H1	Nenagh	wind	Ballinveny (1)	DSO	connected	2.55
H1	Nenagh / Freagh	wind	Castlewaller (1)	TSO	ECP	48
H1	Nenagh	wind	Curraghgraique (1)	DSO	connected	2.55

Area	Node	Type	Name	SO	Status	MEC
H1	Nenagh	wind	Curraghgraique (2)	DSO	connected	2.44
H1	Nenagh	wind	Temploderry (1)	DSO	connected	3.9
J	Newbridge	solar	Dunmurry Springs PV	DSO	offer	12
J	Newbridge	solar	Pollardstown PV	DSO	offer	3.99
G	Oriel	wind	Oriel (1)	TSO	offer	210
E	Oughtragh	solar	Maine Solar	DSO	offer	4
E	Oughtragh	wind	Knockaneden (1)	DSO	connected	9
J	Portlaoise	solar	Acragar Solar Farm	DSO	ECP	4
J	Portlaoise	solar	Shanderry Solar Farm	DSO	offer	4
J	Portlaoise	wind	Dooray WF	DSO	offer	45.001
J	Portlaoise	wind	Lisdowney (1)	DSO	connected	9.2
E	Rathkeale	solar	Dungeeha Solar	DSO	ECP	4
E	Rathkeale	wind	Carrons (1)	DSO	connected	4.99
E	Rathkeale	wind	Grouse Lodge (1)	DSO	connected	15
E	Rathkeale	wind	Rathcahill (1)	DSO	connected	12.5
K	Rathnaskilloge into Cullenagh Dungarvan	solar	Rathnaskilloge	TSO	ECP	95
G	Ratrussan	wind	Mountain Lodge (1)	TSO	connected	24.8
G	Ratrussan	wind	Mountain Lodge (3)	TSO	connected	5.82
G	Ratrussan	wind	Ratrussan (1a)	TSO	connected	48
E	Reamore	battery	Knocknagoum Battery Storage	DSO	ECP	8
E	Reamore	wind	Knocknagoum (1)	DSO	connected	42.55
E	Reamore	wind	Knocknagoum (2) formerly Muingnatee (3)	DSO	connected	1.8
E	Reamore	wind	Muingnaminnane (1)	DSO	connected	15.3
E	Reamore	wind	Muingnaminnane (2)	DSO	offer	13.5
E	Reamore	wind	Stack's Mountain	DSO	offer	25.3
C	Richmond	solar	Cleggil Solar	DSO	ECP	8
C	Richmond	solar	Lisnageeragh Solar Farm	DSO	offer	4
C	Richmond	thermal	Camlin CHP	DSO	ECP	5
H2	Rosspile into GI-Wex	solar	Rosspile Solar Farm	TSO	offer	95
B	Salthill	wind	Inverin (Knock South) (1)	DSO	connected	2.64
B	Salthill	wind	Leitir Guingaid & Doire Chrith1 & 2 Merge	DSO	connected	40.9
G	Shankill	solar	Carrickabane Solar Farm	DSO	offer	4
G	Shankill	wind	Carrickallen Wind Farm	DSO	offer	22
G	Shankill	wind	Liffey Autoproduction Project	DSO	connected	1.6
G	Shankill	wind	Liffey Autoproduction Project (extension)	DSO	connected	1.417
G	Shankill	wind	Mountain Lodge (2)	DSO	connected	3
C	Shannonbridge	solar	Blackwater Bog Solar 1	TSO	ECP	65
C	Shannonbridge 220	battery	Shannonbridge B ESS	TSO	offer	97.2
C	Shannonbridge 220	battery	Shannonbridge ESS	TSO	offer	66

Area	Node	Type	Name	SO	Status	MEC
B	Shantallow into Cashla Somerset T	solar	Shantallow Solar	TSO	offer	35
C	Sliabh Bawn	wind	Sliabh Bawn (1)	TSO	connected	58
D	Slievecallan	wind	Boolinrudda (formerly Boolynagleragh & Glenmore)	TSO	connected	17.64
D	Slievecallan	wind	Boolinrudda (formerly Loughaun North)	TSO	connected	26.87
D	Slievecallan	wind	Knockalassa (formerly Keelderry)	TSO	connected	26.875
B	Sligo	wind	Carrickeeney (1)	DSO	connected	7.65
B	Sligo	wind	Faughary (1)	DSO	connected	6
C	Somerset	solar	Ballycrissane Solar Farm	DSO	offer	4
C	Somerset	wind	Lisbeg Windfarm (formerly Sonnagh Old 2 & 3)	DSO	offer	11.89
C	Somerset	wind	Sonnagh Old (1)	DSO	connected	7.65
A	Sorne Hill	wind	Corvin Wind Turbine	DSO	offer	2.1
A	Sorne Hill	wind	Fahan Wind Farm	DSO	ECP	5
A	Sorne Hill	wind	Flughland (1)	DSO	connected	9.2
A	Sorne Hill	wind	Glackmore Hill (2)	DSO	connected	1.4
A	Sorne Hill	wind	Meenkeeragh (1)	DSO	connected	4.2
A	Sorne Hill	wind	Sorne Hill (1)	DSO	connected	31.5
A	Sorne Hill	wind	Sorne Hill (2)	DSO	connected	7.4
A	Sorne Hill	wind	Sorne Hill Single Turbine (Enros)	DSO	offer	2.3
A	Sorne Hill	wind	Three Trees (1)	DSO	offer	4.25
J	Stephenstown	battery	Gardnershill FGS	DSO	ECP	9
J	Stephenstown	solar	Matt Solar Farm	DSO	offer	4.95
H2	Stratford	solar	Newtownsaunders	DSO	offer	4
B	Tawnaghmore	thermal	Mayo Renewable Power Biomass CHP	DSO	offer	49
B	Tawnaghmore	wind	Killala (1)	DSO	offer	30
J	Thornsberry	solar	Lehinch Solar Farm	DSO	offer	4
J	Thornsberry	solar	Muinagh Solar Farm	DSO	offer	4
J	Thornsberry	thermal	Derryclure (1)	DSO	offer	9.9
H1	Thurles	wind	An Cnoc	DSO	connected	11.5
H1	Thurles	wind	Ballinacurry WF	DSO	offer	4.6
H1	Thurles	wind	Ballybay Wind Farm (Tullaroan)	DSO	connected	13.8
H1	Thurles	wind	Foyle Windfarm	DSO	connected	9.6
H1	Thurles	wind	Gurteen (1)	DSO	connected	2.3
A	Tievebrack	wind	Mully Graffy Windfarm (Kilgorman)	TSO	ECP	29.9
J	Timahoe North into Maynooth Derryiron	solar	Timahoe North	TSO	offer	70
H1	Tipperary	solar	Ballinalard Solar Farm	DSO	offer	4
H1	Tipperary	wind	Slievereagh (1)	DSO	connected	4.6
B	Tonroe	thermal	Biocore Enviromental AD	DSO	offer	1.5
B	Tonroe	wind	Grady Joinery	DSO	connected	2.5
B	Tonroe	wind	Largan Hill (1)	DSO	connected	5.94
B	Tonroe	wind	Roosky (1)	DSO	connected	3.6

Area	Node	Type	Name	SO	Status	MEC
I	Trabeg	solar	Piercestown (formerly Jackeens) SPV	DSO	ECP	4
I	Trabeg	solar	Shanagraigue	DSO	offer	4.95
E	Tralee	solar	Bawnboy Solar Park	DSO	offer	4
E	Tralee	solar	Drummartin Solar Farm	DSO	ECP	4
E	Tralee	wind	Ballincollig Hill (1)	DSO	connected	15
E	Tralee	wind	Beenageeha (1)	DSO	connected	3.96
E	Tralee	wind	Mount Eagle (1)	DSO	connected	5.1
E	Tralee	wind	Mount Eagle (2)	DSO	connected	1.7
E	Tralee	wind	Tursillagh (1)	DSO	connected	15
E	Tralee	wind	Tursillagh (2)	DSO	connected	6.8
J	Treascon into Bracklone Portlaoise	solar	Treascon Solar	TSO	offer	40
E	Trien	solar	Shanacool (Trienearagh) Solar Park	DSO	offer	4
E	Trien	wind	Ballagh (1)	DSO	connected	4.6
E	Trien	wind	Beale Hill (1)	DSO	connected	1.65
E	Trien	wind	Beale Hill (2)	DSO	connected	2.55
E	Trien	wind	Beale Hill (3)	DSO	connected	1.3
E	Trien	wind	Curraghderrig (1)	DSO	connected	4.5
E	Trien	wind	Gortnacloghy Wiind Farm	DSO	connected	4.4
E	Trien	wind	Tournafulla (1)	DSO	connected	7.5
E	Trien_wind	wind	Knockawarriga (1)	DSO	connected	22.5
E	Trien_wind	wind	Knockawarriga Extension (Glenduff & Caherlevoy)	DSO	offer	6.6
E	Trien_wind	wind	Tournafulla (2)	DSO	connected	17.2
A	Trillick	wind	Beam Hill (1)	DSO	connected	14
A	Trillick	wind	Cooly (1)	DSO	connected	4
A	Trillick	wind	Crockahenny (1)	DSO	connected	5
A	Trillick	wind	Drumlough Hill (1)	DSO	connected	4.8
A	Trillick	wind	Drumlough Hill (2)	DSO	connected	9.99
A	Trillick	wind	Meenaward	DSO	connected	6.9
H2	Tullabeg into Banoge Crane	solar	Tullabeg Solar Park	TSO	offer	50
D	Tullabrack	wave	WestWave Killard	DSO	offer	5.4
D	Tullabrack	wind	Carrownawelaun (1)	DSO	connected	4.6
D	Tullabrack	wind	Moanmore (1)	DSO	connected	12.6
D	Tullabrack	wind	Tullabrack (1)	DSO	connected	13.8
B	Uggool	wind	Seecon (1)	TSO	connected	105
B	Uggool	wind	Uggool (1)	TSO	connected	64
H2	Waterford	solar	Curraghmartin Solar Park	DSO	offer	3.99
H2	Waterford	wind	Ballymartin (1)	DSO	connected	6
H2	Waterford	wind	Ballymartin (2)	DSO	connected	8.28
H2	Waterford	wind	Rahora (1)	DSO	connected	4.25
H2	Wexford	solar	Ballycarran Solar Park	DSO	ECP	3.999
H2	Wexford	solar	Ballykereen Solar	DSO	ECP	11
H2	Wexford	solar	Ballymackesy East Solar Farm	DSO	ECP	4
H2	Wexford	solar	Blusheens 2 Solar Park	DSO	offer	3.99

Area	Node	Type	Name	SO	Status	MEC
H2	Wexford	solar	Blusheens Solar Park	DSO	offer	3.99
H2	Wexford	solar	Davidstown Solar	DSO	ECP	5
H2	Wexford	solar	Dennistown Solar	DSO	ECP	26
H2	Wexford	solar	Mackmine Solar	DSO	ECP	10
H2	Wexford	solar	St Johns Solar Farm	DSO	ECP	4
H2	Wexford	solar	Sweetfarm Solar Farm	DSO	ECP	4
H2	Wexford	solar	Tomfarney North Solar Farm	DSO	ECP	8
H2	Wexford	solar	Tomnalossett Solar Farm (Assaly)	DSO	ECP	4
H2	Wexford	wind	Carnsore (1)	DSO	connected	11.9
H2	Wexford	wind	Richfield (1)	DSO	connected	20.25
H2	Wexford	wind	Richfield (2)	DSO	connected	6.75
K	Woodhouse	wind	Knocknamona Wind Farm (Prev. Crohaun)	TSO	offer	34
K	Woodhouse	wind	Woodhouse (1)	TSO	connected	20

Table B-15: Generation in the model

Note that the year of connection is rounded from the build-out rate date or target connection date.

These are in addition to the large generators which are listed in EirGrid's Generation Capacity Statement 2018.

Appendix C Subgroup Results by Area

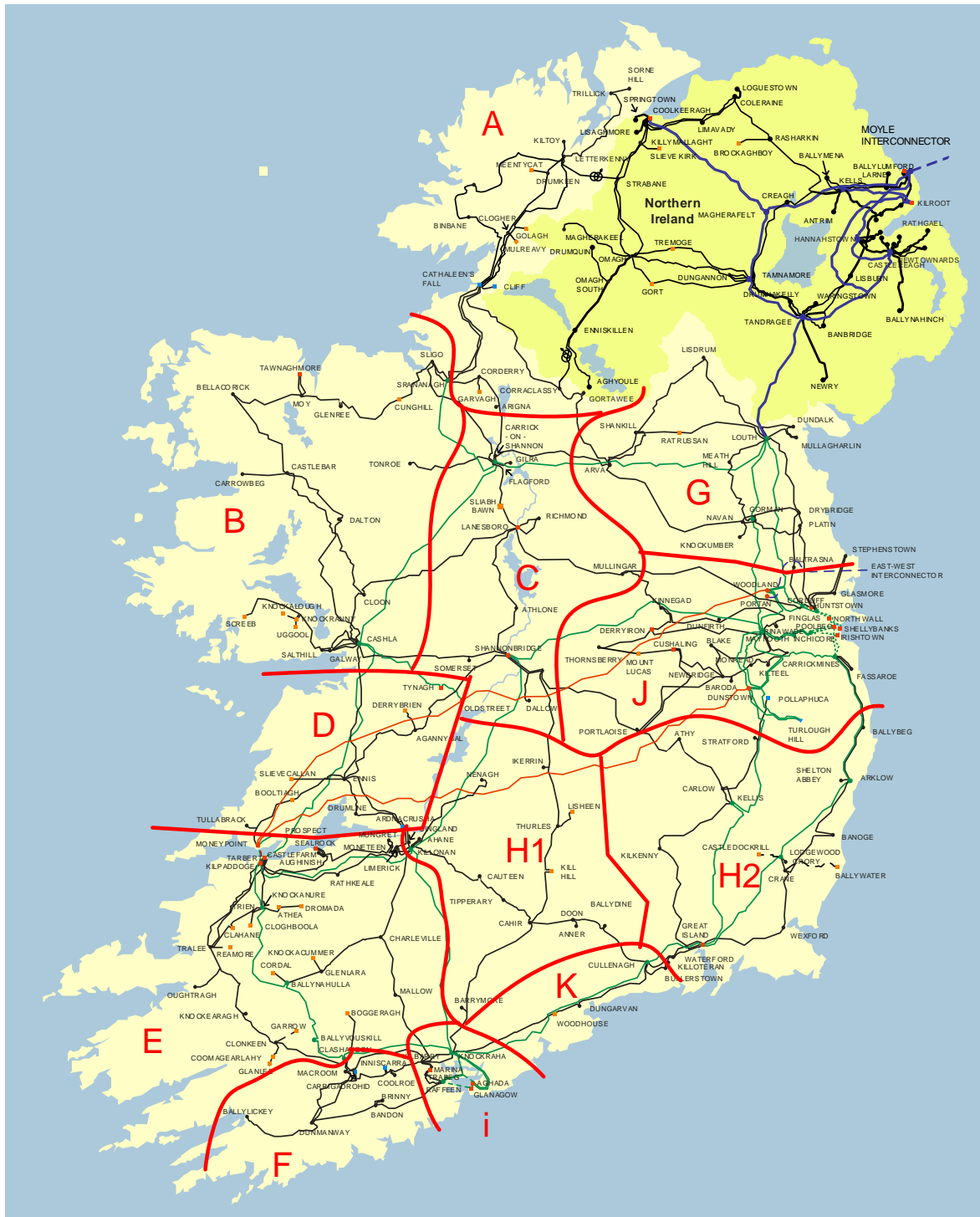


Figure 0-1 Network map showing All Areas

This appendix presents the results of the modelling analysis for each area and the subgroups used. The generators of a given type (solar or wind) in a subgroup are presented in this report as having the same constraints. The levels of curtailment and constraint that controllable solar and wind generators might expect to experience are reported on a subgroup basis for the study scenarios. Details on the

generation capacity at each node are provided along with the assumed amount of controllable wind generation.

The table of results provides information for each scenario of the curtailment, the constraint and the combined curtailment and constraint. Where there is both solar and wind at a node, the solar and wind results are provided separately. The curtailment and constraint results are also provided as a graph. These graphs show how the combined curtailment and constraint increase as additional generation is added and show how it decreases in later years.

C.1 Area A, Area B and Area C

For Areas A, B and C, the selection of subgroups did not align with the area boundaries. Hence, the subgroups were selected based on technical results. For this reason, some of the subgroups include generators from more than one area.



Figure 0-2 – Network Map of Area A, Area B and Area C

C.1.1 Generation in Areas A, B and C

The generation in Areas A, B and C are summarised in the tables below.

Node	SO	Status	Hydro	Solar	Wind
Ardnagappary	DSO	Initial			18
Arigna	DSO	Initial			16
Binbane	DSO	Initial	4		79
Binbane	DSO	Existing Offer			2
Carrickaduff and Carrickalangan	TSO	Existing Offer			66
Carrickaduff and Carrickalangan	TSO	ECP-1 Offer			72
Cathaleen's Fall	DSO	Initial	2		23
Cathaleen's Fall	TSO	Initial	46		
Corderry	DSO	Initial			63
Corderry	TSO	ECP-1 Offer		40	
Garvagh	DSO	Initial			34
Garvagh	TSO	Initial			48
Golagh	TSO	Initial			15
Lenalea	TSO	ECP-1 Offer			31
Letterkenny	DSO	Initial			52
Letterkenny	DSO	Existing Offer			39
Meentycat	TSO	Initial			85
Mulreavy	TSO	Initial			95
Sorne Hill	DSO	Initial			62
Sorne Hill	DSO	ECP-1 Offer			5
Tievebrack	TSO	ECP-1 Offer			30
Trillick	DSO	Initial			45
SUBTOTAL			52 MW	40 MW	882 MW

Table 0-1 Generation Summary in Area A

Node	SO	Status	Battery	Wave	Hydro	Thermal	Solar	Wind
Bellacorick	DSO	Initial		10				26
Bellacorick	TSO	Initial						89
Bellacorick	DSO	Existing Offer						59
Bellacorick	TSO	Existing Offer						133
Bellacorick	DSO	ECP-1 Offer	3					3
Carrownaglogh	TSO	ECP-1 Offer						48
Castlebar	DSO	Initial						44
Cloon	DSO	Initial						4
Cloon	DSO	Existing Offer					4	
Cloon	DSO	ECP-1 Offer					20	
Cunghill	TSO	Initial						35
Dalton	DSO	Initial						43
Dalton	DSO	Existing Offer					4	
Dalton	DSO	ECP-1 Offer	12					
Glenree	DSO	Initial						65
Glenree	DSO	ECP-1 Offer						13
Knockranny	DSO	Initial						3
Knockranny	TSO	Initial						34
Knockranny	TSO	Existing Offer						91
Knockranny	TSO	ECP-1 Offer						29
Moy	DSO	Initial						6
Moy	DSO	Existing Offer					4	
Salthill	DSO	Initial						44
Shantallow	TSO	Existing Offer					35	
Sligo	DSO	Initial			2			14
Tawnaghmore	DSO	Initial						30
Tawnaghmore	TSO	Initial				104		
Tawnaghmore	DSO	Existing Offer				49		
Tonroe	DSO	Initial						12
Uggool	TSO	Initial						169
Subtotal			15	10	2	153	67	994

Table 0-2 Generation Summary in Area B

Node	SO	Status	Battery	Solar	Thermal	Wind
Athlone	DSO	ECP-1 Offer		4		
Athlone	DSO	Existing Offer		8		
Carrick on Shannon	DSO	Existing Offer		8		4
Dallow	DSO	Initial				21
Dallow	DSO	Existing Offer		4		
Dallow	DSO	ECP-1 Offer		4		3
Lanesboro	DSO	Initial				5
Lanesboro	DSO	Existing Offer		4		
Lanesboro	DSO	ECP-1 Offer				5
Lanesboro	TSO	Thermal			94	
Lumcloon	TSO	Existing Offer	100			
Lumcloon	TSO	ECP-1 Offer				34
Mount Dillon	TSO	ECP-1 Offer		90		
Mullingar	DSO	Existing Offer		8		
Mullingar	DSO	ECP-1 Offer		4		
Richmond	DSO	Existing Offer		4		
Richmond	DSO	ECP-1 Offer		8	5	
Shannonbridge	TSO	Initial			141	
Shannonbridge	TSO	ECP-1 Offer		65		
Shannonbridge 220	TSO	Existing Offer	163			
Sliabh Bawn	TSO	Initial				58
Somerset	DSO	Initial				8
Somerset	DSO	Existing Offer		4		12
SUBTOTAL			263	215	240	150

Table 0-3 Generation Summary in Area C

C.1.2 Subgroups in Areas A, B and C

The 110kV nodes in each subgroup are listed in the tables below. The solar subgroups are in Table 0-4 and the subgroups for wind are in Table 0-5.

Subgroup - ABC SOLAR North	Subgroup - ABC SOLAR South
Cordery in Area A	Cloon in Area B
Moy in Area B	Shantallow in Area B
Dalton in Area B	Athlone in Area C
Carrick on Shannon in Area C	Dallow in Area C
Mount Dillon in Area C	Lanesboro in Area C
	Mullingar in Area C
	Richmond in Area C
	Shannonbridge in Area C
	Somerset in Area C

Table 0-4 Subgroups for Solar in Areas A, B and C

Subgroup WIND B Galway	Subgroup WIND B Mayo	Subgroup WIND A, WIND B Sligo, WIND C North	Subgroup WIND C South
Knockranny	Bellacorick (wind and wave)	Sligo in Area B	Dallow
Salthill	Carrownaglogh	All Wind in Area A	Lumcloon
Uggool	Castlebar	Lanesboro in Area C	Somerset
	Cunghill	Sliabh Bawn in Area C	
	Dalton		
	Glenree		
	Moy		
	Tawnaghmore		

Table 0-5 Subgroups for Wind in Areas A, B and C

C 1.3 Industry Scenario Only in Areas A, B and C

The results for Areas A, B and C differ from the other areas in that the Industry scenario and the Industry Future Grid scenario are only presented for Areas A, B and C.

This is because extra studies for the north west were agreed with industry representatives, following on from the publication of the original Area A, B and C reports.

C.1.4 Summary for Areas A, B and C

The following diagrams show the percentage curtailment (blue) and constraint (red) from the study results.

The results for the solar subgroups are shown in Figure 0-3 and Figure 0-4. The results for wind are shown in Figure 0-5 through Figure 0-8.

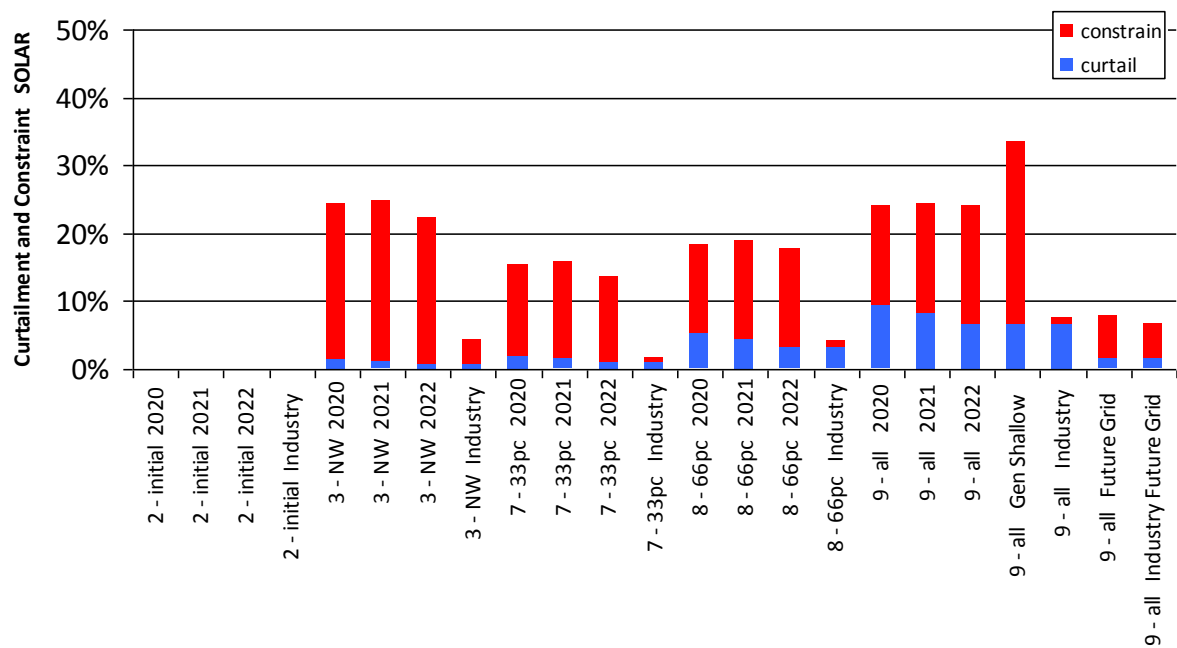


Figure 0-3 Results SOLAR for subgroup ABC North

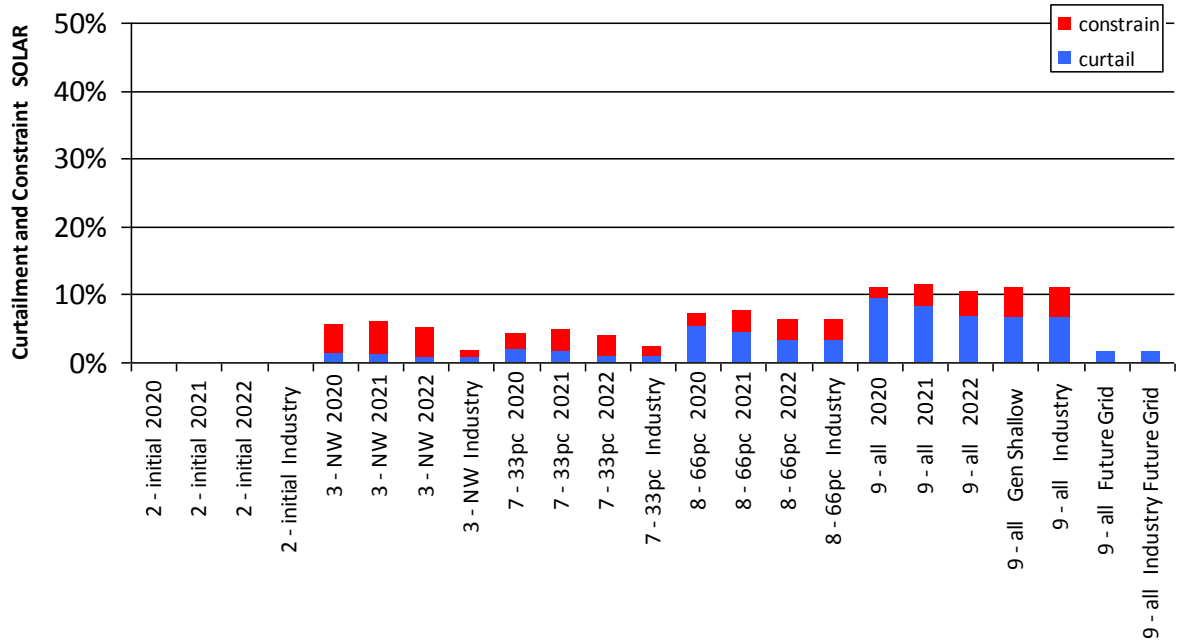


Figure 0-4 Results SOLAR for subgroup ABC South

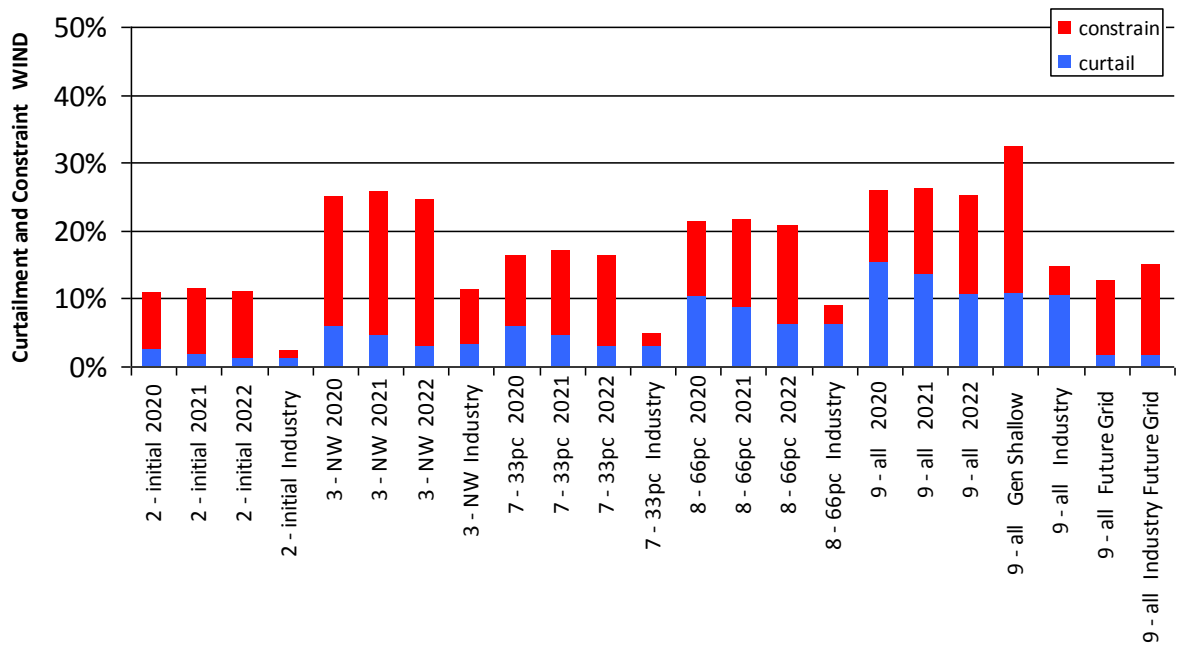


Figure 0-5 Results WIND for subgroup A, B-Sligo, and C North

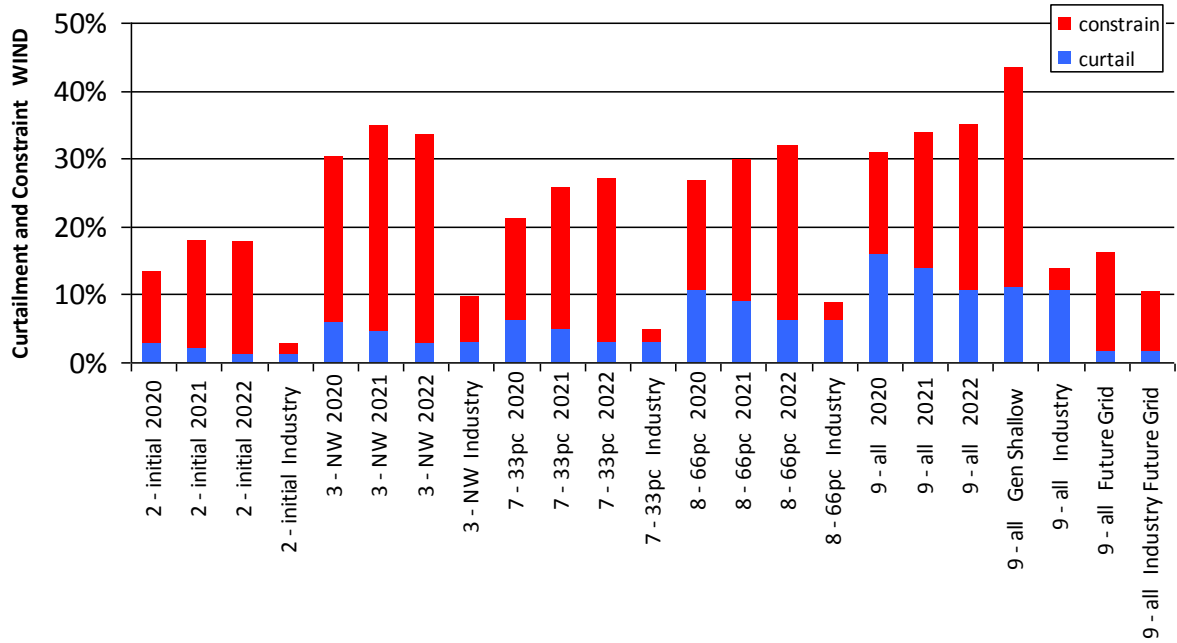


Figure 0-6 Results WIND for subgroup Area B Mayo

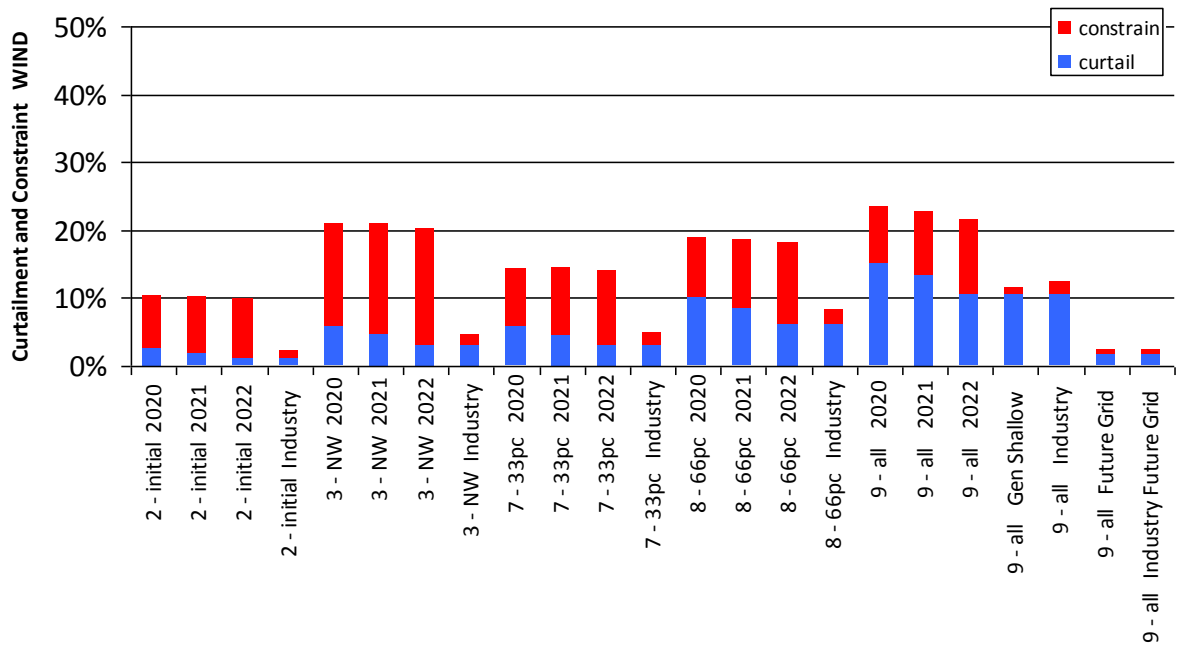


Figure 0-7 Results WIND for subgroup Area B Galway

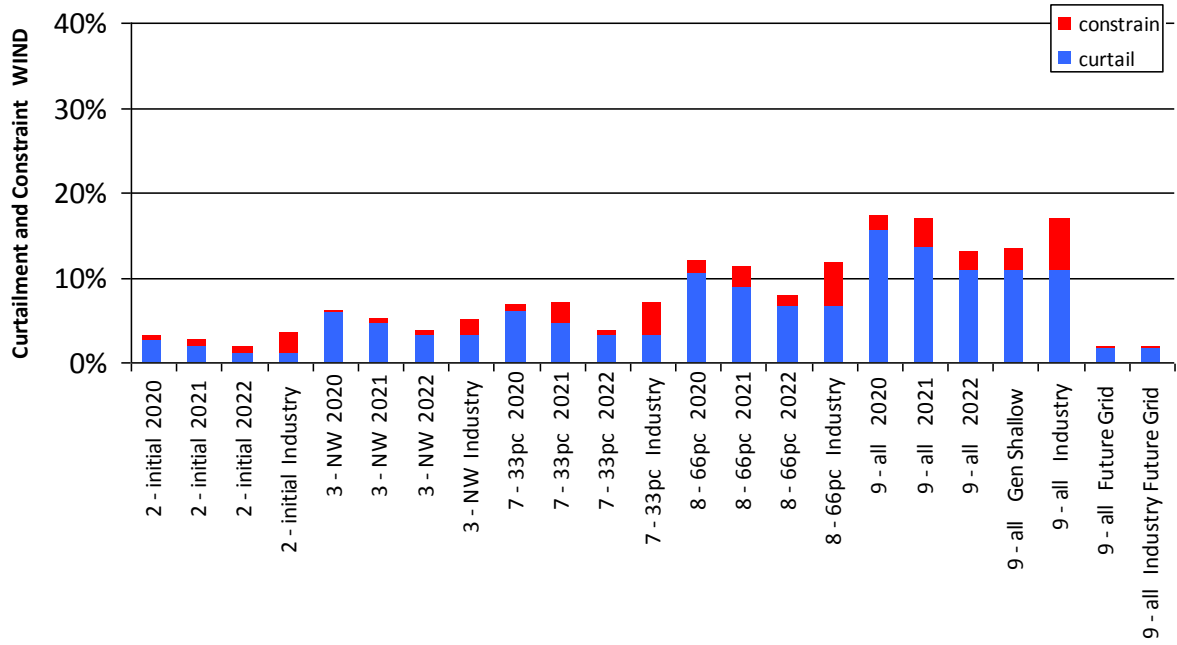


Figure 0-8 Results WIND for subgroup C south

C.1.5 Results for Areas A, B and C

ABC Solar North	Year	Generation Scenarios					
		2020	Initial	NW	33%	66%	All
Total (MW)		0	0	146	48	96	146
of which is Controllable (MW)		0	0	146	48	96	146
Available Energy Controllable (GWh)		0	0	139	46	92	139
Curtailment (GWh)	2020			2	1	5	13
	2021			1	1	4	12
	2022			1	0	3	9
Constraint (GWh)	2020			32	6	12	20
	2021			33	7	13	22
	2022			30	6	13	24
Curtailment and Constraint (GWh)	2020			34	7	17	34
	2021			34	7	17	34
	2022			31	6	16	34
Curtailment	2020			1%	2%	5%	9%
	2021			1%	2%	4%	8%
	2022			1%	1%	3%	7%
	Gen Shallow						7%
	Industry			1%	1%	3%	7%
Constraint	2020			23%	14%	13%	15%
	2021			24%	14%	15%	16%
	2022			22%	12%	14%	17%
	Gen Shallow						27%
	Industry			4%	1%	1%	1%
Curtailment and Constraint	2020			24%	15%	18%	24%
	2021			25%	16%	19%	24%
	2022			22%	13%	18%	24%
	Gen Shallow						33%
	Industry			4%	2%	4%	8%
	Future Grid						8%
	Industry Fut Grid						7%

Table 0-6 Results for Subgroup ABC Solar North

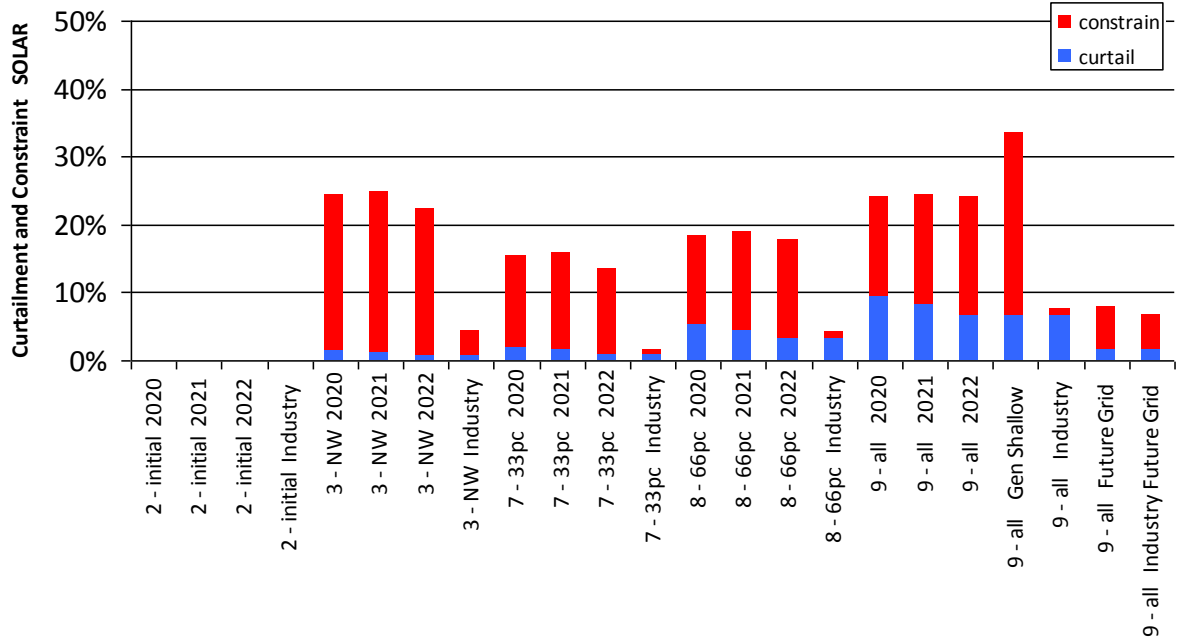


Figure 0-9 Results SOLAR – subgroup ABC North

ABC Solar South	Year	Generation Scenarios					
		2020	Initial	NW	33%	66%	All
Total (MW)	2020 to 2022	0	0	176	58	116	176
of which is Controllable (MW)	2020 to 2022	0	0	176	58	116	176
Available Energy Controllable (GWh)	2020 to 2022	0	0	172	57	113	172
Curtailment (GWh)	2020			2	1	6	16
	2021			2	1	5	14
	2022			1	1	4	12
Constraint (GWh)	2020			7	1	2	3
	2021			8	2	4	5
	2022			8	2	3	6
Curtailment and Constraint (GWh)	2020			9	2	8	19
	2021			10	3	9	20
	2022			9	2	7	18
Curtailment	2020			1%	2%	5%	9%
	2021			1%	2%	4%	8%
	2022			1%	1%	3%	7%
	Gen Shallow						7%
	Industry			1%	1%	3%	7%
Constraint	2020			4%	2%	2%	2%
	2021			5%	3%	3%	3%
	2022			4%	3%	3%	4%
	Gen Shallow						4%
	Industry			1%	1%	3%	4%
Curtailment and Constraint	2020			6%	4%	7%	11%
	2021			6%	5%	8%	11%
	2022			5%	4%	6%	10%
	Gen Shallow						11%
	Industry			2%	2%	6%	11%
	Future Grid						2%
	Industry Fut Grid						2%

Table 0-7 Results for Subgroup ABC Solar South

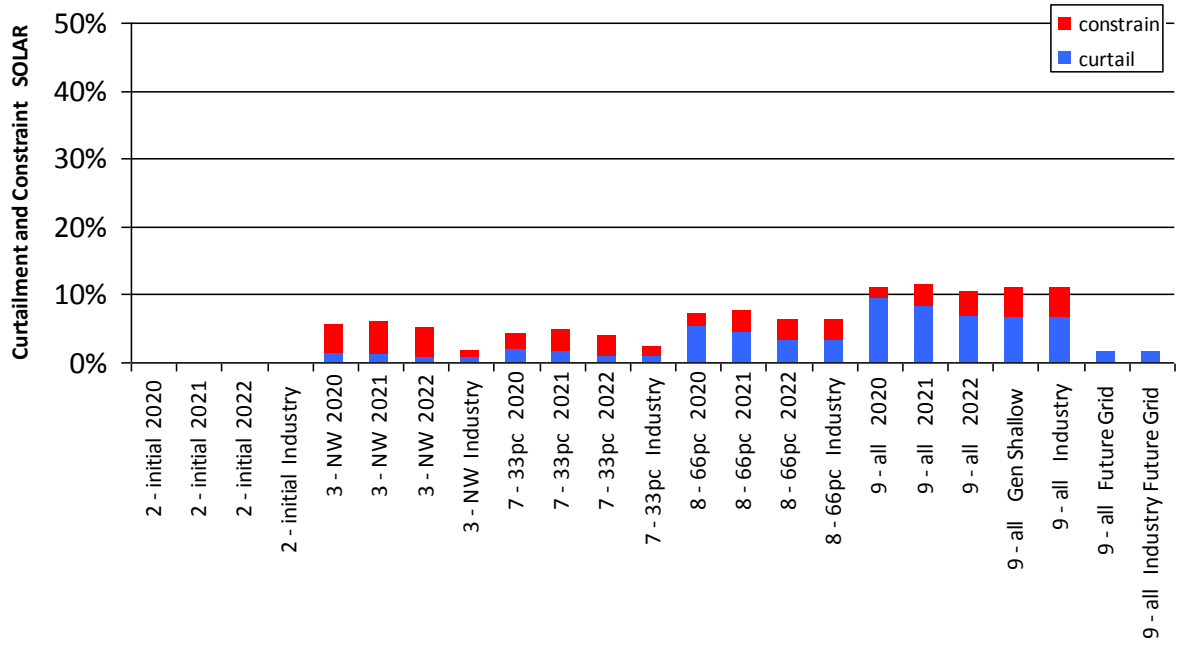


Figure 0-10 Results SOLAR – subgroup ABC South

WIND Area A, and Sligo in Area B Many studies, with Area C North	Year	2020	Generation Scenarios				
			Initial	NW	33%	66%	All
Total (MW)	2020 to 2022	701	726	949	800	873	949
	with Shallow Reinforce			979	810	895	979
of which is Controllable (MW)	2020 to 2022	565	583	796	653	723	796
	with Shallow Reinforce			826	664	745	826
Available Energy Controllable (GWh)	2020 to 2022	1,649	1,709	2,314	1,908	2,108	2,314
	with Shallow Reinforce			2,401	1,940	2,170	2,401
Curtailment (GWh)	2020	43	45	141	114	225	373
	2021	31	32	110	88	188	323
	2022	19	20	70	57	133	246
Constraint (GWh)	2020	115	142	468	203	241	257
	2021	136	164	512	242	281	308
	2022	135	169	497	252	304	332
Curtailment and Constraint (GWh)	2020	158	187	609	318	467	630
	2021	167	196	622	331	469	631
	2022	154	188	567	310	437	578
Curtailment	2020	3%	3%	6%	6%	10%	15%
	2021	2%	2%	5%	5%	9%	13%
	2022	1%	1%	3%	3%	6%	11%
	Gen Shallow						11%
	Industry	1%	1%	3%	3%	6%	11%
Constraint	2020	7%	8%	19%	10%	11%	11%
	2021	8%	10%	21%	13%	13%	13%
	2022	8%	10%	21%	13%	14%	14%
	Gen Shallow						22%
	Industry	1%	1%	8%	2%	3%	4%
Curtailment and Constraint	2020	10%	11%	25%	16%	21%	26%
	2021	10%	11%	26%	17%	22%	26%
	2022	9%	11%	24%	16%	21%	25%
	Gen Shallow						32%
	Industry	2%	2%	11%	5%	9%	15%
	Future Grid						13%
	Industry Fut Grid						15%

Table 0-8 Results for Subgroup Wind Area A, B-Sligo and Area C North

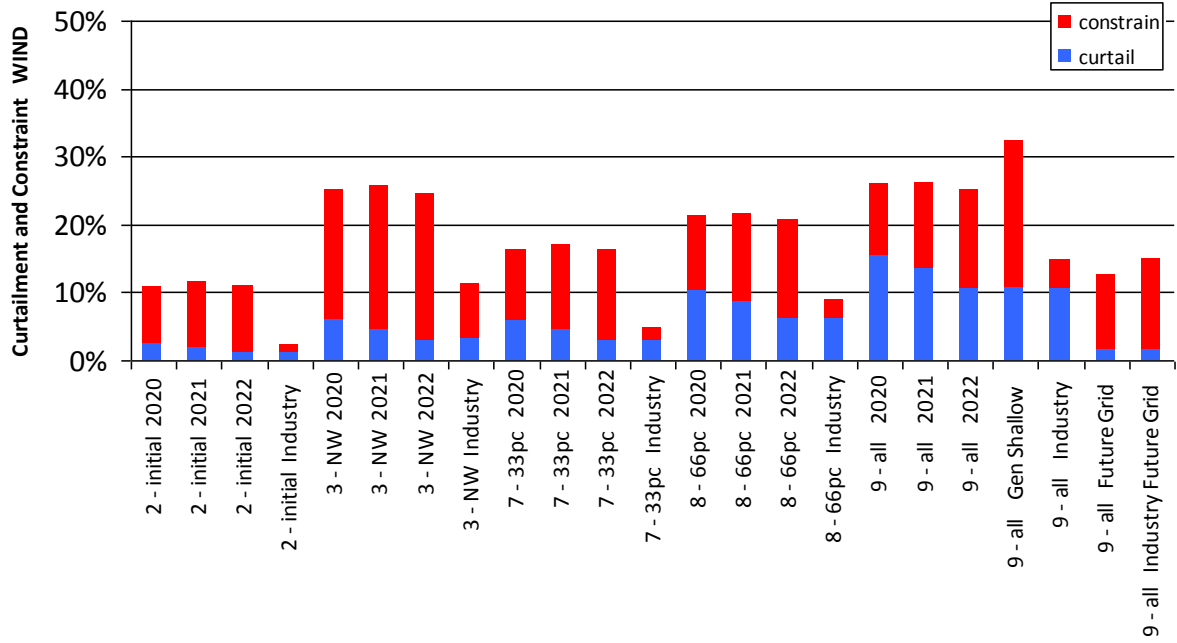


Figure 0-11 Results WIND – subgroup Area A, B-Sligo and Area C North

WIND Mayo	Year	Generation Scenarios					
		2020	Initial	NW	33%	66%	All
Total (MW)	2020 to 2022	321	348	431	376	403	431
	with Shallow Reinforce			604	433	519	604
of which is Controllable (MW)	2020 to 2022	254	281	376	301	338	376
	with Shallow Reinforce			537	348	443	537
Available Energy Controllable (GWh)	2020 to 2022	711	783	1,070	847	957	1,070
	with Shallow Reinforce			1555	992	1274	1555
Curtailment (GWh)	2020	19	21	64	54	104	170
	2021	14	15	50	42	87	148
	2022	9	9	30	25	60	114
Constraint (GWh)	2020	61	83	265	133	159	166
	2021	98	125	324	184	205	217
	2022	99	129	328	204	244	260
Curtailment and Constraint (GWh)	2020	81	105	330	186	264	336
	2021	112	140	375	226	292	365
	2022	107	139	358	229	305	373
Curtailment	2020	3%	3%	6%	6%	11%	16%
	2021	2%	2%	5%	5%	9%	14%
	2022	1%	1%	3%	3%	6%	11%
	Gen Shallow						11%
	Industry	1%	1%	3%	3%	6%	11%
Constraint	2020	9%	11%	25%	15%	16%	15%
	2021	14%	16%	30%	21%	21%	20%
	2022	14%	17%	31%	24%	26%	24%
	Gen Shallow						33%
	Industry	1%	1%	7%	2%	2%	3%
Curtailment and Constraint	2020	11%	13%	31%	21%	27%	31%
	2021	16%	18%	35%	26%	30%	34%
	2022	15%	18%	33%	27%	32%	35%
	Gen Shallow						43%
	Industry	2%	3%	10%	5%	9%	14%
	Future Grid						16%
	Industry Fut Grid						10%

Table 0-9 AREA B WIND for Subgroup Mayo

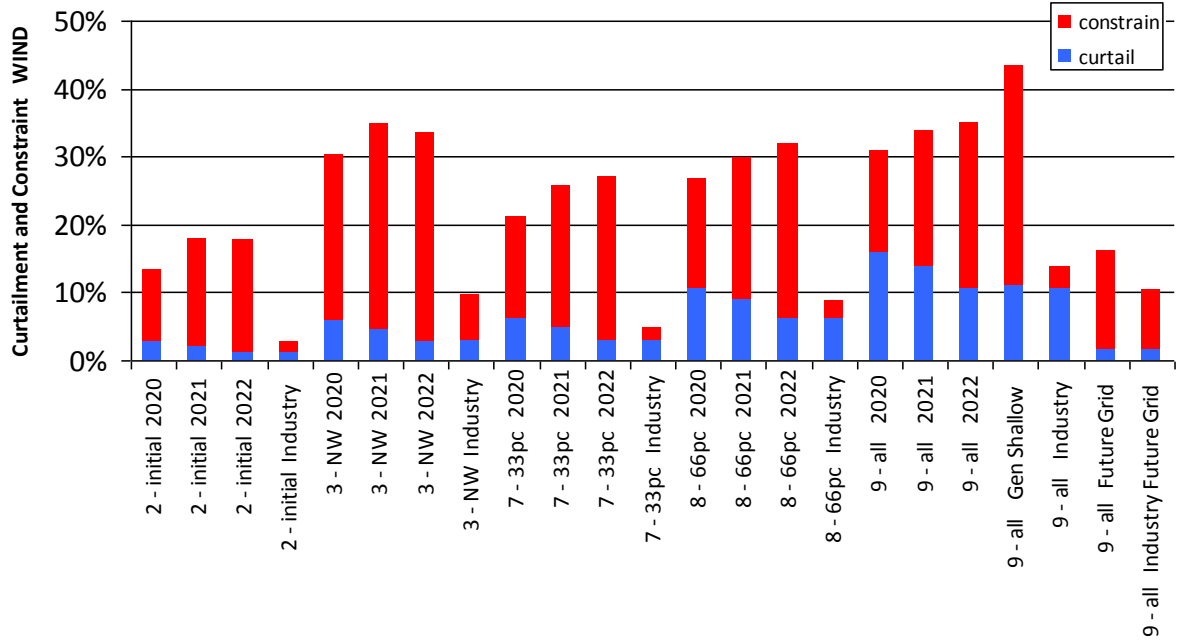


Figure 0-12 AREA B WIND for Subgroup Mayo

WIND Galway	Year	Generation Scenarios						
		2020	Initial	NW	33%	66%	All	
Total (MW)	2020 to 2022	250	250	341	280	310	341	
	with Shallow Reinforce			370	290	330	370	
of which is Controllable (MW)	2020 to 2022	244	244	335	274	304	335	
	with Shallow Reinforce			364	284	324	364	
Available Energy Controllable (GWh)	2020 to 2022	861	861	1,137	952	1,043	1,137	
	with Shallow Reinforce			1,224	982	1,103	1,224	
Curtailment (GWh)	2020	22	22	65	56	107	174	
	2021	16	16	51	43	89	151	
	2022	10	10	35	29	66	120	
Constraint (GWh)	2020	70	68	174	82	91	93	
	2021	70	71	186	95	105	107	
	2022	76	76	196	105	123	126	
Curtailment and Constraint (GWh)	2020	92	90	239	137	198	267	
	2021	86	87	237	138	194	258	
	2022	86	86	231	133	188	246	
Curtailment	2020	3%	3%	6%	6%	10%	15%	
	2021	2%	2%	4%	5%	9%	13%	
	2022	1%	1%	3%	3%	6%	11%	
		Gen Shallow						11%
		Industry	1%	1%	3%	3%	6%	11%
Constraint	2020	8%	8%	15%	9%	9%	8%	
	2021	8%	8%	16%	10%	10%	9%	
	2022	9%	9%	17%	11%	12%	11%	
		Gen Shallow						1%
		Industry	1%	1%	2%	2%	2%	2%
Curtailment and Constraint	2020	10%	10%	21%	14%	19%	23%	
	2021	10%	10%	21%	14%	19%	23%	
	2022	10%	10%	20%	14%	18%	22%	
		Gen Shallow						12%
		Industry	2%	2%	5%	5%	8%	12%
		Future Grid						2%
		Industry Fut Grid						2%

Table 0-10 AREA B WIND for Subgroup Galway

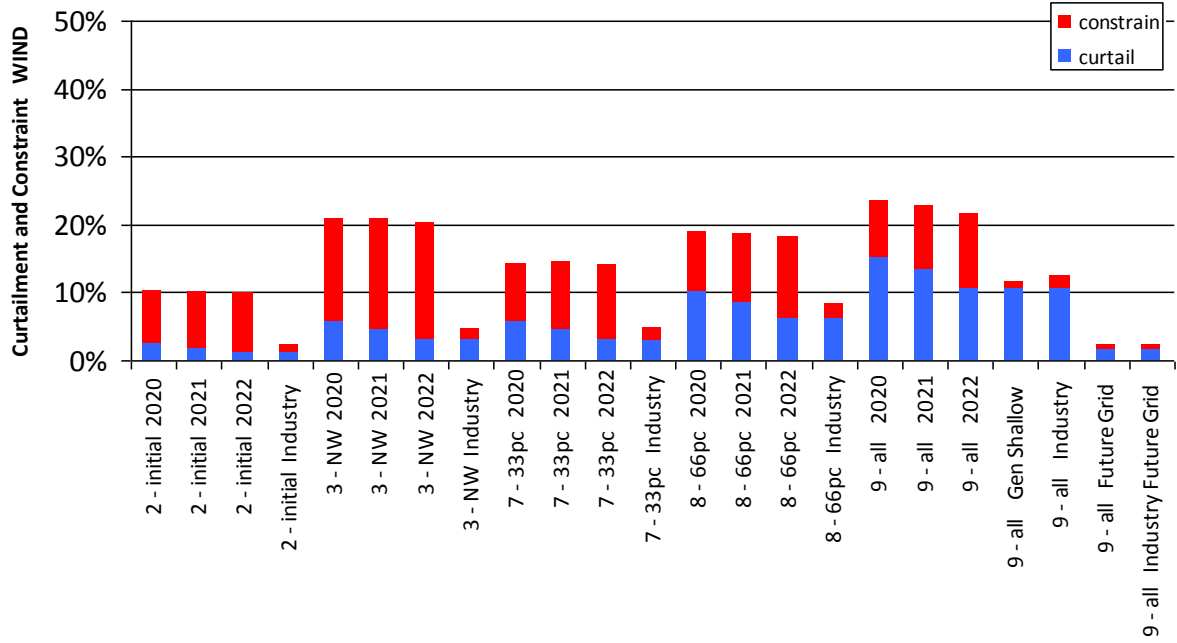


Figure 0-13 AREA B WIND for Subgroup Galway

WIND AREA C SOUTH	Year	Generation Scenarios					
		2020	Initial	NW	33%	66%	All
Total (MW)		29	29	78	45	60	78
of which is Controllable (MW)		10	10	59	26	42	59
Available Energy Controllable (GWh)		28	28	181	78	129	181
Curtailment (GWh)	2020	0.7	0.7	10.8	4.7	13.7	28.5
	2021	0.5	0.5	8.4	3.7	11.4	24.8
	2022	0.3	0.3	5.8	2.5	8.4	19.8
Constraint (GWh)	2020	0.1	0.2	0.3	0.6	1.7	3.1
	2021	0.2	0.2	0.8	1.8	3.2	5.8
	2022	0.2	0.2	0.7	0.5	1.8	3.9
Curtailment and Constraint (GWh)	2020	0.9	0.9	11.1	5.4	15.4	31.6
	2021	0.7	0.7	9.2	5.4	14.6	30.6
	2022	0.5	0.5	6.5	2.9	10.3	23.7
Curtailment	2020	3%	3%	6%	6%	11%	16%
	2021	2%	2%	5%	5%	9%	14%
	2022	1%	1%	3%	3%	7%	11%
	Gen Shallow						11%
	Industry	1%	1%	3%	3%	7%	11%
Constraint	2020	1%	1%	0%	1%	1%	2%
	2021	1%	1%	0%	2%	2%	3%
	2022	1%	1%	0%	1%	1%	2%
	Gen Shallow						3%
	Industry	2%	2%	2%	4%	5%	6%
Curtailment and Constraint	2020	3%	3%	6%	7%	12%	17%
	2021	2%	3%	5%	7%	11%	17%
	2022	2%	2%	4%	4%	8%	13%
	Gen Shallow						13%
	Industry	3%	4%	5%	7%	12%	17%
	Future Grid						2%
	Industry Future Grid						2%

Table 0-11 Results for Subgroup Area C South

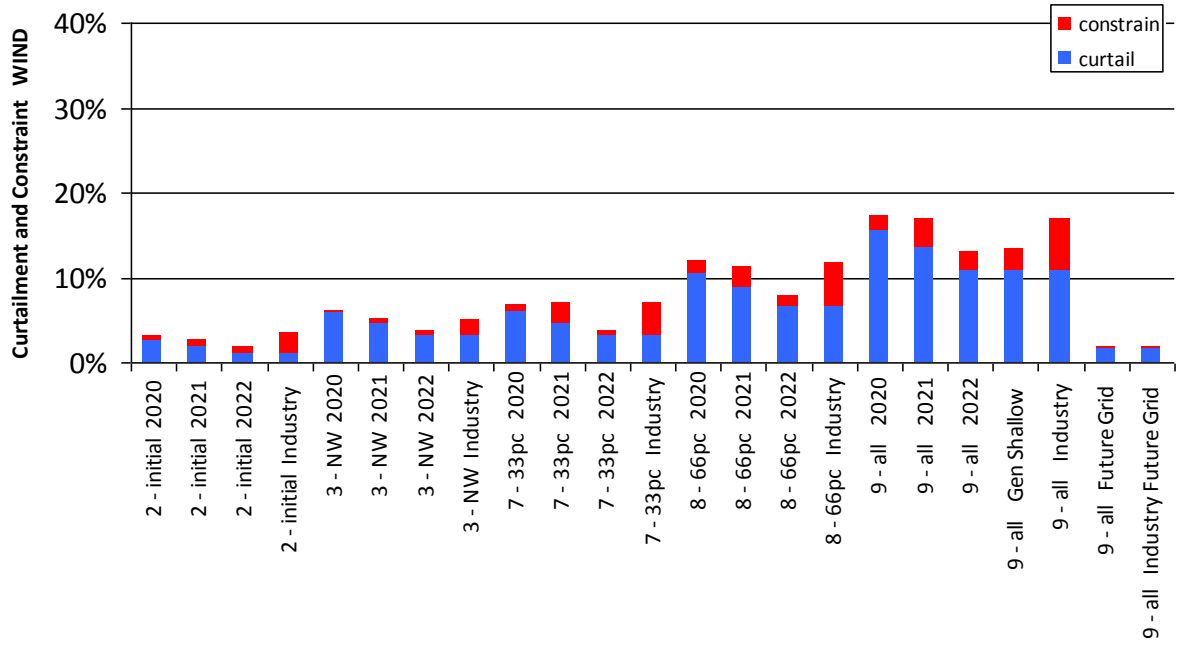


Figure 0-14 Results WIND – subgroup C South

C.4 Area D

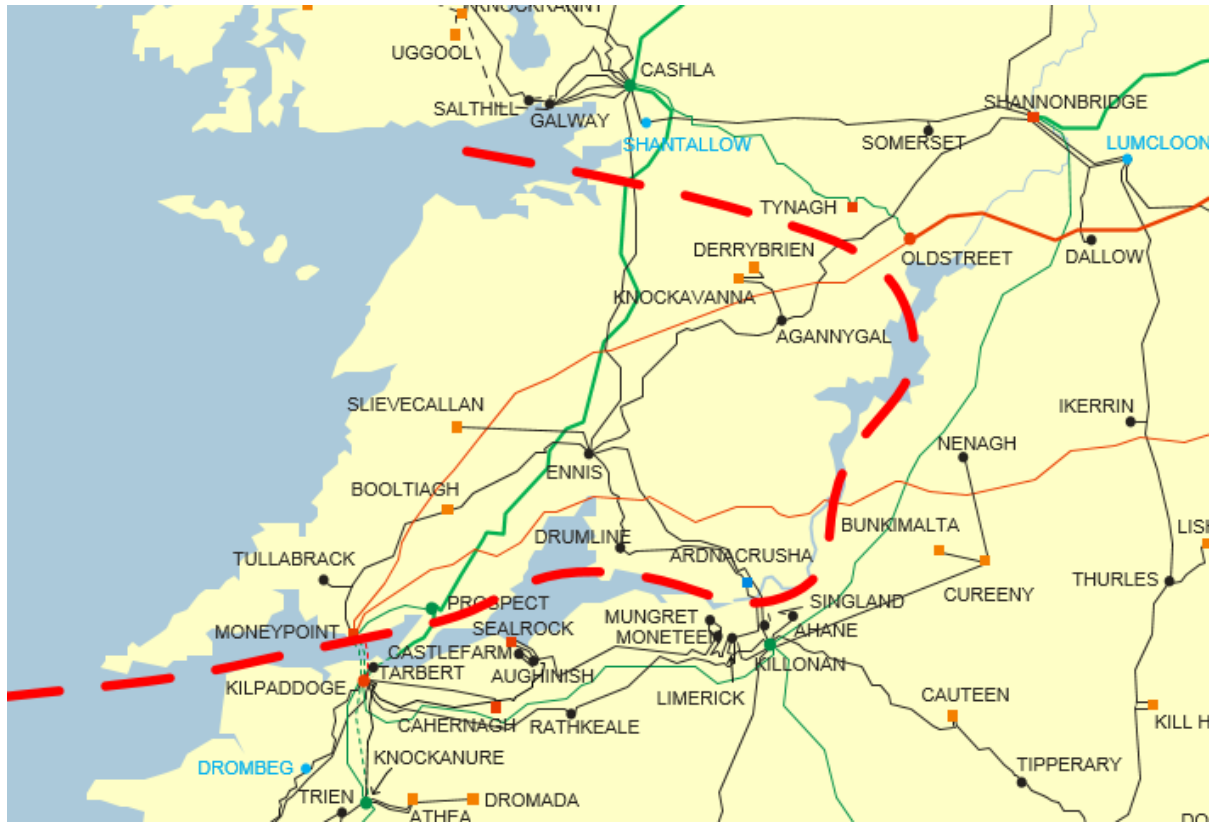


Figure 0-15 Area D

Area	Node	SO	Status	Solar	Wave	Wind
d	Ardnacrusha	DSO	Existing Offer	8		
d	Ardnacrusha	DSO	Initial			8
d	Ardnacrusha	TSO	Initial			
d	Booltiagh	DSO	ECP-1 Offer			23
d	Booltiagh	DSO	Existing Offer			24
d	Booltiagh	DSO	Initial			56
d	Booltiagh	DSO	Initial			5
d	Booltiagh	TSO	Initial			28
d	Booltiagh	TSO	Initial			3
d	Derrybrien	TSO	Initial			60
d	Drumline	DSO	ECP-1 Offer	4		
d	Drumline	DSO	Existing Offer	8		
d	Ennis	DSO	Existing Offer	4		
d	Slievecallan	TSO	Initial			71
d	Tullabrack	DSO	Existing Offer		5	
d	Tullabrack	DSO	Initial			26
d	Tullabrack	DSO	Initial			17
Subtotal				24	5	309

Table 0-12 Generation Summary in Area D

SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		0	24	8	16	24
of which is Controllable (MW)		0	24	8	16	24
Available Energy Controllable (GWh)		0	26	8	18	26
Curtailment (GWh)	2020		0.6	0.2	0.8	2.4
	2021		0.5	0.1	0.7	2.2
	2022		0.4	0	0.6	1.8
Constraint (GWh)	2020		0	0	0	0.2
	2021		0	0	0.1	0.2
	2022		0.8	0	0.1	0.2
Curtailment and Constraint (GWh)	2020		0.6	0.2	1	2.6
	2021		0.6	0.1	0.8	2.4
	2022		1.2	0.1	0.6	1.9
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	1%	1%
	2021		< 1%	< 1%	1%	1%
	2022		3%	< 1%	1%	1%
Curtailment and Constraint	2020		3%	2%	6%	10%
	2021		2%	2%	5%	9%
	2022		5%	2%	4%	8%
	Future Grid					2%

Table 0-13 Results for Area D Solar

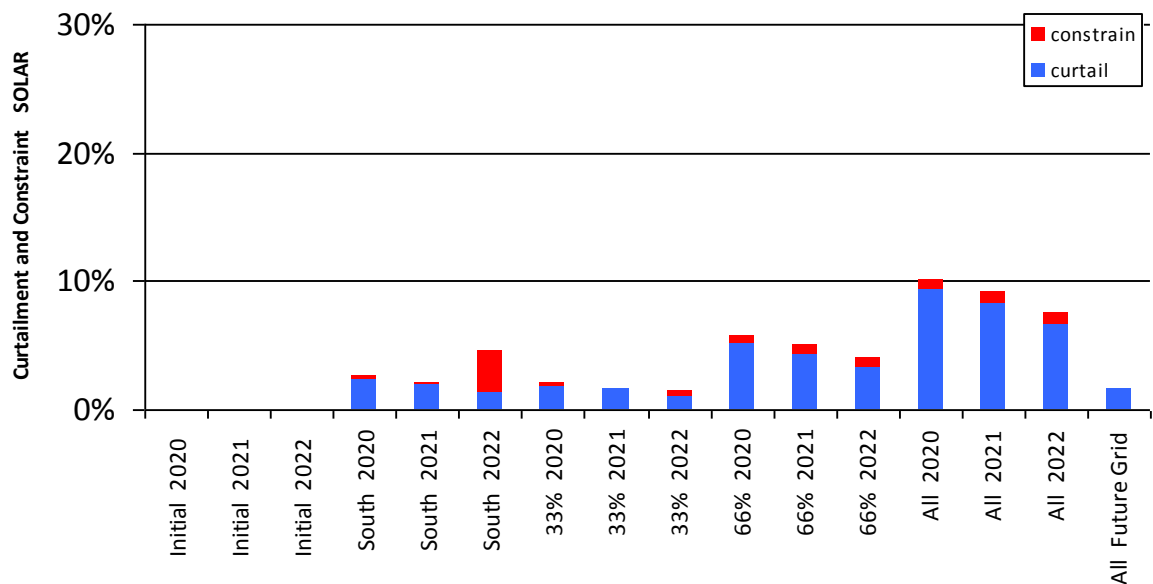


Figure 0-16 Curtailment and Constraint for Area D Solar

WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		263	315	280	298	315
of which is Controllable (MW)		238	290	255	272	290
Available Energy Controllable (GWh)		753	934	813	873	934
Curtailment (GWh)	2020	19.8	52.3	47	87.8	139.5
	2021	14	40.1	36.3	73.2	120.9
	2022	8.6	27.4	24.4	54	96.1
Constraint (GWh)	2020	2.3	10.3	5.4	7.5	8.7
	2021	4.1	13	5	6.6	9.7
	2022	8.5	41	14.9	17.2	18.8
Curtailment and Constraint (GWh)	2020	22.2	62.6	52.3	95.2	148.2
	2021	18.1	53.1	41.1	79.9	130.7
	2022	17.1	68.4	39.4	71.2	115
Curtailment	2020	3%	6%	6%	10%	15%
	2021	2%	4%	4%	8%	13%
	2022	1%	3%	3%	6%	10%
Constraint	2020	< 1%	1%	1%	1%	1%
	2021	1%	1%	1%	1%	1%
	2022	1%	4%	2%	2%	2%
Curtailment and Constraint	2020	3%	7%	6%	11%	16%
	2021	2%	6%	5%	9%	14%
	2022	2%	7%	5%	8%	12%
	Future Grid					2%

Table 0-14 Results for Area D Wind

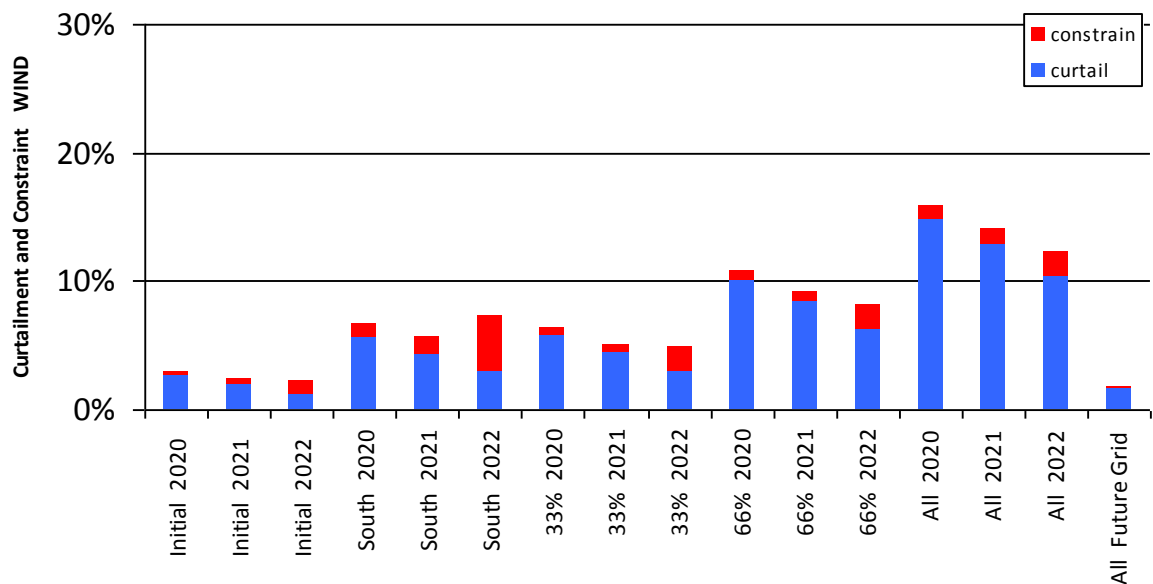


Figure 0-17 Curtailment and Constraint for Area D Wind

C.5 Area E

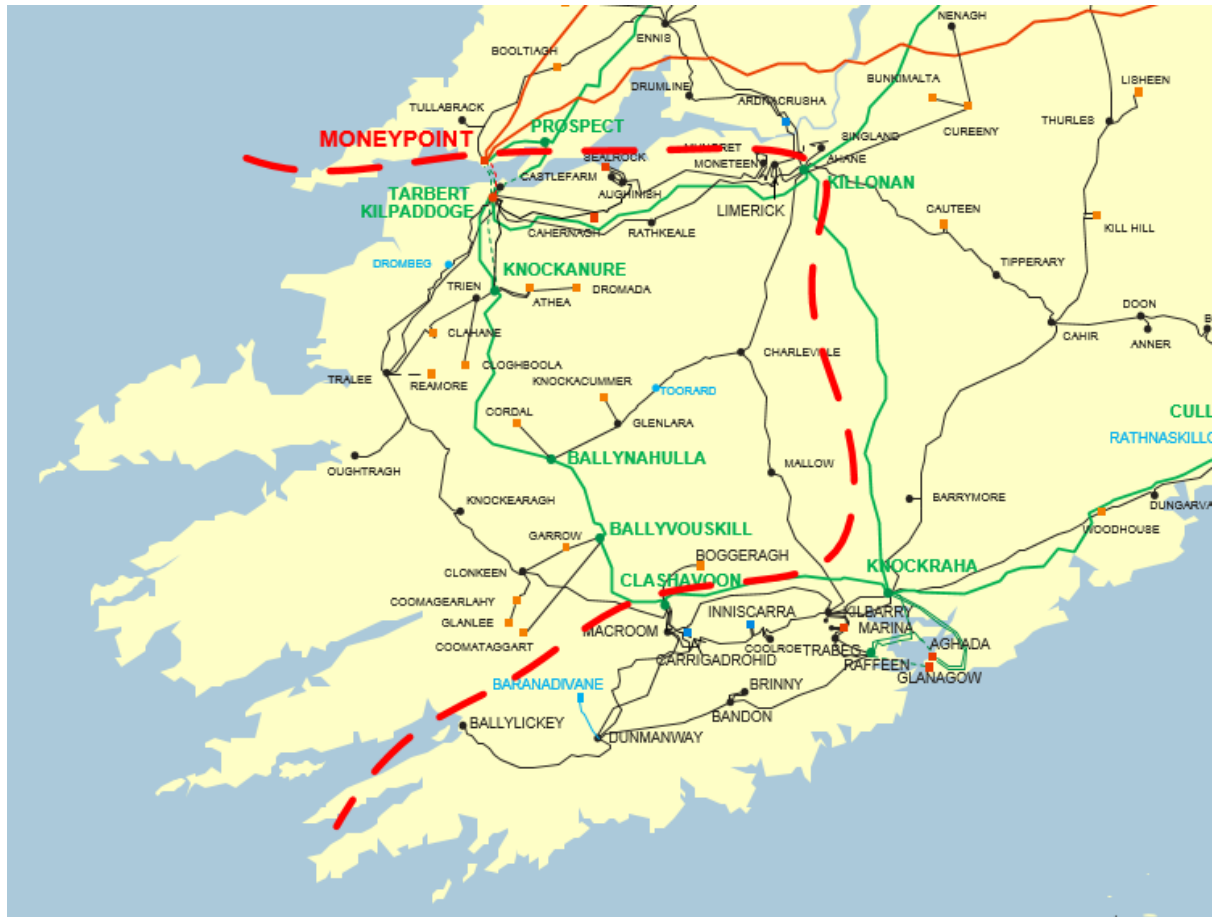


Figure 0-18 Map of Area E

Area	Node	SO	Status	Solar	Wind
e	Athea	DSO	Existing Offer		34
e	Athea	TSO	Existing Offer		34
e	Athea	TSO	Initial		34
e	Aughinish	TSO	Existing Offer	50	
e	Aughinish	TSO	Initial		
e	Boggeragh	DSO	ECP-1 Offer		15
e	Boggeragh	DSO	Existing Offer		11
e	Boggeragh	DSO	Initial		20
e	Boggeragh	TSO	Initial		123
e	Charleville	DSO	ECP-1 Offer		
e	Charleville	DSO	Existing Offer	30	
e	Charleville	DSO	Initial		51
e	Charleville	DSO	Initial		18
e	Clahane	TSO	Existing Offer	34	
e	Clahane	TSO	Initial		52
e	Cloghboola	DSO	Initial		55
e	Cloghboola	TSO	Initial		46
e	Coomagearlahy	TSO	Initial		81
e	Coomataggart	DSO	Initial		64
e	Coomataggart	TSO	Initial		114
e	Cordal	DSO	Initial		54
e	Cordal	DSO	Initial		4
e	Cordal	TSO	Initial		90
e	Dromada	TSO	Initial		29
e	Drombeg	TSO	Existing Offer	50	
e	Garrow	DSO	Initial		10
e	Garrow	DSO	Initial		5
e	Garrow	TSO	Initial		59
e	Glanlee	TSO	Initial		30
e	Glenlara	DSO	Existing Offer	5	
e	Glenlara	DSO	Initial		26
e	Glenlara 220kV side	DSO	Existing Offer		14
e	Glenlara 220kV side	DSO	Initial		27
e	Kilpaddoge	DSO	Initial		18
e	Kilpaddoge	TSO	ECP-1 Offer		
e	Kilpaddoge	TSO	Initial		42
e	Knockacummer	TSO	Initial		100
e	Knockearagh	DSO	ECP-1 Offer	5	
e	Knockearagh	DSO	Existing Offer	4	
e	Knockearagh	DSO	Initial		9
e	Knockearagh	DSO	Initial		5
e	Limerick	DSO	Existing Offer	4	
e	Mallow	DSO	ECP-1 Offer	10	
e	Mallow	DSO	Existing Offer	4	
e	Mallow	DSO	Initial	5	

Area	Node	SO	Status	Solar	Wind
e	Moneypoint	TSO	Existing Offer		
e	Moneypoint	TSO	Initial		17
e	Oughtragh	DSO	Existing Offer	4	
e	Oughtragh	DSO	Initial		9
e	Rathkeale	DSO	ECP-1 Offer	4	
e	Rathkeale	DSO	Initial		28
e	Rathkeale	DSO	Initial		5
e	Reamore	DSO	ECP-1 Offer		
e	Reamore	DSO	Existing Offer		39
e	Reamore	DSO	Initial		58
e	Reamore	DSO	Initial		2
e	Toorard	TSO	ECP-1 Offer	40	
e	Tralee	DSO	ECP-1 Offer	4	
e	Tralee	DSO	Existing Offer	4	
e	Tralee	DSO	Initial		15
e	Tralee	DSO	Initial		33
e	Trien	DSO	Existing Offer	4	
e	Trien	DSO	Initial		8
e	Trien	DSO	Initial		19
e	Trien 220kV side	DSO	Existing Offer		7
e	Trien 220kV side	DSO	Initial		40
Subtotal				261	1552

Table 0-15 Generation Summary in Area E

SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		0	261	87	173	261
of which is Controllable (MW)		0	261	87	173	261
Available Energy Controllable (GWh)		0	280	92	188	280
Curtailment (GWh)	2020		6.7	1.5	9.6	26.1
	2021		5.4	1.4	7.9	23.5
	2022		3.9	0.9	5.9	19.1
Constraint (GWh)	2020		0.3	0	0	0.4
	2021		0	0	0	0
	2022		0	0	0	0
Curtailment and Constraint (GWh)	2020		6.7	1.8	10	26.6
	2021		5.4	1.4	8.3	23.6
	2022		3.9	0.9	6.2	19.4
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-16 Results for Area E Solar

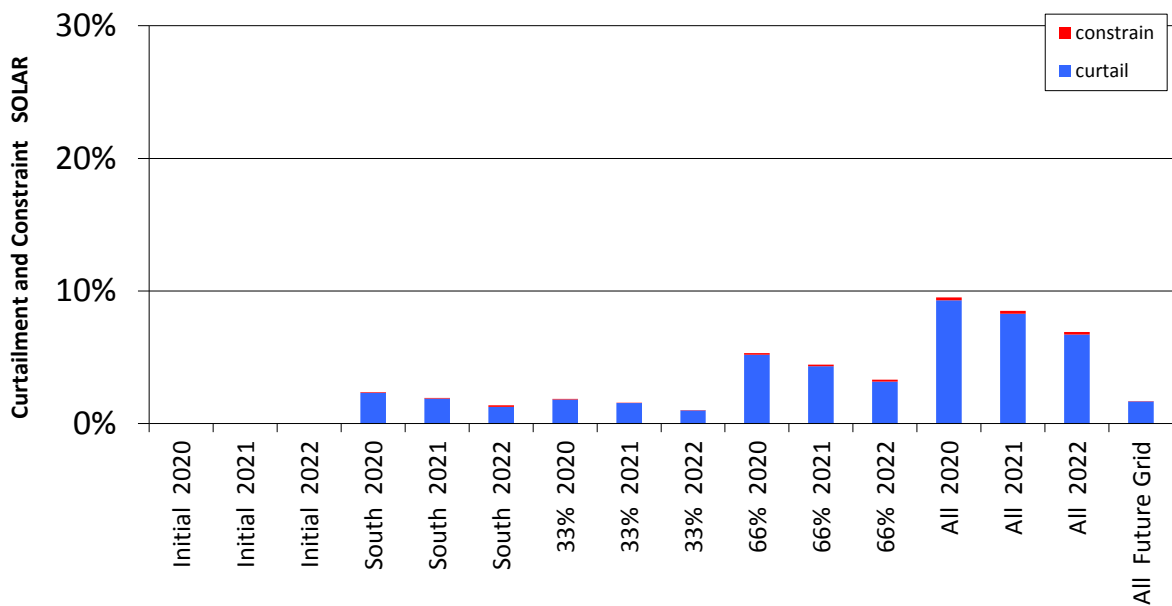


Figure 0-19 Curtailment and Constraint for Area E Solar

WIND	Year	Wind Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		1400	1552	1450	1500	1552
of which is Controllable (MW)		1309	1462	1360	1409	1462
Available Energy Controllable (GWh)		3616	4099	3776	3935	4099
Curtailment (GWh)	2020	91.7	221.2	210.7	380	586.7
	2021	66	170.4	162.7	317.2	508.2
	2022	40.6	116.2	110.4	234.2	403.4
Constraint (GWh)	2020	12.4	17	11.2	13.5	14.8
	2021	5.6	43.6	7	10.1	13.8
	2022	2.1	35.3	3.8	5.3	9.3
Curtailment and Constraint (GWh)	2020	104	238.2	222.1	393.5	601.7
	2021	71.9	213.8	169.8	327.5	521.6
	2022	42.9	151.6	114.1	239.2	413.4
Curtailment	2020	3%	5%	6%	10%	14%
	2021	2%	4%	4%	8%	12%
	2022	1%	3%	3%	6%	10%
Constraint	2020	< 1%	< 1%	< 1%	< 1%	< 1%
	2021	< 1%	1%	< 1%	< 1%	< 1%
	2022	< 1%	1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020	3%	6%	6%	10%	15%
	2021	2%	5%	4%	8%	13%
	2022	1%	4%	3%	6%	10%
	Future Grid					2%

Table 0-17 Results for Area E Wind

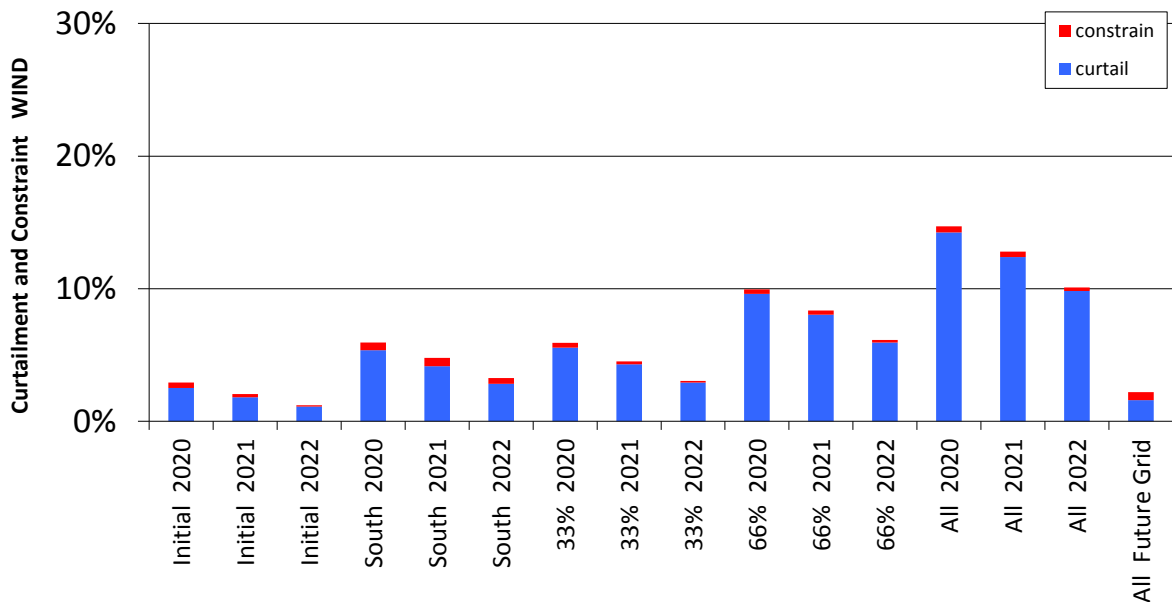


Figure 0-20 Curtailment and Constraint for Area E Wind

C.6 Area F

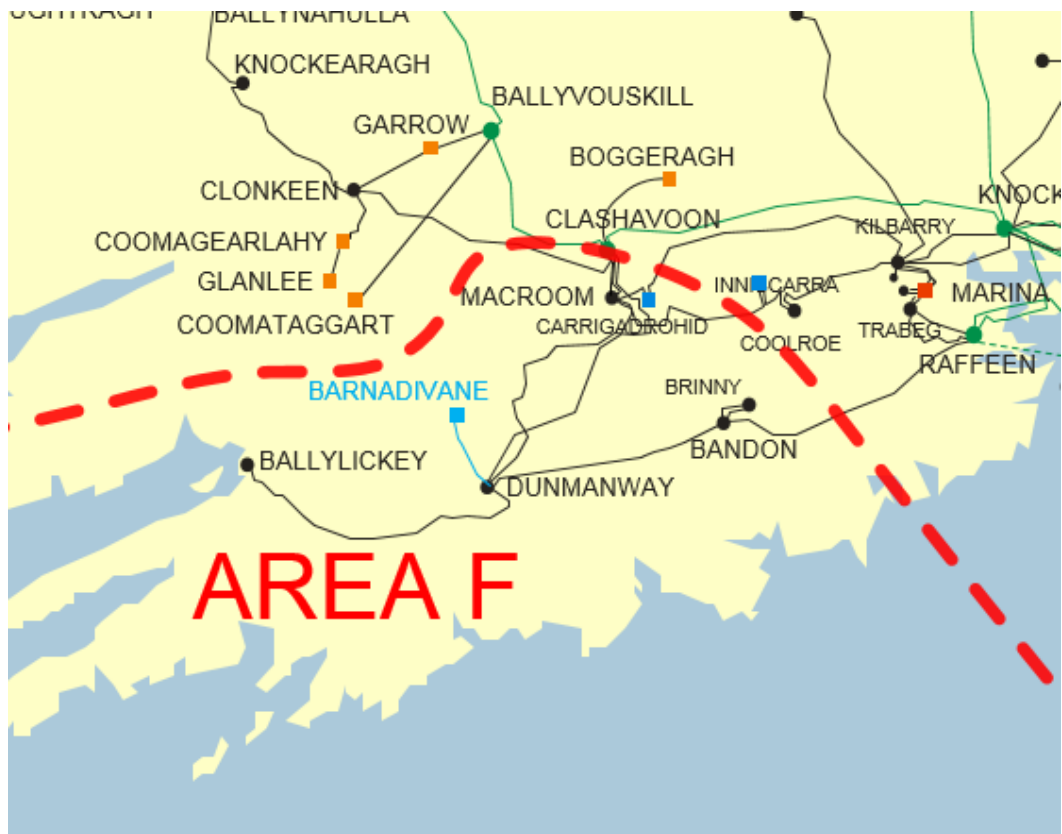


Figure 0-21 Map of Area F

Area	Node	SO	Status	Solar	Wind
f	Ballylickey	DSO	Initial		54
f	Ballylickey	DSO	Initial		6
f	Bandon	DSO	ECP-1 Offer	20	
f	Bandon	DSO	Initial		9
f	Bandon	DSO	Initial		5
f	Dunmanway	DSO	ECP-1 Offer		24
f	Dunmanway	DSO	Existing Offer		6
f	Dunmanway	DSO	Existing Offer		5
f	Dunmanway	DSO	Initial		37
f	Dunmanway	DSO	Initial		13
f	Dunmanway	TSO	ECP-1 Offer		8
f	Dunmanway	TSO	Existing Offer		60
f	Macroom	DSO	Existing Offer	4	
f	Macroom	DSO	Initial		24
Subtotal				24	250

Table 0-18 Generation Summary in Area F

Subgroup Solar	Subgroup Solar	Subgroup Wind	Subgroup Wind	Subgroup Wind
Bandon	Macroom	Ballylickey	Bandon	Macroom
		Dunmanway		
		Barnadivane		

Table 0-19 Subgroups in Area F for Solar and Wind

BANDON SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
		Installed (MW)	0	20	7	
of which is Controllable (MW)	0	20	7	13	20	
Available Energy Controllable (GWh)		0	21	7	14	21
Curtailment (GWh)	2020	0.0	0.5	0.1	0.7	2.0
	2021	0.0	0.4	0.1	0.6	1.8
	2022	0.0	0.3	0.1	0.5	1.4
Constraint (GWh)	2020	0.0	0.0	0.0	0.1	0.1
	2021	0.0	0.0	0.0	0.1	0.1
	2022	0.0	0.0	0.0	0.0	0.1
Curtailment and Constraint (GWh)	2020	0.0	0.5	0.1	0.8	2.1
	2021	0.0	0.4	0.1	0.7	1.9
	2022	0.0	0.3	0.1	0.5	1.5
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		3%	2%	6%	10%
	2021		2%	2%	5%	9%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-20 Results for Bandon Solar

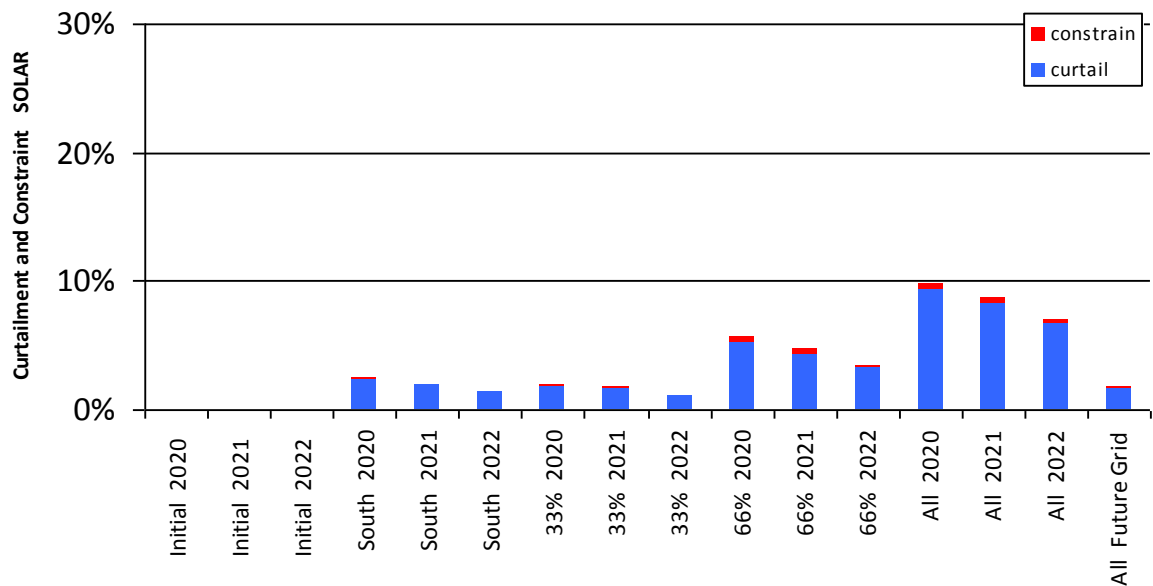


Figure 0-22 Curtailment and Constraint for Bandon Solar

MACROOM SOLAR	Year	Solar Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		0	4	1	3	4
of which is Controllable (MW)		0	4	1	3	4
Available Energy Controllable (GWh)		0	4	1	3	4
Curtailment (GWh)	2020		0.1	0.0	0.1	0.4
	2021		0.1	0.0	0.1	0.4
	2022		0.1	0.0	0.1	0.3
Constraint (GWh)	2020		0.0	0.0	0.0	0.0
	2021		0.0	0.0	0.0	0.0
	2022		0.0	0.0	0.0	0.0
Curtailment and Constraint (GWh)	2020		0.1	0.0	0.2	0.4
	2021		0.1	0.0	0.1	0.4
	2022		0.1	0.0	0.1	0.3
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		3%	2%	5%	10%
	2021		2%	2%	5%	9%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-21 Results for Macroom Solar

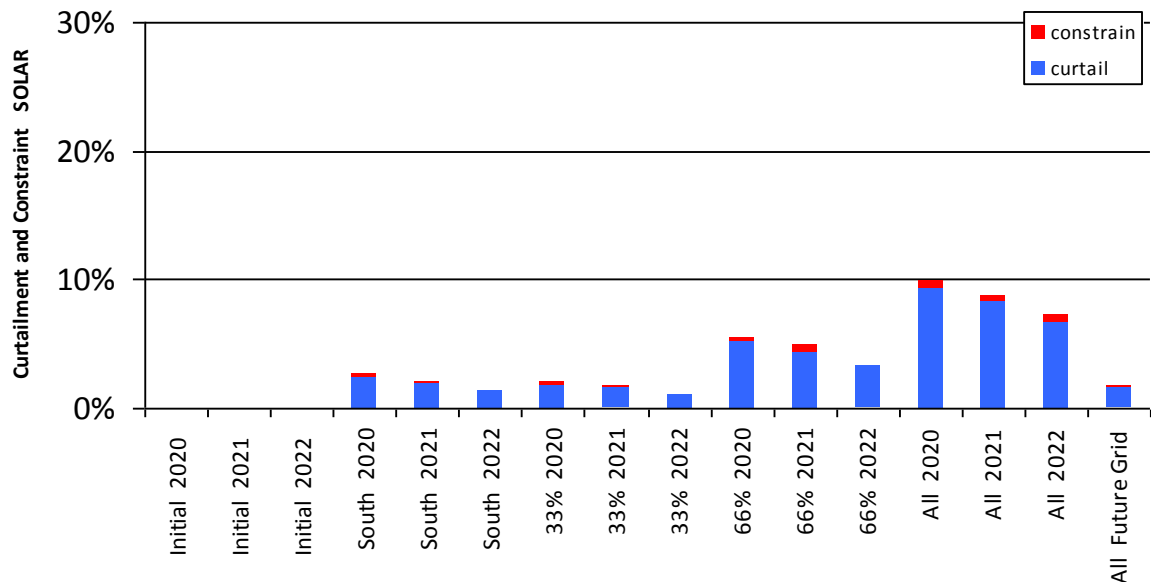


Figure 0-23 Curtailment and Constraint for Macroom Solar

BALLYLICKEY and DUNMANWAY WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
		Installed (MW)	110	213	144	178
of which is Controllable (MW)	85	182	117	149	182	
Available Energy Controllable (GWh)		274	583	376	478	583
Curtailment (GWh)	2020	6.9	31.4	20.8	46.2	83.4
	2021	5	24.4	16.2	39	72.9
	2022	3	16.5	11	28.7	57.8
Constraint (GWh)	2020	1.6	25.1	4.1	8.7	13.1
	2021	2.1	20	3.2	5.5	9.3
	2022	0.8	17	2.1	5.1	9.4
Curtailment and Constraint (GWh)	2020	8.5	56.5	25	54.9	96.5
	2021	7.1	44.3	19.5	44.5	82.1
	2022	3.8	33.5	13.1	33.8	67.3
Curtailment	2020	3%	5%	6%	10%	14%
	2021	2%	4%	4%	8%	13%
	2022	1%	3%	3%	6%	10%
Constraint	2020	1%	4%	1%	2%	2%
	2021	1%	3%	1%	1%	2%
	2022	< 1%	3%	1%	1%	2%
Curtailment and Constraint	2020	3%	10%	7%	11%	16%
	2021	3%	8%	5%	9%	14%
	2022	1%	6%	3%	7%	12%
	Future Grid					2%

Table 0-22 Results for Ballylickey and Dunmanway Wind

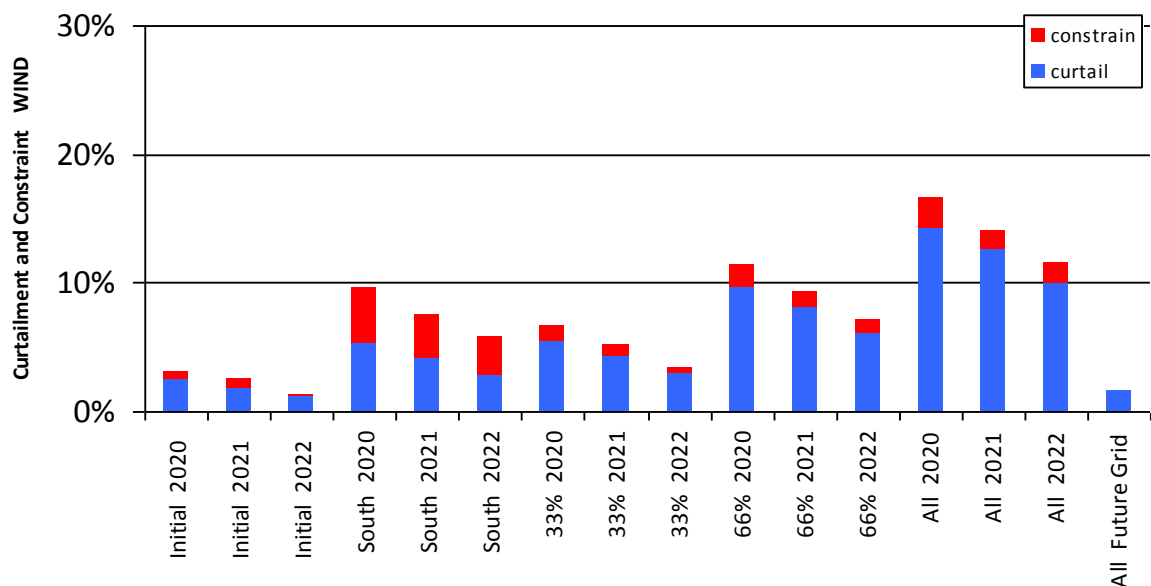


Figure 0-24 Curtailment and Constraint for Ballylickey and Dunmanway

BANDON WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		13	13	13	13	13
of which is Controllable (MW)		9	9	9	9	9
Available Energy Controllable (GWh)		24	24	24	24	24
Curtailment (GWh)	2020	0.6	1.4	1.4	2.5	3.7
	2021	0.4	1.1	1.1	2.1	3.2
	2022	0.3	0.7	0.7	1.5	2.5
Constraint (GWh)	2020	0.1	0.4	0.3	0.3	0.3
	2021	0.2	0.5	0.2	0.3	0.3
	2022	0.1	0.2	0.1	0.2	0.2
Curtailment and Constraint (GWh)	2020	0.8	1.7	1.6	2.7	4.0
	2021	0.6	1.5	1.3	2.4	3.5
	2022	0.3	0.9	0.8	1.7	2.8
Curtailment	2020	3%	6%	6%	10%	15%
	2021	2%	4%	4%	8%	13%
	2022	1%	3%	3%	6%	10%
Constraint	2020	1%	1%	1%	1%	1%
	2021	1%	2%	1%	1%	1%
	2022	< 1%	1%	1%	1%	1%
Curtailment and Constraint	2020	3%	7%	7%	11%	16%
	2021	3%	6%	5%	10%	14%
	2022	1%	4%	3%	7%	11%
	Future Grid					2%

Table 0-23 Results for Bandon Wind

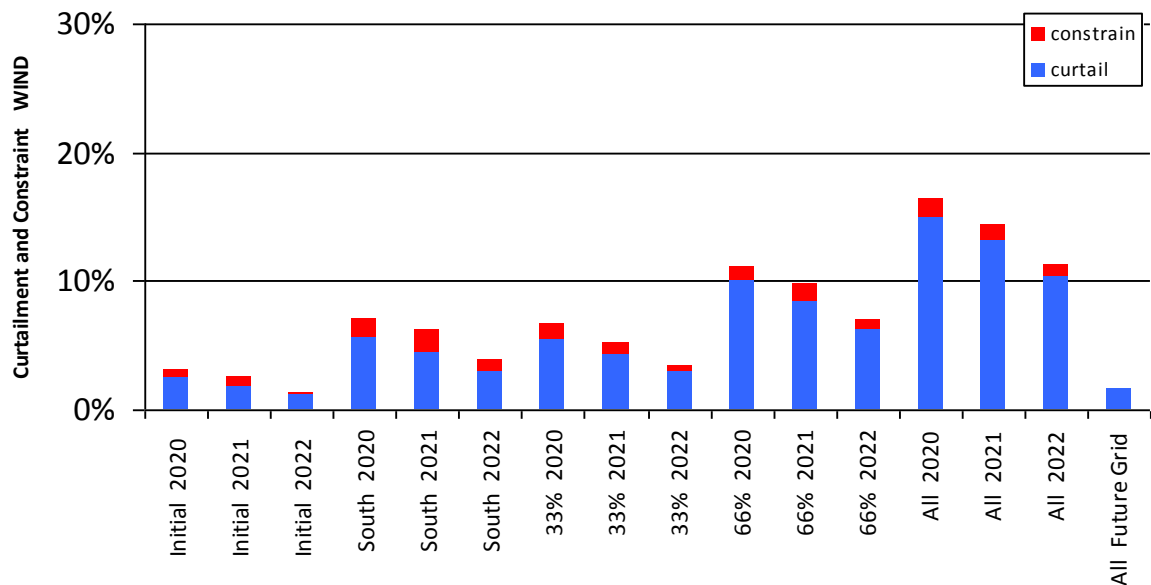


Figure 0-25 Curtailment and Constraint for Bandon Wind

MACROOM WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		24	24	24	24	24
of which is Controllable (MW)		24	24	24	24	24
Available Energy Controllable (GWh)		76	76	76	76	76
Curtailment (GWh)	2020	1.9	3.9	4.2	6.9	10.4
	2021	1.4	3.0	3.3	5.8	9.1
	2022	0.8	2.0	2.2	4.3	7.2
Constraint (GWh)	2020	0.5	0.4	0.8	0.4	0.6
	2021	0.6	0.5	0.7	0.5	0.4
	2022	0.2	0.4	0.4	0.2	0.3
Curtailment and Constraint (GWh)	2020	2.4	4.2	5.1	7.3	11.0
	2021	2.0	3.5	3.9	6.4	9.5
	2022	1.1	2.4	2.6	4.5	7.5
Curtailment	2020	3%	5%	6%	9%	14%
	2021	2%	4%	4%	8%	12%
	2022	1%	3%	3%	6%	9%
Constraint	2020	1%	< 1%	1%	1%	1%
	2021	1%	1%	1%	1%	1%
	2022	< 1%	1%	1%	< 1%	< 1%
Curtailment and Constraint	2020	3%	6%	7%	10%	14%
	2021	3%	5%	5%	8%	13%
	2022	1%	3%	3%	6%	10%
	Future Grid					2%

Table 0-24 Results for Macroom Wind

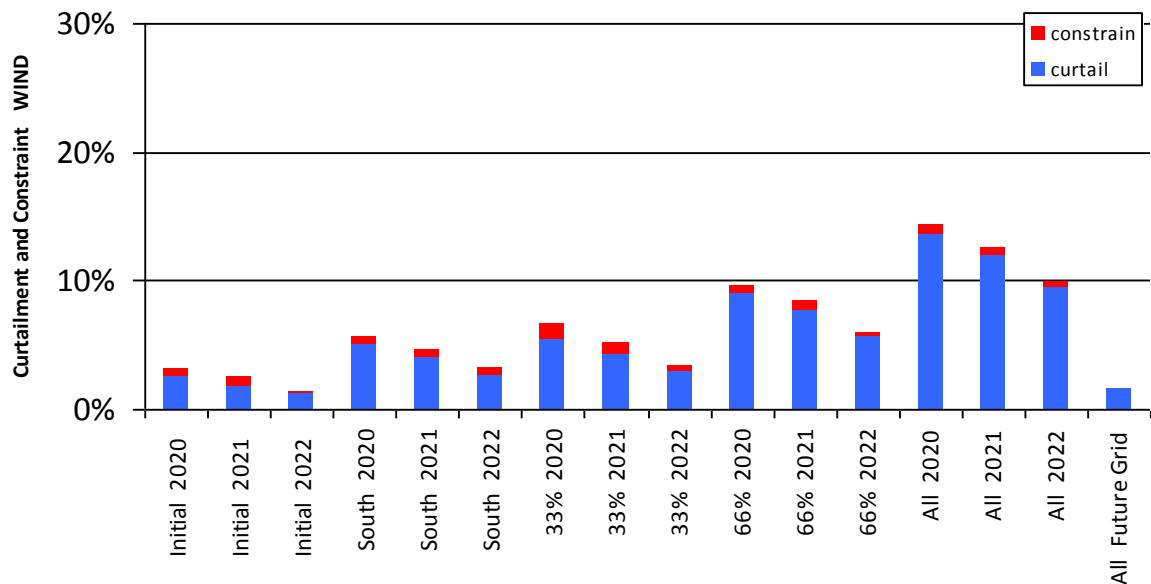


Figure 0-26 Curtailment and Constraint for Macroom Wind

C.7 Area G

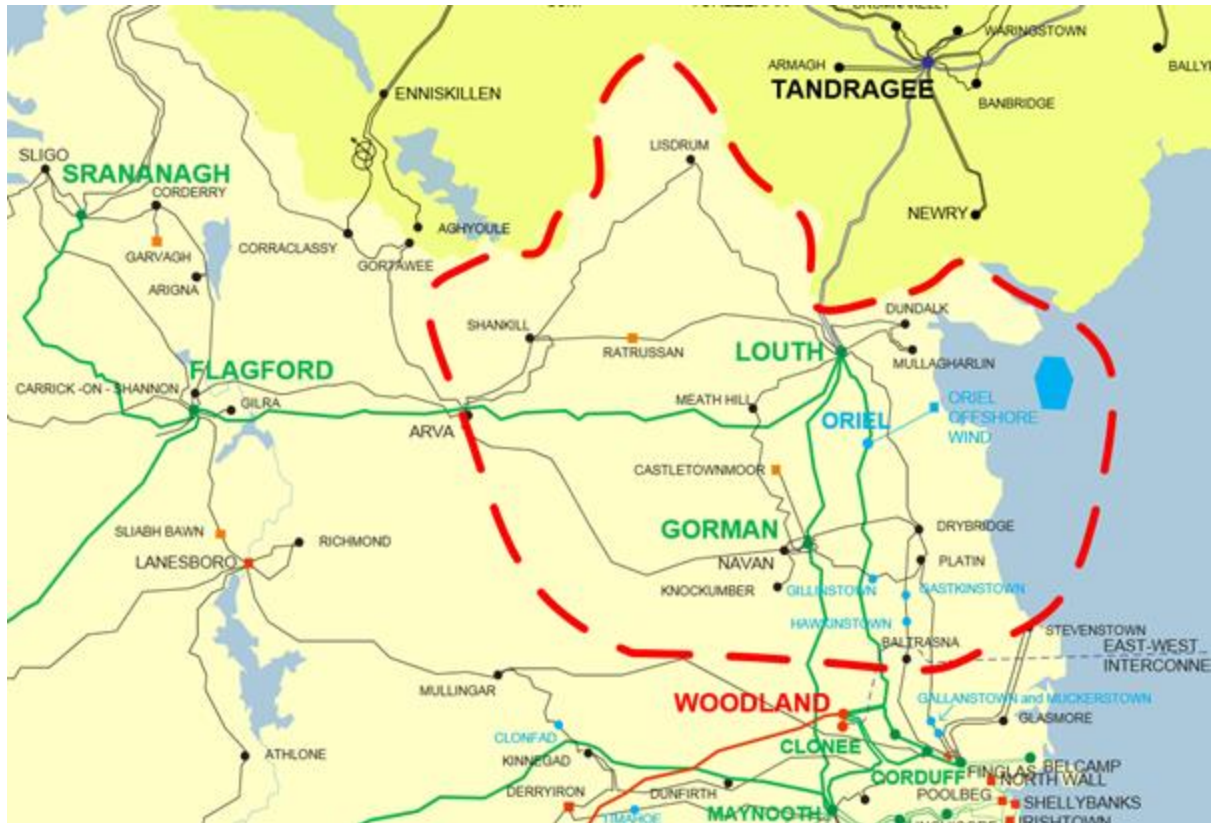


Figure 0-27 Map of Area G

Node	SO	Status	Battery	Solar	Thermal	Wind
Baltrasna	DSO	Existing Offer		20		
Drybridge	DSO	ECP-1 Offer		11		
Drybridge	DSO	Existing Offer		8	3	
Drybridge	DSO	Initial			27	
Drybridge	DSO	Initial				6
Dundalk	DSO	ECP-1 Offer		4		3
Dundalk	DSO	Existing Offer				15
Dundalk	DSO	Initial			2	16
Gaskinstown	TSO	ECP-1 Offer		85		
Gillinstown	TSO	ECP-1 Offer		95		
Gorman	TSO	ECP-1 Offer	50			
Gorman	TSO	Existing Offer				120
Hawkinstown	TSO	Existing Offer		50		
Lisdrum	DSO	Existing Offer				33.1
Lisdrum	TSO	ECP-1 Offer	60			
Meath Hill	DSO	ECP-1 Offer	33		4	23
Meath Hill	DSO	Initial			5	39
Meath Hill	DSO	Initial				7
Navan	DSO	ECP-1 Offer		4		
Navan	DSO	Existing Offer		9	13	
Oriel	TSO	Existing Offer				210
Ratrussan	TSO	Initial				79
Shankill	DSO	Existing Offer		4		
Shankill	DSO	Initial				22
Shankill	DSO	Initial				6
Subtotal			143	290	53	578

Table 0-25 Generation Summary in Area G

Subgroup Solar	Subgroup Wind	Subgroup Wind	Subgroup Wind
Area G Main	Area G Main	Ratrussan	Oriel

Table 0-26 Subgroups in Area G for Solar and Wind

AREA G MAIN SOLAR	Year	Solar Generation Scenarios				
		Initial	North East	33%	66%	All
Installed (MW)		0	290	95	193	290
of which is Controllable (MW)		0	290	95	193	290
Available Energy Controllable (GWh)		0	285	92	188	285
Curtailment (GWh)	2020		6.4	1.7	9.8	26.7
	2021		5.3	1.5	8.2	23.6
	2022		3.4	1	6.1	19.3
Constraint (GWh)	2020		3.4	0	0.2	2.3
	2021		2.9	0	0.2	1.8
	2022		3.2	0	0	1.8
Curtailment and Constraint (GWh)	2020		9.9	1.7	9.9	28.7
	2021		8.3	1.5	8.4	25.7
	2022		6.9	1	6.1	21.1
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		1%	< 1%	< 1%	1%
	2021		1%	< 1%	< 1%	1%
	2022		1%	< 1%	< 1%	1%
Curtailment and Constraint	2020		4%	2%	5%	10%
	2021		3%	2%	4%	9%
	2022		2%	1%	3%	7%
Interconnectors / Future Grid						3% / 3%

Table 0-27 Results for Area G Main Solar

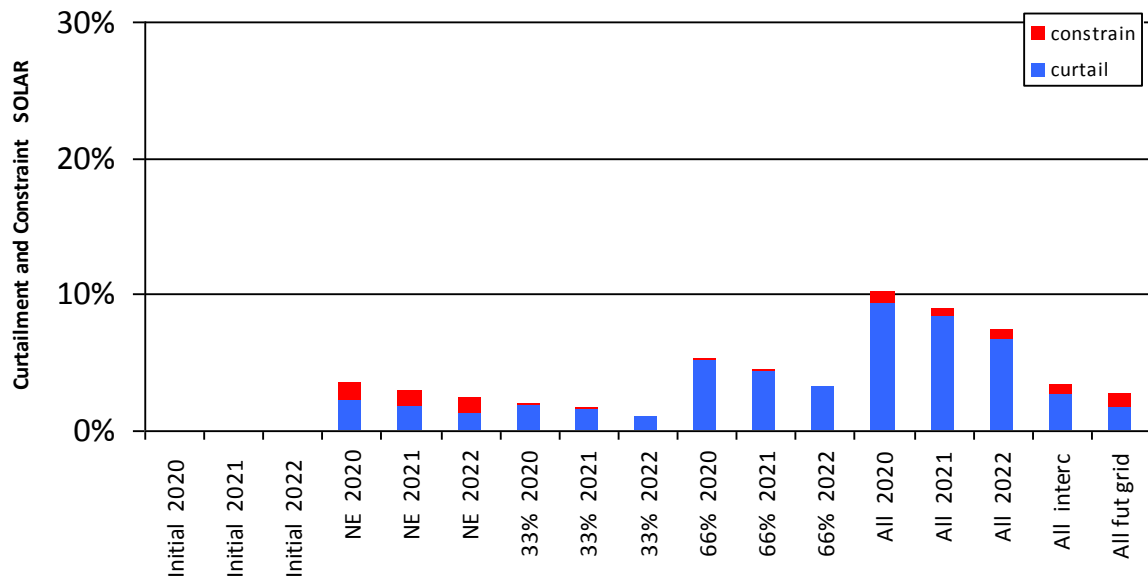


Figure 0-28 Curtailment and Constraint for Area G Main Solar

AREA G MAIN WIND	Year	Wind Generation Scenarios				All
		Initial	North East	33%	66%	
Installed (MW)		28	28	28	28	28
of which is Controllable (MW)		22	22	22	22	22
Available Energy Controllable (GWh)		68	68	68	68	68
Curtailment (GWh)	2020	1.8	4.3	4.0	7.1	10.6
	2021	1.3	3.2	3.1	5.9	9.2
	2022	0.8	2.2	2.1	4.3	7.3
Constraint (GWh)	2020	0.4	0.3	0.3	0.3	0.3
	2021	0.4	0.3	0.3	0.3	0.3
	2022	0.4	0.2	0.1	0.2	0.2
Curtailment and Constraint (GWh)	2020	2.2	4.6	4.3	7.4	10.9
	2021	1.7	3.5	3.3	6.2	9.4
	2022	1.3	2.4	2.2	4.5	7.5
Curtailment	2020	3%	6%	6%	10%	15%
	2021	2%	5%	4%	9%	13%
	2022	1%	3%	3%	6%	11%
Constraint	2020	1%	< 1%	< 1%	< 1%	< 1%
	2021	1%	< 1%	< 1%	< 1%	< 1%
	2022	1%	< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020	3%	7%	6%	11%	16%
	2021	2%	5%	5%	9%	14%
	2022	2%	4%	3%	7%	11%
Interconnectors / Future Grid						3% / 2%

Table 0-28 Results for Area G Main Wind

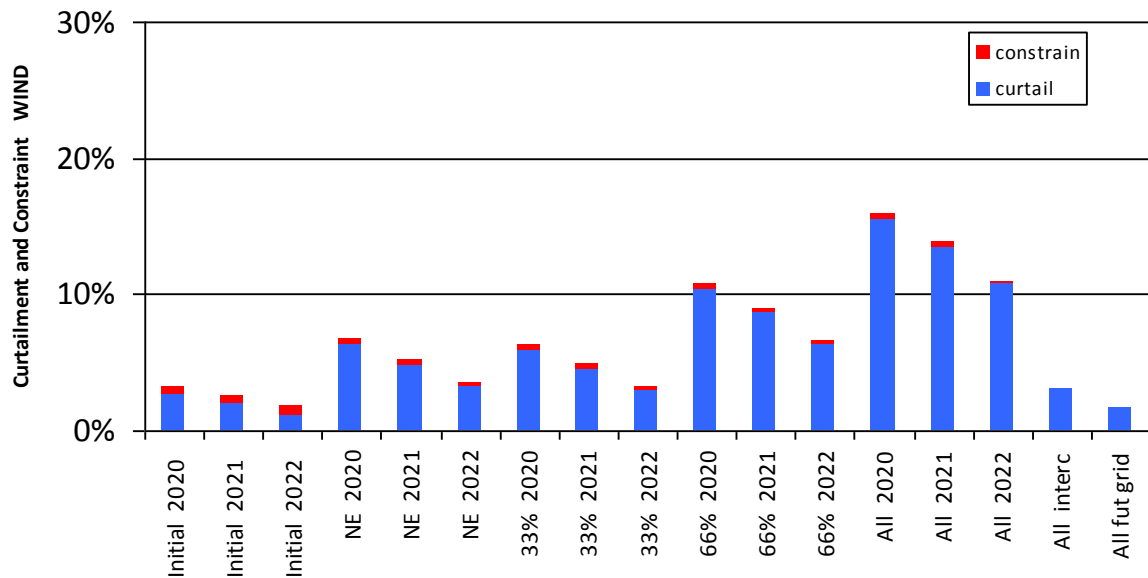


Figure 0-29 Curtailment and Constraint for Area G Main Wind

RATRUSAN WIND	Year	Wind Generation Scenarios				
		Initial	North East	33%	66%	All
Installed (MW)		79	79	79	79	79
of which is Controllable (MW)		79	79	79	79	79
Available Energy Controllable (GWh)		216	216	216	216	216
Curtailment (GWh)	2020	5.8	14.5	13.7	24.0	35.4
	2021	4.1	11.1	10.6	20.0	30.7
	2022	2.5	7.6	7.2	14.8	24.6
Constraint (GWh)	2020	1.2	2.0	2.0	1.3	1.1
	2021	1.2	2.9	1.9	2.0	1.3
	2022	1.4	4.0	3.4	3.2	2.2
Curtailment and Constraint (GWh)	2020	7.0	16.5	15.7	25.3	36.5
	2021	5.4	14.0	12.5	22.0	32.0
	2022	4.0	11.6	10.5	18.0	26.8
Curtailment	2020	3%	7%	6%	11%	16%
	2021	2%	5%	5%	9%	14%
	2022	1%	4%	3%	7%	11%
Constraint	2020	1%	1%	1%	1%	1%
	2021	1%	1%	1%	1%	1%
	2022	1%	2%	2%	1%	1%
Curtailment and Constraint	2020	3%	8%	7%	12%	17%
	2021	2%	6%	6%	10%	15%
	2022	2%	5%	5%	8%	12%
See Also Section 4.5 Node at a Poor Location in This Specific Study	Interconnectors / Future Grid					6% / 20%

Table 0-29 Results for Ratrussan Wind

While Ratrussan is located in Area G, its curtailment and constraint values became very high in one scenario for the updated reports for Area A, B and C. This is described further in Section 4.5.

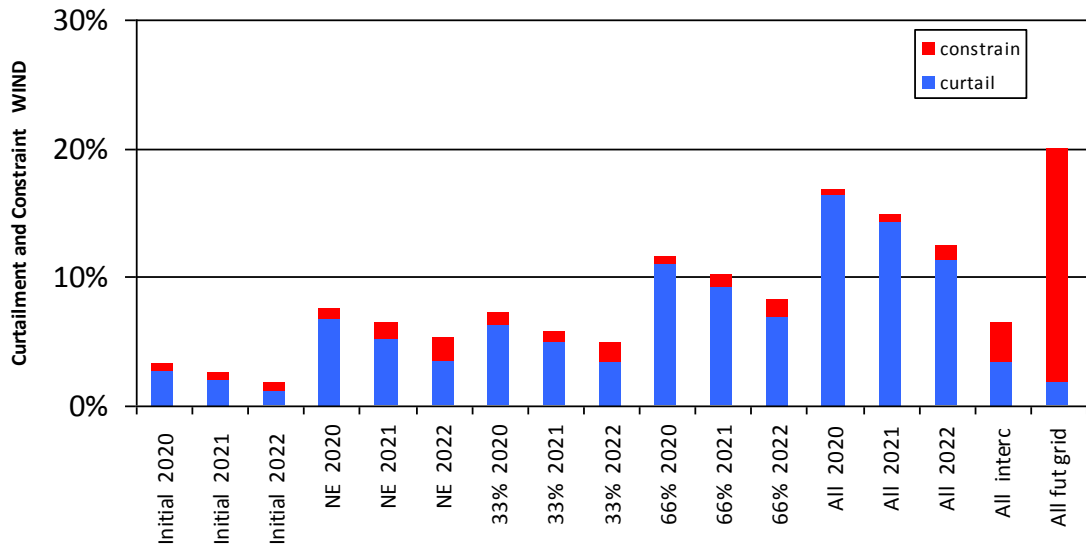


Figure 0-30 Curtailment and Constraint for Ratrussan Wind

ORIEL WIND	Year	Wind Generation Scenarios				
		Initial	North East	33%	66%	All
Installed (MW)		0	210	69	139	210
of which is Controllable (MW)		0	210	69	139	210
Available Energy Controllable (GWh)		0	820	271	542	820
Curtailed (GWh)	2020	0.0	44.1	13.5	49.3	113.5
	2021	0.0	33.2	10.3	40.5	97.1
	2022	0.0	22.6	6.9	29.6	77.1
Constraint (GWh)	2020	0.0	1.9	0.9	1.7	2.1
	2021	0.0	8.6	2.2	4.3	9.4
	2022	0.0	15.2	2.1	8.4	16.9
Curtailed and Constraint (GWh)	2020	0.0	46.0	14.3	51.0	115.6
	2021	0.0	41.9	12.5	44.8	106.5
	2022	0.0	37.8	9.0	38.0	94.0
Curtailed	2020		5%	5%	9%	14%
	2021		4%	4%	7%	12%
	2022		3%	3%	5%	9%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		1%	1%	1%	1%
	2022		3%	1%	2%	2%
Curtailed and Constraint	2020		6%	5%	9%	14%
	2021		5%	5%	8%	13%
	2022		5%	3%	7%	11%
	Interconnectors / Future Grid					3% / 2%

Table 0-30 Results for Oriel Wind

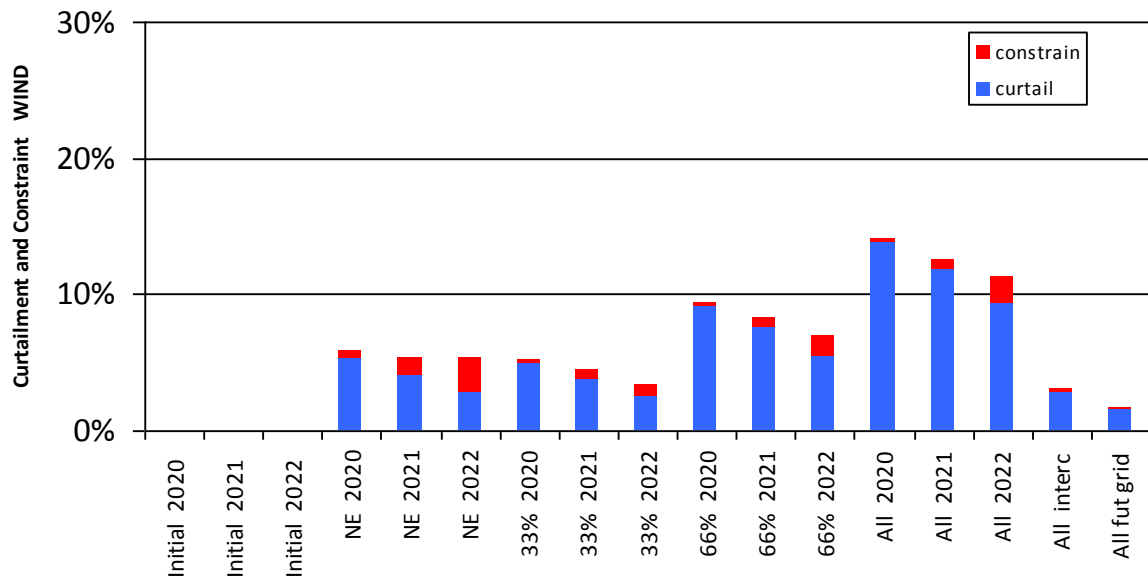


Figure 0-31 Curtailment and Constraint for Oriel Wind

C.8 Area H1



Figure 0-32 Network map of Area H1

Area	Node	SO	Status	Solar	Thermal	Wind
h1	Ahane	DSO	Existing Offer	8		
h1	Ballydine	DSO	Existing Offer	7		
h1	Barrymore	DSO	ECP-1 Offer	10		
h1	Barrymore	DSO	Initial		9	32
h1	Cahir	DSO	ECP-1 Offer	32		
h1	Cahir	DSO	Existing Offer	4		
h1	Cauteen	DSO	Existing Offer			4
h1	Cauteen	DSO	Initial			178
h1	Doon	DSO	ECP-1 Offer	8		
h1	Doon	DSO	Existing Offer			17
h1	Ikerrin	DSO	Existing Offer	30		
h1	Ikerrin	DSO	Initial			36
h1	Kill Hill	TSO	Initial			36
h1	Killonan	DSO	Existing Offer			141
h1	Lisheen	TSO	ECP-1 Offer			29
h1	Lisheen	DSO	Initial			40
h1	Lisheen	TSO	Initial			59
h1	Mothel	TSO	Existing Offer	60		
h1	Nenagh	DSO	Existing Offer	4		
h1	Nenagh	DSO	Initial			14
h1	Nenagh	TSO	ECP-1 Offer			48
h1	Thurles	DSO	Initial			42
h1	Tipperary	DSO	Existing Offer	4		
h1	Tipperary	DSO	Initial			5
Subtotal				167	9	680

Table 0-31 Generation Summary in Area H1

Subgroup Cahir– Barrymore, Cauteen,Mo thel Solar	Subgroup Killonan– Nenagh Solar	Subgroup Ikerrin to Kill Hill Solar	Subgroup Cahir– Barrymore, Cauteen,Mo thel Wind	Subgroup Killonan– Nenagh Wind	Subgroup Ikerrin to Kill Hill Wind
Cahir	Ahane	Ikerrin	Barrymore	Killonan	Ikerrin
Barrymore	Nenagh		Cauteen	Nenagh	Kill Hill
Mothel			Doon		Lisheen
Ballydine					Thurles
Doon					
Tipperary					

Table 0-32 Subgroups in Area H1 for Solar and Wind

CAHIR- BARRYMORE, CAUTEEN MOTHEL SOLAR		Solar Generation Scenarios				
Year		Initial	South	33%	66%	All
Installed (MW)		0	125	41	84	125
of which is Controllable (MW)		0	125	41	84	125
Available Energy Controllable (GWh)		0	136	44	90	136
Curtailment (GWh)	2020		3.1	0.8	4.6	12.5
	2021		2.5	0.6	3.8	11.2
	2022		1.7	0.3	2.9	9
Constraint (GWh)	2020		1.2	0	0.1	0.5
	2021		0.3	0	0.1	0.3
	2022		0.1	0	0.1	0.2
Curtailment and Constraint (GWh)	2020		4.2	0.9	4.9	13
	2021		2.9	0.7	4	11.4
	2022		1.8	0.3	2.9	9.3
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		3%	2%	5%	10%
	2021		2%	2%	5%	8%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-33 Results for Cahir - Barrymore Cauteen Mothel

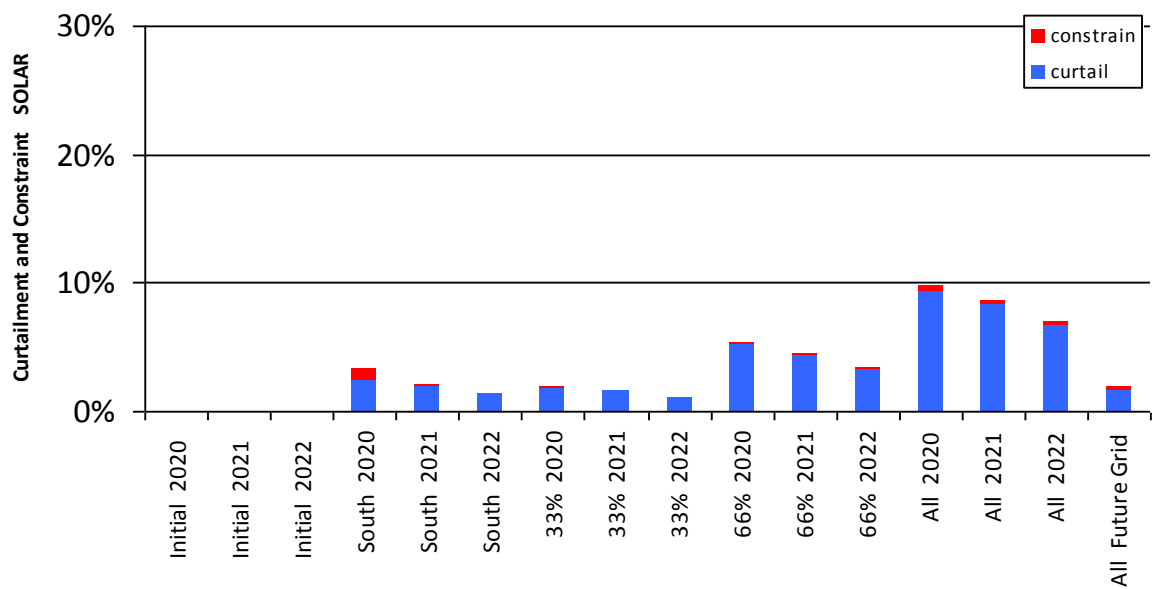


Figure 0-33 Curtailment and Constraint for Cahir - Barrymore Cauteen Mothel Solar

KILLONAN - NENAGH SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		0	12	4	8	12
of which is Controllable (MW)		0	12	4	8	12
Available Energy Controllable (GWh)		0	13	4	9	13
Curtailment (GWh)	2020		0.3	0.1	0.4	1.2
	2021		0.3	0	0.3	1.1
	2022		0.2	0	0.3	0.9
Constraint (GWh)	2020		0.1	0	0.1	0.1
	2021		0.3	0	0.1	0.3
	2022		1	0	0.2	0.3
Curtailment and Constraint (GWh)	2020		0.4	0.1	0.5	1.3
	2021		0.5	0.1	0.5	1.3
	2022		1.2	0.1	0.5	1.2
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		1%	<1 %	1%	1%
	2021		1%	<1 %	1%	2%
	2022		8%	1%	2%	2%
Curtailment and Constraint	2020		3%	2%	6%	11%
	2021		3%	2%	5%	10%
	2022		9%	2%	6%	9%
	Future Grid					2%

Table 0-34 Results for Killonan – Nenagh Subgroup (Ahane and Nenagh Solar)

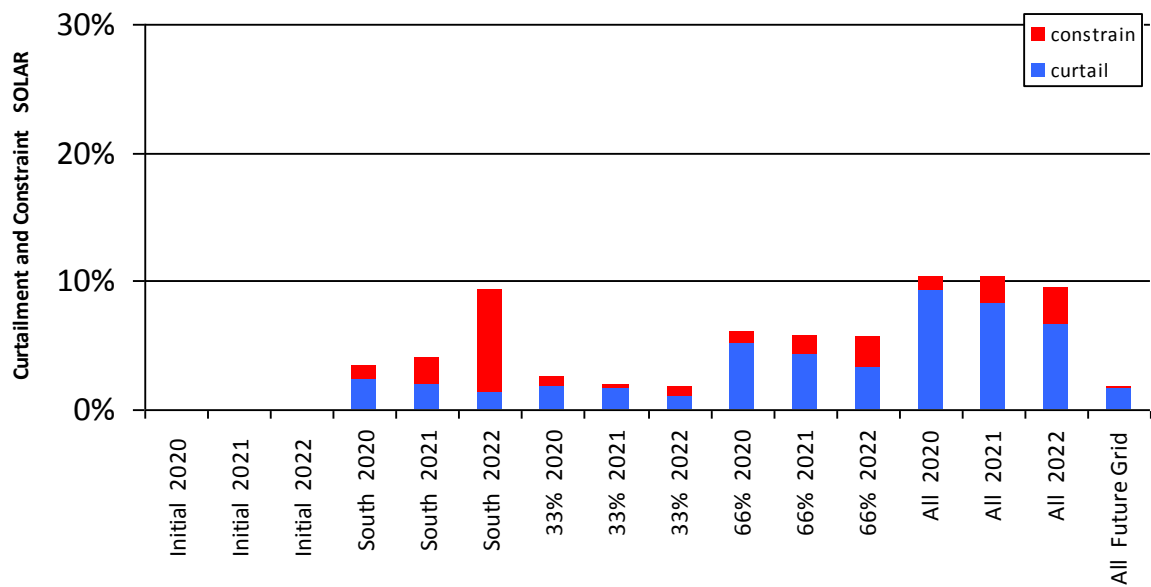


Figure 0-34 Curtailment and Constraint for Ahane and Nenagh Solar

IKERRIN – KILL HILL SOLAR	Year	Solar Generation Scenarios				
		Initial	South	33%	66%	All
		Installed (MW)	0	30	10	20
of which is Controllable (MW)	0	30	10	20	30	
Available Energy Controllable (GWh)	0	32	11	21	32	
Curtailment (GWh)	2020		0.8	0.2	1.1	3.0
	2021		0.6	0.2	0.9	2.7
	2022		0.4	0.1	0.7	2.2
Constraint (GWh)	2020		2.2	0.4	0.5	0.7
	2021		1.9	0.0	0.3	0.9
	2022		4.2	0.4	1.3	1.9
Curtailment and Constraint (GWh)	2020		3.0	0.6	1.6	3.7
	2021		2.5	0.2	1.2	3.5
	2022		4.6	0.5	1.9	4.1
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		7%	4%	2%	2%
	2021		6%	1%	1%	3%
	2022		13%	4%	6%	6%
Curtailment and Constraint	2020		9%	6%	8%	11%
	2021		8%	2%	6%	11%
	2022		14%	5%	9%	13%
	Future Grid					2%

Table 0-35 Results for Ikerrin – Kill Hill Subgroup (Ikerrin Solar)

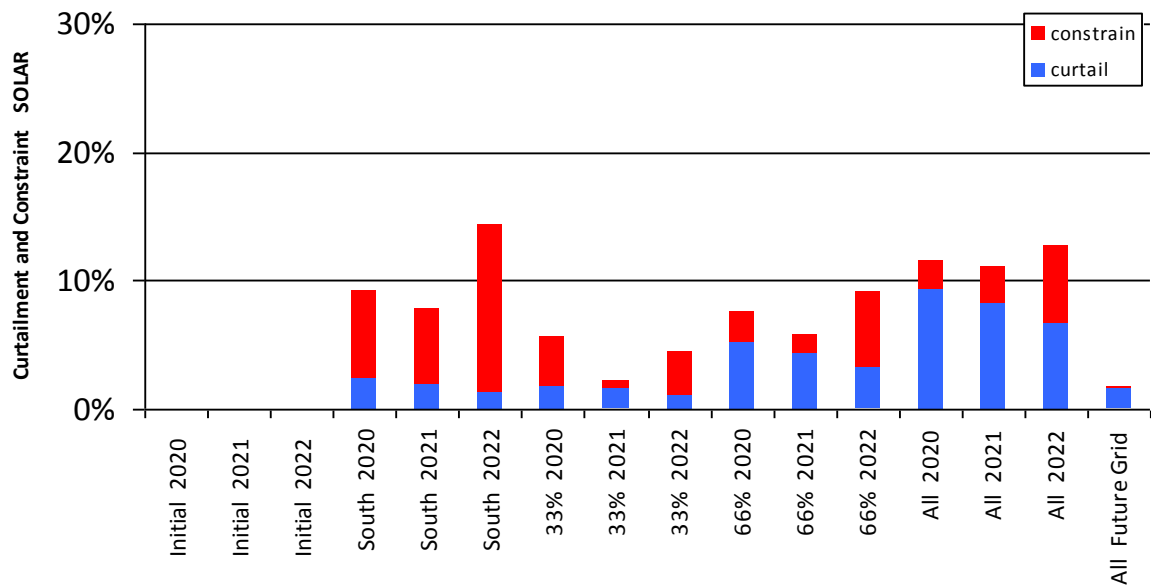


Figure 0-35 Curtailment and Constraint for Ikerrin Solar

CAHIR-BARRYMORE, CAUTEEN, MOTHEL WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		210	231	217	224	231
of which is Controllable (MW)		206	223	212	217	223
Available Energy Controllable (GWh)		672	723	689	705	723
Curtailed (GWh)	2020	16.4	38.3	37.3	67	103
	2021	11.7	29.7	28.9	56.3	89.6
	2022	7.2	20.1	19.5	41.3	70.9
Constraint (GWh)	2020	4.3	6.4	5	4.5	5.4
	2021	3.3	5.1	2.7	3.4	4.2
	2022	1.5	5.7	1.6	1.6	2.5
Curtailed and Constraint (GWh)	2020	20.7	44.7	42.3	71.4	108.3
	2021	15	34.9	31.6	59.6	93.6
	2022	8.7	25.9	21.1	42.8	73.3
Curtailed	2020	2%	5%	5%	9%	14%
	2021	2%	4%	4%	8%	12%
	2022	1%	3%	3%	6%	10%
Constraint	2020	1%	1%	1%	1%	1%
	2021	<1 %	1%	<1 %	<1 %	1%
	2022	<1 %	1%	<1 %	<1 %	<1 %
Curtailed and Constraint	2020	3%	6%	6%	10%	15%
	2021	2%	5%	5%	8%	13%
	2022	1%	4%	3%	6%	10%
	Future Grid					2%

Table 0-36 Results for Cahir - Barrymore Cauteen Mothel Wind

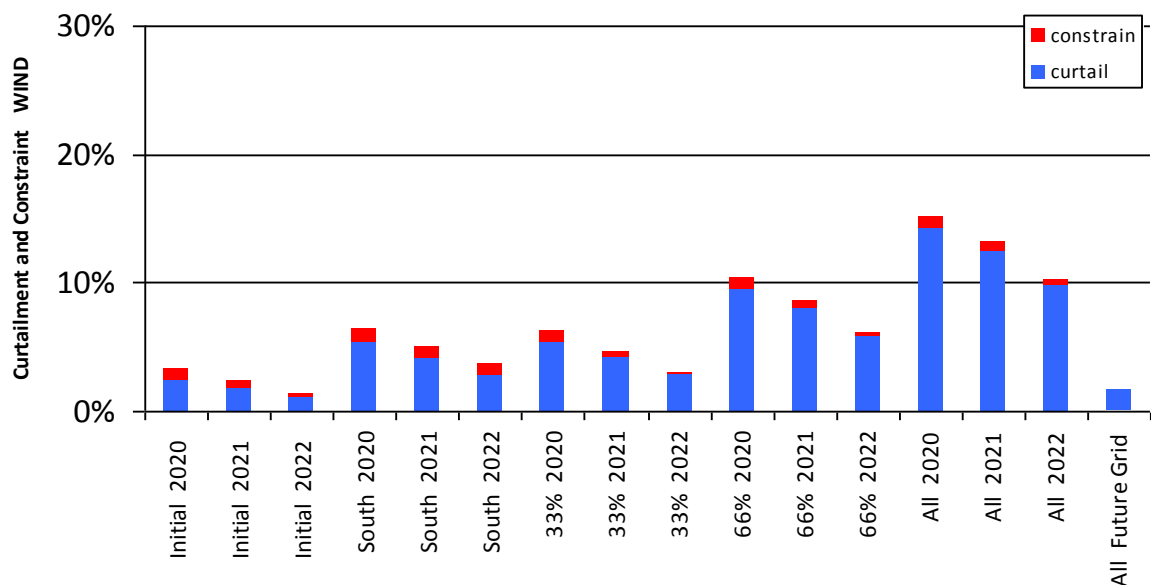


Figure 0-36 Curtailment and Constraint for Cahir - Barrymore Cauteen Mothel Wind

KILLONAN-NENAGH WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		0	203	76	139	203
of which is Controllable (MW)		0	189	62	125	189
Available Energy Controllable (GWh)		0	562	185	372	562
Curtailment (GWh)	2020		32.5	10.9	38.8	88.1
	2021		25.2	8.5	32.6	76.8
	2022		17.2	5.6	23.9	61.1
Constraint (GWh)	2020		2.8	0.9	1.9	2.4
	2021		6	1.1	2.1	5.5
	2022		32.9	3.3	9.5	15.6
Curtailment and Constraint (GWh)	2020		35.3	11.7	40.7	90.6
	2021		31.3	9.5	34.7	82.2
	2022		50	9	33.4	76.6
Curtailment	2020		6%	6%	10%	16%
	2021		4%	5%	9%	14%
	2022		3%	3%	6%	11%
Constraint	2020		1%	< 1%	1%	< 1%
	2021		1%	1%	1%	1%
	2022		6%	2%	3%	3%
Curtailment and Constraint	2020		6%	6%	11%	16%
	2021		6%	5%	9%	15%
	2022		9%	5%	9%	14%
	Future Grid					2%

Table 0-37 Results for Killonan – Nenagh Subgroup Wind

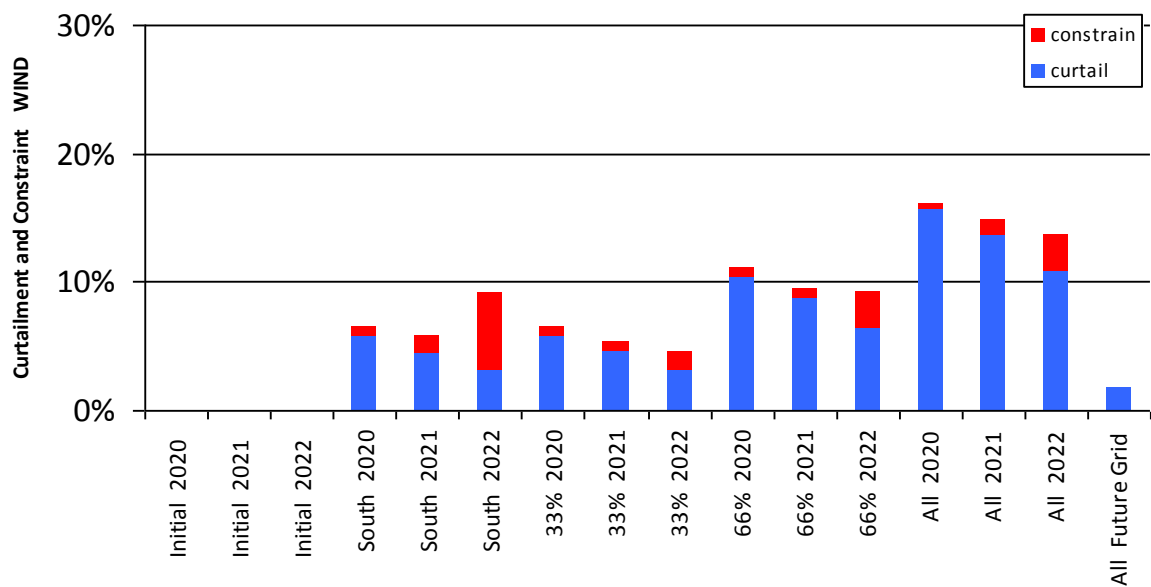


Figure 0-37 Curtailment and Constraint for Killonan – Nenagh Wind

IKERRIN – KILL HILL WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		213	241	222	232	241
of which is Controllable (MW)		206	234	215	225	234
Available Energy Controllable (GWh)		612	698	641	669	698
Curtailment (GWh)	2020	15.1	39.1	36.3	67.9	106.8
	2021	10.9	30.6	28.3	57.1	93
	2022	6.6	20.6	19	41.8	73.8
Constraint (GWh)	2020	9	31.3	12.3	11.6	9.3
	2021	1.4	21.7	2.7	6.3	8.4
	2022	8.2	62.7	13.9	19.8	23.7
Curtailment and Constraint (GWh)	2020	24.1	70.3	48.6	79.4	116.1
	2021	12.5	52.1	31.2	63.4	101.4
	2022	14.8	83.4	33	61.6	97.6
Curtailment	2020	2%	6%	6%	10%	15%
	2021	2%	4%	4%	9%	13%
	2022	1%	3%	3%	6%	11%
Constraint	2020	1%	4%	2%	2%	1%
	2021	< 1%	3%	< 1%	1%	1%
	2022	1%	9%	2%	3%	3%
Curtailment and Constraint	2020	4%	10%	8%	12%	17%
	2021	2%	7%	5%	9%	15%
	2022	2%	12%	5%	9%	14%
	Future Grid					2%

Table 0-38 Results for Ikerrin – Kill Hill Subgroup Wind

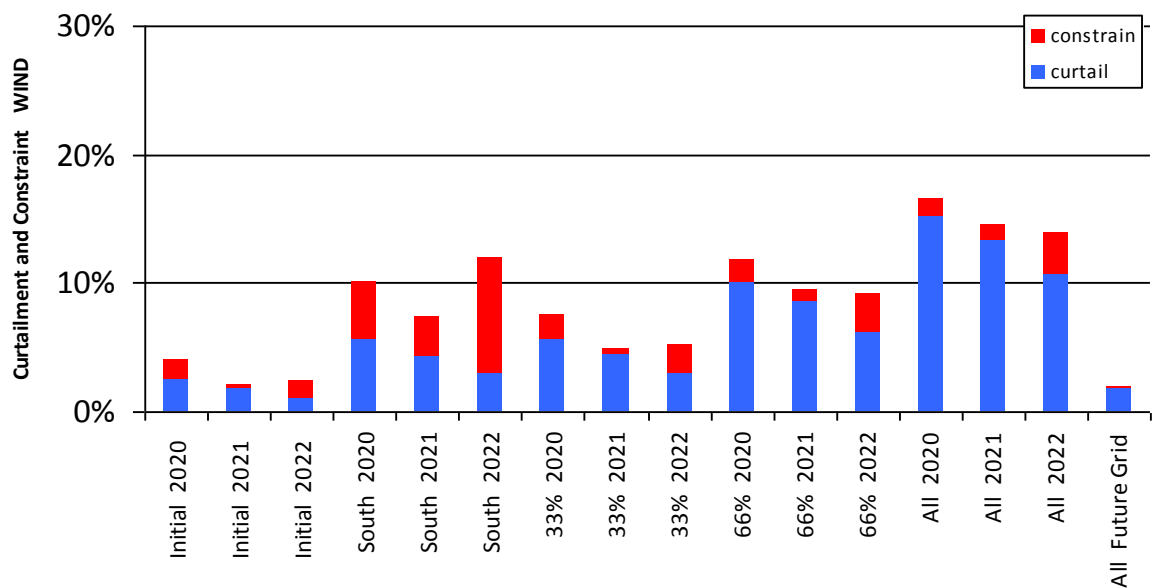


Figure 0-38 Curtailment and Constraint for Ikerrin – Kill Hill Wind

C.9 Area H2



Figure 0-39 Map of Area H2

Area	Node	SO	Status	Battery	Solar	Thermal	Wind
h2	Arklow	DSO	ECP-1 Offer		8		
h2	Arklow	DSO	Existing Offer		6		
h2	Arklow	DSO	Initial				80
h2	Ballybeg	DSO	Existing Offer		8		
h2	Ballyfasy	TSO	ECP-1 Offer		50		
h2	Ballywater	TSO	Initial				42
h2	Banoge	DSO	ECP-1 Offer	9	4		
h2	Banoge	DSO	Existing Offer		4		
h2	Bullockhill	TSO	ECP-1 Offer		50		
h2	Carlow	DSO	ECP-1 Offer		8		15
h2	Carlow	DSO	Existing Offer				5
h2	Carlow	DSO	Initial				35
h2	Castledockrell	TSO	Initial				41
h2	Crane	DSO	ECP-1 Offer	16	13		
h2	Crane	DSO	Initial				7
h2	Croy	DSO	Initial				60
h2	Croy	DSO	Existing Offer		4		
h2	Croy	DSO	ECP-1 Offer		12		
h2	Great Island	DSO	ECP-1 Offer		12		
h2	Great Island	DSO	Existing Offer		5		
h2	Great Island	TSO	ECP-1 Offer	30		33	
h2	Great Island	TSO	Initial			431	
h2	Kilkenny	DSO	ECP-1 Offer		16		
h2	Kilkenny	DSO	Existing Offer		4		
h2	Kilkenny	DSO	Initial		4		
h2	Kilkenny	TSO	ECP-1 Offer	40			
h2	Rosspile	TSO	Existing Offer		95		
h2	Stratford	DSO	Existing Offer		4		
h2	Tullabeg	TSO	Existing Offer		50		
h2	Waterford	DSO	Existing Offer		4		
h2	Waterford	DSO	Initial				19
h2	Wexford	DSO	ECP-1 Offer		80		
h2	Wexford	DSO	Existing Offer		8		
h2	Wexford	DSO	Initial				39
Subtotal				95	449	464	342

Table 0-39 Generation Summary in Area H2

Subgroup Carlow Waterford Solar	Subgroup Ballybeg Solar	Subgroup Arklow Crane Solar	Subgroup Lodgewood Solar	Subgroup Rosspile Wexford Solar
Ballyfasy	Ballybeg	Arklow	Croy	Rosspile
Bullockhill		Banoge		Wexford
Carlow		Tullabeg		
Great Island		Crane		
Kilkenny				
Stratford				
Waterford				

Table 0-40 Subgroups in Area H1 for Solar

Subgroup Carlow Waterford Wind	Subgroup Arklow Crane Wind	Subgroup Lodgewood Wind	Subgroup Wexford Wind
Carlow	Arklow	Castledockrell	Wexford
Waterford	Ballywater	Croy	

Table 0-41 Subgroups in Area H1 for Wind

CARLOW WATERFORD SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Total (MW)		0	157	53	104	157
of which is Controllable (MW)		0	157	53	104	157
Available Energy Controllable (GWh)		0	169	56	113	169
Curtailment (GWh)	2020		4	1	5.8	15.7
	2021		3.2	0.8	4.6	14
	2022		2.1	0.6	3.5	11.3
Constraint (GWh)	2020		0.8	0	0.2	0.2
	2021		3.8	0	0.2	1.2
	2022		0	0	0	0.2
Curtailment and Constraint (GWh)	2020		4.6	1	5.9	16
	2021		7.1	0.8	5.1	15.1
	2022		2.2	0.6	3.8	11.7
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		1%	0%	0%	0%
	2021		2%	0%	0%	1%
	2022		0%	0%	0%	0%
Curtailment and Constraint	2020		3%	2%	5%	9%
	2021		4%	2%	5%	9%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-42 Results for Carlow Waterford Subgroup - Solar

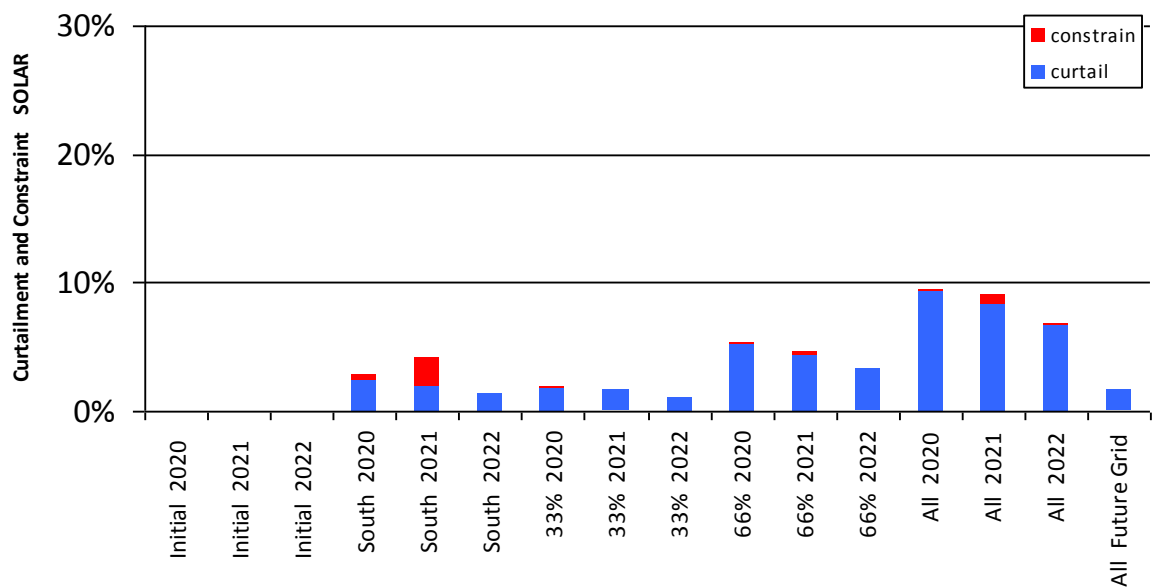


Figure 0-40 Curtailment and Constraint for Carlow Waterford Subgroup Solar

BALLYBEG BALLYBEG SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		0	8	3	5	8
of which is Controllable (MW)		0	8	3	5	8
Available Energy Controllable (GWh)		0	8	3	5	8
Curtailment (GWh)	2020	0.0	0.2	0.0	0.3	0.7
	2021	0.0	0.1	0.0	0.2	0.6
	2022	0.0	0.1	0.0	0.2	0.5
Constraint (GWh)	2020	0.0	0.1	0.0	0.1	0.2
	2021	0.0	0.2	0.0	0.1	0.1
	2022	0.0	0.0	0.0	0.0	0.1
Curtailment and Constraint (GWh)	2020	0.0	0.3	0.1	0.3	0.9
	2021	0.0	0.3	0.1	0.3	0.8
	2022	0.0	0.1	0.0	0.2	0.6
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		1%	1%	1%	2%
	2021		2%	1%	2%	2%
	2022		1%	0%	1%	1%
Curtailment and Constraint	2020		3%	3%	6%	12%
	2021		4%	2%	6%	10%
	2022		2%	1%	4%	8%
	Future Grid					2%

Table 0-43 Results for Ballybeg Solar

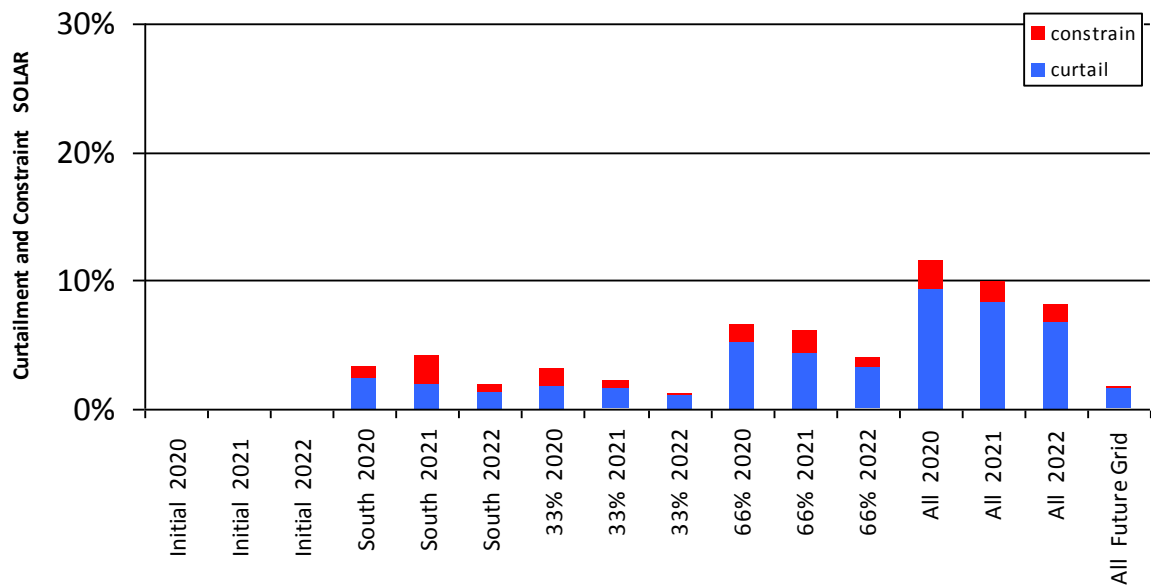


Figure 0-41 Curtailment and Constraint for Ballybeg Solar

ARKLOW CRANE SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		0	85	29	56	85
of which is Controllable (MW)		0	85	29	56	85
Available Energy Controllable (GWh)		0	92	31	61	92
Curtailment (GWh)	2020		2.2	0.6	3.2	8.5
	2021		1.8	0.5	2.5	7.7
	2022		1.2	0.2	1.9	6.1
Constraint (GWh)	2020		20.2	0.6	1.8	5.3
	2021		5.1	0.1	0.5	0.8
	2022		5.1	0	0.4	1.2
Curtailment and Constraint (GWh)	2020		22.4	1.1	5	13.8
	2021		6.8	0.6	3.1	8.5
	2022		6.3	0.4	2.4	7.3
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		22%	2%	3%	6%
	2021		6%	0%	1%	1%
	2022		6%	0%	1%	1%
Curtailment and Constraint	2020		24%	4%	8%	15%
	2021		7%	2%	5%	9%
	2022		7%	1%	4%	8%
	Future Grid					2%

Table 0-44 Results for Arklow Crane Subgroup Solar

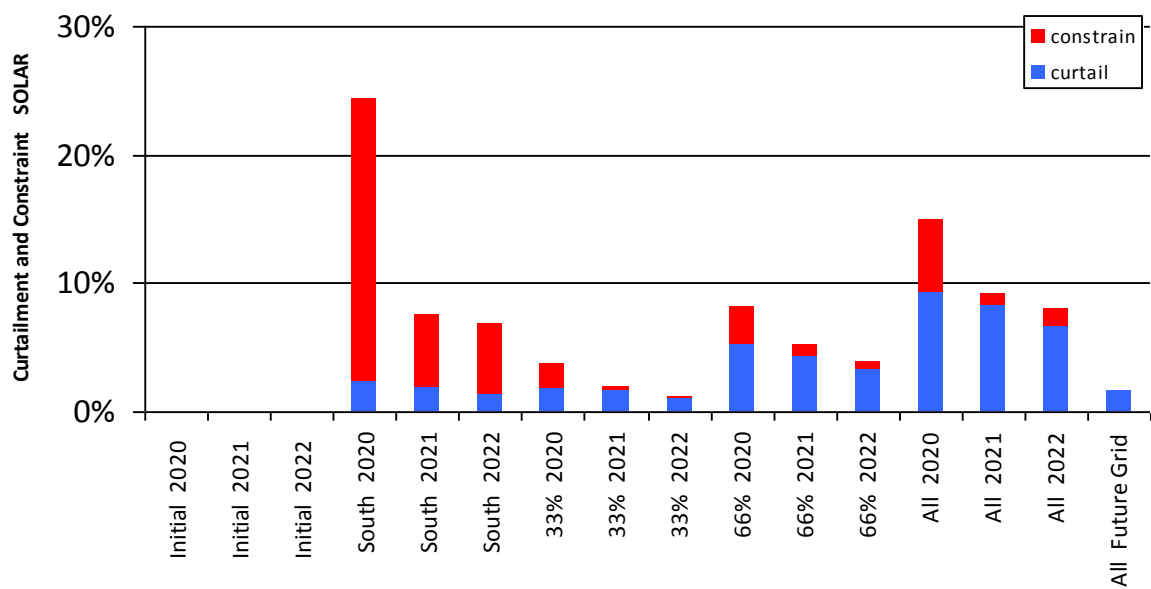


Figure 0-42 Curtailment and Constraint for Arklow Crane Subgroup Solar

LOGGEWOOD SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
		Installed (MW)	0	16	5	
of which is Controllable (MW)	0	16	5	11	16	
Available Energy Controllable (GWh)		0	17	6	11	17
Curtailment (GWh)	2020	0.0	0.4	0.1	0.6	1.6
	2021	0.0	0.3	0.1	0.5	1.4
	2022	0.0	0.2	0.1	0.4	1.2
Constraint (GWh)	2020	0.0	1.6	0.0	0.0	0.1
	2021	0.0	0.2	0.0	0.1	0.1
	2022	0.0	0.0	0.0	0.0	0.1
Curtailment and Constraint (GWh)	2020	0.0	2.0	0.1	0.6	1.7
	2021	0.0	0.5	0.1	0.5	1.5
	2022	0.0	0.3	0.1	0.4	1.2
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		9%	0%	0%	1%
	2021		1%	0%	0%	0%
	2022		0%	0%	0%	0%
Curtailment and Constraint	2020		11%	2%	6%	10%
	2021		3%	2%	5%	9%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-45 Results for Lodgewood (Croy Solar)

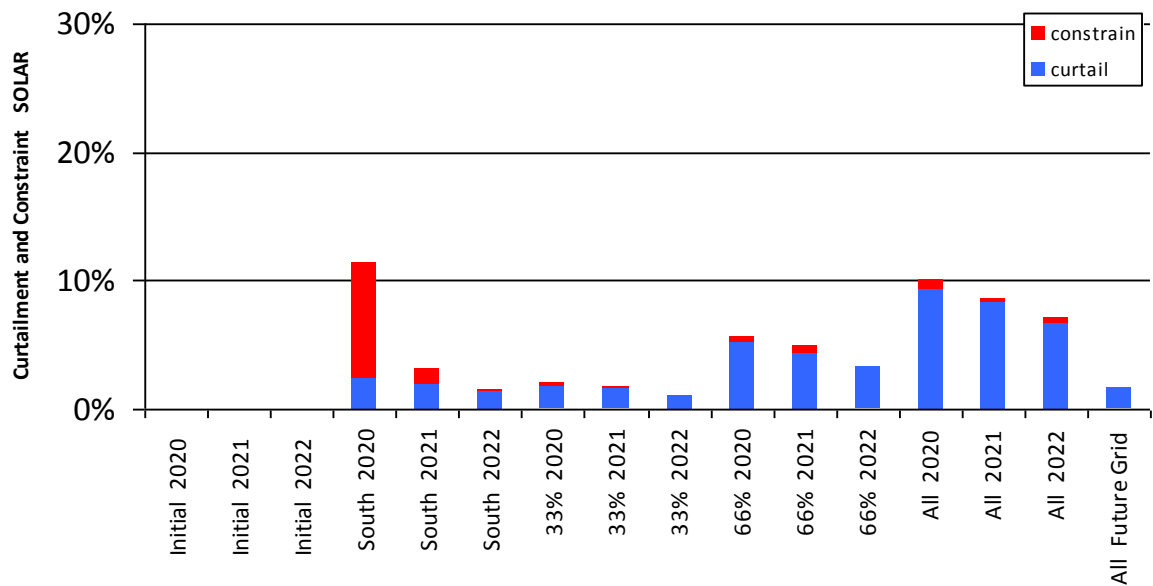


Figure 0-43 Curtailment and Constraint for Croy Solar

ROSSPILE WEXFORD SOLAR	Year	Solar Generation Scenarios				
		Initial	South	33%	66%	All
		Installed (MW)	0	183	60	121
of which is Controllable (MW)	0	183	60	121	183	
Available Energy Controllable (GWh)	0	198	65	131	198	
Curtailment (GWh)	2020		4.6	1.2	6.8	18.4
	2021		3.8	1	5.6	16.4
	2022		2.5	0.6	4.2	13.3
Constraint (GWh)	2020		9.8	0.2	0.8	4.2
	2021		7.5	0.2	0.6	4.6
	2022		6.4	0	0.5	4.4
Curtailment and Constraint (GWh)	2020		14.4	1.4	7.5	22.6
	2021		11.2	1.2	6.2	21
	2022		8.9	0.7	4.6	17.7
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		5%	0%	1%	2%
	2021		4%	0%	0%	2%
	2022		3%	0%	0%	2%
Curtailment and Constraint	2020		7%	2%	6%	11%
	2021		6%	2%	5%	11%
	2022		4%	1%	4%	9%
	Future Grid					4%

Table 0-46 Results for Rosspile Wexford Solar

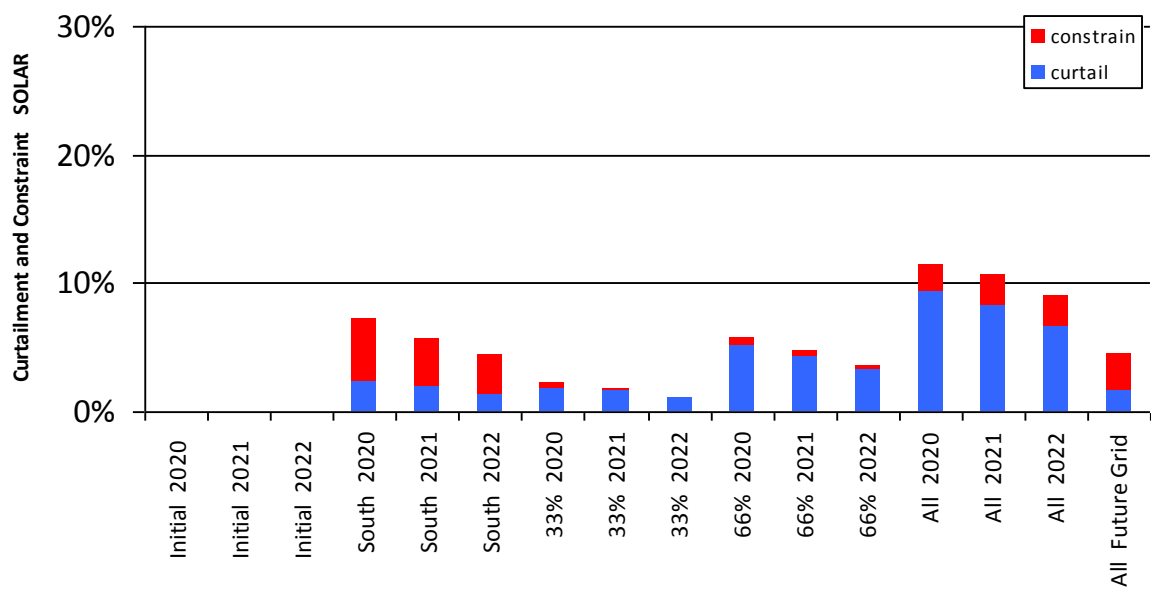


Figure 0-44 Curtailment and Constraint for Rosspile Wexford Solar

CARLOW WATERFORD WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
		Installed (MW)	54	74	60	67
of which is Controllable (MW)	44	64	51	58	64	
Available Energy Controllable (GWh)		132	190	151	170	190
Curtailment (GWh)	2020	3.3	10.3	8.4	16.7	27.8
	2021	2.4	8	6.6	14	24.1
	2022	1.4	5.5	4.4	10.3	19.2
Constraint (GWh)	2020	1	2.6	1.6	2	2.9
	2021	1.7	4.3	1.8	2.3	3.1
	2022	0.4	1.5	0.9	1.3	1.5
Curtailment and Constraint (GWh)	2020	4.2	13	10	18.7	30.7
	2021	4	12.3	8.3	16.3	27.2
	2022	2	7	5.4	11.5	20.6
Curtailment	2020	2%	5%	6%	10%	15%
	2021	2%	4%	4%	8%	13%
	2022	1%	3%	3%	6%	10%
Constraint	2020	1%	1%	1%	1%	2%
	2021	1%	2%	1%	1%	2%
	2022	0%	1%	1%	1%	1%
Curtailment and Constraint	2020	3%	7%	7%	11%	16%
	2021	3%	6%	6%	10%	14%
	2022	1%	4%	4%	7%	11%
	Future Grid					2%

Table 0-47 Results for Carlow Waterford Subgroup Wind

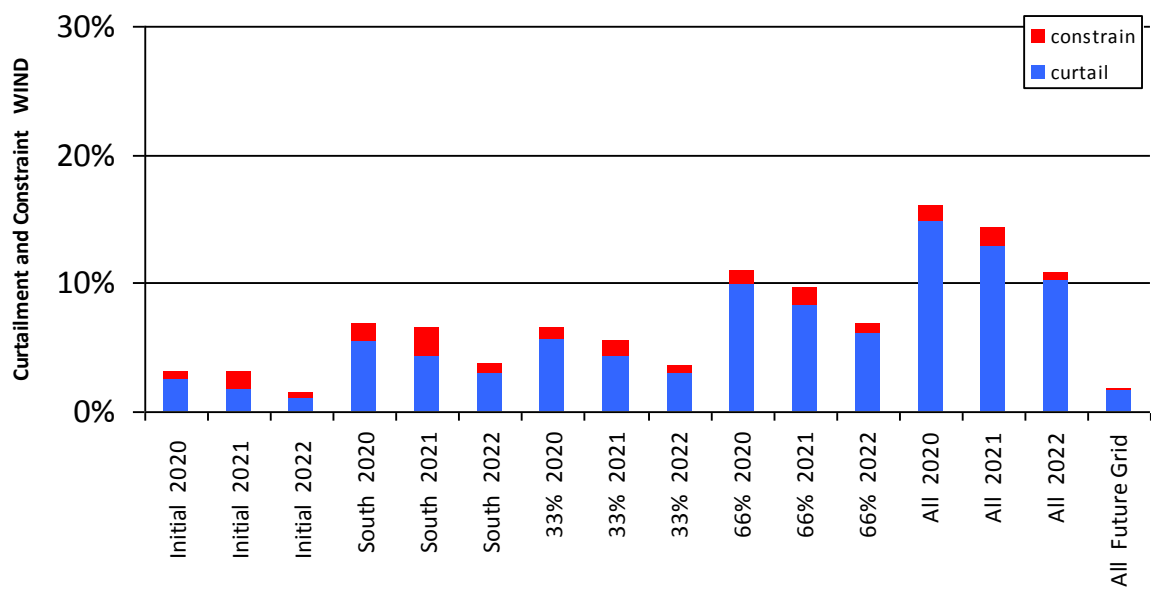


Figure 0-45 Curtailment and Constraint for Carlow Waterford Subgroup Wind

ARKLOW CRANE WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		122	122	122	122	122
of which is Controllable (MW)		97	97	97	97	97
Available Energy Controllable (GWh)		267	267	267	267	267
Curtailment (GWh)	2020	6.6	14.5	14.8	26.2	39.1
	2021	4.9	11.3	11.7	22	33.9
	2022	3	7.7	7.9	16.2	27
Constraint (GWh)	2020	12.7	43.3	11.5	8.7	9.4
	2021	7.5	20.8	7.8	8.7	7.5
	2022	2.9	13.6	2.5	3.3	3.7
Curtailment and Constraint (GWh)	2020	19.4	57.9	26.4	35	48.5
	2021	12.4	32.1	19.4	30.7	41.4
	2022	5.9	21.3	10.3	19.5	30.7
Curtailment	2020	2%	5%	6%	10%	15%
	2021	2%	4%	4%	8%	13%
	2022	1%	3%	3%	6%	10%
Constraint	2020	5%	16%	4%	3%	4%
	2021	3%	8%	3%	3%	3%
	2022	1%	5%	1%	1%	1%
Curtailment and Constraint	2020	7%	22%	10%	13%	18%
	2021	5%	12%	7%	11%	15%
	2022	2%	8%	4%	7%	11%
	Future Grid					2%

Table 0-48 Results for Arklow Crane Subgroup Wind

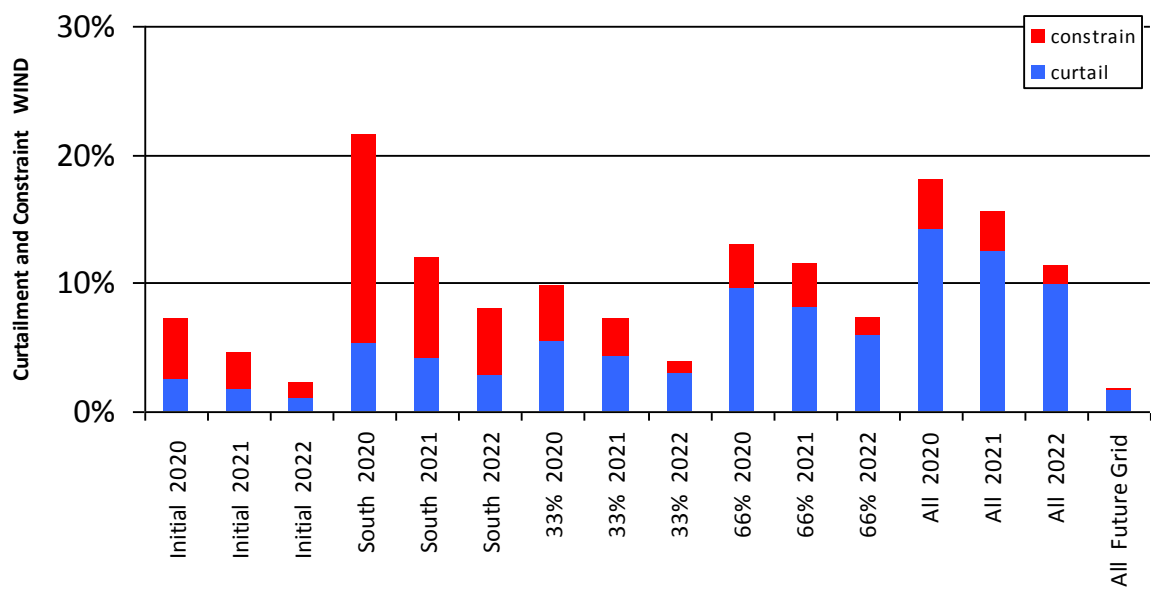


Figure 0-46 Curtailment and Constraint for Arklow Crane Subgroup Wind

LOGGEWOOD WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
		Installed (MW)	101	101	101	101
of which is Controllable (MW)	89	89	89	89	89	
Available Energy Controllable (GWh)		260	260	260	260	260
Curtailment (GWh)	2020	6.4	14.1	14.4	25.3	37.8
	2021	4.7	11	11.3	21.4	32.9
	2022	2.8	7.5	7.6	15.7	26.2
Constraint (GWh)	2020	2	7.6	1.9	2	1.8
	2021	3.2	8.8	3.3	3.9	2.6
	2022	0.3	1.8	0.6	1.4	1.4
Curtailment and Constraint (GWh)	2020	8.5	21.7	16.3	27.4	39.6
	2021	7.9	19.8	14.5	25.2	35.5
	2022	3.2	9.3	8.3	17	27.6
Curtailment	2020	2%	5%	6%	10%	15%
	2021	2%	4%	4%	8%	13%
	2022	1%	3%	3%	6%	10%
Constraint	2020	1%	3%	1%	1%	1%
	2021	1%	3%	1%	1%	1%
	2022	0%	1%	0%	1%	1%
Curtailment and Constraint	2020	3%	8%	6%	10%	15%
	2021	3%	8%	6%	10%	14%
	2022	1%	4%	3%	7%	11%
	Future Grid					2%

Table 0-49 Results for Lodgewood Subgroup Wind

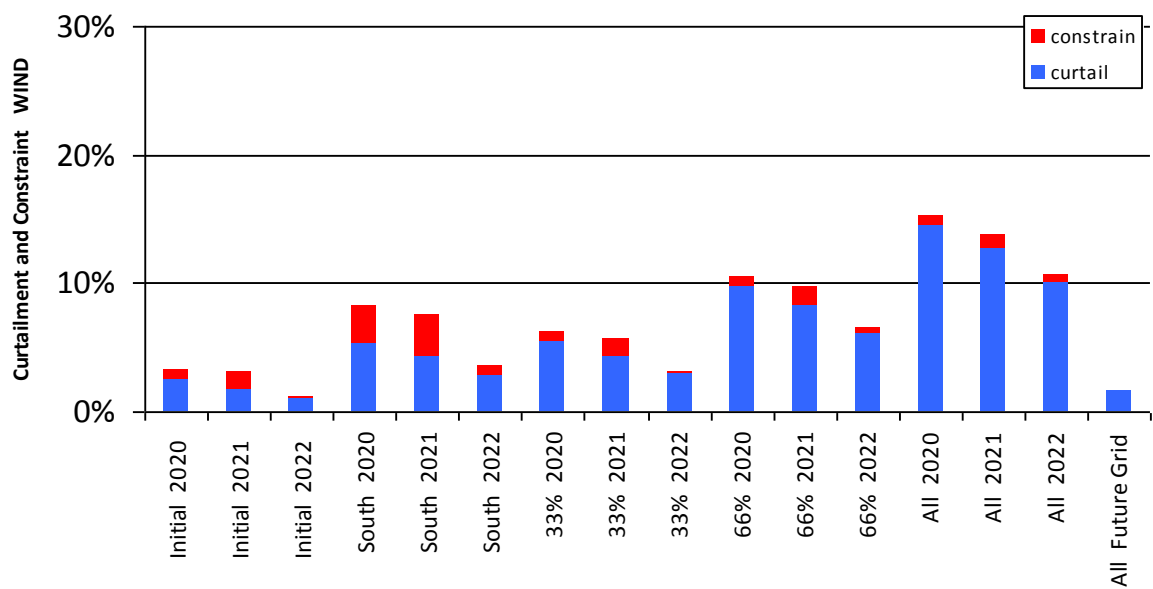


Figure 0-47 Curtailment and Constraint for Lodgewood Subgroup Wind

WEXFORD WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		39	39	39	39	39
of which is Controllable (MW)		27	27	27	27	27
Available Energy Controllable (GWh)		79	79	79	79	79
Curtailment (GWh)	2020	2.0	4.4	4.5	8.0	12.0
	2021	1.4	3.5	3.5	6.8	10.5
	2022	0.9	2.4	2.4	5.0	8.3
Constraint (GWh)	2020	1.3	5.7	1.7	1.6	2.1
	2021	1.8	5.3	1.9	1.9	2.3
	2022	0.6	3.5	0.8	1.0	1.7
Curtailment and Constraint (GWh)	2020	3.3	10.1	6.1	9.6	14.1
	2021	3.2	8.8	5.5	8.7	12.7
	2022	1.4	5.9	3.2	6.0	10.0
Curtailment	2020	2%	6%	6%	10%	15%
	2021	2%	4%	4%	9%	13%
	2022	1%	3%	3%	6%	11%
Constraint	2020	2%	7%	2%	2%	3%
	2021	2%	7%	2%	2%	3%
	2022	1%	4%	1%	1%	2%
Curtailment and Constraint	2020	4%	13%	8%	12%	18%
	2021	4%	11%	7%	11%	16%
	2022	2%	7%	4%	8%	13%
	Future Grid					2%

Table 0-50 Results for Wexford Wind

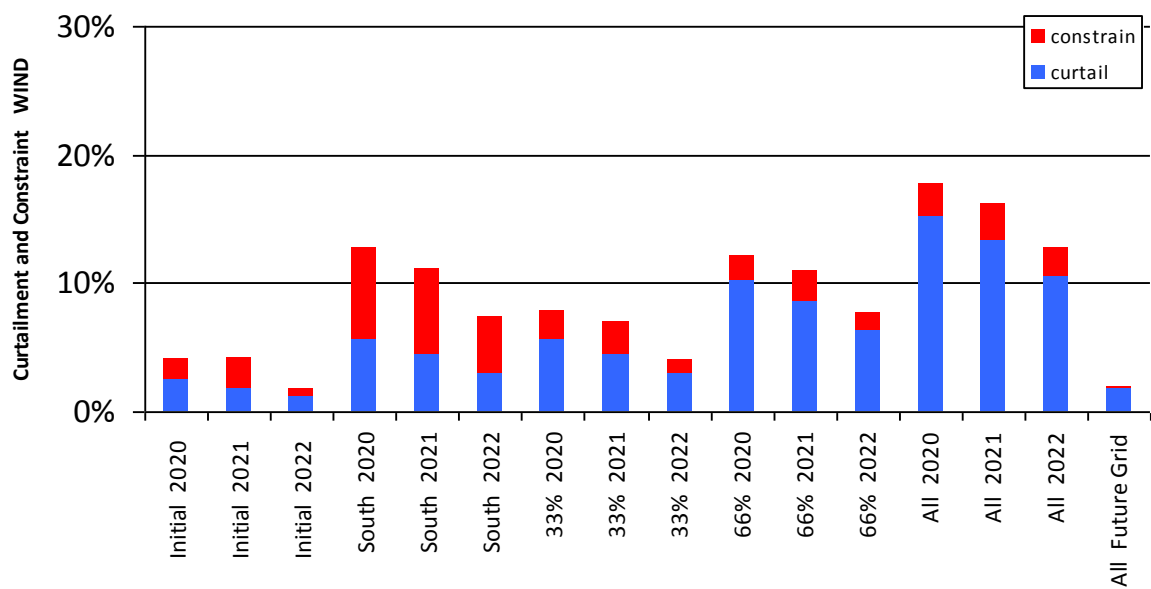


Figure 0-48 Curtailment and Constraint for Wexford Wind

C.10 Area I



Figure 0-49 Map of Area I

Area	Node	SO	Status	Solar	Wind
I	Barnahely	DSO	Existing Offer	5	
I	Barnahely	DSO	Initial		5
I	Coolroe	DSO	Existing Offer	20	
I	Cow Cross	DSO	ECP-1 Offer	5	
I	Kilbarry	DSO	Existing Offer	10	
I	Midleton	DSO	ECP-1 Offer	13	
i	Midleton	DSO	Existing Offer	4	
I	Midleton	DSO	Initial		2
I	Midleton	TSO	Existing Offer	26	
I	Trabeg	DSO	ECP-1 Offer	4	
i	Trabeg	DSO	Existing Offer	5	
Subtotal				91	6

Table 0-51 Generation Summary in Area I

Total SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		0	92	31	60	92
of which is Controllable (MW)		0	92	31	60	92
Available Energy Controllable (GWh)		0	99	33	65	99
Curtailment (GWh)	2020		2.2	0.6	3.4	9.2
	2021		1.9	0.4	2.9	8.1
	2022		1.3	0.3	2.1	6.6
Constraint (GWh)	2020		0.1	0	0.1	0.3
	2021		0	0	0.1	0.3
	2022		0.5	0.1	0.8	2.2
Curtailment and Constraint (GWh)	2020		2.1	0.6	3.2	8.8
	2021		1.5	0.5	2.3	6.6
	2022		0.92	0.22	1.55	5.09
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		2%	2%	5%	10%
	2021		2%	2%	5%	9%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-52 Results for Area I Solar

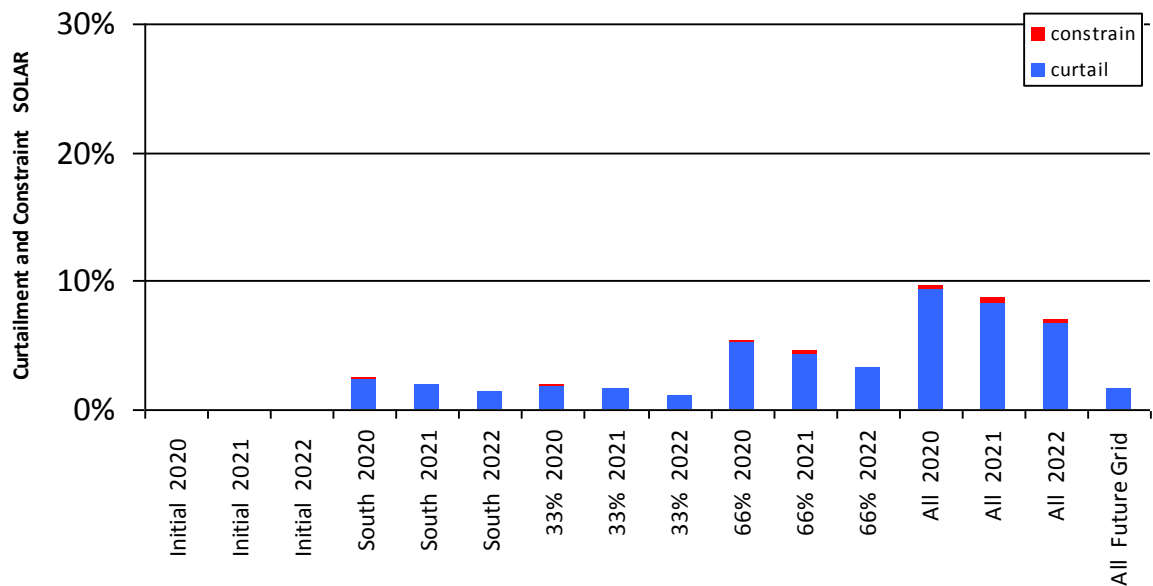


Figure 0-50 Curtailment and Constraint for Area I Solar

Node	SO	Status	Battery	Solar	Thermal	Wind
Griffinrath	DSO	ECP-1 Offer		16		
Griffinrath	DSO	Existing Offer		29		
Harristown	TSO	Existing Offer		42		
Kilteel	DSO	Existing Offer		15		
Kilteel	DSO	Initial			10	
Kilteel	TSO	ECP-1 Offer	30			
Monread	DSO	Existing Offer		8		
Mount Lucas	TSO	Initial				79
Newbridge	DSO	Existing Offer		16		
Newbridge	DSO	Initial			5	
Portlaoise	DSO	ECP-1 Offer		4		
Portlaoise	DSO	Existing Offer		4		45
Portlaoise	DSO	Initial			8	9
Stephenstown	DSO	ECP-1 Offer	9			
Stephenstown	DSO	Existing Offer		5		
Thornsberry	DSO	Existing Offer		8	10	
Timahoe North	TSO	Existing Offer		70		
Treascon	TSO	Existing Offer		40		
SUBTOTAL			67	759	417	233

Table 0-53 Generation Summary in Area J

Subgroup 1 – J City	Subgroup 2 – J North	Subgroup 3 – J Mid	Subgroup 4 – J South
Finglas	Blundelstown	Blake	Athy
Gallanstown and Muckerstown	Clonfad	Kilteel	Coolnabacky
Glasmore	Dunfirth	Monread	Portlaoise
Grangecastle	Harristown	Newbridge	
Griffinrath	Timahoe North		
Stephenstown	Thornsberry		

Table 0-54 Subgroups in Area J Solar

Subgroup 3 – J Mid	Subgroup 4 – J South
Cushaling	Portlaoise
Mount Lucas	

Table 0-55 Subgroups in Area J Wind

1 – J CITY SOLAR	Year	Solar Generation Scenarios				All
		Initial	NE	33%	66%	
Installed (MW)		0	209	69	138	209
of which is Controllable (MW)		0	209	69	138	209
Available Energy Controllable (GWh)		0	203	66	135	203
Curtailment (GWh)	2020		4.6	1.2	7	19.2
	2021		3.8	1	5.7	16.9
	2022		2.5	0.7	4.3	13.7
Constraint (GWh)	2020		0.3	0	0.1	0.4
	2021		0.1	0	0.1	0.2
	2022		0	0	0	0.3
Curtailment and Constraint (GWh)	2020		4.9	1.2	7.2	19.6
	2021		4	1	6	17.1
	2022		2.8	0.7	4.3	14
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		2%	2%	5%	10%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
	Interconnectors / Future Grid					3% / 2%

Table 0-56 Results for 1 – J City Subgroup Solar

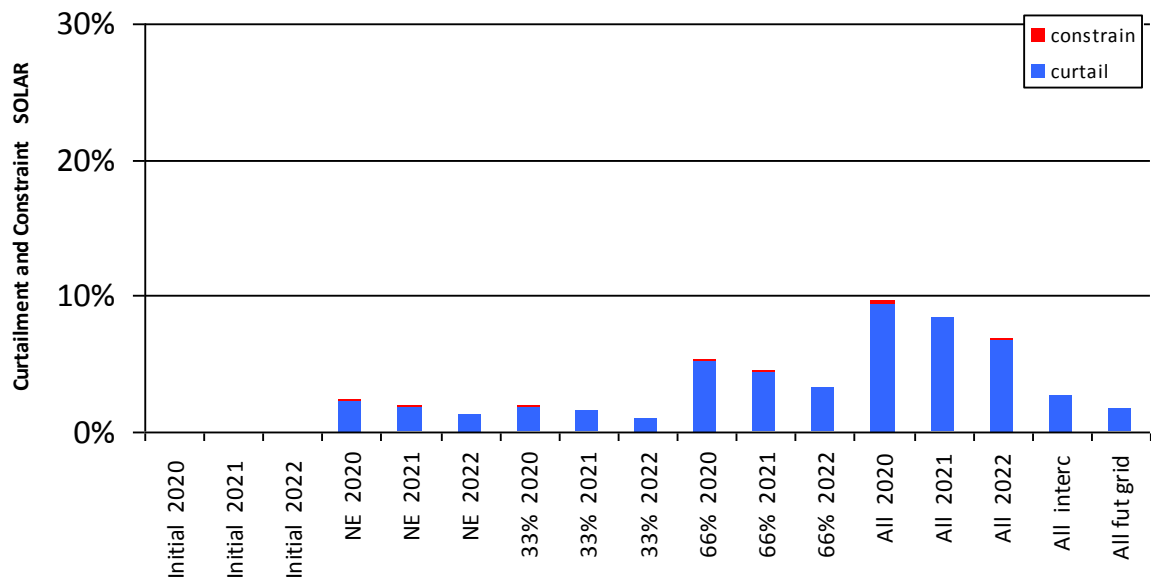


Figure 0-52 Curtailment and Constraint for 1 – J City Subgroup Solar

2 – J NORTH SOLAR	Year	Solar Generation Scenarios				All
		Initial	NE	33%	66%	
Installed (MW)		0	318	105	210	318
of which is Controllable (MW)		0	318	105	210	318
Available Energy Controllable (GWh)		0	311	104	205	311
Curtailment (GWh)	2020		7	1.9	10.7	29
	2021		5.7	1.6	8.9	25.8
	2022		3.9	1	6.6	21
Constraint (GWh)	2020		0.5	0.3	0.3	1
	2021		0.3	0.4	0.3	1.3
	2022		0	0	0	1.3
Curtailment and Constraint (GWh)	2020		7.6	2.3	11	30.2
	2021		6	2.2	9.1	27.1
	2022		4	1	6.8	22.4
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		2%	2%	5%	10%
	2021		2%	2%	4%	9%
	2022		1%	1%	3%	7%
	Interconnectors / Future Grid					3% / 3%

Table 0-57 Results for 2 – J North Subgroup Solar

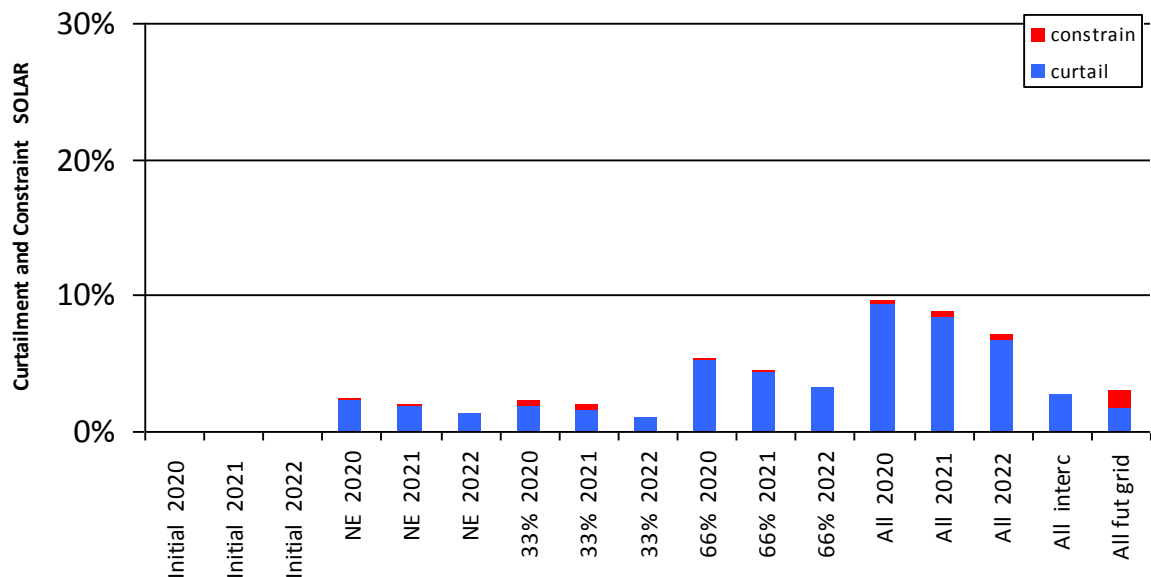


Figure 0-53 Curtailment and Constraint for 2 – J North Subgroup Solar

3 – J MID SOLAR	Year	Solar Generation Scenarios				All
		Initial	NE	33%	66%	
Installed (MW)		0	125	42	82	125
of which is Controllable (MW)		0	125	42	82	125
Available Energy Controllable (GWh)		0	123	41	80	123
Curtailment (GWh)	2020		2.8	0.7	4.2	11.5
	2021		2.3	0.6	3.4	10.1
	2022		1.6	0.4	2.6	8.2
Constraint (GWh)	2020		4.8	0	1.2	6.9
	2021		2.5	0	1.5	6.9
	2022		3.6	0	0.4	5.2
Curtailment and Constraint (GWh)	2020		7.6	0.7	5.4	18.3
	2021		4.8	0.6	4.8	17.2
	2022		5.2	0.4	3	13.5
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		4%	< 1%	2%	6%
	2021		2%	< 1%	2%	6%
	2022		3%	< 1%	1%	4%
Curtailment and Constraint	2020		6%	2%	7%	15%
	2021		4%	2%	6%	14%
	2022		4%	1%	4%	11%
	Interconnectors / Future Grid					9% / 5%

Table 0-58 Results for 3 – J Mid Subgroup Solar

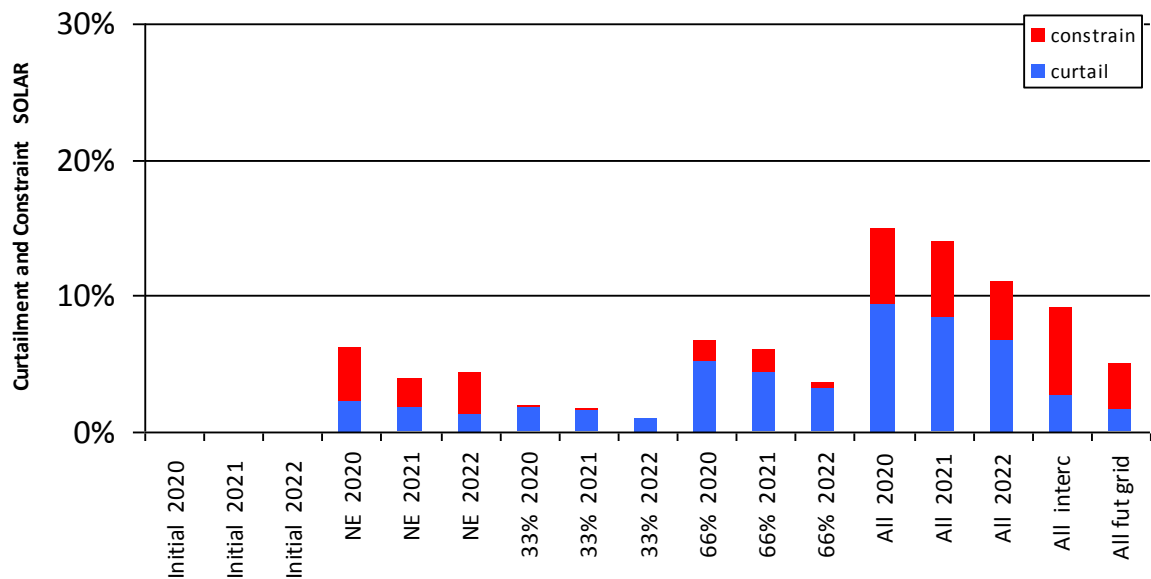


Figure 0-54 Curtailment and Constraint for 3 – J Mid Subgroup Solar

4 – J SOUTH SOLAR	Year	Solar Generation Scenarios				
		Initial	NE	33%	66%	All
Installed (MW)		0	112	37	73	112
of which is Controllable (MW)		0	112	37	73	112
Available Energy Controllable (GWh)		0	110	37	72	110
Curtailment (GWh)	2020		2.5	0.6	3.7	10.1
	2021		2	0.5	3.1	9
	2022		1.4	0.3	2.3	7.3
Constraint (GWh)	2020		0.2	0	0.1	0.3
	2021		0.2	0	0.1	0.3
	2022		0	0	0	0.1
Curtailment and Constraint (GWh)	2020		2.6	0.6	3.9	10.7
	2021		2.3	0.5	3.3	9.5
	2022		1.4	0.3	2.3	7.5
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		< 1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		2%	2%	5%	10%
	2021		2%	2%	5%	9%
	2022		1%	1%	3%	7%
	Interconnectors / Future Grid					3% / 2%

Table 0-59 Results for 4 – J South Subgroup Solar

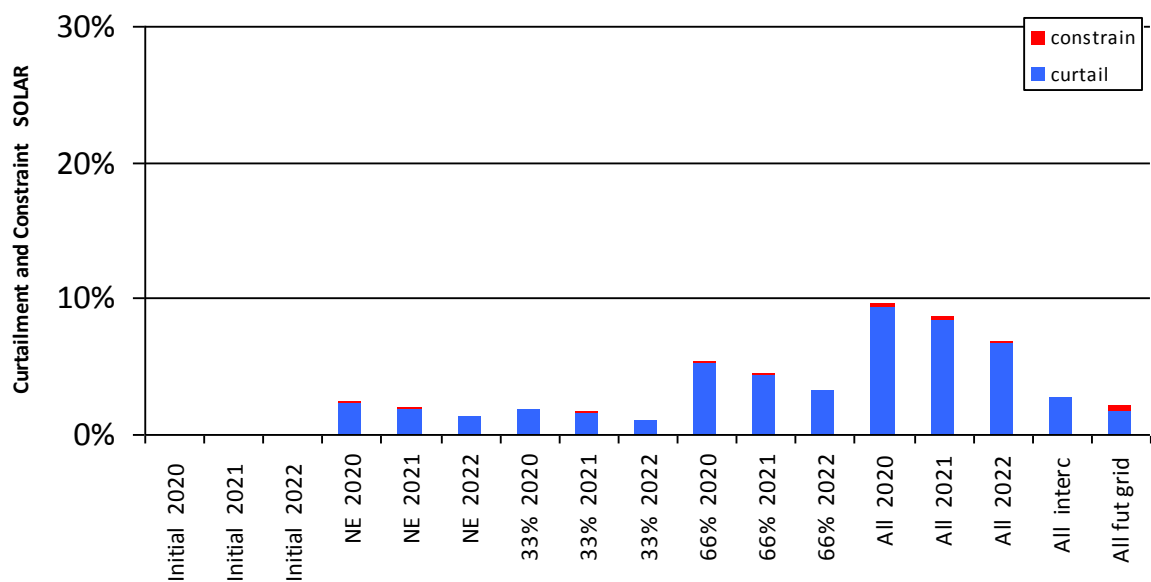


Figure 0-55 Curtailment and Constraint for 4 – J South Subgroup Solar

3 – J MID WIND	Year	Wind Generation Scenarios				All
		Initial	NE	33%	66%	
Installed (MW)		79	179	112	145	179
of which is Controllable (MW)		79	179	112	145	179
Available Energy Controllable (GWh)		227	514	322	416	514
Curtailment (GWh)	2020	6.2	33.5	19.7	44.7	82
	2021	4.5	25.8	15.4	37.6	71.2
	2022	2.8	17.8	10.5	27.9	57.2
Constraint (GWh)	2020	0.4	23.3	2.4	3.1	9.3
	2021	0.9	26.9	1.4	3.5	11.4
	2022	0.2	25.5	0.6	2.4	11.1
Curtailment and Constraint (GWh)	2020	6.7	56.8	22.1	47.9	91.4
	2021	5.4	52.7	16.8	41.1	82.6
	2022	3	43.3	11	30.3	68.3
Curtailment	2020	3%	6%	6%	11%	16%
	2021	2%	5%	5%	9%	14%
	2022	1%	3%	3%	7%	11%
Constraint	2020	< 1%	5%	1%	1%	2%
	2021	< 1%	5%	< 1%	1%	2%
	2022	< 1%	5%	< 1%	1%	2%
Curtailment and Constraint	2020	3%	11%	7%	11%	18%
	2021	2%	10%	5%	10%	16%
	2022	1%	8%	3%	7%	13%
	Interconnectors / Future Grid					8% / 7%

Table 0-60 Results for 3 – J Mid Subgroup Wind

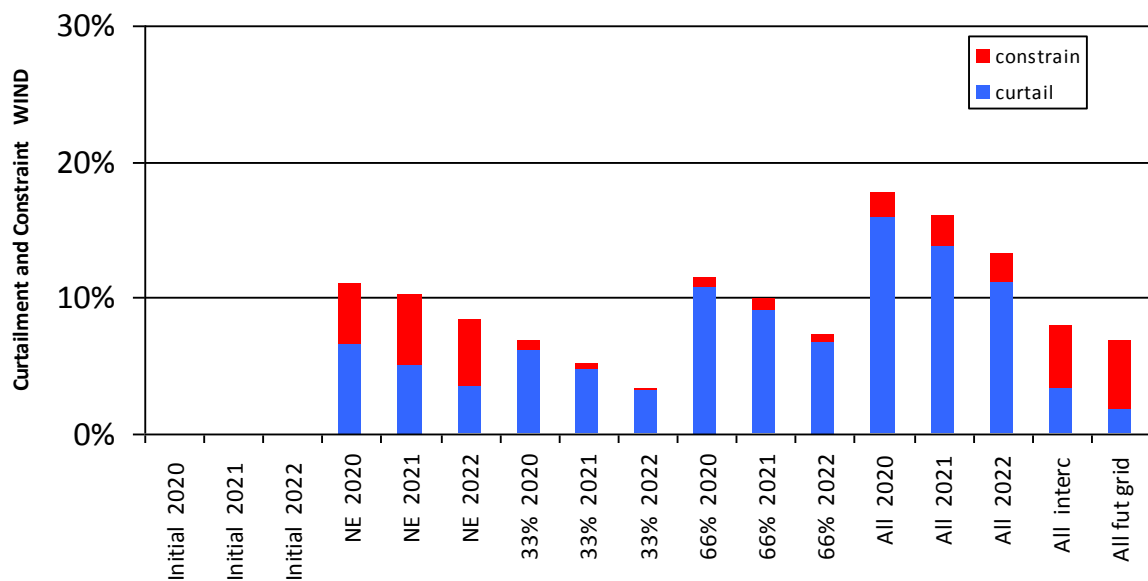


Figure 0-56 Curtailment and Constraint for 3 – J Mid Subgroup Wind

4 – J SOUTH WIND	Year	Wind Generation Scenarios				All
		Initial	NE	33%	66%	
Installed (MW)		9	54	24	39	54
of which is Controllable (MW)		9	54	24	39	54
Available Energy Controllable (GWh)		26	155	69	112	155
Curtailment (GWh)	2020	0.7	10.1	4.2	12.0	24.8
	2021	0.5	7.8	3.3	10.1	21.5
	2022	0.3	5.4	2.2	7.5	17.3
Constraint (GWh)	2020	0.1	0.7	0.3	0.4	0.8
	2021	0.1	0.7	0.3	0.4	0.6
	2022	0.0	0.4	0.1	0.2	0.1
Curtailment and Constraint (GWh)	2020	0.8	10.8	4.5	12.4	25.6
	2021	0.6	8.5	3.6	10.5	22.1
	2022	0.4	5.8	2.3	7.7	17.4
Curtailment	2020	3%	6%	6%	11%	16%
	2021	2%	5%	5%	9%	14%
	2022	1%	3%	3%	7%	11%
Constraint	2020	< 1%	< 1%	< 1%	< 1%	1%
	2021	< 1%	< 1%	< 1%	< 1%	< 1%
	2022	< 1%	< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020	3%	7%	7%	11%	16%
	2021	2%	5%	5%	9%	14%
	2022	1%	4%	3%	7%	11%
	Interconnectors / Future Grid					3% / 2%

Table 0-61 Results for 4 – J South Subgroup Wind

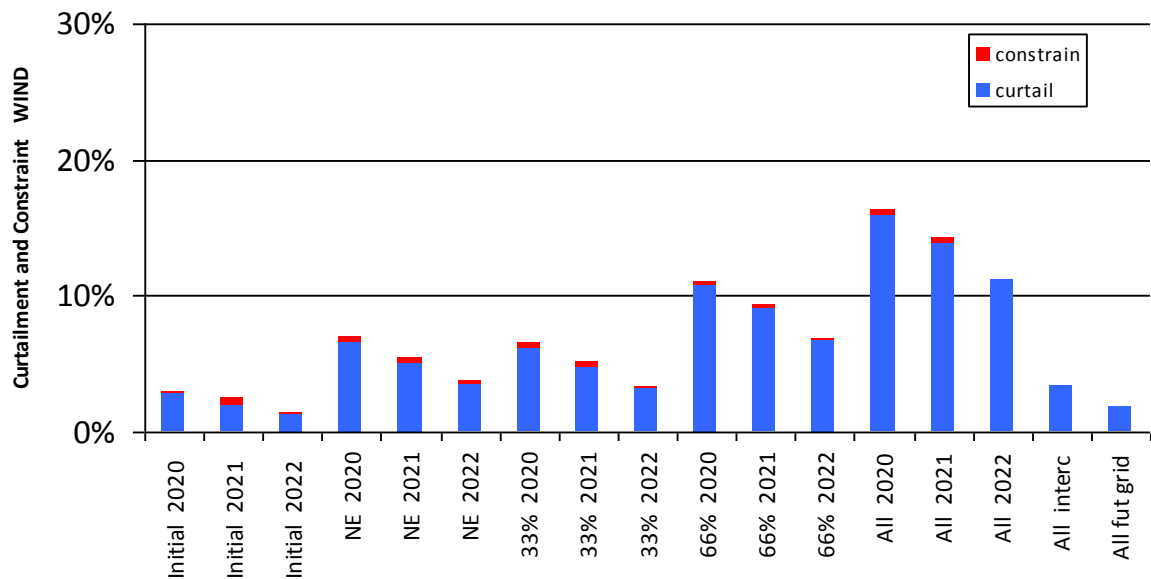


Figure 0-57 Curtailment and Constraint for 4 – J South Subgroup Wind

C.12 Area K



Figure 0-58 Map of Area K

Area	Node	SO	Status	Solar	Wind
k	Butlerstown	DSO	ECP-1 Offer	4	
k	Butlerstown	DSO	Initial		2
k	Dungarvan	DSO	ECP-1 Offer	23	
k	Dungarvan	DSO	Initial		5
k	Rathnaskilloge	TSO	ECP-1 Offer	95	
k	Woodhouse	TSO	Existing Offer		34
k	Woodhouse	TSO	Initial		20
Subtotal				122	61

Table 0-62 Generation Summary for Area K

SOLAR	Year	Solar Generation Scenarios				All
		Initial	South	33%	66%	
Installed (MW)		0	122	40	81	122
of which is Controllable (MW)		0	122	40	81	122
Available Energy Controllable (GWh)		0	132	43	87	132
Curtailment (GWh)	2020		3.1	0.8	4.5	12.3
	2021		2.6	0.6	3.7	11
	2022		1.7	0.4	2.8	8.9
Constraint (GWh)	2020		1.1	0.1	0.3	0.4
	2021		0.6	0	0.1	0.4
	2022		0.1	0	0.1	0.1
Curtailment and Constraint (GWh)	2020		4.2	0.9	4.8	12.7
	2021		3.1	0.7	3.8	11.3
	2022		1.8	0.4	3	9
Curtailment	2020		2%	2%	5%	9%
	2021		2%	2%	4%	8%
	2022		1%	1%	3%	7%
Constraint	2020		1%	< 1%	< 1%	< 1%
	2021		< 1%	< 1%	< 1%	< 1%
	2022		< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020		3%	2%	5%	10%
	2021		2%	2%	4%	9%
	2022		1%	1%	3%	7%
	Future Grid					2%

Table 0-3 Results for Area K Solar

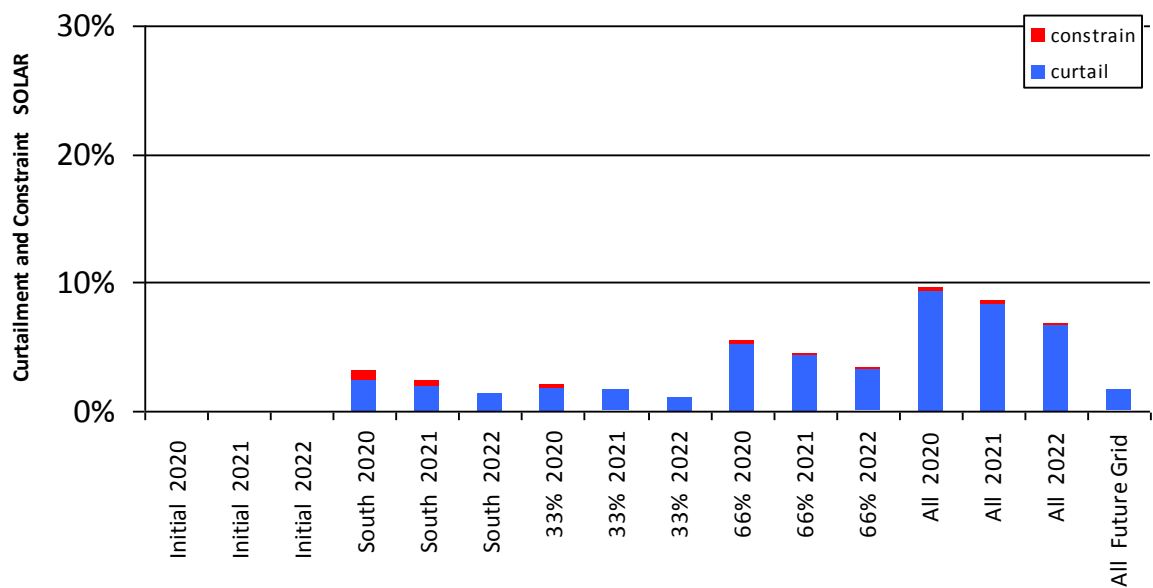


Figure 0-3 Curtailment and Constraint for Area K Solar

WIND	Year	Wind Generation Scenarios				
		Initial	South	33%	66%	All
Installed (MW)		20	54	31	42	54
of which is Controllable (MW)		20	54	31	42	54
Available Energy Controllable (GWh)		73	196	113	154	196
Curtailment (GWh)	2020	1.8	10.2	6.0	14.3	27.1
	2021	1.3	7.9	4.7	11.9	23.4
	2022	0.8	5.4	3.2	8.8	18.6
Constraint (GWh)	2020	0.2	1.5	0.4	0.6	0.8
	2021	0.5	3.1	0.5	0.8	1.1
	2022	0.1	0.6	0.1	0.5	0.5
Curtailment and Constraint (GWh)	2020	1.9	11.7	6.5	14.9	27.9
	2021	1.8	11.0	5.1	12.7	24.5
	2022	0.8	6.0	3.3	9.3	19.1
Curtailment	2020	2%	5%	5%	9%	14%
	2021	2%	4%	4%	8%	12%
	2022	1%	3%	3%	6%	9%
Constraint	2020	< 1%	1%	< 1%	< 1%	< 1%
	2021	1%	2%	< 1%	1%	1%
	2022	< 1%	< 1%	< 1%	< 1%	< 1%
Curtailment and Constraint	2020	3%	6%	6%	10%	14%
	2021	2%	6%	5%	8%	12%
	2022	1%	3%	3%	6%	10%
	Future Grid					2%

Table 0-8 Results for Area K Wind

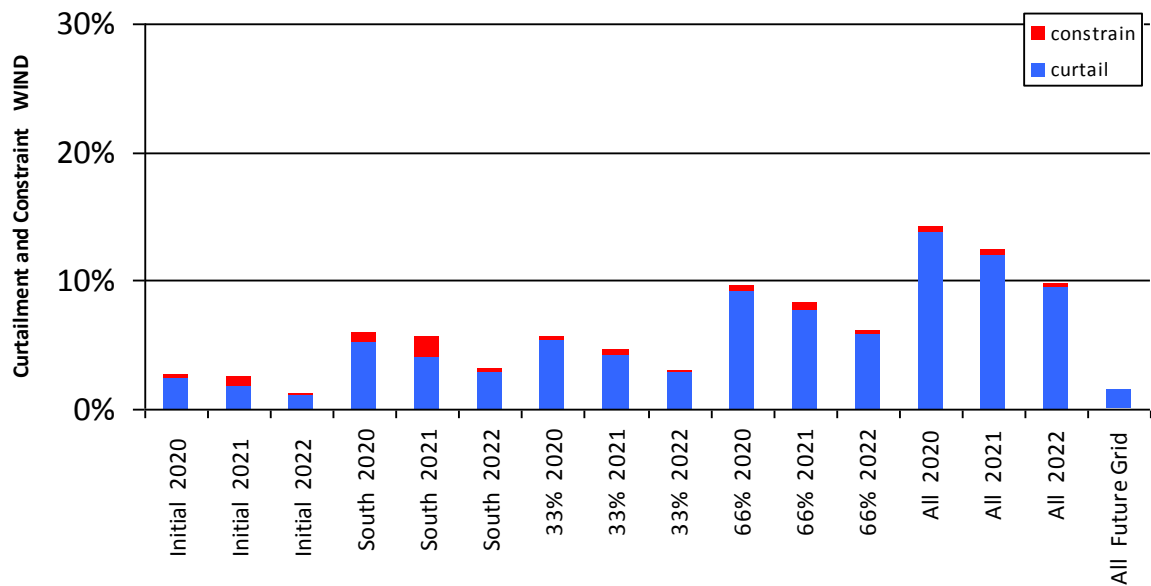


Figure 0-9 Curtailment and Constraint for Area K Wind

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Abbreviation and Terms

Active Power

The product of voltage and the in-phase component of alternating current measured in Megawatts (MW). When compounded with the flow of 'reactive power', measured in Megavolt-Amperes Reactive (Mvar), the resultant is measured in Megavolt-Amperes (MVA).

Busbar

The common connection point of two or more circuits.

Capacity Factor

$$\text{Capacity Factor} = \frac{\text{Energy Output}}{\text{Hours per year} * \text{Installed Capacity}}$$

Combined Cycle Gas Turbine (CCGT)

This is a type of thermal generator that typically uses natural gas as a fuel source. It is a collection of gas turbines and steam units; where waste heat from the gas turbines(s) is passed through a heat recovery boiler to generate steam for the steam turbines.

Commission for Regulation of Utilities (CRU)

The CRU is the regulator for the electricity, natural gas and public water sectors in Ireland.

Constraint

The reduction in output of a generator due to network limits. Usually, constraints are local to a transmission bottleneck.

Contingency

The unexpected failure or outage of a system component, such as a generation unit, transmission line, transformer or other electrical element. The transmission network is operated safe against the possible failure or outage of any system component. Hence, contingency usually refers to the possible loss of any system component. A contingency may also include multiple components, when these are subject to common cause outages.

Curtailement

Curtailement is when the transmission system operators EirGrid and SONI ask generation to reduce their output to ensure system security is maintained. Usually, curtailement is shared across the whole system.

Demand

The amount of electrical power that customers consume and which is measured in Megawatts (MW). In a general sense, the amount of power that must be transported from transmission network connected generation stations to meet all customers' electricity requirements.

Enduring Connection Policy (ECP)

The Commission for Regulation of Utilities (CRU) has put in place a revised approach to issuing connection offers to generators. This approach is called the Enduring Connection Policy (ECP). With ECP, it is envisaged that batches of generator connection offers will issue on a periodic basis.

Enduring Connection Policy - 1 (ECP-1)

Under the ECP arrangements, the processing of the first batch, called Enduring Connection Policy – 1 (ECP-1), began in 2018 and is expected to conclude in early 2020. A second batch, called ECP-2, will begin processing shortly thereafter. For ECP-1, EirGrid and ESB will issue 2 GW of generator connection offers. It is a feature of ECP-1 that these offers are made on a non-firm basis. Also, it is a requirement of ECP-1 that EirGrid provide a constraints report for the generators.

Forced Outage Probability (FOP)

This is the statistical probability that a generation unit will be unable to produce electricity for non-scheduled reasons due to the failure of either the generation plant or supporting systems. Periods, when the unit is on scheduled outage, are not included in the determination of forced outage probability.

Generation Dispatch

This is the configuration of outputs from the connected generation units.

Interconnector

The electrical link, facilities and equipment that connect the transmission network of one EU member state to another.

Loadflow

Study carried out to simulate the flow of power on the transmission system given a generation dispatch and system load.

A DC loadflow is a study, which uses simplifying assumptions in relation to voltage and reactive power. DC loadflow studies are used as part of a complicated overarching study. For example, Plexos uses DC loadflow because it is performing studies for every hour of every study year and is performing a large optimisation calculation for each of these.

Maximum Export Capacity (MEC)

The maximum export value (MW) provided in accordance with a generator's connection agreement. The MEC is a contract value that the generator chooses as its maximum output.

Megawatt (MW) and Gigawatt (GW)

Unit of power: 1 megawatt = 1,000 kilowatts = 10⁶ joules / second

1 gigawatt = 1,000 megawatts

Megawatt Hour (MWh), Gigawatt Hour (GWh) and Terawatt Hour (TWh)

Unit of energy: 1 megawatt hour = 1,000 kilowatt hours = 3.6 x 10⁹ joules

1 gigawatt hour = 1,000 megawatt hours

1 terawatt hour = 1,000 gigawatt hours

Plexos

Plexos is the power system simulation tool used in this study to evaluate curtailment and constraint. Plexos is a detailed generation and transmission analysis program that has been widely used in the electricity industry for many years.

Rate of Change of Frequency (ROCOF)

As low inertia non-synchronous generators displace high inertia synchronous generators in system dispatch, then the system gets lighter. Then, for the loss of a large infeed (e.g. trip of an interconnector or generator), the system frequency will change more quickly.

ROCOF is the agreed limit to which the system is agreed to be operated and which generators, demand and system protection schemes are expected to manage. In Ireland, the TSOs are proposing to increase the ROCOF value. This will allow more renewable generation and may require confirmation by participants that they can meet the proposed ROCOF.

Short Run Marginal Cost (SRMC)

The instantaneous variable cost for a power plant to provide an additional unit of electricity, i.e. the cost of each extra MW it could produce excluding its fixed costs. The SRMC reflects the opportunity

cost of the electricity produced, which is the economic activity that the generator forgoes to produce electricity. For example, in the case of a generator fueled by gas, the opportunity cost includes the price of gas on the day that it is bidding in because if the generator is not producing electricity it could sell its gas in the open market.

System Non-Synchronous Penetration (SNSP)

The introduction of large quantities of non-synchronous generators such as solar and wind poses challenges to a synchronous power system. For Ireland, a system non-synchronous penetration (SNSP) ratio is defined to help identify the system operational limits. The present allowable ratio is 65% but the proposed procurement of system services other than energy and proposed amendments to system operation are expected to allow SNSP to increase in future years.

Total Electricity Requirement (TER)

TER is the total amount of electricity required by a country. It includes all electricity exported by generating units, as well as that consumed on-site by self-consuming electricity producers, e.g. CHP.

Transmission Peak

The peak demand that is transported on the transmission network. The transmission peak includes an estimate of transmission losses.

Transmission System

The transmission system is a meshed network of high-voltage lines and cables (400 kV, 275 kV, 220 kV and 110 kV) for the transmission of bulk electricity supply around Ireland and Northern Ireland.

Transmission System Operator

In the electrical power business, a transmission system operator is the licensed entity that is responsible for transmitting electrical power from generation plants to regional or local electricity distribution operators.

Upgrading

To increase the rating of a circuit. This is achieved by increasing ground clearances and/or replacing conductor, together with any changes to terminal equipment, support structures and foundations.

Winter Peak

This is the maximum annual system demand. It occurs in the period October to February, inclusive in Ireland and in the Period November to February in Northern Ireland.

References

Enduring Connection Policy

<http://www.eirgridgroup.com/customer-and-industry/becoming-a-customer/generator-connections/enduring-connection-polic/>

Generation Capacity Statement

<http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Group-All-Island-Generation-Capacity-Statement-2019-2028.pdf>

Reinforcement Projects

<http://www.eirgridgroup.com/the-grid/projects/>

<http://www.soni.ltd.uk/the-grid/projects/>

All Island Ten Year Transmission Forecast Statement

<http://www.eirgridgroup.com/site-files/library/EirGrid/TYTFS-2018-FINAL-HI-RES.pdf>

Transmission Development Plan for Northern Ireland 2018-2027

<http://www.soni.ltd.uk/the-grid/projects/tdpni-2018-27/related-documents/>

Tomorrows Energy Scenarios

<http://www.eirgridgroup.com/site-files/library/EirGrid/TES-2017-System-Needs-Assessment-Final.pdf>

Generator Information

<http://www.eirgridgroup.com/how-the-grid-works/renewables/>

<https://www.esbnetworks.ie/new-connections/generator-connections/generator-connection-statistics>

DS3 Programme

<http://www.eirgridgroup.com/how-the-grid-works/ds3-programme/>