

Gate 3 Constraint Reports

Gate 3 Liaison Group
CER Offices

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Introduction

- Aim of the Gate 3 Constraint Reports is to provide meaningful information on constraint and curtailment levels to customers.
 - Significant interaction with industry on key issues and feedback received was incorporated into the modelling.
- Output of the Gate 3 constraints modelling includes:
 - Transmission constraint levels for Gate 3 conventional generators.
 - Curtailment levels and transmission constraint levels for **all** wind generators.

Introduction

- Studies have been completed for four scenarios, for study years 2011 through 2022 inclusive.
 - Massive increase in workload compared to previous Gates
 - Studies have been completed on schedule
- The Area K Constraint Report has been compiled and is ready for publication.
- Aim of this presentation is to provide the Liaison Group members with an overview of the information contained in a Gate 3 Area Report.

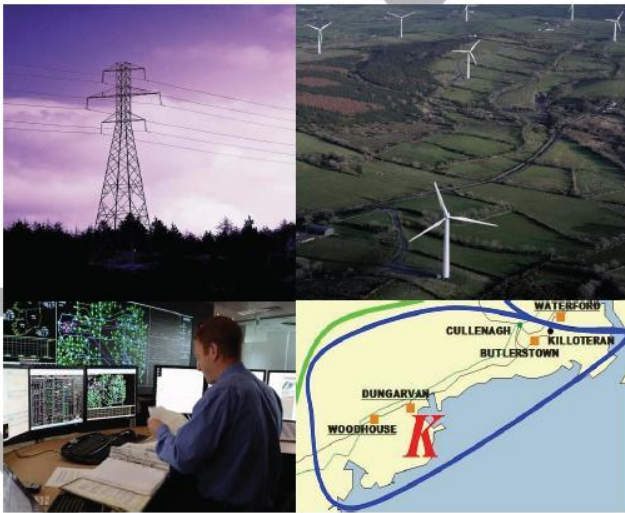


Gate 3 Constraint Report



Gate 3 Constraint Report for Area X

Levels of Curtailment and Transmission Constraint
for Generation in Area X
2011 - 2022



Baseline Version Draft 0.9

Published March 2010

- A draft Gate 3 Constraint Report template was distributed to all Liaison Group members.
- Each Constraint Report contains detailed results for the Gate 3 Area being examined, as well as information on the modelling methodology and input assumptions employed.

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Curtailment and Constraint

- **Curtailment**

Changes in generator output from the most economic dispatch, required for 'system' reasons

- System reasons include Frequency control, Provision of reserve, Voltage control, Load following, Ability to withstand disturbances and Inertia.
- For example, curtailment can occur when wind generation is a high percentage of (or exceeds) system demand.

- **Constraint**

Changes in generator output due to transmission network limitations, specifically the overloading of transmission lines, cables and transformers.

- As requested by industry, curtailment and constraint have been separately identified in the modelling.

'Physical' Modelling versus Market Modelling

- In the constraints modelling, we are determining the 'physical' curtailment and transmission constraint levels.
- We are not determining who would be financially compensated for curtailment or constraint and who would be penalised financially.
- The market rules would be required to determine financial compensation.

Overview of Scenarios

Scenario		Gate 3 Wind (33%,66%,100%)	Fuel Price (Base Case, Alternative)	Additional 'High Wind' Reserve Requirement
Scenario 1	1-A	100%	Base Case	2.5% of Wind > 1000MW
	1-B	100%	Base Case	7.5% of Wind > 1000MW
Scenario 2	2-A	66%	Base Case	2.5% of Wind > 1000MW
	2-B	66%	Base Case	7.5% of Wind > 1000MW
Scenario 3	3-A	33%	Base Case	2.5% of Wind > 1000MW
	3-B	33%	Base Case	7.5% of Wind > 1000MW
Scenario 4	4-A	100%	Alternative	2.5% of Wind > 1000MW
	4-B	100%	Alternative	7.5% of Wind > 1000MW

Key Risks affecting the Results

- Key risks include potential changes to:
 - Dispatch rules
 - Shallow connection methods/timelines
 - Input assumptions, including:
 - Level of uptake of Gate 3
 - Fuel prices
 - Demand growth
 - Roll-out of transmission reinforcements
 - Treatment of interconnection with Great Britain
 - Treatment of Northern Ireland generation and transmission
 - Operational rules
 - Generation portfolio and characteristics

Results

2 RESULTS

pg 11

2.1 Node XXXX Results

pg 12

2.2 Node YYYY Results

pg 16

2.3 Node ZZZZ Results

...

2.4

2.5

Results

- Results provided on a nodal basis for all scenarios
 - Assumed installed wind capacity at nodes detailed for each study year
 - Curtailment and constraint results detailed for each study year
 - Six graphs per node to enable easy comparison between scenarios

Node XXXX Results												
Scenario 1-A: 100% Gate 3 Wind, 2.5% Wind Reserve												
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Installed Wind Capacity (MW)												
Gate 3 Wind (MW)												
Gate 2 Wind (MW)												
Pre-Gate 2 Wind (MW)												
Total Wind (MW)												
Results												
Available Energy (GWh)												
Curtailed Energy (GWh)												
Constrained Energy (GWh)												
Curtailed + Constrained Energy (GWh)												
Curtailment (%)												
Constraint (%)												
Curtailment + Constraint (%)												



Appendix A: Modelling Methodology

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Modelling Methodology

- Detailed methodology provided in Appendix A (pg 20)
- The draft high level dispatch principles provided by the CER are as follows:
 - “Dispatch is based on a least cost basis based on offer prices for non priority dispatch generation;
 - A zero offer price should be used to model priority dispatch plant;
 - No account of ‘firm access’ is to be taken in the dispatch process as per current dispatch practices;
 - Where redispatch of priority dispatch plant is required, the following order is to be employed (in order of what plant is turned down first):
 - peat;
 - hydro;
 - wind, and within wind generators
 - Variable Price Takers (pro rata);
 - Autonomous.”

Appendix B: Input Assumptions

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Input Assumptions

- Detailed assumptions provided in Appendix B (pg 25)
- Moyle and EWIC used to export power at hours when wind would otherwise be curtailed (zero flow at all other hours).
 - Moyle export capacity is assumed to increase from 80MW to 400MW in 2013.
- Operational rules employed include:
 - Requirement for a minimum number of conventional generators to be synchronised
 - Additional reserve requirement for ‘high wind’ situations
 - Two scenarios:
=> 2.5% and 7.5% of wind generation > 1000MW

Appendix C: Transmission Reinforcements

- Transmission reinforcements (new build and uprates) added to the constraints model were consistent with those employed in the workstream for the Incremental Transfer Capability (ITC) Program.
 - Transmission outages for uprates were modelled.
 - Normal transmission maintenance outages were not modelled.
- Detailed assumptions on the transmission reinforcements used in the model are detailed in Appendix C (pg 40).

Appendix D: Shallow Connection Dates

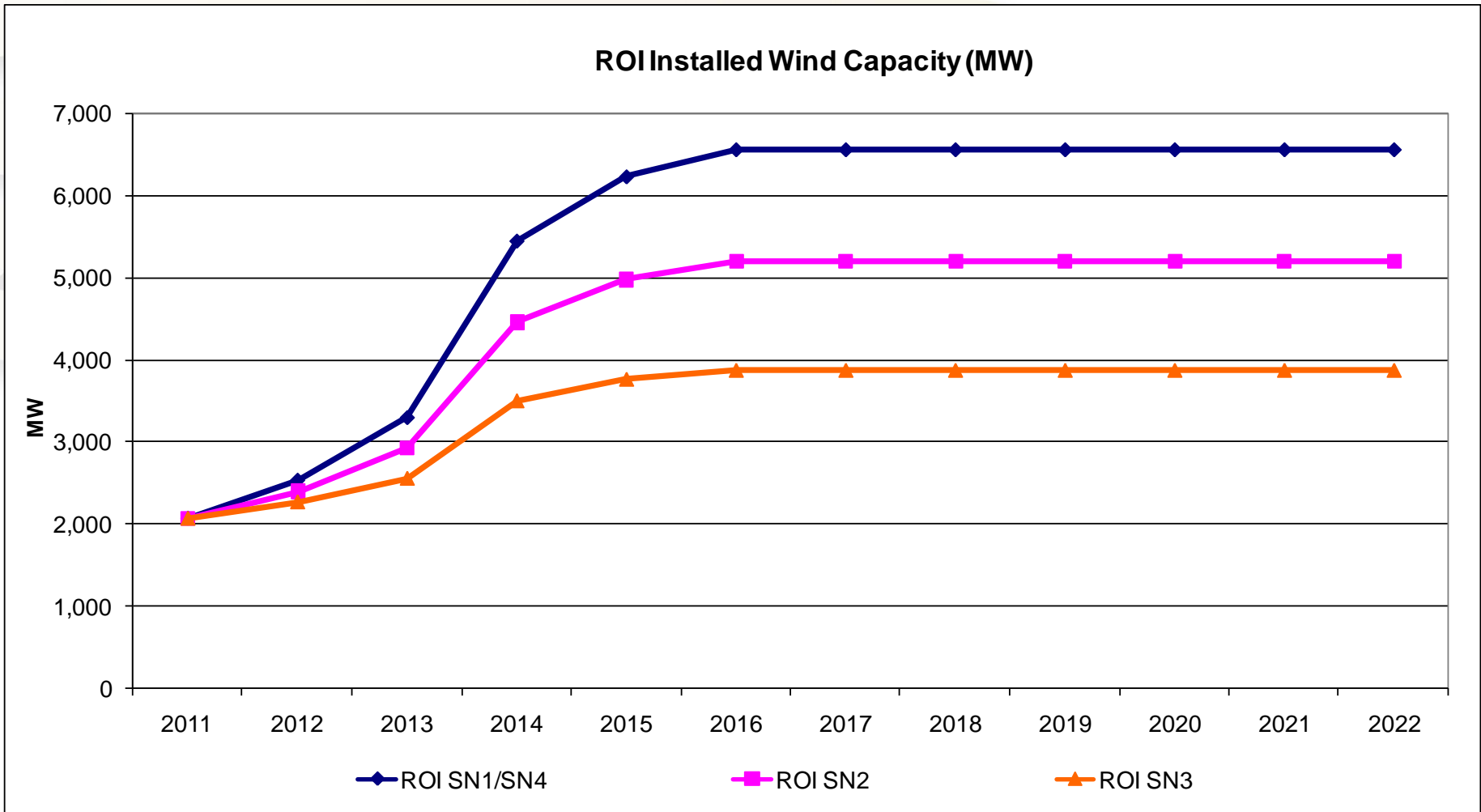
- A full list of the generators included in the Gate 3 constraints modelling analysis, as well as the first year for which they were added to the constraints model, is provided in Appendix D (pg 45).

Transmission Node	Generator	Voltage (kV)	Region	Assumed Maximum Capacity (MW)	Type	Gate	Year Added	Year Removed
NODE A	GENERATOR X	220	A	xxxx	Thermal	Gate 3	2015	
NODE B	GENERATOR Y	220	B	xxxx	Wind	Gate 3	2014	
NODE C	GENERATOR Z	110	C	Xxxx	Wind	Gate 2	2012	

- All generators were added to the model based on their estimated shallow connection dates.
 - Standard leadtimes were employed.
 - Required shallow connection works required were identified based on a high-level analysis and before detailed connection method studies could be performed.
 - Leadtimes were applied from the date each generator is scheduled to receive their connection offer => Produces the earliest possible date that a generator could be expected to connect (assuming non-contestable build) .
 - Assumes that generators connect on a ‘non-firm’ basis in advance of their deep works being completed.

Installed Wind Capacity

- All RoI generation added based on estimated shallow connection leadtimes



Publication Options

- Report Distribution

- Area reports distributed to Gate 3 generators only?
- Area reports distributed to Gate 3 generators and pre-Gate 3 wind generators only?
- Area reports published on the EirGrid website for all to view?

- Publication Timelines

- Area reports published as per currently agreed timelines?
- First few Area reports delayed until the dispatch rules are more “firm” e.g. when the “strawman”, draft or final decision paper on ‘Principles of Dispatch and the Design of the Market Schedule in the Trading & Settlement Code’ is published?

Summary

- Gate 3 Constraint Reports will provide meaningful information on constraint and curtailment levels to customers.
- Decision on who receives each Area Report and when they receive it is required.



Thank You

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