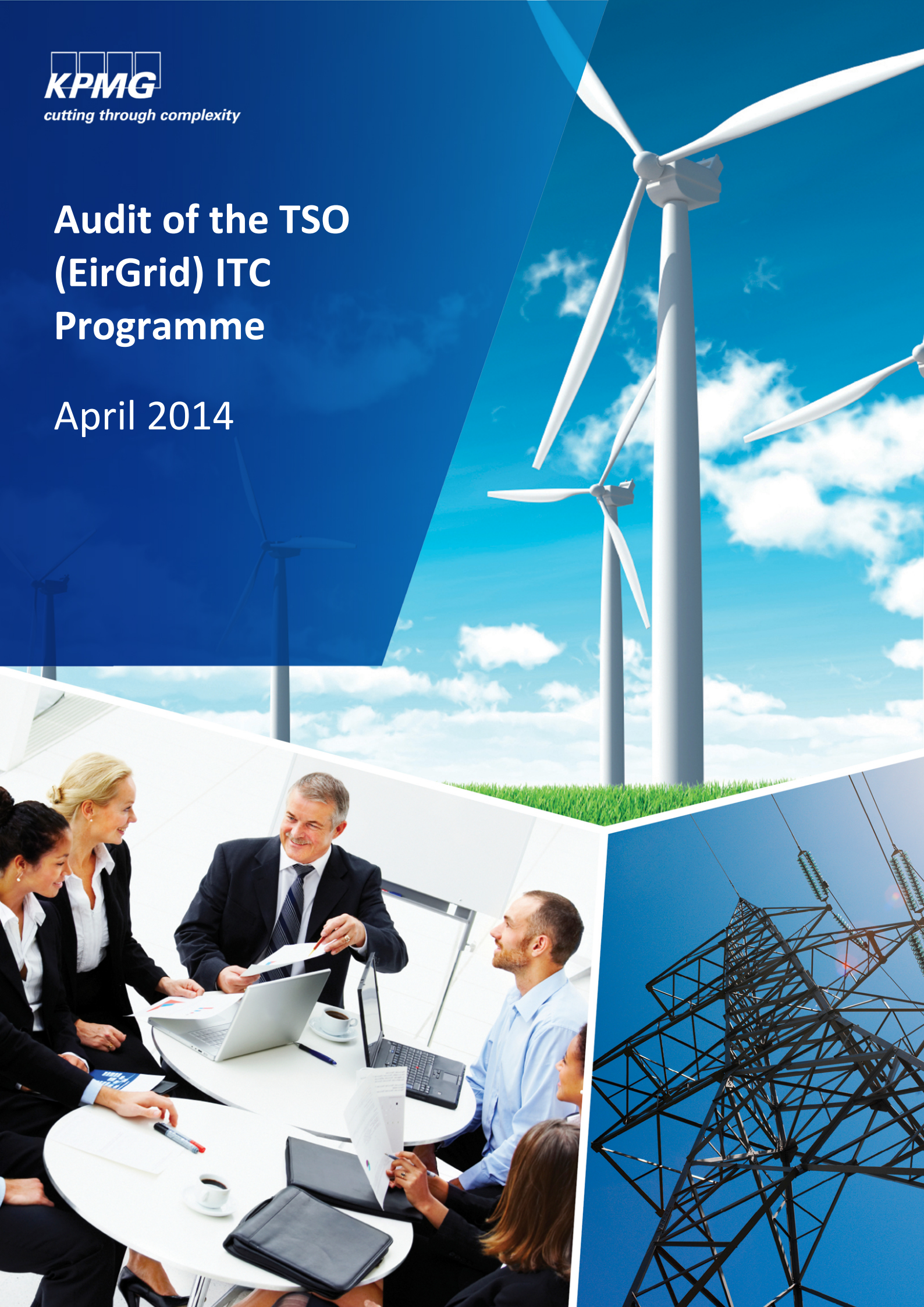


# Audit of the TSO (EirGrid) ITC Programme

April 2014







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# 1 Executive summary

As detailed by the Commission for Energy Regulation (CER) the purpose of the audit of the TSO (EirGrid) ITC Programme was to provide the market with full confidence as to the objectivity and fairness of the FAQs dates and the assumptions and modelling from which these results are derived. The agreed upon test procedures involved the review of six test areas, also detailed in Section 2.2 of this document;

**Test 1** - Consistency of the CER approved documents with the assumptions used in the 2012 run of the ITC Programme.

**Test 2** - Comparison of the ITC Programme as used in 2009 and 2012.

**Test 3** - Consistency in the 2012 run of the ITC Programme in the treatment of applicants, and specific programme parameters.

**Test 4** - Confirmation that all transmission and distribution shallow works are in place in the network models used in the 2012 run of the ITC Programme.

**Test 5** - Treatment of transmission reinforcements, firm capacity and network test tolerances in the 2012 run of the ITC Programme.

**Test 6** - Comparison of treatment of a sample of applicants in the ITC Programme.

## *KPMG observations*

At the conclusion of our testing it can be reported that no issues were noted with no reportable items. In addition, any exceptions identified as part of the tests were proven as having been fully recorded as part of the ITC programme processes and procedures, and reviewed, accepted and deemed appropriate by management. For any of the exceptions identified we validated that they had no impact on the ITC Programme results, in particular on the determination of FAQs for individual applicants.

Based on the test procedures performed and their associated findings we confirm that the methodology applied by EirGrid in the 2012 run of the ITC programme conforms to the Gate 3 Direction (CER/08/260) and that the methodology has been applied on a consistent and appropriate basis, in line with the Gate 3 Direction and the relevant CER approved EirGrid documentation.



## 2 Introduction

### 2.1 Background

On 16 December 2008 CER published its final Gate 3 Direction (CER/08/260 - 'Criteria for Gate 3 Renewable Generator Offers & Related Matters – Direction to the System Operators'). The Gate 3 Direction included a requirement for EirGrid to calculate scheduled transmission firm access levels (Firm Access Quantities or FAQs) for each eligible Gate 3 project based on EirGrid's forward-looking Grid Development Strategy (GDS) and using EirGrid's Incremental Transfer Capability (ITC) Programme.

On 18 December 2009 the CER published a 'Direction on Conventional Offer Issuance Criteria and Matters Related to Gate 3' (CER/09/191). This Direction required EirGrid to calculate scheduled transmission firm access quantities (FAQs) for those conventional projects eligible for an offer in addition to the Gate 3 renewable projects.

Throughout 2012 and 2013, EirGrid carried out a re-study of the Gate 3 FAQs by re-running the ITC Programme, the original run of the programme being in 2009. The assumptions used in this re-run were updated as per EirGrid's "Technical Assumptions for Analysis of Firm Access Quantities and Associated Transmission Reinforcements for Gates 1 – 3 and Eligible non-GPA Generators". This document was approved by the CER in July 2012 and published on the EirGrid website. In December 2012 EirGrid published the results of its analysis of FAQs for Gates 1 - 3 wind projects while the results of the restudy of Gate 3 non-wind projects were published in June 2013.

The CER decided to carry out an independent audit of this ITC Programme run, similar to the audit carried out in 2010, in line with Section 5.22 of the Gate 3 Direction. The purpose of the audit was to provide the market with full confidence as to the objectivity and fairness of the FAQs dates and the assumptions and modelling from which these results are derived.

In November 2013 the CER appointed KPMG to carry out this independent audit following a competitive tendering process. Based on the terms of engagement agreed with the CER the review was performed during December 2013 and January 2014. The results of the review are contained in Section 2 of this report.



## 2.2 Terms of engagement and objectives

As part of our engagement with the CER, specific agreed upon procedures (AUPS) were conducted as part of this independent review of EirGrid's ITC Programme. These AUPS were agreed with the CER as being sufficient and appropriate to fulfil the review.

As agreed with the CER, the detailed AUPS have been grouped into six Test areas, covering the items that the CER required to be checked as part of this audit.

**Test 1** - Consistency of the CER approved documents with the assumptions used in the 2012 run of the ITC Programme;

- The assumptions detailed in EirGrid's Technical Assumptions Document<sup>1</sup> are consistent with the assumptions used in the 2009 and 2012 runs of the ITC Programmes;
- We reviewed for consistency with EirGrid's Technical Assumptions Document, the justification or rationale of:
  - any changes, amendments or updates to the assumptions used in both the 2009 and 2012 run of the ITC Programmes;
  - any additional assumptions included in the 2012 run of the ITC programme run which were not included in 2009 run of the ITC Programme;
  - any assumptions excluded or removed from the 2012 run of the ITC Programme, which were included in 2009 run of the ITC Programme; and
  - the continued usage of the same assumptions in the 2012 and 2009 runs of the ITC Programmes.

**Test 2** - Comparison of the ITC Programme as used in 2009 and 2012;

- The audit examined for consistency the ITC Programmes used to calculate FAQs in 2009 and 2012. The audit examined whether any updates or changes, which were made to the ITC Programme itself since the original 2009 run of the ITC Programme, had a material impact on the calculation of FAQs.

**Test 3** - Consistency in the 2012 run of the ITC Programme in treatment of applicants, and specific programme parameters;

<sup>1</sup> EirGrid document **Technical Assumptions for Analysis of Firm Access Quantities and Associated Transmission Reinforcements for Gates 1 – 3 and Eligible non-GPA Generators**, published July 2012.



The audit tested that;

- the Gate 3 applications tested by the ITC Programme for firm access (FAQ) were those applications listed in Appendix A of the Technical Assumptions Document;
- the date recorded in Appendix A of the Technical Assumptions Document is the date which is used in the ITC Programme for Gate 3 applications;
- the nodes recorded in Appendix A of the Technical Assumptions Document are the nodes used by the ITC Programme;
- the Gate 3 applications with an  $MEC^2 \leq 2$  MW, with the exception of project extensions which result in the total MEC of a project exceeding 2 MW, were not tested and were excluded from the network models used by the ITC Programme in the calculation of FAQ's;
- the generation included in the network models used by the ITC Programme in the calculation of FAQ's conforms to that stipulated in Section 2.2 of the Technical Assumptions Document.
- the ITC Programme allocates scheduled firm access quantities (FAQ's) in line with the date order allocation rules set out in Section 5.18 of CER's Gate 3 Direction, CER/08/260;
- the ITC Programme operates to an "n-1" transmission planning standard in calculation of FAQ's set out in Section 5.16 of CER's Gate 3 Direction, CER/08/260; and
- that the ITC Programme utilises a set of deterministic dispatch scenarios that recognise the likely running regime of generators and the probability of particular units running together as detailed in Section 6.5 of the Technical Assumptions Document;

**Test 4** - Confirmation that all transmission and distribution shallow works are in place in the network models used in the 2012 run of the ITC Programme;

- The audit tested that all transmission and distribution shallow works were assumed to be in place in the network models in the 2012 run of the ITC Programme, bar the following exceptions, as detailed in Section 5.2 of EirGrid's Technical Assumptions Document;
  - network reinforcement works that are deemed to be shallow works for an applicant's facility due to the relative size of the connecting generation and the capacity of the local transmission network (ref. Section 5.2 of the Technical Assumptions Document); and
  - the Bellacorrick (Mayo) node where the respective applicants are modelled on the existing local 110kV network until such time as the EHV shallow-connection infrastructure is assumed to be in place (ref. Section 5.2 of the Technical Assumptions Document).

<sup>2</sup> MEC – Maximum Export Capacity





**Test 5** - Treatment of transmission reinforcements, firm capacity and network test tolerances in the 2012 run of the ITC Programme;

The audit tested that;

- the network models used in the 2012 run of the ITC Programme reflected EirGrid's transmission reinforcement programme consistent with Section 5.1 of the Technical Assumptions Document;
- the ITC Programme's firm capacity test tolerance is 0.5MW, consistent with Section 6.1 of the Technical Assumptions Document;
- that firm capacity (FAQ) identified in any given year is included in the base case model for all subsequent years;
- the ATRs (Associated Transmission Reinforcements) have been determined in a manner which is consistent with the Technical Assumptions Document. The audit should determine that the allocation of ATRs was applied on a consistent basis to all applications and without bias; and
- the ATR treatment in the 2012 run of the ITC Programme is consistent with the calculation of FAQs.

**Test 6** - Comparison of treatment of a sample of applicants in the ITC Programme;

- For a sample of Gate 3 applications, the end-to-end 2012 ITC Programme process was tested to determine that the applications were treated in a consistent manner, and in line with EirGrid's Technical Assumptions Document.

## **2.3 Work performed**

Our results and findings are based on the information and explanations provided to KPMG during this period and any follow up queries undertaken.

We obtained and reviewed all data and information as required to complete this review. Our work also involved gathering information and explanations from EirGrid Transmission Access Planning and ITC programme subject matter experts. We then performed tests, including detailed walk through demonstrations and testing of the ITC Programme, to confirm these explanations.

For the avoidance of doubt, please note the following;

- Our work was based solely on the data and information provided by EirGrid from their records and IT systems. We did not carry out any verification work as to the veracity of this data and information, save that described in our terms of reference;



- KPMG has no comment with regard to compliance of elements not directly tested as part of this engagement;
- We cannot be held responsible or liable if information material to our task is deliberately withheld or concealed from us or fraudulently represented to us;
- The scope of our work did not include IT General Control testing around the ITC Programme systems or other systems used in support;

## **2.4 Status of this report**

This report is final. The findings have been discussed with the CER and factual accuracy confirmed with EirGrid.





## 3 Key findings

### 3.1 Summary of results

#### 3.1.1 Consistency of the CER approved documents with the assumptions used in the 2012 run of the ITC Programme;

##### *Scope*

Test the consistency of the CER approved documents, listed below;

- Direction on Conventional Offer Issuance Criteria and Matters Related to Gate 3, CER/09/191.
- EirGrid's Technical Assumptions for Analysis of Firm Access Quantities; and Associated Transmission Reinforcements for Gates 1 – 3 and Eligible non-GPA Generators.

##### *Tests performed*

We reviewed the Technical Assumptions Document for the 2009 run of the ITC Programme, which is an extract from the CER document – CER/09/191, and the 2012 run of the ITC Programme and found them to be consistent. The differences noted were the following;

- Individual applicants with  $MEC \leq 2$  MW were not tested for FAQ in the 2012 run of the ITC Programme; this is consistent with EirGrid's Technical Assumptions Document. We noted that projects with an  $MEC \leq 2$  MW have a negligible effect on the determination of FAQs and by not including these applicants in the network models used by the ITC Programme, other applicants were not impacted, therefore this assumption change was immaterial in nature;
- We noted differences in the list of applicants for the 2012 run of the ITC Programme and those for the 2009 run of the ITC Programme, which came from the Gate 3 applicants as listed in CER/08/260. We noted that this was due to certain applicants included in the 2009 run withdrawing their application between the periods of running the ITC Programme for Gate 3 in 2009 and 2012. Therefore, we validated that the differences in the list of applicants were as expected.
- Due to the uncertainty around the plans for re-powering of generation at Tarbert, EirGrid revised the assumption used in the 2012 run of the ITC Programme, from those used in the 2009 run of the ITC Programme. The revised assumption was that all 589.4 MW of generation at Tarbert remains connected. In the 2009 run of the ITC Programme, EirGrid assumed that generation units 1-4 at Tarbert would be replaced with a new 285 MW OCGT. The figure of 589.4MW reflects its current contracted Maximum Export Capacity (MEC). As the ITC Programme utilises a set of deterministic dispatch scenarios that recognise the likely running regime of generators and the probability of particular units running together (as detailed in section 6.5 of EirGrid's Technical Assumptions Document), it was observed that the generation at Tarbert of 589.4MW is not modelled as running when determining FAQs for wind generation projects. As a result the change



in assumption for Tarbert does not impact on either the availability or determination of FAQ for wind generation projects. For determining FAQs for non-wind generation projects the anticipated running regime of the Tarbert generation under the revised assumption means in practice two units are not assumed to be running and the other two units are only considered to be available to run in certain high load test scenarios. This change to the assumption of the generation capacity of Tarbert used in the 2012 run of the ITC Programme was consistent with those detailed in Section 2.2.1 of EirGrid's Technical Assumptions Document.

### **Conclusion**

No issues were noted, with no reportable items.

## **3.1.2 Comparison of the ITC Programme as used in 2009 and 2012;**

### **Scope**

We examined whether any updates or changes which were made to the ITC Programme itself since the original 2009 run of the ITC Programme, had a material impact on the calculation of FAQs.

### **Tests performed**

We reviewed the EirGrid processes by which ITC Programme changes, software and programme assumptions, were prepared, tested, reviewed and approved by Management. We reviewed the differences between the 2009 and 2012 ITC Programmes in terms of the functional and technical specifications.

In addition, we reviewed the impact of these changes on the FAQ outputs of the 2012 run of the ITC Programme and we validated that they had no direct impact on the determination of FAQs.

### **Conclusion**

No material issues were noted, with no reportable items

## **3.1.3 Consistency in the 2012 run of the ITC Programme in the treatment of applicants and specific model parameters;**

### **Scope**

The 2012 run of the ITC Programme was tested for consistency in its treatment of applicants and specific model parameters, in particular consistency with EirGrid's Technical Assumptions Document and also the CER Gate 3 Direction CER/08/260 as specified in Test 3 of section 2.2 of this report.

### **Tests performed**



We validated key input data into the ITC Programme, applicant name, date of application, node and treatment of applicants with an  $MEC \leq 2MW$ , with the equivalent listings in EirGrid's Technical Assumptions Document.

We validated that the generation included in the network models, used by the ITC Programme in the assessment of scheduled FAQs, conforms to that stipulated in Section 2.2 of the Technical Assumptions Document.

We validated that the ITC Programme allocates scheduled firm access quantities in line with the date order allocation rules set out in the Gate 3 Direction, CER/08/260.

We validated that the ITC Programme operates to an "n-1" transmission planning standard in calculating scheduled FAQs consistent with Section 5.16 of the Gate 3 Direction.

We validated that the ITC Programme utilises a set of deterministic dispatch scenarios that recognise the likely running regime of generators and the probability of particular generator units running together, which is consistent with Section 6.5 of the EirGrid's Technical Assumptions Document

### **Conclusion**

No issues were noted, with no reportable items.

### **3.1.4 Confirmation that all transmission and distribution shallow works are in place in the network models used in the 2012 run of the ITC Programme;**

#### **Scope**

The audit tested that all transmission and distribution shallow works were assumed to be in place in the network models in the 2012 run of the ITC Programme, bar the following exceptions, for all applicants, as detailed in Section 5.2 of EirGrid's Technical Assumptions Document.

- network reinforcement works that are deemed to be shallow works for an applicant's facility due to the relative size of the connecting generation and the capacity of the local transmission network (ref. Section 5.2 of the Technical Assumptions Document); and
- the Bellacorrick (Mayo) node where the respective applicants are modelled on the existing local 110kV network until such time as the EHV shallow-connection infrastructure is assumed to be in place (ref. Section 5.2 of the Technical Assumptions Document).

#### **Tests Performed**

We validated that every applicant listed in Appendix A of EirGrid's Technical Assumptions Document had an individual 'bus' assigned to it in the network models used in the 2012 run of the ITC Programme. It was demonstrated, and we observed and validated, that the power system simulation software package underlying the ITC Programme will not run unless all 'buses' included in the network model are connected to the electricity transmission network. For all years of the 2012 run



of the ITC Programme all distribution and transmission shallow works are in place for each and all applicants and do not bias the FAQs calculated. Therefore, it can be concluded that all transmission and distribution shallow works, bar the specified exceptions, were assumed to be in place in the network models used in the ITC Programme, consistent with Section 5.2 of EirGrid's Technical Assumptions Document.

We validated that applicants were tested for FAQ in order of date of application in the 2012 run of the ITC Programme and that this was enabled by having all shallow reinforcements in place in the network models.

In addition, we validated that a 400kV circuit modelled from the Bellacorrick 110kV node was first included in the network models used by the ITC Programme in the network model representing the assumed year of delivery, and that this is consistent with Section 5.2 of EirGrid's Technical Assumptions Document.

### **Conclusion**

No issues were noted, with no reportable items.

### **3.1.5 Treatment of transmission reinforcements, firm capacity and test tolerances treatment in the 2012 run of the ITC Programme;**

#### **Scope**

The 2012 run of the ITC Programme was tested for consistency with EirGrid's Technical Assumptions Document in its treatment of transmission reinforcements, firm access quantities capacity (FAQ) allocations and network test tolerances. In addition, we tested that the Associated Transmission Reinforcements (ATRs) were determined in a manner consistent with EirGrid's Technical Assumptions Document and that the ATR treatment in the 2012 run of the ITC Programme is consistent with the determination of FAQs.

#### **Tests Performed**

We validated that the network models used in the ITC Programme reflected EirGrid's transmission reinforcements capital programme and are consistent with those detailed in Section 5.1 of EirGrid's Technical Assumptions Document.

For each year that the ITC Programme is run, from 2012 to 2020, we validated that applicants granted FAQ were carried over to the subsequent year. For example applicants granted FAQ in 2012 were included in the 2013 network model for the ITC Programme when testing for FAQ in 2013, and where included in the network models for all subsequent years, as required by, and consistent with, Gate 3 Direction, CER/08/260.





We reviewed a sample of Gate 3 applicants in the 2012 run of the ITC Programme and we validated that the 0.5MW test tolerance was applied as per EirGrid's Technical Assumptions Document.

For a sample of FAQ results, we validated that the ATRs were allocated consistent with the criteria contained in the EirGrid document, "Dispatch Principles for FAQ and ATR Analysis for Gate 3 Generation Projects"; this document details the dispatch scenarios by which FAQs are allocated, and ATRs are associated with specific applicants. We validated that the association criteria applied when testing applicants for FAQ was also used when determining the specific ATRs associated with applicants. We observed and validated the following;

- We observed that if no ATRs are required to accommodate an applicant, then firm access is provided to that applicant in that year;
- Where additional transmission reinforcement(s) are required then firm access was not provided to those applicants;
- We validated that there was a consistency between the transmission network having insufficient capacity for the applicant to be granted FAQ in a particular year and sufficient ATR being in place for the applicant to be granted FAQ in a subsequent year.

For each year from 2012 to 2020 run in the ITC Programme, we validated that the Gate 3 FAQ output results were consistent with the ATR output results. Therefore, ATRs were determined in a manner consistent with the determination of FAQs and with EirGrid's Technical Assumptions Document.

### **Conclusion**

No issues were noted, with no reportable items.

### **3.1.6 Comparison of treatment of a sample of applicants in the ITC Programme;**

#### **Scope**

For a sample of Gate 3 applications, we performed an end-to-end process review to determine that the applications have all been treated in a consistent manner, in line with EirGrid's Technical Assumptions Document and consistent with Gate 3 Direction, CER/08/260.

#### **Tests Performed**

We performed an end-to-end process review of the treatment of Gate 3 applicants in the 2012 run of the ITC Programme and we validated that they were treated in a consistent manner, in line with EirGrid's Technical Assumptions Document and consistent with Gate 3 Direction, CER/08/260.

From the previous tests detailed in this report under Tests 1 – 5 we validated that the 2012 run of the ITC Programme is consistent with the requirements of EirGrid's Technical Assumptions Document and with Gate 3 Direction, CER/08/260.



For a sample of Gate 3 applications that were granted FAQ over the course of the ITC Programme run from 2012 to 2020, we validated, for the year prior to applicants being granted FAQs, that the addition of the applicant directly resulted in, or increased, a network violation<sup>3</sup> on a specific transmission network element. We validated that this network violation exceeded EirGrid's Association Criteria and hence FAQ was not allocated. For each of the sample applicants we validated that this network violation was considered directly attributable to the applicant, as a clear relationship between the excess loading on the transmission network element and the power exported from the applicant was identified. We validated that the Association Criteria were applied consistently to each of the samples in the 2012 run of the ITC Programme.

For this sample of Gate 3 applications, we validated that in the year that the applicants were granted FAQs that the network violation preventing the allocation of FAQ no longer existed as sufficient reinforcements (ATRs) had been added to the transmission network. We further validated that all samples were treated in a consistent manner in the granting of FAQs in the 2012 run of the ITC Programme.

For a sample of Gate 3 applications we validated, by way of physical review and demonstration by EirGrid, that the results reported by the ITC programme are consistent with the underlying power system simulation software.

In addition, for each of the samples we validated that they were treated consistently in the determination of what ATRs were required to be added to the transmission network for each sample to be granted FAQs. In particular, for each sample we validated that the required ATR(s) were in place to provide the allocation of FAQ and that the addition of this specific ATR(s) results in the removal of the previous year's violation on specific transmission network element(s).

### **Conclusion**

No issues were noted, with no reportable items.

<sup>3</sup> The network violation resulted in a power loading on an element(s) of the transmission network which was in excess of the maximum power loading of that element.




## Appendix 1 - Documentation

Document
CER/08/260 – “Criteria for Gate 3 Renewable Generator Offers & Related Matters – Direction to the System Operators”, July 2012
CER/08/260 – Appendix 1: List of Renewable Projects in Gate 3 of “Criteria for Gate 3 Renewable Generator Offers & Related Matters – Direction to the System Operators”, July 2012
CER/09/191 – “Direction on Conventional Offer Issuance Criteria and Matters Related to Gate 3”, December 2008
“Technical Assumption for Analysis of Firm Access Quantities and Associated Transmission Reinforcements for Gate 1-3 and Eligible Non-GPA Generators”, July 2012
GATE 3 ITC PROGRAMME FINAL RESULTS SCHEDULED FIRM ACCESS QUANTITIES, <a href="http://www.eirgrid.com/media/Gate%203%20Firm%20Access%20Quantities%20(published%20January%202010).pdf">http://www.eirgrid.com/media/Gate%203%20Firm%20Access%20Quantities%20(published%20January%202010).pdf</a>
Results from EirGrid FAQ Analysis for Gate 3 published October 2013 <a href="http://www.eirgrid.com/media/ResultsfromEirGridFAQAnalysisforGate3publishedOctober2013.pdf">http://www.eirgrid.com/media/ResultsfromEirGridFAQAnalysisforGate3publishedOctober2013.pdf</a>







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