



PROPOSED VALUES FOR TESTING TARIFFS FOR THE CALENDAR YEAR 2014

REPORT TO THE REGULATORY AUTHORITIES

EXECUTIVE SUMMARY

Testing tariffs are applied to units under test in the Single Electricity Market (SEM) on the basis of the registered capacity of the generator unit. The tariffs are dependent upon the type of test being carried out and the risk to system security. There are a number of costs that the Transmission System Operators (TSOs) consider are appropriate for inclusion in the testing tariffs. These costs relate to the additional operational reserve carried to maintain system security when a unit is testing, the effect a Generator Unit Under Test (GUUT) has on unit commitment decisions, and the costs incurred when a units output drops very quickly.

This report to the Regulatory Authorities sets out the proposed amounts for Tariff A and Tariff B for 2014 accompanied by relevant justification and background. Comparisons are made between the rates calculated in 2012 as these rates were also applied in 2013.

Tariff A has increased this period. The key factors for the change are: a higher single largest infeed which affects amount of reserve carried, the revised reserve policy, an increase in the data set considered, and the type of unit scheduled for the required additional generation.

Tariff B has increased this period. There was an increase in the trip charges rate (2% increase for inflation) and the dataset considered for this analysis has extended from 3 years to 5.5 years.

The System Operators propose that the revised values for the testing tariffs are implemented for 2014.

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1.0 INTRODUCTION

Testing tariffs are applied to all generator units that may be granted Under Test status in SEM. Paragraph 5.175 of the Single Electricity Market (SEM) Trading and Settlement Code (version 13.0) requires the System Operators to make a report to the Regulatory Authorities at least 4 months before the start of the Year¹ proposing values for the testing tariffs Year.

The SEM Testing Tariffs Consultation Paper², published in July 2011, set out the proposal for the application of two testing tariffs to Generator Unit Under Test (GUUT) dependent upon the type of test being carried out and the risk to system security. The paper reviewed the methodology and background for the costs arising from GUUT when there is an increase in system reserve requirement (high risk) and no increase in system reserve requirement (lower risk). The two types of tariffs considered in the paper were Tariff A and Tariff B.

Tariff A is applicable when new units are being commissioned on to the power system for the first time and when existing units require testing when returning from outages. In these cases the generator will carry out a range of tests to demonstrate Grid Code compliance to the System Operator. The impact of the GUUT is an increase in the costs associated with maintaining system security.

Tariff B covers the costs of when a unit is in the latter stages of commissioning or undergoing general testing. In this case the unit is deemed to be reasonably reliable and normal reserve requirements apply³.

This document is the System Operators' joint submission under Paragraph 5.175 setting out the revised testing tariffs for 2014.

¹ "Year" defined as per Trading and Settlement Code (Version 13.0) glossary : "means a period commencing at 00:00h on 1 January and ending at 24:00h on the next occurring 31 December.

² *SEM Testing Tariff Consultation Paper July 2011* sets out the methodology for calculating the cost components attributable to generator units under test. http://www.allislandproject.org/en/transmission_decision_documents.aspx?article=3d45a24c-5677-4fa6-9254-ebe00aa0db0c

³ Operating reserve requirements are set out in: http://www.eirgrid.com/media/OperationalConstraintsUpdate_v1.8_August2013.pdf

2.0 PURPOSE OF GENERATOR TESTING AND TESTING TARIFFS

As stated in the SEM Testing Tariffs Consultation Paper⁴, published in 2011, testing of a new generator unit or of an existing generator unit returning from major overhaul is required by the transmission system operator (TSO) in advance of the plant becoming fully operational. During such testing the generator will be classified as a GUUT in the SEM. A unit may also request with the TSO to be classified as a GUUT in SEM to carry out their own testing, for example for maintenance works.

GUUT status in the SEM has a number of advantages for the generator. These include the flexibility to nominate its output and conduct unit tests while being exempt from the application of short notice declaration and trip charges.

Testing tariffs are applied on a €/MWh basis to units that have been granted GUUT status in the SEM. The testing tariff applied is determined on the basis of a generator unit's registered capacity. Typically units with a larger registered capacity pay a higher testing tariff on all the MWh the units generate. This is considered reflective of the higher system risk associated with the sudden loss of large generator and their impact on unit commitment decisions.

Under the current Trading & Settlement Code Version 13.0, testing tariffs may be applied to Generator Units and Interconnector Error Units. The units that are exempt are Autonomous Generator Units, Pumped Storage Units, demand side units, Interconnector Units and Interconnector Residual Capacity Units.

Testing tariffs follow the following principles:

1. **Efficient Testing** - testing should be carried out in an efficient and prompt manner.
2. **Cost reflectivity** – where charges are imposed they should be proportionate and cost reflective. Due consideration has been given to making the proposed testing tariffs as cost reflective as possible.
3. **Positive Incentives** – the two different testing tariffs provide a clear financial incentive to units under test to progress through testing promptly.

2.1 COST OF TESTING

The costs to the power system incurred that may be attributed to the GUUT are highly volatile and variable. As such, generators pay for the costs of testing based on an agreed schedule of charges. The testing tariffs have been set at a level that should, on average, recover the additional costs imposed on the power system during generator testing. It should be noted that zero provision has been made for the net contribution of generator testing charges to the forecast imperfections revenue requirement as the costs of testing are assumed to be recovered through the testing tariffs. A GUUT leads to increased system operating costs for several reasons.

- There may be a need to commit extra units to ensure a rapid response to changes from the GUUT's scheduled output and to ensure that the system would remain within normal security standards following the loss of the GUUT. This leads to additional constraint costs DBC in the SEM.
- As the GUUT typically poses a higher risk of tripping, additional operating reserve will be required to ensure that system security is not compromised (e.g. 100% or 90% of largest single infeed).
- Potential increase to the overall reserve requirement if the testing unit's output increases the existing reserve requirement on the system.

⁴ SEM Testing Tariff Consultation Paper July 2011 sets out the methodology for calculating the cost components attributable to generator units under test. http://www.allislandproject.org/en/transmission_decision_documents.aspx?article=3d45a24c-5677-4fa6-9254-eb00aa0db0c

2.2 GENERATOR TESTING

To ensure system security, the TSO divides testing into phases according to the reliability of the GUUT. There are three phases of testing that a unit undergoes:

- **Phase 1 Test Criteria** - In this phase, the unit is considered to be highly unreliable and it is necessary to have sufficient system reserve on line to cover 100% of the MW produced by the generator under test.
- **Phase 2 Test Criteria** - The unit is assumed to be more reliable than in Phase1 but not as reliable as a unit in normal operation. Sufficient system reserve to cover 90% of the MW produced by the generator under test will be maintained.
- **Phase 3 Test Criteria** - At this stage of testing the unit is deemed to be reasonably reliable and normal reserve rules will apply. However, any tripping or unreliable behaviour or known reliability problems occurring during Phase 3 testing may require a restart of Phase 2 with the appropriate operating conditions being restored. Typically, Phase 3 testing will apply to a GUUT during latter stages of commissioning and other general testing on an ongoing basis.

Tariff A covers the system operator cost of higher risk testing, which is typically Phase 1 and 2 testing. Tariff B covers the costs when a unit enters Phase 3 of testing, either upon completing Phases 1 and 2 of testing or when an existing operational unit is granted GUUT status in SEM.

2.0 ASSUMPTIONS

The testing tariff studies and calculations for 2014 are underpinned by the following assumptions:

- The current largest single infeed connected to the transmission system on the island of Ireland is 500MW.
- In the base case, the level of reserve carried, in normal operation, is reflective of the reserve guidelines being implemented at the time the studies and calculations were carried out (75% of the largest single infeed for primary operating reserve (POR) and secondary operating reserve (SOR)).
- The reserve payment rates are correct at the time of writing this paper in accordance with the Statement of Payments and Charges 2013/2014⁵.
- The modelling is performed using the Plexos modelling tool which uses the Regulatory Authorities' validated generator dataset to represent the generators in the SEM, in combination with assumptions developed to determine the annual DBC forecast⁶. The transmission system is not modelled.
- The cost components⁷ associated with testing tariff A are:
 - additional reserve constraint cost;
 - increased cost of operational reserve
 - additional run hours, and
 - costs of tripping commissioning units (cost of interconnector trip is not considered).
- The only cost component associated with this testing tariff B is the cost of tripping.
- Interconnector flows are assumed not to be affected by the testing unit.

⁵ Available from: http://www.allislandproject.org/en/transmission_current_consultations.aspx?article=0f61e9b3-5a0b-4632-b0a2-c3d83433c69e

⁶ DBC forecast assumptions as set out in Appendix 1 Imperfections Revenue Requirements Submission 2013-2014 SEM-13-038
http://www.allislandproject.org/en/smo_current_consultations.aspx?article=0dce2795-efa0-428b-b13a-6ea81e355d89

⁷ SEM Testing Tariff Consultation Paper July 2011 sets out the methodology for calculating the cost components attributable to generator units under test.
http://www.allislandproject.org/en/transmission_decision_documents.aspx?article=3d45a24c-5677-4fa6-9254-ebe00aa0db0c

4.0 PROPOSED TESTING TARIFFS

Testing tariffs (A and B) are applied to GUUT in the SEM have been analysed for the 2014 calendar year and the results are discussed below.

4.1 TESTING TARIFF A

This testing tariff is intended to cover the additional costs to the power system of a GUUT. Tariff A is used in scenarios where additional system reserve is required and there is a high risk of tripping of the generator. This tariff is applied to the commissioning phases of a new unit. The costs associated with this type of testing are the increased reserve, additional reserve constraint costs, the increased reserve premium, additional run hours, and costs of tripping (commissioning units). Historical analysis carried out on previously commissioned generators showed that a generator will typically export 30% of its combined phase 1 and phase 2 output while in phase 1 of testing. Therefore, when summing the cost components calculated for phase 1 and phase 2 they were given a weighting of 0.3 and 0.7 respectively.

Table 4.1.1 sets out testing tariff A schedule for 2014 compared with the schedule for 2012:

Testing Tariff A	2014	2012/2013	
Generator Capacity	€/MWh	€/MWh	% Difference
GEN <50	€11.13	€9.39	19%
50 < GEN ≤100	€11.01	€9.87	12%
100 < GEN ≤ 150	€12.21	€9.36	30%
150 < GEN ≤ 200	€11.95	€9.20	30%
200 < GEN ≤ 250	€12.09	€9.18	32%
250 < GEN ≤ 300	€11.84	€9.53	24%
300 < GEN ≤ 350	€12.27	€9.88	24%
350 < GEN ≤ 400	€12.44	€10.49	19%
400 < GEN ≤ 450	€12.98	€11.19	16%
450 < GEN	€14.58	€13.15	11%

Table 4.1.1: Testing tariff A schedule results and comparison

Testing tariff A has increased from the previous period. The key influencing factors contributing to these changes are set out below.

4.1.1 INCREASED RESERVE:

When the output of the GUUT exceeds the normal operating reserve requirement, the TSOs will increase POR and SOR for system security. There has been a reduction in the percentage requirement of the largest single infeed for reserve (from 81% in 2012 to 75% for 2014), but the size of the the largest single infeed has increased (from 445 MW in 2012 to 500 MW in 2014). Therefore the reserve requirement has increased for this period.

Testing tariffs in the SEM are applied on the basis of the registered capacity of the GUUT. To prevent over recovery of testing charges it is necessary to take account of load factors and to apply a load factor adjustment. The load factor adjustment is designed in such a way that the costs recovered over the entire duration of testing will cover the total cost of the increased operating reserve payments to other generators and the additional reserve constraint during that same period. The load factor adjustments were calculated by

analysing a sample set of generators that had previously completed commissioning testing in the SEM. The sample set increased this period to include interconnector importing during its commissioning phase.

4.1.2 RESERVE CONSTRAINT COST

A GUUT may require extra operating reserve to cover the additional risk of that generator tripping. In order to provide operating reserve, efficient thermal generators are constrained down from their most economic generating level, and more expensive generators are constrained on to meet system demand. In this period, there is more reserve being held for the reasons set out above in *4.1.1 Increased Reserve*, and therefore there is a reduction in the extra constraint cost for a GUUT as there is more reserve being carried in the base case.

4.1.3 RESERVE PREMIUM

Generator units on the system receive an ancillary service payment for the availability and provision of operating reserve. The GUUT that is causing an incremental increase in operating reserve should cover the incremental cost of increased operating reserve payments through the testing tariff mechanism. The rates at which operating reserve are paid are set out in the Statement of Payments and Charges 2013/2014⁸. There is an increase in the rates by 2% for inflation, but a reduction in the extra reserve required as there is more reserve being carried in the base case.

4.1.4 ADDITIONAL RUN HOURS

The GUUT can be regarded as unreliable as it may not start or run as scheduled, or it may become unavailable at short notice. To manage the risk to the system that this unreliability poses, the TSO must constrain on additional unit(s) to mitigate the risk of the GUUT becoming unavailable. The additional run hour cost component is intended to represent the cost arising from scheduling this additional generation. There was an increase this period due to the location of units on the merit order. For the previous tariff calculation, coal units were more likely to have their run hours increased. In this period, coal units have high capacity factors in the base case and the increase in run hours for the GUUT was met with gas generation which has a more expensive no load cost.

4.1.5 COSTS OF TRIPPING

The cost of tripping component has increased this period. The driver for this change is the increase in the trip charge rate (2% increase for inflation). There is currently no provision for an interconnector to pay a trip charge and interconnector data was not included in the analysis of this component.

⁸ Available from: http://www.allislandproject.org/en/transmission_current_consultations.aspx?article=0f61e9b3-5a0b-4632-b0a2-c3d83433c69e

4.2 TESTING TARIFF B

This testing tariff is intended to cover the costs when a unit enters phase 3 of testing, either upon completing Phases 1 and 2 of testing or when an existing operational unit is granted GUUT status in SEM. The cost associated with this type of testing is the cost of tripping.

Table 4.2.1 sets out testing tariff B schedule for 2014 compared with the schedule for 2012:

Testing Tariff B	2014	2012/2013	
Generator Capacity	€/MWh	€/MWh	% Difference
GEN <50	-	-	-
50 < GEN ≤100	-	-	-
100 < GEN ≤ 150	-	-	-
150 < GEN ≤ 200	€0.27	€0.19	40%
200 < GEN ≤ 250	€0.42	€0.42	2%
250 < GEN ≤ 300	€0.67	€0.66	2%
300 < GEN ≤ 350	€1.08	€1.06	2%
350 < GEN ≤ 400	€1.72	€1.69	2%
400 < GEN ≤ 450	€2.75	€2.70	2%
450 < GEN	€4.39	€4.32	2%

Table 4.2.1: Testing tariff B schedule results and comparison

Testing tariff B has increased this period. This change is driven by an increase in the trip charge rate (2% increase for inflation, on occasion not apparent due to rounding) and an increase in the volume of historical data used in the analysis. All the GUUT in the market for a period of 5.5 years were considered in this analysis, whereas the dataset for the study in 2012 was 3 years.

4.0 CONCLUSIONS

It is the System Operators' opinion that the revised testing tariffs are reflective of the current information that is available and should be implemented in 2014. Tariff A has increased this period. The key factors for the change are: a higher single largest infeed which affects amount of reserve carried, the revised reserve policy, increase in the data set considered and a change in merit order impacting the type of unit scheduled for the required additional generation. Testing tariff B has increased this period. There was an increase in the trip charges rate (2% increase for inflation) and the dataset considered for this analysis has extended from 3 years to 5.5 years.