

Proposed Values for Testing Tariffs for the Year 2016

Report to the Regulatory Authorities

28 August 2015



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 2016 accompanied by relevant justification and background. Comparisons are made between the rates calculated for 2015.

Tariff A has increased for this period. The key factors for the change are: An update in the methodology to reflect units where output dropped quickly whilst under this tariff of testing, updates in the fuel prices forecast for the relevant period and the type of unit scheduled for the required additional generation.

Tariff B has decreased for this period. This was due to an update in the methodology to reflect units where output dropped quickly whilst under this tariff of testing.

The System Operators propose that the revised values for the testing tariffs are implemented for 2016.

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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 17.0) 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 Recommendations Paper², published in November 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 2016.

¹ "Year" defined as per Trading and Settlement Code (Version 17.0) 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 Recommendations Paper November 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

³ Operating reserve requirements are set out in: http://www.eirgrid.com/media/OperationalConstraintsUpdateVersion1_28_July_2015.pdf and are updated when required

2.0 PURPOSE OF GENERATOR TESTING AND TESTING TARIFFS

As stated in the SEM Testing Tariffs Recommendations 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 (the exemption from short notice declarations only applicable if the unit follows its agreed load profile) 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 17.0, 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, known as dispatch balancing 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 Recommendations Paper November 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.

3.0 ASSUMPTIONS

The testing tariff studies and calculations for 2016 are underpinned by the following assumptions:

- The current largest single infeed connected to the transmission system on the island of Ireland remains unchanged at 500MW. It should however be noted that the actual largest single infeed will vary depending on system dispatch.
- 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 for Ancillary Services Providers 2015/2016⁵.
- 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
 - The cost of sudden output loss of units under phase 1 and phase 2 of testing (cost of interconnector trip is not considered).
- The only cost component associated with this testing tariff B is the cost of tripping of units under phase 3 testing.
- 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=d5ca3197-765b-4553-b33e-a381e1526600 HAS Consultation Paper 2015-2016 v1

⁶ DBC forecast assumption as set out in *Imperfections Charges for October 2015 – September 2016*; SEM-15-041

http://www.allislandproject.org/en/smo_current_consultations.aspx?article=e45ebcdc-ae05-4bc6-923b-f7f83040e7d9&mode=author

⁷ SEM Testing Tariff Recommendations Paper November 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

4.0 PROPOSED TESTING TARIFFS

Testing tariffs (A and B) which are applied to GUUT in the SEM have been analysed for the 2016 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 and units coming back from a significant outage, which are deemed at a high risk of tripping or not following the load profile. The costs associated with this type of testing are the increased reserve, additional reserve constraint costs, increased reserve premium, additional run hours, and costs of tripping. 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 2016 compared with the schedule for 2015:

Tariff A				
		2016	2015	Difference
Generator Output	MW	Charge	Charge	%
GEN <50	50	€ 9.01	€ 6.57	37%
50 < GEN ≤100	100	€ 7.76	€ 6.59	18%
100 < GEN ≤ 150	150	€ 7.82	€ 7.30	7%
150 < GEN ≤ 200	200	€ 7.27	€ 7.05	3%
200 < GEN ≤ 250	250	€ 7.59	€ 7.96	-5%
250 < GEN ≤ 300	300	€ 7.80	€ 7.82	0%
300 < GEN ≤ 350	350	€ 8.16	€ 7.78	5%
350 < GEN ≤ 400	400	€ 8.10	€ 8.26	-2%
400 < GEN ≤ 450	450	€ 9.41	€ 8.79	7%
450 < GEN	500	€ 12.06	€ 11.02	9%

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 as follows.

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.

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 load factors have decreased from the value that was previously used. This has had the net effect of decreasing the reserve components, outlined below, of the Testing Tariff.

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, cheap generators are constrained down from their most economic generating level, and more expensive generators are constrained on to meet system demand. In this period, the extra reserve constraint cost has decreased from the 2015 rates, due to the change in load factor adjustments as outlined in 4.1.1.

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 for Ancillary Service Providers 2015/2016⁸. There is an overall net decrease of this cost component due to the change in load factor adjustments outlined in 4.1.1, but this is slightly offset due to an increase in the reserve payment rates, by 1% for inflation.

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 a large increase in this cost compared to previous years. In general, there is a large variation between the no load cost of generating units – up to sevenfold in certain cases. Therefore the additional run hour costs are quite sensitive to the particular unit/units that are scheduled in the model to cover the loss of the GUUT's MW. The model used for forecasting the 2016 rates includes updated fuel price forecast, forecasted interconnector flows, inclusion of Gas Transportation Capacity charges for Northern Ireland Units and wind generation capacity.

⁸ Available from: http://www.allislandproject.org/en/transmission_current_consultations.aspx?article=d5ca3197-765b-4553-b33e-a381e1526600 HAS Consultation Paper 2015-2016 v1

Based on the model for the forecast year, the MW that the GUUT is replacing can vary, which can have a huge impact on the costs of having the additional run hours available. For this year the units scheduled by the PLEXOS model to cover the additional run hours per GUUT have increased the proposed €/MWh charge for each size GUUT. This has increased the rates for 2016 compared to 2015.

4.1.5 COSTS OF OUTPUT DROPS

The TSO propose a refinement in how the cost of a sudden output drop is calculated. The 2011 recommendations paper outlined the methodology utilised in calculating the trip cost component, based on previously commissioned units for tariff A and three years historical data for tariff B. For the 2016 consultation, the TSO utilised actual trips from GUUT whilst under test since 2012. For Tariff A, units under test since 2012 and any commissioning units that would be considered high risk to the system for 2 years prior to 2012 were considered, and also GUUT under tariff B since 2012, and GUUT that were under test but not commissioning 2 years prior to 2012. Over the past 3 years, in addition to commissioning units, any units that have returned from significant outages have also been charged Tariff A. It is more cost reflective to calculate a cost of tripping for units that are highly unreliable by analysing all units that have been charged Tariff A. The historical type of trip (direct, fast wind down, slow wind down) was obtained from the October 2010- the September 2014 tariff year other system charges reports⁹, to determine the percentage of trips which were of each type over this period. This showed that the weighting of the actual trips is 62.4% direct trip, 22% fast wind down and 15.6% slow wind down. It is seen as more cost reflective to weight the tariff charge type based off historical data of percentage trip types, rather than assuming that there is an equal amount of each trip type that occurs. This was updated in the calculation. This has resulted in an increase in the cost of sudden output drop under Tariff A.

⁹ Available from: <http://www.eirgrid.com/operations/ancillaryservicesothersystemcharges/>. Ancillary Charges & Other System Charges Reports.

4.2 TESTING TARIFF B

This testing tariff is intended to cover the costs when a unit enters phase 3 of testing, either upon completion of 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 2016 compared with the schedule for 2015:

Tariff B		2016	2015	Difference
Generator Output	MW	Charge	Charge	Charge
GEN <50	50	€ -	€ -	-
50 < GEN ≤ 100	100	€ -	€ -	-
100 < GEN ≤ 150	150	€ -	€ -	-
150 < GEN ≤ 200	200	€ 0.22	€ 0.27	-19%
200 < GEN ≤ 250	250	€ 0.35	€ 0.43	-18%
250 < GEN ≤ 300	300	€ 0.57	€ 0.68	-16%
300 < GEN ≤ 350	350	€ 0.93	€ 1.09	-15%
350 < GEN ≤ 400	400	€ 1.51	€ 1.74	-13%
400 < GEN ≤ 450	450	€ 2.46	€ 2.79	-12%
450 < GEN	500	€ 4.01	€ 4.46	-10%

Table 4.2.1: Testing tariff B schedule results and comparison

4.2.1 COSTS OF OUTPUT DROPS

The TSO propose a refinement in how the cost of a sudden output drop is calculated. The 2011 recommendations paper outlined the methodology utilised in calculating the trip cost component, based on previously commissioned units for tariff A and three years historical data for Tariff B. For the 2016 consultation, the TSO utilised actual trips from GUUT whilst under each tariff since 2012. For Tariff A, units under test since 2012 and any commissioning units that would be considered high risk to the system for 2 years prior to 2012 were considered, and also GUUT under Tariff B since 2012, and GUUT that were under test but not commissioning 2 years prior to 2012. It is more cost reflective to calculate a cost of tripping for units at this stage of testing by analysing all units that have been charged Tariff B. The historical type of trip (direct, fast wind down, slow wind down) was obtained from the October 2010- the September 2014 tariff year other system charges reports¹⁰, to determine the percentage of trips which were of each type over this period. This showed that the weighting of the actual trips is 62.4% direct trips, 22% fast wind down and 15.6% slow wind down. It is seen as more cost reflective to weight the tariff charge type based off historical data of percentage trip types, rather than assuming that there is an equal amount of each trip type that occurs. This was updated in the calculation. This has resulted in a decrease in the cost of a sudden output drop under Tariff B.

¹⁰ Available from: <http://www.eirgrid.com/operations/ancillaryservicesothersystemcharges/>. Ancillary Charges & Other System Charges Reports.

5.0 CLARIFICATIONS

During the 2014/2015 tariff year the TSO have been asked to provide a number of clarifications. These are outlined as follows:

5.1 SHORT NOTICE DECLARATION CHARGES (SND'S)

The recommendations paper¹¹ outlines the following in relation to short notice declarations (section 3.5):

Under normal operating conditions, short notice declaration payments are made by generators who re-declare their availability at short notice. Such declarations can result in a constraint cost as other generation must be re-dispatched. It is assumed that the cost associated with short notice declarations is covered by the additional run hours and the additional reserve constraint cost components of the testing tariffs. For this reason, a GUUT will not be liable for the specific application of short notice declaration charges.

The TSO would like to clarify that whilst the GUUT nominate in their half hourly load profiles, SND's are not applicable if they follow their agreed load profile. Any unexpected deviation, i.e. trip, will result in the charge of a SND.

5.2 QUESTION ON REGISTER CAPACITY CHARGE

The TSO would like to clarify why unit tariff rates are based on the registered capacity of a GUUT and not their real-time output.

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.

5.3 2015 CONSULTATION RESPONSE

A respondent raised the question in response to the 2015 rate recommendations paper about whether a 4th phase of testing could be introduced. The Regulatory Authorities requested the TSO to consider this. This phase of testing was suggested for units under test trying to ensure compliance with Grid Code changes (Such as changes to the Rate of Change of Frequency changes), and the respondent proposed that no testing tariffs be applied. The TSO welcomes the opportunity to clarify our position on this proposal. The TSO are not in favour of a new phase of testing in which no testing tariffs are levied. The following are the reasons for this position:

1. Generating Units carrying out testing in the SEM cause additional Imperfection costs to be incurred. The reasons being well documented in the original SEM testing tariff paper. These imperfections cost are then levied on suppliers and are ultimately passed on to the end consumers. Currently if no testing tariff was levied for this new phase of testing, the additional imperfections cost incurred would have to be recovered in arrears via the K factor adjustment in the settings of the following years imperfections tariffs.

¹¹ SEM Testing Tariff recommendations Paper November 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

This would not be the best practice approach and ultimately the TSO would be required to include an additional provision to cover these costs in the annual Imperfections Revenue Requirement submission.

2. The type of testing which would be completed during the proposed new phase of testing would likely be the type of testing which is currently assigned as Phase A testing. This is considered high risk testing and is therefore charged accordingly.
3. The current testing tariff mechanism is designed to incentivise efficient testing. The TSO's would be concerned that if no testing tariff was in place then there would not be sufficient incentive on generators to carry out testing as efficiently as possible.
4. The Regulatory Authorities have recently set a precedent whereby it was decided that generators must pay their own costs associated with the completing studies for the Grid Code modifications relating to Rate of Change of Frequency.

6.0 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 2016. Tariff A has increased this period. The key factors for the change are: updates in the fuel prices and interconnector flows forecast for the relevant period, the type of unit scheduled for the required additional generation and an increase in the calculation for the cost of output dropping. Testing tariff B has decreased this period, mainly due to an update in the process for calculating the cost of output dropping.