Proposed SEM Testing Tariffs Rates 2018 Consultation

09/08/2017

**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.

The TSOs are currently consulting on the testing tariff arrangements in light of the new Integrated Electricity Market (I-SEM) which is due to go live in Ireland and Northern Ireland during 2018.

This report to the Regulatory Authorities proposes that the amounts for Tariff A and Tariff B until the implementation of I-SEM in 2018 remain the same as the existing rates for 2017 due to the short duration of SEM in 2018.

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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 18.0) requires the System Operators to make a report to the Regulatory Authorities at least 4 months before the start of the Year[[1]](#footnote-1) proposing values for the testing tariffs Year.

The SEM Testing Tariffs Recommendations Paper[[2]](#footnote-2), 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 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 apply[[3]](#footnote-3).

This document is the System Operators’ joint submission under Paragraph 5.175 proposing no change in the testing tariff rates for 2018 from 2017 rates up until I-SEM go live.

**2.0 Request for comments**

Comments are invited from interested parties on this consultation paper and should be aligned with the sections and sub‑sections of this document. This consultation relates to the rollover of 2017 Testing Tariff Rates into the SEM portion of 2018. Comments should be submitted by email to [tariffs@eirgrid.com](mailto:tariffs@eirgrid.com) or [tariffs@soni.ltd.uk](mailto:tariffs@soni.ltd.uk). If confidentiality is required, this should be made explicit in the response as the comments will be published on our websites[[4]](#footnote-4). Please note that, in any event, all responses will be provided to the RAs.

**The closing date for responses is 5pm on Wednesday, 6th September 2017.**

The steps following the closing date are as follows:

* The TSOs will consider the comments received on the consultation paper and make recommendations to the RAs based on these;
* The RAs will approve/reject the recommendations proposed in light of the responses received; and
* The TSOs will implement any changes and tariffs in accordance with the RAs decision paper.

**3.0 Generator Testing**

3.1 Purpose of Generator Testing

As stated in the SEM Testing Tariffs Recommendations Paper[[5]](#footnote-5), 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 18.0, 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.

3.1.1 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.

3.1.2 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.

3.2Assumptions

As the proposed rates for 2018 are carried over from 2017, the testing tariff studies and calculations for 2017 are still applicable and underpinned by the following assumptions:

* The current largest single infeed connected to the transmission system on the island of Ireland is 504MW. 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 in accordance with the DS3 System Services Interim Tariff Rates 2016/2017[[6]](#footnote-6).
* 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 forecast 2016/2017 [[7]](#footnote-7). The transmission system is not modelled.
* The cost components[[8]](#footnote-8) 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.

**4.0 Proposed Testing Tariffs**

Testing tariffs (A and B) which are applied to GUUT in the SEM were analysed in 2016 for 1st January to 31st December 2017 and the results are discussed below. As I-SEM will be implemented during 2018, it is proposed to utilise the existing 2017 SEM testing tariff rates until I-SEM go live.

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 1 sets out testing tariff A schedule for 2017 which shall continue until the implementation of I-SEM in 2018:



**Table 1: Testing tariff A**

The following factors contribute to the value of testing tariff A:

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.

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.

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 in the DS3 System Services Interim Tariff Rates 2016/2017[[9]](#footnote-9).

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.

4.1.5 Costs of output drops (including Tripping)

The TSO utilised actual trips from GUUT since 2010. Rates were weighted based on actual trips from 2010-2016. 62.4% direct trip, 22% fast wind down and 15.6% slow wind down.

4.1.6 Tariff A Cost Components

The following table gives a breakdown of the cost components associated with Tariff A. These are reserve premium, reserve constraint cost, additional run hours and cost of tripping. Additional run hours is the only cost associated with units under test below 150 MW for Tariff A. Reserve premium and reserve constraint costs are small components of the overall charge for units above 350 MW. The cost of tripping is included in units above 150 MW. The additional run hours cost is determined by the unit constrained on by the Plexos model to cover the unit under test. These are the same values as 2017.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **MW** | **TARIFF A** | **TARIFF B** |
| **Reserve Premium** | **Reserve Constraint Cost** | **Additional Run Hours** | **Tripping** | **Total Charge** | **Tripping** |
|  |  |  |  |  |  |  |  |
| **GEN <50** | **50** | **€ -** | **€ -** | **€ 6.09** | **€ -** | **€ 6.09** | **€ -** |
| **50 < GEN ≤100** | **100** | **€ -** | **€ -** | **€ 4.74** | **€ -** | **€ 4.74** | **€ -** |
| **100 < GEN ≤ 150** | **150** | **€ -** | **€ -** | **€ 5.17** | **€ -** | **€ 5.17** | **€ -** |
| **150 < GEN ≤ 200** | **200** | **€ -** | **€ -** | **€ 5.22** | **€ 0.36** | **€ 5.58** | **€ 0.22** |
| **200 < GEN ≤ 250** | **250** | **€ -** | **€ -** | **€ 5.41** | **€ 0.58** | **€ 5.99** | **€ 0.36** |
| **250 < GEN ≤ 300** | **300** | **€ -** | **€ -** | **€ 5.39** | **€ 0.94** | **€ 6.33** | **€ 0.58** |
| **300 < GEN ≤ 350** | **350** | **€ -** | **€ -** | **€ 4.71** | **€ 1.53** | **€ 6.24** | **€ 0.95** |
| **350 < GEN ≤ 400** | **400** | **€ 0.05** | **€ 0.11** | **€ 3.35** | **€ 2.49** | **€ 5.99** | **€ 1.54** |
| **400 < GEN ≤ 450** | **450** | **€ 0.24** | **€ 0.73** | **€ 1.92** | **€ 4.05** | **€ 6.92** | **€ 2.50** |
| **450 < GEN** | **500** | **€ 0.46** | **€ 1.59** | **€ 0.72** | **€ 6.59** | **€ 9.34** | **€ 4.07** |

**Table 2: Testing Tariff Cost Components**

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 3 sets out testing tariff B schedule for 2018 which is unchanged from 2017:

|  |  |  |
| --- | --- | --- |
| **Tariff B** |  | **2017** |
| **Generator Output** | **MW** | **Charge** |
|  |  |  |
| **GEN <50** | **50** | **€ -** |
| **50 < GEN ≤100** | **100** | **€ -** |
| **100 < GEN ≤ 150** | **150** | **€ -** |
| **150 < GEN ≤ 200** | **200** | **€ 0.22** |
| **200 < GEN ≤ 250** | **250** | **€ 0.36** |
| **250 < GEN ≤ 300** | **300** | **€ 0.58** |
| **300 < GEN ≤ 350** | **350** | **€ 0.95** |
| **350 < GEN ≤ 400** | **400** | **€ 1.54** |
| **400 < GEN ≤ 450** | **450** | **€ 2.50** |
| **450 < GEN** | **500** | **€ 4.07** |

**Table 3: Testing Tariff B**

4.2.1 Costs of Output drops

The TSO utilised actual trips from GUUT since 2010. Rates were weighted based on actual trips from 2010-2016. 62.4% direct trip, 22% fast wind down and 15.6% slow wind down.

**5.0 Rollover of 2017 Rates**

The TSOs propose to Rollover the 2017 testing tariff rates until I-SEM go live in 2018. Testing tariff rates in I-SEM will be proposed in a separate consultation paper.

There are no significant risks in carrying the 2017 rates into the SEM portion of 2018.

**6.0 I-SEM Parameters**

The methodology for testing tariff rates in I-SEM is currently under consultation.

1. “Year” defined as per Trading and Settlement Code (Version 18.0) glossary: “means a period commencing at 00:00h on 1 January and ending at 24:00h on the next occurring 31 December. [↑](#footnote-ref-1)
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-ebe00aa0db0c> [↑](#footnote-ref-2)
3. Operating reserve requirements are set out in*:* [*http://www.eirgridgroup.com/site-files/library/EirGrid/OperationalConstraintsUpdateVersion1\_52\_May\_2017.pdf*](http://www.eirgridgroup.com/site-files/library/EirGrid/OperationalConstraintsUpdateVersion1_52_May_2017.pdf) and are updated when required [↑](#footnote-ref-3)
4. [www.eirgridgroup.com](http://www.eirgridgroup.com) and [www.soni.ltd.uk](http://www.soni.ltd.uk) [↑](#footnote-ref-4)
5. *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-ebe00aa0db0c> [↑](#footnote-ref-5)
6. *Available from:* [*http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Interim-Tariffs-FINAL.pdf*](http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Interim-Tariffs-FINAL.pdf) [↑](#footnote-ref-6)
7. *DBC forecast assumption as set out in Imperfections Charges for October 2016 – September 2017; SEM-16-031* [*https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-16-031%20Imperfections%20Charge%202016-17%20and%20Incentive%20Outturn%202014-15%20Consultation%20Paper.pdf*](https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-16-031%20Imperfections%20Charge%202016-17%20and%20Incentive%20Outturn%202014-15%20Consultation%20Paper.pdf) [↑](#footnote-ref-7)
8. *SEM Testing Tariff Recommendations Paper November 2011 sets out the methodology for calculating the cost components attributable to generator units under test.* [*https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-12-014b%20Testing%20Tariff%20Recommendations%20Paper.pdf*](https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-12-014b%20Testing%20Tariff%20Recommendations%20Paper.pdf) [↑](#footnote-ref-8)
9. *Available from:* [*http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Interim-Tariffs-FINAL.pdf*](http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Interim-Tariffs-FINAL.pdf) [↑](#footnote-ref-9)