



Single Electricity Market

FINAL RECOMMENDATION REPORT

MOD_02_22 COST RECOVERY WHEN UNDER TEST

22 SEPTEMBER 2022

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Document History

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Reference Documents

| Document Name |
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| Trading and Settlement Code |
| Mod_02_22 Cost Recovery when Under Test |

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1. MODIFICATIONS COMMITTEE RECOMMENDATION

RECOMMENDED FOR APPROVAL– MAJORITY VOTE

| Recommended for Approval by Majority Vote | | |
|---|-----------------------------|---------|
| Paul McGuckin | Flexible Participant Member | Abstain |
| Robert McCarthy | DSU Member | Approve |
| Eoghan Cudmore | Supplier Alternate | Approve |
| Sean McParland | Generator Alternate | Approve |
| Andrew Burke | Supplier Member | Approve |
| Rochelle Broderick | Supplier Member | Approve |
| Brigid Reilly | Supplier Alternate | Approve |
| Bryan Hennessy | Supplier Member | Approve |
| Stacy Feldmann | Generator Member | Approve |
| Paraic Higgins (Chair) | Generator Member | Approve |
| David Caldwell | Supplier Alternate | Approve |
| Cormac Fagan | Assetless Member | Abstain |
| Cormac Daly | Generator Member | Approve |

2. BACKGROUND

This Modification Proposal was raised by Energia and received by the Secretariat on the 27th January 2022. The Proposal was raised at Meeting 109 on 10th February 2022, discussed at an Industry Call on the 11th March 2022, Meeting 110 on the 7th April 2022 and Meeting 111 on the 16th June 2022. A version 2 of the proposal was submitted on 9th August 2022 and voted on at Meeting 112 on the 6th September 2022.

Area of Concern

The Modification seeks to address a risk where a Generator Unit (GU) operating 'Under Test' upon returning from outage only recovers costs in the Balancing Market (BM) at the level of the BM price. That means a GU will **not recover their costs** when 'Under Test' when the BM price is low and BM revenue is lower than the unit's costs.

The focus on resolving the issue is on how / who is best placed to manage this risk i.e. ensuring an efficient allocation of risk. Energinet consider that the GU cannot efficiently manage this for a number of reasons:

- GU has limited control over the 'Under Test' process. Whilst the Test Profile is initially submitted by the GU to the TSO, the Test Profile can be subsequently changed (both running levels and timing) and is ultimately subject to TSO approval;
- GUs have limited ability to substantially alter timings of when they carry out testing in the event of forecast low BM prices given practical scenarios of having required personnel available (i.e. OEMs etc.).

This Modification puts forward proposals (see below under "Proposed Change") on how to better deal with this risk/cost by ensuring a GU recovers its costs when "Under Test" but prevents it from making a profit should BM revenue outturn higher than its costs.

As the risk/cost currently sits with the GU, it will have to take steps to determine where they can recover this cost. If not through the proposed modification, the GUs will have to consider what other options are available to them in the various markets (i.e. energy or capacity markets) in seeking to manage this risk moving forward e.g. it may be recovered through various bids; it could become part of discussions on the BNE price that could increase the capacity cost across the whole market etc. Given the uncertainty of costs to GUs the alternative steps taken to manage this risk will be more inefficient and the cost to consumer may actually end up being greater than if the cost was socialised under the proposed solution.

Furthermore, as we progress towards a low carbon future with increasing RES generation on the system, energy prices will be expected to be lower (or go negative) more frequently and hence the probability of under recovery when testing will increase.

In summary, the lack of cost recovery for GUs when Under Test is an inefficiency in the current market which will result in inefficient outcomes. As the overall energy system will still need investment in conventional capacity, if such investments are to be incentivised and remunerated then this cost/risk needs to be addressed. This modification proposal seeks to find an alternative, transparent and more efficient solution for managing this risk.

Proposed Change

Several concerns were raised about a proposed initial solution:

- The GU could make a profit if BM revenue was higher than the costs when Under Test. Although this can already occur under current rules, the underlying principle behind the proposal is to address a risk/cost in the market that GUs are not able to manage efficiently;
- Making the change in Settlement only requires difficult and complex and algebra changes to the TSC.

In order to address these issues, the updated proposal has the following key elements:

- I. GU submits zero PNs when Under Test and are dispatched to the agreed test profile. This forms the basis of an alternative TSO proposal presented at the April Mods meeting (albeit applied in a wider manner than proposed by the TSO).
- II. Settlement changes to allow for GUs paying back should the BM price be greater than the GUs costs (and therefore introducing the principle that the GU only recovers costs when Under Test).

This updated approach is a more straightforward method to making a change and addressing the risk facing GUs. It also removes any upside that the GU can profit when going through a testing process by introducing a new "Generation Under Test Not Entitled to Imbalance Component Payment or Charge".

Alternative TSO Proposal

We welcome that the TSO has looked at this issue and in recognising that there is a concern that needs to be addressed have put forward an alternative proposal i.e.

- When GU notifies TSO that it is ready to test, as per agreed test profile, but will defer testing until X date/time due to risk of costs not being recovered;
- If TSO needs plant back earlier than date/time proposed by GU TSO can choose to step in and agree that PNs are submitted as 0, while dispatching to agreed test profile.

However, we have concerns that the TSO proposal does not address the underlying risk and rationale for the modification i.e. it still gives no certainty to GUs ahead of time and therefore they would still have to assume under recovery of costs when Under Test. As a result, the GU will still seek to manage this risk by alternative, more inefficient methods than the modification proposal.

Further concerns with the TSO proposal include:

- Interactions with REMIT requirements;
- Other implications if a GU delays its testing and return to availability for commercial reasons i.e. less units available for the TSO to schedule and dispatch therefore potentially having to run more expensive alternative generators.

3. PURPOSE OF PROPOSED MODIFICATION

3A.) JUSTIFICATION OF MODIFICATION

The principle justification of the modification is that the current TSC ruleset means that a GU operating 'Under Test' upon returning from an outage will ***not recover their costs when 'Under Test'*** if the BM price is low and BM revenue is less than the units actual costs. Given the potential impact on cost recovery when 'Under Test' this is a serious issue for GUs in the market with potentially serious commercial implications. This is unfair on GU's whose costs may exceed BM revenue and are unable to avoid making a loss when testing following an outage.

Both through increasing costs for GUs and expected lower or negative BM prices more frequently as the market moves towards increasing RES generation, the variance between BM revenues and costs incurred by thermal GU's will become more pronounced. The resulting impact is an increasing risk of GUs not recovering their costs when Under Test. This risk will lead to GUs taking steps to determine how these costs can be recovered (through various markets) which will ultimately be more inefficient and still be borne by the consumer.

Other comments/concerns

Imperfections

Whilst unable to calculate any exact increase in imperfections from the modification proposal, we believe the focus on an increase to imperfections resulting from the change is too narrow and does not consider all counterfactual arguments. These points include:

- Any increase to the Imperfections arising from this change would be reflective of the costs currently being incurred by GUs.
- The increase to Imperfections should be partially offset by the repayment proposal as part of this modification proposal i.e. if a GU makes a profit when Under Test due to higher BM revenues;
- If a GU delays its testing and return to availability (as per TSO proposal), this removes that GU as an option for the TSO for that delayed period of time which will potentially also increase costs (as a more expensive GU may be required instead of the GU waiting to test).
- There should be a focus on ***maximising availability on system at all*** times which this modification proposal helps to achieve.

Incentive to minimise costs

Concerns were raised that the modification would incentivise units to test more or not minimise costs when testing. However, we do not believe these concerns will materialise for the following reasons.

There is no incentive for GUs to go 'Under Test' under the current proposal as they cannot make any profit when testing in scenarios where the BM revenues are higher than the unit's costs. In addition the GU will be subject to a testing tariff. Furthermore, all testing needs TSO approval. Perversely, the current settlement rules when Under Test could encourage a GU to carry out inadequate testing due to the risk of commercial loss which could lead to more outages of generators going forward.

How often does the issue occur?

It was previously queried if a GU was ready to go Under Test but due to forecast of BM it would incur a loss, how long would they have to seek to delay testing before it became commercially viable. It is difficult to quantify this due to a number of different factors i.e. different GUs will have different operating costs, will run at different profiles when testing, will require to test for different lengths of time etc.

However, some high-level analysis for February 2022 found that under a baseload profile our thermal plant would have incurred a loss when testing for 71% of the days. Although this analysis is high level it helps to demonstrate that there will be scenarios when a GU would not fully recover its costs for a significant period of time when testing.

Crucially, it is worth re-emphasizing that the modification is seeking to be **forward looking** and address a risk that is expected to become more pronounced as demand is increasingly met by Renewable generation. This is expected to result in conventional generators being in merit for a reducing proportion of the year and hence will be less likely to be testing during a period where they could expect to recover their costs.

Ex- Ante Participation

In respect of the potential for a GU to enter ex-ante markets when 'Under Test', whilst this is possible, we do not believe this represents a viable solution to the underlying risk. In the same way that it may not be possible to recover costs back in the BM, the Ex-Ante market may not cover the GUs costs on a given day.

3B.) IMPACT OF NOT IMPLEMENTING A SOLUTION

The GU cannot efficiently manage this risk and if no changes are made will look to mitigate and manage this risk through alternative, more inefficient methods. Ultimately, this cost is likely to come back to the consumer and the cost may end up being greater than if managed through the proposed solution.

3C.) IMPACT ON CODE OBJECTIVES

The following Code Objectives will be furthered with this Modification Proposal:

- (e) to promote competition in the Single Electricity Market;
- (f) to ensure no undue discrimination between persons who are parties to the Code;

4. WORKING GROUP AND/OR CONSULTATION

N/A

5. IMPACT ON SYSTEMS AND RESOURCES

A system change in Settlement will be required.

6. IMPACT ON OTHER CODES/DOCUMENTS

N/A

7. MODIFICATION COMMITTEE VIEWS

MODIFICATIONS MEETING 109 – 17TH FEBRUARY 2022

The Proposer delivered a presentation on this Modification Proposal noting that currently energy prices are becoming more volatile and as high levels of SNSP are achieved, BM prices will more frequently go negative. The Proposer went through the slides highlighting that the direction of BM prices and operating costs this poses a significant burden to the Generating Unit that are not able to recover their costs.

The Proposer advised that this Modification Proposal would focus on a change in settlement rather than a change upstream to the data submission for pricing. It was noted that when a unit is under test, the proposal allows the PNs to be set at zero (or the maximum of zero and its ex-ante quantity should the unit have trades in day ahead auctions) and this will allow for costs to be recovered.

A DSU Member raised a question around the mechanics of solution in settlement and if Generators are required to put in under test PN this may have no relation to costs to recover. The Proposer noted that under the current mechanism with no change upstream in the submission of data, PNs would be overwritten in the settlement systems and the unit inc'ed up allowing recovery of costs.

A Supplier Member acknowledged the risk on Generators but voiced concern for the wider impacts of this modification. It was also questioned if there could be recovery over and above operating costs. The Proposer noted that that over-recovery was not a new possibility introduced by the Modification proposed and already existed, the Modification only focused on preventing under-recovery.

Further concerns were raised by a SO Member that this Modification could increase Imperfections and if approved all risk associated with testing which are only controllable by the generators, gets just passed on to the consumer. It was also queried how such a change to the Code was not going to change imperfections or tariffs as suggested in the last slide of the presentation. The Proposer indicated that no changes were proposed to those processes and acknowledged the concerns raised but noted that they couldn't see any other solution to try to avoid far reaching changes to data submission which would be more complicated to implement SO Member also highlighted that a testing cost when occurring, is either recovered under testing tariffs or via imperfections. SO Observer also questioned some of the supporting data provided by the proposer that didn't provide the full accurate picture of the revenue stream and of the actual events that took place in the event singled out in the presentation.

A Renewable Generator Member advised that the risk here was best placed with those that could manage it. It was noted that if one trades at the wrong price, there will be a consequence and this risk goes to the Generator and trading organization behind the Generator which is the correct principle.

SO Observer advised that in terms of the impact of changes to testing, it would have to be considered in context to outcomes not just from the Balancing Market, but also in Operations, DS3 System Services, Capacity Market, Imperfections and Testing Tariffs. The benefits of completing testing and coming back from outage are not just limited to the SOs management of the security of supply, but the unit itself has an interest because all relevant revenue streams are only realized when the unit becomes fully available again. Therefore, taking these costs in isolation is not appropriate. On an operational level there is also the cost and limitation of commissioning resources on site, which form part of the unit decision for when to complete testing. It was noted that these additional considerations were not considered in the proposal. SO Observer also raised a concern that the settlement periods singled out in the presentation

were slightly biased to show only those early trading periods where large costs were lumped on; if other periods had been taken into consideration, the picture would be quite different. In terms of volatility there was agreement that the last 2 years volatility increased, but far from resulting in an increase of negative prices, the direction was actually positive and the Balancing Market prices have been steadily increasing rather than decreasing and so are the instances of positive prices vs negative ones in contradiction with what was mentioned in the proposer slides.

The Proposer agreed that the statement needed revision, but the intent was to highlight that the differential between the BM prices and the unit's costs are getting lower.

SO Observer also referred to the last slide and noted that the statements given could not happen at the same time. It was advised that this Modification would either increase imperfection costs or testing tariffs, and if it were to be imperfections, then this would be an additional cost put on the consumer. In many cases significant testing is called by the Generators not the TSO (as it was for the example presented) and it is managed at unit level, therefore the risk should be borne by them.

The Proposer felt that that this proposal would get units back on the market as quickly as possible and that was in everyone's interest. SO Member questioned the fact that the unit should be brought back from outages at all costs and in fact in the instance referred by the Proposer in the presentation, the TSO would not have wished the unit back in the circumstances that were realized: overnight with very high wind.

The Chair summarized that there was a lot of feedback from both sides but that this Modification covered a lot of other aspects of the Code and it could be seen how future increase in wind penetration could indeed cause issues of under-recovery. The Proposer requested more time to discuss this Modification before the next meeting and Secretariat advised that an Industry Call could be convened quite quickly with assistance provided by Secretariat. SO Member noted that there were some areas outside T&SC that would be affected, and it would be beneficial for Members to reach out to other Participants in industry.

INDUSTRY CALL – 11TH MARCH 2022

Clarify Area of Concern – Principle of efficient allocation of Risk and is a change merited?

SONI - commented that in certain circumstances there may be an issue e.g. if there is a case where GU is forced on by TSO you should not lose, other times if not requested by TSO there is no room of compensation. It could be applied in certain circumstances, but a blanket mod may not be the best approach e.g. if the TSO is forcing/requesting you on then you may be eligible.

Ennergia stated that the risk is still not being dealt with here and the risk remains with the GU.

SONI stated that the risk should not be removed from the testing process, if there is capacity for the generator to move to a better time, then perform the testing at another time, but the risk should sit with the generator.

SEMO queried who is best placed to manage the risk and felt it was not TSO, Suppliers, or Consumer. There are not many parties left to manage the risk. There may be situations on the system where testing may be required to be moved forward or backward, in your latest set of testing there wasn't any issue doing it during the day, or the night however it wasn't the preferred option however there wasn't any issue in moving that forward. It was very much at the request of the generator and the generator would have known where the potential risk or exposure at that point. Where the testing may be required to move it forward, or back by the TSO.

SEMO also felt the generator Under Test, is no different for any other generator managing ex-ante market risk when not Under Test. It's the same risk, you don't know what is going to happen. There is an unknown as to how the testing is going to go. The original question is who best placed to manage the risk it is still back to the generator as they are the party who know what will happen on site.

Energia stated that the GU can manage when it runs but it cannot manage what the BM price will be as it can be volatile. The GU wants to manage this risk in a more efficient manner. Without this risk being managed, GUs will need to need to build this risk into their bids on top of the actual risk as the BM is so volatile. This proposal is so that risk can go into the market in a more accurate way, it is not overpaid, the generator just gets it's costs. The consumer has a more efficient market at the end of this by trying to get a more optimal way to manage that risk. We are looking to manage it better as either way the customer is going to see this risk, either through generator bids in an inefficient manner or this potential proposal in a far more efficient manner.

SONI stated that one of the issues is the blanket application of this mod, whereby most units are not trading in the ex-Ante market in all of those cases for every unit Under Test there would be additional imperfections charges all of those tests would be seen as the TSO bringing a unit on. Energia stated that when the BM price is higher the GU actually gets paid that extra money when they go on test at the minute, this would also be removed under this proposal, there will be cases where units go on test and imperfections will be lower because of this proposal because they won't be getting that profit. SONI stated that as the dispatch position is from a zero PN this may not be the case. Energia stated that they haven't finalised legal drafting however that was a consideration that we tried to bring in here regarding GUs only recovering costs and we will look through the legal drafting to see how we can bring it in here. The initial discussions with the TSO was that it was swings in roundabouts, sometimes you win, sometimes you lose in respect of recovery Under Test, it depends on the BM. We just want to manage the risk. Removing both down and upside. This will be included in our legal drafting for settlement. In our view by removing the benefit as well as the risk it could have an upside for imperfections. It balances out removing the risk.

EirGrid raised concerns about the potential for abuse, if you have a unit submitting a test profile, they are going to get paid no matter what. What is regulating them from coming on for a test and the displacing other units who are getting positions in the BM or even displacing renewable generation - concern about how we police something like this. Energia stated that they do not want anyone to abuse the system. The proposal is designed so there is no opportunity to make money out of this. There is a testing charge that also must be paid to test. Also, in this proposal you only get reimbursed your costs that is where it is capped. What is the benefit then for the unit to force itself on to test to pay testing charges and breaking even. In addition, there are rules to go Under Test and you have to be approved. You have an under-test flag from the TSO, so there are checks and balances there. There is an expectation that generators operate in good faith and good behaviour is expected from participants. To the extent that anybody may abuse the market there are mechanisms in place, the MMU there to investigate abuse of the rules and deal with it effectively. If these mechanisms need to be looked at or tightened in any way they can be. The Risk of abuse does not seem likely. There should be mechanisms and process in the market to prevent any sort of abuse or breach of market rules. EirGrid stated that whilst there is good faith, and the Market Monitoring Unit, which have checks in place they still think we need to consider this. Also testing tariffs are only applied under certain circumstances and lots of testing takes place where there are no testing tariffs applied at all. So, it is not a universal, it needs to be taken into accounts. Energia said this is definitely something we can look at, but view would be that there should be processes in place in the market to stope abuse of any sort of market rules. That's why we have the MMU. To the extent that something needs to be looked at or tightened in that regard we can takeaway, however concern about the abuse of a market rule ultimately stops this Mod. We can look at it but there should be mechanisms in place within the market abuses.

A generator member stated that they looked at F.11 of the TSC in the context of that. Even if a GU had a start-up market position in the BM you still need to recover that in the DAM from the ex-ante market. The whole period of F11 could drawback that start-up cost. There is an element of how F11 interacts with that and it should cover off any advantage that a generator would get in a market from being physically brought on as a unit under test. Also, most actions in the BM are 90% complex actions so a lot of assets are complex bid are short run marginal costs. Not a lot of assets are going to make money

operating out of just the BM. It may not give a real advantage to generators in terms of market position, but it is one to consider. They also stated the need to be careful - it is the generator's ability to manage the risk, how they can manage the risk is they can just stay off until the prices become high enough that they can recover their costs under test. If that is the signal and the message we are sending out, we need to be very careful in terms of how keeping DBCs low this actually coincides with the requirements of the grid code in terms of maintaining repairing and operating the asset to be available. Also, there is a requirement to make the asset available in the CM. Would be cautious saying the generator can just wait until its price is high enough to bring it back in. I don't think that coincides / matches up with other parts of the market. We need to be coherent with the message we are sending to generators from all parts of the market.

Another Generator member echoed this point - if we are saying it is just a case that the generator can wait until a particular time, I think that is something is potentially in conflict with what we are trying to achieve and if that is the signal being sent, we need to be very clear as to the unintended consequences. Energia agreed on this, grid code obligation for the generator to come back which means the generator can't manage the risk, if it is by the grid code not allowed to delay the testing. It puts the generator in a very difficult position in terms of losing a lot of money on coming back or attempting to delay a test.

A generator asked for SEMO's thoughts on this point. SEMO stated they don't see it that waiting for the right moment means weeks on end, we are talking about a number of trading periods before or after here. I don't see it as a risk that would impact the maintenance of the apparatus or the availability for the capacity market, it's similar to your normal trade on a normal day. You look at the price and you take everything into consideration. They don't think that it will link back on grid code or other requirements because the difference you might see here will be limited to a number of trading periods. Again because of the volatility of the price because of the fact that it's not likely that you will have weeks and weeks that it's not suitable for recovery, don't see that as an issue. They see more of an issue the other side, if you have a risk-free test then there might be more uncertainty on how secure is that testing and how ready is the apparatus to come back. A Generator member stated they have an obligation to act as prudent operators and I don't think we would rush back an asset that is not ready to come back. SEMO argued similarly they don't think it is the interest of a generator to hold on the maintenance for a really long period of time.

Energia argued based on pure economic reasons there is certainly multiple days where purely economically it would be better for the generator not to test, for numerous days in a row. That would be against the grid code and you would be breaking the grid code. On pure economics there are certainly long periods of time based on what we would do for BM type forecasting, that a unit would not want to test. In our view it is not a few hours here and there it would be long periods where we would prefer not to test. We can't do it at the moment because of the grid code and you have to go ahead and incur losses. If it came to an economic decision it would not be a few hours here and there it would be days in certain circumstances.

A Supplier participant thanked Energia for the presentation. There some very valid comments from different parties, different sides. Their point of view is that I would agree that the risk is best placed with the generator. Although I acknowledge it is a very difficult risk to manage. I welcome the revisions willing to only receive the operating costs which I think is a fair outcome. Other points made around generators managing the risk it is probably more inefficient for the market if a greater risk premium is being added in and this is being reflected in the market, I take on those comments and considering that and looking at it objectively, it is probably fair to say would a modification even though it does increase imperfections is it still going to be more efficient to push through a modification than leaving it the way it is in the market? I am not au fait with all the different scenarios in the market with generator units under test but I would be interested to learn a bit more on those. Generally speaking I can see a merit in the modification in terms of efficiencies in the market.

Another Supplier echoed those comments from a supplier's perspective, ultimately if over the annual budget process you expect to be on test maybe twice a year and you think that's going to cost you €1million a time you are going to price that into your capacity or other ways to try and get that back. For me it is an inefficient way to do it and the consumer or supplier will end up paying more for it rather than a direct cost back from the testing profile.

Another supplier echoed the comments made already there. From a generator perspective is it fair to say that this risk will get worse when increasing renewables come on the system? Energia stated that potentially it would. In our view I would bring it back to the fact that this ruleset was in place in the old SEM and moved across into ISEM. We have a much more dynamic and volatile market than previously and the direction of travel with increased RES and SNSP could increase the differential between BM and your operating costs. We have tried to keep it at a principle level, there is an unmanageable risk there in our view we need to manage it in an efficient manner.

The Supplier member stated that SONI mentioned that where the TSO is obliging a unit to come on there may be a case there for definitely covering the costs and that will come back on suppliers via imperfections and that is obviously something that makes sense from a supplier and consumer perspective but then on the flipside if you limit it only to that, there was a cost risk from a supplier perspective if the generator does hold out and try to pick a time when the BM is high enough to cover its costs. From a security of supply perspective, it is not ideal either so the trade off that you have outlined of addressing it through this modification would seem most balanced from both perspectives.

SEMO asked about the legal drafting and how would you expect to tackle the recovery side? Energia said they would liaise with our settlement team on the changes that we need to make. At this stage we wanted to put forward the principle, the revised proposed solution which is to limit recovery just at operating costs, so you don't benefit from the higher BM. If we decide to move forward with a V2 mod proposal to try and implement that we will work with our settlement team internally to see where the legal drafting changes and engage with SEMO to see what changes would be need to try and implement the mod. SEMO said it feels like this is becoming a much bigger change than initially thought and are concerned as well about the timelines of this coming to fruition eventually. Also a review has been made of the current legal drafting from the settlement point of view for implementation and it doesn't seem that it would work. Energia said they are still trying to limit the change downstream and around settlement as opposed to amending up front processes. They said they would tie in with SEMO to discuss the scope of changes that are needed.

SONI commented that from a hypothetical analysis the application of 0 PNs for all testing, the impact on imperfections might be a lot greater than the other sides savings by only recouping up to operating costs. Imperfections are not going to be great next year, and a blanket mod may add to them. Energia stated that whilst imperfections could go up, without this mod other costs whether it be underlying capacity or DAM price will also go up. If the costs don't go through in an efficient manner (ie via the imperfections) the costs will go through somewhere else in the market. So, either way the costs are going to get into the market, we feel the most efficient way is through this mod. SONI replied that they thought a more efficient way would be to only apply it to the cases where the generator lost out and there could be a more efficient way to do this but don't know what it is yet. Energia replied that they have engaged in discussions on this but couldn't find a better proposal than this. If someone has a better proposal for getting the same result, they were open to discussing it.

A supplier member said the intention is to balance the risk of a generator being off for days and security of supply implications and the cost of imperfections, they will take it away and see if they can come up with any further proposals. Energia agreed that there were a number of elements to balance and that they have tried to come up with the most efficient way of doing that. It comes back to our very first point - if things remain the same, a prudent generator operating in the market will just have to acknowledge the risk that if we go Under Test what is the risk that we will incur losses during that period and what steps do we take to mitigate that risk?

A supplier member added that what might be helpful is to get a view to see days where there are not suitable BM prices that are not high enough to cover the operating costs. They would like to get an idea to the extent of whether it's hours where there are trading periods and kind of balance the risk on the generator versus, the grid code capacity obligation side from the supplier perspective, as you don't want someone choosing to be out of the market for too long either. That is not good for suppliers or consumers either. It would be good to get an idea how often it would be that you could be waiting hours or days. Energia responded that from a high level perspective, if you take the month of February and you are a large CCGT, you would struggle to find days in February that would have been economical to go Under Test, as prices were low. You may find some days that may be profitable but not many as it was a windy month. If we are going to get quite a lot of windy months going forward in the next 3 to 4 years so it's going to become more and more of a problem.

A generator member added that they thought the importance of this mod is more as we start to have more renewables and the SNSP increasing, you will see the full benefit of this in possibly two years' time if the mod gets implemented into the system. I think it is needed right now but the importance of it will grow as we go further and further into renewable targets.

Next steps were queried following this Industry Call - will you be looking to see if there is something different to propose or will you be putting it back into the Mods committee as it stands with the changed legal wording? Energia stated that a few points were raised by different parties on the call and they were open to having conversations on those points to decide do we proceed with trying to implement legal drafting to reflect the amended solution proposed today or do we tweak again. That was the aim to try and bottom this out with a final proposed solution and to try and bring it to the mods committee explain it and vote on it.

MODIFICATIONS MEETING 110 – 7TH APRIL 2022

The Proposer provided an update on this Modification noting that an Industry Call was held on Friday, 11th March 2022 and summary notes had been circulated. The Proposer provided a brief summary of the Modification and Industry Call noting that when a unit goes under test the rules are not satisfactory and a solution must be found for the risk associated with it. It was claimed that a Generator cannot manage this risk and options must be looked at to mitigate this. The Proposer gave assurance that the principle of the amended solution would be to stop losses and not to provide any financial gain. It was noted that there would be a lot of technical changes necessary to systems to implement the proposal and the amendments that would be needed to the code were currently being reviewed.

Renewable Generator Alternate stated that there should be an understanding of the impact of a Generator under test on the rest of the Market, in particular on the imbalance price and price-takers, but it was noted that it would be sensible to make units have an incentive to come back quickly and this proposal removed that incentive. The Proposer appreciated the point that was made but gave assurance that the simple recovery of costs would not make it attractive for a Generator to prolong an outage. The Chair also added that Generators are subject to testing tariffs which would be greater if the period of testing was to be unduly increased.

TSO provided a presentation giving the TSO's perspective on this Modification. TSO went through the slides noting that the Modification's proposal of setting Physical Notifications (PNs) to greater of QEX and zero for each imbalance period in settlement for all units under test does not take into account the difference in granularity of the variables affected and it could not be implemented. Concerns were raised about the overall complexity of the Modification, its intent and the terminology within the detail of it. Going through the presentation it was advised that this Modification was a permanent design change which would not be ideal for all testing scenarios. It was noted that testing times can be constrained on the Generator side as well as the TSO and not enough evidence had been provided to establish the frequency of the issue of non-recovery. There was a concern that if the risk would be fully removed from Generators, there would be no incentive to minimise costs and to manage the testing effectively. TSO

advised that this could lead to spurious testing and the TSO were not in a position to manage the risk associated with the testing because the potential for optimization was with Generators. It was advised that this Modification would increase Imperfection costs and any costs associated with testing should be borne by Generators and if the Modification were to be implemented then an increase in testing tariffs could follow.

TSO also discussed the Settlement issues with the Modification and noted that the comments in the slides were relayed back to the Proposer. TSO summarized that the Modification does not target the problem and would not be implemented in the system until at least October 2023, and at that, only if it was deemed a priority among other system changes. It was advised that a more real time approach could be possible.

TSO offered an option where they would agree following discussions with the unit under test, that in certain scenarios, zero PNs would be submitted for the period of an agreed test profile. It was noted that this was not an ideal solution for TSO but from a cost perspective it was more appropriate than a blanket approach of the Modification for units under test in all scenarios. It was advised that the risk and decision on the timing of the test would stay with the Generator unless the TSO was calling for the unit to bring forward testing. The request to bring forward testing, the test profile and the submission of zero PNs would be discussed and agreed with the TSO control centres. With the TSO's proposal there would be potential for the unit to gain financially by being incremented in the balancing market. It would not cap the compensation and it could also be implemented within a number of months.

The Proposer agreed that their own proposal was very complex and stated that relevant colleagues were considering the settlement complexities. Feedback would be provided after considering further the TSO proposal. The Proposer believed that the TSO proposal still did not address the risk which needed to be mitigated for all unit under test scenarios. It was explained that the unit going under test would generally not be aware in advance if it would experience losses during a test and the TSO proposal does not deal with this risk, except for specific scenarios. The Proposer stated that the generator would therefore seek to mitigate the risk through other means which would be ultimately borne by the consumer. The Proposer also stated that the unit is obliged under Grid Code requirements not to delay a return to service if available.

TSO agreed that the proposal did not remove all the risk for Generators but if the other option was selected a generator could be available and not testing for a long time. The TSO stated that the Grid Code obligations have been given initial consideration, but the indications so far are that a unit cannot be deemed available until testing is complete therefore this does not impact the obligation to return to service. It was queried whether it would make a big difference to Generators if the testing didn't happen immediately and if there was a day or two delay, if it would have a big impact. SO Member advised that their aim was to come up with a solution that would make the process run through normal Settlement. MO Member confirmed that, with the TSO proposal, the PN would be submitted as zero and the unit would be incremented in line with an agreed test profile. MO Member noted that the risk of a unit making a loss in the balancing market was a characteristic of the market and, in scheduling tests, the generator should be assessing risk factors such as the timing for scheduling a test across the year. MO Member also stated that the Proposer's solution removes the incentive for this optimization.

The Proposer noted that their initial solution was similar, in that the unit would have zero PNs and be incremented to the test profile. SEMO clarified that in the TSO proposal the unit under test would only be advised to submit zero PNs in the event this was agreed with the TSO control centres and no change would be required to the PNs in Settlement.

A Generator Member queried how this proposal would relate to REMIT transparency obligations and was not comfortable with the idea that there would be a mechanism for units to remain unavailable until a high price period. It was advised that the principle of a TSO and the unit agreeing to withholding a unit from the market if potentially available would need careful consideration. Along with the potential

impact on the consumer from that MW capacity not participating in the market. They stated that generators would need some comfort from the Regulatory Authorities that the TSO proposal would be acceptable practice. MO Member advised that REMIT obligations are being considered and stated that consideration is being given to a form of communication such as a market message to provide transparency on instances where the TSO proposal would be called upon, the format and timing of which need to be considered in the context of existing reporting and market gate closure. Gate Closure 2 seems to be in line with the current publication of PNs to the market so this would seem a likely timeframe for a market message, but this was open to discussion with the industry. MO Member understood that Generators would still be on outage until testing was complete, therefore unavailable, the testing profile would still be controlled by the Unit and that this was not a case of encouraging the withholding of a unit's availability but rather to facilitate an earlier come back.

SO Member gave assurance that the TSO proposal would mitigate the impact of MW missing from the market by putting in place a mechanism by which a unit could return if needed without the risk of under-recovery. And with the TSO proposal, if there was no pressing need for the unit to return it would be left at the discretion of the generator to test when conditions were favourable. A concern was raised by a Supplier Member that whatever proposal was to be put in place it would increase imperfections charges and the customer would pay for testing regardless of where the cost arises. It was suggested that the Modification seemed to be a cleaner way to deal with the issue.

The Chair summarized the 3 potential outcomes to finding a solution as below:

1. 'As is': Submit profile with all risk borne by the Generators;
2. Generators agree with TSO whether to defer or not. cost to the consumer occur only when TSO agrees to PNs set to zero.
3. PN set to zero in all scenario – unit could get inframarginal rent with no risk and the customer cost will pay in all scenarios.

MO Member acknowledged that some costs are going to be incurred by the consumer with any of the options however views differ on the best means to control and minimize them. It was noted that if the Generator retains the incentive to optimize the recovery of costs then eventually the consumer will have to recover the costs only when needed.

Another Generator Member agreed with the concerns raised in relation to the potential for withholding a unit from the market noting that in a normal situation Generators are under no pressure from TSOs to rush back. It was believed that the TSO solution would reduce availability by delaying a return to service. This Generator Member confirmed that the Proposer's solution was preferred by them in part due to transparency concerns.

The Proposer was asked to provide data on the frequency of these occurrences. Assurance was given that a version 2 of this Modification Proposal will have more data. An Assetless Member advised that they would not be comfortable voting on either the Proposer's solution or the TSO's proposal due to the lack of an impact assessment on Imperfections. The TSO stated that providing an impact assessment is difficult due to uncertainty on key variables such as frequency, timing, duration, price etc. The Assetless Member also queried if a documented procedure would be published for the TSO proposal. TSO responded that this would be done if the modifications panel were interested in pursuing the proposal.

In relation to the Proposer's solution, RAs voiced concerns on removing the incentive to minimize costs and to optimize the timing of the testing. Clarification was sought on what capabilities a Generator has in this regard and if a Generator wanted to delay, what a reasonable time for a cut off would be or for the TSO to step in to avoid long delays. The RAs interpretation of the TSO's solution was that it enabled a unit to return to service earlier than intended by the generator. MO Member confirmed that these are the circumstances where it envisaged the alternative TSO proposal to occur. The testing profile is left

to the Generators as they are best placed to advise on the status of the outage, only in critical conditions would the TSO reject the testing profile submitted but if it is known that the unit capability to return from outage is affected by Market conditions then the alternative process allows the TSO to step in without causing losses to the Generator. Questions were raised on whether this allows Participants to change PNs based on Market conditions. MO Member replied PNs are changed regularly particularly when a unit is under test. The reasons for the change are left to the Participant and not investigated. Changes driven by Market conditions are likely to have occurred already. SO Member also queried how long unfavourable market conditions could persist before a potential 'step in' by a TSO, to which the Proposer advised they will consider this question.

The Proposer queried why the TSO proposal could not be adopted for all testing, negating the need for code modification and system changes. MO Member advised that the TSO proposal may not require a code update, but this is yet to be confirmed.

A Generator Alternate advised that they would welcome greater clarity on the impact to Imperfections with the proposals and that a cost estimate on the potential system changes to accommodate the Proposer's solution would also be welcome.

The Chair summarized that there were several points for discussion here and that these should be addressed in version 2. The Proposer agreed to address these queries and provide some settlement drafting in version 2 which would address the risk. TSO asked for feedback on whether there was a maximum time the TSO should wait before stepping in.

MODIFICATIONS MEETING 111 – 16TH JUNE 2022

The Proposer provided an update on this Modification noting that further work would be needed to liaise with SEMO and other affected Participants. Secretariat requested if more time could be given as there was a clear progression of this proposal in the background. The Proposer advised that last minute comments and queries were raised and as a result further development was required.

MODIFICATIONS MEETING 112 – 6TH SEPTEMBER 2022

The Proposer provided an update on this Modification noting that further work was required to update documents outside the T&SC such as TSO unit under test procedure etc. It was advised that the current rules in relation to cost recovery were a problem and that this modification provided a neater solution.

The Proposer noted there were two elements to this Modification, the first being zero PNs submitted while dispatched to an agreed profile which was brought up in the April Modifications Committee Meeting. The second was a settlement change and a unit which is unable to recover its cost. The Proposer provided assurance that they were not looking to make a profit on the unit but just to recover its cost and the new calculation would not entitle units to a premium charge.

The Proposer referred to the proposal put forward by TSO where generators would notify the test and agree on the preferred times to test if price doesn't allow for an adequate cost recovery. It was advised that in cases where generators may want to defer, there was no path to how generators could recover costs and therefore it did not address the real issue.

The Proposer had offline conversations with DSU member and Interconnector administrator, and they were happy to be exempted for the application of the Modification, however DSU Member clarified that this is based on the current DSU standing in the T&SC which could change based on the ongoing DSU consultation. Any change would need to be considered in the context of the output of that consultation.

The Proposer also commented on the question of impact on Imperfections noting that there were too many variables to be able to quantify but having addressed the profit side as well as the costs should help matters. The potential increase of unnecessary testing was also mentioned by the Proposer stating

that if Generators increased testing frequency, removing that Generator from the energy market would cost more.

The TSO noted concerns previously raised with the proposer verbally and via Email, such as the impact on imperfections costs and the extra administrative workload being transferred to the control rooms, especially given that, for many practical reasons generators often require short notice changes to testing. The TSO agreed with proposer that impact on Imperfection costs couldn't be easily quantified using historical data but stressed that that approval of this modification would add significant costs to the current scale of imperfections cost due to the automatic cover of all under test costs in all circumstances which would equate to a blank cheque to generators. The TSO also noted that the alternative proposal, by the TSOs, whereby PNs would be set to zero, and test profiles entered by the TSOs, was only meant to be for exceptional circumstances, whereby the TSO require a unit back urgently, but the unit wanted to defer, as it could not recover its costs at that time. Given the existing workload and other competing priorities within the control rooms, this modification would likely make the testing process more rigid and formal for all parties, thereby removing the opportunity for ad hoc and opportunistic testing. Concerns were also raised by the TSO that this modification could create a perverse incentive for a unit to go under test and noted that this modification would likely have an impact on testing tariffs which have remained very low to date in recognition that the process was well self-regulated by generators so far the current paper on Testing Tariff published by the TSO might need to be reviewed in light of the possible outcome of this Modification.

The Proposer believed that there was no obvious reason on why the under-test behaviour would change but agreed that this could be reviewed further if required.

8. PROPOSED LEGAL DRAFTING

As per Appendix 1.

9. LEGAL REVIEW

N/A

10. IMPLEMENTATION TIMESCALE

It is recommended that this Modification is implemented on a Settlement Day basis on the first Trading Day following system implementation.

1 APPENDIX 1: MOD_02_22 COST RECOVERY WHEN UNDER TEST V2

| Proposer <i>(Company)</i> | Date of receipt <i>(assigned by Secretariat)</i> | Type of Proposal <i>(delete as appropriate)</i> | Modification Proposal ID <i>(assigned by Secretariat)</i> |
|--|---|--|--|
| Energia | 9th August 2022 | Standard | Mod_02_22 v2 |
| Contact Details for Modification Proposal Originator | | | |
| Name | Telephone number | Email address | |
| Sean McParland | | sean.mcparland@energia.ie | |
| Modification Proposal Title | | | |
| Cost Recovery when Under Test (Version 2) | | | |
| Documents affected <i>(delete as appropriate)</i> | Section(s) Affected | Version number of T&SC or AP used in Drafting | |
| T&SC Part B | | Version 26.0 | |
| Explanation of Proposed Change <i>(mandatory by originator)</i> | | | |
| <p><u>Area of Concern</u></p> <p>The modification seeks to address a risk where a Generator Unit (GU) operating 'Under Test' upon returning from outage only recovers costs in the Balancing Market (BM) at the level of the BM price. That means a GU will <i>not recover their costs</i> when 'Under Test' when the BM price is low and BM revenue is lower than the units costs.</p> <p>The focus on resolving the issue is on how / who is best placed to manage this risk i.e. ensuring an efficient allocation of risk. Energia consider that the GU cannot efficiently manage this for a number of reasons:</p> <ul style="list-style-type: none"> - GU has limited control over the 'Under Test' process. Whilst the Test Profile is initially submitted by the GU to the TSO, the Test Profile can be subsequently changed (both running levels and timing) and is ultimately subject to TSO approval; - GUs have limited ability to substantially alter timings of when they carry out testing in the event of forecast low BM prices given practical scenarios of having required personnel available (i.e. OEMs etc.). <p>This modification puts forward proposals (see below under "Proposed Change") on how to better deal with this risk/cost by ensuring a GU recovers its costs when "Under Test" but prevents it from making a profit should BM revenue outturn higher than its costs.</p> <p>As the risk/cost currently sits with the GU, it will have to take steps to determine where they can recover this cost. If not through the proposed modification, the GUs will have to consider what other options are available to them in the</p> | | | |

various markets (i.e. energy or capacity markets) in seeking to manage this risk moving forward e.g. it may be recovered through various bids; it could become part of discussions on the BNE price that could increase the capacity cost across the whole market etc. Given the uncertainty of costs to GUs the alternative steps taken to manage this risk will be more inefficient and the cost to consumer may actually end up being greater than if the cost was socialised under the proposed solution.

Furthermore, as we progress towards a low carbon future with increasing RES generation on the system, energy prices will be expected to be lower (or go negative) more frequently and hence the probability of under recovery when testing will increase.

In summary, the lack of cost recovery for GUs when Under Test is an inefficiency in the current market which will result in inefficient outcomes. As the overall energy system will still need investment in conventional capacity, if such investments are to be incentivised and remunerated then this cost/risk needs to be addressed. This modification proposal seeks to find an alternative, transparent and more efficient solution for managing this risk.

Proposed Change

Several concerns were raised about a proposed initial solution :

- The GU could make a profit if BM revenue was higher than the costs when Under Test. Although this can already occur under current rules, the underlying principle behind the proposal is to address a risk/cost in the market that GUs are not able to manage efficiently;
- Making the change in Settlement only requires difficult and complex and algebra changes to the TSC.

In order to address these issues, the updated proposal has the following key elements:

- III. GU submits zero PNs when Under Test and are dispatched to the agreed test profile. This forms the basis of an alternative TSO proposal presented at the April Mods meeting (albeit applied in a wider manner than proposed by the TSO).
- IV. Settlement changes to allow for GUs paying back should the BM price be greater than the GUs costs (and therefore introducing the principle that the GU only recovers costs when Under Test).

This updated approach is a more straightforward method to making a change and addressing the risk facing GUs. It also removes any upside that the GU can profit when going through a testing process by introducing a new "Generation Under Test Not Entitled to Imbalance Component Payment or Charge".

Alternative TSO Proposal

We welcome that the TSO has looked at this issue and in recognising that there is a concern that needs to be addressed have put forward an alternative proposal i.e.

- When GU notifies TSO that it is ready to test, as per agreed test profile, but will defer testing until X date/time due to risk of costs not being recovered;
- If TSO needs plant back earlier than date/time proposed by GU TSO can choose to step in and agree that PNs are submitted as 0, while dispatching to agreed test profile.

However, we have concerns that the TSO proposal does not address the underlying risk and rationale for the modification i.e. it still gives no certainty to GUs ahead of time and therefore they would still have to assume under recovery of costs when Under Test. As a result, the GU will still seek to manage this risk by alternative, more inefficient methods than the modification proposal.

Further concerns with the TSO proposal include:

- Interactions with REMIT requirements;
- Other implications if a GU delays its testing and return to availability for commercial reasons i.e. less units available for the TSO to schedule and dispatch therefore potentially having to run more expensive alternative generators.

Legal Drafting Change

*(Clearly show proposed code change using **tracked** changes, if proposer fails to identify changes, please indicate best estimate of potential changes)*

D.7.3 Generator Units Under Test

- D.7.3.1 The relevant System Operator may grant Generator Units the status of 'Under Test' for a limited period under the terms of the relevant Grid Code.
- D.7.3.2 Notwithstanding paragraph A, the status of Under Test shall not be granted to Generator Units which have Priority Dispatch and which are not Dispatchable, Generator Units which are not Dispatchable and not Controllable (with the exception of Interconnector Error Units), or Interconnector Residual Capacity Units. Any request from any such Units shall be deemed returned whether or not a response is received from the System Operator.
- D.7.3.3 Prior to the submission of an Under Test flag under paragraph D.7.3.4, an eligible Participant shall submit a Generator Unit Under Test Request which shall propose a Unit Under Test Start Date and Time and a Unit Under Test End Date and Time as specified in Appendix F "Other Communications" and in accordance with Agreed Procedure 4 "Transaction Submission and Validation".
- D.7.3.4 In order for a Generator Unit to acquire Under Test status under this Code, an eligible Participant shall submit an Under Test Flag to the relevant System Operator as part of its Physical Notification Data ~~which shall identify the relevant Physical Notification Quantities to be considered Under Test.~~ The submission of this data shall constitute an application by the Participant for Under Test status which can be rejected by the System Operator in accordance with Agreed Procedure 4 "Transaction Submission and Validation"
- D.7.3.5 **The System Operator will endeavour to operate the Generator Unit Under Test to reflect the pattern of operation as agreed as part of the Generator Unit Under Test Request process in accordance with paragraph D.7.3.3.** ~~The Physical Notification Quantities for a Generator Unit Under Test within the Physical Notification Data shall reflect the pattern of operation agreed as part of the Generator Unit Under Test Request process in accordance with paragraph D.7.3.3.~~
- D.7.3.6 The Market Operator shall record the Generator Unit Under Test status under this Code for the Imbalance Settlement Periods between the Physical Notification Quantity times associated with the Under Test Flag, starting on the Imbalance Settlement Period in which the Under Test Flag first applies, and ending on the Imbalance Settlement Period in which the Under Test Flag last applies in order to apply the appropriate Testing Tariffs.

Section F – Settlement changes

F.1.2 Settlement Charges and Payments for Generator Units

- F.1.2.1 The Market Operator shall calculate the following charges and payments for each Generator Unit in accordance with the Settlement Calendar in section G.2.4:
- (a) $CIMB_{uy}$, the Imbalance Component Payment or Charge calculated in accordance with section **Error! Reference source not found.**;
 - (b) $CPREMIUM_{uy}$, the Premium Component Payment calculated in accordance with section **Error! Reference source not found.**;

- (c) $CDISCOUNT_{uy}$, the Discount Component Payment calculated in accordance with section **Error! Reference source not found.**;
- (d) $CAOOPO_{uy}$, the Offer Price Only Accepted Offer Payment or Charge calculated in accordance with section **Error! Reference source not found.**;
- (e) $CABBPO_{uy}$, the Bid Price Only Accepted Bid Payment or Charge calculated in accordance with section **Error! Reference source not found.**;
- (f) $CCURL_{uy}$, the Curtailment Payment or Charge calculated in accordance with section **Error! Reference source not found.** and $CGUTCIMB_{uy}$ the Generation Under Test Not Entitled to Imbalance Component Payment or Charge calculated in accordance with section F.8.4
- (g) $CUNIMB_{uy}$, the Uninstructed Imbalance Charge calculated in accordance with section **Error! Reference source not found.**;
- (h) CII_{uy} , the Information Imbalance Charge calculated in accordance with section **Error! Reference source not found.**;
- (i) CFC_{ub} , the Fixed Cost Payment or Charge calculated in accordance with section **Error! Reference source not found.**; and
- (j) $CTEST_{uy}$, the Testing Charge calculated in accordance with section **Error! Reference source not found.**

F.8.4 Calculation of Generation Under Test Not Entitled to Imbalance Component Payment or Charge

F.8.4.1 The Market Operator shall calculate the Generation Under Test Not Entitled to Imbalance Component Payment or Charge for each Generator Unit, u , in each Imbalance Settlement Period, γ , for which it is Under Test as follows:

$$CGUTCIMB_{uy} = ((\text{Min}(PBO_{uoi\gamma} - PIMB_{\gamma}, 0) \times (QMLF_{uy} - QEX_{uy})) - CDIFFCWD_{\gamma})$$

where:

- (k) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ , calculated in accordance with Chapter E (Imbalance Pricing);
- (l) $PBO_{uoi\gamma}$ is the Bid Offer Price for each Accepted Bid Quantity and Accepted Offer Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , determined in accordance with section **Error! Reference source not found.**;
- (m) \sum_o is a summation over all Bid Offer Acceptances, o ;
- (n) \sum_i is a summation over all Bands, i ;
- (o) $QMLF_{uy}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u , in Imbalance Settlement Period, γ ;

- (p) $QEX_{u\gamma}$ is the Ex-Ante Quantity for Generator Unit, u, in Imbalance Settlement Period, γ ; and
- (q) $CDIFFCWD_{\gamma}$ is the Within Day Difference Charge

F.11.4.2 The Market Operator shall calculate the Make-Whole Payment Revenue ($CREVMWP_{uk}$) for each Generator Unit, u, for each Contiguous Operating Period, k, in each Billing Period, b, as follows:

$$\begin{aligned}
& CREVMWP_{uk} \\
&= \sum_{\gamma \in k} \left(\sum_o \sum_i \left(\text{Max}(PBO_{uo\gamma}, PIMB_{\gamma}) \right. \right. \\
&\times \left(QAOLF_{uo\gamma} \right. \\
&- \text{Max}(QAOPOLF_{uo\gamma}, QAObIAS_{uo\gamma}, QAOUNDEL_{uo\gamma}, QAOTOTSOLF_{uo\gamma})) \\
&+ \sum_o \sum_i \left(\text{Min}(PBO_{uo\gamma}, PIMB_{\gamma}) \right. \\
&\times \left(QABLF_{uo\gamma} \right. \\
&- \text{Min}(QABBPOLF_{uo\gamma}, QABBIA S_{uo\gamma}, QABUNDEL_{uo\gamma}, QABNFLF_{uo\gamma}, QABCURLLF_{uo\gamma}, \\
&QABTOTSOLF_{uo\gamma})) \\
&+ \sum_o \sum_i \left(PBO_{uo\gamma} \times \text{Max}(QAOPOLF_{uo\gamma} - QAOUNDEL_{uo\gamma}, 0) \right) \\
&+ \sum_o \sum_i \left(PBO_{uo\gamma} \times \text{Min}(QABBPOLF_{uo\gamma} - \text{Min}(QABCURLLF_{uo\gamma}, QABUNDEL_{uo\gamma}), 0) \right) \\
&+ \sum_o \sum_i \left(PCURL_{u\gamma} \right. \\
&\times \left. \text{Min}(QABCURLLF_{uo\gamma} - \text{Min}(QABBIA S_{uo\gamma}, QABUNDEL_{uo\gamma}), 0) \right) \\
&+ CGUTCIMB_{u\gamma}
\end{aligned}$$

where:

- (a) $\sum_{\gamma \in k}$ is a summation over all Imbalance Settlement Periods, γ , within the Contiguous Operating Period, k;
- (b) $PBO_{uo\gamma}$ is the Bid Offer Price for each Accepted Bid Quantity and Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ ;
- (c) $QAOLF_{uo\gamma}$ is the Loss-Adjusted Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ ;
- (d) $QABLF_{uo\gamma}$ is the Loss-Adjusted Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ ;
- (e) $CAOPO_{u\gamma}$ is the Offer Price Only Accepted Offer Payment or Offer Price Only Accepted Offer Charge for Generator Unit, u, in Imbalance Settlement Period, γ ;

- (f) $CABBPO_{uy}$ is the Bid Price Only Accepted Bid Payment or Bid Price Only Accepted Bid Charge, γ ;
- (g) $CCURL_{uy}$ is the Curtailment Payment or Charge for Generator Unit, u , in Imbalance Settlement Period, γ ;
- (h) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ , calculated in accordance with Chapter E (Imbalance Pricing);
- (i) $QAOTOTSOLF_{uoiy}$ is the Loss-Adjusted Trade Opposite TSO Accepted Offer Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (j) $QABTOTSOLF_{uoiy}$ is the Loss-Adjusted Trade Opposite TSO Accepted Bid Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (k) $QABNFLF_{uoiy}$ is the Loss-Adjusted Non-Firm Accepted Bid Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (l) $QAOUNDEL_{uoiy}$ is the Undelivered Accepted Offer Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (m) $QABUNDEL_{uoiy}$ is the Undelivered Accepted Bid Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (n) $QAObIAS_{uoiy}$ is the Biased Accepted Offer Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (o) $QABBIAS_{uoiy}$ is the Biased Accepted Bid Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (p) $QABCURLLF_{uoiy}$ is the Loss-Adjusted Curtailment Accepted Bid Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (q) $QAOPOLF_{uoiy}$ is the Loss-Adjusted Offer Price Only Accepted Bid Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (r) $QABBOLF_{uoiy}$ is the Loss-Adjusted Bid Price Only Accepted Bid Quantity for Generator Unit, u , for Bid Offer Acceptance, o , for Band, i , in Imbalance Settlement Period, γ , calculated in accordance with section **Error! Reference source not found.**;
- (s) \sum_o is a summation over all Bid Offer Acceptances, o ; and
- (t) \sum_i is a summation over all Bands, i . and

- (u) $CGUTCIMB_{uy}$ is the Generation Under Test Not Entitled to Imbalance Component Payment or Charge for Generator Unit, u, in Imbalance Settlement Period γ calculated in accordance with section F.8.4;

Section G

K.4.10 Charges for Testing

- K.4.10.1 The total Testing Charge ($C_{TEST_{ud}}$) made for each Generator Unit u for each Settlement Day d shall be calculated by the Market Operator as follows:

$$C_{TEST_{ud}} = \sum_{\gamma \text{ in } d} C_{TEST_{u\gamma}}$$

where:

- (a) $C_{TEST_{u\gamma}}$ is the Testing Charge for Generator Unit u in Imbalance Settlement Period γ calculated in accordance with section F.13; and
- (b) $\sum_{\gamma \text{ in } d}$ is a summation over all Imbalance Settlement Periods γ in Settlement Day d.

- K.4.10.2 The Generation Under Test Not Entitled to Imbalance Component Payment or Charge ($CGUTCIMB_{ud}$) made for each Generator Unit u for each Settlement Day d shall be calculated by the Market Operator as follows:

$$CGUTCIMB_{ud} = \sum_{\gamma \text{ in } d} CGUTIMB_{u\gamma}$$

where:

- (a) $CGUTCIMB_{u\gamma}$ is the Generation Under Test Not Entitled to Imbalance Component Payment or Charge for Generator Unit u in Imbalance Settlement Period γ calculated in accordance with section F.8.4; and
- (b) $\sum_{\gamma \text{ in } d}$ is a summation over all Imbalance Settlement Periods γ in Settlement Day d.

K.4.11 Total Daily Amounts for Generator Units

- K.4.11.1 The Total Daily Amounts ($C_{DAY_{ud}}$) made for each Generator Unit u for each Settlement Day d shall be calculated by the Market Operator as follows:

$$C_{DAY_{ud}} = C_{IMB_{ud}} + C_{PREMIUM_{ud}} + C_{DISCOUNT_{ud}} + C_{AOPO_{ud}} + C_{ABBPO_{ud}} + C_{CURL_{ud}} + C_{UNIMB_{ud}} + C_{II_{ud}} + C_{TEST_{ud}} + CGUTCIMB_{ud}$$

where:

- (a) $CIMB_{ud}$ is the total Imbalance Component Payment or Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.2;
- (b) $CPREMIUM_{ud}$ is the total Premium Component Payment for Generator Unit u for Settlement Day d calculated in accordance with section G.4.3;
- (c) $CDISCOUNT_{ud}$ is the total Discount Component Payment for Generator Unit u for Settlement Day d calculated in accordance with section G.4.4;
- (d) $CAOOPO_{ud}$ is the total Offer Price Only Accepted Offer Payment or Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.5;
- (e) $CABBPO_{ud}$ is the total Bid Price Only Accepted Bid Payment or Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.6;
- (f) $CCURL_{ud}$ is the total Curtailment Payment or Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.7;
- (g) $CUNIMB_{ud}$ is the total Uninstructed Imbalance Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.8;
- (h) CII_{ud} is the total Information Imbalance Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.9; and
- (i) $CTEST_{ud}$ is the total Testing Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.10.
- (j) **CGUTCIMBud** is the total Generation Under Test Not Entitled to Imbalance Component Payment or Charge for Generator Unit u for Settlement Day d calculated in accordance with section G.4.10.2

Glossary

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| <p>Generation Under Test Not Entitled to Imbalance Component Payment or Charge</p> | <p>an adjustment to ensure that Generator Units Under Test do not recoup Imbalance Component Payments or Charges where it is not entitled to. It is calculated in accordance with section F.8.4.</p> |
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Modification Proposal Justification
(Clearly state the reason for the Modification)

The principle justification of the modification is that the current TSC ruleset means that a GU operating ‘Under Test’ upon returning from an outage will **not recover their costs when ‘Under Test’** if the BM price is low and BM revenue is less than the units actual costs. Given the potential impact on cost recovery when ‘Under Test’ this is a serious issue

for GUs in the market with potentially serious commercial implications. This is unfair on GU's whose costs may exceed BM revenue and are unable to avoid making a loss when testing following an outage.

Both through increasing costs for GUs and expected lower or negative BM prices more frequently as the market moves towards increasing RES generation, the variance between BM revenues and costs incurred by thermal GU's will become more pronounced. The resulting impact is an increasing risk of GUs not recovering their costs when Under Test. This risk will lead to GUs taking steps to determine how these costs can be recovered (through various markets) which will ultimately be more inefficient and still be borne by the consumer.

Other comments/concerns

Imperfections

Whilst unable to calculate any exact increase in imperfections from the modification proposal, we believe the focus on an increase to imperfections resulting from the change is too narrow and does not consider all counterfactual arguments. These points include:

- Any increase to the Imperfections arising from this change would be reflective of the costs currently being incurred by GUs.
- The increase to Imperfections should be partially offset by the repayment proposal as part of this modification proposal i.e. if a GU makes a profit when Under Test due to higher BM revenues;
- If a GU delays its testing and return to availability (as per TSO proposal), this removes that GU as an option for the TSO for that delayed period of time which will potentially also increase costs (as a more expensive GU may be required instead of the GU waiting to test).
- There should be a focus on ***maximising availability on system at all times*** which this modification proposal helps to achieve.

Incentive to minimise costs

Concerns were raised that the modification would incentivise units to test more or not minimise costs when testing. However, we do not believe these concerns will materialise for the following reasons.

There is no incentive for GUs to go 'Under Test' under the current proposal as they cannot make any profit when testing in scenarios where the BM revenues are higher than the unit's costs. In addition the GU will be subject to a testing tariff. Furthermore, all testing needs TSO approval. Perversely, the current settlement rules when Under Test could encourage a GU to carry out inadequate testing due to the risk of commercial loss which could actually lead to more outages of generators going forward.

How often does the issue occur

It was previously queried if a GU was ready to go Under Test but due to forecast of BM it would incur a loss, how long would they have to seek to delay testing before it became commercially viable. It is difficult to quantify this due to a

number of different factors i.e. different GUs will have different operating costs, will run at different profiles when testing, will require to test for different lengths of time etc.

However, some high-level analysis for February 2022 found that under a baseload profile our thermal plant would have incurred a loss when testing for 71% of the days. Although this analysis is high level it helps to demonstrate that there will be scenarios when a GU would not fully recover its costs for a significant period of time when testing.

Crucially, it is worth re-emphasizing that the modification is seeking to be **forward looking** and address a risk that is expected to become more pronounced as demand is increasingly met by Renewable generation. This is expected to result in conventional generators being in merit for a reducing proportion of the year and hence will be less likely to be testing during a period where they could expect to recover their costs.

Ex- Ante Participation

In respect of the potential for a GU to enter ex-ante markets when 'Under Test', whilst this is possible, we do not believe this represents a viable solution to the underlying risk. In the same way that it may not be possible to recover costs back in the BM, the Ex-Ante market may not cover the GUs costs on a given day.

Code Objectives Furthered

(State the Code Objectives the Proposal furthers, see Section 1.3 of Part A and/or Section A.2.1.4 of Part B of the T&SC for Code Objectives)

The following Code Objectives will be furthered with this Modification Proposal:

- (d) to promote competition in the Single Electricity Market;
- (f) to ensure no undue discrimination between persons who are parties to the Code;

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| <p>Implication of not implementing the Modification Proposal <i>(State the possible outcomes should the Modification Proposal not be implemented)</i></p> | |
| <p>The GU cannot efficiently manage this risk and if no changes are made will look to mitigate and manage this risk through alternative, more inefficient methods. Ultimately, this cost is likely to come back to the consumer and the cost may actually end up being greater than if managed through the proposed solution.</p> | |
| <p>Working Group <i>(State if Working Group considered necessary to develop proposal)</i></p> | <p>Impacts <i>(Indicate the impacts on systems, resources, processes and/or procedures; also indicate impacts on any other Market Code such as Capacity Market Code, Grid Code, Exchange Rules etc.)</i></p> |
| | <p>A system change in Settlement will be required</p> |
| <p>Please return this form to Secretariat by email to balancingmodifications@sem-o.com</p> | |