Process for the Calculation of Outturn Availability Consultation Document

1st February 2013

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1 Introduction

Purpose of Consultation

In their role as Transmission System Operators (TSOs) EirGrid and SONI are obligated under the Trading and Settlement Code to provide a record of a Generator's Outturn Availability to SEMO for settlement purposes. This paper seeks the opinion of all parties on a range of options that the TSOs could apply to calculating Outturn Availability for situations other than when the Generation Unit is unavailable for technical reasons associated with the unit or its auxiliary plant.

There is considerable and divergent custom and practice built up over the years in EirGrid and SONI in this area however no formal or transparent or harmonised policy exists today that sets out how Outturn Availability should be recorded for a Generator under a range of commonly occurring circumstances. In addition, the relationship between Outturn Availability in the Trading and Settlement Code and Availability in the Grid Code is not explicit. The TSOs wish to develop an explicit policy and provide clarity on this issue for all Users. To this end, this consultation paper outlines options for how Outturn Availability could be calculated in a range of commonly occurring scenarios. Importantly, the policy that results from this consultation will effectively sit under the Grid Code and Trading & Settlement Code, i.e. rather than representing a change to either of these codes, it will be a "bridging" document which explains the link between them in terms of the treatment of availability.

The issue of the calculation of outturn availability is inextricably linked with connection arrangements, connection charging policies, firmness regimes and asset ownership boundaries which differ from user to user and between Ireland and Northern Ireland. As a result of these historical differences the approach taken by the two TSOs to calculating outturn availability also differs. Given that the SEM is an All-Island market , in keeping with their chosen connection arrangement, it is desirable that all participants in SEM are treated consistently in the market regardless of the jurisdiction in which they are connected which is why this consultation is being run on an all island basis and will be discussed with the Regulatory Authorities in Ireland and Northern Ireland. The resulting decision will be applied consistently by both TSOs to all existing and future Generators.

Should there be any conflict between any principle set out within this paper and anything set out in any contract between the TSO and a connecting party, or any specific direction or determination from CER/NIAUR in relation to the treatment of Outturn Availability in any specific circumstance, then that contract, direction or determination shall have precedence over the principles derived from this consultation process.

This paper applies to outages on the Transmission System only. In general, an outage on the distribution network will constitute the generator being unavailable from a TSO and SEMO perspective.

Role of the TSOs in this consultation

The TSOs are running this consultation in order to put in place a transparent and non-discriminatory set of principles that can be used by the TSOs in the determination of Outturn Availability for all Generators.

The TSOs are running this consultation process on the basis that they have an experience in administering the existing processes and associated policies which underlie this topic and can attempt to set out the issues, polices and challenges associated with their application. The TSOs have consulted with the Regulatory Authorities prior to issuing this consultation document and will revert to the Regulatory Authorities on completion of the consultation period with a summary of the consultation responses and shall discuss the response with the RAs before publishing a final position.

In developing a final position the TSOs will consider all consultation responses and the following issues:

- The degree to which the final proposal is consistent with existing polices and the underlying principles of these policies.
- The degree to which the process can be implemented within the current market and TSO systems.
- The complexity of the solution. The TSOs prefer to avoid complex, hard to understand solutions where possible. Increases in the level of complexity of the solutions increase the risk that the solution is not applied consistently.

Structure of this Paper

This consultation paper is structured as follows:

- Details of how to respond to this consultation are provided in the Section 2.
- Section 3 outlines some relevant policies and processes in order to provide context to the options set out in Section 4.
- Section 4 sets out a range of options that could be applied to the calculation of outturn availability.

2 Rules of Consultation

How to Respond

Views and comments are invited regarding all aspects of this document. Responses should be sent to info@eirgrid.com and enquiries@soni.ltd.uk by 15th March 2013.

It would be appreciated if comments are clearly aligned with the sections and sub sections of this consultation paper to which they relate. Please note that if confidentiality is required, this should be made clear in the response. In any event, it is intended that all responses will be shared with CER and NIAUR.

On completion of the consultation period the TSOs shall submit a summary of the consultation responses to the Regulatory Authorities (RAs) and shall discuss the response with the RAs before publishing a final position.

Interrelated Policies

This consultation paper is premised upon a number of interrelated policies and processes, including:

- Relevant Planning and Operation Standards
- Calculation of Least Cost Chargeable Connection
- Connection Charging Policy
- Generation Outage Planning Process
- Calculation of capacity and constraint payments under the Trading & Settlement Code
- Firmness Regime (which is still under discussion in Northern Ireland)

This consultation is set out on the premise that the policies and procedures that govern each of these areas are fixed. On completion of the consultation process, any business process documentation and system changes required to support the final set of principles will be developed and published by the TSOs.

3 Background Information

In order to provide context and background to the options in Section 4, this section outlines:

- The definition of Connection Assets for the purpose of this consultation paper
- The definitions of Availability in the Grid Codes and of Outturn Availability in the Trading and Settlement Code
- A brief explanation of how Capacity and Constraint Payments are Made
- A summary of the Generation and Transmission Outage Scheduling Processes
- A summary of Connection Charges and Ongoing Service Charges

3.1 Definition of Connection Assets

In the context of this document "Connection Assets" refers to all assets belonging to the Transmission Asset Owner that exist between the Connection Point and the Meshed all-island Transmission System.

- In Northern Ireland the connection point is usually at the busbar clamps on the nearest busbar. There is a legacy position and a "new" position in N Ireland. The legacy position was the HV side of the transformer but this changed to the busbar clamps. The stations can be identified specifically by their connection arrangement and availability clarified on a set by set basis. Where the nearest busbar is tail-fed from the meshed transmission system, all equipment (including feeders) between the busbar clamps at tail fed station and the busbar clamps at the meshed transmission system are included in the definition of connections assets.

- In Ireland the connection point is normally at the Generator Transformer High Voltage Bushings. The connection assets refer to all equipment between the High Voltage Bushings of the transformer and the busbar disconnects at the meshed transmission.

3.2 Definitions of Availability in the Grid Code and in the Trading and Settlement Code

Under the Grid Code in Ireland the definition of Availability is:

"At any given time the measure of Active Power a Generation Unit(s) is capable of delivering to the Connection Point and the term "Availabilities" shall be construed accordingly. This can be calculated as a gross figure. In terms of a Demand Side Unit the measure at any given time of the Demand Reduction the Demand Side Unit is capable of delivering to the Connection Point."

Under the Grid Code in Northern Ireland the definition of Availability is:

“In respect of any period (and, in the case of a PPA CDGU, in relation to a Designated Fuel and, in the case of a CDGU other than a PPA CDGU, in relation to a fuel), shall mean:

(a) for any CDGU, Controllable WFPS or Dispatchable WFPS the figure (expressed in MW as at the Connection Point and at the direct connection with the Distribution System) stated in accordance with SDC1.4.1.1(a) to be the capability of the CDGU, Controllable WFPS or Dispatchable WFPS to generate electricity during that period. In relation to all CDGUs including an Open Cycle Gas Turbine CDGU and/or a CCGT Installation, the Availability declared by a Generator shall correspond to the maximum generation of electricity which that Generator’s CDGU can achieve during that period. In relation to all CDGUs, the Availability declared by a Generator shall correspond to the level of generation of electricity up to and including the Contracted Capacity (for PPA CDGUs other than PPA Open Cycle Gas Turbines) or Contracted Capacity (Peak) (for PPA Open Cycle Gas Turbines) or Registered Capacity (for non-PPA plant) which that CDGU can achieve during that period;

(b) for Demand Side Units, the Demand Side Unit MW Capacity (expressed in MW as at the Connection Point and at the direct connection with the Distribution System) stated in accordance with SDC1.4.1.1(a) to be the capability of the Demand Side Unit to reduce Demand during that period;

(c) for Aggregated Generating Units, the aggregated figures (expressed in MW as at the Connection Points of each individual Aggregated Generating Unit) stated in accordance with SDC1.4.1.1(a) to be the capability of the Aggregated Generating Units as a whole to generate electricity during that period;

(d) for an Interconnector, the figure (expressed in MW at Auchencrosh) stated in accordance with SDC1.4.1.1(a) to be the capability of the Interconnector to export or import electricity.

"Available" shall be construed accordingly.

<u>The Trading and Settlement Code definition of Outturn Availability is:</u>

“Means the set of Availability data for a Generator Unit provided for a previous Trading Day submitted in accordance with paragraph 4.48.”

<u>Section 4.48 states:</u>

“Each System Operator shall submit to the Market Operator the Generator Unit Technical Characteristics, consisting of Outturn Minimum Stable Generation, Outturn Availability and Outturn Minimum Output, in respect of each Generator Unit, which is Dispatchable, registered within its Currency Zone, for the previous Trading Day, in accordance with Appendix K “Market Data Transactions”. In the case of a Dual Rated Generator Unit, the

Outturn Availability submitted to the Market Operator shall include declarations for Primary and Secondary Fuel Types, the Primary Fuel Type Outturn Availability and Secondary Fuel Type Outturn Availability respectively. In addition, a Rating Flag shall be submitted to denote whether a Dual Rated Generator Unit is operating using its Primary or Secondary Fuel Type".

3.3 How Capacity and Constraint Payments are made

All capacity and constraint payments are made through SEM. The TSOs do not make any payments directly to a Generator for capacity or constraint reasons. SEMO facilitates capacity & constraint payments in accordance with the Trading and Settlement Code on the basis of Dispatch Instruction and Outturn Availability records supplied by the TSOs to SEMO. All constraint costs payable to units that have a non-zero Outturn Availability are ultimately paid for by consumers.

How Availability Records are Produced for Non-Wind Units

All centrally dispatched non-wind units make availability declarations to the TSO via EDIL (Electronic Dispatch Instruction Logger). The declarations state the maximum and minimum output the Generator can export to the transmission system. Declarations may be accepted or rejected by the TSO in consultation with the Generator taking account of all factors affecting the unit in question. A declaration can be entered in EDIL by either the Generator or the System Operator. All declarations entered by the Generator must be accepted or rejected by the System Operator. Availability records from EDIL are sent to the market for settlement on a daily basis.

How Availability Records are Produced for Wind Units

Availability records for participating non-autonomous Wind Units are constructed using the Available Active Power signal sent from the wind farm to the TSO SCADA system.

SEM-O Calculations of Capacity and Constraint Payments for Wind

Variable Price Taker Wind Units are assumed to be generating at their maximum available capacity unless there is a dispatch instruction record from the TSO to the windfarm dispatching it down. A Variable Price Taker Wind Unit's maximum capacity value is provided by the Generator to the TSOs in the form of an Availability Signal via SCADA in accordance with the requirements of the Grid Codes in Ireland and Northern Ireland. This value is in turn converted by the TSOs into a time weighted average for each trading period and submitted by the TSOs to SEM-O in accordance with the requirements of the Trading and Settlement Code. If a TSO instruction exists the market payments to the Generator are based on the maximum of the availability signal and the metered output. If a windfarm is generating 0MW and there is no dispatch instruction from a TSO to do so, the unit receives

no capacity or constraint payments. Autonomous units are paid availability payments based on metered output and do not receive constraint payments for any reason.

3.4 Generation and Tranmission Outage Scheduling Processes

Obligation to carry out maintenance

EirGrid has a statutory obligation to ensure the maintenance of the transmission system is carried out. EirGrid fulfils its obligations through the preparation of Maintenance Policies and Standards and their implementation through the arrangements set out in the Infrastructure Agreement, a regulated Agreement entered into under Regulation 18 of SI 445 (2000). In N Ireland these obligations are fulfilled by NIE the asset owner.

Generation Outage Scheduling Process

All Generators on the island of Ireland are bound by the EirGrid or SONI Grid Code and must comply with the relevant provisions of the Generator Outage Scheduling Process. Under this process an all-island transmission outage plan is developed by EirGrid and SONI taking account of all relevant information supplied by all Generators. The Committed Outage Plan (COP) for Year 1 is agreed with each Generator and finalised by September of year 0. EirGrid and SONI base the transmission outage plan for Year 1 on the Committed Outage Plan. EirGrid, SONI or the Generator may seek changes to the COP at any time following September of Year 0. In determining whether a change is possible EirGrid and SONI take account of the impact of the change on the transmission outage plan and on the efficient operation of the all-island transmission system as well as on security of supply.

Interaction between Generation and Transmission Outage Scheduling Processes

The transmission outage scheduling process is not covered by the Grid Code. The TSOs are responsible for producing the transmission outage plans. The outages plans reflect the timing and duration of outages requested by the TAO and other parties. All outages are scheduled in such a way as to ensure power system security remains within standards, the amount of work completed is maximised and the overall program is economically efficient. The TSOs attempt to schedule all transmission outage works due to take place on any Connection Assets to coincide with planned outages of the associated Generator units.

Developments in Transmission Outage Scheduling

This process of aligning Transmission and Generation outages has become increasingly difficult in recent years for a number of reasons:

1 The design of the transmission system has become more complex, often resulting in Connection Assets being shared by several parties. Where this occurs

it can be very difficult to align a single transmission outage with the plans of several different Generators.

2 Conventional Generator outages plans used to be very predictable as they were based on specific periodic cycles. Generators are now tending to take outages based on run-hours and run-hours have become a lot less predictable with the increase in variable generation on the system. This can result in Generators changing their outage plans after the Committed Outage Plan has been issued.

3 Wind Farms do not normally schedule outages of the entire wind farm at the same time. Usually turbines are maintained one at a time and as a result wind farms are not required to be part of the Generation Outage Scheduling Process. The TSOs do not normally have visibility of the outages of individual turbines on a site in either the operational planning or real time operation timelines.

The TSOs manage these difficulties through continuous communication with the Generators and TAOs. When the Transmission Outage Plan (TOP) is finalised all Generators are notified of any transmission outages that involve their Connection Assets. If a Generator who has participated in the Generator Outage Planning process requests a subsequent change to their Generation Unit outage plan, the associated transmission outage will be changed to match the new dates if possible and if doing so does not adversely impact the secure operation of the transmission system or other Generators who have not moved their outage. If alignment between a Generator Outage and the associated Connection Assets cannot be achieved in Year 1, and the associated transmission plant is considered to be in good working order, EirGrid and SONI (along with NIE) will investigate if any routine maintenance can be moved by up to one year from the required maintenance cycle to optimise the coordination between transmission and generation outage planning processes.

3.5 Connection Charges and On-Going Service Charges

When a Generator connects to the system the connection arrangement and the security of that arrangement is based on the charge the generator is willing to pay. In many cases the resulting arrangement is based on the Least Cost Technically Acceptable Chargeable connection and an on-going service charge. No provision is made in these charges for any constraint costs that may arise during outages of these connections. The Generator pays Transmission Use of System (TUoS) charges for access to the meshed transmission system up the limit of their Maximum Export Capacity. In effect they are paying for the meshed transmission system to be there and maintained so that they can export to the Single Electricity Market and reach customers. All Users of the system share these costs as the meshed transmission system is there for the benefit of all Users.

3.6 Firmness Regimes

On the island of Ireland a shallow transmission connection policy exists. In Ireland the concept of Firm and Non-Firm exists in relation to the access a Generation Unit has to the meshed transmission system. In essence Generators that are fully Firm are held whole for any restriction on the meshed transmission system that limits the output of their unit and consequently the ability of the unit to export to the Single Electricity Market and reach customers. In Northern Ireland proposals are under development for the introduction of a similar firmness regime.

3.7 International Comparisons

A summary of the equivalent processes applied by TSOs in France, Spain and the UK is provided in Appendix 1. The practice in each country is different and includes

- No compensation paid for any outages
- Compensation paid for any overrun of outages outside of a specified target/policy.
- Compensation paid at Market Price for some part of the outage
- Refunds on TNUOS for outages

There does not appear to be a consistent approach taken across these companies.

4 Principles Underlying Calculation of Outturn Availability

EirGrid and SONI invite comments on the following considerations and options presented for the calculation of Outturn Availability. This section is split into two parts. Part 1 deals with calculation of outturn availability for outages of the connection assets. Part 2 deals with the calculation of outturn availability in circumstances other than during outages of the connection assets. For the avoidance of doubt this paper does not address the situation where the generator cannot export power for reasons under their control, in this situation the Outturn Availability is always 0.

Part 1: Outages of the Connection assets:

Outages of connection assets can occur for a range of reasons including outages for maintenance, fault repair, or proximity work; outages to facilitate development of the transmission system or enhancement of the connection assets; outages for system tests and outages for the connection or removal of other assets. In all cases a decision has to be made as to whether the outturn availability should be 0MW or should be the value that the Generator could export to the meshed transmission system if the outage did not take place (i.e. the unit's technical availability). This decision should be based on a number of factors including what party is driving the outage requirement, who owns the assets in question, who paid for the assets and the associated level of security of the connection, who controls the duration of the outage, what options exist for mitigating the impact, likelihood and duration of the outage and who controls these options. It may be correct to have different treatment depending on the driver of the outage. In considering the options outlined in section 4.4 the following summary of reasons for outages may be of use:

Forced Outages

Connection Assets can be forced out of service due to an actual technical failure or fault or a perceived threat of immediate failure. Plant forced outages can arise due to external factors e.g. a cable being dug up, environmental factors (lightening), human factors (human error) or plant failure. The duration of a forced outage is dependent on the nature of the fault, the availability of spare parts and the availability of resources to affect the repair. There are arguments for and against determining the Outturn Availability to be 0MW during forced outages. On one hand, the Generator can mitigate the risk of this arising by paying for enhanced connections to the meshed transmission system. On the other hand the circumstances giving rise to the forced outage are generally outside of the control of the Generator and the System Operator and are part of the normal risk of owning and operating a power system and in determining the transmission network to be built it is within the remit of the TSO to determine how to balance network costs and constraint costs..

Maintenance Outages

EirGrid TSOs and NIE (TAO) have statutory obligations to maintain the transmission system. Maintenance outage durations vary with asset type, for example cable maintenance generally takes longer than overhead line maintenance. During routine scheduled maintenance of Connection Assets the associated Generator(s) may be technically available but unable to export to the meshed transmission system. There are arguments for and against determining the Outturn Availability to be 0 during transmission maintenance. The Generator could argue that it has no direct control over the timing, duration or cycle of maintenance carried out by the TSO or TAO and therefore may feel that they ought not to "lose out" during such work. On the other hand the connection assets exist solely for the benefit of the Generator and as such other users of the system should not be burdened by the indirect costs associated with maintaining these assets. The TUoS paid by generators does not contribute towards the cost of constraints. The TSOs seek to align maintenance outages of the connection assets with the Generator outages and where such outages can be aligned there is a societal benefit and the appropriate incentives ought to be in place to do so. If a Generator subsequently changes the timing of their outage this is under the Generator's control and where the TSO is unable to alter the transmission outage plan to meet the new dates requested the Generator may choose to move their outage or keep it in the original slot based on their assessment of what is in their best interest. Where a Generator reduced their connection charges by connecting two or more units to a single connection point it may not be possible to align the maintenance outages with the Generator outages as the Generator rarely takes multiple units down for maintenance simultaneously.

Temporary Connection Outages

In Ireland a temporary connection exists when a Generator has been connected to the system before all Shallow Connection works have been completed (as set out in the Connection Agreement). For example, if a Generator is due to connect at 220kV but connects to a 110kV node whilst the 220kV node is being constructed this would be a temporary connection. Similarly, if a Generator connects to an existing station before the associated control and protection works are completed, this would be a temporary connection. Such connections will usually require further outages to complete the works associated with the final connection method. Three separate outages are likely to be required to:

- Install the temporary connection,
- Remove the temporary connection, and
- Commission the final connection.

There are arguments for and against determining the Outturn Availability to be 0 during such outages. On the one hand the decision to connect on a temporary basis is taken by the Generator in order to connect early and get the benefits of participating in the SEM early hence other Users should not bear the increased costs of this decision. On the other hand the timing and duration of the outages required to connect, complete or remove the Generator are under the TAO/TSO control and not under the Generators control.

Outages for System Development and System Testing

There are many other reasons why connection assets may be switched out by the system operator. These include, but are not limited to:

- Outages for transmission development works such as busbar and line uprates, protection upgrades etc.;
- Outages to connect new transmission plant including new generation (not addressed above) or demand customers; and
- Outages for Power System Restoration Tests or other System Operator tests.

There are arguments for and against determining the Outturn Availability to be 0 during such outages. On the one hand where a Generator has elected for a single connection to the transmission system it should accept the risk that there will be outages required of that connection from time to time for a variety of reasons. On the other hand the in each of these cases the Generator impacted by the outage is effectively another User of the meshed transmission system and the outage is being used to carry out work for the benefit of other Users and not solely the Generator. In such circumstances all Users of the meshed transmission system should share the costs associated with the work and no one party should suffer disproportionately.

In considering some of the options for calculating outturn availability a number of principles need to be established initially.

4.1 Relevance of asset ownership in outages of connection assets.

As noted in section 3.1 the asset ownership boundary in Ireland and Northern Ireland is often different. In Ireland the Transmission Asset Owner usually owns, and is responsible for the maintenance, development and fault repair of all equipment upwards of, the high voltage bushings of the transformer. In Northern Ireland there are also some connection arrangements of this nature but with more recent connections the Generator usually owns, and is responsible for the maintenance, development and fault repair of, all equipment between the high voltage bushings of the transformer and the connecting busbar / breaker. Hence, in Northern Ireland if a fault develops on the cubicle connecting the Generator transformer to the busbar the Generator is responsible for the repair of this fault and the outturn availability is 0MW until the repair is completed. In Ireland and Northern Ireland, where the TAO is responsible for the fault repair traditionally the outturn availability of the Generator has been set to the technical availability of the Generation Unit in these circumstances.

It is proposed that for the purposes of calculating outturn availability relating to outages of assets the principles developed arising from this consultation only apply where the TAO is the owner of the connection assets in question. Customers cannot be held accountable to compensate a generator for the unavailability of its own assets. A Generator would be

treated as unavailable for any outages of assets that it owns. Effectively this means that a Generator connected in Ireland may be held whole for outages between the Generator transformer high voltage cubicle and the busbar whereas a Generator in Northern Ireland would not be held whole. We invite comments on this proposal and suggestions regarding any alternatives that may exist.

4.2 Customer Preferred Connection Method

In Ireland Generation customers can request to connect to the system in a way that is different from the basis of their connection offer. For example, a Generator may request a cable connection where an overhead line was originally provided for in their connection offer. Such connections may have outage requirements in excess of those associated with the TSO build option (for example the standard maintenance durations for the maintenance of cable connections are longer than overhead lines (length depending)). Where a User requests a Customer Preferred Connection method that can lead to increased maintenance and fault repair outages the question arises as to which parties should bear the risk of the longer outages associated with such a connection. We invite comments on whether Customer Preferred Connection Methods should be considered when applying the principles developed arising from this consultation.

4.3 Non-Firm or Partially-Firm Units

Generation units are allowed to connect to the system in advance of the associated deep reinforcements being completed. This allows the Generators to participate in SEM however they do not receive constraint payments for any output in excess of their Firm Access Quantity if they are dispatched down or off by the TSO. This principle is intended to reflect the reality that the meshed transmission system may not be able to take the output of the unit at all times until the Deep Reinforcement Works are completed. A decision is required as to whether this principle should extend to outages of the connection assets themselves i.e. if a Generator is to have a non-0MW outturn availability for outages of the connection assets should non-firm units be entitled to constraints payments during these outages? We invite comments on whether firmness should be considered in the calculation of constraint payments under the circumstances outlined in this consultation.

4.4 Option 1: Outturn availability is set to 0MW for all outages

Proposal: In all cases the generation unit's outturn availability is set to 0MW reflecting the fact that in general connections are not provided to a level of security or redundancy consistent with the security required to grant firm access to the system more generally (e.g. an n-1 contingency in respect of 'deep' reinforcements).

Rationale: Any User wishing to connect to the transmission system has the option to connect with differing levels of security. A tail fed connection is cheaper however it is

inherently less secure than a looped connection and does not provide the type of security required to grant firm access to the system more generally. This is also true when connecting multiple units to a single cubicle either via a three winding Generator transformer or by connecting two Generator transformers in parallel onto a single high voltage cubicle. Where a User elects to pay for a lower level of security afforded by a tail or multi-unit connection then this party should bear the risk of the associated lower level of security. Generators are given priority access to the outage planning process by getting their maintenance slot booked in advance of the transmission outage planning process commencing. If the Generator subsequently changes the timing of its outage and the TSO is unable to alter the transmission outage plan to meet the new dates requested then the decision to move the Generator's own outage is under the Generator's control and any associated costs should not be borne by other system users.

4.4 Option 2: Outturn availability is set to the technical availability of the generation unit for all outages

Proposal: In all cases a generation unit's outturn availability is determined solely by the ability of the generation unit to generate power and not by the ability of the unit to export that power to the meshed transmission system.

Rationale: In general the Generator does not control the connection assets and cannot take actions to reduce outage durations. Furthermore whilst the Generator has a high level of control over the timing of its own outages, it has no control over the timing of the transmission outages and therefore cannot take any measures to mitigate the risk an outage poses. From a cost perspective where outturn availability is set to 0 this removes the capacity of the unit from the SEM unconstrained market schedule and can drive an increase in SMP which exceeds any reduction in constraint costs and hence all Users may in effect be worse off. If the constraint costs associated with a single connection to a Generator are expected to exceed to cost of a second connection then the system operator should make the investment decision to build a second connection as part of the overall economic development of the transmission system and all Users would benefit accordingly.

4.4 Option 3: Outturn availability is set to 0 for a subset of outages

Proposal: Under this option the outturn availability would be set to 0MW for the standard duration of the given maintenance or forced outage and would be set to the technical availability of the generation unit for the remainder of the outage duration should it exceed the standard duration (standard durations would be published). Outturn availability would be set to 0MW for any outage associated with the connection, alteration, maintenance, repair or removal of a temporary connection. For all other outages outturn availability would be set to the technical availability of the generation unit.

Rationale: This proposal is aimed at sharing the risks of outages resulting in a unit not being able to export to the meshed transmission system and the associated financial consequences between consumers and Generators. The costs of long outages can be prohibitive relative to the annual income of a Generator but less so when looked at relative to total system constraint costs. Whilst Users of the system should not bear increased costs associated with the investment decision made by a Generator on the level of security associated with its connection nor should the Generator be exposed to an unlimited risk of a prolonged outage due to circumstances outside their control. For temporary connections the decision to connect on a temporary basis was taken by the Generator in order to connect early and get the benefits of participating in the SEM early and other Users should not bear any of the risks or costs associated with this decision.

Part 2 Calculation of Outturn Availability where there is no outage of the connection assets:

Following the completion of this consultation process a document will be published which outlines occasions where a Generator's outturn availability does not equate to the Generators Availability as defined under the Grid Code. For completeness it is important that all situations where this may arise are considered as part of this consultation and not just those circumstances associated with outages. The following two circumstances may arise. Comments are invited on both situations.

4.5 Availability Exceeds Maximum Export Capacity

When a Generator applies to connect to the meshed transmission system they request a Maximum Export Capacity (MEC). MEC is used to determine the Connection Method and Connection Costs, it forms the basis of Transmission Use of System (TUoS) charges and is used by the System Operators in optimising the development of the transmission system. Where a Generator installs capacity in excess of the MEC then a decision is required as to whether Outturn Availability is capped at MEC or not. We invite comments on whether Outturn Availability should be capped at MEC or not.

4.6 De-Energisation of a unit under the Grid Code or Connection Agreement

A Generator can be disconnected from the system for reasons arising from an investigation into a breach of the Grid Code, or as a result of actions taken under the terms of their Connection Agreement. We invite comments on whether Outturn Availability should be set to 0MW in this scenario or not.

5 Next Steps

Response to consultation:

Views and comments are invited regarding all aspects of this document. Responses should be sent to info@eirgrid.com and enquiries@soni.ltd.uk by 31st October 2012.

It would be appreciated if comments are clearly aligned with the sections and sub sections of this consultation paper to which they relate. In addition respondents are asked to consider the following questions in their response:

1. Do you agree with the TSOs preferred option set out in this paper? If not, please set out your reasons why.
2. Are there other proposals which have not been considered above which may provide alternative transparent and non-discriminatory options that balance the risks apportioned to TUoS customers and Generators fairly.
3. Do you consider that this document sufficiently captures all scenarios where Outturn Availability may differ from Mechanical Availability? If not, please outline additional scenarios and your view on how these should be treated
4. Where do respondents believe the risk associated with the costs of forced outages of the transmission system should lie?
5. Do respondents believe that Generators who pay for a higher level of security in their connection (e.g. to be looped as opposed to tail fed) should be treated differently than those who do not pay for this?

On completion of the consultation period the TSOs shall submit a summary of the consultation responses to the Regulatory Authorities (RAs) alongside a proposal on the optimum process and shall discuss the proposal with the RAs before publishing a final position.

Appendix 1 – Responses to Queries on International Experience

SPAIN

1. Do REE pay compensation for lost profit to Generators during outages of the Grid connection?
   REE doesn't pay any compensation for lost profit to generators during outages of the Grid connection. However, in the case that a generator would have to reduce or stop its production due to an unforeseen outage which entails a loss of the evacuation power capacity to the generator, the scheduled energy in the generator will be reduced as if it would be required to solve a technical constraint in real time. Thus the production's reduction of the generator due to the unforeseen outage is not treated as a program deviation (the deviation costs are paid by whoever is deviated) whereas the generator cannot participate in the intraday market to change its scheduled energy.

2. Do you treat conventional and wind generators the same?
   Yes, conventional and wind generators are treated the same. Except when a wind power curtailment is order by REE (they received a 15% of the program they would have produced).

3. If you do pay compensation do you differentiate between maintenance outages and forced outages or outages for new connections/network upgrades?
   According to the answer to the first question there is not pay compensation for outages, even though the imbalance of the generator is corrected in case of an unforeseen outage.
   REE takes a lot of care coordinating the transmission network (TN) scheduled outages with the generators maintenance schedules. REE carries out a "yearly maintenance schedule" which it is monthly and weekly updated, for that REE received the generators maintenance schedules in advance.

4. Where is the ownership boundary? In EirGrid the ownership boundary is at the HV bushings of the Grid Connected Generator Transformer. Thus maintenance of the transformer HV cubicle is our responsibility and under our control – how does this work in REE?
   REE is the only Spanish TSO and owns the TN so REE is responsible for the maintenance and control of its ownership. In general speaking, the TN is composed by 400 kV and 220 kV in the peninsula, in the islands this voltage lowers to 60 kV. The generator step up transformers are not part of the TN (the frontier TN/G is located in the high voltage side isolator). Too 400 kV / xxx kV and 220 kV/ xx kV are not part of the TN, with some exceptions in the 400 kV/ 132 kV transformers. The frontier TN/DT or /L is located in the higher voltage side isolator.

FRANCE

- The consequences of planned unavailability are borne by the generator up to 5 days over 3 years; beyond these 5 days, they are borne by the TSO.
- The consequences of forced unavailability of the connection to grid are borne by the generator.
- For your information, the consequences of forced unavailability of some element of the upstream grid (but not the link directly connecting the generator to the grid) are borne by the TSO.
- At the moment, RTE does not compensate onshore generators in case of unavailability of the connection to the main grid.

UK

Detailed information available at
http://www.nationalgrid.com/NR/rdonlyres/F861C1DE-3B86-4379-B88B-33145374EF02/52004/Comparisonofcompensationmechanismsv2.pdf

Essentially payments comprise either a 'refund' of the User's connection tariff (Transmission Network Use of System or TNUoS charge) or a market indexed price (MIP) for the time of disconnection depending upon whether the disconnection was planned or forced respectively.

These payments will apply unless the User has specific provisions within their bilateral connection agreement. For example, if the connection is of non-standard technical design there will be outage conditions (set out in the agreement) for which National Grid will not have to pay.

Ownership boundary

The ownership boundary is generally at the busbar clamp of the 400kV or 275kV busbars. Any failure of the gen transformer, gen breaker or busbar disconnectors is down to the generator.

In Scotland things are a bit different and the ownership boundary is often at the substation fence. The Scottish TO does work on its assets affecting the generator when it is out of service. If the TO's work overruns or the TO needs to take its equipment out of service for an emergency, because the plant is detailed in the Bilateral connection Agreement, no compensation is payable. In many of these cases in Scotland, it is of course the same company for example SHETL doing work on generator connections that allows SSE generation onto the system.

Payments:

Interruption as a result of an unplanned outage (e.g. a trip)

This is an interruption with little or no notice caused by an issue/fault on the transmission system. If an interruption meets eligibility criteria (as detailed in the CUSC) compensation is payable under the arrangements set out in the CUSC. Similar to an emergency deenergisation, the compensation depends on the duration of loss of access:

a) Initial 24 hours: Market Indexed Price Impacted MW (for relevant settlement period)

b) For each day or part day the interruption continues, after the initial 24 hours, is compensated by a refund of the higher of actual or average TNUoS charges.

Interruption as a result of a planned outage

A planned outage is one notified by 16:00, day ahead. If loss of access is due to a planned National Grid outage then the compensation is payable as shown below:

The higher of the actual TNUoS rate of an affected user or the average system TNUoS tariff is calculated. This £/MW/day rate is then multiplied by the MW arrived at by deducting from the Transmission Entry Capacity for the site, the sum of the Connection Entry Capacity of the unaffected BM Units