| MODIFICATION PROPOSAL FORM | | | |
|---|---|---|---|
| **Proposer** *(Company)* | **Date of receipt** *(assigned by Secretariat)* | **Type of Proposal** *(delete as appropriate)* | **Modification Proposal ID** *(assigned by Secretariat)* |
| **EirGrid** | **8th October 2020** | **Provisional** | **Mod_13_19 v2** |

| Contact Details for Modification Proposal Originator | | |
|---|---|---|
| **Name** | **Telephone number** | **Email address** |
| **Niamh Delaney** | | **niamh.delaney@eirgrid.com** |

| Modification Proposal Title |
|---|
| **Payment for Energy Consumption in SEM for non-energy Services Dispatch** |

| **Documents affected** *(delete as appropriate)* | **Section(s) Affected** | **Version number of T&SC or AP used in Drafting** |
|---|---|---|
| **T&SC Part A/Part B/Part C**<br>**Appendices Part A/Part B**<br>**Glossary Part A/Part B/Part C**<br>**Agreed Procedures Part A/Part B** | | |

**Explanation of Proposed Change**
*(mandatory by originator)*

A number of important system services are procured through the DS3 System Services Regulated Arrangements. These include reserves across varying timeframes, inertial response, ramping services and reactive power. Such services help the TSOs to maintain a secure and reliable power system, particularly as the level of installed renewable generation on the power system increases.
While payment for system services is handled through the DS3 System Services Arrangements, there are occasions when the TSOs will need to dispatch on a generator (or other unit) to provide non-energy services. For example, a generator with the capability of operating in synchronous compensation mode or a wind farm capable of providing reactive power at 0MW will consume energy when operating in those modes. However such modes of operation are not currently accounted for in SEM.
The TSOs propose that such modes of operation should be modelled in SEM, that non-energy dispatch instructions should be profiled and accounted for as uninstructed imbalances.

A specific example of the potential application of this in relation to synchronous compensation is given below:

Maintaining voltage on the transmission system is critical to ensuring the stability of power flows. Generators (or other devices) either generate or absorb “reactive power” to maintain system voltage.
Particular requirements for voltage support are often locational. The provision of reactive power as a service is currently remunerated for contracted units through the DS3 System Services Regulated Arrangements.
Voltage support may be provided in various ways. Some units, such as Coolkeeragh GT8 generation unit in Northern Ireland, have the capability to provide voltage support in synchronous compensation mode. When in this mode, the unit effectively runs as a synchronous motor on no load to generate or absorb reactive power, helping to maintain a constant grid voltage at all levels of demand.
When running in synchronous compensation mode, the unit consumes energy and therefore has an associated running cost. This synchronous compensation mode of operation is not modelled in the energy market.
The unit does receive upside through higher payments via its DS3 System Services volumes for Steady State Reactive Power (SSRP) and Synchronous Inertial Response (SIR), but they are not sufficient to cover the increased running cost associated with being in synchronous compensation mode.

SONI currently has an out-of-market Synchronous Compensation Service Contract with Coolkeeragh GT8 as there is currently a specific locational voltage support requirement in the north west. There is no payment rate associated with the service. The unit receives pass through costs only.

The TSOs are proposing that synchronous compensation capability (and other non-energy dispatch actions) should be modelled in SEM and that the means of doing so be explored.
For example a unit capable of operating in synchronous compensation mode could be treated as a conventional dispatchable generator unit instructed to go into synch comp mode. The dispatch instructions to the unit could be profiled such that if dispatched to consume in the energy market the unit pays for its consumption, whereas if dispatched for non-energy actions (such as the provision of reactive power in a particular mode), their energy consumption is allocated to imperfections. The exact means by which non-energy dispatch actions could be modelled is open for further discussion.

Note on Version 2:

Following extensive discussion within the TSOs and a conference call with industry on July 21st 2020, four possible solutions were identified and explored, of which two (noted below) were agreed as warranting further discussion. The proposed legal drafting below relates to Solution 4, proposed by William Carr, which would be a faster to implement, if not perfect solution.

- **Solution 1: Ideal solution**
  - Create a new dispatch instruction whereby a unit could be instructed to a negative generation level, to consume energy while providing a reactive power service
  - Profile DI in the instruction profiler and allocate energy consumed to imperfections

- **Solution 4: Unit as part of a TSSU**
  - Proposed in the context of windfarms – could also be applied to other units
  - Energy being drawn while the unit is providing reactive power at 0MW could be treated as negative generation
  - Unit could be reassigned to be part of a TSSU (rather than an ASU)
  - A flag could be sent to settlement to denote the period where the unit has been instructed to provide reactive power at 0MW

**Legal Drafting Change**

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

## Under Section F of TSC Part B

### F2 Data Sources, Conventions and Definitions

F.2.8 System Services Provider

F.2.8.1 Each System Operator shall submit to the Market Operator, in accordance with the Settlement Calendar, in respect of each Trading Site Supplier Unit which is registered in a Trading Site with a System Service Providing Unit contracted with the respective System Operator under the DS3 System Services Arrangements to provide system services at zero MW exported energy, a flag representing the imbalance settlement periods where the System Services Providing Unit is dispatched so as to provide system services to the System Operator.

F.2.8.2 Each System Operator shall submit the flag referred to in F.2.8.1 in accordance with the Appendix K "Other Market Data Transaction" based on the settlement of the respective System Service Providing Unit under the DS3 System Services Arrangements.

F2.8.3 The Market Operator shall derive the binary value of the System Service Provider

Flag ($SSPF_{v\gamma}$) for each Trading Site Supplier Unit, v, which is on Trading Site, s, in each Imbalance Settlement Period, γ.

Imbalance Component Charges
F.5.3.2

The Market Operator shall calculate the Imbalance Component Payment or Charge ($CIMB_{v\gamma}$) for each Supplier Unit, v, in Imbalance Settlement Period, γ, as follows:

$$if (SSPFvy = 0, then$$

$$CIMB_{v\gamma} = PIMB_{\gamma} \times (QMLF_{v\gamma} - QEX_{v\gamma})$$

$$else$$

$$CIMB_{v\gamma} = 0)$$

where:

(a) $SSPF_{v\gamma}$ is the System Service Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

~~(a)~~(b) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

~~(b)~~(c) $QMLF_{v\gamma}$ is the Loss-Adjusted Metered Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ; and

~~(c)~~(d) $QEX_{v\gamma}$ is the Ex-Ante Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ.

Imperfection Charges

F.12.2.3

The Market Operator shall calculate the Imperfections Charge ($CIMP_{v\gamma}$) for each Trading Site Supplier Unit, v, in each Imbalance Settlement Period, γ, as follows:

$$if (SSPFvy = 0 \; then$$

$$CIMP_{v\gamma} =, Min\left(\sum_{u \in s} QMLF_{u\gamma} + \sum_{v \in s} QMLF_{v\gamma}, 0\right) \times PIMP_{y} \times FCIMP_{\gamma}$$

$$else$$

$$CIMP_{v\gamma} = 0$$

where:

(e) $SSPF_{v\gamma}$ is the System Service Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

~~(d)~~(f) $PIMP_{y}$ is the Imperfections Price for Year, y;

~~(e)~~(g) $QMLF_{v\gamma}$ is the Loss-Adjusted Metered Quantity for Supplier Unit, v, in

Imbalance Settlement Period, γ;

~~(f)~~(h) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

~~(g)~~(i) $\sum_{u \in s}$ is a summation over all Generator Units, u, in Trading Site, s, relevant to the Trading Site Supplier Unit;

~~(h)~~(j) $\sum_{v \in s}$ is the value for the single Trading Site Supplier Unit, v, in Trading Site, s, in accordance with paragraph B.9.1.2; and

~~(i)~~(k) $FCIMP_{\gamma}$ is the Imperfections Charge Factor for Imbalance Settlement Period, γ.

Capacity Charges

F.19.2.2

The Market Operator shall calculate the Capacity Charge ($CCC_{v\gamma}$) for each Supplier Unit, v, which is a Trading Site Supplier Unit, in each Imbalance Settlement Period, γ, as follows:

$$if\,(SSPFvy = 0\ then$$

$$CCC_{v\gamma} = Min\left(\sum_{u \in s} QMLF_{u\gamma} + \sum_{v \in s} QMLF_{v\gamma}, 0\right) \times FQMCC_{\gamma} \times PCCSUP_{y}$$

$$else$$

$$CCC_{v\gamma} = 0$$

where:

(l) $SSPF_{v\gamma}$ is the System Service Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

~~(j)~~(m) $QMLF_{v\gamma}$ is the Loss-Adjusted Metered Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ;

~~(k)~~(n) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

~~(l)~~(o) $PCCSUP_{y}$ is the Supplier Capacity Charge Price in Capacity Year, y;

~~(m)~~(p) $FQMCC_{\gamma}$ is the Capacity Charge Metered Quantity Factor in Imbalance Settlement Period, γ;

~~(n)~~(q) $\sum_{u \in s}$ means the value for all Generator Units, u, in Trading Site, s, relevant to the Trading Site Supplier Unit; and

~~(o)~~(r) $\sum_{v \in s}$ means the value for the single Trading Site Supplier Unit, v, in Trading Site, s, in accordance with paragraph B.9.1.2.

Difference Payment Socialisation Charge

F19.4.2

The Market Operator shall calculate the Difference Payment Socialisation Charge

($CSOCDIFFP_{vγ}$) for each Supplier Unit, v, which is a Trading Site Supplier Unit, in each Imbalance Settlement Period, γ, as follows:

$$if\,(SSPFvy = 0\ then$$

$$CSOCDIFFP_{vγ} = Min\left(\sum_{u \in s} QMLF_{uγ} + \sum_{v \in s} QMLF_{vγ}, 0\right) \times FQMCC_{γ} \times PCCSUP_{y} \times FSOCDIFFP_{y}$$

$$else$$

$$CSOCDIFFP_{vγ} = 0$$

where:

(a) $SSPF_{vγ}$ is the System Service Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

~~(p)~~(b) $QMLF_{vγ}$ is the Loss-Adjusted Metered Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ;

~~(q)~~(c) $QMLF_{uγ}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

~~(r)~~(d) $PCCSUP_{y}$ is the Supplier Capacity Charge Price in Capacity Year, y;

~~(s)~~(e) $FQMCC_{γ}$ is the Capacity Charge Metered Quantity Factor in Imbalance Settlement Period, γ;

~~(t)~~(f) $\sum_{u \in s}$ is a summation over all Generator Units, u, in Trading Site, s, relevant to the Trading Site Supplier Unit;

~~(u)~~(g) $\sum_{v \in s}$ is the value for the single Trading Site Supplier Unit, v, in Trading Site, s, in accordance with paragraph B.9.1.2; and

~~(v)~~(h) $FSOCDIFFP_{y}$ is the Difference Payment Socialisation Multiplier in Capacity Year, y.

Imbalance Difference Quantity

F20.3.2

The Market Operator shall calculate the Imbalance Difference Quantity ($QDIFFPIMB_{vγ}$) for each Trading Site Supplier Unit, v, in each Imbalance Settlement Period, γ, as follows:

$$if\,(SSPFvy = 0\ then$$

$$QDIFFPIMB_{vγ} = Min\left(\sum_{u \in s} QMLF_{uγ} + \sum_{v \in s} QMLF_{vγ}, 0\right)$$

$$else$$

$$QDIFFPIMB_{vγ} = 0$$

where:

(a) $SSPF_{v\gamma}$ is the System Service Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

~~(w)~~(b) $\sum_{u \in s}$ is a summation over all Generator Units, u, in Trading Site, s, relevant to the Trading Site Supplier Unit;

~~(x)~~(c) $\sum_{v \in s}$ is the value for the single Trading Site Supplier Unit, v, in Trading Site, s, in accordance with paragraph B.9.1.2;

~~(y)~~(d) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit u in Imbalance Settlement Period γ; and

~~(z)~~(e) $QMLF_{v\gamma}$ is the Loss-Adjusted Metered Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ.

## Under TSC Part B Glossary

| | |
|---|---|
| DS3 System Services Arrangements | means, the contractual framework in place between each System Operator and System Service Providing Unit governing the provision of and remuneration for system services required by each System Operator to maintain the secure and reliable operation of the system. |
| System Services Provider Flag | means, a binary value derived by the Market Operator indicating whether a System Service Providing Unit was operating to provide system services in a given imbalance settlement period. |
| System Services Providing Unit | means, an apparatus or group of apparatus connected to the Transmission System or Distribution System that are contracted to provide system services to their respective System Operator. |

## Under TSC Part B Appendix K: Other Market Data Transactions

### DATA TRANSACTIONS

A.1.1.3 The Data Transactions in this Appendix K include:

**Data Transactions from System Operator to Market Operator**

(a) System Parameters (FCLAF)

…

(r) System Services Provider Flag

**Data Transactions from Interconnector Administrator to Market Operator**

(b) Interconnector Capacity Market Availability

**System Services Provider Flag Data Transaction**

A.1.1.27 The Data Records for the System Service Provider Flag Data Transaction are

described in Table 3 and the Submission Protocol in Table 4.

**Table 16 –System Services Provider Flag Data Records**

| |
|---|
| Jurisdiction |
| Trading Site Unit |
| Trading Day |
| Imbalance Settlement Period |
| System Service Provider Flag Value |

**Table 27 –System Services Provider Flag Data Submission Protocol**

| | |
|---|---|
| Sender | System Operator(s) |
| Recipient | Market Operator |
| Frequency of Data Transactions | As Available |
| First Submission time | As available |
| Last Submission time | As available |
| Permitted frequency of resubmission prior to last submission time | Unlimited |
| Required resubmission subsequent to last submission time | None |
| Valid Communication Channels | Type 1 (manual) |
| Process for data validation | None |

**Interconnector Capacity Market Availability Data Transaction**

~~A.1.1.27~~A.1.1.51 The Data Records for the Interconnector Capacity Market Availability Data Transaction are described in Table 3 and the Submission Protocol in Table 49.

**Table 38 – Interconnector Capacity Market Availability Data Transaction Data Records: Average values per Imbalance Settlement Period**

| |
|---|
| Interconnector |
| Trading Day |
| Imbalance Settlement Period |
| Maximum Import Capacity Market Availability ($qCMAMAXI_{Iy}$) |
| Maximum Export Capacity Market Availability |

**Table 49 – Interconnector Capacity Market Availability Data Transaction Submission Protocol**

| | |
|---|---|
| Sender | Interconnector Administrator |
| Recipient | Market Operator |
| Number of Data Transactions | One containing:<br>Maximum Import Capacity Market Availability and Maximum Export Capacity Market Availability for each Imbalance Settlement Period in the relevant Trading Day for the relevant Interconnector. |
| Frequency of Data Transactions | Daily and as updated |
| First Submission time | As available |
| Last Submission time | Unlimited, prior to Imbalance Settlement Calculation |
| Permitted frequency of resubmission prior to last submission time | Unlimited |
| Required resubmission subsequent to last submission time | In the event of a change in the magnitude of Capacity Market Availability in either direction, resubmission is possible prior to Imbalance Settlement Calculation or as required to resolve a Settlement Query or a Dispute where the Data Records in the Transaction are discovered to be in error. |
| Valid Communication Channels | Type 3 (computer to computer) |

| | |
|---|---|
| Process for data validation | None |

**Modification Proposal Justification**
*(Clearly state the reason for the Modification)*

Some units in the SEM currently have modes such as synchronous compensation capability which are not currently modelled in the energy market. Such capability can be very useful to the system operator in maintaining voltage stability but, for example, as a unit in sync comp mode consumes energy, energy costs must be remunerated. The current workaround of out-of-market standalone contracts lacks transparency. As synchronous compensation capability contributes to voltage stability, which is an important element of system reliability, the SO is of the opinion that integrating the mode into the energy market would allow it to be used in the most optimum way and deliver the most value to the consumer. The same principle also applies to other units which may have the capability of being dispatched to provide services critical to power system operation and consume energy in order to enact this service provision.

**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)*

This proposal aims to further Code Objectives

1.3.5 "*to provide transparency in the operation of the Single Electricity Market";*

by dealing with synchronous compensation mode payments transparently through the balancing market rather than through out-of-market mechanisms.

and

1.3. 7 *"to promote the short-term and long-term interests of consumers of electricity on the island of Ireland*

*with respect to price, quality, reliability, and security of supply of electricity."*

as provision of adequate voltage support is essential to the reliability of the power system.

**Implication of not implementing the Modification Proposal**
*(State the possible outcomes should the Modification Proposal not be implemented)*

Failure to implement the proposal will necessitate continued out-of-market contracts and associated energy payments to account for synchronous compensation mode and other non-energy services. Where there is no payment rate associated with dispatching a unit into a particular mode to provide a service, running a tender for it is problematic. It would greatly increase transparency if unit dispatch for non-energy services were accounted for within the SEM.

| **Working Group**<br>*(State if Working Group considered necessary to develop proposal)* | **Impacts**<br>*(Indicate the impacts on systems, resources, processes and/or procedures; also indicate impacts on any other Market Code such as Capacity Marker Code, Grid Code, Exchange Rules etc.)* |
|---|---|

| | |
|---|---|
| | Potential system and process impacts include EDIL,<br><br>MMS, CSB and TSO processes. |
| ***Please return this form to Secretariat by email to*** balancingmodifications@sem-o.com | |

## Notes on completing Modification Proposal Form:

1. **If a person submits a Modification Proposal on behalf of another person, that person who proposes the material of the change should be identified on the Modification Proposal Form as the Modification Proposal Originator.**
2. **Any person raising a Modification Proposal shall ensure that their proposal is clear and substantiated with the appropriate detail including the way in which it furthers the Code Objectives to enable it to be fully considered by the Modifications Committee.**
3. **Each Modification Proposal will include a draft text of the proposed Modification to the Code unless, if raising a Provisional Modification Proposal whereby legal drafting text is not imperative.**
4. **For the purposes of this Modification Proposal Form, the following terms shall have the following meanings:**

| | |
|---|---|
| **Agreed Procedure(s):** | **means the detailed procedures to be followed by Parties in performing their obligations and functions under the Code as listed in either Part A or Part B Appendix D "List of Agreed Procedures". The Proposer will need to specify whether the Agreed Procedure to modify refers to Part A, Part B or both.** |
| **T&SC / Code:** | **means the Trading and Settlement Code for the Single Electricity Market. The Proposer will also need to specify whether all Part A, Part B, Part C of the Code or a subset of these, are affected by the proposed Modification;** |
| **Modification Proposal:** | **means the proposal to modify the Code as set out in the attached form** |
| **Derivative Work:** | **means any text or work which incorporates or contains all or part of the Modification Proposal or any adaptation, abridgement, expansion or other modification of the Modification Proposal** |

**The terms "Market Operator", "Modifications Committee" and "Regulatory Authorities" shall have the meanings assigned to those terms in the Code.**

**In consideration for the right to submit, and have the Modification Proposal assessed in accordance with the terms of Section 2 of Part A or Chapter B of Part B of the Code (and Part A Agreed Procedure 12 or Part B Agreed Procedure 12) , which I have read and understand, I agree as follows:**

1. **I hereby grant a worldwide, perpetual, royalty-free, non-exclusive licence:**

   1.1 **to the Market Operator and the Regulatory Authorities to publish and/or distribute the Modification Proposal for free and unrestricted access;**

   1.2 **to the Regulatory Authorities, the Modifications Committee and each member of the Modifications Committee to amend, adapt, combine, abridge, expand or otherwise modify the Modification Proposal at their sole discretion for the purpose of developing the Modification Proposal in accordance with the Code;**

   1.3 **to the Market Operator and the Regulatory Authorities to incorporate the Modification Proposal into the Code;**

   1.4 **to all Parties to the Code and the Regulatory Authorities to use, reproduce and distribute the Modification Proposal, whether as part of the Code or otherwise, for any purpose arising out of or in connection with the Code.**

2. **The licences set out in clause 1 shall equally apply to any Derivative Works.**

3. **I hereby waive in favour of the Parties to the Code and the Regulatory Authorities any and all moral rights I may have arising out of or in connection with the Modification Proposal or any Derivative Works.**

4. **I hereby warrant that, except where expressly indicated otherwise, I am the owner of the copyright and any other intellectual property and proprietary rights in the Modification Proposal and, where not the owner, I have the requisite permissions to grant the rights set out in this form.**

5. **I hereby acknowledge that the Modification Proposal may be rejected by the Modifications Committee and/or the Regulatory Authorities and that there is no guarantee that my Modification Proposal will be incorporated into the Code.**