MODIFICATION PROPOSAL FORM			
Proposer *(Company)*	**Date of receipt** *(assigned by Secretariat)*	**Type of Proposal** *(delete as appropriate)*	**Modification Proposal ID** *(assigned by Secretariat)*
EirGrid	**10th March 2025**	**Standard**	**Mod_01_25 v3**

Contact Details for Modification Proposal Originator		
Name	**Telephone number**	**Email address**
Elaine Corcoran		

Modification Proposal Title
Synchronous Condensers SDP_06

Documents affected *(delete as appropriate)*	**Section(s) Affected**	**Version number of T&SC or Agreed Procedure used in Drafting**
T&SC **Appendices** **Glossary**	**T&SC:** B.7.2.2, B.9.6.1, B.9.6.2, D.4.2.11A, D.4.2.12, D.4.2.15, D.4.3.4, D.4.4.1, D.7.1.4, F.2.8.1, F.2.8.2, F.2.8.3, F.2.8.4, F.2.8.5, F.5.3.2, F.12.2.3, F.19.2.2, F.19.4.2, F.20.3.2 **Appendix I:** Table 1, Table 2, paragraph 15 **Appendix K:** paragraph 2, paragraph 25A, Table 35A **Appendix O:** paragraph 6 **Glossary**: Definitions and List of Variables and Parameters	**V30 + Mod_02_24 (SDP_02 Battery Integration V3)**

Explanation of Proposed Change
(mandatory by originator)

The integration of synchronous condensers is a crucial step in enabling Ireland's transition towards achieving 80% renewable electricity (RES-E) and 95% System Non-Synchronous Penetration (SNSP) by 2030. Synchronous condensers play a vital role in ensuring system stability by providing inertia, reactive power control, as well as addressing short circuits.

The current market and scheduling framework does not accommodate the unique characteristics of synchronous condensers, leading to inefficiencies in scheduling and dispatch of these units. Initiative 6 of the Scheduling & Dispatch Programme (SDP_06) seeks to address these issues by introducing a structured approached to the registration and data submission of synchronous condensers within the Trading and Settlement Code (TSC) and establishing optimal scheduling and dispatch mechanisms for synchronous condensers to ensure they meet applicable system service requirements.

Synchronous condensers are not accounted for in the TSC at present, meaning multiple workarounds are in place to accommodate current operational synchronous condensers. At present, synchronous condensers are modelled as multi-fuel generator units in the Market Management System (MMS), which does not support negative dispatch instruction for such units, nor does it allow units to be considered "ON" at 0MW. To work around this limitation, synchronous condensers are issued a 1MW dispatch instruction, which is unreflective of their unique operational characteristics. Additionally, synchronous condensers are capable of submitting non-zero Commercial Offer Data (COD) such as Start Up Costs, No Load Costs and Incremental and Decremental Price/Quantity Pairs in the Balancing Market. These non-zero costs can force scheduling / dispatch outcomes that may not be optimal.

This modification introduces changes to the TSC, which can be summarised as follows:

- 'Synchronous Condenser Units' is defined in the TSC Glossary. The definition of 'Generator Unit' and 'Fuel Type' have also been updated.
- Registration criteria for Synchronous Condenser Units has been defined in TSC Chapter B.
- Physical Notifications (PNs) for Synchronous Condenser Units shall be zero.
- The following elements of Commercial Offer Data (COD) shall be zero:
    - Start Up Costs
    - No Load Costs
    - Incremental and Decremental Price/Quantity pairs
- Synchronous Condenser Units shall submit Technical Offer Data (TOD) that is relevant to Synchronous Condenser Units. The applicable fields will be defined in TSC Appendix I – Offer Data.
- Instruction Profiling will not be performed for Synchronous Condenser Units.
- Dispatch Quantity data will not be calculated for Synchronous Condenser Units.

The application of Mod_13_19 will remain, meaning that units providing system services at 0MW (including synchronous condensers) will not incur charges for their energy consumption while providing these services.

The changes between Version 1 (V1) to Version 2 (V2) of the modification proposal are highlighted below:

- Synchronous Condenser Units will not be entirely excluded from submitting Commercial Offer Data (COD), and will submit their Forecast Availability Profile, Forecast Minimum Output Profile and Forecast Minimum Stable Generation Profile. This data is necessary for scheduling purposes.
- Appendix I – An additional column has been added to *Table 1 – Commercial Offer Data Elements*, titled "Synchronous Condenser Unit". This column will reflect the elements of COD to be submitted by Synchronous Condenser Units, as listed above.
- Appendix I – Synchronous Condensers will submit three additional elements of TOD outlined in *Table 2 – Technical Offer Data Elements*. These are Start Up Time (Hot, Warm and Cold).
- All references to 'DS3 System Services' have been changed to 'System Services' throughout the TSC, Appendix, and Glossary since the 'DS3 System Services Flag' will continue to be used for System Services Providing Units, and it is recognised that the terminology could be rendered obsolete in the future.

The changes between Version 2 (V2) and Version 3 (V3) of the modification proposal are highlighted below:

- Clarifications to Forecast Availability Profile, Forecast Minimum Output Profile and Forecast Minimum Stable Generation Profile in D.4.2.11A, D.4.2.12, D.4.2.15 respectively.
- Clarification to the definition of "Synchronisation" in the Glossary.

Note: Changes to ensure optimal scheduling and dispatch mechanisms for synchronous condensers will be required as part of SDP_06 but will not form part of the TSC modification.

Implementing this modification will establish a structured framework for synchronous condensers within the TSC and eliminate the workarounds in place for their registration, scheduling and dispatch. SDP_06 will provide a scalable solution that can accommodate more synchronous condensers as they become operational in Ireland and Northern Ireland. By formalising these changes, SDP_06 will provide an improved and more efficient solution for the stable integration of synchronous condensers into Ireland's evolving energy market.

Legal Drafting Change

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

From the Code:

B. LEGAL AND GOVERNANCE

B.7.2 Participation Notices

B.7.2.2 A Party (or Applicant, as applicable) shall, in a Participation Notice in respect of a Generator Unit, specify if the Unit is:

(a) a Wind Power Unit;

(b) an Energy Limited Generator Unit;

(c) a Pumped Storage Unit;

(d) a Battery Storage Unit;

(e) a Demand Side Unit;

(f) an Aggregated Generator Unit;

(g) a Trading Unit;

(h) an Assetless Unit;

(i) a Dual Rated Generator Unit; ~~or~~

(j) a Solar Power Unit; or

(k) a Synchronous Condenser Unit.

B.9.6.1 For each Synchronous Condenser Unit, a Party (or Applicant as applicable) shall register as part of a single Trading Site in accordance with this section B.9:

(a) the Synchronous Condenser Unit or Units;

(b) a single Supplier Unit which is a Trading Site Supplier Unit; and

(c) no other Unit.

B.9.6.2 Any Trading Site with a Synchronous Condenser Unit must meet and continue to meet the following criteria:

(a) the Trading Site shall have the technical and operational capability to deliver agreed System Services in response to Dispatch Instructions from the relevant System Operator in accordance with the relevant Grid Code; and

(b) the Demand Site shall have appropriate equipment to permit real-time monitoring of delivery by the relevant System Operator.

D. BALANCING MARKET DATA SUBMISSION

D.4.2.11A A Participant shall ensure that values of the Forecast Availability Profile submitted in respect of Synchronous Condenser Units, as part of Commercial Offer Data, shall be equal to zero in each relevant Imbalance Settlement Period.

D.4.2.12 A Participant shall ensure that values of the Forecast Minimum Output Profile submitted in respect of Pumped Storage Units, ~~or~~ Battery Storage Units or Synchronous Condenser Units, as part of Commercial Offer Data, shall be equal to the expected pumping capability for that Pumped Storage Unit, ~~or~~ storage capability for that Battery Storage Unit or Demand for that Synchronous Condenser Unit (as the case may be) in each relevant Imbalance Settlement Period.

D.4.2.15 A Participant shall ensure that values of the Forecast Minimum Stable Generation Profile submitted in respect of Battery Storage Units and Synchronous Condenser Units, as part of Commercial Offer Data, shall be equal to zero.

D.4.3 Start Up Costs and No Load Costs

D.4.3.4 In respect of a Synchronous Condenser Unit, No Load Cost, Cold Start Up Cost, Warm Start Up Cost and Hot Start Up Cost components of Complex Bid Offer Data, including Default Data shall be zero.

D.4.4 Incremental and Decremental Price Quantity Pairs

D.4.4.1 A Participant submitting Commercial Offer Data in respect of a Generator Unit, u, which is not a Synchronous Condenser Unit:

(a) shall include a set of Incremental Price Quantity Pairs; and
(b) shall include a set of Decremental Price Quantity Pairs.

D.7.1 Physical Notification Data Format

D.7.1.4 Participants shall ensure that all Physical Notification Data submitted in respect of a Generator Unit are consistent with the Technical Offer Data for that Generator Unit, except for Synchronous Condenser Units where Physical Notification Data shall be 0 in all circumstances.

F. CALCULATION OF PAYMENTS AND CHARGES

F.2.8 ~~DS3~~ System Services Provider

F.2.8.1. Subject to F.2.8.3, 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 ~~DS3~~ System Service Providing Unit contracted with the respective System Operator under the ~~DS3~~ System Services Arrangements to provide ~~DS3~~ System Services at zero MW exported energy, a flag with a value of 1 for each imbalance settlement periods where the ~~DS3~~ System Services Providing Unit is dispatched to provide ~~DS3~~ 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 ~~DS3~~ System Services Providing Unit under the ~~DS3~~ System Service Arrangements.

F.2.8.3. The System Operators shall not submit the flag referred to in F.2.8.1 for any Trading Site Supplier Unit, v, which is on a Trading Site, s, where a Demand Side Unit or any Autoproducer Unit is also registered to that Trading Site.

F.2.8.4. The Market Operator shall derive the binary value of the ~~DS3~~ System Services Provider Flag (SSPFvy) for each Trading Site Supplier Unit, v, which is on the Trading Site, s, in each Imbalance Settlement Period, y, in accordance with F.2.8.5.

F.2.8.5. The Market Operator shall set the ~~DS3~~ System Services Provider Flag (SSPFvγ) to zero unless a value of one has been submitted by the System Operator for a Trading Site Supplier Unit, v, which is on Trading Site, s, in imbalance Settlement Period, γ, in accordance with F.2.8.1.

F.5.3 Calculation of Imbalance Component Payments and 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:

$\text{if } (SSPFvy = 0, \text{then}$

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

$Else$

$CIMB\,v\gamma = 0)$

where:

(a) $SSPF_{v\gamma}$ is the ~~DS3~~ System Service Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

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

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

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

F.12.2 Calculation of Imperfections 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:

(a) $SSPF_{v\gamma}$ is the ~~DS3~~ System Services Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

(b) $PIMP_{y}$ is the Imperfections Price for Year, y;

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

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

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

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

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

F.19.2 Calculation of 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:

(a) $SSPF_{v\gamma}$ is the ~~DS3~~ System Services Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

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

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

(d) $PCCSUP_y$ is the Supplier Capacity Charge Price in Capacity Year, y;

(e) $FQMCC_\gamma$ is the Capacity Charge Metered Quantity Factor in Imbalance Settlement Period, γ;

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

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

F.19.4 Calculation of Difference Payment Socialisation Charges

F.19.4.2 The Market Operator shall calculate the Difference Payment Socialisation Charge ($CSOCDIFFP_{v\gamma}$) for each Supplier Unit, v, which is a Trading Site Supplier Unit, in each Imbalance Settlement Period, γ, as follows:

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

$$CSOCDIFFP_{v\gamma} = Min\left(\sum_{u \in s} QMLF_{u\gamma} + \sum_{v \in s} QMLF_{v\gamma}, 0\right) \times FQMCC_\gamma \times PCCSUP_y \times FSOCDIFFP_y$$

$$else$$

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

where:

(a) $SSPF_{v\gamma}$ is the ~~DS3~~ System Services Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

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

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

(d) $PCCSUP_y$ is the Supplier Capacity Charge Price in Capacity Year, y;

(e) $FQMCC_\gamma$ is the Capacity Charge Metered Quantity Factor in Imbalance Settlement Period, γ;

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

(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

(h) $FSOCDIFFP_y$ is the Difference Payment Socialisation Multiplier in Capacity Year, y.

F.20.3 Calculation of Imbalance Difference Quantities and Payments

F.20.3.2 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) $SSPF_{vγ}$ is the ~~DS3~~ System Services Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

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

(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;

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

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

From Appendices:

APPENDIX I : OFFER DATA

COMMERCIAL OFFER DATA

Commercial Offer Data for Generator Units

5. A Participant shall only submit Commercial Offer Data to the Market Operator in respect of its Generator Units, as provided for in **Error! Not a valid bookmark self-reference.**.

Table 1 – Commercial Offer Data Elements

Data Element	**Energy Limited Unit**	**Demand Side Unit**	**Synchronous Condenser Unit**	**Other Generator Units not included in paragraph** Error! Reference source not found. **of this Appendix**
Simple Incremental Price Quantity Pairs (MW quantities and € / MWh or £ / MWh prices)	Yes	Yes		Yes
Simple Decremental Price Quantity Pairs (MW quantities and € / MWh or £ / MWh prices)	Yes	Yes		Yes
Complex Incremental Price Quantity Pairs (MW quantities and € / MWh or £/MWh prices)	Yes	Yes		Yes
Complex Decremental Price Quantity Pairs (MW quantities and € / MWh or £ / MWh prices)	Yes	Yes		Yes
No Load Costs (€ / hr or £ / hr)	Yes			Yes
Start Up Costs (€ or £)	Yes			Yes
Shut Down Cost (€ or £)		Yes		
Energy Limit (MWh)	Yes			
Forecast Availability Profile (MW)	Yes	Yes	Yes	Yes
Forecast Minimum Output Profile (MW)	Yes	Yes	Yes	Yes
Forecast Minimum Stable Generation Profile (MW)	Yes	Yes	Yes	Yes

TECHNICAL OFFER DATA

Technical Offer Data for Generator Units

12. A Participant shall only submit Technical Offer Data to the Market Operator in respect of its Generator Units as provided for in **Error! Reference source not found.**.

Table 2 – Technical Offer Data Elements

	TYPE OF DATA		SUBMISSION REQUIREMENT BY UNIT				
	Validation Technical Offer Data	**Validation Registration Data**	**Battery Storage Unit**	**Pumped Storage Unit**	**Demand Side Unit**	**Synchronous Condenser Unit**	**Other Generator Units not included in paragraph Error! Reference source not found. of this Appendix**
Minimum On Time (hours)	Yes		Yes	Yes		Yes	Yes
Minimum Off Time (hours)	Yes		Yes	Yes		Yes	Yes
Maximum On Time (hours)	Yes		Yes	Yes		Yes	Yes
Synchronous Start Up Time Hot (hours)	Yes		Yes	Yes		Yes	Yes
Synchronous Start Up Time Warm (hours)	Yes		Yes	Yes		Yes	Yes
Synchronous Start Up Time Cold (hours)	Yes		Yes	Yes		Yes	Yes
Block Load Cold (MW)	Yes		Yes	Yes			Yes
Block Load Hot (MW)	Yes		Yes	Yes			Yes

Block Load Warm (MW)	Yes		Yes	Yes			Yes
Deload Break Point (MW)	Yes		Yes	Yes			Yes
Deloading Rate 1 (MW / minute)	Yes		Yes	Yes			Yes
Deloading Rate 2 (MW / minute)	Yes		Yes	Yes			Yes
Dwell Time Up 1 (minutes)	Yes		Yes	Yes			Yes
Dwell Time Up 2 (minutes)	Yes		Yes	Yes			Yes
Dwell Time Up 3 (minutes)	Yes		Yes	Yes			Yes
Dwell Time Down 1 (minutes)	Yes		Yes	Yes			Yes
Dwell Time Down 2 (minutes)	Yes		Yes	Yes			Yes
Dwell Time Down 3 (minutes)	Yes		Yes	Yes			Yes
Dwell Time Up Trigger Point 1 (MW)	Yes		Yes	Yes			Yes
Dwell Time Up Trigger Point 2 (MW)	Yes		Yes	Yes			Yes
Dwell Time Up Trigger Point 3 (MW)	Yes		Yes	Yes			Yes

Dwell Time Down Trigger Point 1 (MW)	Yes		Yes	Yes			Yes
Dwell Time Down Trigger Point 2 (MW)	Yes		Yes	Yes			Yes
Dwell Time Down Trigger Point 3 (MW)	Yes		Yes	Yes			Yes
End Point of Start Up Period (MW)	Yes		Yes	Yes			Yes
Load Up Break Point Cold 1 (MW)	Yes		Yes	Yes			Yes
Load Up Break Point Cold 2 (MW)	Yes		Yes	Yes			Yes
Load Up Break Point Hot 1 (MW)	Yes		Yes	Yes			Yes
Load Up Break Point Hot 2 (MW)	Yes		Yes	Yes			Yes
Load Up Break Point Warm 1 (MW)	Yes		Yes	Yes			Yes
Load Up Break Point Warm 2 (MW)	Yes		Yes	Yes			Yes
Loading Rate Cold 1 (MW / minute)	Yes		Yes	Yes			Yes
Loading Rate Cold 2 (MW / minute)	Yes		Yes	Yes			Yes

Loading Rate Cold 3 (MW / minute)	Yes		Yes	Yes			Yes
Loading Rate Hot 1 (MW / minute)	Yes		Yes	Yes			Yes
Loading Rate Hot 2 (MW / minute)	Yes		Yes	Yes			Yes
Loading Rate Hot 3 (MW / minute)	Yes		Yes	Yes			Yes
Loading Rate Warm 1 (MW / minute)	Yes		Yes	Yes			Yes
Loading Rate Warm 2 (MW / minute)	Yes		Yes	Yes			Yes
Loading Rate Warm 3 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Down Break Point 1 (MW)	Yes		Yes	Yes			Yes
Ramp Down Break Point 2 (MW)	Yes		Yes	Yes			Yes
Ramp Down Break Point 3 (MW)	Yes		Yes	Yes			Yes
Ramp Down Break Point 4 (MW)	Yes		Yes	Yes			Yes
Ramp Down Rate 1 (MW / minute)	Yes		Yes	Yes		Yes	Yes

Ramp Down Rate 2 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Down Rate 3 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Down Rate 4 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Down Rate 5 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Up Break Point 1 (MW)	Yes		Yes	Yes			Yes
Ramp Up Break Point 2 (MW)	Yes		Yes	Yes			Yes
Ramp Up Break Point 3 (MW)	Yes		Yes	Yes			Yes
Ramp Up Break Point 4 (MW)	Yes		Yes	Yes			Yes
Ramp Up Rate 1 (MW / minute)	Yes		Yes	Yes		Yes	Yes
Ramp Up Rate 2 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Up Rate 3 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Up Rate 4 (MW / minute)	Yes		Yes	Yes			Yes
Ramp Up Rate 5 (MW / minute)	Yes		Yes	Yes			Yes

Soak Time Cold 1 (minutes)	Yes		Yes	Yes			Yes
Soak Time Cold 2 (minutes)	Yes		Yes	Yes			Yes
Soak Time Trigger Point Cold 1 (MW)	Yes		Yes	Yes			Yes
Soak Time Trigger Point Cold 2 (MW)	Yes		Yes	Yes			Yes
Soak Time Hot 1 (minutes)	Yes		Yes	Yes			Yes
Soak Time Hot 2 (minutes)	Yes		Yes	Yes			Yes
Soak Time Trigger Point Hot 1 (MW)	Yes		Yes	Yes			Yes
Soak Time Trigger Point Hot 2 (MW)	Yes		Yes	Yes			Yes
Soak Time Warm 1 (minutes)	Yes		Yes	Yes			Yes
Soak Time Warm 2 (minutes)	Yes		Yes	Yes			Yes
Soak Time Trigger Point Warm 1 (MW)	Yes		Yes	Yes			Yes
Soak Time Trigger Point Warm 2 (MW)	Yes		Yes	Yes			Yes
Start of Restricted Range 1 (MW)	Yes		Yes	Yes		Yes	Yes

End of Restricted Range 1 (MW)	Yes		Yes	Yes		Yes	Yes
Start of Restricted Range 2 (MW)	Yes		Yes	Yes			Yes
End of Restricted Range 2 (MW)	Yes		Yes	Yes			Yes
Hot Cooling Boundary (hours)	Yes		Yes	Yes			Yes
Warm Cooling Boundary (hours)	Yes		Yes	Yes			Yes
Block Load Flag (True or False)	Yes		Yes	Yes		Yes	Yes
Short-Term Maximisation Capability (MW)	Yes		Yes	Yes			Yes
Short-Term Maximisation Time (minutes)	Yes		Yes	Yes			Yes
Registered Minimum Stable Generation (MW)	Yes		Yes	Yes		Yes	Yes
Registered Minimum Output (MW)		Yes	Yes	Yes		Yes	Yes
Pumped Storage Cycle Efficiency (percentage)	Yes			Yes			

Battery Storage Efficiency (percentage)	Yes		Yes				
Pumping Capacity (MW)	Yes			Yes			
Off to Generating Time (minutes)	Yes			Yes			
Off to Spin Pump Time (minutes)	Yes			Yes			
Spin Pump to Pumping Energy Time (minutes)	Yes			Yes			
Battery Storage Capacity (MW)	Yes		Yes				
Minimum Battery Storage Quantity (MWh)		Yes	Yes				
Maximum Battery Storage Quantity (MWh)		Yes	Yes				
Maximum Storage Quantity (MWh)		Yes		Yes			
Minimum Storage Quantity (MWh)		Yes		Yes			

Maximum Ramp Down Rate (MW / minute)	Yes				Yes		
Maximum Ramp Up Rate (MW / minute)	Yes				Yes		
Minimum Down Time (hours)	Yes				Yes		
Maximum Down Time (hours)	Yes				Yes		

PHYSICAL NOTIFICATION DATA

Physical Notification Data Submission

15. Participants shall not submit Physical Notification Data in respect of each of the following Generator Units:

(a) Trading Unit;
(b) Assetless Unit;
(c) Interconnector Residual Capacity Unit; ~~or~~
(d) Interconnector Error Unit; or
(e) Synchronous Condenser Unit.

APPENDIX K: OTHER MARKET DATA TRANSACTIONS

DATA TRANSACTIONS

2. The Data Transactions in this Appendix K include:

Data Transactions from System Operator to Market Operator

(a) System Parameters (FCLAF)
(b) Loss Adjustment Factors (FTLAF and FDLAF)
(c) Generator Unit Technical Characteristics
(d) Short Term Reserves (qSTR and qORR)
(e) System Operator Flags (FSO, FNM and FSS)
(f) Demand Control (QDC)
(g) System Characteristics (FRQAVG and FRQNOR)
(h) Dispatch Instructions

(i) SO Interconnector Trades

(j) SO Interconnector Physical Notifications

(k) Annual Load Forecast

(l) Four Day Load Forecast

(m) Wind and Solar Power Unit Forecast

(n) Uninstructed Imbalance Parameters (FPUG, FDOG, FUREG, TOLMW, TOLENG)

(o) Testing Tariffs

(p) Strike Price Parameters (PCARBON, PFUELNG and PFUELO)

(p2) ~~DS3~~ System Services Provider Flag

Data Transactions from Interconnector Administrator to Market Operator

(q) Interconnector Capacity Market Availability

~~DS3~~ System Services Provider Flag Data Transaction

25A The Data Records for the ~~DS3~~ System Services Provider Flag Data Transaction are described in Table 35A and the Submission Protocol in Table 35B.

Table 35A – System Services Provider Flag Data Records

Jurisdiction
Trading Site Unit
Trading Day
Imbalance Settlement Period
~~DS3~~ System Services Provider Flag Value

APPENDIX O: INSTRUCTION PROFILING CALCULATIONS

6. Instruction Profiling shall not be performed for Generator Units which are not Dispatchable and not Controllable, Assetless Units, ~~or~~ Interconnector Residual Capacity Units or Synchronous Condenser Units, and the values of Dispatch Quantity for these Generator Units, where applicable, shall be calculated as set out in section F.2.4.

From Glossary:

DEFINITIONS

~~DS3~~ System Service Arrangements	means, the contractual framework in place between each System Operator and ~~DS3~~ System Services Providing Unit governing the provision of and remuneration for ~~DS3~~ System Services required by each System Operator to maintain the secure and reliable operation of the system.
~~DS3~~ System Services	means the services essential to the proper functioning of the power system as defined in the ~~DS3~~ System Services Arrangements.
~~DS3~~ System Services Provider Flag	means, a binary value derived by the Market Operator for a Trading Site Supplier Unit indicating whether a ~~DS3~~ System Services Providing Unit registered to that site was operating to provide ~~DS3~~ System Services while at zero MW exported energy in a given imbalance settlement period.
~~DS3~~ System Services Providing Unit	means, an apparatus or group of apparatus connected to the Transmission System or Distribution System that are contracted to provide ~~DS3~~ System Services to their respective System Operator.
Fuel Type	means the fuel or fuels registered in accordance with the Grid Code as the principal fuel(s) authorised for energy production by the Generator Unit except for Synchronous Condenser Units where the Fuel Type will be set to 'SYNCHRONOUS_CONDENSER'.
Generator Unit	means one or more Generators, other item of Dispatchable plant or a notional unit registered as a Generator Unit under this Code. For the purposes of the Code a Generator Unit may be any one of the following types: (a) physical: Aggregated Generator Unit, Demand Side Unit, Energy Limited Generator Unit, Hydro-electric Generator Unit, Pumped Storage Unit, Battery Storage Unit, Trading Unit, Wind Power Unit, Solar Power Unit, ~~or~~ Dual Rated Generator Unit or a Synchronous Condenser Unit; (b) notional: Assetless Unit, which includes a unit registered by a SEM NEMO or a Shipping Agent under section B.8, an Interconnector Error Unit or Interconnector Residual Capacity Unit.
Synchronous Condenser Unit	A Dispatchable apparatus that provides System Services only, as agreed with the System Operator.
Synchronisation	means the process where a Generator Unit or Interconnector is preparing to connect ~~and produce energy on~~ to the system to which it is Connected in accordance with a Dispatch Instruction as appropriate, so that the frequencies, voltage levels and phase relationships of that Generator Unit or Interconnector, as the case may be and the system to which it is Connected are aligned. "Desynchronisation", "Synchronised" "Synchronise" and "Desynchronised" will be interpreted accordingly.

LIST OF VARIABLES AND PARAMETERS

Topic:	Element:	Long Name:	Definition/Description:	Units:
Variable	SSPF$_{v\gamma}$	~~DS3~~ System Services Provider Flag	~~DS3~~ System Services Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ	Number

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

These changes will allow the TSOs to accommodate synchronous condensers by establishing a structured framework within the TSC and eliminate the workarounds currently in place for their registration, scheduling and dispatch. SDP_06 will provide a scalable solution that can accommodate more synchronous condensers as they become operational in Ireland and Northern Ireland. By formalising these changes, SDP_06 will provide an improved and more efficient solution for the stable integration of synchronous condensers into Ireland's evolving energy market.

Code Objectives Furthered
(State the Code Objectives the Proposal furthers, see Section A.2.1.4 of Pa of the T&SC for Code Objectives)

The aim of this Modification is to further the following Code objectives:

(a) to facilitate the participation of electricity undertakings engaged in the generation, supply or sale of electricity in the trading arrangements under the Single Electricity Market;

(g) 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.

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

The Scheduling & Dispatch Programme aims to enhance scheduling and dispatch processes in Ireland and Northern Ireland and facilitate low carbon grid technologies such as synchronous condensers. Over the coming years, more synchronous condensers will become operational and if this modification is not implemented, the current limitations and workarounds described for synchronous condenser units will remain in place.

Working Group *(State if Working Group considered necessary to develop proposal)*	**Impacts** *(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.)*
N/A	Impact Assessment on Market System changes to be provided by the vendor.

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.**