Integrated Single Electricity Market (I-SEM)

Balancing Market Principles Code of Practice

SEM-17-049

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COMPLEX BID OFFER DATA IN THE I-SEM BALANCING MARKET[1]

I. INTRODUCTION

1. This Code of Practice is published jointly by the Northern Ireland Authority for Utility Regulation (the Authority) and the Commission for Energy Regulation (the Commission) in accordance with [paragraph 2] of the condition entitled, "Balancing Market Principles Code of Practice", inserted by decision of the Authority dated [#] and of the Commission dated [#] into certain electricity generation and supply licenses.

2. This Code makes provision for the purpose of securing that complex bid offer data reasonably reflect the short run marginal cost of operating the generation set or unit to which they relate, thereby facilitating the efficient operation of the I-SEM Balancing Market by helping to ensure that generators cannot exercise market power in the generation of electricity on the island of Ireland or any part thereof.

3. In accordance with [paragraph 1] of each relevant condition the Licensee must ensure that, in [formulating and submitting offers to the Single Market Operation Business under the Single Electricity Market Trading and Settlement Code] (whether by the Licensee itself or by any person acting on its behalf in relation to a generation set or unit for which the Licensee is the licensed generator), it acts so as to ensure its compliance with this document.

II. APPLICATION OF THIS CODE TO COMPLEX BID OFFER DATA

4. The provisions of this Code of Practice shall apply only to the Commercial Offer Data submitted to the Single Electricity Market Operator in the Balancing Market under the Single Electricity Market Trading and Settlement Code in the form of complex bid offer data, such complex bid offer data consisting of the following components:

   a. a price-quantity component, consisting of up to 10 incremental price-quantity pairs and up to 10 decremental price-quantity pairs (€/MWh or £/MWh);

   b. a start-up costs component (€/start or £/start);

   c. a no load costs component (€/hour or £/hour);

[1] All licence condition and paragraph references included in this Code of Practice refer to the proposed licence modifications published by the CER and UR on the 2nd June 2017.

d. in respect of Demand Side Units, a shutdown costs component (€/shutdown or £/shutdown).

III. COST-REFLECTIVE BIDDING

5. Licensees shall ensure that each of the components of the Commercial Offer Data to which this Code of Practice applies is cost-reflective.

Cost reflectivity of price-quantity component

6. The price-quantity component of such Commercial Offer Data shall be treated as cost-reflective only if, in relation to each relevant generation set or unit, it represents the SRMC curve of that generation set or unit in respect of the Imbalance Settlement Period concerned, calculated in accordance with the following paragraphs.

7. For the purposes of the previous paragraph, the SRMC shall represent the rate of change of the total Eligible Costs of operating the generation set or unit, during the Imbalance Settlement Period concerned, and it shall be measured in €/MWh or £/MWh.

8. For each Relevant Output Level, the SRMC shall be calculated as the change in total Eligible Costs for a 1 MWh change in output relative to that Relevant Output Level. This rate of change shall therefore be calculated as the difference between:

   a. the [total Eligible Costs] attributable to the generation set or unit during the Imbalance Settlement Period at the Relevant Output Level; and

   b. the [total Eligible Costs] attributable to that generation set or unit during that Imbalance Settlement Period at an output level which is either 1MWh lower or higher than the Relevant Output Level.[2]

9. Relevant Output Levels for this purpose shall be determined by the Licensee at representative intervals ranging from the [Minimum Stable Capacity] to the [Maximum Capacity] of the generation set or unit concerned.

10. In accordance with the [Code], the price component of the Commercial Offer Data must be represented as a [set of up to 10 monotonically-increasing price/quantity

[2] If a value 1 MWh *higher* is used, then the rate of change is represented by (b) minus (a). If a value 1 MWh *lower* is used, then the rate of change is represented by (a) minus (b).

pairs], and this stepwise function shall be that which is best representative of the SRMC curve of the set or unit.

11. Each of the Eligible Cost Items applicable to the price-quantity component of Commercial Offer Data shall (or, where expressly permitted, may) be included in the calculation of SRMC. No other cost items, including, but not limited to, potential future foregone revenues, potential future penalties and (in respect of the price-quantity component of offer or bid prices) costs associated with starting up the generation set or unit and no load costs, may be included in that calculation.

Cost reflectivity of start-up cost component

12. The start-up cost component of Commercial Offer Data shall reflect the cost of starting the generation set or unit in three operational states: cold, warm, and hot start. It shall also reflect the costs of starting the set or unit assuming that the generation set or unit is offline, irrespective of whether the generation has acquired ex-ante trading positions in the [Day-Ahead] and [Intraday Markets].

13. Each of the Eligible Cost Items applicable to the start-up component of Commercial Offer Data shall (or, where expressly permitted, may) be included in the calculation of that component. No other cost items may be included in the calculation of that component.

Cost reflectivity of no load costs component

14. The no load costs component of Commercial Offer Data shall reflect the fuel and other costs required to maintain zero net output at synchronous generator speed, calculated in a manner that ensures that the price quantity component submitted by the generation set or unit is monotonically increasing.

15. Each of the Eligible Cost Items applicable to the no load costs component of Commercial Offer Data shall be included in the calculation of that component. No other cost item may be included in the calculation of that component.

IV. ELIGIBLE COST ITEMS

16. The following section sets out the exclusive list of cost items that shall (or, where expressly permitted, may) be included in the calculation of the components of Commercial Offer Data.

Eligible Cost Items in relation to price-quantity component

Incremental Fuel Costs

17. Incremental Fuel Costs include those costs in relation to fuel required to generate an incremental unit of energy (1 MWh), [but not those incurred in preparing the set or unit for generation (starting up) or for operating under no load conditions].

18. Incremental fuel costs shall be calculated in accordance with paragraph [8].

19. The Licensee shall determine its own fuel cost calculation method, including its chosen fuel price index. The Licensee will ensure that its fuel cost calculation method, including its chosen price index, is applied consistently and is consistent with the provisions of this Code of Practice. The Licensee may change its chosen fuel cost calculation method from time to time and shall inform the Regulatory Authority of its decision in advance, including the motivation for any change. If a fuel price index is not applicable to the fuel burned at the plant (for example in the case of specific coal or oil fuels that a plant may use), the Licensee may elect to base its fuel cost calculation method on the replacement cost of fuel.

Incremental VOM Costs

20. VOM Costs that vary with the level of output, including consumables and materials, shall be included in the price component of Commercial Offer Data. Fixed operations and maintenance costs that do not vary with the level of output shall not be included. VOM Costs that vary with hours of operation rather than level of output shall be included in the no-load costs component.

Incremental Fuel Transportation Costs

21. If the fuel cost calculation method referenced in paragraph [19] uses a gas price index that is outside of the Island of Ireland, then the fuel cost calculation may include an element to account for relevant incremental gas transportation costs associated with shipping gas from the outside pricing hub to the relevant wholesale gas pricing point in the Island of Ireland (save to the extent that such index already accounts for such costs), based on published transportation tariffs or, where relevant, the price of gas transportation capacity traded on secondary markets.

22. The incremental exit gas transportation costs, at the point of consumption, that is required for the generation of an additional unit of output, may also be included.

23. The fuel cost calculation for fuels other than gas may include the cost for delivery of fuel to the plant and fuel handling costs incurred within the plant.

Incremental Emissions Costs

24. Incremental emission costs consist of the value of CO2 credits, issued under the Emissions Trading Scheme established by the European Commission, that are required to cover the CO2 emissions resulting from generating an incremental unit of energy (1 MWh).

25. The Licensee shall submit its incremental emissions cost as part of the price component of its Commercial Offer Data. The cost per unit of generation (1 MWh) is calculated as the product of the following two components:

a. *CO2 emission rate (tonnes per unit of generation)*. This may vary by generator unit.

b. *Value of CO2 credits (€ per tonne of CO2* or £ *per tonne of CO2)*. This will be the same across the Single Electricity Market, equal to the Emissions Trading Scheme value.

Decremental Bids and Offers

26. The price-quantity component in respect of decremental bids and offers shall reflect the avoided Eligible Cost Items specified above in respect of incremental offers and shall be calculated using the same principles and methodology as are specified above in respect of such incremental offers.

Eligible Cost Items in relation to start-up costs component

27. Start-up costs shall include the following items to the extent these are directly associated with bringing the generation set or unit from shutdown conditions to the point where it can inject power into the system:

a. *Cost of fuel required for start-up*. The fuel cost element of the start-up costs component shall cover the units of fuel required to start-up the set or unit at the request of the Transmission System Operator. It should use the same calculation method as the incremental fuel costs outlined in paragraph [19] including (if applicable) the same price index, if the start-up fuel is the same

fuel type as that used for incremental production. In the event the start-up fuel, or blend of start-up fuels, is different than the fuel(s) used for incremental production then the provisions of paragraph [19] shall apply separately to the fuel or fuel blend concerned.

b. *VOM costs*. VOM Costs shall cover those directly incurred as a result of a set or unit start-up, including consumables and materials. Fixed operations and maintenance expenses that do not vary with number of starts shall not be included in start-up costs.

c. *Incremental fuel transportation costs.* Fuel transportation costs may be calculated using the same calculation method as the incremental fuel transportation costs outlined in paragraphs [21] to [23].

d. *Related emissions costs*. The value of CO2 credits issued under the Emissions Trading Scheme established by the European Commission multiplied by the number of units of credits required to cover the emissions resulting from the set or unit start-up. The emissions costs shall be calculated using the same parameters set out in paragraphs [24] to [25].

e. *Additional labour costs*. Any additional labour costs above normal staffing conditions incurred in the process of starting-up the generation set or unit. Where the generation unit is contracted to provide availability, no additional labour start-up costs shall be included.

f. *Residual Risk.* In accordance with any approval of the Regulatory Authority given under paragraph [28] but not otherwise, potential future costs resulting from damage to plant and equipment that:

   (i) cannot be mitigated by maintenance and/or insurance; and

   (ii) were not, and could reasonably have been, anticipated in the investment decision for the relevant generation set or unit; and

   (iii) are not attributable to energy actions by the same set or unit in the Day Ahead Market, Intra Day Market or the Balancing Market.

   Such costs must consistently be reflected in the start-up cost component at the level approved by the Regulatory Authority.

28. A Licensee may, in respect of one or more specified generation units, apply to the Regulatory Authority for approval to include as a function of an incremental start-up or a sub-set of start-up categories outlined in paragraph [30] an Eligible Cost Item falling within sub-paragraph [27f]. Any such application shall include:

    a. a statistical or actuarial study validating the level of cost sought to be included; and

    b. a certificate from an officer of the applicant that such costs:

        i. are included in a similar manner for all similar units operated by the Licensee and any of its affiliated companies;

        ii. cannot be mitigated by maintenance and/or insurance;

        iii. were not, and could not reasonably have been, anticipated in the investment decision for the relevant generation set or unit; and

        iv. are not attributable to energy actions by the same set or unit in the Day Ahead Market, Intra Day Market or the Balancing Market.

29. The Regulatory Authority shall issue a reasoned decision approving or refusing the inclusion of such costs. A Licensee holding such an approval may request the Regulatory Authority to revise the level of costs approved for inclusion and the provisions of sub-paragraphs (28a) and (28b) shall apply to any such request.

30. Start-up costs can vary with the time the set or unit has been offline and are categorised into three temperature conditions: hot, warm and cold. Cold start represents starting up after the longest period of being offline, and therefore the longest time and/or highest cost to start-up.

Eligible Cost Items in relation to no load costs component

31. The no load cost shall include, as the starting point, the total fuel cost required to maintain zero net output at synchronous generator speed and shall include the following items:

    a. *Cost of fuel required for no-load.* The fuel cost shall be calculated using the same calculation method as for incremental fuel costs outlined in paragraph [19, including the same price index if applicable.

b. *VOM costs.* VOM costs that vary with the hours of operation but not with level of output, including consumables and materials, shall be included in the no-load component of Commercial Offer Data. Fixed operations and maintenance expenses that do not vary with hours of operation shall not be included in no load costs.

c. *Incremental fuel transportation costs.* No load fuel transportation costs should use the same calculation method as the incremental fuel transportation costs outlined in paragraphs [21] to [23].

d. *Related emissions costs.* The emissions costs shall be calculated using the same parameters set out in paragraphs [24] to [25].

32. This estimated no load cost shall be adjusted if required to ensure that the incremental price-quantity component submitted by the generation set or unit is monotonically increasing. The adjusted price-quantity component should reflect the incremental efficiency of their generation set or unit as accurately as possible, while respecting the constraint that price-quantity component be monotonically increasing.

Eligible Cost Items in relation to shutdown costs component

33. Demand Side Units shall include shutdown costs directly related to the provision of energy through demand response in the [Balancing Market] in the shutdown cost component of their Commercial Offer Data. These shutdown costs shall reflect directly incurred costs associated with the activation of the reduction of electricity consumption during the Imbalance Settlement Period, where such costs do not vary with the volume of electricity demand reduction.

V. VALUATION OF COST ITEMS AT OPPORTUNITY COST

34. Eligible Cost Items shall be valued at their OC calculated in accordance with the following paragraphs and so that a reasoned explanation of the calculation of that OC is capable of being given to the Regulatory Authority on request.

35. The OC of any cost item shall comprise the value of the benefit foregone by the Licensee in employing that cost item during the Imbalance Settlement Period for the purposes of electricity generation, by reference to the most valuable realisable alternative use of that cost item for purposes other than electricity generation.

36. Unless otherwise provided in this Code of Practice, in calculating the value of the benefit foregone in employing a cost item for the purposes of electricity generation, the following principles shall, unless it can be demonstrated to the satisfaction of the Regulatory Authority that there is good cause not to, be applied:

    a. where there exists a recognised and generally accessible trading market in the relevant cost item, the OC of that item should reflect the prevailing market value or spot price of the cost item for the relevant time period concerned, which may be for immediate or future delivery or use as appropriate to the circumstances of the Licensee, having regard to costs the Licensee would incur in offering that cost item for sale, or acquiring that cost item, on a recognised and generally accessible trading market; and

    b. where no recognised and generally accessible trading market exists in the relevant cost item the OC of that item should reflect the costs which would be incurred by the Licensee in replacing that cost item, providing evidence of a minimum of three bilateral offers for the cost item.

37. All Commercial Offer Data submitted in respect of a generation set or unit are to reflect the costs relating to that generation set or unit when considered on a stand-alone basis.

System Services

38. Where the generation of electricity is associated with the simultaneous provision of system services to the Transmission System Operators, the OC of generating electricity for delivery to the [Single Electricity Market] may reflect the value of benefit forgone or gained through those system services.

39. In accordance with paragraph [38], the Eligible Cost Items that a generation unit may include in the calculation of its Commercial Offer Data shall reflect, as relevant, the value of system service revenues lost or gained as a result of provision of electricity.

Energy, emissions or time limited units

40. Where there is an externally-imposed constraint on: (a) the total time a generation set or unit may run (i.e. being less than the total time it could be available); or (b) the total emissions a generation set or unit may emit over a period of time; or (c) the total amount of energy that a generation set or unit or is able to provide during a period of time (an Inter-Temporal Constraint), and there is a reasonable

expectation that operating the generation set or unit during the relevant Imbalance Settlement Period will contribute to reaching the Inter-Temporal Constraint, the Eligible Cost Items included in the calculation of the relevant price-quantity components may reflect the value of benefit forgone from electricity generation later in that period of time. Licensees shall submit their OC methodology to the Regulatory Authority upon request with all relevant documentation including all permits that limit the operation of the set or unit and the exact nature and time period of the limit.

41. The OC determined in accordance with paragraph [40] may be calculated using relevant futures prices of fuel and electricity, as forecasts of fuel and electricity costs, which, together with unit characteristics and SRMC-based offers, can be used to calculate the expected margins for a set or unit during a defined future period.

42. For the purposes of paragraph [40], the OC shall be calculated over the same period in which the Inter-Temporal Constraint applies. For example, where an Inter-Temporal Constraint on total emissions applies over a one-year period, OCs shall be calculated over the same one-year period. Where the Inter-Temporal Constraint applies to the total amount of fuel available to a generation set or unit, OCs shall be calculated over the period for which the operation of the energy-limited generation unit is normally subject to that constraint. For example, if the operation of a pumped storage unit is normally restricted and optimised over a 24-hour horizon, then OCs shall be calculated over the same period.

Co-generation

43. Where the generation of electricity is associated with additional processes other than generation, the OC of generating electricity for delivery to the [Single Electricity Market] shall reflect the value of the use of electricity, or heat used to generate electricity, or both, in those associated processes.

44. In accordance with paragraph [43], the Eligible Cost Items that a co-generation unit may include in the calculation of its Commercial Offer Data shall reflect, as relevant, the cost of generating heat using alternative processes and/or the value of lost production, as appropriate.

Demand Side Units

45. For a Demand Side Unit, the OC associated with reducing electricity consumption shall reflect the value of the use of electricity in the associated process applicable to that Demand Side Unit, such as the cost of obtaining or generating electricity through alternative sources or the value of lost production. The OC shall be reflective of whether the demand reduction occurs through avoided consumption (load shedding) or through shifting demand to another period (load shifting).

Fuel transportation costs

46. The cost of fuel transportation capacity (FTC) that is required for the generation of an additional unit of output shall be valued at:

    a. the amount which the Licensee would pay to purchase sufficient additional FTC, to the extent that the generation of an additional unit of output requires the Licensee to purchase FTC not yet held; or
    b. the amount which the Licensee would realise by disposing of the unused FRTC, referenced to the price of the product on a generally accessible and liquid market.

47. The commodity element of fuel transportation costs shall be valued in line with published tariffs if the transportation service is tariff-based.

VI. CHANGE MANAGEMENT

48. In accordance with paragraph [2] of the relevant licence conditions and subject to compliance with the requirements of paragraph [2], this Code of Practice may, following consultation with those persons obliged by their licences to comply with this Code of Practice and such other persons as the Regulatory Authority considers appropriate, from time to time be amended by direction.

49. Except where the Regulatory Authority is satisfied that a proposed amendment of the Code of Practice is of a trivial nature or requires to be progressed as a matter of urgency, the following requirements shall apply:

    a. Before commencing a consultation on any proposed amendments to the Code of Practice, the Regulatory Authority shall issue a call for evidence in relation to the issue giving rise to the potential need for an amendment.

b. The Regulatory Authority shall analyse the responses to its call for evidence and decide, in light of that analysis, whether to proceed with the relevant consultation.

c. The Regulatory Authority shall allow a minimum of six weeks for responses to any call for evidence and any subsequent consultation on proposed amendments to the Code of Practice.

VII. INTERPRETATION

50. Words and expressions used in this Code of Practice and not defined shall, unless the context otherwise requires, have the same meaning as when used in the licences containing the relevant conditions [or (where appropriate) in the Single Electricity Market Trading and Settlement Code].

51. In this document:

"**Balancing Market**"	means the market operated by the Market Operator under the Trading and Settlement Code to balance continuously generation and demand on the electricity transmission systems on the island of Ireland, and provide for market-based management of System Operator actions and processes to maintain the stable and secure operation of those systems;
"**Eligible Cost Item**"	means a cost item which is required (or, as the case may be, permitted), pursuant to section IV of this Code of Practice, to be included in the calculation of the components of Commercial Offer Data (and "Eligible Costs" means costs exclusively composed of Eligible Cost Items);
"**Incremental Fuel Cost**"	means the cost of each unit of fuel multiplied by the number of units of fuel required to increase generation output by one additional unit of energy (1 MWh), plus any appropriate variable costs related to handling of those units of fuel;

"Imbalance Settlement Period"	means the period of time relevant to settlement of the Balancing Market, which is a thirty minute period beginning on each hour or half-hour
"**OC**"	means, in relation to any Eligible Cost Item, its opportunity cost calculated in accordance with the provisions of this Code of Practice;
"**Regulatory Authority**"	for the purposes of applying this Code of Practice in Ireland, means the Commission and, for the purposes of applying it in Northern Ireland, means the Authority;
"Relevant Output Level"	with respect to an incremental offer or decremental bid, represents the level of output, in terms of energy provided in the Balancing Market, that a generation set or unit or Demand Side Unit reaches when its corresponding incremental offer or decremental bid is accepted;
"**SRMC**"	means the short run marginal cost related to a generation set or unit in respect of an Imbalance Settlement Period calculated in accordance with the provisions of this Code of Practice;
"VOM Costs"	means, non-fuel variable operating and maintenance costs.