Integrated Single Electricity Market (I-SEM)

Proposed
Balancing Market Principles Code of Practice

SEM-17-026

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COMPLEX BID OFFER DATA IN THE I-SEM BALANCING MARKET

I. INTRODUCTION

1. This [document] is published jointly by:

    a. the Northern Ireland Authority for Utility Regulation (the Authority), in accordance with [paragraph ??] of the following conditions of licences in Northern Ireland:

        (i)   [Condition ??] of each electricity generation licence; and

        (ii) [Condition ??] of the public electricity supply licence granted to Northern Ireland Electricity plc under Article 10(1) of the Electricity (Northern Ireland) Order 1992 under a licence document dated 31 March 1992 and transferred to NIE Energy Limited; and

    b. the Commission for Energy Regulation (the Commission), in accordance with [paragraph ??] of the following conditions of licences to generate electricity in the Republic of Ireland:

        (i)   [Condition ??] of the interim electricity generation licence granted to the Electricity Supply Board on [21 April 2006];

        (ii) [Condition ??] of the electricity generation licence granted to Synergen on [31 July 2002]; and

        (iii) [Condition ??] of electricity generation licences granted to all other licensed generators of electricity.

2. In accordance with [paragraph ??] 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

3. 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 (€ or £/MWh);

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

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

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

III. COST-REFLECTIVE BIDDING

4. 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

5. 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 that Imbalance Settlement Period, calculated in accordance with the following paragraphs.

6. 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 € or £/MWh.

7. 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.[1]

8. 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.

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

10. Each of the Eligible Cost Items applicable to the price-quantity component of Commercial Offer Data shall 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

11. 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 during the [Operating Day], 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].

12. Each of the Eligible Cost Items applicable to the start-up component of Commercial Offer Data shall 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

13. The no load costs component of Commercial Offer Data shall reflect the fuel cost required to maintain zero net output at synchronous generator speed, calculated

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[1] 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).

in a manner that ensures that the offer curve submitted by the generation set or unit is monotonically increasing.

14.   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

15.   The following cost items 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

16.   Incremental Fuel Costs include those costs in relation to fuel that are incurred directly as a result of generating an incremental unit of energy (1 MWh), [but not those incurred in preparing the set or unit for generation (starting up)].

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

18.   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 consistent with the provisions of this Code of Practice. The Licensee may change its chosen fuel cost calculation method from time to time by informing the Regulatory Authority of its decision including the motivation for the change.

Incremental VOM Costs

19.   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 Gas Transportation Costs

20.   If the fuel cost calculation method referenced in paragraph [18] 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, based on published transportation tariffs or, where relevant, the price of gas transportation capacity traded on secondary markets.

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

<u>Incremental Emissions Costs</u>

22. Incremental emission costs consist of the value of CO_2 credits, issued under the Emissions Trading Scheme established by the European Commission, that are required to cover the CO_2 emissions resulting from generating an incremental unit of energy (1 MWh).

23. 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. *CO_2 emission rate (tonnes per unit of generation)*. This may vary by generator unit.

   b. *Value of CO_2 credits (€ or £ per tonne of CO_2)*. This will be the same across the Single Electricity Market, equal to the Emissions Trading Scheme value.

<u>Decremental Bids and Offers</u>

24. 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

25. 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 paragraphs [16] to [18], including the same price index.

b. *VOM costs*. VOM Costs should 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 gas transportation costs.* Gas transportation costs should be calculated using the same calculation method as the incremental gas transportation costs outlined in paragraphs [20] to [21].

d. *Related emissions costs*. The value of CO_2 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 [22] to [23].

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.

26. 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

27. 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 paragraphs [16] to [18], including the same fuel price.

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 gas transportation costs.* No load gas transportation costs should use the same calculation method as the incremental gas transportation costs outlined in paragraphs [20] to [21].

    d. *Related emissions costs.* The emissions costs shall be calculated using the same parameters set out in paragraphs [22] to [23].

28. 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

29. 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

30. 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.

31. 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.

32. 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 operating day, 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.

33. 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

34. 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 of those system services.

35. In accordance with paragraph [34], 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

36. 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.

37. The OC determined in accordance with paragraph [36] 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.

38. For the purposes of paragraph [36], 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

39. 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.

40. In accordance with paragraph [39], 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 or the value of lost production.

Demand Side Units

41.   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).

Gas transportation costs

42.   The cost of gas transportation capacity (GTC) 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 GTC, to the extent that the generation of an additional unit of output requires the Licensee to purchase GTC not yet held; or
b. the amount which the Licensee would realise by disposing of the unused GTC, referenced to the price of the product on a generally accessible and liquid market.

43.   The commodity element of gas transportation costs shall be valued in line with published tariffs.

VI. CHANGE MANAGEMENT

44.   In accordance with paragraph [??] of the relevant conditions, this Code of Practice may, following consultation with the holders of generation licences and such other persons as the Regulatory Authority considers appropriate, from time to time be amended by direction.

VII. INTERPRETATION

45.   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].

46.   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, pursuant to section IV of this Code of Practice, to be included in the calculation of the components of Commercial Offer Data;
"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.