Imperfections Charge

October 2016 – September 2017

And

Incentive Outturn

October 2014 – September 2015

Consultation Paper

SEM-16-031

23 June 2016

CONTENTS

1 EXECUTIVE SUMMARY

The Single Electricity Market (SEM) Imperfections Charge is made up of a number of components, the largest of which relates to Dispatch Balancing Costs (DBC). The purpose of the Imperfections Charge is to recover the anticipated DBC (less Other System Charges), Make Whole Payments and any net imbalance between Energy Payments and Energy Charges and Capacity Payments and Capacity Charges, over the tariff year. The K factor adjustment mechanism enables any under or over recovery of Imperfections Costs, in the previous year and an estimate for the current year, to be accounted for in the following tariff year.

Eirgrid and SONI, together the Transmission System Operators (TSOs), have prepared and submitted the:

1. 'Forecast Imperfections Revenue Requirement for Tariff Year 1st October 2016 to 30th September 2017'[1] (2016/17 Forecast); and
2. 'Imperfections Costs Incentive for Tariff Year 1st October 2014 to 30th September 2015'[2] (2014/15 Incentive Outturn).

The Utility Regulator (UR), in Northern Ireland, and the Commission for Energy Regulation (CER), in the Republic of Ireland, together the Regulatory Authorities (RAs), have analysed both submissions and the models underpinning them. This paper details the RAs proposals in relation to each submission.

1.1 2016/17 FORECAST

The TSOs have forecast an Imperfections revenue requirement of €146.8 million for the 2016/17 tariff year. This represents a 14% decline from the €170.7 million forecast for the 2015/16 tariff year. Taking into account a K factor adjustment of (€77.56m), this results in a 2016/17 Imperfections Charge of €2.05 per megawatt-hour (MWh), compared with €4.47 per MWh for the 2015/16 tariff year, as shown in Table 1 overleaf.

The RAs are minded to endorse the TSOs' 2016/17 Forecast and a K factor adjustment of (€77.56m).

[1] Appendix 1
[2] Appendix 2

	2016-17	2015-16	Change
Imperfections Allowance (€m)	146.80	170.70	(14%)
K factor (€m)	(77.56)	(22.12)	
Total Allowance (€m)	69.24	148.58	(53%)
Forecast Demand (GWh)	33,700	33,230	1.4%
Tariff (€/MWh)	**2.05**	**4.47**	**(54%)**

Table 1: Imperfections Charge 2016/17 versus 2015/16

1.2 2014/15 INCENTIVE OUTTURN

DBC are a significant cost element passed on to the all-island consumer and represent the majority of the Imperfections Charge[3]. In light of the above, the 'Single Electricity Market Incentivisation of All-Island Dispatch Balancing Costs Decision Paper SEM-12-033' (the Decision Paper) introduced an all-island DBC incentive mechanism, with effect from 1 October 2012[4]. The purpose of the incentive mechanism is to give the TSOs a reward for reducing DBC below the forecast, while penalising them for the reverse result; subject to reasonable ex-post model adjustments to the original forecast. Any incentive payment/penalty is split on a 75:25 basis between Ireland's Transmission Use of System (TUoS) and Northern Ireland's System Support Services (SSS) revenues respectively.

The TSOs' originally submitted a forecast DBC, for the 2014/15 tariff year, of €177.6 million, in May 2014. The PLEXOS element of this forecast stood at €181.5 million, with the supplementary modelling component equalling (€3.9 million). The TSOs propose that the PLEXOS component of this forecast is amended, to take account of the following ex-post review factors:

1. Model basecase refinements to include:

    a) "12 months of benefit" principle - allowing the TSOs to gain 12 months of benefit from the Dublin Must Run and Reserve co-optimisation initiatives, introduced in the 2013/14 tariff year. This is achieved by removing the effect of these initiatives from

[3] DBC has accounted for 95-100% of the forecast Imperfections Charge over the last 5 tariff years
[4] SEM-12-033 Incentivisation of All-Island Dispatch Balancing Costs Decision Paper, dated 5 June 2012

the 2014/15 forecast, so as to enable the benefit of the initiatives to be realised when comparing the TSOs' outturn performance to the ex-post adjusted baseline.

b) New generating units – correction of assumptions around Great Island connection dates and technical and commercial parameters. Also adjustment to account for all Demand Side Units which became operational during the 2014/15 tariff year.

c) Interconnector adjustments - During the year the flows on both interconnectors changed significantly, predominately due to the increase of the Carbon Price Floor in Great Britain on 01/04/2015.

2. Combination of actual demand, COD, wind and MIUNs data

In relation to the "12 months of benefit" principle detailed above, the RAs feel that any period of benefit less than 12 months may create a perverse incentive for the TSOs to delay new initiatives until the start of the following tariff year. Furthermore, the RAs feel that a period greater than 12 months may discourage the TSOs from implementing new initiatives as frequently.

The TSOs' 2014/15 Incentive Outturn submission details actual Imperfections Costs of €128.7 million, €17.2 million lower than the ex-post adjusted baseline of €145.9 million[5]. This saving potentially entitles the TSOs to an incentive payment of €0.63 million[6]. This is the second year in which the TSOs have claimed entitlement to an incentive payment, with the TSOs receiving an incentive payment of €2.5m last year, based on the outturn Imperfections Cost for tariff year 2013/14.

The RAs are minded to endorse the payment of this €0.63 million incentive amount to the TSOs, in light of the efficiency gains achieved by the TSOs in reducing outturn Imperfections Costs below the ex-post adjusted baseline.

1.3 PROVISION OF COMMENTS

Comments on the 2016/17 Forecast, the 2014/15 Incentive Outturn and the RAs' recommendations in relation to both are invited from industry and the public by 17.00 on Friday 22nd July 2016, as detailed in section 11.

Comments on this paper should be forwarded, in electronic form, to Bronagh McKeown at Bronagh.McKeown@uregni.gov.uk.

[5] Calculated as original DBC forecast (177.6m) + model basecase refinements (3.5m) less actual data (52.6m) plus supplementary modeling adjustments (17.4m) = 145.9m

[6] See Appendix 2 – Table 10: Method of calculating the incentive payment with ex-post adjusted baseline

2 INTRODUCTION

2.1 THE SINGLE ELECTRICITY MARKET

The all-island wholesale electricity market was established as the Single Electricity Market (SEM), in November 2007. The SEM is a centralised or gross mandatory pool market, with electricity being bought and sold through the pool under a market clearing mechanism.

Generators receive the System Marginal Price (SMP) for their scheduled dispatch quantities, Capacity Payments for their actual availability and Constraint Payments for dispatches outside the market schedule due to system constraints and other specific factors.

Suppliers purchasing energy from the pool will pay the SMP for each trading period, Capacity Charges, and System Support Charges. The SEM market rules are set out in the Trading and Settlement Code (TSC)[7]. The SEM is governed by the SEM Committee (SEMC) which was set up by the Governments in the Republic of Ireland and Northern Ireland. This Committee has representatives from both RAs, UR in Northern Ireland and CER in the Republic of Ireland, together with an Independent Member. The SEM is operated by the Single Electricity Market Operator (SEMO), which operates as a contractual joint venture between the System Operators EirGrid and SONI.

2.2 OBJECTIVE OF PAPER

The objective of this consultation paper is to solicit comments, from interested parties, on the TSOs' submissions, namely the 2016/17 Forecast and the 2014/15 Incentive Outturn.

2.3 OVERVIEW

The Imperfections Charge is levied on suppliers by SEMO. The purpose of the Imperfections Charge is to recover the anticipated DBC (less Other System Charges), Make Whole Payments, any net imbalance between Energy Payments and Energy Charges and Capacity Payments and Capacity Charges over the year, with adjustments for previous years as appropriate. The K factor adjustment mechanism enables any under or over recovery of Imperfections Costs, in the previous year and an estimate for the current year, to be accounted for in the upcoming tariff year. The costs making up the Imperfections Charge are depicted in Figure 1 overleaf and a description of each provided in section 3 below.

[7] http://www.sem-o.com/Search/Pages/SearchResult.aspx?k=trading%20and%20settlement%20code

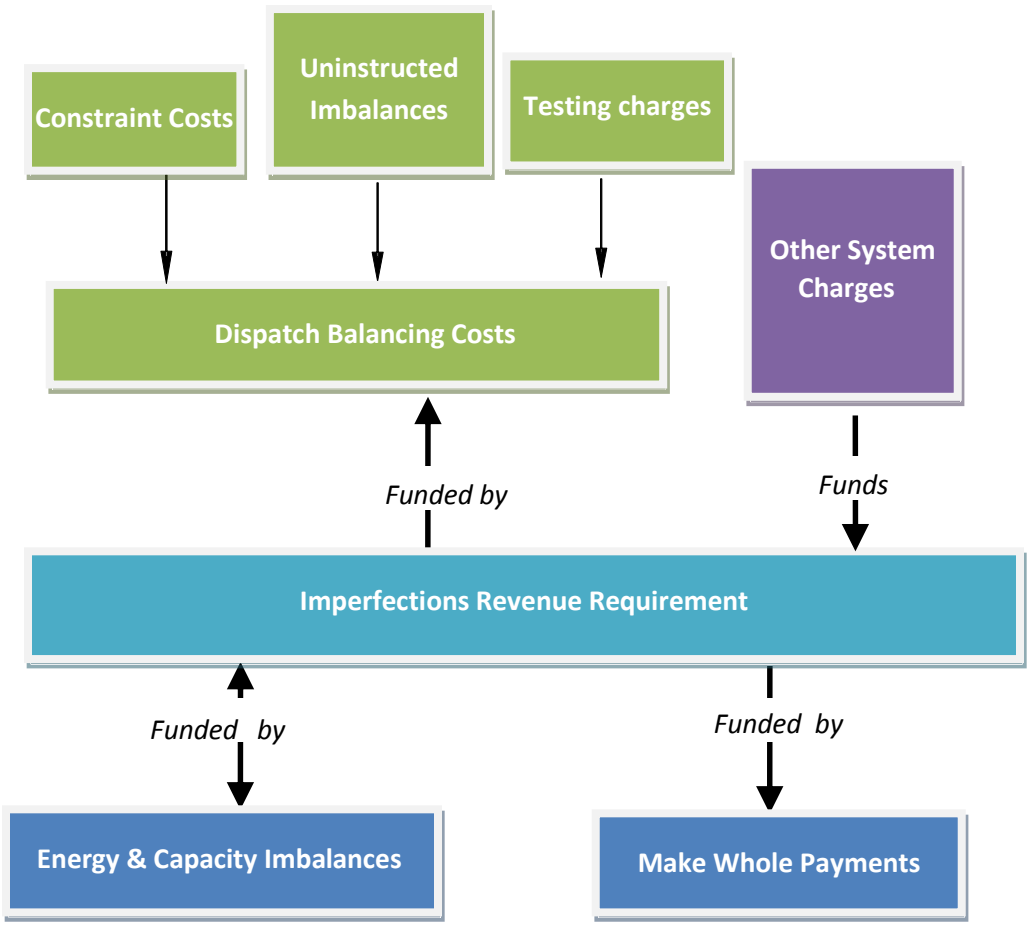

Figure 1: Imperfections Charge Components

3 THE 2016/17 FORECAST

The TSOs' 2016/17 Forecast was prepared jointly by EirGrid and SONI, and captures an all-island estimate of the Imperfections Charge for the 2016/17 tariff year. All costs are estimated ex-ante and recovered from suppliers on a MWh basis, through the Imperfections Charge. The TSOs have forecast an Imperfections revenue requirement of €146.8 million for the 2016/17 tariff year. This represents a 14% decline from the €170.7 million forecast for the 2015/16 tariff year. There are a number of key factors influencing the 2016/17 Forecast, including:

- Lower levels of forecasted interconnector imports during the day and higher exports during the night contribute to a reduction in forecast Constraint Costs. Interconnector flows, on both Moyle and the East West Interconnector (EWIC), have predominantly been imports from Great Britain (GB) to SEM in recent years. On the 01/04/2015 the Carbon Price Floor in GB increased significantly, resulting in the price spread between SEM and GB narrowing, significantly. This increase in the Carbon Price Floor resulted in significant exports from SEM during the night and a reduced level of imports, to SEM, during the day. Lower levels of forecasted interconnector imports during the day and higher exports during the night contribute to a reduction in forecast Constraint Costs, as more generating units fall into merit in the unconstrained model, therefore closing the gap between the constrained and unconstrained production costs;

- A significant decrease in forecast fuel prices leads to a reduction in forecast Constraint Costs;

- An increase in wind generation relative to overall demand contributes to an increase in forecast Constraint Costs; and

- There is a significant programme of capital works on the transmission system scheduled for the 2016/17 tariff year which results in an increase in forecast Constraint Costs.

Detail on the forecasts for each of the Imperfections Charge components is provided below and further information regarding the 2016/17 Forecast is provided by the TSOs in Appendix 1.

For the purpose of the 2016/17 Forecast the TSOs have assumed that ROI and NI generators will continue to bid Gas Transportation Capacity (GTC) charges in line with current practice. Currently no generators in NI are including GTC within their bids and the TSOs have assumed that this behaviour will continue for the 2016/17 tariff year. The RAs deem these GTC assumptions to be reasonable. If generator bidding behaviour does change then this can be considered as part of the ex-post review process during the 2016/17 incentive outturn process.

3.1 DISPATCH BALANCING COSTS

DBC refers to the sum of Constraint Payments, Uninstructed Imbalance Payments and Generator Testing Charges. DBC makes up 98% of the Imperfections Charge in the 2016/17 Forecast. DBC for the 2016/17 tariff year is forecast as €144.3 million.

3.2 CONSTRAINT PAYMENTS

Constraint Payments make up the entirety of the 2016/17 DBC forecast (€144.3m), as Uninstructed Imbalances and Testing Charges are forecast at zero. Constraint Costs arise due to the TSOs having to dispatch some generators differently from the ex-post market unconstrained schedule, in real time, to ensure security of supply on the system. Generators receive Constraint Payments to compensate them for any difference between the market schedule and actual dispatch. A generator that is scheduled to run by the market but which is not run in the actual dispatch (or run at a decreased level) is 'constrained off/down'; a generator that is not scheduled to run or runs at a low level in the market, but which is instructed to run at a higher level in reality is 'constrained on/up'.

PLEXOS Constraints

The majority of the forecast Constraint Costs are derived using the PLEXOS modelling tool. The RAs have performed validation of the TSOs' PLEXOS model using their in house PLEXOS database. The RAs have sense checked the TSOs' modelling assumptions against an externally validated PLEXOS model produced by the RAs. The RAs have investigated any differences between the models and the TSOs have provided explanations for any divergence from the RAs' validated PLEXOS model. In some cases the TSOs have used actual data rather than the forecast data contained in the RAs' validated PLEXOS model. Additionally, certain parameters were updated to enable a more realistic PLEXOS outcome, based on the TSOs' experience. The PLEXOS element of the TSOs' Constraint Costs forecast is €125.8 million, which has decreased significantly from the forecast Constraint Costs of €152.4 million for the PLEXOS component of the 2015/16 tariff year. The reasons for this decrease are detailed in the bullet points in section 3 above. The assumptions underlying the TSOs' PLEXOS Constraints are detailed within their submission[8].

[8] Appendix 1 page 23 and 35

Supplementary Modelling Constraints

As it is not possible to model all Constraint Cost drivers in PLEXOS, part of the TSOs' Constraint forecast is made up of supplementary modelling results. The supplementary model includes forecasts for the following areas that PLEXOS is unable to effectively model; perfect foresight, specific reserve constraints, specific transmission system constraints, market modelling assumptions, system security constraints and other factors[9]. The 2016/17 forecast for Constraint Costs, derived from supplementary modelling, is €18.5 million. This represents an increase of €7.4 million from the 2015/16 tariff year. The largest influencing factor behind this increase is the reduction in the impact of System Operator interconnector countertrading[10].

A provision of €0.8 million for Secondary Fuel start-up tests has been made within the supplementary model. This is included as CER have requested that Eirgrid carry out Secondary Fuel start-up testing, for security of supply reasons. The TSOs have anticipated that the fuel switching arrangements will come into place in NI in 2016/17 and the obligations have been in place in ROI since 2010. The TSOs aim to fully commence secondary fuel testing during unit start-ups in the 2016/17 tariff period. A provision has been made to constrain on Open Cycle Gas Turbines (OCGTs) and to constrain on the marginal unit during Combined Cycle Gas Turbine (CCGTs) tests for a period of time. A provision has been made for one test for all applicable units during the 2016/17 tariff year. The TSOs have provided a detailed breakdown of how they arrived at the forecast figure for Secondary Fuel start-up testing, at a meeting with the RAs.

Combining both the PLEXOS and supplementary modelling Constraints, a forecast of €144.3 million is included for 2016/17 Constraint Costs, representing a decrease of 12% from the 2015/16 forecast of €163.5 million.

3.3 UNINSTRUCTED IMBALANCES

Uninstructed Imbalances occur when there is a difference between a generator unit's dispatch quantity and its actual output. Uninstructed Imbalances and Constraint Costs are related, with Uninstructed Imbalances having a direct effect on Constraints Costs, as TSOs re-dispatch generators to counteract the impact of Uninstructed Imbalances on the system.

A forecast of zero is included for Uninstructed Imbalances as it is assumed that the additional Constraint Costs as a result of Uninstructed Imbalances will, on average, be recovered by the Uninstructed Imbalance payments for the forecast period.

[9] See Appendix 1 page 13 and 25 for further detail on these components

[10] See Appendix 1 page 11 for further information on this

3.4 TESTING CHARGES

The testing of generator units results in additional operating costs to the system, in order to maintain system security. As a testing generator unit typically poses a higher risk of tripping, additional operating reserve will be required to ensure that system security is not compromised, which will give rise to increased Constraint Costs.

A zero forecast has been included for Testing Charges, as it is assumed that any testing generator unit will pay Testing Charges to offset the additional Constraint Costs that will arise from out-of-merit running of other generators on the system as a result of the testing.

3.5 ENERGY IMBALANCES

Energy Imbalances occur in SEM in the event that the sum of Energy Payments to generators does not equal the sum of Energy Charges to suppliers. An Energy Imbalance will generally impact Constraint Costs in the opposite direction, artificially increasing or decreasing the total Constraint Costs. A forecast of zero is included as it is assumed that if Energy Imbalances do occur that they will have an equal and opposite effect on Constraint Costs and will offset any increase or decrease accordingly.

3.6 MAKE WHOLE PAYMENTS

Make Whole Payments account for any difference between the total Energy Payments to a generator and the production cost of that generator on a weekly basis. As such, Make Whole Payments are a feature of the SEM rules and are generally independent of dispatch and DBC. SEMO is responsible for administering all Make Whole Payments and they are funded through the Imperfections Charge. The TSOs have included a forecast of €2.5 million for Make Whole Payments, based on the TSOs' experience of actual outturn, from 1st October 2015 to 2nd April 2016, extrapolated out for a 12 month period. Make Whole Payments are not included within the incentive mechanism, as they are viewed as being independent of dispatch and DBC.

3.7 OTHER SYSTEM CHARGES

Other System Charges (OSC) are levied on generators whose failure to provide necessary services to the system lead to higher DBC and Ancillary Service Costs. OSC include charges for generator units which trip or make downward re-declarations of availability at short notice.

In their submission the TSOs assume that generators are compliant with Grid Code and that no charges will be recovered through Other System Charges i.e. a forecast of zero is included for OSC for the 2016/17 tariff year. The TSOs argue that any deviation from this assumption will

result in an increase in DBC, and that any monies recovered through Other System Charges will net off the resultant costs to the system in DBC.

3.8 RECOVERY OF IMPERFECTION COSTS

Imperfections Costs are estimated ex-ante and recovered during the following tariff period, through the Imperfections Charge.

Differences between the amount of Imperfections Charges paid out by SEMO to generators and the amounts paid to SEMO by suppliers will lead to instances where SEMO will:

1. Require working capital to fund Imperfections Costs that exceed revenue collected through the Imperfections Charge, or,
2. Have collected revenue through the Imperfections Charge that exceeds the amount being paid out on Imperfections Costs.

To allow for the first scenario, SEMO may require funding from EirGrid Group to cover fluctuations during the tariff period. Any allowed under-recovery of revenue during the tariff period will be paid to SEMO, in the subsequent tariff period(s), with the appropriate amount of interest. This reflects the cost of short-term financing required to meet SEMO's working capital needs.

Similarly, for situations where the revenue recovered by SEMO through the Imperfections Charge is greater than that paid out in Imperfections Costs (second scenario above), the Imperfections Charge in the following tariff period will be reduced by an appropriate amount to reflect the allowed over-recovery and the associated interest.

The K factor mechanism accounts for any under or over recovery of Imperfections Costs, in previous periods and the current period and adjusts the following period's tariff accordingly. The K factor expected to be applied to the Imperfections Charge for 2016/17 is (€77.56m). This comprises of:

Summary of K factor adjustment

Over-recovery in tariff year 2014/15	(€37.56m)
Estimated over-recovery for tariff year 2015/16	(€40.00m)
Total Imperfections K factor to be applied in 2016/17	(€77.56m)

This €77.56 million over-recovery is netted off the 2016/17 forecast Imperfections Charge leading to a reduction in the Imperfections Charge for the 2016/17 tariff year.

3.9 DEMAND FORECAST

Based on outturn 14/15 demand and 15/16 year to date figures the TSOs have forecast demand for the 2016/17 tariff year at 33,700 GWh, representing a 1.4% increase from the 2015/16 forecast demand of 33,230 GWh.

3.10 IMPERFECTIONS CHARGE

As stated in section 3.2 above, the TSOs have forecast Constraint Costs of €144.3 million for the 2016/17 tariff year. As the other components of DBC are forecast at zero, this figure also equates to the forecast for DBC. As discussed in section 3.6 above, the TSOs have forecast Make Whole Payments of €2.5 million, based on 2015/16 outturn to date. The remaining elements of the Imperfections Charge are forecast at zero, meaning the forecast Imperfections Charge for 2016/17 stands at €146.8 million. Allowing for the K factor adjustment, provides a total forecast Imperfections Charge of €69.24 million, which when divided by the forecast demand, of 33,700 GWh, equates to an Imperfections Charge of €2.05/MWh for the 2016/17 tariff year.

The comparable figure for the current 2015/16 tariff year stood at €4.47/MWh. Any under or over recovery of Imperfections Costs in the 2016/17 tariff year will feed into the K factor of subsequent tariff years. The trend in the Imperfections Charge is summarised in Table 2 below:

€m	**2016-17**	**2015-16**	**2014-15**	**2013-14**	**2012-13**	**2011-12**
Total Constraints costs	144.3	163.5	177.6	165.5	142.0	142.6
Uninstructed Imbalances	-	-	-	-	-	-
Testing charges	-	-	-	-	-	-
Dispatch Balancing Costs	144.3	163.5	177.6	165.5	142.0	142.6
Energy Imbalance	-	-	-		-	-
Make whole payments	2.5	7.2	3.6	0.1	0.1	0.1
K factor Adjustment	(77.6)	(22.1)	5.2	(18.9)	12.8	42.5
Other System Charges	-	-	-	-	-	-
Total Imperfections Charge	**69.2**	**148.6**	**186.4**	**146.7**	**154.9**	**185.2**
Forecast Demand ('000 MWh)	33,700	33,230	33,320	33,220	32,900	34,030
Imperfections Charge/ MWh	**2.05**	**4.47**	**5.60**	**4.42**	**4.71**	**5.44**

Table 2: Imperfections Charge over the years

RAs Proposal

As stated previously, the RAs have sense checked the assumptions within the TSOs' forecast against the RAs' validated PLEXOS model. The RAs honed in on any values, in the TSOs' forecast, that differed from those contained in the RAs' validated model and the TSOs provided explanations for the differences. The RAs are satisfied that the TSOs' assumptions are reasonable and are minded to endorse the TSOs' 2016/17 Forecast and a K factor adjustment of (€77.56m). The RAs welcome any comments on this proposal and the TSOs' submission.

4 INCENTIVE OUTTURN SUMMARY 2014/15

The TSOs are responsible for managing DBC through efficient dispatch of generation, while still maintaining a secure electricity system. In light of this, a process to incentivise the TSOs to reduce DBC was introduced by the SEMC, with effect from 1 October 2012. The current parameters, as detailed in the Decision Paper[11], are presented in Table 3 below. Any payments or penalties associated with the incentivisation of DBC are administered across both TSOs on a 75:25 split basis.

	Lower Bound	Dead Band	Upper Bound	Below Target	Above Target
Dispatch Balancing Costs	7.5% - 20% below baseline	7.5% below and above the baseline	7.5% - 20% above baseline	TSOs retain 10% of every 2.5% below	TSOs penalised 5% of every 2.5% above

Table 3: DBC incentive parameters

The cost categories included in the incentive baseline are detailed in the Decision Paper and listed in Table 4 below:

INCLUDED	NOT INCLUDED
Constraint Costs	Make Whole Payments
Uninstructed Imbalances	Capacity Imbalances
Testing charges	Other Imperfection Charge Components
Energy Imbalances	
Other System Charges	
SO-SO Trades	

Table 4: Cost categories included in the DBC incentivisation mechanism

The 2014/15 tariff year is the third year to fall within the incentive mechanism and the second year where an incentive payment is potentially due. EirGrid and SONI's assessment of the incentive outcome for the 2014/15 tariff year is attached as Appendix 2 to this paper[12]. The TSOs' assessment provides for outturn Imperfections Costs of €128.7 million; €17.2 million lower than the ex-post adjusted baseline. Based on this, the TSOs are potentially entitled to an incentive payment of €0.63 million. The resultant incentive payment would be applied on a

[11] SEM-12-033 Incentivisation of All-Island Dispatch Balancing Costs Decision Paper, dated 5 June 2012
[12] Appendix 2 - Imperfections Costs Incentive for Tariff Year 1st October 2014 – 30 September 2015, submitted by the TSOs on 24 March 2016

75:25 split between Ireland's Transmission Use of System (TUoS) and Northern Ireland's System Support Services (SSS) revenues respectively.

5 EX-POST REVIEW FACTORS

The ex-post review is designed to take into account any external factors which heavily influenced DBC during the tariff period, e.g. unforeseen long-term outage of plant and other High Impact Low Probability events (HILPs). An effective ex-post adjustment mechanism should ensure the protection of both the TSOs and the all-island consumer from potential windfall gains or losses, as it removes some of the risk for events outside of the TSOs' influence.

Table 6 of the Decision Paper details the allowable ex-post review factors as follows:

- Change in SEM market rules or any RA decision affecting DBC
- Changes in demand forecast/exchange rates/fuel prices (inc. bids)/wind generation
- High Impact Low Probability (HILP) events: long-term unforeseen outage of generators, key reserve provider or transmission plants.

In addition to the above, the Decision Paper states that the RAs will, as part of the ex-post review, examine any significant factors not identified above which affected DBC outturn. Combinations of the above factors which lead to DBC outturn being 10% either side of the ex-ante baseline will also be reviewed in detail by the RAs. The SEMC consider the ex-post review process enables a more accurate and effective incentive mechanism.

The TSOs submitted the 'Forecast Imperfections Revenue Requirement for Tariff Year 1st October 2014 to 30th September 2015' (ex-ante DBC forecast) in May 2014. This submission forecast DBC for the 2014/15 tariff year at €177.6 million. The 2014/15 Incentive Outturn paper contains the TSOs' ex-post adjustments to this €177.6 million baseline, to form an ex-post adjusted baseline of €145.9 million. Details of the adjustments made to the ex-ante DBC forecast are discussed in the proceeding paragraphs. The TSOs's submission contains information on the key assumptions within the ex-ante and ex-post PLEXOS modelling process[13].

[13] Appendix 2 page 21

5.1 PLEXOS MODEL BASECASE REFINEMENTS

In their 2014/15 Incentive Outturn submission the TSOs assert that the combined effect of the PLEXOS model basecase refinements, detailed below, is to increase the originally submitted (ex-ante) PLEXOS model from €181.5 million to €185 million.

Initiatives introduced in 2013/14

The TSOs introduced a number of operational initiatives at various points in the 2013/14 tariff year. The TSOs have adjusted the 2014/15 ex-ante DBC forecast to allow for 12 months of benefit from each initiative. These initiatives are outlined below:

a. Dublin Must Run Generation - The number of units in the Dublin operational constraint, for voltage support, was reduced from three by night/two by day to two (plus EWIC) at all times, following a period of successful testing on 25/10/2013. The original 2014/15 forecast, submitted to the RAs, included the new operational constraint rules for the entire tariff year, therefore this needed to be readjusted so that the old operation rule of three by night/two by day was effective from 01/10/2014 to 25/10/2014 and the new rule, of two (plus EWIC) at all times, was made effective after this date.

b. Reserve Co-optimisation - Countertrading for reserve co-optimisation was introduced by the TSOs on 03/03/2014, following consultation with the RAs. The principle behind this initiative was that the TSOs would countertrade with Great Britain (GB), to export across EWIC, in order to prevent it from becoming the Largest Single Infeed (LSI). By doing this it meant that EWIC could still hold reserve and the amount of reserve required on the island was minimised. The original 2014/15 forecast, submitted to the RAs, included an estimate of both the production cost saving and revenue from the trades, as part of the supplementary modelling, for the entire tariff year. The TSOs argue that this needs to be readjusted as the TSOs have only realised approximately six months (03/03/2014 to 30/09/2014) of benefit in the 2013/14 tariff year. The TSOs have adjusted the ex-ante DBC baseline from 01/10/2014 to 03/03/2015, by removing the effect of countertrading for reserve co-optimisation and allowing the TSOs to realise 12 months of benefit.

RAs Proposal

The RAs are minded to endorse the TSOs' '12 months of benefit' principle and to allow for the above amendments, to the ex-ante DBC baseline. The RAs are cognisant of the fact that not

allowing 12 months of benefit, for each new TSO initiative, may provide the TSOs with a perverse incentive to delay new initiatives, until the beginning of the next tariff period. Furthermore, the RAs feel that any period longer than 12 months may disincentivise the TSOs from introducing new initiatives on as frequent a basis. This "12 months of benefit" principle may be applied to any outperformance of System Non-Synchronous Penetration (SNSP) targets, achieved by the TSOs, as part of the DS3 programme. The RAs welcome any comments on this proposal.

New Generating Units

In the TSOs' ex-ante DBC forecast, submitted in May 2014, the TSOs had to make a number of assumptions around the connection dates of new generation capacity. Additionally, as these units had not undergone testing the technical and commercial parameters of these units could only be estimated. The TSOs made the following adjustments to the ex-ante DBC baseline to account for these new generating units:

a. Great Island - The new Great Island Combined Cycle Gas Turbine (CCGT) went into commercial operation on 16/04/2015. The original 2014/15 forecast assumed a commercial operational date of the start of the tariff year i.e. 01/10/2014. The technical and commercial parameters, determined by the owner, also changed considerably relative to those contained within the ex-ante forecast. These parameters were updated in the DBC ex-post model.
b. Demand Side Units (DSUs) - DSUs can become commercially operational significantly quicker than conventional generating units and windfarms. The ex-ante DBC model was therefore updated to include all DSUs which became operational during the 2014/15 tariff year.

Interconnector Adjustments

In their ex-ante DBC forecast the TSOs included fixed flows on both interconnectors, as this was the trend at the time of submission. During the year the flows on both interconnectors changed significantly, predominately due to the increase of the Carbon Price Floor in Great Britain on 01/04/2015. In the ex-ante DBC forecast the import and export limits on both interconnectors were not binding, due to their fixed flow profiles. To reflect the change in actual flows the TSOs updated the ex-ante DBC forecast to reflect the following:

- Moyle: Export limit from SEM to GB increased from 80 MW to 250 MW as measured in Northern Ireland;

- EWIC: Export limit from SEM to GB increased from 400 MW to 526 MW as measured in Ireland; and
- EWIC: import limit from GB to SEM increased from 500 MW to 504 MW.

Furthermore, refinements were made to how the Moyle interconnector was modelled to align this with that used for EWIC. This amendment was made to reflect the actual flows for the 2014/15 tariff year.

RAs Proposal

As stated above, the SEMC Decision Paper on DBC Incentivisation states that the RAs will, as part of the ex-post review, examine any significant factors not identified which affected DBC outturn. Although the above factors are not specifically referred to as allowable ex-post review adjustments, in the Decision Paper, the RAs are minded to allow for their inclusion. Allowing for these amendments provides a more accurate ex-post DBC baseline by which to assess the TSOs' performance. The TSOs' have advised that if the refinements for new generating units and interconnector adjustments were not made that the ex-post adjusted baseline would be higher and the TSOs' outturn performance appear better as a result. The RAs are keen to ensure as transparent an ex-post review process as possible.

The RAs welcome any comments on this proposal.

5.2 SEM RULES OR ANY RA DECISION

The TSOs reviewed any changes to SEM market rules and any RA decision that became effective between the data freeze date of 27/03/2014 and the end of the 2014/15 tariff year. The TSOs identified that there were no changes to the SEM rules or RA rule changes which impacted on the 2014/15 ex-post review process.

5.3 DEMAND

The actual average monthly demand for Ireland was 1% lower than forecast, while the actual demand for Northern Ireland was 5% lower than forecast. When actual demand figures were rerun in PLEXOS, DBC decreased by 3%, therefore meeting the criteria for inclusion in the ex-post adjustment process[14].

[14] Per SEM-12-033 Incentivisation of All-Island Dispatch Balancing Costs, Table 6

5.4 WIND

Actual all-island wind availability was 2% higher than the assumed wind availability in the submitted ex-ante DBC forecast. This was considered a material difference and a rerun of the PLEXOS model was carried out. This model rerun showed an increase in DBC of 2% when compared with the submitted ex-ante DBC forecast. This change to DBC did not meet the criteria for inclusion in the ex-post adjusted model, when considered in isolation.

5.5 COMMERCIAL OFFER DATA & MIUNS

Actual Commercial Offer Data (COD) was compared to the submitted ex-ante forecast COD and these differed significantly. The main reason for this was a significant reduction in wholesale fuel prices across the island. The impact of the generator COD was assessed in PLEXOS and this resulted in a reduction to the DBC ex-ante baseline of 8%.

Forecasted Modified Interconnector Unit Nominations (MIUNs) on both Interconnectors were based on historical flows, experienced on both interconnectors, over a number of years. The actual MIUNs, however, differed significantly on both interconnectors. The increase in the Carbon Price Floor in GB, from 01/04/2015, was the main driver behind this change. The introduction of the Carbon Price Floor in GB significantly reduced the price spread between SEM and GB, with the result that both interconnectors exported more energy from SEM to GB, than was forecast. The impact of the actual MIUNs on DBC was assessed in PLEXOS and resulted in a reduction to DBC of 16%.

The actual COD (including actual MIUNs) was considered material and a rerun of the PLEXOS model was carried out. This resulted in a €43 million decrease to DBC, which equates to a 23% reduction, to the ex-ante DBC baseline. As this exceeds the threshold of 3% of the baseline, this warrants inclusion in the ex-post adjusted model.

5.6 COMBINATION OF DEMAND, WIND AND COD & MIUNS

When rerun in PLEXOS the combination of actual demand, actual wind availability and actual COD (including MIUNs) caused a €52.6 million (€185 million - €132.4 million) decrease to the ex-ante DBC baseline (including model refinements discussed above). This equates to a 29% decrease in DBC and meets the 8% threshold for inclusion in the ex-post adjusted model.

5.7 HILP EVENTS

Transmission outages, both forced outages and scheduled outage overruns, were assessed by the TSO for the 2014/15 tariff year. Generator forced outages, scheduled outage overruns and generator issues were also examined. The combination of the generation and transmission outages did not met the HILP criteria as they resulted in a change in DBC of less than 1%. This was therefore not considered material and was not included in the ex-post adjustment process.

5.8 CONCLUSION ON EX-POST PLEXOS ADJUSTMENTS

PLEXOS Results

The above amendments relate to the PLEXOS modelled component of the DBC forecast and result in an ex-post PLEXOS component value of €132.4 million. The PLEXOS portion of the DBC forecast has decreased, relative to the ex-ante forecast of €181.5 million, largely due to actual COD & MIUN levels differing from forecasts.

	€m
Ex-ante DBC PLEXOS forecast	181.5
PLEXOS Model basecase refinements	3.5
Adjustments for actual demand, exchange rates, wind, COD & MIUNs	(52.6)
Ex-post DBC PLEXOS value	132.4

Table 5: PLEXOS amendments in the Ex-post review process

RAs Proposal

As with the TSOs' 2016/17 Forecast, the RAs have sense checked the reasonableness of the TSOs' PLEXOS models against the RAs' validated PLEXOS model. The RAs investigated any reasons for differences between the models and the TSOs provided justification and evidence to explain any divergences.

The €52.6m of adjustments, for actual data, shown in table 5 above are clearly defined as allowable ex-post adjustment factors within the Decision Paper. Furthermore the Decision Paper states that the RAs will, as part of the ex-post review, examine any significant factors not identified in table 6 of the Decision Paper. The RAs feel the PLEXOS model basecase refinements should be included in order to ensure the TSO's performance is gauged against as

accurate an ex-post DBC forecast as possible. The RAs are minded to endorse the above amendments to the ex-ante DBC PLEXOS forecast.

The RAs welcome any comments on this proposal.

6 SUPPLEMENTARY MODELLING RESULTS

The supplementary modelling is designed to take account of the specific external factors that cannot be captured by the PLEXOS model. The TSOs have calculated an ex-post supplementary model DBC value of €13.5 million. This represents an increase of €17.4 million from the submitted ex-ante forecast. System Operator Interconnector Trades for countertrading account for the majority of this €17.4 million movement from the ex-ante forecast. As mentioned previously, the increase in the Carbon Price Floor in GB reduced the potential for countertrading for reserve co-optimisation and this has been reflected in the ex-post model. The results of the supplementary modelling process are summarised in Table 8 of the TSOs submission[15].

The table below shows the effect of both the PLEXOS and supplementary modelling ex-post amendments on the Constraint Costs forecast.

€m	Ex-ante DBC baseline	Ex-post adjusted DBC baseline
PLEXOS	181.5	132.4
Supplementary model	(3.9)	13.5
Total constraints	177.6	145.9

Table 6: Total constraints

RAs Proposal

As stated previously, the supplementary modelling takes account of the specific external factors that cannot be captured by the PLEXOS model. The RAs have checked the TSOs' supplementary model for accuracy and reasonableness of assumptions and are minded to endorse the above amendments.

The RAs welcome any comments on this proposal.

[15] Appendix 2

7 AMENDMENTS TO OUTTURN DBC

In their 2014/15 Incentive Outturn submission the TSOs propose additional amendments, on top of the ex-post review adjustments detailed above. The TSOs argue that outturn DBC should be amended to take account of two SEM Settlement Disputes, raised by the TSOs during the 2014/15 tariff year. The TSOs provided the following information on these disputes:

1. SEM Dispute #1: When a generating unit is under test in the SEM it can increase Imperfection Costs as additional units are constrained on/up for system security reasons. The SEM Testing Tariff is designed to help recover some of the additional costs associated with this testing. An incorrect SEM Testing Tariff was applied in the SEM settlement systems for periods during the 2014/15 tariff year. The TSOs identified this and raised a formal settlement dispute. This was resettled outside of the normal SEM settlement process, however the cost associated with this testing would have increased DBC. As this is an accounting issue the TSOs have included this as a separate line item;

2. SEM Dispute #2: The SEM systems assign Market Scheduled Quantities (MSQ) to the maximum of a generating units Firm Access Quantity (FAQ) or Dispatch Quantity (DQ). An incorrect FAQ was issued to a new generating unit for a period during the 2014/15 tariff year. The TSOs identified this and raised a formal settlement dispute. This was resettled outside of the normal SEM settlement process. As this is an accounting issue the TSOs have included this as a separate line item.

The RAs asked for further reasoning as to why outturn Imperfections Costs should be adjusted for the above disputes. The TSOs argued that the SEM settlement disputes relate to the actual outturn and not the ex-post adjusted baseline. The settlement disputes were considered material by SEMO and resettled accordingly. The TSOs further asserted that this means the cost recovery will be passed through to the all-island consumer, however it was not included in the initial settlement data for the 14/15 tariff year. As this is merely an accounting anomaly the TSOs are strongly of the view that it warrants inclusion in the actual outturn figures.

RAs Proposal

Amendments to outturn Imperfections Costs are not specifically referred to within the Decision Paper on DBC incentivisation and this is the first time the TSOs have proposed such amendments within the DBC incentivisation process.

The RAs are keen to ensure the TSOs' performance is assessed on an accurate basis and are therefore minded to allow for the above amendments to outturn DBC. The RAs want to promote transparency within the incentivisation process and equal treatment for such amendments will apply, whether they increase or decrease outturn Imperfection costs.

The table below shows the total Imperfections Costs, allowing for each of the RAs above proposals:

	Actual Outturn €m
Dispatch Balancing Costs	140.6
Energy Imbalance	(3.5)
Other System Charges	(6.2)
SEM Dispute #1	(1.8)
SEM Dispute #2	(0.4)
Total Imperfections Costs	**128.7**

Table 7: Actual Outturn Imperfections Costs

8 IMPERFECTIONS OUTTURN AND INCENTIVE CONCLUSIONS

As shown in table 7 above, actual Imperfections Costs for the tariff year 2014/15 are €128.7 million. This is €17.2 million lower than the ex-post adjusted baseline of €145.9 million, shown in table 6 above. The table below summarises the 2014/15 Incentive Outturn.

€m	**2014/15**		
	Actual	**Ex-post baseline**	**Ex-ante forecast**
Total constraints	144.05	145.90	177.60
Uninstructed Imbalances	(2.00)	-	-
Testing charges	(1.48)	-	-
Total DBC	**140.56**	**145.90**	**177.60**
Energy Imbalance	(3.50)	-	-
SEM Dispute #1	(1.80)	-	-
SEM Dispute #2	(0.40)	-	-
Other System Charges	(6.20)	-	-
Total Imperfections Charge	**128.70**	**145.90**	**177.60**

Table 8: Actual v Forecast Imperfections Costs

Based on this the TSOs are entitled to an incentive payment of €0.63 million. The €0.63 million is calculated in accordance with table 3, 'DBC Incentive Parameters' above. The €17.2 million

saving equates to an 11.8% reduction to the ex-post adjusted Imperfections Cost, and the TSOs have calculated the €0.63 million by extrapolating between 10% and 12.5% under budget.

RAs Proposal

The TSOs calculation is in accordance with the Decision Paper on DBC incentivisation and the TSOs have provided further breakdown of their calculation within table 10 of their submission[16]. The RAs are minded to endorse the payment of €0.63 million to the TSOs, in line with the specified proportions.

8.1 TSO EFFICIENCY GAINS

The TSOs have continued to introduce a significant number of operational initiatives to help reduce DBC. The TSOs assert that the €17.2 million saving was achieved largely through the following:

1. Dublin Must Run – the TSOs accounted for the full 12 months of benefit of this initiative, as referred to above.
2. Reserve Co-optimisation Countertrading - the TSOs accounted for the full 12 months of benefit of this initiative, as referred to above.
3. Dublin Load Based Constraint Rule – Poolbeg was removed as a temporary must run on 13/10/2014. This necessitated the introduction of a new load based constraint rule to help manage system contingencies in Dublin. A new load based operational constraint was therefore introduced on 18/11/2014, which required Huntstown 1 to be run for system loads over 3,800 MW and Poolbeg over 4,400 MW. This new constraint rule helped reduce DBC as the generation was only dispatched when the contingency became binding. The load based constraint rule for Poolbeg was further refined from 4,400 MW to 4,600 MW, on 04/02/2015, following operational experience;
4. North – South Total Transfer Capacity - A change was made to the scheduling software used by the TSOs on 15/11/2014, which refined the modelling of North-South reserve flows. The scheduling tool had considered that all reserve held in Ireland would flow South to North in the event of a generator trip in Northern Ireland. In reality this would not be the case as the reserve flow would be limited by the size of the generator to trip coupled with the fact that there would also be utilisation of the reserve held in Northern Ireland;

[16] See Appendix 2 page 19

5. Short Circuit Tool - A bespoke Short Circuit Tool was introduced into the National Control Centre as part of the existing Energy Management System (EMS). This new tool, which went live on 16/06/2015, allows for studies to be carried out on the network topology whilst allowing the generation dispatch to be optimised. The major benefit of the introduction of this tool was that it enabled the TSOs to couple Shellybanks 220 kV station at various times during the tariff year. This allowed the TSOs to dispatch cheaper generation in the Dublin region whereas previously more expensive generation was made must run.

9 DBC FORECAST & INCENTIVISATION IN THE I-SEM

The 2016/17 Forecast covers the period to the end of the SEM. The forecast for the 2017/18 tariff year will be based on different parameters, under the new European Integrated model. As the Integrated Single Electricity Market (I-SEM) design is likely to differ from the current SEM design any incentivisation mechanism, around DBC in the I-SEM, will have to reflect these market differences. Given time constraints, there potentially may not be an incentive mechanism in place for the first year of the I-SEM, however it is important that an accurate DBC forecast is in place for tariff setting purposes.

10 TSOS REPORTING AND TRANSPARENCY MEASURES

In order to increase transparency around DBC, the SEMC has introduced reporting requirements on the TSOs. The TSOs provide quarterly updates on the levels of Constraint Costs, drivers behind Constraint Costs, mitigating measures being taken and other information or commentary that the TSOs believe will aid transparency in this area.

These Quarterly Imperfections Costs Reports are available on EirGrid's and SONI's websites. The most recent report relates to the period January to March 2016[17] and includes a Year-to-Date section.

[17] SONI Ltd - Publications

11 PROVISION OF COMMENTS

The RAs request comments on the proposals set out in this consultation paper. All comments received will be published, unless the author specifically requests otherwise. Accordingly, respondents should submit any sections that they do not wish to be published in an appendix that is clearly marked “confidential”.

Comments on this paper should be forwarded, in electronic form, to Bronagh McKeown at Bronagh.McKeown@uregni.gov.uk by 17:00 on Friday 22nd July 2016.