



**Imperfections Charge
October 2018 – September 2019**

And

**Incentive Outturn
October 2016 – September 2017**

Consultation Paper

SEM-18-038

20 July 2018

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1 EXECUTIVE SUMMARY

The Integrated Single Electricity Market (I-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), Fixed Cost 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 2018 to 30th September 2019'¹ (2018/19 Forecast); and
2. 'Imperfections Costs Incentive for Tariff Year 1st October 2016 to 30th September 2017'² (2015/16 Incentive Outturn).

The Utility Regulator (UR), in Northern Ireland, and the Commission for Regulation of Utilities (CRU), 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 2018/19 FORECAST

The TSOs have forecast an Imperfections revenue requirement of €231.17 million for the 2018/19 tariff year. This represents a 28.17% increase from the €180.36 million final decision for the 2017/18 tariff year. The RAs have reviewed this forecast and proposed an overall revenue requirement of €197.63m which now represents a 9.57% increase from the 2017/18 tariff year.

The forecast provided by the TSOs included a number of new items and I-SEM factors for consideration for 2018/19 which are discussed in the TSO submission. The RAs have recommended that specific amendments are made to the new items, which are:-

- Interconnector Ramp Rate Disparity forecast, €8.0m – The RAs consider this to be a non-volatility issue and recommend a €0 allowance.

¹ Appendix 1

² Appendix 2

The RAs have recommended for inclusion in the forecast :-

- Dispatch Down of DSUs (€8.34m) - The RAs have reviewed this forecast and are content to allow this amount for this year.
- Long Notice Adjustment Factors forecast, €0.0m – Following a decision (SEM-17-046) a provision of zero has been made for the 2018/19 forecast.
- Imbalance Price Impact forecast, €45.54m – The RAs recommend a revised allowance of €20m for this item.
- Northern Ireland Gas Product Charges forecast, €7.0m – Gas Transportation Charges are unlikely to alter in Northern Ireland during this tariff year and this cost has been viewed as reasonable.

The result of the amendments totalling €33.54m has reduced the Imperfections Revenue Requirement to €197.63m.

Taking into account a K factor adjustment of (€13.86m), this results in a 2018/19 Imperfections Charge of €5.22 per megawatt-hour (MWh), compared with €5.00 per MWh for the 2017/18 tariff year, as shown in Table 1 overleaf.

The RAs are minded to endorse the TSOs' 2018/19 revised Forecast and a K factor adjustment of (€13.86m).

	2018-19	2017-18	Change
Imperfections Allowance (€m)	197.63	180.36	9.57%
K factor (€m)	(13.86)	(7.34)	
Total Allowance (€m)	183.77	173.02	6.21%
Forecast Demand (GWh)	35,200	34,550	1.88%
Tariff (€/MWh)	5.22	5.00	4.4%

Table 1: Imperfections Charge 2018/19 versus 2017/18

1.2 2015/16 INCENTIVE OUTTURN

DBC are a significant cost element passed on to the all-island consumer and represent the majority of the Imperfections Charge³. 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 2012⁴. 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 2016/17 tariff year of €144.3 million, in April 2016. The PLEXOS element of this forecast stood at €125.8 million, with the supplementary modelling component equalling €18.5 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 Load based Constraints/ Dublin Generation Rules introduced from 24/05/2016. SNSP was also increased from 50% to 55% on 01/03/2016. This is achieved by removing the effect of any initiative from the 2016/17 forecast so as to enable the benefit of the initiatives to be realised when comparing the TSOs’ outturn performance to the forecast.
 - b) New Generating Units – Adjustment to account for all Demand Side Units which became operational during the 2016/17 tariff year.
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.

³ DBC has accounted for 96-100% 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 TSOs' 2016/17 Incentive Outturn submission details actual Imperfections Costs of €126.9 million, €15.3 million lower than the ex-post adjusted baseline of €142.2 million⁵. This saving potentially entitles the TSOs to an incentive payment of €0.46 million⁶. This is the fourth year in which the TSOs have claimed entitlement to an incentive payment, with the TSOs receiving an incentive payment of €0.15m last year, based on the outturn Imperfections Cost for tariff year 2015/16.

The RAs are minded to endorse the payment of this €0.46 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 2018/19 Forecast, the 2016/17 Incentive Outturn and the RAs' recommendations in relation to both are invited from industry and the public by 12.00 on Friday 17 August 2018, as detailed in section 11.

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

2 INTRODUCTION

2.1 OBJECTIVE OF PAPER

The objective of this consultation paper is to solicit comments, from interested parties, on the TSOs' submissions in relation to the Imperfections in the SEM/I-SEM, namely the 2018/19 Forecast and the 2016/17 Incentive Outturn.

⁵ Calculated as original DBC forecast (144.3m) less basecase refinements and actual data (5.4m) plus supplementary modeling adjustments (3.3m) = 142.2m

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

2.2 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), Fixed Cost 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.

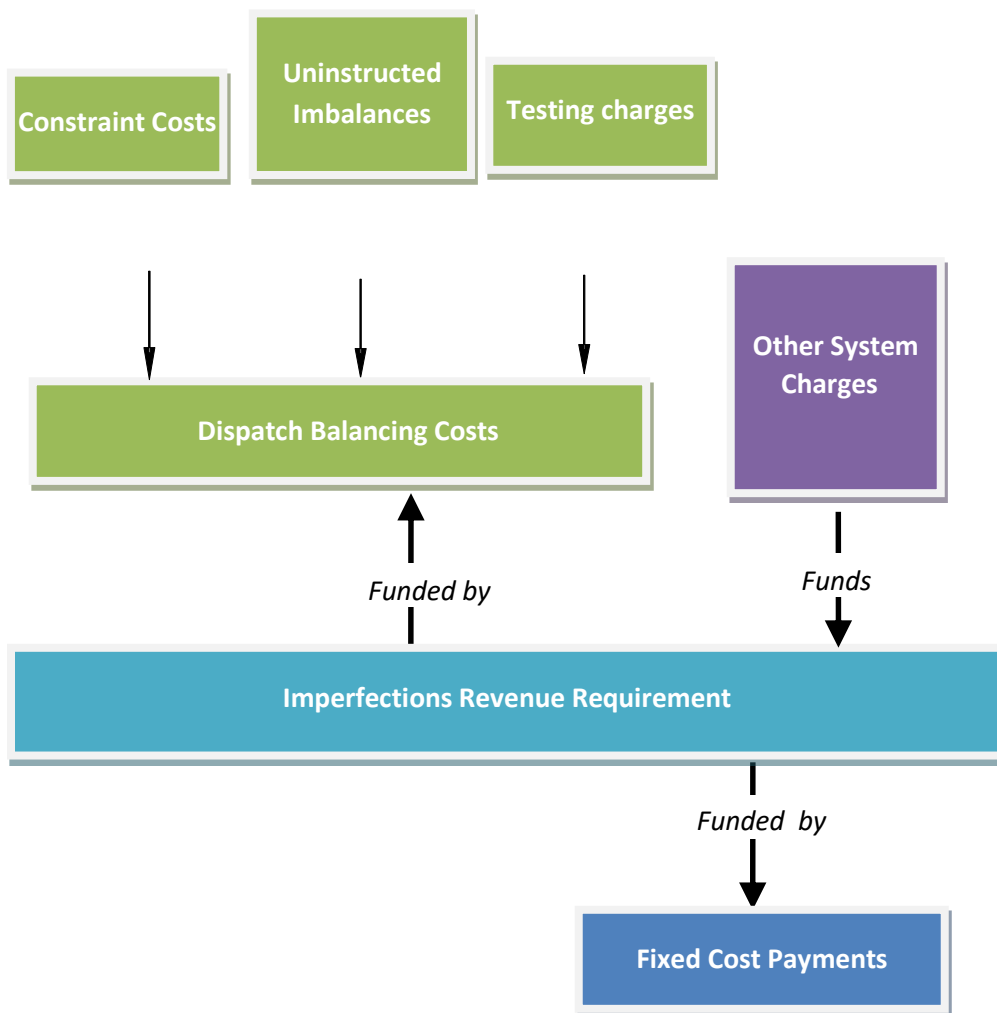


Figure 1: Imperfections Charge Components

3 THE 2018/19 FORECAST

The TSOs' 2018/19 Forecast was prepared jointly by EirGrid and SONI, and captures an all-island estimate of the Imperfections Charge for the 2018/19 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 €231.17 million for the 2018/19 tariff year. This forecast has been revised by the RAs to €197.63m.

This represents a 9.57% increase from the €180.36 million final decision for the 2017/18 tariff year. There are a number of key factors influencing the revised 2018/19 Forecast, including:

- An increase in available priority dispatch generation in the unconstrained PLEXOS model of 9% leading to an additional €17 million compared to the 2017/18 forecast.
- An increase in forecasted wholesale fuel costs increases constraint costs by approximately €8 million in the PLEXOS model.
- An improvement in generator parameters through the introduction of the TSO's System Services Contracts contributes to a reduction of €49 million compared to the 2017/18 forecast.
- In I-SEM wind generation that is constrained or curtailed down from their market position will have to pay back either ex-ante market revenue or the imbalance settlement price rather than retaining their revenue under the SEM. This can result in additional charges which can offset DBC leading to a reduction of the forecast of €8.9 million.

Detail on the forecasts for each of the Imperfections Charge components is provided below and further information regarding the 2018/19 Forecast is provided by the TSOs in Appendix 1.

3.1 DISPATCH BALANCING COSTS

DBC refers to the sum of Constraint Payments, Uninstructed Imbalance Payments and Generator Testing Charges. DBC makes up 96.4% of the revised Imperfections Charge in the 2018/19 Forecast. DBC for the 2018/19 tariff year is forecast as €190.44 million.

3.2 CONSTRAINT PAYMENTS

Constraint Payments make up the entirety of the 2018/19 DBC revised forecast (€190.44m), 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 and have sense checked the TSOs' modelling assumptions. The RAs have investigated any differences between the models and the TSOs have provided explanations for any divergence from the RAs' internal models. The PLEXOS element of the TSOs' Constraint Costs forecast is €149.48 million, which has increased from the forecast Constraint Costs of €140.04 million for the PLEXOS component of the 2017/18 tariff year. The reasons for this increase are detailed in the bullet points in section 3 above. The assumptions underlying the TSOs' PLEXOS Constraints are detailed within their submission⁷.

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 factors⁸. The 2018/19 forecast for Constraint Costs, derived from supplementary modelling, is €66.50 million plus €8m for Interconnector Ramp Rate Disparity. The allowed figure for the 2017/18 tariff year was €37.6 million.

A provision of €0.77 million for Secondary Fuel start-up tests has been made within the supplementary model. The TSOs have anticipated that the fuel switching arrangements which

⁷ Appendix 1 page 12

⁸ See Appendix 1 page 15

are currently progressing will come into place in NI in 2018/19. The obligations have been in place in ROI since 2010.

Combining both the PLEXOS and supplementary modelling Constraints, a revised forecast of €190.44 million is included for 2018/19 Constraint Costs, representing an increase of 7.2% from the 2017/18 revised forecast of €177.6 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.

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 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 (FIXED COST 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 €7.19 million for Make Whole Payments, based on the TSOs' experience of actual outturn, from 1st October 2017 to 31st March 2018, 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 2018/19 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 2018/19 is (€13.86m). This comprises of:

Summary of K factor adjustment

Over-recovery in tariff year 2016/17	(€13.86)
Estimated over-recovery for tariff year 2017/18	<u>(€0m)</u>
Total Imperfections K factor to be applied in 2016/17	<u>(€13.86m)</u>

This €13.86 million over-recovery is netted off the 2018/19 forecast Imperfections Charge leading to a reduction in the Imperfections Charge for the 2018/19 tariff year.

3.9 DEMAND FORECAST

Based on outturn 17/18 demand and 18/19 year to date figures the TSOs have forecast demand for the 2018/19 tariff year at 35,200 GWh, representing a 1.9% increase from the 2017/18 forecast demand of 34,550 GWh.

3.10 IMPERFECTIONS CHARGE

As stated in section 3.2 above, the RAs revised forecast Constraint Costs of €190.44 million are proposed for the 2018/19 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 Fixed Cost (Make Whole) Payments of €7.19 million, based on 2017/18 outturn to date. The remaining elements of the Imperfections Charge are forecast at zero, meaning the forecast Imperfections Charge for 2018/19 stands at €197.63 million. Allowing for the K factor adjustment, provides a total forecast Imperfections Charge of €183.77 million, which when divided by the forecast demand, of 35,200 GWh, equates to an Imperfections Charge of €5.22/MWh for the 2018/19 tariff year.

The comparable figure for the current 2017/18 tariff year stood at €5.00/MWh. Any under or over recovery of Imperfections Costs in the 2018/19 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	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14
Total Constraints costs	190.44	177.6	144.3	163.5	177.6	165.5
Uninstructed Imbalances		-	-	-	-	-
Testing charges		-	-	-	-	-
Dispatch Balancing Costs	190.44	177.6	144.3	163.5	177.6	165.5
Energy Imbalance		-	-	-	-	
Fixed Cost (Make whole) payments	7.19	2.7	2.5	7.2	3.6	0.1
K factor Adjustment	(13.86)	(7.34)	(77.6)	(22.1)	5.2	(18.9)
Other System Charges	-	-	-	-	-	-
Total Imperfections Charge	183.77	173.02	69.2	148.6	186.4	146.7
Forecast Demand ('000 MWh)	35,200	34,550	33,700	33,230	33,320	33,220
Imperfections Charge/ MWh	5.22	5.00	2.05	4.47	5.60	4.42

Table 2: Imperfections Charge over the years

3.11 RAS PROPOSAL

As stated previously, the RAs have sense checked the assumptions within the TSOs' forecast against the RAs' validated PLEXOS model. The RAs examined 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 reviewed the forecast which included new items for consideration for the 2018/19 tariff year and proposed that the following items, totalling €33.54m are revised.

- Interconnector Ramp Rate Disparity forecast, €8.0m –The RAs have not been persuaded that this effect leads to an expected loss (ie a bias in the differences during ramping) and consider this to be a non-volatility issue and recommend a €0 allowance.
- Imbalance Price Impact forecast, €45.54m – The RAs note the use of the uninstructed imbalance modelling approach for this item. The RAs consider however, that the occurrence of uninstructed imbalances in the SEM may not be strongly related to the occurrence of generation requiring a higher payment price in settlement. Further, the likelihood of a generator having offers substantially below the imbalance price (or conversely bids above) may be small.

Balancing this, the RAs acknowledge that the expected impact of these effects will be non-negative, and further acknowledge the difficulty in establishing a robust figure ahead of the commencement of the I-SEM.

The RAs nevertheless consider that €45.54m is too conservative an allowance for the full year for these effects. An allowance of €20m is recommended noting that this is not derived from a detailed model and noting the safety nets of the contingency fund and the RAs ability to revise tariffs mid-year should this allowance prove significantly smaller than what is required.

The RAs have proposed that the following items totalling €15.34m are included within the forecast.

- Long Notice Adjustment Factors forecast, €0.0m
- Dispatch Down of DSUs (€8.34m) - The RAs have reviewed this forecast and are content to allow this amount for this year.
- Northern Ireland Gas Product Charges forecast, (€7.0m) – Gas Transportation Charges are unlikely to alter in Northern Ireland during this tariff year and this cost has been viewed as reasonable.

The RAs are minded to endorse the revised 2018/19 Forecast and a K factor adjustment of (€13.86 million). The RAs welcome any comments on this proposal and the TSOs' submission.

4 INCENTIVE OUTTURN SUMMARY 2016/17

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 Paper⁹, 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 2016/17 tariff year is the fifth year to fall within the incentive mechanism and the fourth year where an incentive payment is potentially due. EirGrid and SONI's assessment of the incentive outcome for the 2016/17 tariff year is attached as Appendix 2 to this paper¹⁰. The TSOs' assessment provides for outturn Imperfections Costs of €126.9 million; €15.3 million lower than the ex-post adjusted baseline. Based on this, the TSOs are potentially entitled to an incentive

⁹ SEM-12-033 Incentivisation of All-Island Dispatch Balancing Costs Decision Paper, dated 5 June 2012

¹⁰ Appendix 2 - Imperfections Costs Incentive for Tariff Year 1st October 2015 – 30 September 2017, submitted by the TSOs on 10 May 2018

payment of €0.46 million. The resultant incentive payment would be applied on a 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 2016 to 30th September 2017' (ex-ante DBC forecast) in April 2016. This submission forecast DBC for the 2016/17 tariff year at €144.3 million. The 2016/17 Incentive Outturn paper contains the TSOs' ex-post adjustments to this €144.3 million baseline, to form an ex-post adjusted baseline of €142.2 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 process¹¹.

¹¹ Appendix 2

5.1 PLEXOS MODEL BASECASE REFINEMENTS AND ACTUAL DATA

In their 2016/17 Incentive Outturn submission the TSOs assert that the combined effect of the PLEXOS model basecase refinements, detailed below, is to decrease the originally submitted (ex-ante) PLEXOS model from €125.8 million to €120.4 million.

Initiatives introduced in 2015/16

The TSOs introduced a number of operational initiatives at various points in the 2015/16 tariff year. The TSOs have adjusted the 2016/17 ex-ante DBC forecast to allow for 12 months of benefit from each initiative. These initiatives are outlined below:

- a. Dublin Load Based Constraints / Dublin Generation Rules – From 24/05/2016 the requirement for generation in North and South Dublin was changed to reflect changing generator characteristics. The system stability requirements were also changed.
- b. SNSP– increased from 50% to 55% on 01/03/2016

Other System Changes

The TSOs made the following adjustments to the ex-ante DBC baseline to account for these new generating units:

- a. 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 2016/17 tariff year.
- b. Generator Technical Offer Data – A number of units in Dublin reduced their minimum load value during 2016/17 and can now provide operating reserve from a lower value. This helped reduce DBC as the units had been constrained on and the reduction in minimum load helped bring them into merit in the SEM.

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 11/04/2016 and the end of the 2016/17 tariff year. The TSOs identified that there were no changes to the SEM rules or RA rule changes which impacted on the 2016/17 ex-post review process.

5.3 DEMAND

The actual all-Island monthly demand was 0.5% higher than forecast. Ireland was 1.1% higher than forecast and Northern Ireland was 1.4% lower. When actual demand figures were rerun in PLEXOS, DBC decreased by 6.1%, therefore meeting the criteria for inclusion in the ex-post adjustment process¹².

5.4 WIND, SOLAR, DSU AND PEAT

Actual all-Island wind, Solar, DSU and peat availability was higher than the assumed respective availabilities in the submitted forecast.

It was found that the shape of DSU available energy does not have a flat profile but varies considerably with time. The actual DSU available energy was included in the ex-post model.

The PLEXOS check of the combination of these availability changes indicated that it had a material impact on DBC for tariff year 2016/17. This resulted in a 15.3% decrease in DBC. As this was greater than the +/-3% threshold of the baseline, this was included in the ex-post adjusted model.

5.5 COMMERCIAL OFFER DATA & MIUNS

Actual Commercial Offer Data (COD) was compared to the submitted ex-ante forecast COD and these differed enough to consider for inclusion. Actual interconnector flows for 2016/17 were updated as these differed significantly from the forecast flows.

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

The actual COD (including actual MIUNs) was considered material and a rerun of the PLEXOS model was carried out. This resulted in a 5% decrease to DBC. 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 €37.9 million decrease to the ex-ante DBC baseline (including model refinements discussed above). This equates to a 26.7% 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 2016/17 tariff year. Generator forced outages, scheduled outage overruns and generator issues were also examined. The combination of the generation and transmission outages met the HILP criteria as they resulted in an increase in DBC of 8%. This was therefore considered material and was 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 €120.4 million. The PLEXOS portion of the DBC forecast has decreased, relative to the ex-ante forecast of €125.8 million, largely due to actual COD & MIUN levels differing from forecasts.

	€m
Ex-ante DBC PLEXOS forecast	125.8
Net of base case refinements and actual data change adjustments	(5.4)
Ex-post DBC PLEXOS value	120.4

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

RAs Proposal

As with the TSOs' 2018/19 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 adjustments, for actual data, which are included in table 5 above appear reasonably 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 €21.8 million. This represents an increase of €3.3 million from the submitted ex-ante forecast. System Operator Interconnector Trades for countertrading account for the majority of this €3.3 million movement from the ex-ante forecast. The results of the supplementary modelling process are summarised in Table 8 of the TSOs submission¹³.

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	125.8	120.4
Supplementary model	18.5	21.8
Total constraints	144.3	142.2

Table 6: Total constraints

¹³ Appendix 2

RA's 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.

7 OUTTURN DBC

RA's Proposal

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

	Actual Outturn €m
Dispatch Balancing Costs	127.6
Energy Imbalance	(2.6)
Other System Charges	(9.0)
SO Trades	10.9
Total Imperfections Costs	126.9

Table 7: Actual Outturn Imperfections Costs

8 IMPERFECTIONS OUTFURN AND INCENTIVE CONCLUSIONS

As shown in table 7 above, actual Imperfections Costs for the tariff year 2016/17 are €126.9 million. This is €15.3 million lower than the ex-post adjusted baseline of €142.4 million, shown in table 6 above. The table below summarises the 2016/17 Incentive Outturn.

€m	2016/17		
	Actual	Ex-post baseline	Ex-ante forecast
Total constraints	144.1	142.2	144.3
Uninstructed Imbalances	(4.1)	-	-
Testing charges	(1.5)	-	-
Total DBC	138.5	142.2	144.3
Energy Imbalance	(2.6)	-	-
		-	-
		-	-
Other System Charges	(9.0)	-	-
Total Imperfections Charge	126.9	142.2	144.3

Table 8: Actual v Forecast Imperfections Costs

Based on this the TSOs are entitled to an incentive payment of €0.46 million. The €0.46 million is calculated in accordance with Table 3, 'DBC Incentive Parameters' above. The €15.3 million saving equates to an 10.73% reduction to the ex-post adjusted Imperfections Cost, and the TSOs have calculated the €0.46 million by extrapolating between 10% and 12.5% under budget.

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 submission¹⁴.

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 €15.3 million saving was achieved largely through the following:

1. SNSP 55% – Following a successful trial from October 2015 the Non-Syncchronous Generation limit permanently changed from 50% to 55% on 01/03/2016.

¹⁴ See Appendix 2 page 18

2. SNSP 60% – Following a successful trial from November 2016 the Non-Synchronous Generation limit permanently changed from 55% to 60% on 09/03/2017.
3. Special Protection Schemes – The implementation of special protection schemes at Clogher and Mount Lucas has helped reduce DBC.
4. Dublin Generation Rules- From 24/05/2016 the requirement for generation in North and South Dublin was changed to reflect changing generator characteristics along with system stability requirements.

8.2 RA PROPOSAL ON INCENTIVE PAYMENT

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 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 are minded to continue to apply the '12 months of benefit' principle and to allow for the above amendments, to the ex-ante DBC baseline, as applied by the TSOs on the basis they are entitled to a minimum of twelve months benefit for any initiative introduced and noting it may be necessary to apply an initiative for a full tariff year following the tariff year in which it was introduced in order to gain the full benefit of this and for the incentive to be effective. The RAs welcome any comments on this proposal.

The RAs acknowledge and are minded to endorse the efficiency gains described in section 8.1 above.

The RAs are subsequently minded to endorse the €0.46 million incentive amount and welcome any comments on this proposal.

9 DBC FORECAST & INCENTIVISATION IN THE I-SEM

The 2018/19 Forecast covers the introduction of I- SEM. The forecast for the 2018/19 tariff year is based on different parameters, under the new European Integrated model. As the Integrated Single Electricity Market (I-SEM) design differs from the previous SEM design any incentivisation mechanism, around DBC in the I-SEM, will have to reflect these market differences. Given time constraints, there 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 2018¹⁵ and includes a Year-to-Date section.

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 Billy Walker at billy.walker@uregni.gov.uk by 12:00 on Friday 17th August 2018.

¹⁵ [SONI Ltd - Publications](#)