



**Imperfections Charge  
October 2019 – September 2020**

**And**

**Incentive Outturn  
October 2017 – September 2018**

**Consultation Paper**

**SEM-19-031**

**1 July 2019**

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## 1 EXECUTIVE SUMMARY

The 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 2019 to 30th September 2020'<sup>1</sup> (2019/20 Forecast); and
2. 'Imperfections Costs Incentive for Tariff Year 1<sup>st</sup> October 2017 to 30<sup>th</sup> September 2018'<sup>2</sup> (2017/18 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 and invites responses from stakeholders.

### 1.1 2019/20 FORECAST

The TSOs have forecast an Imperfections revenue requirement of €302.65 million for the 2019/20 tariff year. This represents a 53% increase from the €197.63 million final decision for the 2018/19 tariff year. The RAs have reviewed this forecast and proposed some amendments, resulting in an overall revenue requirement of €271.33m which would represent a 37% increase from the 2018/19 tariff year.

The forecast provided by the TSOs included a number of new items and factors relating to the function of the new market arrangements for consideration for 2019/20. The RAs are minded that specific amendments should be made to the new items proposed by the TSOs. These are:

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<sup>1</sup> Appendix 1

<sup>2</sup> Appendix 2

- Interconnector Ramp Rate Disparity forecast, €3.2m. The RAs are minded that this element has not been shown to be an underlying expected cost, but rather a cost that can vary either positively or negatively during the Year, and so are minded to make a €0 allowance for this.
- Provision of €18 million for the inclusion of NI Gas Transportation Charges (GTC). The RAs note that the TSOs have assumed that all large gas-fired units in NI will purchase gas transportation on the short-term market during 2019-20. The RAs do not see evidence for an increase in this element and propose to exclude from the calculation.
- An inclusion of €5.7 million has been requested for “Undo Actions” which are new settlement cost components, the intent of which is to ensure units are compensated for energy dispatched by the TSOs which the TSOs then decide on not taking. While the RAs accept that these costs will arise, we are proposing to make no specific allowance for it but would encourage the TSOs to minimise these occurrences in the course of near and real time operation.
- Provision of €14.42 million for the settlement of Pumped Storage units in the new market. While the RAs acknowledge the treatment of these units in Plexos differs from the new market, we note that the PLEXOS models already include a gap between the efficiencies, with the unconstrained and constrained set to 70% and 48% respectively. The RAs propose to retain the efficiency gap and make a reduced supplementary allowance of €10 million, and would expect the TSOs to strive to match the market position of the units in dispatch as closely as possible.

The TSOs have proposed a K factor adjustment of €84.44m, to correct for previous years and to include an estimate of the costs above forecast for the remainder of the 2018/19 year. The RAs note that this amount is significant when taken together with the significantly higher potential requirement in 2019/20 of €271.33m.

Bearing in mind the uncertainty of the revenue that may be required in future years, the RAs are minded to allow the €84.44m K factor adjustment in full in 2019-20. However, given the impact on tariffs (shown in the table below), the RAs have considered the possibility of delaying the recovery of part of this amount until the subsequent year, in order to smooth the effects of the increases borne by suppliers and ultimately consumers. The RAs would invite respondents to comment on the merit of this and on the quantum of any amount to be delayed for recovery until the subsequent tariff year.

The TSOs made representations to the SEM Committee during the most recent meeting of the Committee on 28 June 2019 as to their dedication to the objective of lowering DBC and continuing to research and refine their operating processes to bring this about. The SEM Committee welcomed this.

Taking into account the Imperfections Allowance and the proposed K factor adjustment of €84.44m, this results in a 2019/20 Imperfections Charge of €10.40 per megawatt-hour (MWh), compared with €5.22 per MWh for the 2018/19 tariff year, as shown in Table 1 below.

	<b>2019-20</b>	<b>2018-19</b>	<b>Change</b>
Imperfections Allowance (€m)	271.33	197.63	+37.29%
K factor (€m)	84.44	(13.86)	
Total Allowance (€m)	355.77	183.77	+93.59%
Forecast Demand (GWh)	34,200	35,200	
<b>Tariff (€/MWh)</b>	<b>10.40</b>	<b>5.22</b>	<b>+99.23%</b>

**Table 1: Imperfections Charge 2019/20 versus 2018/19**

## 1.2 2017/18 INCENTIVE OUTTURN

Dispatch Balancing Costs (DBC) are a significant cost element passed on to the all-island consumer and represent the majority of the Imperfections Charge<sup>3</sup>. In light of this, 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<sup>4</sup>. 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

<sup>3</sup> DBC has accounted for 95-100% of the forecast Imperfections Charge over the last 5 tariff years

<sup>4</sup> SEM-12-033 Incentivisation of All-Island Dispatch Balancing Costs Decision Paper, dated 5 June 2012

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

This section of the paper covers the TSO's proposals for the calculation of the incentive to apply for the 2017/18 tariff year, and the RAs minded to position on the proposal.

The TSOs originally submitted a forecast DBC, for the 2017/18 tariff year of €177.7 million, in April 2017. The PLEXOS element of this forecast stood at €140.04 million, with the supplementary modelling component equalling €37.62 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) SNSP was increased from 55% to 60% on 09/03/2017 and then to 65% from 14/11/2017 as a trial that later became permanent in March 2018.
  - b) New / Closing Generator Units – DSUs along with Solar/PV where included within the base case model and the Marina Unit MRC was removed from PLEXOS from 10/09/2018.
2. Combination of actual demand, Commercial Offer Data, Wind and MIUNs data. When rerun in PLEXOS, the combination of actual demand, actual wind availability and actual COD including (MIUNs) caused a 9.83% increase in the ex-ante DBC baseline including model refinements discussed above.

The TSOs' 2017/18 Incentive Outturn submission details actual Imperfections Costs of €184.3 million, €18.77 million lower than the ex-post adjusted baseline of €203.1 million<sup>5</sup>. This saving potentially entitles the TSOs to an incentive payment of €0.354 million<sup>6</sup>. This is the fifth year in which the TSOs have claimed entitlement to an incentive payment, with the TSOs receiving an incentive payment of €0.46m last year, based on the outturn Imperfections Cost for tariff year 2016/17.

The RAs are minded to endorse the analysis by the TSOs with the exception of the deductions made for RoCoF GPI payments under Other System Charges. This is a substantial element of the process however, and would reduce the apparent savings made by the TSOs, resulting still in a net savings in DBC made against forecast, but with resulting incentive payment of €0.

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<sup>5</sup> Calculated as original DBC forecast (177.7m) plus basecase refinements and actual data (45.88m) minus supplementary modeling adjustments (20.42m) = 203.16m

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

### 1.3 PROVISION OF COMMENTS

Comments on the 2019/20 Forecast, the 2017/18 Incentive Outturn and the RAs' recommendations in relation to both are invited from industry and the public by 12.00 on Friday 29 July 2019, as detailed in section 11.

Comments on this paper should be forwarded, in electronic form, to Billy Walker at [Billy.Walker@uregni.gov.uk](mailto:Billy.Walker@uregni.gov.uk).

## 2 INTRODUCTION

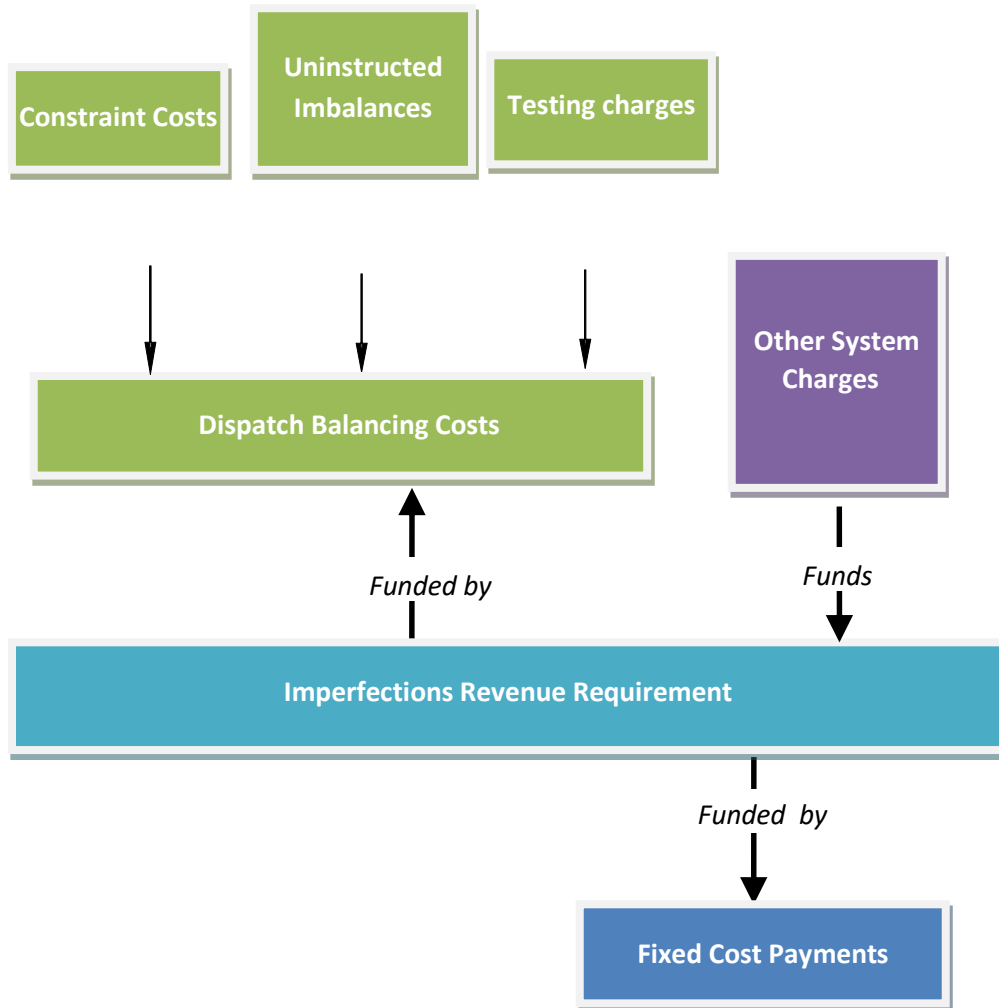
### 2.1 OBJECTIVE OF PAPER

The objective of this consultation paper is to solicit comments, from interested parties, on the TSOs' submissions in relation to the Imperfections in the I-SEM, namely the 2019/20 Forecast and the 2017/18 Incentive Outturn.

### 2.2 OVERVIEW

The Imperfections Charge is levied on suppliers by SEMO. The purpose of the Imperfections Charge is to recover the anticipated Dispatch Balancing Costs (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 2019/20 FORECAST

The TSOs’ 2019/20 Forecast was prepared jointly by EirGrid and SONI, and captures an all-island estimate of the Imperfections Charge for the 2019/20 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 €302.65 million for the 2019/20 tariff year. The RAs are minded to revise the forecast to €271.33 million.

This represents a 37% increase from the €197.63 million final decision for the 2018/19 tariff year. There are a number of key factors influencing the revised 2019/20 Forecast, including:

- An increase in available priority dispatch generation in the unconstrained PLEXOS model contributes to an additional €29 million imperfections cost compared to the 2018/19 forecast.
- An increase in forecasted wholesale fuel costs, a change in gas supply arrangements for one large unit in Dublin, as well as the potential inclusion of Gas Transportation capacity charges in its offers, increases constraint costs by approximately €38 million in the PLEXOS model.
- Higher flows on the interconnectors and the North-South Tie Line along with Operational constraints improvements have reduced the PLEXOS model constraint costs by €19 million
- Provision of €19.05 million for the exposure to the new imbalance pricing design in the new market through CPREMIUM and CDISCOUNT.

Detail on the forecasts for each of the Imperfections Charge components is provided below and further information regarding the 2019/20 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 95% of the revised Imperfections Charge in the 2019/20 Forecast. Revised DBC for the 2019/20 tariff year is forecast as €256.97 million.

### 3.2 CONSTRAINT PAYMENTS

Constraint Payments make up the entirety of the 2019/20 DBC revised forecast (€256.97m), 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 revised forecast is €216.57 million, which has increased from the forecast Constraint Costs of €149.48 million for the PLEXOS component of the 2018/19 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 submission<sup>7</sup>.

### **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<sup>8</sup>. The 2019/20 revised forecast for Constraint Costs, derived from supplementary modelling, is €40.40 million. The allowed figure for the 2018/19 tariff year was €66.5 million.

A provision of €1.06 million for Secondary Fuel start-up tests has been made within the supplementary model.

Combining both the PLEXOS and supplementary modelling Constraints, a revised forecast of €256.97 million is included for 2019/20 Constraint Costs, representing an increase of 35% from the 2018/19 revised forecast of €190.44 million.

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<sup>7</sup> Appendix 1 page 11

<sup>8</sup> See Appendix 1 page 15

### 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 that were considered a part of imperfections in SEM are assumed to be managed by the new balancing design, for the purposes of the TSO submission and will be monitored by the TSOs throughout the tariff year.

### 3.6 FIXED COST PAYMENTS

Fixed Cost Payments in the new market comprise of: Make Whole Payment, Recoverable Start Up Costs and recoverable No-Load Costs. A provision for the Fixed Cost Payments for the entire 2019/20 is included in the TSO submission based on the Fixed Cost Payments estimate for the 2019/20 tariff year. As the Recoverable Start Up Costs were already captured in the PLEXOS

production cost difference in order to avoid double counting the Recoverable Start Up part was subtracted from the total yearly estimate. A provision of €14.35 million has been made by the TSOs for Fixed Cost Payments.

### 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 2019/20 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 submitted by the TSOs to be applied to the Imperfections Charge for 2019/20 is €84.44m. This comprises of:

#### **Summary of K factor adjustment**

Under-recovery in tariff year 2017/18	€-4.44m
Estimated Under-recovery for tariff year 2018/19	<u>€-80m</u>
Total Imperfections K factor to be applied in 2019/20	<u>€-84.44m</u>

This €84.44 million under-recovery would usually be applied to the 2019/20 forecast Imperfections Charge leading to an increase in the Imperfections Charge for the 2019/20 tariff year. However, the RAs are aware that the higher observed costs in 2018/19 are attributable partly to the impact of defects in systems. The RAs are minded to allow the full under-recovery to be applied to the 2019/20 tariff but recognise this is a significant rise in the Imperfections Charge for 2019/20, with the potential for a corresponding impact on final customer bills. However, bearing in mind the various uncertainties in the near future (e.g. Brexit, revenue requirements of future years), and the negative impacts that would arise in the event the TSOs' working capital facility was exhausted (short-paying or deferring paying generators), measures such as profiling might not be wise at this time. Comments are invited on the potential option that a percentage of an under-recovery is applied over a number of tariff years, with indexation to apply as normal.

### 3.9 DEMAND FORECAST

Based on outturn 18/19 demand and 19/20 year to date figures the TSOs have forecast demand for the 2019/20 tariff year at 34,200 GWh, representing a 2.8% decrease from the 2018/19 forecast demand of 35,200 GWh. The reduction is due in the main to the movement of Residual Error volumes out of the supplementary process (to now be the subject of a specific tariff published later in the summer).

### 3.10 IMPERFECTIONS CHARGE

As stated above, the RAs revised forecast Constraint Costs of €256.97 million are proposed for the 2019/20 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 Payments of €14.35 million, based on 2018/19 outturn to date. The remaining elements of the Imperfections Charge are forecast at zero, meaning the forecast Imperfections Charge for 2019/20 stands at €271.33 million. Allowing for the K factor adjustment, provides a total forecast Imperfections Charge of €355.77 million, which when divided by the forecast demand, of 34,200 GWh, equates to an Imperfections Charge of €10.40/MWh for the 2019/20 tariff year.

The comparable figure for the current 2018/19 tariff year stood at €5.22/MWh. Any under or over recovery of Imperfections Costs in the 2019/20 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	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15
Total Constraints costs	256.97	190.44	177.6	144.3	163.5	177.6
Uninstructed Imbalances			-	-	-	-
Testing charges			-	-	-	-
Dispatch Balancing Costs	256.97	190.44	177.6	144.3	163.5	177.6
Energy Imbalance			-	-	-	-
Fixed Cost (Make whole) payments	14.35	7.19	2.7	2.5	7.2	3.6
K factor Adjustment	84.44	(13.86)	(7.34)	(77.6)	(22.1)	5.2
Other System Charges	-	-	-	-	-	-
<b>Total Imperfections Charge</b>	<b>355.76</b>	<b>183.77</b>	<b>173.02</b>	<b>69.2</b>	<b>148.6</b>	<b>186.4</b>
Forecast Demand ('000 MWh)	34,200	35,200	34,550	33,700	33,230	33,320
<b>Imperfections Charge/ MWh</b>	<b>10.40</b>	<b>5.22</b>	<b>5.00</b>	<b>2.05</b>	<b>4.47</b>	<b>5.60</b>

Table 2: Imperfections Charge over the years

### 3.11 RA'S 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 2019/20 tariff year and proposed that the following items, totalling €31.32m are revised.

- Interconnector Ramp Rate Disparity forecast, €3.2m –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.
- Provision of €18 million for the inclusion of NI Gas Transportation Charges (GTC). The RAs note that the TSOs have assumed that all large gas-fired units in NI will purchase gas transportation on the short-term market during 2019-20. The RAs do not see evidence for an increase in this element and propose to exclude from the calculation.
- An inclusion of €5.7 million has been requested for “Undo Actions” which are new settlement cost components, the intent of which is to ensure units are compensated for energy dispatched by the TSOs which the TSOs then decide on not taking. While the RAs accept that these costs will arise, we are proposing to make no specific allowance for it but would encourage the TSOs to minimise these occurrences in the course of near and real time operation.
- Provision of €14.42 million for the settlement of Pumped Storage units in the new market. While the RAs acknowledge the treatment of these units in Plexos differs from the new market, we note that the PLEXOS models already include a gap between the efficiencies, with the unconstrained and constrained set to 70% and 48% respectively. The RAs propose to retain the efficiency gap and make a reduced supplementary allowance of €10 million, and would expect the TSOs to strive to match the market position of the units in dispatch as closely as possible.

The RAs propose that the following items are included within the forecast.

- A provision of €19.05 million for the exposure to the new imbalance pricing design in the new market calculated through CPREMIUM and CDISCOUNT



- An increase in the forecast for Wholesale fuel costs of approximately €38 million.
- Contribution of Generator and interconnector outages of €10 million.

The RAs are minded to endorse the revised 2019/20 Forecast amended as above, and a K factor adjustment of €84.44 million.

The RAs welcome any comments on this proposal and on the TSOs' submission.

#### 4 INCENTIVE OUTTURN SUMMARY 2017/18

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<sup>9</sup>, 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.

	<b>Lower Bound</b>	<b>Dead Band</b>	<b>Upper Bound</b>	<b>Below Target</b>	<b>Above Target</b>
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:

<b>INCLUDED</b>	<b>NOT INCLUDED</b>
Constraint Costs	Make Whole Payments
Uninstructed Imbalances	Capacity Imbalances
Testing charges	Other Imperfection Charge Components

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

Energy Imbalances	
Other System Charges	
SO-SO Trades	

**Table 4: Cost categories included in the DBC incentivisation mechanism**

The 2017/18 tariff year is the sixth year to fall within the incentive mechanism and the fifth year where an incentive payment is potentially due. EirGrid and SONI's assessment of the incentive outcome for the 2017/18 tariff year is attached as Appendix 2 to this paper<sup>10</sup>. The TSOs' assessment provides for outturn Imperfections Costs of €184.3 million; €18.77 million lower than the ex-post adjusted baseline. Based on this, the TSOs are potentially entitled to an incentive payment of €0.354 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.

<sup>10</sup> Appendix 2 - Imperfections Costs Incentive for Tariff Year 1<sup>st</sup> October 2017 – 30 September 2018, submitted by the TSOs on 9 May 2019

The TSOs submitted the 'Forecast Imperfections Revenue Requirement for Tariff Year 1<sup>st</sup> October 2017 to 30<sup>th</sup> September 2018' (ex-ante DBC forecast) in April 2017. The allowed submission forecast DBC for the 2017/18 tariff year at €177.7 million. The 2017/18 Incentive Outturn paper contains the TSOs' ex-post adjustments to this €177.7 million baseline, to form an ex-post adjusted baseline of €203.1 million. Details of the adjustments made to the ex-ante DBC forecast are discussed in the proceeding paragraphs. The TSO's submission contains information on the key assumptions within the ex-ante and ex-post PLEXOS modelling process<sup>11</sup>.

## 5.1 PLEXOS MODEL BASECASE REFINEMENTS AND ACTUAL DATA

In their 2017/18 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 €140.04 million to €185.92 million.

### **Initiatives introduced in 2016/17**

SNSP was increased from 55% to 60% on 9/03/2017. This change affects the 2017/18 incentive payment due to the '12 months of benefit' principle, in which the RAs apply the effects over a 12 month period, spanning two tariff years as necessary.

### **Initiatives introduced in 2017/18**

1. SNSP increased to 65% from 14/11/2017 as a trial that later became permanent in March 2018. This was accompanied by an increase to System Inertia Requirement from 20,000 MWs to 23,000 MWs on 14/11/2017.
2. Dublin Generator Rules – Requirement for 1 Unit in South Dublin (for load flow and voltage control) constraint was removed from 15/05/2018.
3. Dublin Constraints amended from 15/05/2018 – Load flow control and system demand addressed via changes to the number of units required.

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<sup>11</sup> Appendix 2

4. Kilroot Generation Rules- The Kilroot constraint for 1 unit on load for NI system demand above 1400MW and 2 units on load for 1500MW was removed from 15/01/2018.

### **Other System Changes**

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

- a. New / Closing Generator Units to include DSUs along with Solar / PV and the Marina Unit MRC removal from PLEXOS on 10/09/2018.
- b. Inclusion of Turlough Hill Efficiency in ex-post PLEXOS model – The Turlough Hill Efficiency adjustments were included in the PLEXOS model rather than the supplementary modelling as it was a more accurate representation of the actual efficiency. The approach was used in the 2016/17 model.
- c. STAR Scheme – From June 2018 the STAR Scheme was discontinued (The scheme allowed a reduction of 54 MW of static reserve). The minimum daytime operating reserve requirement in Ireland increased from 110MW to 155MW as a result.
- d. DS3 System Services – from July 2018 the minimum daytime operating reserve requirement in Ireland decreased from 155 MW to 135 MW due to Systems Services Contracts, also the minimum daytime operating reserve requirement in NI decreased from 50 MW to 49 MW.
- e. Reserve requirements for North-South Tie-Line Outage – Jurisdictional reserve in the model was adjusted to represent actual reserve during the outage, when more conventional units were run, at lower levels.

## **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 31/03/2017 and the end of the 2017/18 tariff year. The TSOs identified that there were no changes to the SEM rules or RA rule changes which impacted on the 2017/18 ex-post review process.

### 5.3 DEMAND

The actual all-Island monthly demand was 0.26% higher than forecast. Ireland was 2.4% higher than forecast and Northern Ireland was 8.8% lower.

### 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.

### 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 2017/18 were updated as these differed significantly from the forecast flows.

The actual COD (including actual MIUNS) was considered material and a rerun of the PLEXOS model was carried out.

### 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 9.83% increase to the ex-ante DBC baseline (including model refinements discussed above) 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 2017/18 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 5.55%. 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 €185.92 million. The PLEXOS portion of the DBC forecast has decreased, relative to the ex-ante forecast of €140.04 million, largely due to actual COD & MIUN levels differing from forecasts.

	€m
Ex-ante DBC PLEXOS forecast	140.04
Net of base case refinements and actual data change adjustments	45.88
Ex-post DBC PLEXOS value	185.92

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

### **RAs Proposal**

As with the TSOs' 2019/20 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 reasonable 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 consider that the PLEXOS model basecase

refinements should be included and are minded to endorse the above amendments to the ex-ante DBC PLEXOS forecast.

## 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 €17.18 million. This represents a decrease of €20.44 million from the submitted ex-ante forecast. It should be noted that the ex-ante supplementary modelling included I-SEM components as go-live was anticipated in May 2018. I-SEM was later delayed to outside the 2017/18 incentive year, and this is the main reason for the difference in the ex-ante and ex-post supplementary modelling totals as they are not included in the ex-post model. Aside from the removal of the I-SEM components System Operator Interconnector Trades for countertrading account for the majority of the difference in the supplementary modelling totals. The results of the supplementary modelling process are summarised in Table 8 of the TSOs submission<sup>12</sup>.

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	140.04	185.92
Supplementary model	37.62	17.18
Total constraints	177.66	203.1

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

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<sup>12</sup> Appendix 2

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

### **Other Systems Charges and inclusion of RoCoF GPI collections.**

Normally the revenues from Other System Charges are fully deducted from the Plexos and Supplementary elements as part of the final calculation. In discussion with the TSOs the RAs asked why RoCoF GPI payments, collected as part of OSC, should be included in the reforecast measurement. The TSOs explained the definitions of DBC and OSC in the SEM paper SEM -12-033 and also within the RAs RoCoF decision paper and that it would be inconsistent to exclude RoCoF GPI payments.

In considering this further, the RAs minded-to view is that, unlike the other components of the OSC which as outlined in Section 3.7 are deemed to be offset by higher DBC, RoCoF GPI charges do not carry a corresponding DBC cost as the DBC of a given day would be the same, regardless of whether a certain unit was on time with its RoCoF compliance commitments. Indeed, the movement of DBC due to RoCoF is linked only to the timing at which the TSOs move the SNSP, and this is well covered in the 12-month of benefit principle when a SNSP limit change does occur. As a result, we propose that these specific revenues not be deducted in re-basing the imperfections forecast.

The TSOs have confirmed that the RoCoF GPI payments initially included in the Other systems charges are €6.2 million.

If the RoCoF GPI charges are removed from the Other System Charges this will result in an Actual Imperfections Outturn of €190.5m. This would represent a €12.61m savings equating to 6.21% under budget. The incentive payment framework works on a boundary principle, as laid in the Decision Paper (page 17). A value of 6.21% does not exceed the deadband boundary, and results in no incentive payment.



The RAs welcome any comments on this proposal.

## 8 IMPERFECTIONS OUTFURN AND INCENTIVE CONCLUSIONS

### 8.1 INCENTIVE PAYMENT CALCULATION

As shown in Table 7 above, actual Imperfections Costs for the tariff year 2017/18 were €190.5 million. This is €12.61 million lower than the ex-post adjusted baseline of €203.1 million, shown in Table 6 above. The table below summarises the 2017/18 Incentive Outturn.

€m	2017/18		
	Actual	Ex-post baseline	Ex-ante forecast
Total constraints	206.2	203.1	177.7
SO Countertrading	(3.4)		
Uninstructed Imbalances	(3.57)	-	-
Testing charges	(1.04)	-	-
<b>Total DBC</b>	<b>198.2</b>	<b>203.1</b>	<b>177.7</b>
Energy Imbalance	(2.5)	-	-
		-	-
		-	-
Other System Charges (less RoCoF)	(5.2)	-	-
<b>Total Imperfections Charge</b>	<b>190.5</b>	<b>203.1</b>	<b>177.7</b>

Table 8: Actual v Forecast Imperfections Costs

Based on this the TSOs are entitled to an incentive payment of €0 million. The €0 million is calculated in accordance with Table 3, 'DBC Incentive Parameters' above. The €12.61 million saving equates to a 6.2% reduction to the ex-post adjusted Imperfections Cost.

The TSOs have provided further breakdown of their calculation within Table 10 of their submission<sup>13</sup>.

<sup>13</sup> See Appendix 2 page 18

## 8.2 RA PROPOSAL ON INCENTIVE PAYMENT

The RAs are minded to allow this zero incentive amount and welcome any comments on this proposal.

## 9 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 2019<sup>14</sup> and includes a Year-to-Date section.

## 10 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](mailto:billy.walker@uregni.gov.uk) by 12:00 on Monday 29th July 2019.

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<sup>14</sup> [SONI Ltd - Publications](#)