Imperfections Charge

October 2017 – September 2018

And

Incentive Outturn

October 2015 – September 2016

Decision Paper

SEM-17-076

04 October 2017

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.

On 5th July 2017, the Regulatory Authorities (RAs), together the Utility Regulator (UR) in Northern Ireland, and the Commission for Energy Regulation (CER) in the Republic of Ireland, published the "Imperfections Charge October 2017 to September 2018 and Incentive Outturn October 2015 to September 2016 Consultation Paper"[1] (the Consultation Paper). The Consultation Paper considered the Transmission System Operators' (TSOs) submissions in relation to the:

1. 'Forecast Imperfections Revenue Requirement for Tariff Year 1st October 2017 to 30th September 2018'[2] (2017/18 Forecast); and
2. 'Imperfections Costs Incentive for Tariff Year 1st October 2015 to 30th September 2016'[3] (2015/16 Incentive Outturn).

Formal responses to this Consultation Paper were received from the following respondents[4]:

- Eirgrid and SONI, together the Transmission System Operators (TSOs);
- The Irish Wind Energy Association (IWEA);
- Brookfield Renewable; and
- Bord Gais Energy (BGE).

These responses have been considered by the SEM Committee (SEMC) in coming to the decisions outlined in this paper.

[1] SEM-17-045
[2] SEM-17-045a
[3] SEM-17-045b
[4] Attached as Appendices 1 to 4 of this decision paper

1.1 2017/18 FORECAST

As part of their 2017/18 Forecast the TSOs provided an estimate of Imperfection Costs for the 2017/18 tariff year which is 45% higher than that forecast for the current 2016/17 tariff year.

This submitted revenue forecast of €213.6m gave an Imperfections Charge of €5.97 per megawatt-hour (MWh)

The RAs reviewed the forecast and proposed an overall revenue requirement of €183.28m which represented a 25% increase from the 2016/17 tariff year and gave an Imperfections Charge of €5.09/MWh, as proposed in the consultation.

As the Long Notice Adjustment factors (LNAF) framework has now been set to zero at I-SEM go live the provision for this cost of €2.92m has now been removed reducing the revenue requirement to €180.36m and increase to 23% higher than that forecast, for the current 2016/17 tariff year. The final revenue requirement gave an imperfections charge of €5.00/MWh.

The main factors behind the increase relative to the current year include the following:

- Low K-factor credit of €7.34m
- A 6% reduction in gas prices.
- Over 20% increase in available priority dispatch generation.

Given the TSOs forecast Imperfections Costs and allowing for a K-factor adjustment of (€7.34m), results in a 2017/18 Imperfections Charge of €5.00 per megawatt-hour (MWh), compared with €2.05 per MWh for the 2016/17 tariff year. This represents a 144% increase in tariffs from the levels currently experienced.

In the Consultation paper the RAs proposed that the adjusted TSOs forecast and K-factor adjustment be accepted and one respondent to the Consultation Paper welcomed the lower tariff value. The SEMC has made the decision to allow for an Imperfections tariff of €5.00/MWh to be applied for the period from 1 October 2017 to 30 September 2018, per the table below which shows the submitted Imperfections allowance by the TSOs, the allowance consulted upon by the RAs and the final decision by the SEMC along with percentage change from the final decision and 2016-17 Imperfections Charge.

	2017-18 Submitted by TSOs	2017-18 Proposed in Consultation	2017-18 Final Decision	2016-17	Change 17/18-16-17
Imperfections Allowance (€m)	213.60	183.28	180.36	146.8	23%
K-factor (€m)	(7.34)	(7.34)	(7.34)	(77.56)	
Total Allowance (€m)	**206.26**	**175.94**	**173.02**	**69.24**	**150%**
Forecast Demand (GWh)	34,550	34,550	34,550	33,700	2.5%
Tariff (€/MWh)	**5.97**	**5.09**	**5.00**	**2.05**	**144%**

Table 1: Imperfections Charge 2017/18 Final and 2016/17

The higher tariff values are primarily a result of the low over recovery of €7.34 million that will be recouped in the upcoming tariff year, compared to the much higher over recovery of €77.56 million in the year before This over recovery is composed of an over recovery in the 2015/16 tariff year and an estimate of the over recovery for the current 2016/17 tariff year. This over recovery has arisen for different reasons and essentially reflects differences between the TSOs estimate of Imperfections Costs and the actual Imperfections Costs incurred.

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 Charge[5]. 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[6]. 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 incurred 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 2015/16 tariff year, of €163.5 million, in May 2015. The PLEXOS element of this forecast stood at €152.4 million, with the supplementary modelling component equalling €11.1 million. In their 2015/16 Incentive Outturn the TSOs proposed that the PLEXOS component of this forecast be amended, to take account of the following ex-post review factors:

1. Model basecase refinements to include:

    a) The '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 2014/15 tariff year.
    b) New generating units – Adjustment to account for all Demand Side Units (DSUs) which became operational during the 2015/16 tariff year.
    c) North South Net Transfer – Amendment made to adjust the flows that could materialise if a generating unit was to trip either direction.
    d) Generator technical Offer data – One unit in Dublin has reduced their minimum load value during 2015/16 and can now provide operating reserve from a lower value helping reduce DBC.
    e) Reserve – reserve curves for a number of units were revised to reflect technical issues with these units who were unable to provide reserve times.

[5] DBC has accounted for 96-100% of the forecast Imperfections Charge over the last 5 tariff years

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

2. Combination of actual demand, Commercial Offer Data (COD), wind and Modified Interconnector Unit Nominations (MIUNs) data.

In the Consultation Paper the RAs proposed to allow for the above ex-post review factors. In relation to the '12 months of benefit' principle, the RAs noted that any period of benefit of 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 felt that a period greater than 12 months may discourage the TSOs from implementing new initiatives as frequently.

The TSOs' 2015/16 Incentive Outturn submission detailed actual Imperfections Costs of €109.4 million, €10.5 million lower than the ex-post DBC baseline of €119.9 million[7]. This saving potentially entitles the TSOs to an incentive payment of €0.15 million[8] and the RAs recommended endorsement of this incentive payment in the Consultation Paper.

The SEMC has decided to provide the TSOs with an incentive payment of €0.15 million in light of the efficiency gains achieved by them in reducing outturn Imperfections Costs below the ex-post DBC baseline. Moreover, the SEMC has decided to endorse the '12 months of benefit' principle, meaning the TSOs are to benefit from any new initiatives introduced by them for a period of 12 months.This is the third year in which the TSOs have claimed entitlement to an incentive payment, having received an incentive payment of €0.63m last year, based on the outturn Imperfections Cost for tariff year 2014/15.

[7] Calculated as original DBC forecast (163.5m) + model basecase refinements (34.6m) less actual data (81.3m) plus supplementary modeling adjustments (3.03m) = 119.83m

[8] SEM-17-045b – 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 SEM in November 2007. The SEM is a centralised 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)[9]. The SEM is governed by the 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 is a contractual joint venture between the System Operators EirGrid and SONI.

2.2 OBJECTIVE OF PAPER

This decision paper outlines the SEMC's determination on the Imperfections Charge for the 2017-18 tariff year and also allows for the third Imperfections based TSO incentive payment to be made. Comments received from interested parties, following the publication of the Consultation Paper on 5th July 2017, are summarised throughout this paper and published on the SEMC website[10]. All responses received have been considered in preparation of this decision paper.

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

[9] http://www.sem-o.com/MarketDevelopment/MarketRules/TSC.docx
[10] Attached as Appendices 1 to 4 of this decision paper

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.

In 2012 the RAs introduced an incentive mechanism to encourage the TSOs to minimise Imperfection Costs where possible. The TSOs' entitlement to an incentive payment is assessed by comparing outturn Imperfections Costs against the ex-post DBC forecast for the same period. This is the third year where an incentive payment is due, with the TSOs receiving an incentive payment of €0.63 million last year. Payment of the €0.15 million incentive amount will be paid to the TSOs in line with the specified 75/25 proportions between Eirgird and SONI respectively.

3 THE 2017/18 FORECAST

The TSOs' 2017/18 Forecast was prepared jointly by EirGrid and SONI, and captures an all-island estimate of the Imperfections Charge for that year. All costs are estimated ex-ante and recovered from suppliers on a MWh basis through the Imperfections Charge. The TSOs forecast an Imperfections revenue requirement of €213.6 million for the 2017/18 tariff year. This forecast has been revised by the RA to €183.28m for the consultation paper with a further €2.92m being deducted due to the Long Notice Adjustment Factors forecast no longer applying at I-SEM go live. This gives a final Imperfections revenue requirement of €180.36m and represents a 23% increase from the €146.8 million forecast for the 2016/17 tariff year. A number of key factors influenced the 2017/18 Forecast submitted by the TSOs, including:

- Over 20% increase in available priority dispatch generation (wind generation in particular) in the unconstrained PLEXOS model which contributes to a lower unconstrained PLEXOS model production cost relative to the constrained PLEXOS model and an increase in forecast constraint costs;

- A 6% reduction in gas prices in the PLEXOS model reduces the production costs in both the unconstrained and constrained PLEXOS models relative to the 2016/17 forecast PLEXOS models ;

- Incorporating the more recent experience of 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. However the reduction in Moyle export capacity reduces this impact from 1/11/2017 until the end of the tariff year; and

- New considerations for I-SEM totalling €35m which cover I-SEM related uncertainties.

- Cost of €14.5m to compensate for the absence of SONI debt facilities.

The RAs reviewed the new considerations for I-SEM and SONI debt facilities and made the following proposals in the consultation paper.

- Include the provision for LNAFs, however should the LNAF framework not apply at I-SEM Go-Live then remove this element from final tariff calculation.

- Include the Imbalance Price impact noting the task of forecasting the impact is difficult and the rationale applied is reasonable.
- NI Gas Product Charge will be excluded as the UR has engaged with Northern Ireland Generators to seek to maximise the economic interests of consumers in the next tariff year.
- Interconnector Ramp Rate Disparity will be excluded as the RAs have engaged with the TSOs and consider that exposure is largely a volatility issue.
- SONI debt facilities will be excluded as this is a matter for respective price controls rather than the imperfections revenue.

Detail on the final forecasts for each of the Imperfections Charge components is provided in the sections below.

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 2017/18 Forecast. Final DBC for the 2017/18 tariff year is forecast as €177.66 million.

3.2 CONSTRAINT PAYMENTS

Constraint Payments make up the entirety of the 2017/18 final DBC forecast (€177.66m), 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 performed validation of the TSOs' PLEXOS model using their in house PLEXOS database. The TSOs' modelling assumptions were sense checked against an externally validated PLEXOS model produced by the RAs. The RAs investigated any differences between the models and the TSOs provided explanations for any divergences. In some cases the TSOs 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 €140.04 million, which has increased significantly from the forecast Constraint Costs of €125.8 million for the PLEXOS component of the 2016/17 tariff year. The reasons for this increase are detailed in the bullet points in section three above. The assumptions underlying the TSOs' PLEXOS Constraints are detailed within the 2016/17 Forecast submission[11].

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[12]. The supplementary modelling component of the 2017/18 forecast for Constraint Costs, is €21.3 million. This represents an increase of €2.9 million from the forecast for the 2016/17 tariff year for standard supplementary modelling and along with €16.3m for new considerations to cover I-SEM uncertainties gives an overall cost of €37.6m. The largest influencing factor behind this increase is the reduction in the impact of System Operator interconnector countertrading[13].

A provision of €0.63 million for Secondary Fuel start-up tests was made within the supplementary model. The TSOs anticipate that the fuel switching arrangements will come into place in NI in 2017/18. 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 2017/18 tariff period. A provision has been made to constrain on Open Cycle Gas Turbines (OCGTs) and to constrain on the marginal unit

[11] SEM-17-045a

[12] See SEM-17-045a page 13 and 25 for further detail on these components

[13] See SEM-17-045a page 12 for further information on this

during Combined Cycle Gas Turbine (CCGTs) tests for a period of time. A provision is included for one test on all applicable units during the 2017/18 tariff year. The TSOs 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 €177.66 million is included for 2017/18 Constraint Costs, representing an increase of 23% from the 2016/17 forecast of €144.3 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 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 included a forecast of €2.7 million for Make Whole Payments, based on the TSOs' experience of actual outturn, from 1st October 2016 to 31st March 2017, 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 2017/18 tariff year. The TSOs argued that any deviation from this assumption would result in an increase to 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:

- Require working capital to fund Imperfections Costs that exceed revenue collected through the Imperfections Charge, or,
- 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 to be applied to the Imperfections Charge for 2017/18 is (€7.34m). This is comprised of the following:

Summary of K-factor adjustment

Over-recovery in tariff year 2015/16	(€7.34m)
Estimated over-recovery for tariff year 2016/17	(€0m)
Total Imperfections K-factor to be applied in 2017/18	(€7.34m)

This €7.34 million over-recovery is netted off the 2017/18 forecast Imperfections Charge leading to a reduction in the Imperfections Charge for the 2017/18 tariff year. This over recovery is composed of an over recovery in the 2015/16 tariff year and an estimate of the over recovery for the current 2016/17 tariff year. The over recovery has arisen for different reasons and essentially reflects differences between the TSOs estimate of Imperfections Costs and the actual Imperfections Costs incurred.

3.9 DEMAND FORECAST

Based on outturn 15/16 demand and 16/17 year to date figures the TSOs have forecast demand for the 2017/18 tariff year at 34,550 GWh, representing a 2.5% increase from the 2016/17 forecast demand of 33,700 GWh.

3.10 IMPERFECTIONS CHARGE

As stated in section 3.2 above, the final forecast Constraint Costs are €177.66 million for the 2017/18 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 forecast Make Whole Payments of €2.7 million, based on 2016/17 outturn to date. The remaining elements of the Imperfections Charge are forecast at zero, meaning the forecast Imperfections Charge for 2016/17 stands at €180.36 million. Allowing for the K-factor adjustment, provides a total forecast Imperfections Charge of €173.02 million, which when divided by the forecast demand, of 34,550 GWh, equates to an Imperfections Charge of €5.00/MWh for the 2017/18 tariff year.

The comparable figure for the current 2016/17 tariff year is €2.05/MWh. Any under or over recovery of Imperfections Costs in the 2017/18 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	**2017-18 Final**	**2016-17**	**2015-16**	**2014-15**	**2013-14**	**2012-13**
Total Constraints costs	177.6	144.3	163.5	177.6	165.5	142.0
Uninstructed Imbalances	-	-	-	-	-	-
Testing charges	-	-	-	-	-	-
Dispatch Balancing Costs	177.6	144.3	163.5	177.6	165.5	142.0
Energy Imbalance	-	-	-	-		-
Make whole payments	2.7	2.5	7.2	3.6	0.1	0.1
K-factor Adjustment	(7.34)	(77.6)	(22.1)	5.2	(18.9)	12.8
Other System Charges	-	-	-	-	-	-
Total Imperfections Charge	**173.02**	**69.2**	**148.6**	**186.4**	**146.7**	**154.9**
Forecast Demand ('000 MWh)	34,550	33,700	33,230	33,320	33,220	32,900
Imperfections Charge/ MWh	**5.00**	**2.05**	**4.47**	**5.60**	**4.42**	**4.71**

Table 2: Imperfections Charge over time

CONSULTATION PAPER PROPOSALS

As stated in the Consultation Paper, the RAs have sense checked the assumptions within the TSOs' forecast against the RAs' validated PLEXOS model. The RAs focused on any values, in the TSOs' forecast, that differed from those contained in the RAs' validated model and the TSOs provided explanations for any differences. For this reason the Consultation Paper proposed

endorsing the revised Imperfections Charge of €5.09/MWh which has now been finalised as €5.00/MWh shown in Table 2 above.

RESPONSES

BGE

BGE raised concerns about the proposed large increase in the imperfections charge. They supported the RAs proposal to remove the Interconnector ramp disparity forecast, the NI Gas Product Charge and the SONI debt replacement forecast. They suggested the LNAF forecast should be removed now that this framework is set to zero at I-SEM go live. BGE also suggested further areas where the forecast could be reduced and that delays and overruns of outages, Interconnector flows and a high forecast connection rate assumption for wind be given further consideration by the RAs.

BGE also requested that the RAs give consideration to the introduction of a mid-term review of imperfections to allow suppliers early sight of possible step changes.

TSOs

The TSOs raised concerns around the removal of the Interconnector Ramp Rate Disparity forecast and its description as a volatility issue and stated that based on the I-SEM imbalance pricing design the expectation on average is that when the imbalance market is short the imbalance price will be higher than when the imbalance is long and interconnector imbalances will both impact and be exposed to the price differential. The TSOs welcomed the statement that this will be dealt with under contingent capital but suggested it was at variance with the removal of the SONI debt replacement forecast. The TSOs welcomed the engagement of the Utility Regulator and NIE PPB to remove the NI Gas Product Charges impact from the forecast.

The TSOs also raised concern that SONI in particular, may not be able to meet market payments should there be adverse movement relative to tariffs from 1 October 2017, following the omission of the €14.5m SONI debt facility by the RAs.

Brookfield Renewable

Brookfield Renewable requested further clarity on how Dispatch balancing Costs will be dealt with in I-SEM referring to the allowance of €19.22m proposed in the consultation paper made for I-SEM uncertainties but stating no further detail had been provided to support this.

SEMC DECISION

BGE

With regard to the BGE point on delays and overruns of outages, the SEMC view that it is reasonable that the methodology for calculating DBC be based on the scheduled transmission outages that are the main DBC drivers in order to ensure efficient operation of the market.

In relation to the BGE point on Interconnector flows, the TSOs are not proposing to re-forcast during the tariff year but are highlighting the influence market interconnector flows have on DBC. The SEMC is satisfied with the approach for data estimating purposes at time of data freeze is to use the most recent data ie from January 2017 until February 2017 and this is the same approach as the previous year.

Regarding the use of a high forecast connection rate as queried by BGE, the TSOs have based the forecast on the All Island Renewable Connection Report 36 month Forecast (Q4 2013). Wind generation in the SEM has increased by 702 MW in the last 12 months and the SEMC view is that this assumption is reasonable.

The SEMC view on the need for a mid-term review as requested by BGE, is that the large k-factor in 2016/17 was unsual and expected to be a rare event. On balance the SEMC do not consider a mid-term review to be necessary..

TSOs

The RAs liaised in some depth with the TSOs on the issue of Interconnector ramping and interactions with balancing markets. The RAs are of the view that the disparity between real rates and those given to EUPHEMIA will be dealt with under contingent capital via the relevant price control. Regarding the potential tendency for short markets to have higher imbalances than long markets, the RAs will observe the outturn in the context of the 2018-19 imperfections exercise. The RAs are not persuaded that there is enough material bias to warrant a specific allowance above the amount for imbalance price uncertainty already included under the Imbalance Price Impact allowance of €16.3m.

The RAs view the area of SONI debt facilities as outside the scope of the imperfections charge and consider that it will be addressed via the current ongoing CMA appeal process.

Brookfield Renewable

Regarding further clarity on how DBC will be dealt with in I-SEM, the new provisions submitted by the TSOs were discussed in section 2.2.2 of the Imperfections Revenue requirements

submission under "New Considerations for 2017/18". The items of Long Notice Adjustment Factors, Interconnector Ramp Rate disparity and Imbalance Price Impact had a cost inclusion of €30.02m which the RAs discussed with the TSOs in terms of methodology used. The RAs had removed the Interconnector Ramp rate Disparity of €10.8m and proposed the remaining €19.22m be considered in the consultation. This has been further reduced to €16.3m by the SEMC following the omission of the LNAF cost.

Conclusion

Given the level of RA sense checking the SEMC are satisfied that the TSOs' assumptions are reasonable and have made the decision to endorse the TSOs' 2017/18 revised Forecast and a K-factor adjustment of (€7.34m), in line with that proposed in the Consultation Paper.

SEMC Decision: 2017/18 Imperfections Charge to be set at €5.00/MWh in line with Table 2 above.

4 INCENTIVE OUTTURN REVIEW FOR 2015/16

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[14], 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 2015/16 tariff year is the fourth year to fall within the incentive mechanism and the third year where an incentive payment has been claimed. The TSOs' 2015/16 Incentive Outturn submission detailed outturn Imperfections Costs of €109.4 million; €10.5 million lower than the ex-post DBC baseline. Based on this, the TSOs are potentially entitled to an incentive payment of €0.15 million. The resultant incentive payment would be applied on a 75:25 split between

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

Ireland's Transmission Use of System (TUoS) and Northern Ireland's System Support Services (SSS) revenues respectively.

4.1 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:

- Changes 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 providers or transmission network.

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 2015 to 30th September 2016' (ex-ante DBC forecast) in May 2015. This submission forecast DBC for the 2015/16 tariff year at €163.5 million. The 2015/16 Incentive Outturn paper contains the TSOs' ex-post adjustments to this €163.5 million baseline, to form an ex-post DBC baseline of €119.9 million. Details of the adjustments made to the ex-ante DBC forecast are discussed in the proceeding paragraphs.

4.2 PLEXOS MODEL BASECASE REFINEMENTS

In their 2015/16 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 €152.4 million to €187 million.

Initiatives introduced in 2014/15

The TSOs introduced a number of operational initiatives at various points in the 2014/15 tariff year. The TSOs adjusted the 2015/16 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 Dublin load based operational constraint for one unit increased from 4400 MW to 4600 MW in February 2015. The model was amended so that the value was 4400 MW until February 2016 and 4600MW thereafter.

b. South Generation – In July 2015 a new south load based transmission Constraint Group (TCG) was added to replace the southwest generation constraint. The model was amended so that the old rule of two units by day/three by night was used until July 2016 and the new load based rules were used thereafter.

CONSULTATION PAPER PROPOSALS

The RAs were 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 were 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 felt 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.

RESPONSES

No specific responses where received on the "12 months of benefit principle".

SEMC DECISION

The SEMC has decided to endorse the '12 months of benefit' principle which entitles the TSOs to 12 months' worth of benefit from new DBC minimising initiatives introduced by them.

SEMC Decision: Ex-post review adjustments to the ex-ante DBC baseline to allow for 12 months worth of benefit for new DBC minimising initiatives introduced by the TSOs.

New Generating Units

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

a. Demand Side Units – DSUs can become commercially operational more quickly than conventional generating units and windfarms. The ex-ante DBC model was therefore updated to include all DSUs which became operational during the 2015/16 tariff year.

North South Net Transfer Capacity

The Operational Constraints outlines how the Total Transfer Capacity from North to South cannot exceed 450 MW while the South to North value cannot exceed 400 MW in the version of Plexos deployed. In the original Plexos model a static NTC of 300 MW was applied for flows in both directions. When optimising the dispatch schedule, the TSO scheduling tool optimises the 275kV tie-line flow such that the Total Transfer Capacity including rescue flows is not breached. This is influenced by transmission outages, the level of wind generation in either jurisdiction , regional location of wind and where other generation is being sourced.

The TSOs carried out desktop analysis and found that the actual NTC value was lower than the 300 MW included in the original model. The TSOs included revised hourly NTC values into the constrained Plexos model for flows in the direction of South to North. This revised NTC was based on the actual TTC value that was used in real time based on transmission outages. The average South – North value was 156 MW, while at times this could be up to 311 MW.

Generator Technical Offer Data

One unit in Dublin reduced their minimum load value during 2015/16 and can now provide operating reserve from a lower value. This helped reduce DBC as the unit had been constrained on and the reduction in minimum load helped bring it into merit in the SEM.

Reserve

Reserve curves for a number of units were revised to reflect technical issues with these units who were unable to provide reserve at times.

CONSULTATION PAPER PROPOSALS

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 were 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' advised that if the refinements for new generating units and interconnector adjustments were not made that the ex-post DBC baseline would be higher and the TSOs' outturn performance appear better as a result. The RAs stated that they wished to ensure as transparent an ex-post review process as possible.

RESPONSES

There were no responses received in relation to the inclusion of the new generating unit, North South Net Transfer Capacity, Generator Technical Offer Data and Reserve described above.

SEMC DECISION

The SEMC has decided to allow for inclusion of the above amendments within the ex-post DBC model. The SEMC wishes to ensure the TSOs are held to account and incentivised against as accurate data as possible. The TSOs' performance would have appeared better had these adjustments not been made and the SEMC welcomes the TSOs' transparency in this matter.

SEMC Decision: Ex-post review adjustments to the ex-ante DBC baseline to allow for amendments to reflect new generating units North South Net Transfer capacity, Generator Technical Offer Data and reserve.

4.3 SEM RULES OR ANY RA DECISION

The TSOs reviewed the changes to SEM market rules and the RA decisions that became effective between the data freeze date of 30/04/2015 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 2015/16 ex-post review process.

4.4 DEMAND

The actual average monthly demand for Ireland was 3% lower than forecast, while the actual demand for Northern Ireland was in line with forecast. When actual demand figures were rerun in PLEXOS, DBC decreased by 6.5%, therefore meeting the criteria for inclusion in the ex-post adjustment process[15].

4.5 WIND

Actual all-island wind availability was in line with the assumed wind availability in the submitted ex-ante DBC forecast. The PLEXOS check of actual wind indicated that it did not have a material impact on DBC for tariff year 2015/16. This model rerun showed an increase in DBC of less than 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 DBC model, when considered in isolation.

4.6 COMMERCIAL OFFER DATA & MIUNS

Actual COD was compared to the submitted ex-ante forecast COD and these differed significantly. The main reason for this was a considerable reduction in wholesale fuel prices across the island. The impact of the generator COD was assessed in PLEXOS and resulted in a reduction to the DBC ex-ante baseline of 34%.

When the original 2015/16 forecast was submitted, flows on both interconnectors were predominatly imports to SEM prior to the data freeze. From 01/04/2015 flows changed significantly due to the increase of the Carbon Price Floor in Great Britain. As a result the level of

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

imports into SEM reduced during the day and the levels of exports into GB increased during the night from this date. Actual Interconnector flows for 15/16 were updated as these differed significantly from forecasted flows. The impact of the actual MIUNs on DBC was assessed in PLEXOS and resulted in a reduction to DBC of 4%.

The actual COD (including actual MIUNs) was considered material and a rerun of the PLEXOS model was carried out. This resulted in a €71 million decrease to DBC, which equates to a 38% reduction, to the ex-ante DBC baseline. As this exceeds the threshold of 3% of the baseline, the SEMC has included it in the ex-post DBC model.

4.7 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 €81.3 million (€187 million - €105.7 million) decrease to the ex-ante DBC baseline (including model refinements discussed above). This equates to a 43% decrease in DBC and meets the 8% threshold for inclusion in the ex-post DBC model.

CONSULTATION PAPER PROPOSALS

The €81.3m of adjustments, to reflect actual data, are clearly defined as allowable ex-post adjustment factors within the Decision Paper and the ex-ante DBC baseline should be amended to reflect these actuals.

RESPONSES

There were no responses received in relation to amendments to reflect the combination of actual demand, actual wind availability and actual COD (including MIUNs).

SEMC DECISION

The SEMC has made the decision to allow for the adjustments to the ex-ante DBC model to reflect actual demand, actual wind availability and actual COD (including MIUNs). These amendments are clearly labelled as allowable ex-post review factors within Table 6 of the decision paper on Incentivisation of all-island DBC. Again, allowing for these amendments insures the TSOs' performance is assessed on as accurate a basis as possible.

SEMC Decision: Ex-post review adjustments to the ex-ante DBC baseline to allow for amendments to reflect actual demand, actual wind availability and actual COD (including MIUNs).

4.8 HILP EVENTS

Transmission outages, both forced outages and scheduled outage overruns, were assessed by the TSO for the 2015/16 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.

4.9 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 €105.7 million. The PLEXOS portion of the DBC forecast has decreased, relative to the ex-ante forecast of €152.4 million, largely due to actual COD & MIUN levels differing from forecasts.

	€m
Ex-ante DBC PLEXOS forecast	152.4
PLEXOS Model basecase refinements	34.6
Adjustments for actual demand, exchange rates, wind, COD & MIUNs	(81.3)
Ex-post DBC PLEXOS value	105.7

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

CONSULTATION PAPER PROPOSALS

As with the TSOs' 2017/18 Forecast, the RAs sense checked the reasonableness of the TSOs' PLEXOS models against the RAs' validated PLEXOS model for the same period. The RAs investigated any reasons for differences between the models and the TSOs provided justification and evidence to explain any divergences. As noted previously, in some cases the TSOs used actual data rather than the forecast data contained in the RAs' validated PLEXOS model. Additionally, certain parameters were updated within the TSOs' models to enable a more realistic PLEXOS outcome, based on the TSOs' experience.

SEMC DECISION

For the reasons stated in the paragraphs above the SEMC has decided to endorse the proposals contained in the Consultation Paper and to include the ex-post review factors detailed in Table 5 above.

SEMC Decision: Ex-post review adjustments to the ex-ante DBC baseline to be included per Table 5 above.

5 SUPPLEMENTARY MODELLING RESULTS

The supplementary modelling component of the DBC forecast is designed to take account of the specific external factors that cannot be captured by the PLEXOS model. The TSOs calculated an ex-post supplementary model DBC value of €14.13 million. This represents an increase of €3.03 million from the submitted ex-ante forecast of €11.1 million. System Operator Interconnector Trades for countertrading account for the majority of this €3.03 million movement from the ex-ante forecast. The results of the supplementary modelling process are summarised in the TSOs 2014/15 Incentive Outturn submission[16].

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

€m	Ex-ante DBC baseline	Ex-post DBC baseline
PLEXOS	152.4	105.73
Supplementary model	11.1	14.13
Total constraints	163.5	119.86

Table 6: Ex-ante DBC v Ex-post DBC

CONSULTATION PAPER PROPOSALS

As stated previously, the supplementary modelling takes account of the specific external factors that cannot be captured by the PLEXOS model. The RAs sense checked the TSOs' supplementary

[16] SEM-17-045b Table 8

model for accuracy and reasonableness of assumptions and were minded to endorse the above amendments.

RESPONSES

No responses were received in relation to the ex-post adjustments to the supplementary modelling component of the DBC baseline.

SEMC DECISION

The SEMC has decided to endorse the ex-post adjustments to the supplementary modelling element of the DBC forecast.

SEMC Decision: Ex-post review adjustments to the ex-ante DBC baseline to allow for amendments to the supplementary modelling element of the DBC forecast as detailed in Table 6 above.

6 AMENDMENTS TO OUTTURN DBC

The table below shows actual outturn Imperfections Costs:

	Actual Outturn €m
Dispatch Balancing Costs	121.2
Energy Imbalance	(4.3)
Other System Charges	(7.5)
Total Imperfections Costs	**109.4**

Table 7: Actual Outturn Imperfections Costs

SEMC Decision:. No amendment to the Outturn Imperfections Costs equal €109.4 million per Table 7 above.

7 IMPERFECTIONS OUTTURN AND INCENTIVE CONCLUSIONS

As shown in Table 7 above, actual Imperfections Costs for the tariff year 2015/16 equalled €109.4 million. This is €10.5 million lower than the ex-post DBC baseline of €119.9 million, shown in Table 6 above. The table below summarises how actual Imperfection Costs compare to both the ex-post and ex-ante DBC baseline.

€m	**2015/16**		
	Actual	**Ex-post baseline**	**Ex-ante forecast**
Total constraints	125.33	119.90	163.50
Uninstructed Imbalances	(2.94)	-	-
Testing charges	(1.19)	-	-
Total DBC	**121.2**	**119.90**	**163.50**
Energy Imbalance	(4.30)	-	-
Other System Charges	(7.50)	-	-
Total Imperfections Charge	**109.40**	**119.9**	**163.50**

Table 8: Actual v Forecast Imperfections Costs

Based on this the TSOs are entitled to an incentive payment of €0.15 million. The incentive payment has been calculated in accordance with Table 3, 'DBC Incentive Parameters' above. The €10.5 million saving equates to an 8.75% reduction to the ex-post DBC baseline and the TSOs have calculated the €0.15 million by extrapolating between 7.5% and 10.0% under the budget.

CONSULTATION PAPER PROPOSALS

The TSOs calculation is in accordance with the Decision Paper on DBC incentivisation[17]. The RAs were minded to endorse the payment of €0.15 million to the TSOs, in line with the specified proportions.

[17] See SEM-17-045b Table 10 page 18 for further details on calculation

RESPONSES

IWEA

IWEA stated that they fundamentally disagreed with the process whereby the TSOs are incentivised to better their own forecast of Dispatch balancing Costs and noted that over the last number of years the TSOs have been rewarded for performance and no penalties have been paid as yet.

BGE

BGE stated that they were a strong advocate of incentives which maximise cost efficiencies and minimise DBCs in terms of imperfections and supported the application of ex-post refinements to the baseline against which an assessment is made on the level of incentive payments.

SEMC DECISION

IWEA

The SEMC consider that the DBC incentive mechanism provides a natural incentive to reduce Dispatch Balancing Costs and that the methodology as decided on in June 2012 following a consultation process, has been effective to date.

The SEMC has decided pay the TSOs an incentive amount of €0.15 million, to be split between SONI and Eirgrid on a 25% to 75% basis between Ireland's TUOS and Northern Ireland's SSS revenues respectively.

SEMC Decision: TSOs to be paid €0.15 million incentive payment in line with specified proportions.

8 DBC FORECAST & INCENTIVISATION IN THE I-SEM

The 2017/18 Forecast covers the period to the end of the SEM on 22 May 2018 and the following I-SEM period to 30 September 2018. The forecast for the 2017/18 tariff year has included certain I-SEM related costs. The Consultation Paper considered that, given time constraints, there potentially may not be an incentive mechanism in place for the first year of the I-SEM, however the RAs noted the importance of ensuring an accurate DBC forecast for tariff setting purposes.

RESPONSE

BGE had concerns about the proposal that there may not be an incentive mechanism in place for the first year of I-SEM and had understood that a consultation would be forthcoming in the summer of 2017 on system operator incentives. They believe that a DBC incentive will have a critical role in this area.

Both Brookfield Renewable and IWEA are of the opinion that an incentive mechanism should be introduced for the TSOs to provide current, accurate and consistent information relating to energy imbalances, constraints, curtailments and other system charges. They both suggest a penalty imposition if information is not shared in a suitable manner.

SEMC DECISION

In response to concerns that there may not be an incentive mechanism in place for commencement of I-SEM, the RAs will be engaging with the TSOs in this area in coming months.

SEMC Decision: TSO incentives for the I-SEM yet to be developed, decisions on the same are outside the scope of this paper.

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 April to June 2017[18] and includes a year-to-date section.

RESPONSE

Both IWEA and Brookfield Renewable raised concern around DBC transparency and information flow to market participants stating that without up to date information participants cannot accurately assess risk exposure due to energy imbalances which will lead to increased costs to electricity consumers. They both refer to inconsistent REMIT notifications, participants having no means of understanding up to date network conditions and outages and, dispatch instructions differentiating between constraints and curtailment no longer being distinguishable in the data supplied by the TSOs.

DECISION

The TSOs publish generator and interconnector unit outage plan updates to assist market participants in complying with REMIT on both a weekly and monthly basis along with a fortnightly Transmission Outage Summary.

Currently constraint and curtailment instructions are not distinguished between in the dispatch instruction files sent to market participants through the SEMO systems. The SEMC will continue to work with the TSOs to develop data transparency in the I-SEM. This will be outside the scope of the Imperfections tariff setting exercise.

[18] SONI Ltd - Publications

10 IMPERFECTIONS CHARGE SUMMARY

Based on the above decisions, the Imperfections Charge will be €5.00/MWh for the period from 1 October 2017 to 30 September 2018. The €5.00/MWh tariff represents a 144% increase from the current tariff of €2.05/MWh, as shown in the table below. This increase is driven mainly by the change in k-factor.

	2017-18 Final	2016-17	Change
Imperfections Allowance (€m)	180.36	146.80	23%
K-factor (€m)	(7.34)	(77.56)	
Total Allowance (€m)	**173.02**	**69.24**	**150%**
Forecast Demand (GWh)	34,550	33,700	1.4%
Tariff (€/MWh)	**5.00**	**2.05**	**144%**

Table 9: Imperfections Charge 2017/18 Final and 2016/17