



**Constraints Costs (Imperfections Charges)  
October 2023 – September 2024**

**and**

**Reforecast Report  
October 2021 – September 2022**

**Consultation Paper  
SEM-23-049**

**30 June 2023**

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## 1 EXECUTIVE SUMMARY

The Regulatory Authorities (the RAs, i.e. UR & CRU) are consulting on the Transmission System Operators (TSOs i.e. EirGrid & SONI) 'Imperfections Charges Forecast Tariff Year 2023/24', prior to issuing its final decision on the Tariff Year 2023/24 Imperfections Charge.

The RAs invite stakeholders' views on any aspect of the content of the accompanying TSOs' submission, including if there are actions the TSOs could take to minimise the Imperfection Charge.

The purpose of the Constraints (Imperfections) Charge is for the TSOs to recover the total expected costs associated with managing the transmission system. SEMO levies the Constraints (Imperfections) Charge on suppliers. The Charge is made up of a number of components, the largest of which relates to Dispatch Balancing Costs (DBC).

For Tariff Year 2023/24, and similar to recent Tariff Years, Imperfections Costs are mostly due to Constraints. Constraint Costs occur due to the differences between the market determined schedule of generation to meet demand and the actual instructions issued to generators by the TSOs. In the normal course of events the cost of constraining generators on or up is paid by SEMO on behalf of the TSOs to the relevant generators. Given the forecast element to the Imperfections allowance, such costs are also subject to a K-factor adjustment.

On 12 June 2023, the RAs received the following documentation from the TSOs:

- 'Imperfections Charges Forecast Tariff Year 2023/24' (see Annex 1)
- 'Imperfections K-factor Submission' (see Annex 2)

The RAs received the related '2020/21 Imperfections Outturn Report' from the RAs on 16 June 2023 (see Annex 3).

Ordinarily, the RAs expect to receive all the reports from the TSOs by 1 June. This is to allow for analysis and any clarifications by the RAs, and their consideration by SEMC ahead of publishing the consultation paper.

Given the delays in receiving the TSOs' submission, the usual level of scrutiny before publishing the consultation paper has not been possible for Tariff Year 2023/24. The RAs will continue to conduct analysis during the consultation period. Therefore, the information in this paper is subject to change based on the RAs' findings.

The TSOs have forecast constraints costs for Tariff Year 2023/24 at €613.23m, compared to the €694.14m allowed by the RAs for Tariff Year 2022/23<sup>1</sup>. The TSOs attribute most of the constraint costs to fuel prices, which while remaining at a substantially elevated level, represent a decrease on the previous Tariff Year. As such, the TSO forecast a €312.47m decrease on Tariff Year 2022/23.

The TSOs have also proposed a K-factor adjustment of -€91.17m for inclusion in the Tariff Year 2023/24 Imperfections Charge.

This results in a proposal by the TSOs for total Imperfections costs of €522.06m for Tariff Year 2023/24, which is an Imperfections Price of €13.40 per megawatt-hour (MWh)<sup>2</sup>, compared with total Imperfections costs of €834.53m / Imperfections Price of €21.85 per MWh for Tariff Year 2022/23 (see Table 1).

	TSOs Tariff Year 2023/24 (€ m)	Tariff Year 2022/23 (allowed) (€ m)	Difference (€ m)
<b>PLEXOS model</b>	407.24	532.91	-125.67
<b>Supplementary model</b>	205.99	161.23	44.76
<b>Total constraint costs</b>	<i>613.23</i>	<i>694.14</i>	<i>-80.91</i>
<b>K-factor</b>	-91.17	140.36	-231.53
<b>Total Imperfections costs</b>	<b>522.06</b>	<b>834.53</b>	<b>-312.47</b>
<b>Imperfections Price*</b>	13.40	21.85	-8.4

\* Imperfections Price based on estimated SEM metered demand. For 2023/24 = 38.95 TWh and for 2022/23 = 38.20 TWh.

**Table 1.** 2023/24 submitted TSO constraint costs compared to allowed by SEMC for 2022/23

SEMC invites all stakeholders' feedback on the TSOs' Imperfections Revenue Requirement for Tariff Year 2023/24 by **close of business on Friday 28 July 2023**. Following consideration of stakeholders' feedback, SEMC intends publishing its decision in early September 2023.

Separate but related to this consultation on Imperfections charges, SEMC has recently issued letters to the TSOs on the topic of redispatch reporting. This will be subject to a future consultation (see Section 5 for further details).

<sup>1</sup> The TSOs' submission for Tariff Year 2023/24 was €730.45m, see Decision Paper [SEM-22-045](#)

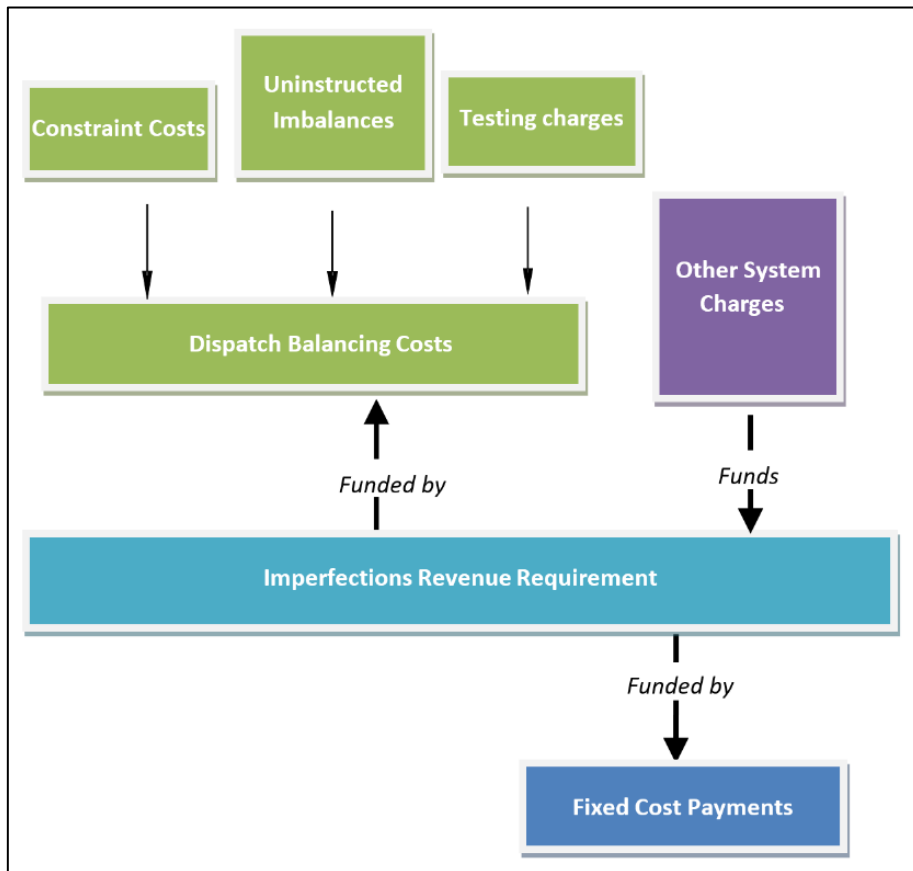
<sup>2</sup> The TSOs forecast demand for the 2023/24 tariff year is 38,950 GWh, which represents a 1.9% increase from the 2023/24 forecast demand of 38,200 GWh.

## 2 INTRODUCTION

The RAs are consulting on TSOs’ submission for Tariff Year 2023/24 (i.e. 1<sup>st</sup> October 2023 to 30<sup>th</sup> September 2024), prior to issuing a final decision on the 2023/24 Imperfections Price and Imperfections Charge Factor.

Imperfections Charges allow SEMO to recover the total expected costs associated with managing the transmission system, and are levied on suppliers, under the Trading and Settlement Code. Typically, costs covered by Imperfections Charges are due to network constraints, resulting in compensation to generators for being redispatched.

Under the Trading and Settlement Code, Imperfections Charges are levied on the Loss-adjusted Metered Quantities of Supplier Units. These charges are intended to recover the Dispatch Balancing Costs (DBC), Fixed Cost Payments and Charges, and any other imbalances between Trading Payments, Trading Charges, Capacity Payments and Capacity Charges over the Year (see Figure 1).



**Figure 1:** Imperfections Charge Components

DBC's are the greatest component of these costs. They are largely responsible for the significant increase in projected costs for the forthcoming Tariff Year 2023/24. DBC's cover costs of balancing the system, and result from a combination of offer and bid prices of re-dispatched generation and how successfully the TSOs manage network constraints, including through measures such as network and outage planning. The vast majority of DBC's are caused by constraints on the system.

Section F.12 of the Trading and Settlement Code requires the TSOs to report to the RAs proposing values, for approval, of the Imperfections Price (PIMPy) and Imperfections Charge Factor (FCIMPy), which are used in the calculation of Imperfections Charges<sup>3</sup>. The Trading and Settlement Code also requires that the TSOs set out relevant research of analysis and justifying the values proposed.

The TSOs have submitted reports, 'Imperfections Charges Forecast Tariff Year 2023/24' and 'Imperfections K-factor Submission' (see Annexes 1 and 2) with their forecasts of the costs to be covered by Imperfections Charges during the period 1 October 2022 to 30 September 2023.

In this Consultation Paper, the RAs are requesting stakeholder feedback on these forecasts and any views on actions the TSOs could take to minimise Imperfections costs. In response to views received, the RAs may request the TSOs to revise these forecasts, and will approve proposed values of Imperfections Price and Imperfections Charge Factor, determined on this basis.

### 3 TSOs' TARIFF YEAR 2023/24 CONSTRAINTS (IMPERFECTIONS) CHARGE SUBMISSION

The TSOs' Imperfections forecast presents an all-island estimate of the Imperfections costs for Tariff Year 2023/24. All costs are ex-ante estimates to for recovery from suppliers on a MWh basis.

The TSOs forecast total constraint costs at €613.23m for Tariff Year 2023/24, which, with the addition of the forecast negative K-factor, gives total Imperfections costs of €522.06m. This will be recovered from suppliers at an estimated Imperfections Price of €13.40/MWh<sup>4</sup>. This

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<sup>3</sup> As part of their decision on Constraint Costs (Imperfections Charge) October 2022 – September 2023 ([SEM-22-045](#)) SEMC determined to put in place an Imperfections biannual review process. To help facilitate this, a modification Trading and Settlement Code modification to update section F.12.1.4 to allow bidirectional amendments to the Imperfections Charge Factor.

<sup>4</sup> Based on a TSO estimated total demand in the SEM for 2022/23, compared to 36 TWh for 2022/23.

represents a 37.4% decrease from the €834.53m allowed Imperfections costs for Tariff Year 2022/23.

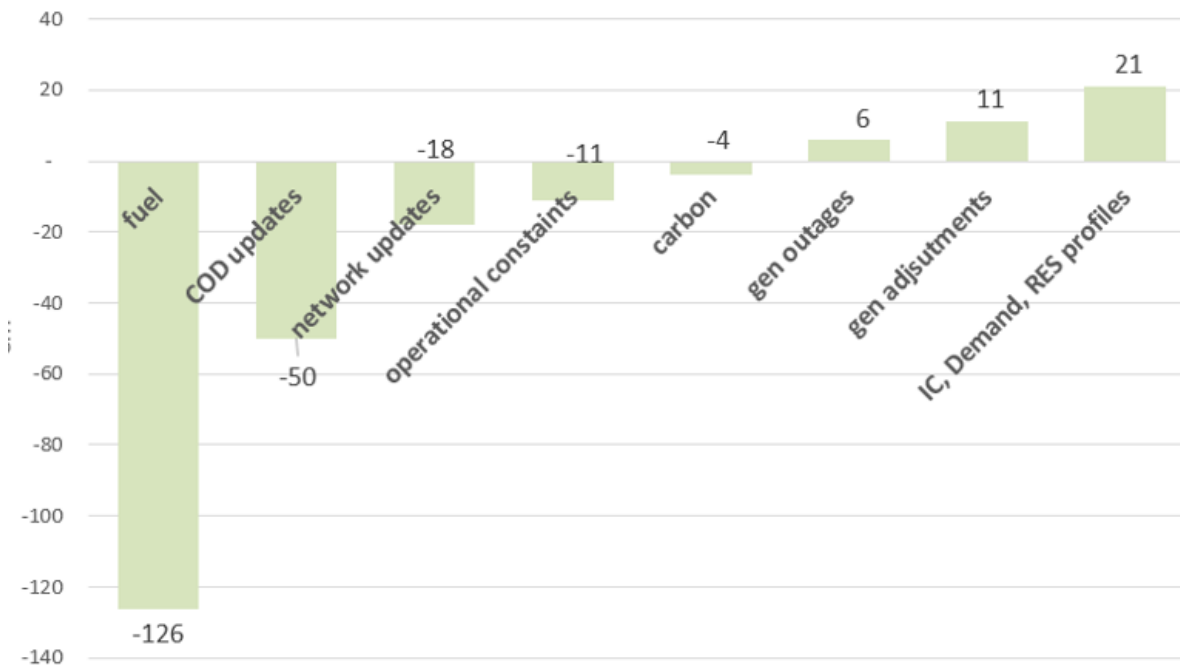


Figure 2. 2023/24 Plexos Imperfections Costs relative to 2022/23 (graph from TSOs' submission)

Figure 2 details the key drivers of change, relative to Tariff Year 2022/23, as identified by the TSOs. The main change is the projected increase in fuel prices compared to Tariff Year 2022/23. Figure 3 provides more detail on the individual fuel price components.

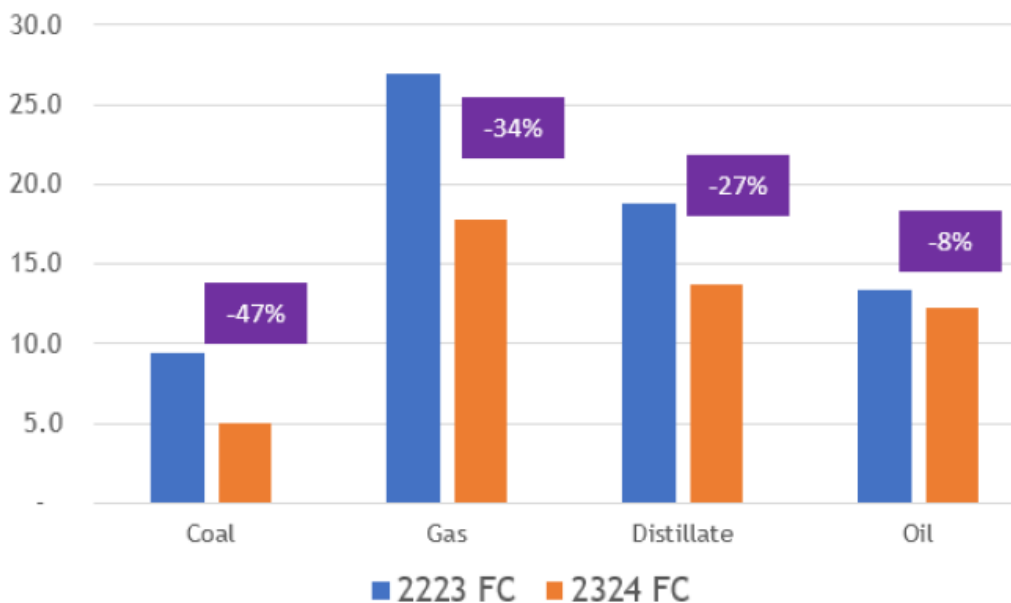


Figure 3. The increase in key fuel prices seen between Tariff Year 2023/24 and Tariff Year 2022/23.

Details on the forecasts for each of the Imperfections costs components, comprising DBCs, Fixed Costs payments and Other System Costs, are provided below and in the TSOs' submission, which is attached as Annexes.

### 3.1 DISPATCH BALANCING COSTS (DBC)

DBC includes Constraint Costs, Uninstructed Imbalance Payments and Generator Testing Charges the majority of the TSOs' forecast costs for Tariff Year 2023/24<sup>5</sup>.

### 3.2 DBC - CONSTRAINT COSTS

As Uninstructed Imbalances and Testing Charges are both forecast by the TSOs' at zero for Tariff Year 2023/24 (see sections 3.3 and 3.4) the TSOs' forecast Constraint Costs comprise DBCs only.

Constraints arise where the TSOs need to reduce the output of one or a specific group of generation units to manage an issue, such as a restriction in the transmission network. In such an instance the TSOs compensate generators for costs incurred from where they are scheduled to run by the market but are not run (or are run at a decreased level) by the TSO's actual dispatch.

The TSOs forecast Constraint Costs using a combination of a PLEXOS model and supplementary modelling. These are set out below.

#### 3.2.1 PLEXOS Modelled Constraints

The PLEXOS Model forecast is €407.24m. SEMC welcomes stakeholder's views both on the totality of the TSOs' PLEXOS modelled constraint costs and any of its component parts (see Figure 2), the most significant of which are detailed below.

##### 3.2.1.1 Fuel Costs

The TSOs state that a key driver in the change on Tariff Year 2022/23 is a decrease of €125.70m in fuel costs. This makes the cost of constraining an out-of-merit generation less expensive and drives a lower production cost in the constrained model. The result is that the

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<sup>5</sup> 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.



disparity between the unconstrained and constrained model production costs decreases, and with it, the DBC. Figure 3 (above) shows the various fuel costs used in the PLEXOS model.

### *3.2.1.2 Commercial Offer Data*

The second greatest change from 2022/23 is commercial offer data, which has decreased by €50m. Commercial offer data is based on analysis by the TSOs of historic data including incremental cost of generation, no-load costs and start-up costs but with the impact of fuel (but not Gas Transportation Costs) and carbon removed.

### *3.2.1.3 Interconnector / Demand / RES Profiles*

Interconnector / Demand / RES Profiles increased by €21m on Tariff Year 2022/23, primarily due to a predicted rise in renewable generation. In turn, this increases constraint costs as particular conventional generators must be run to meet system constraints.

## **3.2.2 Supplementary Modelling**

The Supplementary Model forecast is for €205.99m. It is not possible for the TSOs to model all Constraint Cost drivers in PLEXOS. Therefore, the TSOs' include further costs that are derived through Supplementary Modelling, as detailed in Annex 1.

### *3.2.2.1 DSU Energy Payments*

A modification to the Trading and Settlement Code coming into effect in Tariff Year 2022/23 will allow additional energy payments to DSUs at all times. These payments will be funded by Imperfections until further review. The TSOs forecast a payment of €56m based on historical unit data in the 12 months preceding 1 May 2023. However, the TSO acknowledge the significant uncertainties involved for example around trading/bidding strategy, system demand, Imbalance Settlement Price, availability and the dispatched quantity.

### *3.2.2.2 Payment for energy imports for units in system services modes*

A further Trading and Settlement Code modification allows for the remuneration of energy consumption for units that are dispatched by the TSOs in system services mode. Tariff Year 2023/24 is the first of its deployment. The TSOs estimate a cost for it of €6.7m.

### *3.2.2.3 Interconnector countertrading*

The System Operator Interconnector Countertrading forecast is based on actual data from May 2022 to April 2023, which it is assumed will be approximately replicated in the forthcoming Tariff Year. during which they have seen an increase in the frequency and cost

of countertrades. The TSOs report the outturn cost for countertrades at €20.61m; a 19% increase on the amount allowed by SEMC for Tariff Year 2022/23<sup>6</sup>.

#### 3.2.2.4 Pump storage

Pump storage is the third largest component, at €24.79m. The TSOs state that pump storage units are used overnight in pump mode, to minimise curtailment, and dispatched during the day at Minimum Generation to provide reserve, resulting in large CPREMIUM and CDISCOUNT payments. In previous years, SEMC acknowledged that the treatment of these units in PLEXOS differs from the revised market arrangements, while noting that the PLEXOS models already include a gap between the unconstrained and constrained efficiencies.

#### 3.2.2.5 Additional CPREMIUM and CDISCOUNT payments

There is also one other notable decrease, the under the supplementary model ‘additional CPREMIUM and CDISCOUNT Payments’<sup>7</sup>, which is forecast to reduce by 41% from €99.23m to €58.52m. This is in the supplementary model as it captures costs not accounted for by PLEXOS. The TSOs’ state the reduction is mainly caused by a decrease in redispatch Models and is based on actual imbalance prices from the last 12 months.

#### 3.2.2.6 Block loading, capacity testing for system security, and secondary fuel testing

Unlike previous years, the 2023/24 TSOs forecast does not include figures for block loading, capacity testing for system security and secondary fuel testing. For the 2023/24 forecast these three totaled €3.74m. In this years’ submission the TSOs state that provision is not included “due to the relatively small cost in comparison with overall pot”.

### 3.3 DBC - UNINSTRUCTED IMBALANCES

Uninstructed Imbalances occur when there is a difference between a Generator Unit’s Dispatch Quantity and its Actual Output. Uninstructed Imbalances have a direct effect on DBCs, as TSOs re-dispatch generators to counteract the impact of Uninstructed Imbalances on the system.

The forecast for Uninstructed Imbalances is zero in the TSOs’ Imperfections Charges submission for Tariff Year 2023/24 as it is assumed that any resulting additional Constraint Costs will, on average, be recovered by separate Uninstructed Imbalance Payments.

<sup>6</sup> The TSOs submitted an interconnector countertrading cost of €35.79m. However, this figure included significant outlier costs which SEMC decided did not represent a useful predictor and removed, resulting in the lower estimate of €16.68.

<sup>7</sup> CPREMIUM is paid when an offer is scheduled in balancing (and delivered) at an offer price above the imbalance settlement price. CDISCOUNT is paid when a bid is scheduled in balancing (and delivered) at a bid price below the imbalance settlement price.

### 3.4 DBC - TESTING CHARGES

As testing a Generator Unit typically poses a higher risk of tripping, additional operating reserve is required to ensure that system security is not compromised, which gives rise to increased system operating costs.

A forecast of zero is included in the TSOs' Imperfections Charges submission for Tariff Year 2023/24 for Testing Charges, as it is assumed that Testing Charges will offset any additional Constraint Costs.

### 3.5 FIXED COST PAYMENTS AND CHARGES

Fixed Cost Payments in the new market comprise: Make Whole Payments, Recoverable Start Up Costs and recoverable No-Load Costs. In their report, the TSOs have assumed that these costs are captured in the PLEXOS model.

### 3.6 OTHER SYSTEM CHARGES (OSC)

Other System Charges (OSC) include Generator Performance Incentive Charges, Short Notice Declaration Charges, Trip Charges, which are Transmission Use of System Charges levied on Generators Users in respect of events or the provision of services that affect DBC and Ancillary Service Costs.

The TSOs assume generators are compliant with the Grid Code requirements and no charges will be recovered through Other System Charges, i.e. a forecast of zero is included for OSC for Tariff Year 2023/24. The TSOs further assume that any deviation from this assumption will result in an increase in DBCs, and that any monies recovered through OSC will net off the resultant costs to the system in DBCs.

### 3.7 CLEAN ENERGY PACKAGE COSTS

As per SEMC's Decision ([SEM-22-009](#)) to implement and compensate any payments for curtailment beginning in Tariff Year 2024/25, the TSOs did not include provision for Clean Energy Package in their Tariff Year 2023/24 submission.

### 3.8 K-FACTOR

The K-factor is the TSOs' within-year estimate of the shortfall of funding for the current Tariff Year, i.e. 2022/23) based on the actual outturn for the first seven months (1 October 2022 to 30 April 2023), plus an estimate for the remaining five months (1 May 2023 to 30 September 2023).

Differences between the Imperfections Charges paid out by the TSOs to generators and the amounts paid to the TSOs by suppliers based on the Imperfections Price for the current Tariff Year can lead to a surplus or shortfall across the Tariff Year. The TSOs refund any surplus or seeks to recover any shortfall through an adjustment to the Imperfections Price in the following Tariff Year. A further adjustment, to account for differences between the estimate and the outturn made for the remaining five months, may be required in the next Tariff Year plus 1 i.e., 2024/25.

The K-factor submitted by the TSOs for Tariff Year 2023/24 is an over-recovery of €97.17m, comprising of an actual €28.83m under-recovery for Tariff Year 2021/22 and a €120m estimated over-recovery for Tariff Year 2022/23 (see Table 2 and see Annex 2 for the TSOs' submission).

	€ million
Actual under-recovery 2021/22	-28.83
Estimated over-recovery 2022/23	120.00
Estimated total over-recovery	91.17
<b>Total K-factor to be applied 2023/24</b>	<b>91.17</b>

**Table 2.** K-factor calculation for 2023/24

The actual under-recovery shown in Table 2 for Tariff Year 2021/22 relates to a K Factor under recovery of €179m which was only partially recouped by the €150m for 2021/22 included in Tariff Year 2022/23's Imperfections charges<sup>8</sup>.

For Tariff Year 2022/23 the estimated over-recovery now stands at €120m over-recovery, which is due to lower-than-expected expenditure, mostly because of decreasing fuel prices.

<sup>8</sup> See SEMC [Imperfections Charge 2022/23 and Reforecast Report 2021/2021 Decision Paper](#)

## 4 PROVISIONAL IMPERFECTIONS COSTS FOR TARIFF YEAR 2023/24

The TSOs proposed total Imperfections costs of €522.06m for Tariff Year 2023/24. This comprises total constraints costs of €613.23m, most of which are attributable to Constraint Costs and a K-factor of -€91.17m, which, when divided by the forecast demand, of 38,950 GWh, equates to an Imperfections Price of €13.40/MWh for Tariff Year 2023/24. This is a 38% decrease on Tariff Year 2022/23 (€834.53m / €21.85/MWh). The trend in the Imperfections Prices and costs is summarised in Table 3 below:

€ m	TSO proposed 2023/24	2022/23	2021/22	2020/21	2019/20	2018/19	2017/18	2016/17
Total Constraints costs	613.23	694.14	341.01	271.09	256.97	190.44	177.6	144.3
Uninstructed Imbalances								
Testing charges								
Dispatch Balancing Costs	613.23	694.14	341.01	271.09	256.97	190.44	177.6	144.3
Energy Imbalance							-	-
Fixed Cost Payments				15.38	14.35	7.19	2.7	2.5
K-factor Adjustment	(91.17)	140.36	(10.18)	(0.37)	84.44	(13.86)	(7.34)	(77.6)
Other System Charges								
<b>Total Imperfections Charge</b>	<b>522.06</b>	<b>834.53</b>	<b>330.83</b>	<b>286.10</b>	<b>355.76</b>	<b>183.77</b>	<b>173.02</b>	<b>69.2</b>
Forecast Demand ('000 MWh)	38,950	38,200	36,000	33,600	34,200	35,200	34,550	33,700
<b>Imperfections Price/ MWh</b>	<b>13.40</b>	<b>21.85</b>	<b>9.19</b>	<b>8.51</b>	<b>10.40</b>	<b>5.22</b>	<b>5.00</b>	<b>2.05</b>

**Table 3:** Imperfections costs over time

## 5 LETTERS TO SYSTEM OPERATORS RE: REDISPATCH REPORTING

SEMC is not requesting comments on the following at this stage but rather taking this opportunity to update stakeholders on a topic related to Imperfections and notify about a future consultation.

SEMC has recently issued letters to all the electricity transmission and distribution system operators on the topic of redispatch reporting. Under Article 13.4 of Regulation 943 of 2019

on the internal market for electricity<sup>9</sup>, the system operators are required to submit an annual report to their relevant RA on a range of topics related to redispatch volumes, reasons for redispatch, and measures being taken to reduce the need for such actions.

The letters from SEMC request a joint submission from the system operators on the content and structure of this new reporting framework. Following receipt of responses SEMC will consult on the system operators' proposals.

## 6 NEXT STEPS

The RAs invite stakeholders' responses on the TSOs' Imperfections Costs for Tariff Year 2023/24. All responses received will be published, unless the respondent 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".

Responses to this paper should be forwarded to Gavin Miller ([mmg@cru.ie](mailto:mmg@cru.ie)) and Mary Farrelly ([mary.farrelly@uregni.gov.uk](mailto:mary.farrelly@uregni.gov.uk)) **by close of business on 28<sup>th</sup> July 2023**.

Following consideration of responses received and further review of the TSOs' submission, the RAs intend publishing a decision in early September 2023.

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<sup>9</sup> [Regulation \(EU\) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity](#)