Imperfections Charges
October 2025 – September 2026

and

Reforecast Report
October 2023 – September 2024

Consultation Paper
SEM-25-028

30th June 2025

EXECUTIVE SUMMARY

The Regulatory Authorities (the RAs, i.e. UR & CRU) are consulting on proposals from the Transmission System Operators' (i.e. EirGrid & SONI) in relation to their forecast for the Imperfections Charge for Tariff Year 2025/26 (to apply 01/10/2025 to 30/9/2026). These charges are largely driven by constraint and curtailment costs.

The purpose of this charge is for the TSOs to recover their forecast total costs associated with:

- managing the costs that arise given the transmission system (the wires) cannot deliver the efficient outcomes from the electricity market; and
- the operational requirements of the electricity system (e.g. minimum number of generating units on requirements, local Security of Supply (SoS) requirements in Dublin and Northern Ireland).

These charges ensure that the TSOs can recover the costs associated with addressing these network constraints and maintaining system security. Given the annual charge is based on a forecast, the overall charge for each year includes a K-Factor adjustment which adjusts the difference between forecast and actual costs in the preceding periods.

These charges across Europe have followed an increasing trend in recent years due to various changes in market conditions, including, inter-alia, significant increases in underlying wholesale energy prices (the cost of deviating from the market position increases as the cost of energy itself increases).

On 30th May 2025, the TSOs submitted the following documentation to the RAs in order to enable a decision on setting the 2025/26 Imperfections Tariff:

- 'Imperfections Charges Forecast for Tariff Year 2025/26' (reference Annex 1); and
- 'Imperfections K-factor Submission' (reference Annex 2).

The RAs also received the related 'Imperfections Outturn Report' for Tariff Year 2023/24 from the TSOs.

In the submission, the TSOs forecast an Imperfections) cost of €699.81 million for the Tariff Year 2025/26. The TSOs forecast that the following factors, inter-alia, will have an inflationary impact on forecast Imperfections costs for Tariff Year 2025/26:

i) "Updated Renewable Energy Sources (RES) and interconnector capacities" (€104 million);
ii) "Article 13 of Regulation (EU) 2019/943" (€91 million);
iii) "Forecast Generator Outages" (€75 million);
iv) "Partial Cost Representation of Transmission Outages" (€64 million); and
v) "Generator Portfolio Updates" (€10 million).

The TSOs have also proposed a K-Factor adjustment of €183.43 million for inclusion in the Tariff Year 2025/26 Imperfections Charge and this has further increased the total cost proposed. The estimated costs associated with the within year (2024-25) K-Factor is the main price driver due to significant difference between the original forecast and out-turn actual costs for the first 7.5 months of the 2024/25 Tariff Year. The TSOs project that €167.06 million will be required for the 2024/25 K-Factor. Challenges encountered in satisfying the Northern Ireland (NI) Security of Supply dynamic stability requirements following storm Darragh is a primary contributory cost driving this K-Factor.

The TSO proposed cost allowance of €699.81 million, combined with the K-Factor adjustment of €183.43 million, results in a total proposed charge of €883.24 million for Tariff Year 2025/26.

This proposed charge equates to an Imperfections Price of €22.28 per megawatt-hour (MWh)[1]. By comparison, in Tariff Year 2024/25[2], the Constraints (Imperfections) Charge was €567.21 million, and the Imperfections Price was €14.62/MWh.

[1] The TSOs forecast demand for the 2025/26 tariff year is 39,650 GWh, which represents a 2% increase from the 2024/25 forecast demand of 38,800 GWh.

[2] The TSOs' original submission for Tariff Year 2024/25 was €592.02 million, reference Decision Paper SEM-24-064.

The proposed charge would equate to 2.23 c/kWh, translating as €93.56 on an Estimated Annual Bill (EAB) in Ireland and £61.45 in Northern Ireland.
Noting the high and increasing Imperfections Costs in the SEM and similar trends across Europe (where these are generally referred to as balancing costs) the SEM RAs and TSOs have been engaged in a number of actions to help mitigate/control these costs. Some of these actions are set out below and referenced in other relevant sections of this consultation paper.

North South Interconnector (NSIC): The delivery of the second NSIC will reduce system constraints and thus reduce imperfections costs and will also improve security of supply, while also contributing to decarbonisation objectives.

Action Plan on Dispatch Down: In 2024, SONI undertook an action plan to reduce renewable dispatch down in Northern Ireland, Eirgrid are undertaking a similar review in Ireland in 2025. The combination of these reviews and subsequent action plans should reduce imperfections costs across the SEM.

Network investment: In addition to the NSIC, both RAs have approved extensive network investment to modernise and increase the ability of the system to transmit electricity (and reduce constraints).

Bidding rules: In March 2024, the SEM Committee (SEMC) published a note reminding market participants of the requirement to meet the BCOP bidding rules. The SEM RAs are actively considering enhancements to the bidding rules in the SEM.

All Island Programme: The SEM Committee has an extensive All Island Programme of work (covering Interconnection, Future Arrangements for System Services, and Scheduling and Dispatch programme) to enhance flexibility within the SEM which will allow more effective delivery of renewable electricity to customers (SEM-24-034).

Quality of reporting of constraints and curtailment: As part of the SEMC Imperfections Charge 2022/23 Decision Paper (SEM-22-045), SEMC requested the TSOs to develop an enduring method for monitoring Imperfections costs within the Tariff Year in the form of a biannual review. The RAs continue engaging with the TSOs

to improve the reporting, readability, and forecasting of imperfections charges. Better and earlier identification of costs and the drivers will allow better targeted actions to be taken sooner.

TSO Operational roadmap: The SEM RAs are working with the TSOs to deliver on their operation roadmap in an expedited manner. This should help to reduce renewable dispatch down and thus curtailment costs in particular.

Incentives: SONI's Forward Work Plan for 2024/25[3] states that it will continue to take steps to minimise dispatch balancing costs and will report on the outturn of those when completed. The current price control framework "Price Review 5"[4] financially incentivises EirGrid to deliver on actions outlined in its multi-year plan, as part of this process the CRU have put in place mechanisms to improve and incentivise reporting of Imperfections and network constraints. A similar approach to incentives is expected in the forthcoming Price Review 6 period.

In this Consultation Paper, the RAs are requesting stakeholder feedback on the TSOs' proposed forecasts, the TSOs' proposed K-Factor adjustment, and views on actions the TSOs could take to minimise Imperfections costs. In response to views received, the RAs may request the TSOs to adjust these forecasts. Subsequently, the RAs will approve values for the Imperfections Price and Imperfections Charge Factor for the 2025/26 period.

[3] SONI Forward Work Plan 24/25
[4] Price Review 5 Electricity Networks | CRU.ie

The RAs have reviewed the TSOs' report, and seek stakeholders' views on any aspect of the proposals and, in particular, on the following:

- The TSOs' forecasts of costs and assumptions for Tariff Year 2025/26. In particular, stakeholders' views of the inclusion of the following costs are requested:
    i. The costs attributed to Generator Outages (€75M);
    ii. The potential payments to participants under Article 13 of Regulation (EU) 2019/943 (€91M). The €91 million provision is comprised of:
        - €54 million for an under-estimation of the potential payments for 1st January 2020 – 30th September 2025; plus
        - €37 million forecast costs attributable to Tariff Year 2025/26.
- The TSOs' standard and frequency of reporting Imperfections costs and drivers;
- Potential actions the TSOs/RAs could take to minimise Imperfections Charges (€699.81M) for the upcoming tariff year;
- Potential actions the TSOs/RAs could take to minimise Imperfections Charges in the medium to long term timeframe;
- Whether the K-factor element (€183.43M), which is projected to be significantly greater for Tariff Year 2025/26 than in previous Tariff Years should be partially recovered over one or more Tariff Year and, if so, at what quantum.

The RAs request comments by close of business on Friday 25th July 2025. Following consideration of stakeholders' feedback, SEMC intends publishing its decision in early September 2025.

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1. Introduction

1.1 Background

The RAs are consulting on the TSOs' Imperfections Charges Forecast submission for Tariff Year 2025/26 (i.e. 1st October 2025 to 30th September 2026), prior to issuing a final decision on the 2025/26 Imperfections Price and Imperfections Charge Factor.

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

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 (reference Figure 1).

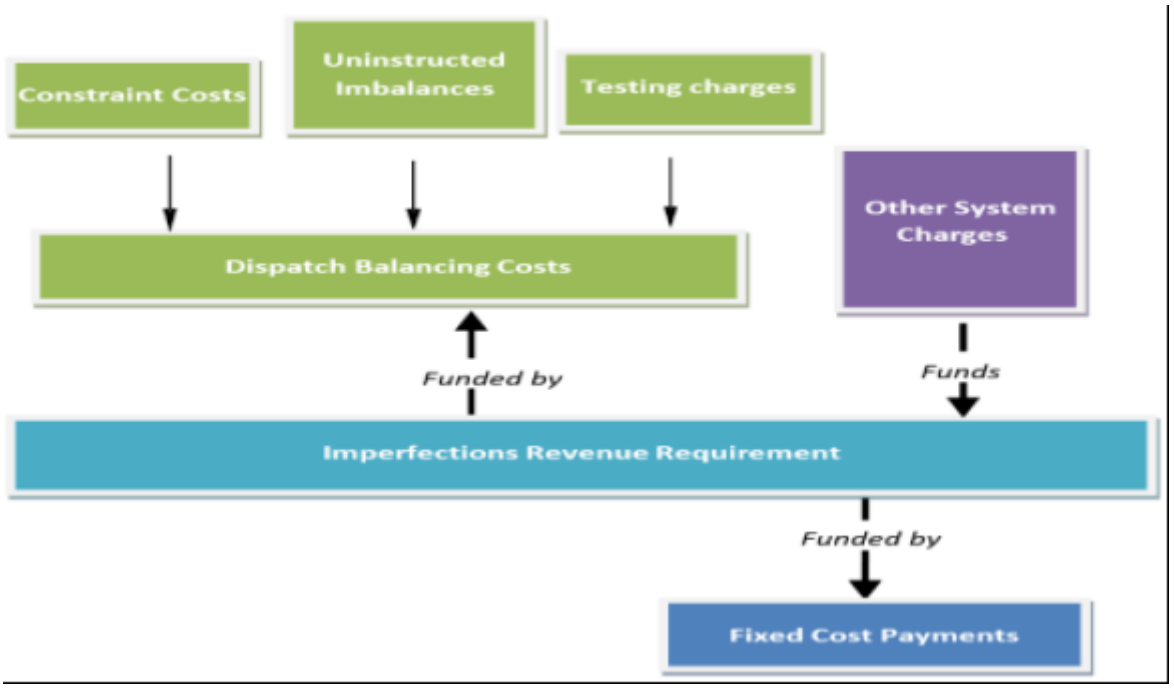

Figure 1: *Imperfections Charge Components*

DBCs are one of the most material components of Imperfections Charge costs. DBCs cover the costs associated with redispatching of units to meet network and system constraints and result from a combination of offer and bid prices of redispatched generation and how successfully the TSOs manage network and system constraints, including through measures such as network and outage planning. The vast majority of DBCs are caused by constraints on the network and system.

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

The TSOs have submitted a report, 'Imperfections Charges Forecast submission for Tariff Year 2025/26' (reference Annex 1), with their forecasts of the costs to be covered by Imperfections Charges during the period 1 October 2025 to 30 September 2026.

1.2 Key drivers of Dispatch Balancing Costs increases.

Several factors can contribute to the increase of Dispatch Balancing Costs.

1. **The intermittent nature of Renewable Energy:** The intermittent nature of wind and solar energy means their output can be unpredictable and variable. To ensure a stable and reliable electricity supply, additional balancing measures are necessary to manage these fluctuations. For example, it may be necessary for renewable energy sources to be constrained due to limitations in the electricity grid or demand fluctuations. Such generators (i.e. Wind or Solar) are compensated for the lost or reduced output as a result of the constraint. These costs can be significant particularly during periods of high renewable energy production and limited grid capacity or demand. In recent years, the SEM has seen a significant increase in renewable energy as part of Ireland's and Northern Ireland's transition to a "greener grid". This transition aims to combat climate change and create a more sustainable energy system. While the actions required to balance intermittent renewables can lead to increases

in DBCs, it is important to note that renewable energy enhances security of supply and reduces our dependence on fossil fuel-exporting countries. Additionally, renewable generation contributes to lowering wholesale electricity prices[5].

2. **Fuel Prices:** In the electricity market, there is a strong correlation between fuel prices and balancing costs. When fuel prices rise, particularly natural gas which sets the marginal price in the wholesale market, balancing costs tend to increase as well. This is because balancing mechanisms are used to procure additional electricity when demand exceeds supply or when there are unexpected changes in generation. The cost of these mechanisms is heavily influenced by the price of the fuel needed to generate that additional electricity. In recent years**,** wholesale energy prices have increased significantly both in the SEM and International markets, predominately due to an increase in gas commodity prices. In the first five months of 2025, average daily SEM Day Ahead Market prices was 134% higher by comparison to the same period of 2019.

3. **Grid Congestion:** Grid congestion arises when the demand for electricity surpasses the transmission network's capacity to deliver it efficiently. This situation typically occurs during peak usage periods, due to infrastructure limitations, or because of unexpected outages. This also typically occurs at times of high renewable generation where the network cannot transport all the generation to where the demand is located. Consequently, higher balancing costs are incurred because of the increased reliance on more expensive generation. Additionally, ensuring reliability under these conditions necessitates implementing supplementary measures, such as utilising more costly and carbon intensive generation. These actions, combined with the inherent inefficiencies caused by congestion, contribute to the overall increase in balancing costs.

[5] How renewable energy helps Irish electricity consumers | Baringa

4. **Transmission outages:** can significantly increase balancing costs by limiting access to certain generation sources, which forces reliance on more expensive, carbon intensive, or less efficient alternatives.

1.3 Imperfections (Constraints) Charges Across Europe

The increasing trend in Imperfections Charges is not just unique to SEM, it is observed across Europe. These costs, which arise from the need to balance supply and demand in real-time, have been driven by several factors, including the integration of renewable energy sources and the variability they introduce. For instance, in Great Britain, balancing costs continue to trend upwards, with costs in Financial Year (FY) 2024/25[6] more than doubling (108% increase) since FY2021/22..

Similarly, in Germany, the costs associated with balancing the grid have also risen. In 2023 the total costs for redispatch measures had increased by more than two and a half times when compared with 2021 costs[7].

1.4 Structure of Paper

The remainder of this document is structured as follows:

- **Section 2 - The TSOs' Imperfections Charges Forecast:** Provides details of the components of the TSOs' estimated total Imperfections Charges for the forthcoming Tariff Year 2025/26.
- **Section 3 - Provisional Imperfections Charge for Tariff Year 2025/26:** Outlines the forecast Imperfections Price and the trend of Imperfections Costs and Prices in recent years.
- **Section 4 - Next Steps**

[6] Balancing costs | National Energy System Operator
[7] Grid operators recommend splitting German power price zone, industry disagrees | Clean Energy Wire

2. The TSOs' Imperfections Charges Forecast for Tariff Year 2025/26

The TSOs' Imperfections Charges Forecast for Tariff Year 2025/26 was prepared jointly by the TSOs (EirGrid and SONI). It presents an all-island estimate of the Imperfections Charges for Tariff Year 2025/26. All costs are ex-ante estimates to be recovered from suppliers on a per MWh basis.

The TSOs forecast total constraint costs to be €699.81 million for Tariff Year 2025/26. With the addition of the forecast K-Factor (€183.43 million), the TSOs estimate the total Imperfections Charges for Tariff Year 2025/26 to be €883.24 million. If approved, such charges will be recovered from suppliers at an estimated Imperfections Price of €22.28/MWh[8]. This represents a 56% increase from the €567.21 million allowed Imperfections Charge for Tariff Year 2024/25.

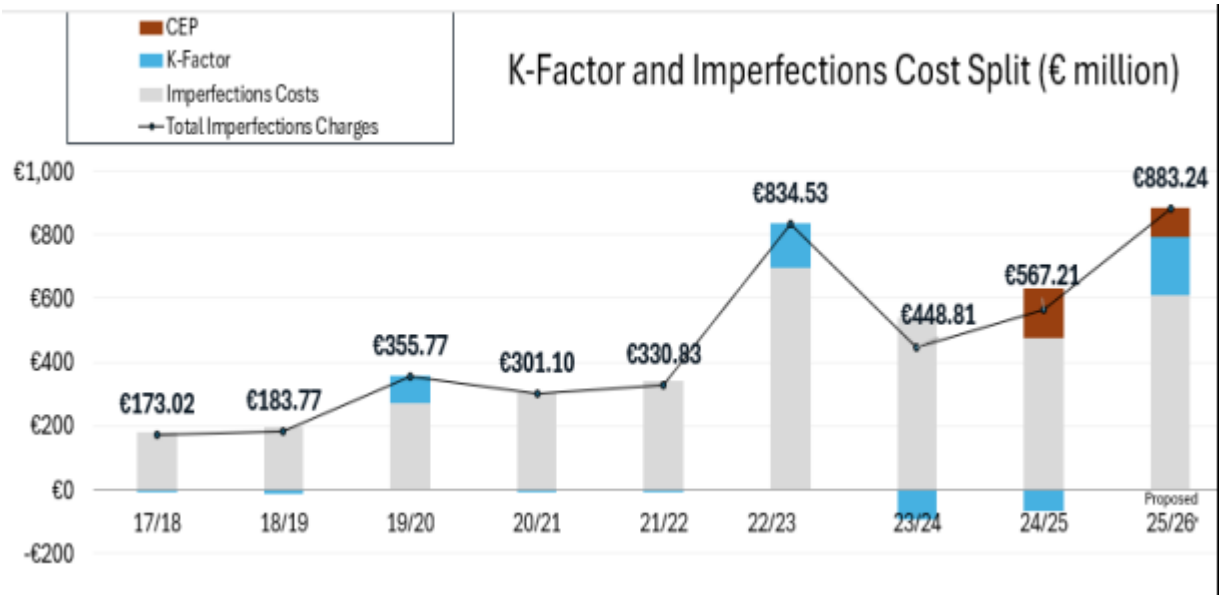

***Figure 2**. Trend of approved Imperfections Charges in recent Tariff Years vs. the TSOs' Proposed Imperfections Charge in Tariff Year 2025/26*

[8] Based on the TSOs' estimated total forecast demand in the SEM for Tariff Year 2025/26 of 39,650 GWh.

A significant cost driver is the inclusion of a provision for potential payments to market participants under Article 13 of Regulation (EU) 2019 / 943 (€91 million). This provision is comprised of:

i) €54 million (an "*under estimation*" of the potential payments for 1st January 2020 – 30th September 2025); and

ii) €37 million (forecast costs associated with Tariff Year 2025/26).

As mentioned above the SEMC Decision SEM/22/009 is currently the subject of a judicial review in Ireland.

Another key cost driver of the proposed 2025/26 Imperfections Charge is the TSOs' K-Factor adjustment (€183.43 million). The estimated costs associated with the within year (2024-25) K-Factor (€167.06 million) is the main influence. The TSOs state the challenges encountered in satisfying the Northern Ireland (NI) Security of Supply dynamic stability requirements is the primary contributory cost driver of the under-recovery of costs incurred within Tariff Year 2024/25.

The TSOs provided analysis (reference Figure 3) of their forecast Imperfections Charges for Tariff Year 2025/26 relative to their Tariff Year 2023/24 backcast findings. The main upward price drivers include

i. Updated Renewable Energy Sources (RES) and interconnector capacities (€104M);

ii. Forecast Generator Outages (€75M);

iii. Partial Cost Representation of Transmission Outages (€64M); and

iv. Generator Portfolio Updates (€10M)

The main deflationary cost driver is the change observed in Commercial Offer Data relative to Tariff Year 2023/24.

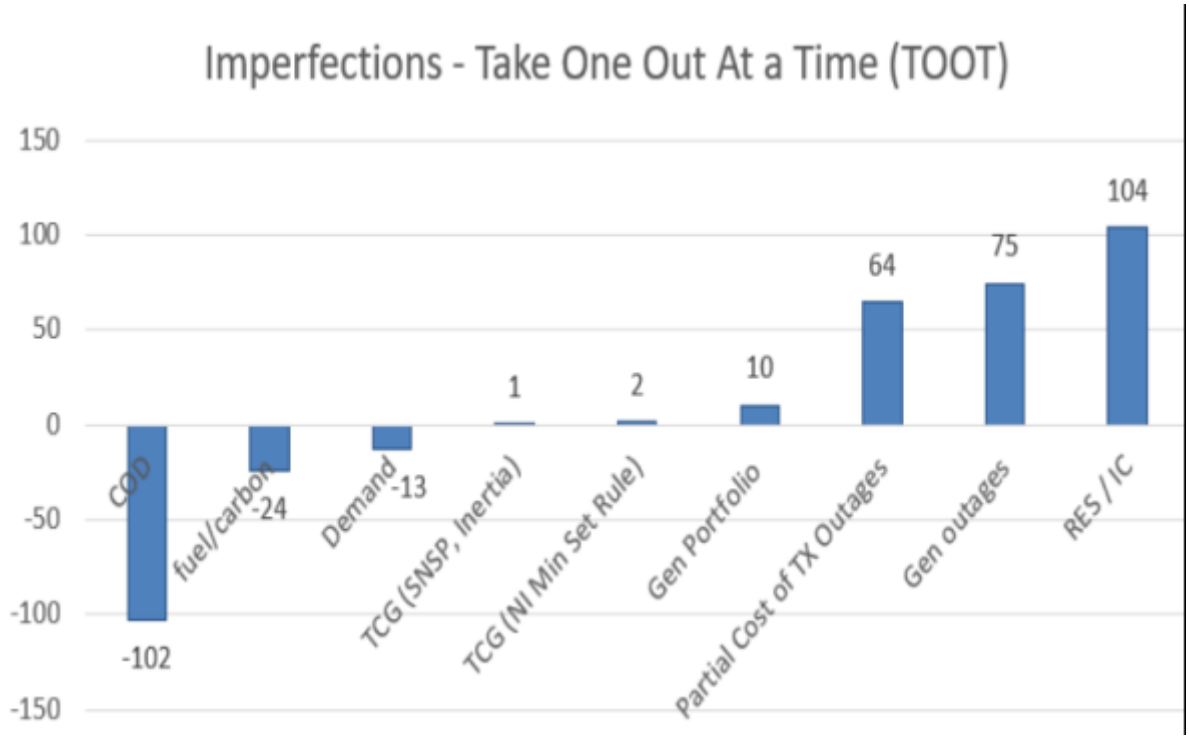

Figure 3. *The key drivers of the change in the TSOs 2025/26 PLEXOS Imperfections Costs relative to the TSOs backcast findings from Tariff Year 2023/24*

Details on the forecasts for each of the Imperfections Charge components, comprising Dispatch Balancing Costs (DBC), Fixed Costs payments and Other System Costs, are provided below and in the TSOs' submission, which is attached as Annex 1.

2.1 Dispatch Balancing Costs

Dispatch Balancing Costs (DBCs) form the majority of the TSOs' forecast costs for Tariff Year 2025/26[9]. DBCs include but are not limited to the following:

- Constraint Costs;
- Uninstructed Imbalance Payments; and
- Generator Testing Charges.

Constraints arise when 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

[9] In order to increase transparency around DBC, the SEMC has reporting requirements for 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.

network. In such an instance, the TSOs compensate generators for costs incurred as a result of being ran differently by the TSOs (constrained up or on or down or off) than the market scheduled.

As Uninstructed Imbalances and Testing Charges are both forecast by the TSOs' to be zero for Tariff Year 2024/25 (reference Section 2.1.2 and 2.1.3) the TSOs' forecast Constraint Costs is comprised of DBCs only. Constraint Costs are forecast using a combination of a PLEXOS model and Supplementary modelling.

2.1.1 Constraint Costs

2.1.1.1 PLEXOS Modelled Constraints

The TSOs' PLEXOS Model forecasts Imperfection Costs in Tariff Year 2025/26 to be €529.56 million. The TSOs used an ex-post adjusted "2023/24 backcast" model from Tariff Year 2023/24 to compare values against outputs from their 2025/26 forecast model[10] [11]. The RAs invite stakeholders to share their views both on the overall TSOs' PLEXOS modelled constraints costs as well as any of its individual component parts (reference Figure 3). The most significant components are outlined below.

i. Interconnector Flows and Renewable Energy Sources (RES) Capacity Updates

Interconnector flows and RES Capacity Updates (combined) have the greatest inflationary impact on the PLEXOS modelled Imperfections costs and are forecast to increase Imperfections Costs by €104 million in Tariff Year 2025/26. The TSOs state although their modelling analysis shows that increasing renewable capacity leads to lower overall system generation production costs (and consequently lower market prices), it tends to elevate Imperfection Costs. The TSOs note this is because it "*becomes less likely for units to clear in the market that are necessary to satisfy operational constraints for system security requirements and will therefore have to be*

[10] Note, this is the second year that the TSOs used a backcast model based on the Y-2 (2023/24) Tariff Year.

[11] The TSOs conducted a "Take-Out-One-at-a-Time" (i.e., TOOT) analysis to determine the approximate scale of each input change relative to the final model. Due to the nature of the TSOs' TOOT analysis, each component is considered in isolation and all other inputs remain constant. The sum of all increases/decreases in values does not infer an aggregate increase/decrease.

run by an out of market action by the TSOs at an Imperfections Cost". The TSOs add that the savings derived from lower generational costs outweigh any increase in Imperfections Costs.

The introduction of the Greenlink Interconnector has increased overall imports into SEM from the UK BETTA market. Although this is a deflationary market price driver, it tends to increase Imperfections Costs. The TSOs state, similar to the impact of increased RES Capacity, "*units that would otherwise have cleared in the market are now required to be run without clearing in the market to satisfy system security requirements at an Imperfection Cost*".

ii. Forecast Generator Outages

The TSOs have indicated that their PLEXOS model results show that generator outages have had a higher cost impact on Imperfection Costs in their forecasts for 2025/26. Generator outages are found to have the second largest impact on forecast constraints costs in 2025/26 imperfections forecast. The model results increase costs by €75 million relative to the 2023/24 backcast model. The TSOs note when a standard unit (which generally satisfies certain Transmission Constraint Groups) is on outage it must be replaced by an alternative unit. Previously, proxy Commercial Offer Data (COD) was used in the modelling of such alternative units. However, the TSOs' analysis of actual COD found that the costs are much greater than the proxy data previously used. When incorporating the updated data into their PLEXOS model, the output suggests that generator outages will have a much greater impact on Imperfection Costs by comparison to previous years. The TSOs note that generator outages can be significantly influenced by other system factors and conditions. Therefore, generator outages can result in either a relatively small or substantial cost impact, depending on various concurrent factors such as wind levels, other units experiencing forced outages, and demand levels.

iii. Transmission Outages

Transmission outages continue to be an increased driver of Imperfections Costs in 2025/26. The TSOs state such outages will continue to inflate Imperfections costs for the next number of years due to "*the level of activity planned on the Network to facilitate the various customer connections and network enhancements over the next*

number of years, required to meet the objectives set out in the Operational Policy Roadmap". Such outages are forecast to increase Imperfections costs by €64 million during Tariff Year 2025/26.

The TSOs have changed their modelling approach to quantify the impact that Transmission Outages have on forecast Imperfections Costs. In the past, the TSOs conducted a desktop exercise based on the indicative transmission outages scheduled to take place during a given tariff year. There was a particular focus on a representative set of outages input into PLEXOS. This year, the TSOs devised a new approach whereby actual availability profiles that occurred in the 2022/23 backcast period were used and scaled up based on the new available Renewable Capacity planned to be connected throughout 2025/26. Such profiles were input into the PLEXOS unconstrained model. In their submission, the TSOs have outlined limitations of the new approach that could underestimate the costs forecast, for example, the TSOs state the costs may be underestimated due to an anticipated increase in outage requirements due to an increase in the quantity of key infrastructure projects requested.

iv. Generator Portfolio Updates

The TSOs note adjustments were made to account for changes in the generation fleet within their PLEXOS model. Such adjustments included the retirement of specific coal units and addition of new thermal generation expected to come online. The TSOs note the new conventional plant "*is expected to behave like peaking plant and are replacing traditional baseload plant*". Consequently, this has led to a forecast increase in costs of €10 million.

v. Commercial Offer Data (COD)

The TSOs conducted a review of the latest Commercial Offer Data (COD) submissions of all generator units. Following the review, the TSOs determined that there was a general increase in the production costs of units from the data used to represent the 2023/24 backcast period. This consequently increased the market price determined by the TSOs constrained model however, conversely, it reduced the price differential between the market price and the out of market actions required to maintain system security. The updated representation of COD data in the 2025/26 forecast model is

estimated to reduce imperfections costs by €102 million. Cognisant of the above, the RAs refer to the TSOs' model results that indicate generator outages have increased costs by €75 million relative to the 2023/24 backcast model. The TSOs cite updated COD data as the primary reason for the forecast increase in costs attributable to Generator Outages (see 2.1.1.1 ii.) of the paper for further details.

vi. Wholesale Fuel and Carbon Prices

The TSOs state that wholesale fuel and carbon prices are a fundamental driver of Imperfections Costs. The TSOs' analysis notes the cost impact due to the change in wholesale fuel and carbon prices is a reduction of €24 million compared to their base backcast model. Lower fuel costs 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 disparity between the unconstrained and constrained model production costs decreases, and consequently, the DBC.

vii. Demand

The TSOs estimate an increase of ~5,000 GWh energy demand in their 2025/26 forecast submission compared to the 2023/24 backcast model. The TSOs' analysis estimates the cost impact due to the change in forecast demand is a reduction of €13 million. Although higher demand puts inflationary pressure on market prices, it puts deflationary pressure on Imperfections Costs. The TSOs note "*forecasted higher energy demand results in a reduction of DBC as this allows must run generator units which are essential to meet network stability requirements to clear in the market to meet energy demand thus reducing overall imperfection costs".*

2.1.1.2 Supplementary Modelled Constraints

The TSOs' Supplementary Model forecast for the tariff year 2025/26 is for €79.25 million. As it is not possible to model all constraint cost drivers in the TSOs' PLEXOS model, the TSOs include further costs that are derived through Supplementary Modelling. Further information can be found in Annex 1.

i. Constrained Wind/Solar

Constrained wind forms the largest cost component of the TSOs' Supplementary Modelling Results at €34.92 million, an increase from €28.37 million in the TSOs'

2023/24 backcast model findings. The TSOs note this provision is based on the actual CDISCOUNT that wind/solar participants received in the last 12 months up to 30 April 2025.

ii. Dispatch of Pump Storage Units

The TSOs Supplementary Modelling results show the cost of Pump Storage Running is forecasted to be the second largest Supplementary Model cost component in Tariff Year 2025/26 (€23.06 million). The TSOs state that pump storage units are mostly dispatched overnight in pump mode in order to minimise curtailment levels and facilitate more priority dispatch. The TSOs note the running profile of such units is different than the profile that clears in the Day Ahead Market and therefore, the units differ from their Physical Notifications in the Balancing Market. Consequently, large CPREMIUMS and CDISCOUNTS payments are made to the pump storage units. The TSOs state the provision of €23.06 million is based on the actual CPREMIUM and CDISCOUNT payments that the pump storage units received in the last 12 months (1 May 2024 – 30 April 2025).

iii. Interconnector Counter Trades

Based on the actual cost of countertrades to Imperfections in the last 12 months, an allowance of €19.69 million has been requested by the TSOs for the 2025/26 forecast. This compares to €11.4 million in costs output from the 2023/24 backcast exercise.

iv. Payment for Energy Imports for Units in System Service Modes

The TSOs note Modification 13_19 allows the remuneration of energy consumption for units that are dispatched by the TSOs in system services mode. The TSOs forecast the cost of redispatching units to cover the imported energy of units in system services mode will be €1.58 million during Tariff Year 2025/26. The TSOs note the cost was determined based on historic unit data and imbalance price data in the 12 months preceding 30 April 2025.

v. Additional CPREMIUM and CDISCOUNT

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. In Tariff Year 2025/26, the TSOs note the settlement cost components of CPREMIUM and CDISCOUNT is negligible and therefore, no cost (€0 million) is included in their submission. The TSOs' calculation is based on actual imbalance prices, for the period October 2023 to September 2024.

2.1.1.3 Article 13.7 Costs

Another significant cost driver is the inclusion of a provision for potential payments to market participants under Article 13 of Regulation (EU) 2019 / 943 (€91 million). For context, the SEMC Decision (SEM-22-009) was challenged in the High Court in two sets of proceedings and judgment, covering both proceedings, was delivered on 10 November 2023 (the "First High Court Judgment"); a further judgment was delivered on 1 July 2024 (the "Second High Court Judgment"); and an ex tempore ruling delivered on 10 July 2024 (together the "High Court Judgments"). The High Court quashed the SEMC's decision and made various declarations, with a stay placed on the High Court orders until the Hearing of the appeal. The CRU, as the Respondent, issued appeals in both cases on 8 August 2024. The matter was heard by the Supreme Court in December 2024 and the Court made a preliminary reference to the Court of Justice of the European Union ("CJEU"). After the CJEU has delivered its judgment, the case returns to the Irish Court, which must apply the CJEU's judgment to resolve the case before it. The matter is expected to return to the Supreme Court for their consideration in 2026.

The TSOs seek a provision of €91 million for potential payments to participants under Article 13 of Regulation (EU) 2019/943. The €91 million provision is comprised of

- €54 million for an under-estimation of the potential payments for 1st January 2020 – 30th September 2025; plus
- €37 million forecast costs attributable to Tariff Year 2025/26.

The TSOs state a provision is sought to ensure sufficient funding is in place to meet any potential future obligations that may arise, without prejudice to the ongoing judicial review process.

2.1.1.4 Items Omitted from Forecast Imperfections Charges for Tariff Year 2025/26

i. Article 12: SDP-01-Operation of Non-Priority Dispatch Renewables (NDPR)

If implemented, this modification will mean that renewable generators will not be classified as Priority Dispatch units in the market. The TSOs note based on the low production costs of these units "*it is not anticipated that this will have a significant influence on CPremium payments as the participants incremental price is assumed to be low to reflect this*".

The TSOs note there is a potential risk that a material impact on CDiscount payments may occur "*if the dispatch down of NPDR does not set the price and it is not marginally flagged out".* The TSOs state that due to a lack of information to quantify this risk, it was excluded from the forecast analysis for Imperfections Charges in Tariff Year 2025/26. The TSOs also suggest that NPDR may influence the forecast liability for potential payments to participants under Article 13(7) of Regulation (EU) 2019 / 94 as part of the Clean Energy Package.

ii. DSU Energy Payments: SEM-24-046 - A revised phase 1 solution for energy payments

As per SEMC's Consultation Paper (SEM-24-046) dated August 23 2024, Demand Side Units (DSUs) will play an important role in achieving decarbonization targets through effective demand response mechanisms. The TSOs have excluded costs associated with DSU Energy Payments from their forecast submission *"as there was not enough information available to quantify*" the impact. The TSOs add it is not yet clear when any proposed changes will be operational. As there was not enough information available to quantify this impact it was thus excluded, noting that there is scope for an impact on imperfections costs depending on implementation timelines.

2.1.1.5 Risk-factors in the TSOs' Forecast

The TSOs included several risk factors that should be considered when assessing the forecast Imperfections Costs for 2025/26. The TSOs note the following factors could result in a "*significant difference between the forecast and actual imperfections costs";*

i) Wholesale fuel prices;
ii) SEM Design and modifications to the SEM Trading and Settlement Code;
iii) Items of uncertain impact;
iv) Article 12: SDP-01-Operation of Non-Priority Dispatch Renewables (NDPR);
v) SEM-24-046: Demand Side Units: A revised phase 1 solution for energy payments and other issues;
vi) Participant behaviour;
vii) High Impact, Low Probability Events (HILPs);
viii) Reduced generator availability;
ix) Variable renewable generation;
x) Forced outages of transmission plant;
xi) Testing charges; and
xii) Additional security constraints.

Refer to Section 3.4.1 of the *TSOs' Imperfections Charges Forecast Tariff Year 2025/26* report for further details of the TSOs' comments of the above risk factors.

2.1.2 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 2025/26 as it is assumed that any resulting undelivered quantities are settled at the imbalance settlement price.

2.1.3 Generator Testing Charges

The TSOs have not included specific DBC provisions for new units that will be under test before they are commissioned or units returning from a significant outage. The TSOs assume that testing charges will offset the additional DBC incurred and will primarily consist of constraints, due to out-of-merit running. However, the TSOs add that due to the difficulty in forecasting, testing charges do not cover any transmission-related constraints that arise due to new unit commissioning. There is no provision included in the TSOs' forecast for any future changes.

2.2 Fixed Cost Payments

Fixed Cost Payments in the market are comprised of the following: Make Whole Payment, Recoverable Start Up Costs and recoverable No-Load Costs. In their report, the TSOs have assumed that these costs have largely been captured in the PLEXOS model. There is no provision included in the TSOs' forecast for fixed cost payments.

2.3 Other System Charges (OSC)

Other System Charges (OSC) include Generator Performance Incentive Charges, Short Notice Declaration Charges and Trip Charges. OSC are charges levied outside the SEM by the TSOs. The TSOs did not include a provision for OSC for Tariff Year 2025/26.

2.4 K-Factor

2.4.1 2025/26 K-Factor

The K-Factor is the TSOs' within-year estimate of the funding position of the current Tariff Year (i.e., 2024/25). The K-Factor is based on the actual outturn Imperfections costs for the first seven and half months (i.e., 1 October 2024 to 10 May 2025), plus an estimate for the remaining five months (i.e., 11 May 2025 to 30 September 2025).

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., 2027/28.

The TSOs have also proposed a substantial negative K-Factor adjustment of €183.43 million for inclusion in the Tariff Year 2025/26 Imperfections Charge. The proposed K-Factor is comprised of an actual under-recovery of €16.37 million for Tariff Year 2023/24 and an estimated under-recovery for Tariff Year 2024/25 of €167.06 million (reference Table 1 below and Annex 2 for the TSOs' submission). The estimated costs associated with the within year (2024-25) K-Factor is a significant price driver of

Imperfections Charges for Tariff Year 2025/26. The notable increase in the size of the K-Factor is due to significant difference between the original Imperfections forecast and out-turn actual costs on for the first seven and a half months of the 2024/25 Tariff Year. The TSOs estimate the within year 2024/25 K-Factor to be an under recovery of €167.06 million. Challenges encountered in satisfying the Northern Ireland (NI) Security of Supply dynamic stability requirements is the primary contributory cost driver.

	€ Million
Actual Under-Recovery in 2023/24	(16.37)
Estimated Under-Recovery in 2024/25	(167.06)
Total Estimated Under Recovery	(183.43)
Total Proposed K-Factor to be Applied in 2025/26	**(183.43)**

***Table 1**. K-Factor calculation for 2025/26.*

In calculating the K-Factor for Tariff Year 2025/26 as shown above, the TSOs considered two factors for the within year K-Factor for 2024/25; Estimated Outturn Expenditure and Estimated Outturn Revenue. The within year K-Factor for 2024/25 Estimated Outturn Expenditure resulted in an under recovery €171.58 million, whilst the Estimated Outturn Revenue estimated an over recovery of €4.52 million. Combined, these figures resulted in an estimated under recovery of €167.06 million for 2024/25. In terms of the 2023/24 actual under recovery calculation, the TSOs note this is comprised of a €88 million over recovery for 2023/24 (which was included when setting the 2024/25 tariff), plus an actual €71.63 million K-Factor over recovery arising from the 2023/24 year (resulting in an outturn under recovery of €16.37 million for Tariff Year 2023/24).

2.4.2 TSOs' Imperfections Charges 2024/25 Mid-Year Review

In May 2025, the TSOs provided the RAs with an updated assessment of actual Imperfections cost data from 1 October 2024 to 26 April 2025, as well as projecting costs and revenues for the remaining five months for the Tariff Year. For the first time since the Mid-Year Review process commenced and in accordance with section F.12.1.1 (b) of the Trading and Settlement Code, the Single Electricity Market Operator submitted a request proposing an adjustment to the Imperfections Charge Factor, FCIMPy (for Capacity Year y), to 1.5 for each imbalance settlement period, applicable from 1 July 2025 to 30 September 2025[12].

The SEM Committee (SEM-25-025) did not approve a mid-year adjustment for the following reasons:

- The TSO have noted improvements in their outlooks of the Market Working Capital Facility for the remainder of Tariff Year 2024/25 as a result of less unfavourable system conditions;
- More recent analysis shows that when the costs associated with the Northern Ireland Security of Supply dynamic requirements are removed, the TSOs have moved from a position of -€7.5 million under recovery in March 2025 to an over recovery of +€16.4 million in April.

The SEM Committee noted it requires the TSOs to review the adequacy of their Market Working Capital Facility as a matter of urgency. By ensuring the credit facility level is sufficient on an enduring basis, it would mitigate future potential risks of their credit facility being exhausted within a Tariff Year due to unforeseen or unprecedented circumstances. This exercise would protect the public's best interests and ensure consumers are protected from any unforeseen increases in their electricity bills mid-year.

[12] 2024/25 Imperfections Mid-Year Review Report

3. TSOs' Reporting of Imperfections costs and drivers

Given the significance of costs associated with Imperfections Charges, and its impact on current and future consumers, the SEM Committee deems it essential that the TSOs increase the transparency of forecast and actual costs associated with Imperfections Charges on a publicly available platform, on a real time basis. Additionally, the SEM Committee emphasises the importance of transparent reporting on the TSOs' measures to reduce such costs to ensure that consumers money is being used in an efficient manner.

The SEM Committee refers to the reporting of Imperfections Costs in other jurisdictions and highlights the National Energy System Operator (NESO) format of reporting in Great Britain[13]. NESO's format of reporting is extensive, comprehensive, relevant and contains easily accessible data. The SEM Committee is seeking stakeholders' comments on the standard and readability of the TSOs' Imperfections Reports and the frequency of Imperfections Charges reporting in the SEM in general.

4. Ongoing actions to Reduce Imperfection Costs.

In May 2023, EirGrid published the "TSO Imperfections & Constraints Multi-Year Plan 2023-2027". Within this document, the TSOs outlined a multiyear plan to manage and reduce imperfections and constraints in the electricity system. These actions include updating reserve policies, reviewing and reducing transmission constraints, lowering the minimum number of conventional units online, conducting trials to reduce system inertia, developing procedures for new interconnectors, and enhancing imperfection reporting. These measures aim to optimise system efficiency, support renewable energy integration, and reduce operational costs. Under the current price control framework (PR5:2021-2025), the TSO is financially incentivised to deliver on the actions set out in its multi-year plan.

In Q2 2025, the System Operator for Northern Ireland (SONI) reduced the Minimum Number of Inflexible Units (MINNIU) Technical Constraint Group (TCG) from three units to two.

[13] https://www.neso.energy/industry-information/balancing-costs

In addition to this the RAs are considering the operation of the Bidding Code of Practice (BCOP) as the basis of the bidding rules in the SEM.

Furthermore, the introduction of the North-South Interconnector will potentially alleviate system constraints and therefore Imperfections Costs. The SEMC has requested regular updates from the TSOs and Transmission Asset Owner (TAO) on its delivery.

5. Consideration of Ways to Reduce Future Imperfections Costs

One potential way to reduce imperfections costs in the future (relative to what they would otherwise be) would be to modify the Trading and Settlement Code so that only those units dispatched away from their Final Physical Notification (FPN) by the TSO for balancing energy reasons would be settled at the imbalance price. Units dispatched away from their FPN by the TSO for non-energy reasons, such as to meet a system constraint, would be settled on their complex Commercial Offer Data (COD) only. The SEM Committee is seeking stakeholders' comments on potential actions the TSOs, RAs or SEM Committee could take to reduce Imperfections Costs in the SEM.

6. Summary

The TSOs proposed an Imperfections Charge of €883.24 million for the Tariff Year 2025/26. This comprises of total constraints costs of €699.81 million (includes €91 million of costs associated with the Clean Energy Package) and a K-Factor adjustment of €183.43 million. When the total forecast Imperfections Charge is divided by the forecast demand, of 39,650 GWh[14], it equates to an Imperfections Price of €22.28 MWh for Tariff Year 2025/26. This is a 52% increase on Imperfections Charges during Tariff Year 2024/25 (€14.62/MWh). The trend in the Imperfections Prices and costs is summarised in Table 2 below.

[14] The TSOs forecast demand for the 2025/26 tariff year is 39,650 GWh.

€ Million	TSOs' Proposed 2025-26	2024-25	2023-24	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18
Total Constraints Costs (DBC)	608.81	475.62	539.98	694.14	341.01	271.09	256.97	190.44	177.6
CEP Art. 13(7)	91	158							
Fixed Cost Payments	-	-	-	-	-	15.38	14.35	7.19	2.7
K-factor Adjustment	183.43	(66.41)	(91.17)	140.36	(10.18)	(0.37)	84.44	(13.86)	(7.34)
Total Imperfections Charge	883.24	**567.21**	**448.81**	**834.53**	**330.83**	**286.10**	**355.76**	**183.77**	**173.02**
Forecast Demand (GWh)	39,650	38,800	38,950	38,200	36,000	33,600	34,200	35,200	34,550
Imperfections Price / MWh	22.28	**14.62**	**11.52**	**21.85**	**9.19**	**8.51**	**10.40**	**5.22**	**5.00**

Table 2: *Imperfections Charge over time*

7. Next Steps

The RAs seek stakeholders' views on any aspect of the proposals and, in particular, on the following:

- The TSOs' forecasts of costs and assumptions for Tariff Year 2025/26. In particular, stakeholders' views of the inclusion of the following costs are requested:
  - i) The costs attributed to Generator Outages (€75M);
  - ii) The potential payments to participants under Article 13 of Regulation (EU) 2019/943(€91M). The €91 million provision is comprised of;
    - €54 million for an under-estimation of the potential payments for 1st January 2020 – 30th September 2025; plus
    - €37 million forecast costs attributable to Tariff Year 2025/26
- The TSOs' standard and frequency of reporting Imperfections costs and drivers;
- Potential actions the TSOs/RAs could take to minimise Imperfections Charges (€699.81M) for the upcoming tariff year;
- Potential actions the TSOs/RAs could take to minimise Imperfections Charges in the medium to long term timeframe;
- Whether the K-factor element (€183.43M) which is projected to be significantly greater for Tariff Year 2025/26 than in previous Tariff Years should be partially recovered over one or more Tariff Year and, if so, at what quantum.

Responses to this paper should be forwarded to the Market Modelling Group (mmg@cru.ie) and Caroline Winder (caroline.winder@uregni.gov.uk) by close of business on 25th July 2025. Following consideration of stakeholders' feedback, SEMC intends publishing its decision in early September 2025.