NESO National Energy System Operator

Public

Workgroup Consultation

CMP432:

Improve "Locational Onshore Security Factor" for TNUoS Wider Tariffs

Overview: This modification seeks to improve the cost reflectivity of the "Locational Onshore Security Factor", so that Wider locational TNUoS charges better reflect the way Transmission Owners plan for a secure network based on the Security and Quality of Supply Standard requirements.

Modification process & timetable

1. **Proposal Form** 07 March 2024
2. **Workgroup Consultation** 27 February 2025 to 07 March 2025
3. **Workgroup Report** 14 April 2025
4. **Code Administrator Consultation** 22 April 2025 to 02 May 2025
5. **Draft Modification Report** 09 May 2025
6. **Final Modification Report** 15 May 2025
7. **Implementation** 01 April 2026

Have 5 minutes? Read our Executive summary

Have 30 minutes? Read the full Workgroup Consultation

Have 40 minutes? Read the full Workgroup Consultation and Annexes.

Status summary: The Workgroup are seeking your views on the work completed to date to form the final solution to the issue raised.

This modification is expected to have a: High impact on Generators and Suppliers

Governance route	Urgent modification to proceed under a timetable agreed by the Authority (with an Authority decision)	
Who can I talk to about the change?	**Proposer:** John Tindal, SSE John.tindal@sse.com Phone: 01738 547308	**Code Administrator Chair**: Sarah Williams Sarah.williams@nationalenergyso.com Phone: 07593 899145
How do I respond?	Send your response proforma to cusc.team@nationalenergyso.com by **5pm** on **07 March 2025**	

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Executive Summary

What is the issue?

The Locational Onshore Security Factor applied to TNUoS Wider locational tariffs is not cost reflective of the way the MITS is planned. This is because it is a measure of average existing security, while, by contrast, charges should reflect the incremental cost associated with incremental security

Incremental increases in MITS network transfer capability does not generally require any additional cost of incremental security where the transmission system is already sufficiently secure. This is because incremental network reinforcement is kept secure by the already existing secure redundant network capacity.

What is the solution and when will it come into effect?

Proposer's solution:

It is proposed that the existing Locational Onshore Security Factor uplift should be removed from all TNUoS Wider locational tariffs for both Peak Security and Year-Round.

Local charges will remain unchanged.

Implementation date: 01 April 2026.

What is the impact if this change is made?

High impact on Generators and Consumers

If approved, this modification would reduce the security factor to 1 or remove it entirely which would reduce the steepness of the north-south gradient of Wider TNUoS tariffs. NESO have carried out an assessment of tariffs described in more detail on page 15. This shows that:

- For Generators, this would tend to reduce the value of TNUoS Wider locational charges in northern areas and also reduce the value of TNUoS credits in southern areas. It would also reduce the value of the TNUoS adjustment credit to zero for the year modelled, which would result in increasing costs for the majority of Generators in the southerly areas (irrespective of if they receive a Generator credit).
- For demand, this would reduce the value of Wider TNUoS charges in southern areas. However, it would not change demand locational charges in northern areas where those demand charges are negative but floored at £zero. It will also increase the level of demand residual tariffs charged to customers.

Interactions

There is an interaction with CUSC modification CMP444. Both CMP432 and CMP444 could be implemented; they are not incompatible. Consideration should be given to the combined effect. For example, a generation plant far from demand centres might have reduced TNUoS through CMP432 but which still go high enough in future to hit, and then be limited by, the Cap brought in under CMP444.

What is the issue?

The defect is that the Locational Onshore Security Factor applied to Transmission Network Use of System (TNUoS) Wider locational tariffs is not cost reflective because it doesn't match with how the MITS is planned. This is because it is a measure of average existing security, while, by contrast, charges should reflect the incremental cost associated with incremental security.

Incremental increases in MITS network transfer capability does not generally require any additional cost of incremental security where the transmission system is already sufficiently secure. This is because incremental network reinforcement is kept secure by the already existing secure redundant network capacity.

The Security and Quality of Supply Standard (SQSS) requires that the Main Interconnected Transmission System (MITS) network is already sufficiently secure.

The TNUoS Transport and Tariff model calculates a value to reflect the cost of reinforcing the transmission network to provide incremental power transport capability, so:

- If additional MITS network capacity does not require additional redundant network capacity for security, then;
- TNUoS Wider locational price signal should not charge for additional redundant network capacity for security.

SQSS Requirements

Transmission Owner's (TOs) plan network additions using SQSS criteria. This requires a level of surplus network capacity is available as a form of reserve, so the network can continue to accommodate flows in the event of particular network faults or outages. An example of a fault condition that must be secured against is an outage/fault on the two largest separate circuits, a situation often referred to as "N-2"[1].

The following illustrates the implications of the SQSS security requirement, which should be the basis for any security factor in the CUSC. The SQSS requires that a boundary is initially sufficiently secure against relevant fault conditions specified in absolute terms, such as N-2 requiring a surplus network capacity equivalent to two redundant circuits.

Where additional network transfer capacity built across that boundary leaves the relevant fault conditions the same as it was before, then the security provided by the already existing two redundant circuits means the network remains sufficiently secure after the additional transfer capacity is added. This additional transfer capacity would not trigger a requirement for any additional redundant network capacity to be added for additional security.

[1] The principle of *N*-2 security in transmission expansion planning requires the system to maintain a constant power supply with a two-component failure, e.g. two transmission lines

In this way, the network that initially had sufficient redundant capacity to meet the security conditions, continues to have sufficient redundant capacity to meet security conditions and no additional redundant secure capacity is required.

TNUoS Transport and Tariff Model

The TNUoS Transport and Tariff model takes a different approach from the SQSS.

Instead of modelling security as a specific test, it instead assumes that the capacity of redundant secure network always increases on a pro-rata basis with increases in network transfer capacity. TNUoS does this by assuming security is a factor multiplier of all MITS network reinforcement. The current TNUoS tariff methodology has the effect of assuming:

- For each 1 MWkm of required new network capacity, then (based on the current "Security Factor"), 1.76 times that capacity is actually built.
- Capacity of redundant secure network capacity is modelled to increase pro-rata with all increases in network transfer capacity.

If this pro-rata increase in security did happen in practice, then it would lead to the network being over-secure compared with the SQSS requirements.

The result is that the TNUoS Transport and Tariff Model is over-forecasting how much network will be planned to meet SQSS requirements.

This gives rise to the issue that the CUSC TNUoS charging methodology treatment of system security is not cost reflective of what actually occurs with transmission network planning.

Why change?

The CUSC TNUoS charging methodology treatment of system security should be more cost reflective of network planning, so should better incentivise economically efficient investment decisions for both generation and demand.

The proposed change would also be better for effective competition because it would improve predictability of Wider locational charges by reducing their sensitivity to variations in input variables, such as Expansion Constant, or changes in the location of generation, demand, or network reinforcement. Additionally, there will be a positive impact on consumer costs, both from (i) fundamentally lower demand charges and from (ii) a shallower delta between northern and southern projects, which is expected to positively impact CfD clearing prices.

The above improvements to cost reflectivity and effective competition through reduced risk should reduce cost to consumers over the long-term. This is because it would better incentivise economically efficient investment decisions, as well as reduce risk margins and reduce cost of capital.

What is the solution?

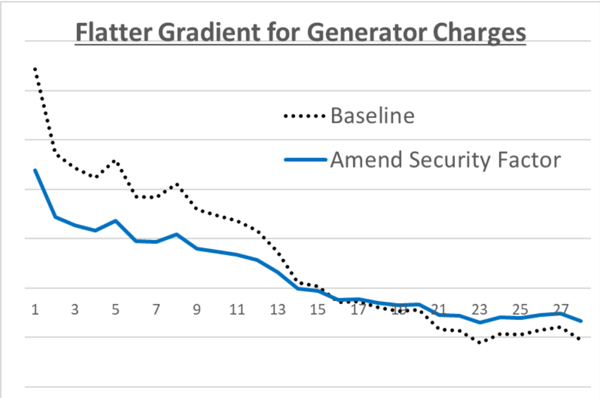
Proposer's solution

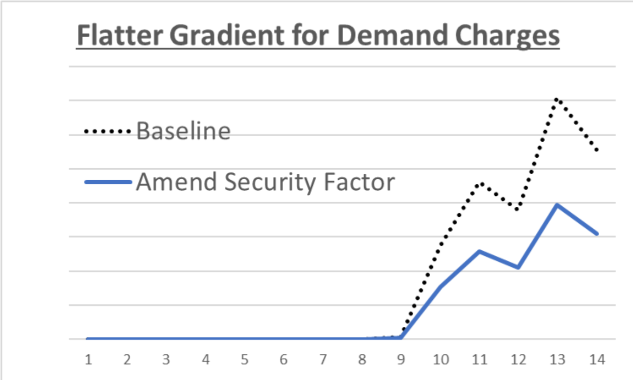
It is proposed that the existing Locational Onshore Security Factor uplift should be removed from all TNUoS Wider locational tariffs for both Peak Security and Year-Round, for both generation and demand tariffs.

Note it is the intent that local charges would remain unchanged.

Examples of Charges Before and After Amending the Security Factor

[Examples based on forecast charges in 2035, generation assumes an intermittent Generator]





Results for Generators

- Flatter gradient for locational charges: reduced differential between North & South as charges become smaller charges and credits become smaller credits.

- Reduced magnitude of Generator adjustment credit: if the reduction in total revenue recovered from positive Generator charges outweighs the corresponding reduction in credits paid out to other Generators.

Results for Demand

- Flatter gradient for locational charges: reduced Southern charges, while Northern charges remain floored at £zero.

- Higher Demand Residual charges: smaller collection from demand locational charges.

Workgroup considerations

The Workgroup convened 6 times to discuss the identified issue within the scope of the defect, develop potential solutions, and evaluate the proposal in relation to the Applicable Code Objectives.

Whilst reviewing the consultation with Workgroup members, it became apparent that members had conflicting views on the considerations section within this consultation. The Workgroup therefore agreed that it would be useful to outline the arguments in support of the proposal, as well as in opposition to the proposal. The consultation has been structured so that the arguments in favour of the proposal and the counterarguments in response to these are covered in detail below.

Consideration of the Proposer's solution

The Proposer introduced their solution to remove the existing Locational Onshore Security Factor uplift from TNUoS Wider locational tariffs for both Peak Security and Year-Round, for both generation and demand tariffs. They noted that the principle of charging should reflect incremental costs rather than the existing network security, referencing CUSC 14.14.6.

One Workgroup member agreed that costs should reflect incremental usage, not total capacity, to ensure accurate pricing. They advised that security costs should only be added if truly necessary.

The Proposer advised that their solution could be implemented into the CUSC in two ways, and invited the Workgroup to provide feedback on this:

- **OPTION 1**: Remove references to the Locational Onshore Security Factor entirely from the CUSC and all Wider charge calculations.
- **OPTION 2**: Amend the value of the Locational Onshore Security Factor for Wider Tariffs to be 1.00 (instead of 1.76 at present).

The Original proposal is to use option 1 to remove the Locational Onshore Security Factor entirely. This is because it is a cleaner and more efficient solution compared with option 2 of retaining legal text for an adjustment factor of 1x that has no effect on the value of tariff calculation methodology.

Incremental Costs price signal versus average cost recovery and fairness discussion

The Proposer considered the difference between incremental and actual costs, with the Proposer advocating for an incremental approach that reflects the contribution to reinforcement.

The Proposer explained that the current Security Factor calculated based on average existing cost is not cost reflective, because it is overly inclusive as it includes sunk costs for existing security that do not vary with network expansion. They argued that an incremental price signal should only reflect the value of incremental costs and should not attempt to reflect the value of sunk costs that do not vary with network expansion.

The Proposer explained that this is consistent with economic principles that efficient prices signals should reflect incremental cost, and it is consistent with the CUSC principles that charges should reflect incremental cost, as per CUSC sections 14.14.6 and 14.14.11. They argued this principle is also consistent with Ofgem's Targeted Charging Review, Access and Forward-Looking Charges review and BSUoS Task Forces conclusions that Generator charges should reflect incremental cost, that fairness relates to revenue collection and that it is in the best interest of customers for revenue collection to be wholly on final demand, not on generation.

The Connection and Use of System Code (CUSC) explains that TNUoS charges should reflect incremental cost rather than average cost:

> *"The underlying rationale behind Transmission Network Use of System charges is that efficient economic signals are provided to Users when services are priced to reflect the* ***incremental costs*** *of supplying them." (*CUSC 14.14.6, emphasis added*)*
>
> *"In setting and reviewing these charges The Company has a number of further objectives. These are to*:
>
> > *• offer clarity of principles and transparency of the methodology;*
> >
> > *• inform existing Users and potential new entrants with accurate and stable cost messages;*
> >
> > *• charge on the basis of services provided and* ***on the basis of incremental rather than average costs****, and so promote the optimal use of and investment in the transmission system; and*
> >
> > *• be implementable within practical cost parameters and time-scales" (*CUSC 14.14.11, emphasis added*)*

The Proposer also explained that in some circumstances, it can be appropriate for price signals to use a measure of average existing cost, but only if it is being used as a proxy for the value of incremental cost, and only in circumstances if that value of average cost does actually appropriately reflect the value of incremental cost. They argued that since the transmission system is already sufficiently secure and the provision of incremental security is systematically lower than the value of average existing security, then the incremental price signal should reflect the lower value of incremental security (i.e. no additional security), not the higher value of average existing security.

It was agreed that the TNUoS Transport model uses a measure of the expansion of the existing network to calculate TNUoS tariffs. However, the Proposer explained that the purpose of the existing transport methodology is to use the MWkm weighted average cost of the existing network as a proxy measure to reflect the long-run incremental cost of network expansion. They argued that removing, or setting Security Factor to 1, to better reflect the long-run incremental cost of security would make it more consistent with the current Transport Model approach to reflect the long-run incremental cost of network expansion.

The Proposer argued that if incremental network expansion did take place with the same degree of security as the existing network, as TNUoS charges currently assume, this would imply an ever-increasing provision of security which does not reflect the way the network is built in practice.

The Workgroup discussed the use of deeper connection charges. The Proposer explained that it would be incorrect to claim that a move to deeper connection charges, with its associated shortcomings, would be the only way to provide charges based on incremental cost. They explained that it would be incorrect and represent a false choice to claim that charging had to be based on either average existing cost, or deeper connection charges.

NESO SECULF Model Discussion

The Proposer suggested that SECULF model and its answer could be disregarded for the purposes of this modification CMP432. The reasons they gave were that firstly SECULF does not appear to measure what it claims to measure as it appears to assume its own answer rather being an accurate mease of existing network security, and secondly, SECULF attempts to measure the wrong thing by producing a view of average existing security, when charging should be based on incremental security instead.

Three Workgroup members concurred that the SECULF model can be disregarded for the purposes of CMP432. There is no historical evidence of the 1.76 factor being consistently applied in network planning, nor did NESO provide any justification for its origin. Furthermore, since the system is already secure enough to meet demand in the south, the SECULF methodology is no longer relevant when the primary focus is planning for the connection of Scottish generation.

One Workgroup member raised concerns about the SECULF model and whether it accurately reflects yearly changes and infrastructure needs. They advised that the model automatically adds new circuits but should instead focus on optimising the existing network.

The Proposer raised concerns with the lack of transparency in how security is calculated, as the methodology and key data are not accessible to Users. They further explained that the SECULF model assumes that longer circuits appear to inappropriately increase the SECULF measure of security but advised that this may not be accurate. In practice and without access to the necessary SECULF calculations, it is difficult to verify these assumptions and fully understand their impact.

The Proposer requested access to the NESO SECULF model, and the VBA Code within the Transport and Tariff model however the NESO representative advised that the model was NESO intellectual property and elements within the model are commercially sensitive and could not be shared. After Workgroup discussions and challenges to NESO on confidentiality an action was taken away to seek a legal position. Potential solutions to resolve these concerns were suggested included to deal with the intellectual property issue by requiring a license agreement, and deal with the confidential information issue by replacing confidential data with public domain data prior to publishing. Both solutions are already used by NESO in publishing the TNUoS Transport and Tariff model, but NESO rejected using these solutions for the SECULF model. If the data cannot be released a written response from NESO has been requested. An alternative solution of an independent audit of the SECULF model was suggested by the Proposer and the NESO representative has taken this away for consideration.

When discussing the Terms of Reference for the modification, the Proposer advised it would be helpful to get input from the NESO strategic network planning team and Transmission Owners to better understand how network reinforcements work in practice. These organisations were invited, however, no representative from NESO strategic planning team, or any of the Transmission Owners has yet been made available to support the Workgroup process.

The Authority Representative stated that there needs to be a clear approach to how bootstraps are charged, especially in relation to zoning and their interaction with existing methodologies. They emphasised that most of the Transmission System is not made of bootstraps, so any changes should be considered in the right context without losing sight of the overall system.

The Authority Representative advised NESO to share as much information as possible in relation to how security factors are calculated to provide transparency. NESO committed to provide a teach-in to the Workgroup on the SECULF model, however, a NESO subject matter expert (SME) has not yet been made available. In the meantime, NESO circulated a PowerPoint presentation pack, and questions were collated to be taken away. The Authority Representative asked NESO to carry out a Teach-In by an SME.

The Authority Representative noted NESO's explanation around the operation of the model as it is today and how we get from that SQSS piece to a revised DCLF model and the security factor of 1.76 would be helpful to the Workgroup.

The Authority Representative noted the interaction of CMP432 with CMP444, advising that a decision on this modification is expected to be made before the decision on CMP444, and it will be well in advance of AR-7 job. Another Workgroup member noted that the timing is currently problematic. There is a need for all market participants to have clarity sooner, particularly for bidders into the Contract for Difference Allocation Round 7 in summer 2025 to have a decision on both CMP444 and CMP432 prior to submitting bids.

As of 25 February, the final modification for CMP444 is due to be sent to Ofgem on 28/03/2025 with a decision date of 01/07/2025, whereas the final modification for this CMP432 is due to be sent to Ofgem on 15/05/2025 with a final decision date of 30/09/2024.

Security Factor Materiality Discussions

The Proposer advised that the current security factor in the charging model amplifies locational signals, in a way that is not cost reflective and provides a locational security signal which substantially over-states the incremental cost of security. He proposed setting the security factor to 1, or removing it from the Wider tariff calculation entirely, to better align with the incremental cost of network reinforcement.

Two Workgroup members agreed that the current security factor may have been artificially inflating charges, as the 1.76 security factor does not appear to have been consistently applied to each new circuit build, given that the system is already secure. This inconsistency makes the approach highly non-cost reflective, leading to unjustified cost increases across the network.

They emphasised the significant impact of the security factor on consumer costs, both through direct fundamental demand charges and the steep pricing disparity between southern and northern Generators affecting CfD clearing prices. Given these material implications, they argued that it would be untenable to continue applying an unjustified 1.76 factor.

The Proposer presented the materiality of the security factor, showing that the highest impact is on northern intermittent Generators. He explained that the impact on conventional carbon generation in the south is relatively small, as the bulk of conventional carbon generation is located in the south.

The Proposer explained that the security factor has a significant impact on the Year-Round tariffs for northern intermittent Generators and provided data showing that the impact on tariffs for conventional carbon generation in the south is relatively small.

Evidence of how the network is built in practice for security discussion

The Proposer provided the Workgroup with examples of the West Coast bootstrap and other network reinforcements to demonstrate security impacts using data from the NESO ETYS publications. This showed that, in practice, network reinforcement capacity does tend to increase boundary transfer capability at a ratio of 1:1 which is consistent with a Security Factor of 1.00.

A Workgroup member provided examples of network planning, including the Sizewell and West Coast bootstrap projects, to illustrate the impact of SQSS security considerations on network capacity and transfer capability.

The Proposer discussed the impact of strategic planning on network reinforcement and the role of individual Generators in causing incremental security costs. The Proposer and two Workgroup members argued that substantial network upgrades that triggered changes in fault conditions are driven by strategic planning, not incremental Generator investment decisions, so should not be part of a locational price signal. The Proposer explained that for locational investment price signals to be useful, they should reflect the incremental cost caused by user investment decisions and not reflect sunk costs, or other costs that are not impacted by that user's locational investment decisions.

There were comments regarding whether the figure should be 1, 1.76 or somewhere in between and if it is a different number, how that could be evidenced.

The SSE Consultant presented on the locational security factor methodology, emphasising the addition of transmission capacity through new circuits rather than increasing the loading of existing circuits. He highlighted the importance of considering the secured system when adding incremental generation.

The SSE Consultant raised concerns that the current LSF methodology does not accurately reflect the realities of the GB transmission system development, which primarily involves adding new transmission lines rather than increasing the capacity of existing ones.

The Proposer and a Workgroup member debated the need to review the security factor and its impact on the transmission charging system due to concerns that the current methodology does not accurately reflect incremental costs and may lead to inappropriate price signals.

Presentation on how charging wrongly implies N- numbers

The Proposer explained that the current charging methodology implies that every time a new circuit is added, it would be appropriate to add an additional redundant circuit, leading to an ever-increasing number of redundant circuits (N-1, N-2, N-3, N-4, etc.). They noted that this is not reflective of actual network reinforcement practices.

The Proposer shared an example, explaining that when a new circuit is added without changing the fault condition, the security factor should be 1. However, the current methodology assumes that additional security is always required, which is not the case in practice.

The Proposer argued that the long-run incremental price signal should reflect the actual incremental cost of security, which does not increase indefinitely with each new circuit. Their opinion was that the current TNUoS charging methodology's assumption of continuous increases in the fault condition is incorrect.

Transmission Capacity Discussion

The Proposer discussed the impact of adding new circuits on transmission capacity and the importance of considering short-term ratings and dynamic systems and emphasised the need to understand the incremental transmission capacity required for new generation.

Two Workgroup Members discussed the complexity of the transmission system and the need to consider various factors such as thermal constraints, voltage stability, and reinforcement reasons when determining the Locational Security Factor.

The SSE Consultant highlighted that the addition of new transmission lines can significantly increase cross-boundary capability, demonstrating the impact of new lines on overall transmission capacity. Noting that this evidence supports an LSF of one for certain boundaries, as the new lines provide sufficient capacity without the need for additional security factors.

The Proposer presented the proposed legal text amendments, suggesting two options: removing references to the security factor entirely or amending it to one. They also highlighted the need to address the interaction between locational and local security factors to ensure that changes to the locational security factor do not inadvertently affect local charges.

Impacts on Tariffs if Locational Security Factor amended to 1 or removing completely

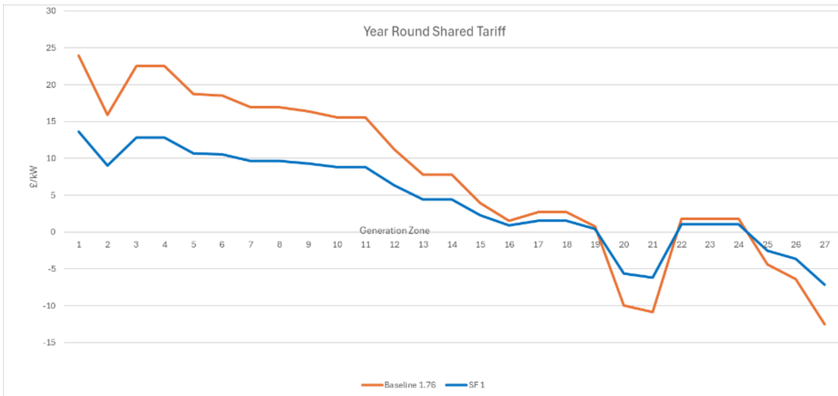
The Workgroup asked NESO to provide analysis on the impacts of adjusting the Locational Security Factor was reduced to 1 or removed. The analysis can be found in Annex 5 with a summary of impacts noted below for charging year 2025/26.

Amending Locational Security Factor to 1:

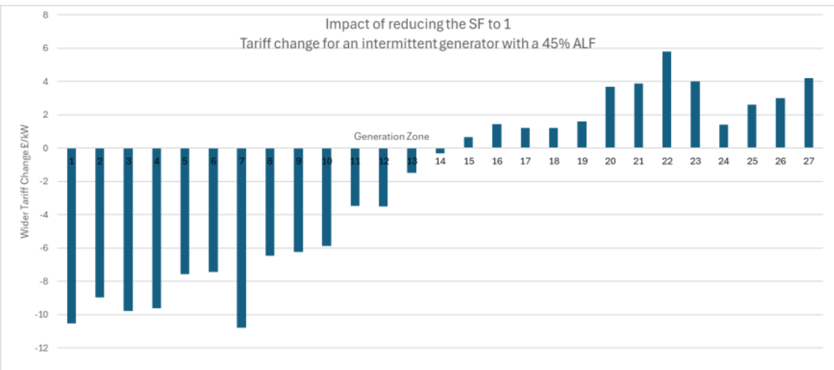
- It has the impact of reducing all wider locational tariffs by 43% this applies to both demand and generation
- It reduces generation tariffs to the extent that the tariffs fall within the Euro cap range so the adjustment tariff would be zero
- The shortfall in revenue from the reduced locational tariffs would be picked up the demand residual fixed charge, this would increase by 3%
- There is an equal swing between reduced revenue generated from Generation (-4.6%) and an increase of revenue from Demand (1.3%) of £51.98m

The impacts are shown below are also contained in Annex 5

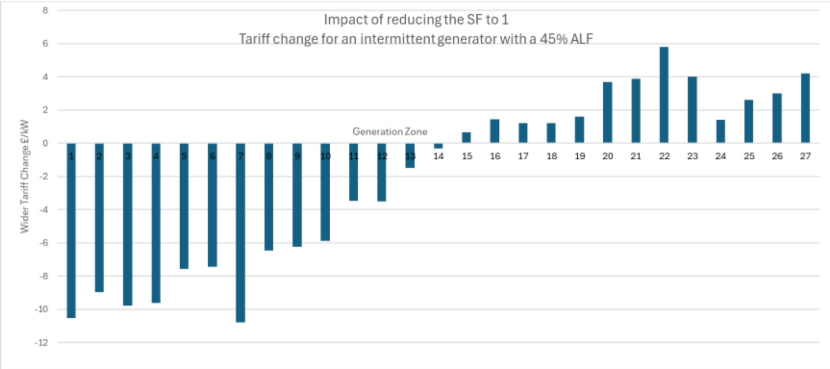
Impact on Year-Round Shared Tariff



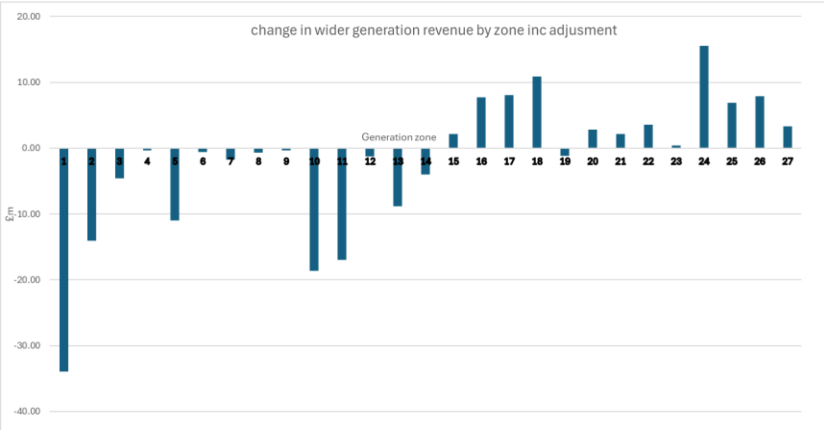
Impact on Tariff change for an intermittent Generator with a 45% ALF



Impact on Demand Locational



Change in wider generation revenue by zone including adjustment



Removing the Locational Security Factor

- This would have the same impact in practice as setting it to 1. This could be seen as more permanent as references are removed in CUSC.
- NESO Revenue team have not looked at a security factor of zero because as the security factor is used as a multiplier in converting from marginal KM to a £/kW tariff setting it to zero would have the impact of setting all of the locational tariffs to zero

The Workgroup agreed that it will be helpful to carry out additional tariff impact analysis including the impact on later charging years, breakdown by different types of generation technology and interactions with other modifications including CMP444 (cap and floor), CMP440 (demand credits), CMP423 (Reference Node), and CMP315/375 (Expansion Constant). This would also consider the longer-term impact on the generation adjustment credits and demand residual.

Argument for an average Locational Security Factor

A Workgroup member presented an alternative perspective. While accepting the premise that efficient economic signals should be sent when the incremental (or marginal) cost effects of a market participant's actions are reflected, the Workgroup member stated that the current charge structure and ICRP model deliberately do not fully reflect these costs, as they balance cost reflectivity with stability and fair charging.

The Workgroup member stated that a full marginal approach to charging would involve a deeper charging method that reflects the actual or expected impact of a party's investment decision on the transmission network. If a party's decision resulted in a need for new network investment, the party would be charged the cost of that investment. Similarly, if no investment was needed to accommodate the party, no charge would be levied. As network investment tends to occur in specific "chunks" of MWs, if a party triggered investment that exceeded its own needs, it would bear the full cost under a marginal approach.

The Workgroup member added that the current methodology only charges a party based on its proportionate use of the network. Indeed, the methodology shifted from a previous approach where local network reinforcements were charged on a deep basis, referred to as "shallowish" charging, to a fully shallow arrangement. This change was made because it was deemed unfair to burden such users with substantial costs, especially since this creates spare capacity that subsequent users can benefit from. The principle of charging users only for their "fair share" of the network means that subsequent users and existing users are charged the same cost, which reflects the cost of new network and network that has already been built.

The Workgroup member noted that this proportionate approach not only applies to the number of MWs of network that is used by the user, but also to the number of years that the user uses the network for. Network investment has a long asset life and is assumed to be made for 50 years in the methodology. Therefore, the cost of the network is spread over 50 years when calculating the cost per MWkm of network in the Expansion Constant and Expansion Factors. This allows users to be charged annually for their usage of the network, even if the life of their project is less than 50 years, which is often the case.

If users were only charged based on the current view of future network investments each year, costs could not be spread over 50 years. Once the investment was made, it could no longer be considered a future investment and its costs could therefore not be reflected in locational charges, meaning its remaining years' costs would be lost. This issue does not arise with deeper charging arrangements, where users triggering the investment are charged the full cost upfront or annually, with termination top-up payments if their project closes before charges are paid off.

Therefore, the Workgroup member stated that by its nature the current shallow charging methodology seeks to reflect combinations of existing network and future network costs, and identified key aspects of the methodology that followed a consistent approach to this:

Expansion Constant: uses the past 10 years' investment costs in 400kV overhead lines, indexed to reflect price key changes in the inputs to costs, assuming that the asset is used its full MW capacity for a period of 50 years.

Expansion Factors: uses the same approach as the Expansion Constant, to calculate costs of other network types and voltages.

Locational Security Factor: average amount of security provided across the whole network currently.

Use of HVDC "onshore" assets: these links are by their nature controllable so can be used to varying levels of capacity. The Transport Model assumes that the DC link is used in the same proportion as existing AC onshore network, even though the actual incremental use could be more or less than this.

The Workgroup member stated the belief that the current methodology seeks to reflect the incremental cost of the network through the calculation of the marginal MWkm, rather than trying to do so in every aspect of the methodology, identifying paragraph of 14.15.4 of the CUSC which states:

"The DCLF ICRP transport model calculates the marginal costs of investment in the transmission system which would be required as a consequence of an increase in demand or generation at each connection point or node on the transmission system, based on a study of peak demand conditions using both Peak Security and Year-Round generation backgrounds on the transmission system. ***One measure of the investment costs is in terms of MWkm. This is the concept that ICRP uses to calculate marginal costs of investment."***

The Workgroup member noted, however, that even in this aspect of the methodology, the existing network plays a crucial role in calculating the locational signal. The DCLF model reflects the current network but assumes it is perfectly sized to meet the assumed amount and locational distribution of generation and demand. Additional flows are calculated by introducing additional generation at different locations on the network, with the assumption that the network can be expanded only by the necessary fractions of MW to accommodate these additional flows. Therefore, the model focuses not on actual investments needed to accommodate new generation, but rather on the additional use of the existing network.

The Workgroup member believed the model accurately represents the average level of security required for the system as a whole when calculating the Locational Security Factor, particularly since the model assumes the network is precisely sized to current requirements, so any additional assets would also need to provide security. In reality, various approaches might be adopted depending on the circumstance: additional circuits may need to be constructed, existing circuits might need reinforcement, or no additional investment may be required. The Workgroup member stated the opinion that this does not imply an ever-increasing level of security on the network to ever higher levels than N-2 and observed that under the current methodology, if the average amount of security in the network were reduced, the Locational Security Factor would accordingly decrease.

Another key aspect highlighted by the Workgroup member is the need to provide signals for efficiently reusing the existing network, which aligns with the current charging approach described above. The efficient reuse of the system is particularly important now as the country strives to meet Clean Power 2030 objectives by altering the generation mix as well as increasing the total amount of generation. Consequently, it is impractical to focus solely on new network construction while neglecting the use of the existing network. Inefficient use of the existing network could lead to unnecessary new infrastructure development or inefficient levels of constraint costs, ultimately harming customers.

The Workgroup member argued that if the Locational Security Factor calculation were altered to reflect only actual new investments, all aspects of the methodology should be reviewed and, where appropriate, modified to ensure consistency within any new model. This should be conducted under a comprehensive review, as suggested by Ofgem, to ensure transmission charging is appropriate for future low carbon trading arrangements.

A specific example where a similar change might be required is the treatment of HVDC assets. The Workgroup member noted that a major argument for the CMP432 solution is that new investments tend to involve new circuits, such as the Western DC link; therefore, only the effect of these assets on security should be included in the model, excluding existing assets. A similar argument could be made that only the new HVDC assets should be considered when calculating the use of that relevant part of the network in the transport model, as this would be the marginal impact on the transmission system. It would be inconsistent to exclude existing network security from the security factor calculation while including the use of existing onshore assets in the MWkms calculation. In a purely marginal or incremental approach, the usage of HVDC assets should be set at 100 percent, not an average approach agreed upon to ensure fairness in charging, as mentioned above.

The Workgroup member believed that altering the Locational Security Factor alone, without ensuring consistency with the broader model, would result in a less cost-reflective methodology.

Notwithstanding the above views, in response to arguments that new network investment only provided transfer capability, and not new security, the Workgroup member expressed a perspective that it was not possible to concluded this simply by looking at investments made in single transmission lines or cables. The provision of security and network planning in general is clearly more complex than this and the network investment that is expected in future will consist of multiple new lines and cables, as well as reinforcement of existing circuits. It is this as a whole that provides a combination of transfer capability and security.

The Workgroup member said that looking at the specific example of the Western HVDC link that was used in the Workgroup to demonstrate that only transfer capability had been provided to several network boundaries, showed this sort of complexity. The Workgroup member noted two things:

- That the Electricity Ten Year Statement had indicated that the additional capacity on the B6 boundary was provided by "*the addition of the new Western HVDC circuit and upgrade of cables at Torness*", so not just the HVDC circuit.
- That prior to the above network investments, the initial 3.5GW of boundary capability appeared to be provided by existing assets with a total capacity of around 10GW.

Therefore, it was wrong to assume that new investments were providing just transfer capability and the preexisting network demonstrated the significant amount of additional network needed to provide security on a boundary.

The Workgroup member also considered that strategically planned network still needed to be covered by locational signals. For the wholesale market to work competitively, those using strategically planned network assets should be exposed to locational signals in the same manner as other users, so they can internalise the costs of those assets in their investment and closure decisions. This is important to ensure efficient use of new and existing assets.

Draft Legal Text Review

The Proposer presented some suggested legal text amendments, noting the changes will depend on the approach taken to implementing the solution.

Options for how this could be implemented in the CUSC and Transport and Tariff model include:

OPTION 1: Remove references to the Locational Onshore Security Factor entirely from the CUSC and all Wider charge calculations.

OPTION 2: Amend the value of the Locational Onshore Security Factor for Wider Tariffs to be 1.00 (instead of 1.76 at present).

Additional considerations:

•Require solution where Locational Security Factor interacts with "Local Security Factor"

•Terminology in the CUSC interchangeably varies between:

- "Locational Security Factor" (11 references)
- "Locational Onshore Security Factor" (9 references)
- If it is to be set to "1", then this should be corrected (there is no mention of any Locational Offshore Security Factor.

The Proposer presented the below suggested legal text to the Workgroup:

Deriving the Final Local £/kW Tariff and the Wider £/kW Tariff

14.15.58 The zonal marginal km (ZMkmGi) are converted into costs and hence a tariff by multiply-ing by the Expansion Constant ~~and the Locational Security Factor~~ (see below). The nodal local marginal km (NLMkmL) are converted into costs and hence a tariff by multiplying by the Expan-sion Constant and a Local Security Factor.

Legal text: Delete, then either leave blank, or state it is equal to "1"

~~**The Locational Onshore Security Factor**~~

~~14.15.88 The locational onshore security factor for everything other than Identified Onshore Circuits is derived by running a secure DCLF ICRP transport study of the network excluding local circuits and Identified Onshore Circuits based on the same market background as used for Zoning in the DCLF ICRP transport model. This calculates the nodal marginal costs where peak net demand can be met despite the Security and Quality of Supply Standard contingencies (simulating single and double circuit faults) on the network. Essentially the calculation of secured nodal marginal costs is identical to the process outlined above except that the secure DCLF study additionally calculates a nodal marginal cost taking into account the requirement to be secure against a set of worse case contingencies in terms of maximum flow for each circuit.~~

~~14.15.89 For the purposes of 14.15.88 the secured nodal cost differential is compared to that produced by the DCLF ICRP transport model and the resultant ratio of the two determines the locational security factor using the Least Squares Fit method. Further information may be obtained from the charging website1 2 .~~

~~14.15.90 For the purposes of 14.15.88 the locational onshore security factor, derived in accordance with paragraphs 14.15.88 and 14.15.89 and expressed to eight decimal places, is based on an average from a number of studies conducted by The Company to account for future network developments. This security factor is reviewed for each price control period and fixed for the duration. The locational onshore security factor which is currently applicable, is detailed in The Company's Statement of Use of System Charges, which is available from the Charging website.~~

~~14.15.90A An Identified Onshore Circuit shall be defined as a single transmission HVDC subsea circuit or a single transmission AC subsea circuit between two MITS Nodes where there is only one route for the power to flow between the two MITS Nodes. The expansion factors for Identified Onshore Circuits are adjusted by dividing the applicable expansion factor for the Identified Onshore Circuits, calculated as per Sections 14.15.70 to 14.15.77, by the locational onshore security factor calculated in 14.15.90. When the locational onshore security factor is applied as per Section 14.15.94 and 14.15.95, this would result in an effective locational onshore security factor for Identified Onshore Circuits of 1.0.~~

Local Security Factors

14.15.91 Local onshore security factors are Generator specific and are applied to a Generator's local onshore circuits. If the loss of any one of the local circuits prevents the export of power from the Generator to the MITS then a local security factor of 1.0 is applied. For generation with circuit redundancy, a local security factor is applied that is equal to the locational security factor, derived in accordance with paragraphs 14.15.88 and 14.15.90.

14.15.92 Where a Transmission Owner has designed a local onshore circuit (or otherwise that circuit once built) to a capacity lower than the aggregated TEC of the generation using that circuit, then the local security factor of 1.0 will be multiplied by a Counter Correlation Factor (CCF) as described in the formula below;

Initial Transport Tariff

14.15.96 First an Initial Transport Tariff (ITT) must be calculated for both Peak Security and Year Round backgrounds. For Generation, the Peak Security zonal marginal km (ZMkmPS), Year Round Not-Shared zonal marginal km (ZMkmYRNS) and Year Round Shared zonal marginal km (ZMkmYRS) are simply multiplied by the expansion constant and the locational security factor to give the Peak Security ITT, Year Round Not-Shared ITT and Year Round Shared ITT respectively:

14.15.147 The factors which will affect the level of TNUoS charges from year to year include but are not limited to-;

- the forecast level of peak demand on the system
- the Price Control formula (including the effect of any under/over recovery from the previous year),
- the expansion constant,
- the locational security factor,
- the PS flag
- the Year Round Not Shared (YRNS) Flag
- the ALF of a Generator
- changes in the transmission network
- HVDC circuit impedance calculation
- changes in the pattern of generation capacity and demand.
- Changes in the pattern of embedded exports
- the £/ € exchange rate and expected Generator Output
- Number of Final Demand Sites per Charging Band
- Volume (in kWh) apportioned to each Charging Band

14.23 Example: Calculation of Zonal Generation Tariff

(iv) calculate the initial Peak Security wider transport tariff, Year-Round Shared wider transport tariff and Year Round Not-Shared wider transport tariff by multiplying the figure in (iii) above by the expansion constant (& dividing by 1000 to put into units of £/kW). For zone 4 and assuming an expansion constant of £10.07/MWkm ~~and a locational security factor of 1.8~~:

14.24 Example: Calculation of Zonal Demand Locational Tariff

(iv) i.) calculate the transport (locational) tariffs by multiplying the figures in (ii) above by -1. This changes the original Nodal Marginal Km for injecting (Generation) into Nodal Marginal Km for withdrawing (Demand). Then multiply by the expansion constant, ~~the locational security factor~~ and then divide by 1000 to put into units of £/kW:

For this example zone, assuming an expansion constant of £10.07/MWkm ~~and a locational security factor of 1.80~~:

14.29 Stability & Predictability of TNUoS tariffs Stability of tariffs

The Transmission Network Use of System Charging Methodology has a number of elements to enhance the stability of the tariffs, which is an important aspect of facilitating competition in the generation and supply of electricity. This appendix seeks to highlight those elements.

Each node of the transmission network is assigned to a zone, these zones are themselves fixed. The result of this is to dampen fluctuations that would otherwise be observed at a given node caused by changes in generation, demand, and network parameters. The criteria used to establish generation zones are part of the methodology and are described in Paragraph 14.15.42.

In addition to fixing zones, other key parameters within the methodology are also fixed for the duration of the price control period or annual changes restricted in some way. Specifically:

• the expansion constant, which reflects the annuitised value of capital investment required to transport 1MW over 1km by a 400kV over-headline, changes annually according to TOPI. The other elements used to derive the expansion constant are only reviewed at the beginning of a price control period to ensure that it remains cost-reflective. This review will consider those components outlined in Paragraph 14.15.59 to Paragraph 14.15.69.

• the expansion factors, which are set on the same basis of the expansion constant and used to reflect the relative investment costs in each TO region of circuits at different transmission voltages and types, are fixed for the duration price control. These factors are reviewed at the beginning of a price control period and will take account of the same factors considered in the review of the expansion constant.

~~• the locational security factor, which reflects the transmission security provided under the NETS Security and Quality of Supply Standard, is fixed for the duration of the price control period and reviewed at the beginning of a price control period.~~

• the Transmission Demand Residual Charging Bands which are used in setting Transmission Demand Residual Tariffs are fixed for the duration of the Onshore Transmission Owner price control period and reviewed at the beginning of a price control period

Legal text

Legal text will be drafted by the Workgroup following the Workgroup Consultation. Suggested legal text is above.

What is the impact of this change?

Proposer's assessment against Code Objectives

Proposer's assessment against CUSC Charging Objectives	
Relevant Objective	**Identified impact**
(a) That compliance with the use of system charging methodology facilitates effective competition in the generation and supply of electricity and (so far as is consistent therewith) facilitates competition in the sale, distribution and purchase of electricity;	**Positive** Removing Security Factor would be better for effective competition for both Generators and demand through: Firstly, deliver better predictability of Wider locational TNUoS charges, for both Generators and demand, by reducing the sensitivity of charges to changes in elements such as: Expansion Constant, Expansion Factors, or location of generation, demand and new network. Currently, the impact on charges from changes in any of these elements is amplified by multiplying their impact by the 1.76 Security Factor. Secondly improve international competition for Generators because the Security Factor would no-longer inappropriately amplify the cost of network charges compared with the network charges paid by Generators in other markets.
(b) That compliance with the use of system charging methodology results in charges which reflect, as far as is reasonably practicable, the costs (excluding any payments between transmission licensees which are made under and accordance with the STC) incurred by transmission licensees in their transmission businesses and which are compatible with standard licence condition C11 requirements of a connect and manage connection);	**Positive** Removing the Security Factor would be better for cost reflectivity for both Generator and demand charges. This is because the change would result in Wider locational TNUoS charges that better reflect the cost of incremental network investment.
(c) That, so far as is consistent with sub-paragraphs (a) and (b), the use of system charging methodology, as far as is reasonably practicable, properly takes account of the developments in transmission licensees' transmission businesses and the ISOP business*;	**Positive** As the planned growth of the Transmission network increases to meet net zero, it is becoming increasingly apparent that such new network is being built for economic reasons to increase power transport capacity.

	It is increasingly clear that such new network investment is not being built with accompanying pro-rata additional surplus redundant network capacity for security purposes.
(d) Compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency **; and	**Neutral**
(e) Promoting efficiency in the implementation and administration of the system charging methodology.	**Positive** Removing the Security Factor calculation and its application to Wider charges would make the administration of the charging methodology more efficient by removing the need for NESO to operate the Secure Load Flow model (SECULF) that is currently used to calculate the Security Factor or implement its results into the charging methodology.
**See Electricity System Operator Licence* ***The Electricity Regulation referred to in objective (d) is Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast) as it has effect immediately before IP completion day as read with the modifications set out in the SI 2020/1006.*	

Proposer's assessment of the impact of the modification on the stakeholder / consumer benefit categories	
Stakeholder / consumer benefit categories	**Identified impact**
Improved safety and reliability of the system	**Neutral**
Lower bills than would otherwise be the case	**Positive** By improving both cost reflectivity and predictability, this improvement should reduce existing distortions to locational investment decisions, as well as reduced cost of capital and risk premiums for investors in new generation. This should result in a lower total system cost and lower pass-through costs to customers, such as cheaper CfD Strike Prices.
Benefits for society as a whole	**Positive**

	Better facilitate net zero at best value to customers and the energy system overall by reducing the cost and distortions to investment in generation, and in low carbon generation in particular.
Reduced environmental damage	**Positive** For the reasons given above, it would better facilitate the journey toward statutory net-zero targets.
Improved quality of service	**Positive** As per above, would improve contribution of economic growth and jobs due to better facilitating achieving net zero at best value to customers and the energy system overall.

When will this change take place?

Implementation date

01 April 2026

Date decision required by

In parallel, or before CMP444 (TNUoS cap and floor) with sufficient notice for developers to take it into account in their CfD AR7 bid prices. To be implemented in tariffs from April 2026.

Implementation approach

TNUoS Transport and Tariff Model will require amendments

Interactions

On 20 January 2025 the Authority published the decision on the urgent treatment for CMP432 stating that "with respect to potential interactions with the proposed cap and floor mechanism through CMP444 , we agree with the Proposer that CMP432 should be progressed in parallel, or prior to CMP444 "Cap and Floor" modification. We consider that the prospects of modifying the Security Factor post the introduction of the cap and floor could generate uncertainty and interact with levels of the cap and the floor if introduced."

How to respond

Standard Workgroup Consultation questions

1. Do you believe that the Original proposal better facilitates the Applicable Objectives?
2. Do you support the proposed implementation approach?
3. Do you have any other comments?
4. Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?
5. Do you agree with the Workgroup's assessment that the modification does not impact the European Electricity Balancing Regulation (EBR) Article 18 terms and conditions held within the CUSC?

Specific Workgroup Consultation questions

6. Do you think there are any other approaches to reflecting the cost of security or is there a value other than 1 or 1.76 that is more appropriate. If you have any supporting evidence, please provide this?
7. Do you believe price signals should reflect average existing cost, incremental cost, a combination of the 2, or something else?
8. Do you have a view on whether the SECULF model is appropriate? Is enough information available to market participants?

The Workgroup is seeking the views of CUSC Users and other interested parties in relation to the issues noted in this document and specifically in response to the questions above.

Please send your response to cusc.team@nationalenergyso.com using the response pro-forma which can be found on the CMP432 modification page.

In accordance with Governance Rules if you wish to raise a Workgroup Consultation Alternative Request, please fill in the form which you can find at the above link.

If you wish to submit a confidential response, mark the relevant box on your consultation proforma. Confidential responses will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the Panel, Workgroup or the industry and may therefore not influence the debate to the same extent as a non-confidential response.

Acronyms, key terms and reference material

Acronym / key term	Meaning
AR7	Allocation Round
BSC	Balancing and Settlement Code
BSUoS	Balancing Services Use of System

CfD	Contracts for Difference
CMP	CUSC Modification Proposal
CUSC	Connection and Use of System Code
EBR	Electricity Balancing Regulation
ICRP	Investment Cost Related Pricing
MWkm	Megawatt-kilometres
MITS	Main Interconnected Transmission System
STC	System Operator Transmission Owner Code
SQSS	Security and Quality of Supply Standards
T&Cs	Terms and Conditions
TNUoS	Transmission Network Use of System
SECULF	Secure Load Flow model (used by NESO to calculate the Security Factor)

Reference material

- TCMF slides from Meeting on 29th February 2024 where the Proposal was presented (item 7 on the agenda)
- Taskforce Headline report from the TNUoS Task Force meeting held on 27th February 2024, where the proposal was presented and discussed.

Annexes

Annex	Information
Annex 1	CMP432 Proposal form
Annex 2	CMP432 Terms of reference
Annex 3	CMP432 Urgency letters
Annex 4	CMP432 Tariff and Revenue impact of setting the Global Locational Security Factor to 1

Annex 5	CMP432 Trident Economics – Setting the locational onshore security factor