Workgroup Consultation

CMP357: To improve the accuracy of the TNUoS Locational Onshore Security Factor for the RIIO2 Period

Modification process & timetable

1	**Proposal Form**	22 December 2020
2	**Workgroup Consultation**	06 January 2021 - 08 January 2021
3	**Workgroup Report**	12 January 2021
4	**Code Administrator Consultation**	14 January 2021 - 19 January 2021
5	**Draft Modification Report**	21 January 2021
6	**Final Modification Report**	21 January 2021
7	**Implementation**	01 April 2021

Overview: The TNUoS Locational Onshore Security Factor is required to be reviewed before the start of the next RIIO2 price control period in April 2021. The Proposer is seeking to improve the accuracy of Locational Onshore Security Factor by ensuring that it is applied using eight decimal places.

Have 5 minutes? Read our Executive summary

Have 20 minutes? Read the full Workgroup Consultation

Have 30 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(s) to the issue raised.

This modification is expected to have a: This modification is expected to have a:
Medium impact
On all CUSC Users who pay TNUoS tariffs.

Governance route	This modification should be treated as Urgent and be assessed by a Workgroup. On 30 December 2020, the Authority approved that CMP357 should be treated as urgent. See Annex 3 for the letter sent to the Authority and the Authority's decision.
Who can I talk to about the change?	**Proposer:** Garth Graham garth.graham@sse.com 01738 456000	**Code Administrator Contact:** Paul Mullen paul.j.mullen@nationalgrideso.com 07794537028
How do I respond?	Send your response proforma to cusc.team@nationalgrideso.com **by 5pm on 08 January 2021**	

Contents

Executive summary

What is the issue?

The CUSC is currently silent on the number of decimal places that should be used when applying the calculated Locational Onshore Security Factor. It was recently shown in an ESO consultation that the number of decimal places used could have a material impact on TNUoS charges paid by some TNUoS payers.

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

Proposer's solution: CMP357 seeks to implement a TNUoS Locational Onshore Security Factor that is set at eight decimal places and is applied for the duration of the RIIOT2 price control period.

Implementation date: 1 April 2021, but a decision is required from Ofgem by 25 January 2021 in order for this to be included in the ESO's tariff setting.

Summary of potential alternative solution(s) and implementation date(s):

The Workgroup have discussed potential for alternatives specifically:

- A TNUoS Locational Onshore Security Factor set to 1 or 2 decimal places that would be applied for the duration of the RIIOT2 price control period; and
- Implementation from a date later than 1 April 2021. The Proposer is clear that their defect is limited to the number of decimal places and do not believe alternatives delaying the Implementation Date beyond 1 April 2021 are applicable. The Workgroup are awaiting further confirmation from the Code Administrator and Ofgem on this point before considering alternatives in this area.

What is the impact if this change is made?

The Proposer argues that their solution improves the cost-reflectivity of the value of the Locational Onshore Security Factor and improves the effectiveness of competition in generation as it increases the accuracy of TNUoS charges, reducing the potential for unduly increased or reduced tariffs.

What is the issue?

The TNUoS wider tariffs, calculated by the ESO, consist of two parts. These are the locational tariffs (which sends investment signals) and the non-locational (residual) tariffs, which ensures recovery of the revenue.

TNUoS locational tariffs are derived on a purely unconstrained network with all circuits in service. After calculating the locational prices on the unconstrained network, the ESO then "stretch" the locational tariffs by the Locational Onshore Security Factor to reflect the extra capacity in a constrained transmission network. After multiplying locational prices by the Locational Onshore Security Factor, the ESO set the wider (zonal) tariff by applying weighted average to the "stretched" locational prices at relevant sites within that zone.

Therefore, all generator and demand users are affected by the value of the Locational Onshore Security Factor. This Locational Onshore Security Factor was set as 1.8 for the charging years 2013/14 to 2020/21.

In advance of the start of RIIO2, the ESO has been consulting industry about its review of the Locational Onshore Security Factor. This process highlighted that the number of decimal places to which the Locational Onshore Security Factor is applied can have a material impact on the TNUoS liability of network users.

The CUSC is currently silent on the number of decimal places that should be used when applying the calculated Locational Onshore Security Factor.

Why change?

The ESO's recent review[1] of the 'TNUoS Locational Onshore Security Factor for RIIO2 Period' has brought to light that the number of decimal places used in determining the Locational Onshore Security Factor value that is used to set tariffs can have a material impact on the accuracy of this parameter, and hence cost-reflectivity of TNUoS tariffs.

The materiality is shown in detail in Tables 1-3 (for generation) and 4-6 (for demand) in the Appendix to the review. TNUoS liability can change by up to £0.65/kW for a renewable generator, by up to £0.86/kW for a conventional low carbon generator, and by £0.76/kW for a conventional carbon generator, depending on whether one or eight decimal places are applied to the Locational Onshore Security Factor (in some generation zones, the difference is an increase, in others it is a decrease of the locational charge).

The ESO's conclusion[2] of its recent review was published on 21 December 2020 and it identified that "*The majority of responses favour increasing the number of decimal places from 1d.p. to 8d.p as the most cost reflective option*". However, the ESO concluded to:

- Maintain the value of Locational Onshore Security Factor at 1.8 for year 2021/22 tariffs; and
- Raise a CUSC modification proposal in early 2021 to clarify two decimal places for the Locational Onshore Security Factor, and if approved, apply the value of 1.76 to the TNUoS tariffs for the rest of RIIO2 period (2022/23 – 2025/26).

---

[1] https://www.nationalgrideso.com/document/180741/download (see Annex 5 of this document for a hard copy)
[2] https://www.nationalgrideso.com/document/183471/download (see Annex 6 of this document for a hard copy)

What is the proposer's solution?

CMP357 seeks to implement a TNUoS Locational Onshore Security Factor that is set at eight decimal places and is applied for the duration of the RIIO2 price control period.

Draft legal text

This is set out in Annex 4 of this document. This shows both the approved changes for CMP320 and CMP346, which will both be implemented by 1 April 2021 and the CMP357 proposed changes overlaid on this.

Some Workgroup Members raised concerns that there was no need to reference the number of decimal places that the Locational Onshore Security Factor would be set to in the CUSC and reference that the Locational Onshore Security Factor is set out in the Statement of Use of System Charges, which should therefore be sufficient. Alternatively, a Workgroup Member argued that it could be better to hard-code the actual Locational Onshore Security Factor into the CUSC; however it was recognised that the current direction of travel is remove hard-coding such numbers into CUSC as evidenced by recent decisions on CMP346 and CMP347.

What is the impact of this change?

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** The proposal improves the effectiveness of competition in generation as it increases the accuracy of TNUoS charges, reducing the potential for unduly increased or reduced tariffs.
(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 C26 requirements of a connect and manage connection);	**Positive** The proposal promotes greater accuracy of the security factor and this will improve the cost-reflectivity of the value of the security factor.
(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;	**Neutral**

(d) Compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency *; and	**Positive** It is a legal requirement of Directive 2009/72(EU) Recital 36 that transmission tariffs in GB "are non-discriminatory and cost-reflective" and this proposal, by ensuring more accurate transmission tariffs are in place in GB for the forthcoming Price Control period will mean the that compliance with Electricity Regulation and any relevant legally binding decision etc. (in terms of the duties placed upon the NRA – Ofgem - in Article 37(1)(a) according to Recital 36) is achieved as without accurate transmission tariffs there will be (i) discrimination in those tariffs (as some will pay more and some less than they should for no justified reason) and (ii) they will not be accurately cost-reflective.
(e) Promoting efficiency in the implementation and administration of the system charging methodology.	**Neutral**
*Objective (d) refers specifically to European Regulation 2009/714/EC. Reference to the Agency is to the Agency for the Cooperation of Energy Regulators (ACER).	

The Workgroup further considered the costs, benefits and impacts against the CMP357 Original Proposal. In summary:

Process and System Costs – ESO expect its implementation costs to be negligible with no associated system changes. Workgroup envisage this will also be the case for industry.

Predictability and Stability? - Some Workgroup members expressed concern with the late notice of this change and that could lead to unforeseen costs or windfall benefits for those exposed to TNUoS tariffs, who may have assumed this factor would remain stable.

The Proposer noted that there are a number of variables related to TNUoS which would not be finalised until tariff publication and Workgroup Members noted the general current instability of some of the factors that feed into the TNUoS methodology; however a Workgroup Member argued that industry would not necessarily factor in a change to the Locational Onshore Security Factor as this has remained unchanged for 17 years with a value stated to 1 decimal place.

One Workgroup Member highlighted that the fast-moving nature of this change is inconsistent with other changes in terms of a delay or phasing in implementation e.g. CMP353. The Proposer however reiterated the benefits that would result from improved cost reflectivity which he believed his proposal will bring and, as example, highlighted the change that there have been changes approved by Ofgem without phasing (most recently with CMP317/327).

Behavioural impact on Users who pay the Transmission Demand Residual – A Workgroup Member noted that some users may react differently on a TRIAD period given the impact on locational demand tariffs that CMP357 would cause.

The Workgroup are seeking views as to whether or not the CMP357 Original Proposal or the potential alternative options will impact on your business and how - Please respond to question 6 if you have any views on this.

When will this change take place?

Implementation date
1st April 2021 (the start of the RIIO2 price control).

Date decision required by
Decision is required from Ofgem by 25 January 2021 in order for this to be included in the ESO's TNUoS tariff publications on 31 January 2021.

Implementation approach
Several Workgroup members considered that a delayed implementation approach would be more beneficial for parties who may be adversely impacted by CMP357.

As a result, there may be scope for an alternative to be raised which aims for an implementation later than 1 April 2021, with the primary focus on reducing the impact on those who may be adversely impacted by this change. Notwithstanding that there is a question as to whether or not a later implementation is within the scope of CMP357, the Workgroup would be interested to hear industry views on whether a delay would help - **if you have any views on this, could you please respond to Question 2 of this consultation accordingly.**

Interactions

☐Grid Code   ☐BSC   ☐STC   ☐SQSS
☐European   ☐ EBGL Article 18   ☐Other   ☐Other
Network Codes   T&Cs[3]   modifications

---

[3] If the modification has an impact on Article 18 T&Cs, it will need to follow the process set out in Article 18 of the European Electricity Balancing Guideline (EBGL – EU Regulation 2017/2195) – the main aspect of this is that the modification will need to be consulted on for 1 month in the Code Administrator Consultation phase. N.B. This will also satisfy the requirements of the NCER process.

Workgroup Considerations

The Workgroup met on 5 January 2021 to consider the following key issues.

Consideration of Original Proposal

Accuracy

The Proposer's view is that the Locational Onshore Security Factor would be more accurate if it was set to 8 decimal places, which was supported by the majority of respondents to the ESO's consultation on TNUoS Locational Onshore Security Factor for RIIO2 Period (published 16 November 2020, detailed further in this section). This is somewhat in opposition to the outcome of the ESO's consultation, which recommended that 1 decimal place be used for the 2021/22 charging year, and 2 decimal places for the rest of the RIIO2 Price Control.

The Proposer highlighted that the number of decimal places in the Locational Onshore Security Factor value that is used to set the tariffs can have a material impact and stated that having more decimal places will result in more cost reflective TNUoS tariffs.

The Workgroup noted that some of the numbers displayed in the ESO's guidance to tariff setting are expressed to 7 decimal places and that outturn tariffs were are stated to 6 decimal places. Therefore, there is precedent in using more decimal places than currently used for the Locational Onshore Security Factor.

Some Workgroup Members also suggested that rounding clearly introduces inaccuracies, and more granularity reduces rounding errors, so therefore more decimal places would arguably be preferable.

The concept of spurious accuracy was introduced to the Workgroup with regards to the value of the Locational Onshore Security Factor. It was suggested that this may occur if more decimal places were to be used and this may imply that the value of the factor has been more accurately determined than can realistically be achieved by the calculation. Quoting an inaccurate number to a higher level of decimal places than is justified could lead to inaccuracy.

Some Workgroup Members noted that the Locational Onshore Security Factor is a number calculated to estimate the average level of redundancy in the system to meet security of supply and that elements of this process could introduce inaccuracies which would mean only a lower number of decimal places are justified, including:

- Assumptions used to set up the Secured Load Flow model (SECULF) used to estimate secured flows at each node;
- Inaccuracies implied by estimating a linear relationship between the unsecured values from the DCLF model and those in SECULF; and
- The Locational Onshore Security Factor for the whole Price Control Period is an average of the individual values calculated for each year within the Price Control period using modelling with a large number of input assumptions. .

Given this, some Workgroup Members argued that the ultimate calculated value of the Locational Onshore Security Factor is not necessarily a precise forecast for future years to justify being quoted to a larger number of decimal places to attain cost reflectivity (Some support for this view can be implied from the ESO analyst stating that a rerun of the modelling a year later for remaining future charging years would be expected to deliver different values for the Locational Onshore Security Factors owing to the large number of assumptions that would have changed and been updated). Increasing the number of decimal places may uses a level of precision that the calculation may not justify and so imply spurious accuracy.

Analysis put forwards by the ESO

The ESO produced quantitative analysis to help the Workgroup understand the impacts on Generation tariffs and Demand tariffs based on presenting the Locational Onshore Security Factor as 1 to 8 decimal points. This analysis is available at Annex 7 of this document and is summarised below.

i)   Margin Calculation

The ESO presented a graph which demonstrated the derivation of the Locational Onshore Security Factor for the 2021/22 charging year The ratio of secured marginal costs to unsecured marginal costs (based on average least squares fit method for all the nodes on the wider network, i.e. the slope of the graph) is the Locational Onshore Security Factor.

Year	Security Factor
2021/22	1.7505
2022/23	1.7481
2023/24	1.7677
2024/25	1.7550
2025/26	1.7561

The ESO calculated a Locational Onshore Security Factor for each year, using the network models for RIIO2 (2021/22 – 2025/26). The values are listed in the following table (values are rounded to 4 decimal places, as displayed in Excel trendline by default). The average of these values provides the Locational Onshore Security Factor to be applied for each RIIO2 charging year.

For completeness, the ESO also showed the same Locational Onshore Security Factors and the average figure to 8 decimal places.

Year	SF
2021/22	1.75045496
2022/23	1.74807929
2023/24	1.76769979
2024/25	1.75501257
2025/26	1.75613621
Average	**1.75547656**

An example of the 2021/22 result is shown here.
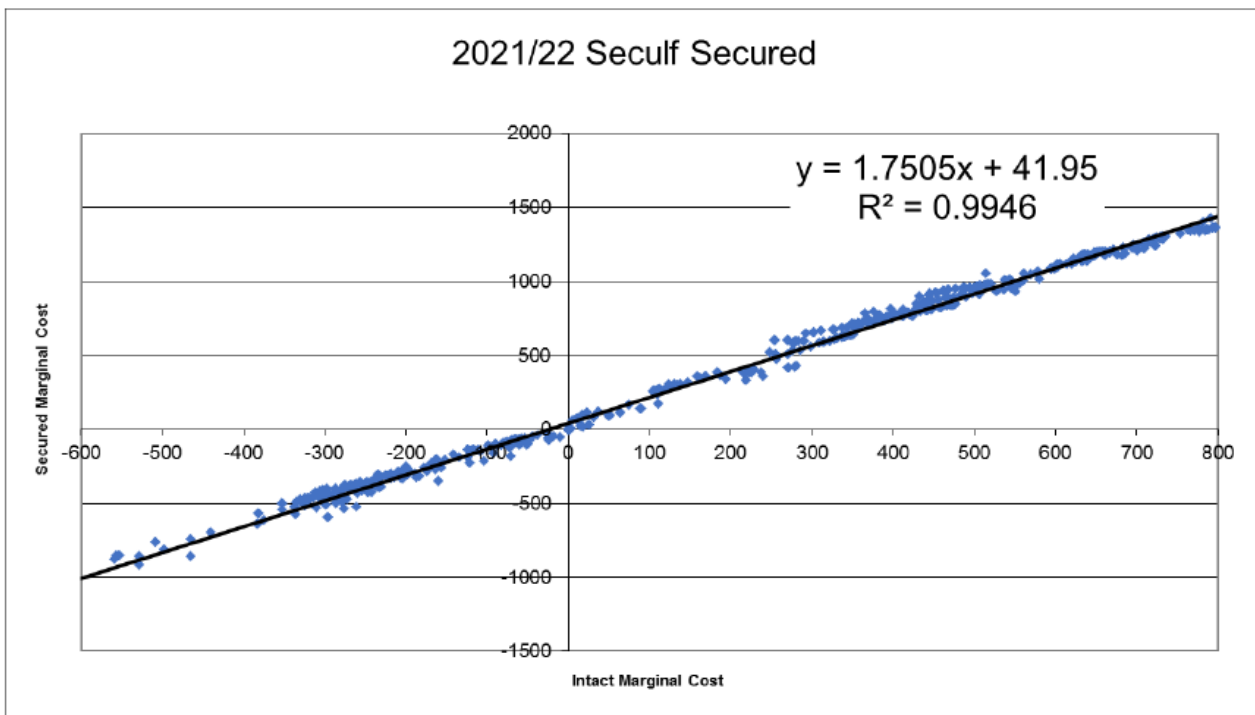
Workgroup Members questioned how many decimal places the calculation behind these tables were calculated to. One Workgroup member suggested that it could be up to 13 decimal places. The Workgroup was advised that most input data into the tariff model was more granular than 8 decimal places.

The Workgroup agreed that the plot of the data shows high precision, as the dots were placed close to the line and the R squared value was high, but this did not mean the line itself may be accurate. One Workgroup Member questioned why there was no intercept with zero, and whether a regression could be running accordingly with an intercept of zero, as this could possibly give a more accurate value for the Locational Onshore Security Factor. This analysis is provided in Annex 7c.

The Workgroup noted that the Locational Onshore Security Factor has remained unchanged for 17 years and has always been stated to one decimal place. A Workgroup Member noted that this was set at 1.9 in the 2004 Charging Statement, which is included as Annex 8 of this document. The ESO advised that one decimal place was used based on the assumption that industry was happy with this level of accuracy.

The ESO also presented a worked-up example of the SECULF calculation used to calculate the Locational Onshore Security Factor[4]. The Locational Onshore Security Factor is derived using a Secured DCLF (SECULF) programme, which calculates the marginal cost for each node. The programme takes into account the requirement to meet the peak demand through simulating circuit faults resulting in maximum flows for each circuit. Two Workgroup Members subsequently highlighted the need to be able to be confident in the accuracy of the SECULF methodology to be able to claim that a number derived from it is also accurate.

ii)   Deltas for each number of decimal places

The ESO presented data in order to demonstrate the delta for the Locational Onshore Security Factor, for each number of decimal places up to 8 for Windfarms (WF) in different zones, and demand in different zones to illustrate the converse effect. This is illustrated in the below tables (assuming 40% or 80% Annual Load Factors (ALFs) for intermittent and conventional generators respectively), and is available in full at Annex 7 of this document.

The data looked at the annual TNUoS liability, expressed as £k/year. The table below analyses the impacts on at windfarms, CCGT, and Hydro in different zones, and took into account different liabilities. The same was done for Half Hourly and Non Half Hourly Demand to illustrate the converse effect.

The conclusion was that the difference in wider liability between 3 decimal places and 8 decimal places was demonstrated to be relatively negligible, however the difference between 1 decimal place and 2 was noticeably significant. One Workgroup Member argued that this was attributed to an order of magnitude issue, but some Workgroup Members questioned the need to use 8 decimal places, as it had been highlighted that anything above 3 decimal places seems somewhat superfluous and inconsequential in terms of final TNUoS charges.

wider liability (£k per year)	1d.p.	2d.p.	3d.p.	4d.p.	5d.p.	6d.p.	7d.p.	8d.p.
a 100MW WF in gen zone 1	2745	2687	2680	2680	2680	2680	2680	2680
a 100MW WF in gen zone 22	-726	-707	-705	-705	-705	-705	-705	-705
a 100MW CCGT in gen zone 1	3597	3520	3510	3511	3510	3510	3510	3510
a 100MW CCGT in gen zone 22	-175	-168	-168	-168	-168	-168	-168	-168
a 100MW hydro in gen zone 1	3983	3898	3887	3888	3888	3888	3888	3888
a 100MW hydro in gen zone 22	-348	-338	-337	-337	-337	-337	-337	-337

---

[4] Guidance on TNUoS Local Security Factor – ESO, December 2020, Page 3 and 4 (Annex 9)

a 100MW HH demand in dem zone 1	2063	2145	2156	2155	2155	2155	2155	2155
a 100MW HH demand in dem zone 14	6301	6289	6288	6288	6288	6288	6288	6288
a 100GWh NHH demand in dem zone 1	2731	2840	2855	2853	2853	2853	2853	2853
a 100MWh NHH demand in dem zone 14	8596	8580	8579	8579	8579	8579	8579	8579

The Workgroup have posed a question on whether any further analysis is required . Please respond to question 5 if you have any further analysis / evidence to support your view.

Consideration of Alternatives

The Workgroup considered whether the scope of the defect of CMP357 would allow for different implementation timescales to be included in an alternative. The Proposer, along with several Workgroup Members, thought that the scope of the defect only allowed to fix the number of decimal places for a whole price control period.

It was also made clear by the Code Administrator that changing the calculation or methodology that defined the Locational Onshore Security Factor annually itself was out of scope of the defect. However, the Workgroup agreed that a change to the number of decimal places to which the calculated value of the Locational Onshore Security Factor is expressed during the Price Control period could be in scope, and the question for the Code Administrator and Ofgem is whether different implementation dates to the start of the Price Control (i.e. 1 April 2021) for such a change could be proposed. It was noted that setting the implementation date is in the gift of the Authority.

The ESO Workgroup Member noted that, pending the outcome of CMP357, they are considering raising a CUSC modification proposal in early 2021 to codify two decimal places for the Locational Onshore Security Factor, and if approved, this would apply the value of 1.76 to the TNUoS tariffs for the rest of RIIO2 period (2022/23 – 2025/26).

The Workgroup noted 2 potential alternatives:

i) *One Decimal Place from April 2021 for the duration of the price control*

One Workgroup Member stated that they were minded to raise an alternative which would keep one decimal place for the duration of the next price control. One decimal place is current custom and practice but is not currently explicitly set out in CUSC so this would provide clarity and certainty for industry.

ii) *Two Decimal Places from April 2021 for the duration of the price control*

A second Workgroup Member stated that they were minded to raising an alternative which would express the Locational Onshore Security Factor to two decimal places for the duration of the price control given the analysis shows this would have a material impact but further decimal places delivered negligible further change.

The Workgroup are keen for any views on potential alternatives to be fed in via Question 4 of this consultation. It was noted that pending the Code Administrator/Ofgem's feedback post consultation, other alternatives may be raised by the Workgroup.

EBGL Implications

The Workgroup considered any implications on EGBL. The Workgroup considered that there would be no EBGL implications off the back of this modification as it does not address matters pertaining to the terms and conditions related to balancing established in accordance with Article 18 of EBGL.

How to respond

Standard Workgroup consultation questions

1. Do you believe that the CMP357 Original proposal or potential alternatives better facilitate 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?

Specific Workgroup consultation questions

5. Do you have any further analysis/evidence to support your conclusions under Question 1?
6. Will the CMP357 Original Proposal or the potential alternative options impact on your business. If so, how?

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@nationalgrideso.com using the response pro-forma which can be found on the CMP357 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, please note that information provided in response to this consultation will be published on National Grid ESO's website unless the response is clearly marked "Private & Confidential", we will contact you to establish the extent of the confidentiality. A response marked "Private & Confidential" will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the CUSC Modifications Panel or the industry and may therefore not influence the debate to the same extent as a non-confidential response. Please note an automatic confidentiality disclaimer generated by your IT System will not in itself, mean that your response is treated as if it had been marked "Private and Confidential".

Acronyms, key terms and reference material

Acronym / key term	Meaning
BSC	Balancing and Settlement Code
CMP	CUSC Modification Proposal
CUSC	Connection and Use of System Code
EBGL	Electricity Balancing Guideline
SECULF	The Security Factor is derived using a Secured DCLF (SECULF) programme, which calculates the marginal cost for each node
STC	System Operator Transmission Owner Code
SQSS	Security and Quality of Supply Standards
T&Cs	Terms and Conditions
TNUoS	Transmission Network Use of System

Reference material

- See footnotes on the relevant pages.

Annexes

Annex	Information
Annex 1	Proposal Form
Annex 2	Terms of Reference
Annex 3	Urgency letters
Annex 4	Legal Text
Annex 5	ESO Consultation
Annex 6	ESO Consultation Responses
Annex 7	ESO Analysis
Annex 8	2004 Charging Statement
Annex 9	Guidance on TNUoS Local Security Factor – ESO, December 2020