Public

CMP432 Improve Locational Onshore Security Factor for TNUoS Wider Tariffs

Workgroup 3 (14 February 2025)

Online Meeting via Teams

WELCOME

NESO
National Energy
System Operator

Agenda

Topics to be discussed	Lead
Introductions	Chair
Action Log Review	Chair
Presentation – SSE Consultant Report – 45 mins	Neil Cornelius
Presentation - Draft legal text	Proposer
Draft Workgroup Consultation – Specific questions	All
Any Other Business	Chair
Next Steps	Chair

Expectations of a Workgroup Member

Contribute to the discussion	Be respectful of each other's opinions	Language and Conduct to be consistent with the values of equality and diversity	Do not share commercially sensitive information
Be prepared - Review Papers and Reports ahead of meetings	Complete actions in a timely manner	Keep to agreed scope	Email communications to/cc'ing the .box email

Your Roles

Help refine/develop the solution(s)	Bring forward alternatives as early as possible	Vote on whether or not to proceed with requests for Alternatives	Vote on whether the solution(s) better facilitate the Code Objectives

Workgroup Membership

Role	Name	Company	Alternate	Name
Chair	Sarah Williams	NESO		
Tech Sec	Prisca Evans	NESO		
Proposer	John Tindal	SSE	Alternate	Damien Clough
Workgroup Member	Neil Dewar	NESO		
Workgroup Member	Tom Steward	RWE	Alternate	Lauren Jauss
Workgroup Member	Ryan Ward	Scottish Power Renewables	Alternate	Hector Eduardo Perez
Workgroup Member	Andrew Rimmer	Engie	Alternate	Simon Lord
Workgroup Member	Paul Jones	Uniper	Alternate	Sean Gauton
Workgroup Member	Alan Kelly	Corio Generation	Alternate	Dan Gilbert
Workgroup Member	Giulia Licocci	Ocean Winds		
Observer	Loukas Papageorgiou	RWE		
Observer	Kyle Murchie	Roadnight Taylor	Alternate	Catherine Cleary
Observer	Sally Young	SSE		
Observer	Zahira Rafiq	NESO		
Authority Representative	Sinan Kufeoglu	OFGEM		

What is the Alternative Request?

What is an Alternative Request? The formal starting point for a Workgroup Alternative Modification to be developed which can be raised up until the Workgroup Vote.

What do I need to include in my Alternative Request form? The requirements are the same for a Modification Proposal you need to articulate in writing:
- a description (in reasonable but not excessive detail) of the issue or defect which the proposal seeks to address compared to the current proposed solution(s);
- the reasons why the you believe that the proposed alternative request would better facilitate the Applicable Objectives compared with the current proposed solution(s) together with background information;
- where possible, an indication of those parts of the Code which would need amending in order to give effect to (and/or would otherwise be affected by) the proposed alterative request and an indication of the impacts of those amendments or effects; and
- where possible, an indication of the impact of the proposed alterative request on relevant computer systems and processes.

How do Alternative Requests become formal Workgroup Alternative Modifications? The Workgroup will carry out a Vote on Alternatives Requests. If the majority of the Workgroup members or the Workgroup Chair believe the Alternative Request will better facilitate the Applicable Objectives than the current proposed solution(s), the Workgroup will develop it as a Workgroup Alternative Modification.

Who develops the legal text for Workgroup Alternative Modifications? ESO will assist Proposers and Workgroups with the production of draft legal text once a clear solution has been developed to support discussion and understanding of the Workgroup Alternative Modifications.

Timeline for CMP432 as of 29 January 2025

Pre-Workgroup		
Proposal raised	07/03/2024	
Proposal submitted to Panel	22/03/2024	
Workgroup Nominations	09/04/2024	
Urgency Decision Granted	21/01/2025	
Workgroups		
~~Workgroup 1~~	~~29/01/2025~~	~~Objectives and Timeline/Review and Agree Terms of Reference / Proposer presentation~~
~~Workgroup 2~~	~~05/02/2025~~	~~Solution Development / Workgroup Discussions/Legal Text~~
Workgroup 3	14/02/2025	Draft Legal Text/Draft Workgroup Consultation /Specific Questions
Workgroup 4	21/02/2025	Final Workgroup Consultation Review
Workgroup Consultation	26/02/2025 – 06/03/2025	
Workgroup 5	13/03/2025	Review of Workgroup Consultation Responses / Alternative Requests Discussion/Review Solution position
Workgroup 6	20/03/2025	TOR Discussion/Alternative Requests Presentations and Vote (if required)/
Workgroup 7	26/03/2025	Draft Legal text and WACMs Legal text (if required) review
Workgroup 8	03/04/2025	Final Workgroup Report Review / ToR Sign-off / Final Legal Text Review (WACMS legal text)

Timeline for CMP432 as of 29 January 2025

Post Workgroups		Key info
Workgroup Report submitted to Panel	14/04/2025	
Panel to agree whether ToR have been met	17/04/2025	Special Panel invites to be shared
Code Administrator Consultation	22/04/2025 – 02/05/2025	
Code Administrator Consultation Analysis and DFMR generation	02/05/2025 – 08/05/2025	
Draft Final Modification Report to Panel	09/05/2025	
Panel Recommendation Vote	15/05/2025	Special Panel
Final Modification to Ofgem	15/05/2025	
Decision Date	30/09/2025	
Implementation Date	01/04/2026	

CMP432 - Terms of Reference

Workgroup Term of Reference	Location in Workgroup Report (to be completed at Workgroup Report stage)
a) Consider EBR implications	
b) Consider the methodology for calculating the security factor (Locational Onshore Security Factor Section 14.15.88 – 14.15.90) and the further objectives of the Charging Methodology set out in Section 14. 14.11	
c) Consider whether reinforcement with a larger capacity circuit, compared with the previous, increases the fault condition.	
d) Consider the impact of whether reinforcement is achieved by upgrading an existing circuit to a larger capacity, therefore increasing the fault condition	
e) Consider whether some types of technology require additional MITS redundancy, e.g. large inflexible conventional such as nuclear	
f) Consider and evaluate the evidence that the current Security Factor is reflective of how TOs make network reinforcement decisions	
g) Consider the scope of work identified and whether this is achievable within the timeframe outlined in the Ofgem Urgency decision letter	

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Action Log Review

Sarah Williams - NESO Code Administrator

Action Log

Action	Description	Owner	Due	Status
1	Share the SECULF model with the work group to enable replication of the calculation	ND	WG 2	Open
3	NESO to speak to teams internally to request industry access to VBA code within the Transport and Tariff Model	ND	WG2	Open

Presentation – SSE Consultant Report

Neil Cornelius – Trident Economics

Proposers Presentation – Draft Legal Text

John Tindal – SSE

CUSC Modification Proposal CMP432

Improve "Locational Onshore Security Factor” for TNUoS Wider Tariffs

WG3

14th February 2025

Potential issues with SECULF to be considered

- **The thing it attempts to measure is irrelevant - Measures existing average conditions, not incremental conditions:** If existing average conditions are a reasonable proxy for incremental conditions, then that is fine. But if incremental conditions are different from existing average, then the SECULF model is irrelevant, we can ignore it and we do not need to understand how it works

- **The measured answer does not mean what it claims to mean:** The measured ratio of pre-fault to post-fault MWkm is different from redundant network capacity built for security. Instead, SECULF is measuring the shape of the network in terms of relative lengths and circuit types which have primarily been built to serve the geographical distribution of demand.

- **The methodology is not appropriate: Currently uses the Year Round background due to largest flow**
  - Implications for network security may be different in the Demand Security versus Economy investment criteria, as reflected by Peak Security and Year Round charges because:
    - **Network outage in Demand Security conditions**: can be a much more expensive problem where firm generation cannot get power to customers, so risks causing an extended period of loss of load valued at £6,000 per MWh
    - **Network outage in Economy conditions:** is a short-term stability issue which can be addressed in cheaper ways (e.g. intertrips and reserve) compared with building and holding back redundant network. In a network outage, wind can be curtailed and flexible-firm plant brought on at a relatively low cost compared with lost load

Requests

- **Ask NESO to provide a teach-in regarding how the SECULF model works**
- **Ask NESO to share the SECULF model, so WG can consider it**
- **Ask NESO publish the historical working calculations behind these studies beyond simply the final answer**

Link to: Guidance on TNUoS Locational Onshore Security Factor Calculation December 2020 - download

sse Thermal

Legal text

The changes to the legal text 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)

CUSC Legal Text: download

Legal text

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 multiplying 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 Expansion 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.~~

Legal text

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;

Legal text

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:

$$ZMkm_{Gi\,PS} \times EC \times LSF = ITT_{Gi\,PS}$$

$$ZMkm_{GiYRNS} \times EC \times LSF = ITT_{GiYRNS}$$

$$ZMkm_{GiYRS} \times EC \times LSF = ITT_{GiYRS}$$

Where

$ZMkm_{GiPS}$ = Peak Security Zonal Marginal km for each generation zone

$ZMkm_{GiYRNS}$ = Year Round Not-Shared Zonal Marginal km for each generation charging zone

$ZMkm_{GiYRS}$ = Year Round Shared Zonal Marginal km for each generation charging zone

EC = Expansion Constant

LSF = Locational Security Factor

ITT_{GiPS} = Peak Security Initial Transport Tariff (£/MW) for each generation zone

ITT_{GiYRNS} = Year Round Not-Shared Initial Transport Tariff (£/MW) for each generation charging zone

ITT_{GiYRS} = Year Round Shared Initial Transport Tariff (£/MW) for each generation charging zone.

14.15.97 Similarly, for demand the Peak Security zonal marginal km (ZMkmPS) and Year Round zonal marginal km (ZMkmYR) are simply multiplied by the expansion constant ~~and the locational security factor~~ to give the Peak Security ITT and Year Round ITT respectively:

$$ZMkm_{Di\,PS} \times EC \times LSF = ITT_{Di\,PS}$$

$$ZMkm_{Di\,YR} \times EC \times LSF = ITT_{Di\,YR}$$

Where

$ZMkm_{DiPS}$ = Peak Security Zonal Marginal km for each demand zone

$ZMkm_{DiYR}$ = Year Round Zonal Marginal km for each demand zone

ITT_{DiPS} = Peak Security Initial Transport Tariff (£/MW) for each demand one

ITT_{DiYR} = Year Round Initial Transport Tariff (£/MW) for each demand zone

Legal text

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

Legal text

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~~:

(a) Initial Peak Security wider tariff - $\frac{59.07 \text{ km} * £10.07/\text{MWkm} * 1.8}{1000}$ = **£1.071/kW**

b) Initial Year Round Shared wider tariff -

$\frac{344.56 \text{ km} * £10.07/\text{MWkm} * 1.8}{1000}$ = **£6.245/kW**

c) Initial Year Round Not-Shared wider tariff -

$\frac{172.26 \text{ km} * £10.07/\text{MWkm} * 1.8}{1000}$ = **£1.309/kW**

Legal text

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~~:

a) Peak Security tariff –

$$- \frac{(120\text{km} * £10.07/\text{MWkm} * 1.8)}{1000} = -\mathbf{£2.47/kW}$$

b) Year Round tariff -

$$- \frac{(82 * £10.07/\text{MWkm} * 1.8)}{1000} = -\mathbf{£1.49/kW}$$

The Locational signal for Demand within this zone is negative for both Peak and Year Round, which indicates withdrawing at this part of the network, reduces total system flows.

ii.) A NHH locational demand element is calculated in accordance with the methodology given in 14.16.2.

Legal text

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-head line, 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

Draft Workgroup Consultation – Specific questions

Sarah Williams – NESO Code Administrator

Any Other Business

Sarah Williams – NESO Code Administrator

Next Steps

Sarah Williams – NESO Code Administrator