CUSC Modification Proposal Form

CMP405: TNUoS Locational Demand Signals for Storage

Overview: Currently Locational Demand signals are floored at £0/KWh to avoid a perverse operational incentive to increase import over periods with tight system margin at Peak demand. However, the DCLF Model shows that, in areas dominated by intermittent generation, there are significant benefits from importing during periods of peak wind generation as illustrated by the Year Round Tariffs. This modification seeks to separate out the demand Year Round locational signals from Peak Security locational Signals and charge (reward) Storage which imports during times other than Triads, i.e. When Wind Generation is fully operating

Modification process & timetable

1. **Proposal Form** – 10 November 2022
2. **Workgroup Consultation** – TBC – link to CMP393/CMP394
3. **Workgroup Report** – TBC – link to CMP393/CMP394
4. **Code Administrator Consultation** – TBC – link to CMP393/CMP394
5. **Draft Final Modification Report** – TBC – link to CMP393/CMP394
6. **Final Modification Report** – TBC – link to CMP393/CMP394
7. **Implementation** – 01 April 2024

Status summary: The Proposer has raised a modification and is seeking a decision from the Panel on the governance route to be taken

This modification is expected to have a: High impact

Generators (i.e. Storage), Transmission System Operators, Transmission Owners

Proposer's recommendation of governance route	Standard Governance modification with assessment by a Workgroup	
Who can I talk to about the change?	**Proposer:** Damian Clough Damian.Clough@sse.com 07833087067	**Code Administrator Contact:** Paul Mullen Paul.j.mullen@nationalgrideso.com 07794537028

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What is the issue?

Creation of the signals

The DCLF model creates two locational demand signals to reflect the investment criteria of the SQSS:

- a Peak Security signal which shows the impact on flows on the Transmission System, if a Party were to Import when Generation as determined by the Demand Security Scenario in the SQSS is operating; and
- a Year Round Locational Signal which shows the impact on flows on the Transmission System if a Party were to Import when Generation as determined by the Economy Scenario in the SQSS is operating.

The table below is an example of how Generation is scaled under the two different scenarios.

Generator Type	Fuel Class	TEC	Peak Security Transport Model Scaling	Year Round Transport Model Scaling
Biomass	Other (Conventional)	2,736.0	75%	31%
CCGT	Other (Conventional)	35,436.0	75%	31%
CHP	Other (Conventional)	1,876.0	75%	31%
Coal	Other (Conventional)	6,277.0	75%	31%
Hydro	Hydro	668.4	75%	31%
Interconnectors	Interconnectors	8,715.0	0%	100%
Nuclear	Nuclear & CCS	9,256.0	75%	85%
OCGT	Peaking	2,324.0	75%	0%
Pump Storage	Pumped Storage	3,143.2	75%	50%
Tidal	Intermittent	-	0%	70%
Wave	Intermittent	-	0%	70%
Wind Offshore	Intermittent	13,868.9	0%	70%
Wind Onshore	Intermittent	5,568.5	0%	70%

Under the Peak Security scenario, controllable Generation is scaled to meet Peak Demand.

Under the Year Round Scenario, Generation is scaled according to set amounts as detailed in Appendix E of the SQSS, but at a high level the availability of the Generation source and cost of constraints are the main factor inputs into the scaling factors, with the end scaling factors intended to reflect the efficient build of new Transmission infrastructure.

Importing under the two different scenarios above creates two different locational signals as illustrated by the underlying tariffs as per the November 2021 Forecast Tariffs

Derivation of Zonal Gross HH Gross HH Demand Tariff					
Zone	**Zone Name**	**Gross HH Peak Security Location Tariff (£/kW)**	**Gross HH Year Round Location Tariff (£/kW)**	**Gross Demand Residual Tariff (£/kW)**	**Final Gross HH Zonal Tariff (£/kW)**
1	Northern Scotland	-2.06	-31.22	54.41	21.13
2	Southern Scotland	-2.65	-21.81	54.41	29.95
3	Northern	-3.18	-8.69	54.41	42.54
4	North West	-2.19	-2.93	54.41	49.29
5	Yorkshire	-2.39	-2.04	54.41	49.98
6	N Wales & Mersey	-2.31	-1.42	54.41	50.68
7	East Midlands	-2.39	1.53	54.41	53.55
8	Midlands	-1.91	2.67	54.41	55.18
9	Eastern	1.26	-0.30	54.41	55.37
10	South Wales	-3.97	6.99	54.41	57.44
11	South East	3.66	-0.13	54.41	57.94
12	London	5.08	0.91	54.41	60.41
13	Southern	1.95	3.74	54.41	60.11
14	South Western	1.46	7.14	54.41	63.01

Negative demand locational signals show there is excess Generation in a location when compared to Demand under that particular scenario. Under the Year Round scenario above, the model indicates that in negative demand zones, importing under the Year Round Scenario reduces flows on the Transmission System.

How the Tariffs are charged

Generation is charged a separate Peak Security and a Year Round Tariff dependent on whether it operates under the scenario, and type of Generator and percentage of low carbon generators in the locality.

For demand the Peak Security and Year Round locational signals are summed together creating a single Demand tariff and this is charged based on average imports over the Triad Period.

Prior to 2023, the Transmission Demand Residual was also part of the Demand Tariff and charged based on average demand over the Triads but this will be removed and charged under a different methodology from April 2023 onwards.

For Demand Tariffs, the Year Round tariff did previously reduce the overall Demand tariffs i.e. when the Transmission Demand Residual was charged based on Triad demand. However, in the Proposer's view, this didn't actually provide any benefits to Storage as they are incentivised not to import over Triad periods anyway.

Summary of Defect

Due to how demand is charged, tariffs have lost the signal of a **negative; Year Round; Demand** locational charge to encourage **Storage to locate closer to Generation** and import when intermittent generation is operating.

Why change?

Incentivising Storage to locate near to Intermittent Generation (on the same side of a constraint), can improve the utilisation of network assets, reduce the need for permanent Transmission Investment and reduce constraint costs. As we move towards net zero, storage can ensure constrained low carbon generation is not lost to the Transmission system, but instead can be stored and returned to the Transmission system at a later settlement period. By displacing fossil fuels at other settlement periods when there are no constraints, generation from stored low carbon energy can reduce generation from unabated thermal generators, with the added benefit of contributing to energy security by reducing reliance on burning gas, as well as contributing to net zero by reducing emissions of carbon.

Transmission Investment

The DCLF model which generically reflects the Transmission Investment processes carried out by the ESO, indicates that importing when Intermittent Generation is operating reduces flows on the Transmission System which indicates reduced incremental constraints and reduced Transmission Investment.

By changing how the Year Round Demand tariff is charged (away from Triad charging) should provide benefits to all users by better aligning TNUoS tariffs with actual investment. If locating Storage nearer to constraints is less expensive than new Transmission Investment and/or constraints the end consumers should benefit due to lower system cost.

Constraints

Storage will be cheaper to constrain off than any Generation, which currently receives subsidises (not all Generation receives subsidies), as Storage can also use that stored energy at a later settlement period and potentially with a higher wholesale price or 'value' within the Balancing Mechanism.

Reduce Carbon

One element which consistently appears to be undervalued or not valued at all within the current charging methodologies is carbon. When low carbon is available, but is constrained that low carbon energy is lost to the Transmission system. More often than not, that wind energy is replaced by burning fossil fuels. By incentivising Storage to locate on the same side of a constraint, low carbon energy which would be lost to the system, can now be stored, displacing fossil fuels at a later settlement period.

What is the proposer's solution?

We envisage the solution changing following workgroup discussions but current thoughts are:

Similar to Generation in Generation Zones with negative tariffs; for Storage located in Demand Zones with negative Year Round Locational Signals or for Half Hourly Demand over Triads, the chargeable capacity can be determined after the event, and reconciled within the Generation Reconciliation e.g.it is assumed Generation in negative zones generates up to Transmission Entry Capacity when receiving TNUoS payments, but this is checked.

A similar process could be undertaken for Storage demand, with the chargeable capacity based on its maximum import across a number of periods within a particular window, with those periods linked to constraints.

Draft legal text

To be developed by the Workgroup

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** When the actual costs incurred to the Transmission Owner are not aligned with the costs or benefits levied on Users on the Transmission System then this creates inefficiency and creates uncertainty where to locate. This ultimately creates increased costs to the end consumer
(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** Currently Locational Demand Tariffs are floored at £0/MWh even though the underlying signals are negative. This shows a clear misalignment between investment and costs and TNUoS tariffs which this modification will start to address, thus vastly increasing the cost reflectivity of demand tariffs in certain areas of the country
(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;	**Positive** The ESO and Transmission Owners are currently seeking alternative way to provide increased capacity through the Network Options Assessment process and the various pathfinders. However the current TNUoS tariffs actually work against these initiatives, by not reflecting the actual system benefits locating Storage in the right places can provide to the system.
(d) Compliance with the Electricity Regulation and any relevant legally	**Neutral**

binding decision of the European Commission and/or the Agency *; and	
(e) Promoting efficiency in the implementation and administration of the system charging methodology.	**Neutral**
**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.	

When will this change take place?

Implementation date
1 April 2024

Date decision required by
To be confirmed – linked to CMP393/CMP394

Implementation approach
To be confirmed – linked to CMP393/CMP394

Proposer's justification for governance route
Governance route: Standard Governance modification with assessment by a Workgroup

Will need Ofgem decision given the materiality and a Workgroup as there could be many potential solutions to explore. It is proposed to run in parallel with CMP393 and CMP394 and although there could be a case to seek amalgamation of CMP405 with CMP393 and/or CMP394, the Proposer wishes to keep these separate at this current time.

Interactions

☐Grid Code	☐BSC	☐STC	☐SQSS
☐European Network Codes	☐ EBR Article 18 T&Cs[1]	☐Other modifications	☐Other

This proposed Modification will look at similar evidence as CMP393/394 and examine the relationship between Storage and Network investment. However, CMP393/394 is examining the relationship between Generation TNUoS and what Transmission Network is needed to accommodate Storage Exports, if any at all, whilst this modification will assess whether Storage reduces the need for Transmission Investment by importing at times of constraints, and how the Demand TNUoS charges can better reflect that.

The TNUoS taskforce may propose for CUSC Modifications to be raised at any time to deal with defects recognised by the taskforce. It also does not prevent CUSC Modifications being raised outside of the taskforce. Following CMP393/394 being raised this is now perfect timing to also consider Demand Locational Signals.

We do not think that this has any interaction with European legislation

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
DCLF	DC Load Flow
EBR	Electricity Balancing Regulation
STC	System Operator Transmission Owner Code
SQSS	Security and Quality of Supply Standards
T&Cs	Terms and Conditions
TNUoS	Transmission Network Use of System Charges

Reference material

- None

[1] If your modification amends any of the clauses mapped out in Exhibit Y to the CUSC, it will change the Terms & Conditions relating to Balancing Service Providers. The modification will need to follow the process set out in Article 18 of the Electricity Balancing Guideline (EBR – 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.