CUSC Modification Proposal Form

CMP394: Removing Generation Charges from Electricity Storage Operators in Positive TNUoS Zones

Overview: This modification proposes to exempt electricity storage assets in positive Transmission Network Use of System (TNUoS) zones from payment of generation charges. Here, 'electricity storage' refers to all storage that has booked Transmission Entry Capacity (i.e., pumped and battery).

Modification process & timetable

1. **Proposal Form**
   09 June 2022
2. **Workgroup Consultation**
   3 October 2022 to 24 October 2022
3. **Workgroup Report**
   19 January 2023
4. **Code Administrator Consultation**
   1 February 2023 to 22 February 2023
5. **Draft Final Modification Report**
   23 March 2023
6. **Final Modification Report**
   12 April 2023
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

Storage Operators, Generators, Transmission Owners, ESO, Parties Liable for TNUoS

Proposer's recommendation of governance route	Standard Governance modification with assessment by a Workgroup	
Who can I talk to about the change?	**Proposer:** Robert Newton robert.newton@zenobe.com 07342 169677	**Code Administrator Contact:** Paul Mullen Paul.j.mullen@nationalgrideso.com 07794 537028

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What is the issue?

Transmission-connected storage operators have an almost net neutral annual load factor.[1] As such, their impact on the National Electricity Transmission System (NETS) differs from that of exporting generators.

Current transmission charges are designed to reflect the impacts of exporting generators. They do not register how storage assets interact with the NETS in technologically and locationally specific ways. The current TNUoS regime is therefore resulting in unduly discriminatory conditions for storage operators.

Storage brings a range of benefits to the NETS. However, the current charging regime does not incentivise operators to deploy where the system need for storage is strongest: in generation-constrained areas. In fact, transmission charges in positive zones provide a signal that actively disincentivises storage operators from deploying in these zones.

Why change?

Context:

The current transmission charging methodology differentiates between positive and negative TNUoS zones, in the following ways:

Positive zones: 'TNUoS is charged annually and costs are calculated on the highest level of TEC held by the generator during the year'.

Negative zones: 'Where a generator's specific tariff is negative, the generator will be paid during the year based on their highest Transmission Entry Capacity (TEC) for that year. After the end of the year, there is a reconciliation, when the true amount to be paid to the generator is recalculated'. Therefore, generators in negative zones are not charged based on TEC, but rather on individual export based on actual highest outputs.

As such, there is a precedent for differentiating between treatment of operators in positive and negative charging zones.

Case for change:

As the transmission charging methodology was not designed with electricity storage in mind, as significant quantities of battery storage have connected since the last substantial updates to the methodology, and as the system need for storage will only grow as more renewable generation connects to the system, we find that there is a strong case for targeted updates to the transmission charging methodology, enacted through the Standard Governance Procedure.

The ESO, Ofgem, and BEIS have all published strategies and scenarios emphasising the strategic need for flexibility in an increasingly non-synchronous power system. The amount of storage connecting to the system is accelerating, with over 1GW of battery storage clearing at the latest Capacity Market auction.[2] The ESO is amending its generation background, or Connection Planning Assumptions (CPA), modelling to take account of the net positive effects of storage in constrained renewable power systems in worst-case conditions.

[1] By 'storage' the Proposer refers to all electricity storage that currently has booked Transmission Entry Capacity (i.e., pumped and battery).
[2] *Review of the T-4 2025/26 GB capacity market auction* (Frontier Economics and LCP: London, 2022).

In the view of the Proposer, the current generation transmission charging methodology is outdated and it contradicts these emerging objectives, system conditions, and investment signals. The last fundamental updates to the charging methodology took place in 2014, as part of Project TransmiT. These updates were based on analysis of modelling that did not consider potential system impacts of storage.[3] Since Project TransmiT concluded, the amount of intermittent renewable generation connected to the system has increased substantially. Consequently, the system need for storage, especially in generation-constrained areas, has intensified.

As the latest T-4 auction demonstrates, with over 1GW of capacity awarded to battery storage, the market is responding to this need.[4] As more renewables connect to the system, the need for storage will increase. Wind deployment is set to accelerate due to the UK's target of 50GW of offshore wind by 2030, and due to the move to annual Contracts for Difference. While storage deployment is increasing, there is a lack of economic incentives to bring forward the amount of storage needed to deliver the government's decarbonisation objectives. There is a need for economic signals to direct operators to deploy in the most beneficial areas, and in the quantity necessary to keep pace with accelerating renewables deployment.

Battery storage technologies in particular are modular and have relatively short lead times, and so can rapidly deploy in strategic locations with the right economic incentives. Regulation must respond to the opportunities presented by this new sector. But the current transmission charging methodology inaccurately designates storage as a form of 'Conventional Carbon' generation, charging storage operators via the same tariff as coal or gas-fired generators. This tariff takes into account exports but not imports, and so does not reflect how storage annual load factors are close to neutral. In the view of the proposer, the current methodology therefore unduly discriminates against storage as it 'unjustifiably treat[s] different cases alike'.[5] This creates a barrier to entry and inhibits storage operators from competing on their relative merits. Furthermore, as a result of this inaccurate economic signal, storage operators are disincentivised from deploying in generation-constrained areas, where they can provide significant system benefits by importing power.

The need for storage in generation-constrained regions:

Storage operators provide active power services, alleviating network constraints by importing surplus electricity. This reduces the need for the ESO to pay generators to curtail their output. Storage operators also reduce the need for transmission licensees to invest in expensive network upgrades in response to the stresses that intermittent sources of generation in low-demand areas place onto the grid. Furthermore, storage operators provide a range of stability services, including short circuit level, inertia and reactive power. Increasing the rollout of storage in constrained areas would reduce reinforcement and curtailment costs, thus reducing the overall TNUoS cost for both generation and demand users. In turn, this would reduce costs for consumers while reducing energy wastage and driving progress to net zero. See 'Annex 1: Cornwall

[3] See 'Project TransmiT: Impact Assessment of industry's proposals (CMP213) to change the electricity transmission charging methodology', Ofgem, (137/13, 2013), <bit.ly/3x4HNH2>.
[4] See *Review of the T-4 2025/26 GB capacity market auction* (Frontier Economics and LCP: London, 2022).
[5] Ofgem, 'Project TransmiT: Decision on proposals to change the electricity transmission charging methodology', Ofgem, (2013) <bit.ly/3t6Dfis>.

Insight Analysis of CMP393 and CMP394' for Cornwall Insight's modelling showing the results of the proposed modification on constraint costs and overall TNUoS costs.

Section 14 of CUSC sets out that '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':

> Therefore, charges should reflect the impact that Users of the transmission system at different locations would have on the Transmission Owner's costs if they were to increase or decrease their use of the respective systems. These costs are primarily defined as the investment costs in the transmission system, maintenance of the transmission system and maintaining a system capable of providing a secure bulk supply of energy.[6]

Current transmission charges for storage operators reflect only the costs of exports into the system, and not the benefits of imports. As a result, there is no economic signal to incentivise storage operators to alleviate constraints. Indeed, the economic signal provided by current transmission charging invites operators to do the opposite. In the view of the proposer, transmission charges for storage operators should be amended better to align with the Applicable Charging Objectives, catalysing effective competition in the sector, reflecting the value of storage to transmission licensees, and taking account of new strategic, market and technological developments.

Interaction with Wider Work on TNUoS

Ofgem recently published draft terms of reference for the forthcoming TNUoS Task Force. This document sets out the terms of reference for the forthcoming Task Force charged with improving the present methodology, and conducting a longer-term review of the purpose and structure of TNUoS charges. While there is some overlap between this modification and the Task Force, the proposed changes are not explicitly in scope of the Task Force. Ofgem stated in a call for evidence on the Task Force that 'it is possible that other changes to the charging methodology [will be] implemented […] outside of the Task Force processes'.[7] This modification is therefore intended to achieve targeted change outside the scope of the Task Force process and through the standard governance procedure, in line with Ofgem's intention to 'move quickly'.[8] Ofgem has already shown it is prepared to move forward with storage-related 'quick win' modifications (CMP280, CMP281) alongside Significant Code Reviews on transmission charging. Furthermore, CMP315 / CMP375 will run alongside the TNUoS Task Force, setting a direct precedent for the proposed approach. As set out in Annex 1, Cornwall Insight's modelling shows the primary benefits of the proposed modification are in early years (2025-30), supporting use of the Standard Governance Procedure to achieve a 2024 implementation date.

What is the proposer's solution?

It is proposed to incentivise storage operators to locate assets in generation-constrained regions by exempting pumped storage and battery storage assets in positive TNUoS zones from payment of TNUoS charges.

[6] See 'CUSC - Section 14: Charging Methodologies', in *CUSC v.1.16*, <bit.ly/3O67MVI>, 14.14.6 (p. 32).
[7] See Ofgem, 'TNUoS Call for Evidence: Next Steps', 25 February 2022, <bit.ly/3PShU5X>.
[8] See 'TNUoS Call for Evidence'.

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** Our proposed modification will incentivise storage operators to compete to connect in generation-constrained regions, improving the ESO's options for managing constraints and facilitating effective competition in the generation and supply of electricity.
(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** This modification will result in more cost-reflective charges. It will ensure that the transmission charging methodology reflects how battery storage and pumped storage assets import power from the NETS, as well as exporting it. In generation-constrained regions, this reduces curtailment and reinforcement costs for transmission licensees.
(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** This modification will ensure that the transmission charging methodology responds to the accelerating deployment of storage in the NETS. This is creating opportunities for innovative network

	reinforcement that can reduce costs for transmission licensees
(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.	**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.	

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	**Positive** Incentivising storage operators to deploy in generation-constrained regions will drive innovative reinforcement funded by independent operators, rather than by transmission licensees. This will make the network more balanced and secure, and less wasteful and carbon-intensive, without placing the costs of reinforcement onto consumers. It will also reduce operational costs by enabling more efficient management of intermittent electricity flows in constrained regions. Storage assets provide a range of stability services, such as reactive power, short circuit level, and inertia. Incentivising operators to deploy in generation-constrained regions will enable more targeted and effective provision of these services, resulting in a safer and more reliable energy system.
Lower bills than would otherwise be the case	**Positive** The evolving nature of the electricity system is putting more emphasis on the need for the ESO to provide a flexible transmission system, particularly as the move towards net zero will continue to locate renewable generation in areas of low demand. This modification proposal would incentivise the location of storage in constrained areas of the transmission system, thereby avoiding the transmission investment that would otherwise be required to meet the provision of enhanced renewable generation. The costs of traditional transmission investment are ultimately passed on to consumers. By reducing the need for new transmission investment, this modification will drive lower bills for consumers in the long term.
Benefits for society as a whole	**Positive** [Government policy requires an electricity system that will help to deliver net zero. Encouraging the deployment of storage in constrained areas of the transmission system (areas that seem destined to become further constrained) will facilitate the move to net zero. This modification will result in reduced reinforcement costs for TOs and reduced curtailment costs for the ESO, in turn reducing costs for consumers. It will also result in less waste of electricity through curtailment, driving the more efficient use of renewable energy. This modification supports long-term Government aims to provide cheap, abundant renewable electricity. It will facilitate Government policy and accelerate the move to net zero.
Reduced environmental damage	**Positive** This modification will result in reduced environmental damage by:

	- Accelerating the decarbonisation of the GB energy system, mitigating climate crisis and driving progress to legally-binding net zero goals. - Enabling the more efficient use of renewable energy by mobilising storage to avoid curtailment and manage constraints.
Improved quality of service	**Positive** This modification would support the development of a thriving renewable energy economy in Scotland (Great Britain's most generation-constrained region) and more widely in GB. It would result in better integration of renewable generation into the GB energy system and send a strong signal incentivising investment in electricity storage. This, in turn, will drive creation of green jobs and zero-carbon industrial and economic development.

When will this change take place?

Implementation date
1 April 2024

Date decision required by
1 October 2023

Implementation approach
There are ESO process impacts in tariff setting and potential system impacts on the Transport and Tariff model.

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

The Proposer has selected the Standard Governance route as the proposed modification is likely to have an impact on parties connecting to the NETS.

Interactions

☐Grid Code	☐BSC	☐STC	☐SQSS
☐European Network Codes	☐ EBR Article 18 T&Cs[9]	☐Other modifications	☐Other

None identified.

[9] 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.

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
EBR	Electricity Balancing Regulation
ESO	Electricity System Operator
NETS	National Electricity Transmission System
STC	System Operator Transmission Owner Code
SQSS	Security and Quality of Supply Standards
T&Cs	Terms and Conditions
TEC	Transmission Entry Capacity
TNUoS	Transmission Network Use of System charges

Reference material

- Annex 1 – Cornwall Insight modelling results.