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CUSC Alternative Form – Charging

CMP440 Alternative Request 1: Charging over all periods to avoid negative price incentives

Overview:

This WACM proposes that for TNUoS zones where the total demand locational signal is negative, locational TNUoS is converted into a p/KWh figure and charged across total year-round demand. For simplicity, a single common rate is calculated for NHH and HH.

The proposer's solution will result in a strong distortive signal for demand in Scotland to increase or shift to a large number of peak settlement periods – the type of perverse incentive that the introduction of the floor was trying to avoid in the first place. This WACM avoids this by spreading the negative demand locational signal across all periods of demand, not just peak periods.

NESO's CP30 document highlights that the major (£60bn) transmission investments required to achieve a low carbon electricity system are largely driven by avoidance of constraint costs. In addition, the TNUoS model calculates that 95% of the negative signals output from the model relate to year-round, not peak circuits.

Charging across year-round is more consistent with the negative demand signal outputs from the TNUoS model, *but more importantly*, are a better proxy for the real-world drivers of grid infrastructure investment.

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This WACM avoids perverse operational incentives and is more cost reflective of the savings that result of demand being in negative zones.

Proposer: Alex Savvides, Statkraft UK Ltd

☒ I/We confirm that this Alternative Request proposes to modify the charging section of the CUSC only

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What is the proposed alternative solution?

For TNUoS zones where the total demand locational signal is negative, locational TNUoS is converted into a p/kWh figure and charged across total year-round demand. The same rate applies to NHH and HH. Full calculation of indicative charges can be found in Annex 1, but the calculated tariffs are summarised below:

		2026/27 CMP440 WACMI		
Demand Zone		HH Triad (£/kW)	NHH 4-7 (p/kWh)	Negative (p/kWh)
1	Northern Scotland	-		-0.732923
2	Southern Scotland	-		-0.542167
3	Northern	-		-0.279523
4	North West	-		-0.132102
5	Yorkshire	-		-0.111410
6	N Wales & Mersey	-		-0.061140
7	East Midlands	-		-0.0175177
8	Midlands	3.119104	0.421146	
9	Eastern	0.637046	0.091692	
10	South Wales	7.95916	0.97599	
11	South East	5.625208	0.811494	
12	London	6.993935	0.754048	
13	Southern	8.382088	1.138618	
14	South Western	15.566653	2.257036	
Demand residual £m		Impact on demand residual	4.55%	

This approach spreads the negative charge across all a consumer's demand, removing any incentives to shift demand to peak periods to capture lower effective prices.

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The overall amount allocated is the same as the proposer's solution – and is dictated by the output of the TNUoS Model. This WACM proposes using a similar approach to converting to p/kWh as is currently used for positive NHH charging but spreads the credit overall demand (not just peak) to avoid unintentional signals. This can be summarised as:

Zones with positive locational TNUoS HH: Directly use the £/KW figure generated by the TNUoS model (current method – does not change).

Zones with Positive locational TNUoS NHH: £/KW (from model) x NHH TNUoS Model Zonal Demand / NHH forecast zonal annual demand across 4–7pm.

(current method used to convert to p/kWh – does not change)

Zones with negative locational TNUoS HH and NHH: £k/KW (from model) x Total TNUoS model Zonal Demand / Total forecast zonal annual demand across all periods.

(New – converts to a year-round total p/kWh demand spread across all annual demand in negative zones)

The TNUoS model demand = is the demand used in the TNUoS model, which only uses demand at peak as an input (a model simplification).

What is the difference between this and the Original Proposal

For zones which have a net negative locational TNUoS signal, the original proposal converts the £/KW output from the TNUoS model to a p/kWh tariff spread over demand in the 4–7pm peak hours. Two separate calculations are made for HH and NHH. This WACM differs in the following way:

For any zones which have a net negative TNUoS locational signal –

1. The £/KW output from the TNUoS model is converted to a p/kWh spread over year-round demand.

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2. A single tariff is calculated for HH and NHH.

What drives grid investment in negative price zones?

The TNUoS Model is a simplification – It uses a single snapshot of demand at peak as an input but categorises circuits into whether they are mostly used to transmit energy year-round or at peak. It is incorrect to assume that because the model only uses a single peak demand snapshot as an input, that the saved infrastructure costs occur only, or predominately at a single HH peak. Of course, there would be no economic justification to spend £60bn predicted to be required by NESO to reach CP30 to meet the power needs of just a single HH peak period.

The majority of the required infrastructure investments associated with negative zones in Scotland relate to avoiding constraints on transmitting wind power to the south. The *most* cost reflective approach would be for any negative credit to be applied across times where there is a renewable constraint, or would have been a renewable constraint had the demand not been present. However, this would introduce an unworkable amount of complexity to forecast and administer, and result in very volatile tariffs, and is therefore not a practical solution.

Wind speed in Scotland is not materially correlated with time of day, therefore constraints are *less* likely to occur over peak demand periods, as more energy can be directly used north of the B6 if wind output is high over peak periods. It is therefore *more* cost reflective to spread the negative signal across all year round demand than just over peak.

This is reflected in the TNUoS model itself. Of the six zones that are predicted to have a net negative demand locational signal by 2029/30, 95% of the charge is generated by year-round circuits –i.e. the TNUoS model outputs show that transmission infrastructure savings relate to circuits that are predominately used year-round (not at peak).

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Extract from 5-year TNUoS Tariff Report

Demand Zone		2029/30	
		Peak (£/kW)	Year Round (£/kW)
1	Northern Scotland	(0.52)	(50.68)
2	Southern Scotland	(1.94)	(37.35)
3	Northern	(2.50)	(10.08)
4	North West	(0.14)	(6.97)
5	Yorkshire	(1.82)	(2.15)
6	N Wales & Mersey	0.82	(2.97)

A model input simplification (using a snapshot at peak demand) should not be confused with the model outputs (that negative signals save on year-round circuits) or, more importantly the reality of what is actually driving grid reinforcement investments (i.e. to avoid increasing constraint costs).

Wrong incentives – the reason for the floor

The implementation of the floor by Ofgem was driven by a concern that once the residual element was removed, large negative locational credits might provide distortive signals for demand to turn up over peak times, adding to system costs. This was particularly a concern for zones 1 and 2 (Scotland) where the negative signal is strongest.

There are lots of the elements that make up a demand customer's final bill, most of these do not provide short run operational signals i.e. AAHEDC, BSUoS, RO, FiT, CfD, CCL are charged on a fixed £/MWh basis across all demand and TNUoS residual is a banded £/Site/Yr.

The wholesale power price provides the main short run operational signal for demand, varying significantly by each HH within a day and over longer time frames.

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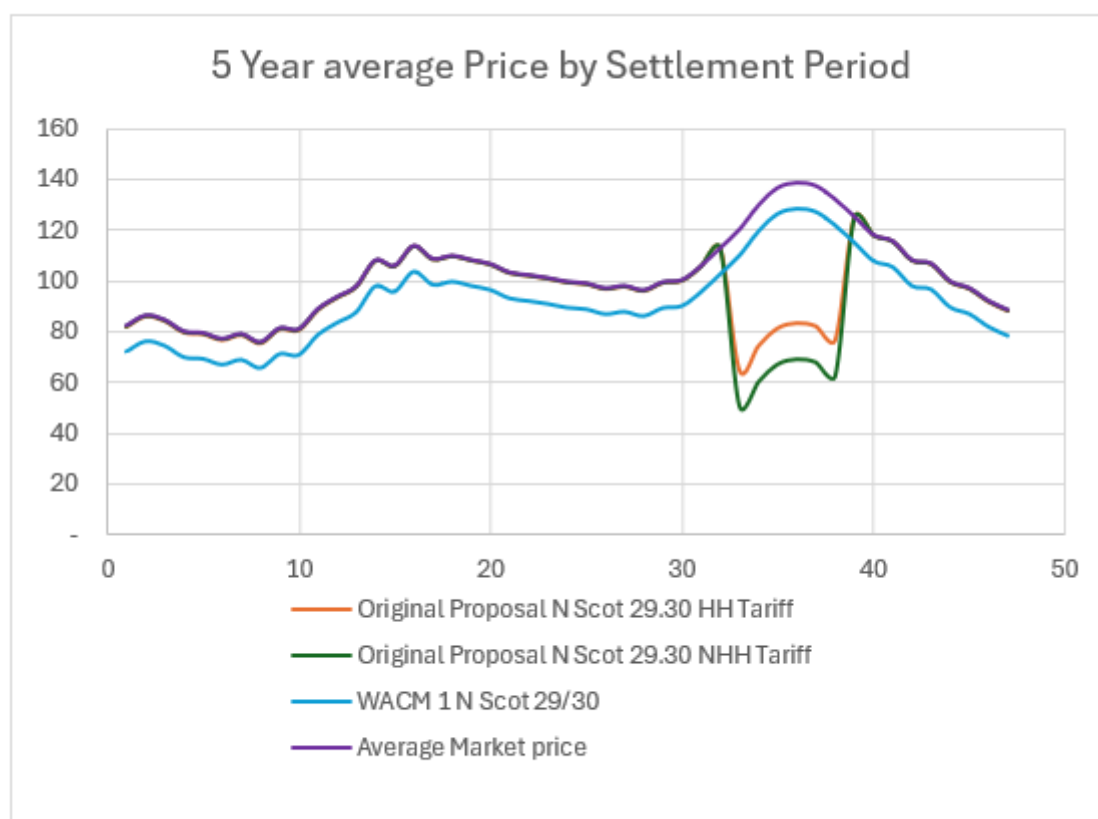
The capacity market is charged over weekday winter (Nov-Feb) 4-7pm hours, however NHH and HH EII (Energy Intensive Industry) customers are 100% exempt from this charge. The magnitude of CMSC levy is quite large ~ £50-100/MWh over these hours but varies significantly depending on a particular year's auction results. The capacity market charging periods coincide with 24% of the TNUoS peak periods (which are 4-7 every day all year). Therefore under the original proposal, for negative charging zones the following short run marginal signals would apply:

Period	No of HH	Short run operational signal ORIGINAL	Short run operational signal THIS WACM
Non EII Demand			
CMCS periods (4-7pm weekdays Nov-Feb)	515	CMCS rate + Negative locational TNUoS + Wholesale price	CMCS rate + Wholesale price
All other peak periods exc CMCS periods	1,676	Negative locational TNUoS + Wholesale price	Wholesale price
All other periods	15,341	Wholesale Price	Wholesale Price
EII Demand			
4-7pm all days	2192	Negative locational TNUoS + Wholesale price	Wholesale price
All other periods	15341	Wholesale Price	Wholesale Price

Modelling was completed to calculate the impact the original proposal and this WACM would have on the short run marginal signal taking into consideration the wholesale power price and the negative locational TNUoS demand tariff. The 2029/30 North Scotland tariff for each solution was applied to historic year's Elexon wholesale power price data.

This represents the situation for EII demand and the majority of the time (76%) for non EII demand.

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For HH customers in Scotland, under the original proposer's solution, there would be a clear incentive to shift demand to peak periods where possible.

Historically, NHH customers would not be able to respond to such a signal, as their demand is profiled, and a supplier would not see lower costs if one of their customers shifted their usage. However, the market is moving to HH settlement for all, and it is the policy intent for historically NHH customers to be able to flexibly respond to such signals through half hourly metering allowing suppliers to offer time of use tariffs. Consequently, under the original proposal, we should expect traditional NHH customers to shift demand to peak periods as well.

For current HH customers, the original proposer's solution may actually result in a greater distortive behaviour than if triads were used to allocate the negative TNUoS demand signal. Triads can be predicted, a flexible demand user in Scotland would probably only need to ensure they are drawing maximum power for 15 peak HH periods to be reasonably certain of capturing the negative full

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TNUoS demand signal. Under the original proposal, flexible demand in Scotland will be incentivised to maximise demand over hundreds or even thousands of peak settlement periods each year.

This distortive signal risks adding additional system cost as a result of these demand shifting incentives. This WACM avoids this market distortion.

What is the impact of this change?

The outcomes of the change are as follows:

- (i) Incentive to increase demand over peak periods is avoided
- (ii) NHH and HH rates are combined for simplicity (only 3 possible rates per zone).

This WACM will reinstate the incentive for demand to optimally locate within the GB power system, providing reduction in grid costs in line with avoided infrastructure savings, but without causing distortive operational behaviour, reducing overall system costs.

The total negative credit allocated and the impact on the residual is the same as in the original proposer's solution.

Proposer's assessment against CUSC Charging Objectives

Relevant Objective	Identified impact
(d) 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;	<p>Select an impact</p> <p>Positive: This WACM is better than the status quo as it reinstates negative TNUoS locational signal in areas where locating</p>

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	<p>demand will reduce system costs. It is more positive than the original as it does not introduce any distortive behaviours in demand response.</p>
<p>(e) 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);</p>	<p>Select an impact</p> <p>Positive</p> <p>Reinstating the negative demand signal is more reflective, as the implied transmission savings are not currently being recognised since the floor was implemented. This WACM is more reflective than the original proposal as it distributes the negative charges over periods that better reflect the system savings.</p>
<p>(f) 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*;</p>	<p>Neutral</p>

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(g) Compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency **; and	Neutral
(h) Promoting efficiency in the implementation and administration of the system charging methodology.	Select an impact Positive – the solution in this WACM is simple and is consistent with existing approaches.

* See Electricity System Operator Licence

**The Electricity Regulation referred to in objective (g) 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 against CUSC Connection Charging Objectives

Relevant Objective	Identified impact
Means the Use of System Charging Objectives, as if references therein to the Use of System Charging Methodology were to the Connection Charging Methodology and in addition, the objective (where consistent with the other objectives) of facilitating competition in the carrying out of works for connection to the National Electricity Transmission System.	Select an impact Neutral

When will this change take place?

Implementation date:

The implementation timeframe is the same as the original proposer's solution.

Implementation approach:

To be confirmed through Workgroup discussion.

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Acronyms, key terms and reference material

Acronym / key term	Meaning
EII	Energy Intensive Industries
HH	Half hour
NHH	Non Half Hour
BSUoS	Balancing Services use of system charges
AAHDEC	Assistance for areas with high electricity distribution costs
RO	Renewable obligation
FiT	Feed in Tariff
CfD	Contract for Difference
CCL	Climate Change Levy
CMSC	Capacity Market Supplier Charge