Making a positive difference
for energy consumers

Date: 3 September 2019

Dear Stakeholder,

Future Charging and Access programme – consultation on refined residual charging banding in the Targeted Charging Review

In November 2018, we published our minded-to consultation and draft Impact Assessment on the Targeted Charging Review (TCR) covering proposed reforms to residual charges and non-locational Embedded Benefits.[1] In June 2019, we consulted on further matters, including updated analysis on the Capacity Market and system costs, and the findings of the Balancing Services Charges Task Force.[2]

We welcome the contributions stakeholders have made to help inform our final decision. We received over 130 responses to our minded-to consultation, and a further 23 representations to our supplementary consultation.[3] Having considered these responses, we wish to update stakeholders on refined proposals for reform of residual charges and provide the opportunity to comment on them, before we make our final decision.

We intend to publish our final decision on the TCR and direction (including the final Impact Assessment) in the next two months. We welcome any stakeholder feedback on the proposals and additional analysis outlined in this letter by email to **TCR@ofgem.gov.uk** by **25 September 2019**.

Alongside this letter, and following requests from some industry participants, we are also publishing a sensitivity analysis we have undertaken on the implications of our proposed reforms on renewable generation.

1) Refined residual charging proposals

We proposed two leading options for reform for residual electricity network charges and said we preferred a fixed residual charge. Where a preference was stated, most respondents supported fixed residual charges, but some respondents raised particular concerns with aspects of the detailed design. We have therefore reviewed and refined our thinking.

Our minded-to proposals

Residual charges are levied once the forward-looking charges have been applied, to recover the remaining allowed revenue for network companies set under our price controls.

[1] Our minded-to consultation is available here: https://www.ofgem.gov.uk/publications-and-updates/targeted-charging-review-minded-decision-and-draft-impact-assessment
[2] Available here: https://www.ofgem.gov.uk/publications-and-updates/future-charging-and-access-programme-consultation-supplementary-analysis-november-2018-minded-decision-targeted-charging-review
[3] These responses are available here: : https://www.ofgem.gov.uk/publications-and-updates/future-charging-and-access-programme-consultation-supplementary-analysis-november-2018-minded-decision-targeted-charging-review

Our modelling, undertaken for our draft Impact Assessment, indicated a strong long-term case for reform of residual charges, with our proposed options resulting in an estimated Net Present Value (NPV) of system benefits to 2040 in the range **£0.8bn to £3.2bn** and consumer benefits in the range **of £0.5bn to £1.6bn**.[4]

The guiding principles for the TCR have been to **reduce harmful distortions**, ensure **costs are shared fairly,** and to be **proportionate and practical**.

We have expressed our view that residual charges should be levied only on final demand and have received widespread support from stakeholders for this approach.[5] In our minded-to consultation, we consulted on **two leading alternative options** for reform -

- **A fixed charge - our preferred option**, where the total allowed residual revenue is first apportioned **to voltage levels** based on the total contribution of users at the relevant voltage level to net volumes on each network, and then apportioned further to **user segments** within each voltage level, to calculate a single, fixed charge for all users in that segment.
    - For non-domestic users, this involved segmenting users through an existing industry classification - 10 line-loss factor classes.[6]
    - For domestic users, this involved splitting between those with and without Economy 7 meters, producing a higher and lower domestic charge reflecting their different average usage.[7]
- **An agreed capacity charge**, where all users would face a charge based on the capacity of their connection to the network, with larger users' charges based on their agreed capacity level, and smaller users for whom this data is not available charged on a "deemed" or assumed capacity level.[8]

Applying the options

For the avoidance of doubt, by final demand in the context of the TCR, we mean electricity which is consumed other than for the purposes of generation or export onto the electricity network. In practice, this would exclude electricity imported from the grid that is necessary for the operation of generation or, in the context of storage, which is imported for the purposes of re-exporting, including any which may be lost through waste in doing so.

As we said in the minded-to consultation, and clarified at the January Charging Futures Forum, we consider a fixed residual charge should be applied on a per site basis as is currently the case for both CDCM and EDCM models. We recognise that multiple MPANs can sometimes be associated with a single site. In general, it is not our policy intention to apply multiple fixed charges to single sites. However, we welcome views on any complexities or distortions which might be anticipated, such as in applying this to complex sites, IDNO or private networks. We would expect industry to consider how this policy can be implemented in practice through the industry modification process.

Arrangements will need to differentiate between domestic and non-domestic users, as well as unmetered customers, with the residual allocated to these groups separately, within a

[4] The ranges of figures quoted take into account the results of sensitivity analysis on the total residual charge increasing or decreasing by 50%.
[5] Our working paper on our approach to reviewing residual charges can be found here: https://www.ofgem.gov.uk/system/files/docs/2017/11/tcr_working_paper_nov17_final.pdf
[6] Line-loss factor classes are a collection of metering systems with the same line loss factors. The line loss factors indicate the user's location on the network and metering characteristics.
[7] Economy 7 meters are two-rate meters, which apply different tariffs for day and night time use. Typically, these customers are on Economy 7 tariffs which are designed for those that have high night time load, such as storage heating.
[8] We estimated three 'deemed' capacity levels for low, medium and high using domestic consumers. Further information is available here: https://www.ofgem.gov.uk/system/files/docs/2018/11/distributional_and_wider_system_impacts_of_reform_to_residual_charges.pdf

voltage level, before any further segmentation is applied. For the avoidance of doubt, we do not propose that the refined options presented here or in our minded-to consultation would apply to unmetered customers. We proposed that the residual charge apportioned to this group of customers would continue to be charged on the same basis as today, using profiled consumption volumes.

In practice, we expect many other aspects of how the charge is set will be consistent with existing arrangements, although it will be for industry to consider consequential changes which may be needed to industry processes or codes through the modification process. We would expect that some form of revenue reconciliation is likely to be needed, and that it is likely to make sense to apply the fixed charge pro rata on a daily rather than yearly basis to account for changes within year. We expect these matters to be developed further by industry in the most appropriate way through the modification process.

Our refined residual charging proposals

Non-domestic customers: Most respondents who expressed a view supported a fixed charge approach, but a number disagreed with aspects of the detailed proposals. Some respondents felt the fixed charges should take more account of the diversity of non-domestic users, noting that these users spanned a broad range of sizes within a given band. Some respondents also thought aspects of our proposed basis for segments could be seen as arbitrary. Having reflected on these responses, we are now considering a **fixed charge option**, **with refined segments** for non-domestic users at each voltage level, in place of using line-loss factor classes. This is an evolution of our preferred fixed charge option proposed in our minded-to consultation. We describe the proposed design of this refined segmentation below.

We have also considered a hybrid charge, similar to that suggested by some respondents, comprising a fixed charge for smaller users with agreed capacity charges (a charge per kW) for larger users. While an agreed capacity charge would increase equity, a fixed charge is likely to lead to fewer harmful distortions than alternatives.

Domestic customers: Some respondents also raised concerns about potential impacts on low consuming and vulnerable domestic users, and about the implications of charging domestic customers with Economy 7 more than other households. Our current thinking remains that domestic users should be treated separately from non-domestic users due to their different characteristics. We are considering the approach to any segmentation of domestic consumers under a fixed charge option, including the combination of all customers into one charging band.

Refined proposal for non-domestic customer segmentation

Our refined proposal is that:

- total allowed residual revenue would first be apportioned between voltage levels, on the basis of net volumes, as set out in the November 2018 minded-to consultation; and

- non-domestic segment boundaries would be set in terms of agreed capacity levels for users at higher voltages where this data is widely available, and net volume levels at Low Voltage (LV). This is in place of segmenting these users on the basis of the line-loss factor classes (as set out in the November minded-to consultation).

Our large user research and our consultants' behavioural analysis suggests a number of factors would limit users' ability or willingness to reduce their agreed capacity in practice, limiting any change to the economic efficiency of the solution.[9] We think boundaries should be designed to avoid undue discrimination as far as possible between similar users. Setting

[9] Such as the large cost of building on-site capacity capable of providing the same level of system security as the grid, and the ability to re-gain network capacity once it had been handed back. Further information is available in Annex 6 of the minded-to consultation.

a low number of segments, consistent with meeting other objectives, should help reduce incentives to change behaviour further. We outline how we have applied the TCR principles to customer segmentation in Figure 1 below.

Figure 1 – applying TCR principles to customer segmentation criteria

Reducing harmful distortions	• Lowest number of segments needed to achieve objectives • Segments avoid splitting dense clusters of similar user types where possible • Potentially an appropriate minimum number of users per segment
Fairness	• Broadly consistent upper limit on range of user types facing the same charge across segments • Segments well balanced with a broadly consistent basis, aiming to distinguishing user groups with significantly distinct characteristics, or clear reasons for differences. • Tangible, justifiable link to energy usage in the basis for segment boundaries
Practicality and proportionality	• Lowest number of segments necessary to achieve objectives • Broadly consistent basis for segments for simplicity • Uses available data and any system changes are proportionate • Distributional effects and complexity are no greater than necessary to achieve objectives

Applying the criteria outlined in Figure 1, we have identified five national level charging bands for Low Voltage non-domestic users and five charging bands for High Voltage (HV) / Extra High Voltage (EHV) non-domestic users. As the banding is the same for HV and EHV customers but their share of the residual charges is calculated at voltage level this results in 15 charges. Applying the criteria to transmission connected customers suggests that further segmentation is not required. We note there may be few customers in a given segment in some regions and seek views on how this should be accounted for in banding.

An illustration of our proposed approach to applying these criteria in the context of an example distribution region is set out in the annex to this letter.

Updating the refined charging bands

We consider the refined band thresholds should be applied on a consistent basis across Britain. We propose to set and allocate users to bands on a historic basis and update them periodically in line with price controls. This should also reduce any incentives to change behaviour in response to residual charges.

Over time, where more users get agreed capacity or other improved capacity data, for example in line with Access reform, we currently think any banding at those voltage levels should also transition to an agreed capacity or more appropriate basis.[10] We also envisage that as the distinction between half hourly and non-half hourly customers diminishes, it may be necessary to update the approach.[11]

Stakeholders with an interest in these refined proposals are invited to submit a written response to this letter by the date below. For any parties who wish to engage on specific aspects of these refined proposals, including practical implications, we intend to hold an open meeting on 13 September. **We invite expressions of interest to participate by email by 9 September.**

Depending on the number of people interested in attending, it may be necessary to limit the number of participants at the workshop on the refined residual proposals. If we receive a large number of expressions of interest, we would seek to ensure a broad representation

[10] https://www.ofgem.gov.uk/electricity/transmission-networks/charging/reform-network-access-and-forward-looking-charges
[11] https://www.ofgem.gov.uk/electricity/retail-market/market-review-and-reform/smarter-markets-programme/electricity-settlement

of interested stakeholder groups. We will confirm attendance with those who have expressed an interest. We also intend to engage separately with the system and network companies, particularly with a focus on the practical implications of these proposals.

2) Supplementary renewables modelling

In the modelling published with our minded-to consultation, the renewable deployment was set using two of National Grid's Future Energy Scenarios, following the approach recommended by our independent consultants.[12] This modelling recognised that reform of the non-locational embedded benefits would directly impact revenues of grid-connected generation, assuming that Contracts for Difference (CfD) support payments for new build generators would adjust to maintain decarbonisation targets in the reform scenarios.

Some consultation responses recommended testing the benefits case presented against a large reduction in onshore wind and solar PV investment.[13] We have today published further analysis which assesses the benefits case (of our minded to proposals on the embedded benefits element of reforms) should there be a significant change in onshore wind and solar build. This should not be considered a prediction but rather an illustration of how the benefits case for our reforms changes in response to a different assumption on renewable deployment.

The results of this supplementary modelling show that, in a scenario with subsidy-free onshore wind and solar PV, consumer benefits from the Embedded Benefits reforms are somewhat lower but still very large, ranging from -£1.9bn to -£3.5bn. The increase in projected system costs (from -£0.0bn to +0.3bn) to +£1.0bn to +£4.1bn reflects the assumption that support payments would be used to incentivise replacement of onshore wind and solar PV with more expensive offshore wind, which has a higher "strike price" for the purpose of this sensitivity.[14] As stated above, this is a sensitivity designed to test the robustness of our modelling to this set of assumptions and not to show the overall impacts of our reforms. We will provide our detailed assessment of this analysis in our final decision.[15] A full breakdown is available in the consultants' report which is published alongside this document.[16]

If you wish to provide feedback on any of the information outlined in this consultation letter (including the proposed refined fixed charge approach and segmentation criteria, any impacts and practical considerations of the resulting bands and per site charging, considering our TCR principles), please email **TCR@ofgem.gov.uk** by 25 September 2019.[17] We will publish non-confidential responses on our website. We will also discuss the content of this letter at the next Charging Futures Forum on 19 September.[18]

Yours faithfully

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Deputy Director, Electricity Charging and Access

[12] Information on National Grid's FES scenarios is available here: http://fes.nationalgrid.com/fes-document/
[13] This 50% reduction roughly aligns to the upper-end of the projected impact on onshore wind and solar PV set out by Aurora, ie a 5 year delay to deployment.
[14] The range of benefits quoted are for the Embedded Benefit full reform scenario, using Steady progression and Community renewables FES.
[15] This analysis does also not take account that the hurdle rate associated with an unsupported technology is typically higher than for the same project under the CfD regime. This in turn increases the levelised (per unit lifetime cost of ownership) for these technologies and if taken into account would reduce the difference in levelised cost between unsupported onshore wind and solar PV and CfD supported offshore wind.
[16] This is published as an associated document to this letter.
[17] We invite stakeholders to indicate to TCR@ofgem.gov.uk no later than 13 September if they are unable to respond within this timeframe.
[18] http://www.chargingfutures.com/sign-up/sign-up-and-future-events/

Annex – Specific non-domestic fixed charge segmentation proposal: Detailed approach and breakdown of proposed bands

We propose to establish criteria, linked to our principles, to inform segment definition and updates over time, where further segmentation of a user group is warranted, as outlined above. We have applied our principles, to identify a set of refined segments for fixed residual charges for non-domestic network users. Below we describe the approach we have taken to applying these principles, the resulting bands and corresponding charge estimates for an illustrative network area.

In applying the below criteria, any approach would need to consider how the resulting bands perform against the TCR principles. We recognise there will be trade-offs between these criteria. Overall, segments should be sought which best meet our guiding principles, while meeting these criteria.

Overview of approach

First, we consider **whether segmentation** of a given customer group / voltage level **is needed**. Where users span around an order of magnitude in size, we propose that they are likely to be sufficiently similar that further segmentation is not merited.[19]

Applying this first test to non-domestic distribution connected customers at different voltage levels indicates further segmentation is required. Applying it to transmission connected customers suggests that further segmentation is not required.

Second, we assess the **population characteristics** where additional segmentation is required to identify potential boundaries, based on agreed capacity at those voltage levels where this is widely available or net volumes where not, applying our criteria of a consistent basis for segmentation.

Applying this test to non-domestic voltage levels indicates five potential consumer groups:

- *Low Voltage-connected non-half hourly settled users,*
- *Low Voltage-connected half-hourly settled users,*
- *High Voltage-connected consumers,*
- *Extra High Voltage-connected consumers and*
- *Transmission-connected users.*

In recognition of the overlap in the range of energy usage and capacity between these customer groups, any volume boundaries derived on the basis of each LV consumer group are applied to all LV customers. Similarly, agreed capacity boundaries derived on the basis of HV and EHV customers are applied for all customers across these voltage levels.

Third, we assess whether it is possible to segment these users in a way which **reflects key characteristics**, whilst keeping number of bands and hence complexity and distortions to a minimum, and meeting other TCR principles. This should minimise separation of similar users, notably where populations are densely clustered, and ensure user in the resulting bands meet the criteria set for test 1 above.

Applying this test to non-domestic LV-connected customers results in four boundaries and five segments, with the boundaries set as follows[20]:

[19] We think that where customers within a segment span more than one order of magnitude, further segmentation should be considered. For example, where a segment covered customers with a range greater than 10s of kVA to 100s of kVA, or 100s of kVA to 1,000s of kVA, we would consider if further segmentation was required.
[20] For the purposes of these illustrative charges, we have based these bands on sample data for Profile Class 3 and 4 customers and Half Hourly charged customers for the Northeast region. This data excluded customers in the LV network non-domestic non-CT group.

- *40th percentiles of Non-Half hourly settled customers and Half-hourly settled customers – separating the cluster of lower users in each group*

- *75th percentile of Non-Half hourly settled customers and Half-hourly settled customers – separating the diverse group of higher consuming users.*

Applying this test to non-domestic HV and EHV customers results in four boundaries and five segments, the boundaries are as follows:

- *40th percentiles of HV and EHV-connected customers – separating the cluster of users with lower capacity levels in each group*

- *75th percentile of HV and EHV-connected customers – separating the diverse users with higher capacity levels in each group.*

While the segments are the same for HV and EHV customers, their share of overall residual costs are calculated based on their voltage level, as described above, so their charges will differ. The 10 charging bands produced will result in 15 charges at a national level.

Fourth, for the purpose of this illustrative example, the 15 charges are then evaluated at DNO level to consider whether the banding introduces segments which might have **too few customers per segment**.[21]

For our illustrative Northeast region, this results in the merging of some DUoS bands at EHV level from five to two bands, and the top two HV bands being merged. Figure 3 below outlines the indicative charging bands and charges which result from the application of this criteria, based on sample data. Figure 2 presents the charging bands proposed in our minded-to consultation for comparison.

Illustrative charges

Figure 2 – charging bands proposed in the minded-to consultation

Voltage level	LLFC charging bands	Charging bands	
Low Voltage	Small Non Domestic Unrestricted	£	236
Low Voltage	Small Non Domestic Two Rate	£	431
Low Voltage	LV Medium Non-Domestic	£	1,190
Low Voltage	LV Sub Medium Non-Domestic	£	2,160
Low Voltage	LV Network Non-Domestic Non-CT	£	1,099
Low Voltage	LV HH Metered	£	4,439
Low Voltage	LV Sub HH Metered	£	16,928
High Voltage	HV medium non-domestic	£	3,024
High Voltage	HV HH Metered	£	54,950
Extra-High Voltage	EDCM customers	£	155,045

[21] For this example, we have based the illustrative charges on a limit of 10 customers per band.

Figure 3 – illustrative charges in proposed refined non-domestic banding[22]

Voltage level	Proposed refined bands	Updated illustrative band charges	
Low Voltage	0-5,000 kWh	£	37
Low Voltage	5,000 kWh - 20,000 kWh	£	201
Low Voltage	20,000 kWh - 100,000 kWh	£	783
Low Voltage	100,000m kWh - 280,000 kWh	£	3,011
Low Voltage	Above 280,000 kWh	£	12,391
High Voltage	0 kVA - 500 kVA	£	10,830
High Voltage	500 kVA - 1400 kVA	£	37,334
High Voltage	1,400 kVA - 2,500 kVA	£	80,643
High Voltage	Above 2,500 kVA	£	200,831
Extra-High Voltage	0 kVA - 500 kVA	£	18,586
Extra-High Voltage	500 kVA - 1400 kVA	£	37,634
Extra-High Voltage	1,400 kVA - 2,500 kVA	£	59,564
Extra-High Voltage	2,500 kVA - 12,000 kVA	£	174,092
Extra-High Voltage	Above 12,000 kVA	£	846,545

[22] These are illustrative charges for the Northeast DNO charging region, based on sample data provided by Northern Powergrid. Reflecting stakeholder feedback, we have removed generation sites from the Extra High Voltage level. Bands have been rounded for simplicity.