

Targeted Charging Review: minded to position and draft impact assessment

Response on behalf of the Solar Trade Association

About us

Since 1978, the Solar Trade Association (STA) has worked to promote the benefits of solar energy and to make its adoption easy and profitable for domestic and commercial users.

A not-for-profit association, we are funded entirely by our membership, which includes installers, manufacturers, distributors, large scale developers, investors and law firms.

Our mission is to empower the UK solar transformation. We are paving the way for solar to deliver the maximum possible share of UK energy by 2030 by enabling a bigger and better solar industry. We represent both solar heat and power, and have a proven track record of winning breakthroughs for solar PV and solar thermal.

Respondent details

Respondent Name:	Nicholas Gall, Gemma Stanley [Policy Analyst]
Email Address:	consultations@solar-trade.org.uk
Contact Address:	Greencoat House, Francis Street, London, SW1P 1DH
Contact Telephone:	0203 637 2945
Organisation Name:	Solar Trade Association
Would you like this response to remain confidential?	No

Introduction and Background

Network charges are a core component of any energy system, and in Britain typically make up 25.5% of a domestic customer's electricity bill¹. As the GB energy system continues to evolve, it is appropriate that the underlying methodology of these charges be reviewed, in tandem with the price control framework governing network operators' allowed revenues.

At the outset, we must be absolutely clear on the prevailing policy context, in which the Government has on the one hand emphasised a commitment to reducing carbon emissions², fighting fuel poverty³ and encouraging a smart, flexible energy system⁴, whilst at the same time providing the EU's highest level of subsidy to fossil fuel industries. It is profoundly regrettable that the TCR framing focuses on the supposed unfairness of policy supports for renewable generation, completely overlooking the fact that the £10.5 billion in taxpayer funding provided each year to fossil fuel industries is over 26% more than the total amount provided to the entire renewables sector.

Considering this context, a holistic understanding of the way network charges are levied is of paramount importance. The Smart Systems and Flexibility Plan emphasises the importance of time of use tariffs as well as demand side response for managing consumption at peak. This has been validated through reports such as Imperial College and Ovo's [Blueprint for a post-carbon society](#) finding £6.9 billion savings are possible through residential flexibility alone. Similarly the CCC reports that without significant policy intervention, by 2030 there could be a nearly 50TWh gap between the actual quantity of low-carbon generation and the 270TWh required to achieve our climate targets (a gap equivalent to three Hinkley Point C power stations by 2030). Thus, any comprehensive review of network charging arrangement should be premised on the benefits both small and large scale generation have and could bring to the energy system, alongside our legally-binding commitments to decarbonisation.

The minded-to position on reform to residual charges has been met with considerable concern from many industry stakeholders. This criticism extends to the scope, methodology and proposed implementation timelines, as well as an overarching concern regarding the fragmentary approach adopted by Ofgem. The

¹ Ofgem: Bills, Prices and Profits (31 Jan 2019) – Available from: <https://www.ofgem.gov.uk/publications-and-updates/infographic-bills-prices-and-profits>

² HM Government: The Clean Growth Strategy (October 2017) – Available from: <https://www.gov.uk/government/publications/clean-growth-strategy>

³ UK Department for Business, Energy and Industrial Strategy (BEIS): "Government delivers on manifesto pledge with £6 billion package to help end fuel poverty and drive innovation in energy efficiency" (30 March 2018) – Available from: <https://www.gov.uk/government/news/government-delivers-on-manifesto-pledge-with-6-billion-package-to-help-end-fuel-poverty-and-drive-innovation-in-energy-efficiency>

⁴ BEIS/Ofgem: "Upgrading our Energy System – Smart Systems and Flexibility Plan: Progress Update" (16 October 2018) – Available from: <https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan-progress-update>



revenue collected from the differing elements of network charges (residual, access and forward-looking charges) are dependent on the way each are set to be collected – for instance, if the residual element is larger than the access and forward-looking charges this will be reflected in a lower access and forward looking incentive. As such, it is unclear how a disjointed analysis of residual charging and some embedded benefits (BSUOS) can confidently propose system and consumer benefits when the impact of its piecemeal decisions are so intrinsically tied to the Access and Forward Looking Charges SCR, for which only the scope has been determined.

Section 4 – “How we reached the leading options”

1. Do you agree that residual charges should be levied on final demand only

Movement away from residual charges being levied on a combination of demand users, some generators and storage facilities to final demand only is acceptable in principle, but Ofgem’s proposed approach to implementation of this principle is profoundly flawed.

2. Do you agree with how we have assessed the impacts of the changes we have considered against the principles? If you disagree with our assessment please provide evidence for your reasoning.

Ofgem’s overarching mandate is to protect the interests of existing and future energy consumers. This is assessed through three principles:

- **Reducing harmful distortions;**
- **Fairness** (Simplicity, Transparency, Justifiability, Equity and Equality, Predictability);
- **Proportionality and practical considerations**

We strongly disagree with how the impacts of the changes have been assessed against these principles, and view the principles themselves as incomplete and unfit for the purpose of assessing an overhaul of current network charging arrangements.

Incomplete Principles-based approach

The “minded-to” position is based on a review that is intentionally distinct from the wider UK policy context as well as the UK’s legally-binding emissions reduction targets. Ofgem’s statement that ‘we have been mindful of our environmental obligations’ highlights the fundamentally inadequate consideration given to how the average carbon intensity of electricity generation must be reduced by 60% from approximately 235gCO₂e/KWh to less than 100g in just 11 years. It is notable that the *Network Access and Forward Looking Charges* SCR has also omitted environmental considerations as a key principle. Both review work streams are inherently incomplete without a principle pertaining to environmental obligations. Furthermore, assessment without consideration of further policy streams is evident from the outcome of the minded-to position being in direct opposition to the Government’s own policy objectives as set out in the [Smart Systems and Flexibility Plan](#) (July 2017).

Given that this evaluation is undertaken against a fragmented review of the charging system, particularly with regard to the Access and Forward Looking Charges work-stream, any outcomes pertaining to fairness, reducing harmful distortions and proportionality and practicality will be similarly fragmented. Consequently, the risk of unintended consequences and further harmful distortions is far higher.

Ofgem's Principles:

- **Harmful Distortions:**

We do not agree that the impacts have been assessed effectively against the three principles Ofgem have prioritised. The harmful distortions that the "minded-to" position will likely bring forward against residential and commercial flexibility were not in scope. Recent analysis has demonstrated £6.4bn in savings could be achieved relative to a Business-as-Usual baseline through regulation and policy enable residential flexibility alone to the energy system⁵. The fixing of residual charges has the potential to significantly dampen flexibility markets, especially with the misalignment of the residual element from the forward looking incentives reform.

Furthermore, the harmful distortion created by moving the goalposts for homes, businesses or community energy schemes (including those on schools, churches and hospitals) that have a lower energy consumption as a result of investments in energy efficiency measures or onsite generation has not been adequately assessed. The impacts highlighted within the consultation for businesses with onsite generation were as much as a fivefold increase residual charges – An extraordinary increase for those customers least able to absorb this additional cost, and least able to participate in this complex and inaccessible review process.

- **Fairness:**

This point is also intrinsically linked to the fairness principle Ofgem prioritises. We question the assessment that fixed charges are 'very justified' due to how 'charges are set based on actual usage'. This is inherently inaccurate, as the lowest-consuming households will pay the same as the most profligate consumers within their segment. Furthermore, an energy-inefficient, intensive high-using domestic user and a low-using commercial with the same consumption band will pay unreasonably different residual charges, as a consequence of the proposed arbitrary segmentation approach. It is also apparent that the fairness assessment is disjointed from the actual results Ofgem reported. It is telling that the consumer focus groups identified 'generally perceived the current methodology, whereby residual charges are levied mostly on volumes, to be fair' with 'the majority of panellists thought that the users should continue to pay for what they used, and that this was the 'fairest' method in which to pay for the network'. Yet despite this, Ofgem's own assessment concludes that fixing residual charges is the 'fairest option on balance'. This seems in total contradiction to their overarching concern of protecting the interests of current and future consumers.

- **Proportionality:**

Ofgem's long-term savings of £2 has clearly not been considered appropriately against the impacts the proposed changes will have on network users. The moderate £8 savings of the 'median' domestic user is completely disproportionate to the savings made by the most profligate energy users and the costs to those who consume the least.

⁵ The Carbon Trust/Imperial College London: *An analysis of electricity system flexibility for Great Britain* (November 2016) – Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/568982/An_analysis_of_electricity_flexibility_for_Great_Britain.pdf

- **Baseline Assessment:**

Furthermore, no assessment is given to the baseline scenario of how the current charges are levied, meaning evaluations of simplicity, transparency, justifiability, equity and equality and predictability all fail to compare this to the current charging arrangements, which customers themselves demonstrably consider to be fair and appropriate.

- 3. For each user, residual charges are currently based on the costs of the voltage level of the network to which a user is connected and the higher voltage levels of the network, but not from the lower voltage levels below the user's connection. At this stage, we are not proposing changes to this aspect of the current arrangements. Are there other approaches that would better meet our TCR principles reducing harmful distortions, fairness and proportionality and practicality considerations?**

Continuing this arrangement without full consideration and analysis of the impact that this arrangement has is short-sighted. The notion that those connected to the lower-voltage networks are reliant on the higher voltage networks and as such should pay for both is completely arbitrary – Nearly 30% of the total electricity transported by higher-voltage network infrastructure is ultimately consumed by lowest-voltage domestic end users.⁶ The system is far too complex and interlinked for these overtly simplistic distinctions, and as such we would support analysis being provided into the effects on consumer bills on how this arrangement is currently levied and whether different approaches would reflect user costs more accurately.

- 4. We think we should prioritise equality within charging segments and equity across all segments.**

- a. Do you agree that it is fair for all users in the same segment to pay the same charge?**

We concur with the view of Ofgem's consumer focus groups that the charge that customers should face should reflect their use of the networks. As such, it is not fair for all users in the same segment to pay the same charges. The redistribution of residual charges in this manner would benefit the most energy-intensive users (potentially at times of grid constraint during peak hours) of the network at the expense of those who reduce their consumption by way of necessity (fuel poverty), energy efficiency measures, or onsite generation. Further to this, the costs this will bring to the lowest users of the network (~£22/annum) are far more significant than the savings to the 'median' user (£8/year). This inequity is far greater for commercial customers.

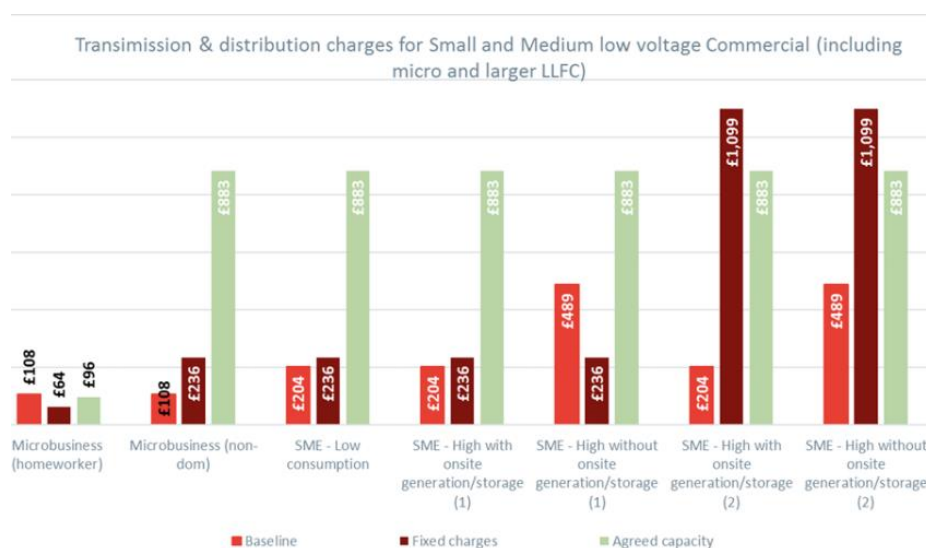
Ofgem's dismissal of intra-group variance (which in some circumstances will exceed inter-group variance) highlights the lack of attention given to both social realities and the overall diversification of the energy system, including the increasing electrification of transport and in future heat. Whilst some in vulnerable situations will out of necessity require high consumption use (for instance, for those with electrical medical equipment) and there are strong arguments in favour of these individuals not incurring excessively high energy (including network) costs, it is far beyond the remit of Ofgem as the energy regulator to conduct social policy interventions that are the responsibility of Government. It is vital that a mistaken concept of equality is not prioritised over equity within charging segments, as this would mean that vast variations within these groups would be ignored.

⁶ BEIS: National Statistics – Energy Trends – Electricity (31 Jan. 2019) – Available from: <https://www.gov.uk/government/statistics/electricity-section-5-energy-trends>

a. Do you agree with the manner in which we have set the segments? If not, do you know of another approach with available data, which would address this issue?

This proposal is not reflective of the purpose of LLFCs, ‘which are used to scale energy consumed or generated to account for losses on the UK’s Distribution Networks’⁷. Considering the extent of this review, it is unclear why Ofgem have dismissed the possibility of creating fit-for-purpose network charging segments in favour of an ill-suited existing approach. The inappropriateness of LLFC segmentation is apparent from the fact that there are already multiple LLFCID per LLFC, in order to correspond with DNOs’ numerous tariffs.

The graph below highlights how the arbitrarily application of LLFC to commercial customers falling into Class 2 compared to Class 1 could result in roughly a twofold increase in residual charging. This effect is exacerbated if the business has installed onsite generation where the distinction between LLFC1 and 2 is nearer a fivefold increase. This is an egregious result for businesses who proactively installed on-site generation or energy-saving technology to mitigate their impact on the grid as well as their own energy consumption, to the benefit of those without the same inclination. It is only *fair* that commercial customer who have higher impact on the grid from increased consumption and thus contribute more to the overall grid costs have this reflected in their residual charges. Beyond the LLFC1 and LLFC2 distinction it is unclear how LLFC will be used to determine charges or the basis upon which LLFC are assigned to a customer.



Regarding Agreed Capacity, the proposed bandings and charges for different types of domestic customer is similarly ill-suited. The 10% EV and heat pumps banding is unrealistic, considering the government’s 2040 EV deployment targets. The categorisation of specific technologies is also queried as failing to be future-proofed as well as being detrimental to flexibility. As the current Access and Forward Looking charges do not incentivise consumption and peak-shaving behaviour from domestic household on a wide basis (there are currently just two Time-of-Use tariffs, introduced only recently) it holds that domestic users should be excluded from implementation.

⁷ ELEXON: Line Loss Factors – Available from: <https://www.elexon.co.uk/operations-settlement/losses/>

Consequently, segmentation is an inappropriate method to determine the level of network charging. This is both in terms of the preferred manner as well as the premise of determining network charging solely by the segment you are attributed to, with no consideration of usage.

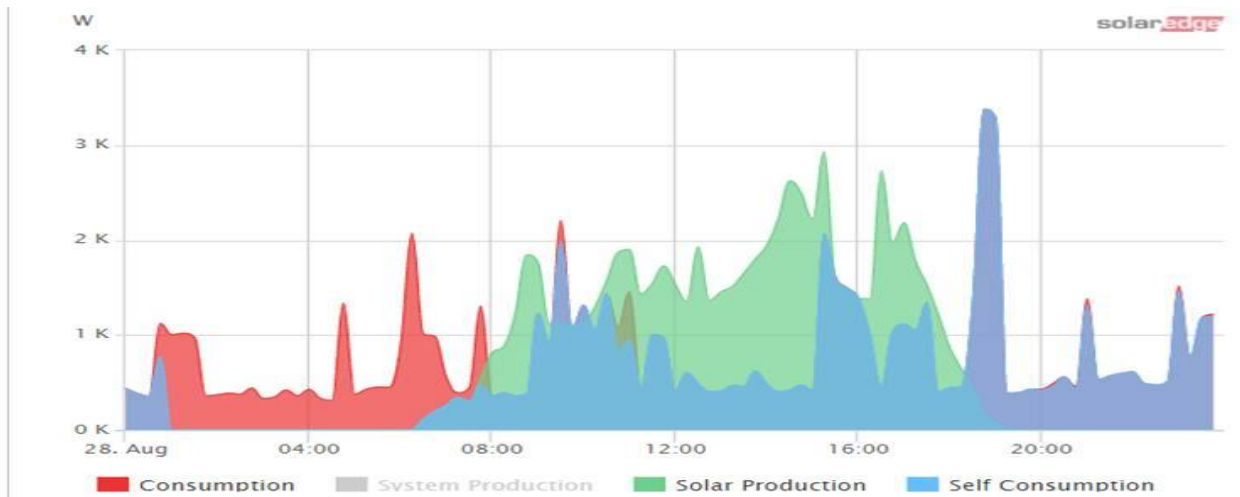
5. Do you agree that similar customers with and without onsite generation should pay the same residual charges? Should both types of users face the same residual charge for their LLFC?

- **Definition of ‘similar’**

As indicated above, the arbitrary assigning of LLFC to network users is an inappropriate way to determine customer similarity. ‘Similarity’ of customers should only be defined based on consumption and network usage. Whilst the proposed changes would allow for those with onsite generation and those without to pay the same, it also allows for those with the lowest consumption through either the necessity of fuel poverty or proactive investment in energy efficiency and onsite generation to pay the same as the highest energy-consuming households (including those with extremely large houses and energy-intensive technologies such as electric hot tubs or, as the consultation paper highlights, EVs and heat pumps).

- **Onsite Generation as a Distorter**

This question also, without any evidence provided, indicates that onsite generation is a main distorter of residual charges. It is acknowledged that onsite generation such as solar can reduce a customer’s consumption as well as exporting surplus electricity in ways that customers without cannot. It is agreed that residual charges should not be avoided completely when customers remain reliant on the grid. However, we question the statement ‘that network users reduce their usage and/or run on-site generation, which is not justified by the savings in marginal system costs’. This has no evidence provided to indicate its validity. In terms of solar co-located with storage, the figure below demonstrates how this arrangement does not draw from the grid during peak demand – a clear benefit to the system. A full evaluation of solar and solar-plus-storage owners is required to justify these extraordinary claims regarding supposedly inefficient avoidance of network usage.



Above: Typical daily electricity demand profile of a real GB household with rooftop solar and a battery storage system - Import from the grid is shown in red, PV generation in green, and consumption from storage in purple – Source: Solar Edge Technologies (UK) 2018

For households, the export of surplus onsite generation onto the grid is totally insignificant compared to other constraints possible from household electrical appliances – the electrification of heat and transport is again relevant here. Additionally, the impact of larger, commercial systems is also already being managed by the networks through the use of ‘export limiters’, which are regularly required before connections applications are approved, often with limitations to the generation capacity installed as well.

- **Consumer Focus Groups**

The consumer focus groups conducted by [Revealing Realities](#) on behalf of Ofgem covers onsite generation. The research into opinions on how solar owners should be charged for residual costs elicited a number of quotes. Two provided in support of charging according to network use were medium users, whereas the quote given in support of fixed citing ‘if they can afford the panels they can afford the network charge’, comes from a high user who would directly benefit from a fixed charge. This misconception that low-consumption users are wealthy solar owners ignores the reality that nearly 65% of FIT-accredited PV capacity is installed on schools, social housing rooftops, or other local council properties.

- **Onsite Generation Types**

There is a further consideration within this question regarding the differentiation between renewable and non-renewable forms of onsite generation. At a time where grid decarbonisation is imperative it is important that polluting and inefficient onsite generation be discouraged. However, there are far more efficient ways to ensure that (for instance) diesel generators are not incentivised to be installed than through network charges, for example through a carbon tax or local air quality control, and we would therefore consider network charging to be an inappropriate tool to achieve this objective.

6. Do you know of any reasons why the expected consumer benefits from our leading options might not materialise?

The following five reasons highlight unconsidered factors that could contribute to the consumer benefits from the leading options not materialising:

- **Flexibility Disincentive**

The consultation does not consider what the impact that the fixing of one element of intra-day price signals could be, at a time when forward-looking charges do not incentivise significant amounts of flexibility behaviour, and when there is no clarity on future forward-looking charging arrangements. The TCR documentation omits any analysis of the impacts of these proposed reforms to residual charging in terms of increases to peak electricity demand, and less flexibility-incentivised behaviour.

- **Unrealistic Half-Hourly Profile**

The graphs demonstrating the lower residual costs that domestic solar and storage customers benefit from include a reduced TNUOS charge, indicating a monetary benefit from avoiding charges during evening peaks. This benefit could only materialise for domestic customers who are half-hourly settled, an option which is far from universally available and far from certain at a whole-system level, as the smart meter rollout continues to lag far behind schedule. Thus, some of the savings from which homeowners with solar and storage are meant to benefit, which are allegedly passed on as costs to the rest of the population, are could be far less significant than is suggested in the TCR documentation.

- **Supplier Cost Uncertainty**

As there does not appear to have been any formal evaluation of the costs of implementing the “minded-to” position, it is uncertain whether suppliers will pass through the residual charges in the way expected by Ofgem, or what the costs of this will be. It is unclear whether supplier systems for billing and reconciliation will be significantly affected by these changes, particularly with Half-Hourly settlement being introduced in the near future. This is even more salient at a time of supplier instability, as evidenced by the 10 energy suppliers that have failed since January 2018 at a combined cost to consumers of £171 million over the past year. The decision to not evaluate what the implementation costs of changing network charges (which suppliers would pass on to customer) could be further undermine the likelihood promised consumer benefits materialising, particularly given how marginal the £2-per-household average savings would be.

- **Underlying Data**

It is deeply concerning that Frontier Economics appear to have relied upon the ‘Customer-led Network Revolution’ (CLNR) research (2010 -2014) as a major data source for this Impact Assessment. In addition to being worryingly outdated, the consumption and generation electricity profiles in the dataset did not specify sizes of installation for PV users other than that the trial group on average exported 1.3 kW at midday, indicating that system sizes evaluated are approximately 50% smaller than the average FIT capacity for domestic PV installations. Additionally, storage technologies were not covered in this research aside from those associated with heat, with the single Tesla battery (13.5kWh) Frontier opted to consider extremely unlikely to be reflective

of an average domestic storage users.⁸ There are similar concerns with the underlying data for the commercial analysis (of which there is far greater variation in size and consumption profiles)⁹: “Many had installed at least one energy efficiency measure. Most popular were double-glazing (43%), loft insulation (28%) and cavity wall insulation (11%). **Only two trial participants had installed micro-generation - solar panels.**” It is questioned whether limited datasets from 2013 are appropriate to formalise significant policy decisions, especially when the technologies in question have evolved immensely over the intervening five years.

- **Assumptions:**

The assumptions the analysis is based upon are too limited. For instance, “We also note that all the LCTs are subsidised currently, and if the subsidy adjusts to maintain the current relativity with alternate technologies, then the customer will not necessarily see any impact of a change in network charges”. Firstly, the UK leads the European Union in subsidising fossil fuels, with £10.5 billion in taxpayer funding provided each year. The framing that it is only low carbon technologies in receipt of subsidies is egregiously misleading. Further to this, large-scale solar has been entirely subsidy-free since 31 March 2017, due to its ongoing exclusion from the CfD and Capacity Market mechanism that other generation technologies receive. Small-scale solar will similarly be fully subsidy free as of 1 April 2019. Before any implementation commences an analysis into how these changes may affect future market behaviour and structures, including investment in onsite low carbon technology, should be undertaken.

The modelling undertaken by Frontier Economics is based on the generation capacities set out in National Grid’s Future Energy Scenarios, with the assumption that “non-CM build (e.g., most renewable generation that is supported through other subsidy schemes) is held constant across the scenarios considered.” The authors further acknowledge that they “do not take into account the effect that future changes to the market structure may have on the behaviour of market participants.” Either of these proposed reforms would represent a profound structural change to the market, to the extent that any future build-out of unsubsidised renewables, and the attendant impact on system carbon intensity and wholesale prices this would entail, would therefore be in significant doubt. In terms of the supposed consumer benefits achieved under these reform scenarios, the apparent omission of the extent to which suppliers will have already procured electricity for 2020-21 delivery would seem to greatly undermine confidence in any conclusions regarding the need to implement reform in 2020, to say nothing of the overall probability that any consumer benefits whatsoever will materialise.

- **Incomplete Academic Review**

Finally, the academic literature review appears to have been far from holistic, meaning Ofgem’s conclusion that ‘Our recent review of the academic literature also strongly supports not using net volumetric charges as the primary means to recover residual charges’ is of highly dubious validity. Nor does it follow that as other energy systems have increased fixed charging elements of residual charging, this is necessarily a fair and appropriate direction for reform in GB. In particular, it is important to take note of the recent report from the Regulatory

⁸ European Market Monitor on Energy Storage suggests the UK market is strongly tied to domestic PV installations, of which the average size is <4KW – Available from: <https://www.delta-ee.com/EMMES>

⁹ <http://www.networkrevolution.co.uk/wp-content/uploads/2015/01/CLNR-L247-Developing-the-smarter-grid-the-role-of-industrial-and-commercial-and-distributed-generation-customers-2901.pdf>

Assistance Project (RAP) on 'Cleaner, Smarter, Cheaper: Network tariff design for a smart future' which was not included in the academic review¹⁰. The authors conclude that not only will fixed rates 'promote consumption at times of stress on the grid and overconsumption generally', but that this will result 'in increased costs for all by driving excessive investment in underutilised grid infrastructure'. Furthermore, the review of other countries' moves to fixed/agreed capacity is similarly incomplete and inadequate. For instance, Ofgem notes the Netherlands' move to adopt Agreed Capacity Charges yet fails to mention that when they 'changed their network tariffs from volumetric to completely fixed (capacity-based) charges, the government increased the imposed tax per unit of consumption, thus sharpening the signal to consumers through energy taxation in order to counter the effect'¹¹. This paper also echoes the equity concerns highlighted in this response - 'A uniform fixed tariff tends to shift costs from the high-usage customers in a customer class to the low-usage ones. This is evident for example in Germany, where low-usage customers in the same distribution territory can pay up to two and a half times as much per unit of energy delivered to their premises compared to high-usage consumers, as is evident in five of the six distribution areas', with the final area receiving equitable charging due to not applying fixed charges for shared infrastructure.

Given the evident reliance by Ofgem upon this Impact Assessment as justification for these proposed reforms to Embedded Benefits, we must question whether the commissioning and interpretation of this analysis are in compliance with *The Aqua Book: guidance on producing quality analysis for government* (2015), notably section 5.17 (Communicating Uncertainty), which compels commissioners of analysis to be "open about the existence of any deep uncertainties whose impact cannot be assessed, and explain how they are managing those uncertainties" and cautions against "implying unwarranted confidence in particular outcomes."¹²

¹⁰ Kolokathis, Christos, Michael Hogan, and Andreas Jahn: "Cleaner, Smarter, Cheaper: Network tariff design for a smart future" – Regulatory Assistance Project (19 January 2018) – Available from: <https://www.raponline.org/knowledge-center/cleaner-smarter-cheaper-network-tariff-design-for-a-smart-future/>

¹¹ Ibid

¹² P. 31 – HM Treasury: *The Aqua Book - guidance on producing quality analysis for government* (March 2015) – Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/416478/aqua_book_final_web.pdf

7. Do you agree that our leading options will be more practical to implement than our other options?

In theory, fixing network costs could be practical, purely from an implementation standpoint. In practice, the costs and procedural issues that could arise from this change should be evaluated before the decision is made. The option of 'Business as Usual' is notably absent from the analysis, and it is clear that this approach would obviously surpass any of the leading options in terms of practicality and ease of implementation. Whether "practicality" should be such a consequential factor for this decision on network charging reform is also questionable.

8. Do you agree with the approaches set out for banding (either LLFC or demanding for agreed capacity)? If not please provide evidence as why different approaches to banding would better facilitate the TCR principles

See response to 4.

9. Do you agree that LLFC are a sensible way to segment residual charges? If not, are there other existing classifications that should be considered in more detail.

See response to 4.

Section 5 – "Quantifying the benefits of reform"

10. Do you agree with the conclusions we have drawn from the assessment?

See response to 15.

Section 6 – “Remaining Embedded Benefits”

11. Do you agree with our proposed approach to the reform of the remaining non-locational Embedded Benefits?

We agree that there may be merit in exploring whether and to what extent remaining non-locational Embedded Benefits could be improved. However, we strongly disagree with the proposed approach to reform. We have the following fundamental concerns with the approach, and with the underlying justification for it:

- **Significant limitations of the modelling methodology cast doubt upon any conclusions, to the extent that it is highly questionable whether and to what extent any of the purported consumer benefits of reform would be realised**

As stated in response to Q. 6, the modelling undertaken by Frontier Economics is based on the generation capacities set out in National Grid’s Future Energy Scenarios, with the assumption that “non-CM build (e.g., most renewable generation that is supported through other subsidy schemes) is held constant across the scenarios considered”¹³. The authors further acknowledge that they “do not take into account the effect that future changes to the market structure may have on the behaviour of market participants.” Either of these proposed reforms would represent a profound structural change to the market, to the extent that any future build-out of unsubsidised renewables, and the attendant impact on system carbon intensity and wholesale prices this would entail, would therefore be in significant doubt. In terms of the supposed consumer benefits achieved under these reform scenarios, the apparent omission of the extent to which suppliers will have already procured electricity for 2020-21 delivery would seem to greatly undermine confidence in any conclusions regarding the need to implement reform in 2020, to say nothing of the overall probability that any consumer benefits whatsoever will materialise.

Frontier Economics preface the Impact Assessment document with the caveat that “quantitative modelling should not be the sole (or in many cases even principal) basis for determining whether particular modifications to a charging regime are appropriate, and that a qualitative assessment against clear criteria is of critical importance.” This would seem a commonplace and uncontroversial statement, were it not for the fact that Ofgem repeatedly quote these modelled figures for overall system and cost savings throughout the TCR consultation document explicitly as justification for the proposed reforms, at no point acknowledging the limitations Frontier’s analysis. It is clear that from the perspective of Frontier Economics, this entire modelling exercise was conducted as an addendum to an economic principles-based reform proposal. Conversely, the TCR consultation document seems to misleadingly suggest that the reforms are driven by the quantitative evidence itself as opposed to principle.

Given the evident reliance by Ofgem upon this Impact Assessment as justification for these proposed reforms to Embedded Benefits, we must question whether the commissioning and interpretation of this analysis are in compliance with *The Aqua Book: guidance on producing quality analysis for government* (2015), notably section

¹³ P. 6 - Frontier Economics: Wider System Impacts of TGR and BSUOS Reform (November 2018) – Available from: https://www.ofgem.gov.uk/system/files/docs/2018/11/wider_system_impacts_of_tgr_and_bsuos_reforms.pdf

5.17 (*Communicating Uncertainty*), which compels commissioners of analysis to be “open about the existence of any deep uncertainties whose impact cannot be assessed, and explain how they are managing those uncertainties” and cautions against “implying unwarranted confidence in particular outcomes.”¹⁴

- **This process is inadequately coordinated with the parallel Network Access and Forward-Looking Charges (NAFC) review process**

Within the NAFC process, the dedicated multi-stakeholder BSUOS Task Force are presently reviewing the extent to which BSUOS and elements thereof are cost-reflective, and thus how the charge can be adapted to better reflect its impact on network user behaviour. It is troubling that the work of this Task Force will apparently conclude mere weeks before a decision is due on TCR reform. If the group were to recommend substantive structural reform to the BSUOS charge itself such that major elements of it be made more reflective of the behaviours of individual network users, and that the residual aspect should be significantly reduced, this will obviously have a meaningful impact on the simplicity, fairness and proportionality of the charge recovery approach to be determined through the TCR.

It is worth noting that, by virtue of the alignment of its generation profile with system demand, solar PV has been correlated with a lower BSUoS price¹⁵. Until the work of the Task Force has concluded and the impacts of different DER output on individual constraint costs and other constituent elements of BSUoS are better understood, it would be unreasonable and quite possibly counterproductive in terms of (dis)incentivising future investment decisions in new capacity deployment through indiscriminate application of the BSUoS charge.

- **These reforms are premised on a fundamental misunderstanding of Transmission-connected generation and DER, and Transmission and Distribution networks themselves, as being equivalent**

More broadly, the NAFC review process will address key questions on the cost-reflectivity of the current connection charging boundary. This is specifically relevant to solar in that, as is noted in Ofgem’s *Getting more out of our electricity networks by reforming access and forward-looking charging arrangements* (July 2018) document, moving to a shallower connection charging boundary at distribution could reduce barriers to entry for those wanting to connect to the distribution network, as it would mean that new connections would no longer principally bear the costs of any reinforcement:

“Users with less firm rights should generally face lower charges. This currently occurs via reduced connection charges at distribution but could also be reflected via reduced UoS charges. We would need to give greater consideration to how this could be signalled via UoS charges if we moved to a shallower distribution connection charging boundary, because it could no longer be signalled via a reduction in connection charges”

¹⁴ P. 31 – HM Treasury: *The Aqua Book - guidance on producing quality analysis for government* (March 2015) – Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/416478/aqua_book_final_web.pdf

¹⁵ Michael Joos, Iain Staffell, *Short-term integration costs of variable renewable energy: Wind curtailment and balancing in Britain and Germany*, Renewable and Sustainable Energy Reviews, Volume 86, 2018, Pages 45-65, ISSN 1364-0321, <https://www.sciencedirect.com/science/article/pii/S1364032118300091>

It seems essentially backward to put forward and possibly implement these transformative structural reforms to how BSUoS is collected potentially years before any determinations on the future structure of the connection boundary and the UoS-vs.-Connection charging arrangement have been made. If more flexible/less firm connection arrangements are to be made available to DER as an outcome of the NAFC review process, and that this generation would conceivably be even more susceptible to curtailment, then according to any principle of fairness and proportionately this ought to figure into a determination of which party should pay BSUoS in the first instance.

DER and transmission-connected generation are substantively different, and this distinction is particularly salient in the case of weather-dependent (non-dispatchable) DER. We recognise that the significant underestimation on the part of Ofgem and the ESO/DNOs of the growth in the volume of DER over the decade, and weather-dependent renewables in particular, has created challenges in terms of grid management. However, it is essential that these challenges be framed in the context of the fundamental and ineluctable distinctions between Transmission and Distribution-level connection and usage charging.

There is currently no correlation between the costs of managing the Transmission network and the costs of managing the Distribution network in terms of how users themselves pay for these pieces of infrastructure. At present, the costs of Transmission network constraints and reinforcement are mainly socialised through TNUoS and BSUoS, on the basis that the network itself is a public good, and the fact it would be impractical for any individual party to fund infrastructure reinforcement themselves. Meanwhile, the costs of Distribution network reinforcement and balancing (i.e. generation constraint) are absorbed by individual generators themselves.

It is important to emphasise that large-scale solar generation, which constitutes a plurality of total DER capacity¹⁶, can be curtailed at any time both for network infrastructure maintenance and repairs and as part of normal grid balancing operations without any compensation whatsoever for curtailment. Effectively, large-scale solar currently functions as a source of flexibility at zero cost to transmission-connected generation, with losses being absorbed by owners of these generation assets. Our members estimate that outages due to repairs, regular maintenance or balancing activity at the Transmission network level already cost them between 0.5 - 1% of maximum potential output each year in foregone generation.

Furthermore, it is important to note that solar and other DER does not currently benefit from the same status as Transmission-connected generation in being able to participate in balancing/ancillary services markets. Flexible solar PV plant operation, enabled by next-generation smart inverter technology, has only recently emerged as a practical option for grid balancing operations, and solar has of course historically been inherently excluded from these markets. Whilst this is gradually beginning to change, and we are heartened for example by National Grid ESO's recent launch of a dedicated "DER Desk" for coordinating smaller-scale flexibility, the reality is that we remain a long way off from equivalent operation of Transmission- and Distribution-connected generation assets. It is therefore deeply troubling that, despite the fact that despite solar PV's persistent disadvantages relative to Transmission-connected generation, it is possible that owners of PV asset generation would be forced to bear the cost of balancing the Transmission system.

¹⁶ National Grid Future Energy Scenarios (2018) – Available from: <http://fes.nationalgrid.com/media/1373/crib-sheet-v6.pdf>

Rather than “levelling the playing field” by removing a distortion, the proposal to charge BSUoS to DER would in fact exacerbate existing inequities in the market. It is fair and reasonable that under the current framework, those parties who enjoy the greatest benefit in terms of their firm connection to the Transmission network ought to bear a higher share of the cost for maintaining that infrastructure.

- **These reforms will have an extremely detrimental impact on deployment of renewable DER going forward, to the extent that they run counter to the Government’s stated objectives on clean growth and climate change**

It cannot be overstated that Full BSUOS reform would represent a net loss per MWh of approximately 10% of the PV capture price. As the TCR documentation acknowledges, it is existing ROC-accredited sites that will bear the full impact of these reforms – As these sites constitute at least 95% of existing large-scale PV capacity it is not difficult to see that this will have a profound impact on the viability of existing sites, and will lead to extraordinary losses across the sector, and ultimately bankruptcies and significant job losses. Based on our analysis of levelised cost forecasts for GB large-scale PV, the economic viability of potential new-build sites will be undermined to the extent that deployment of unsubsidised/fully merchant PV would be delayed by at least 3-5 years purely as a result of BSUOS reform. As solar is likely to be by far the most affordable renewable generation technology in many cases across GB, this undermining of the viability of the PV industry will have profound implications for decarbonisation at lowest cost to consumers.

12. Do you agree with our proposal not to address any other remaining Embedded Benefits at this stage? Which of the embedded benefits do you think should be removed as outlined in xx? Please state your reasoning and provide evidence to support your answer.

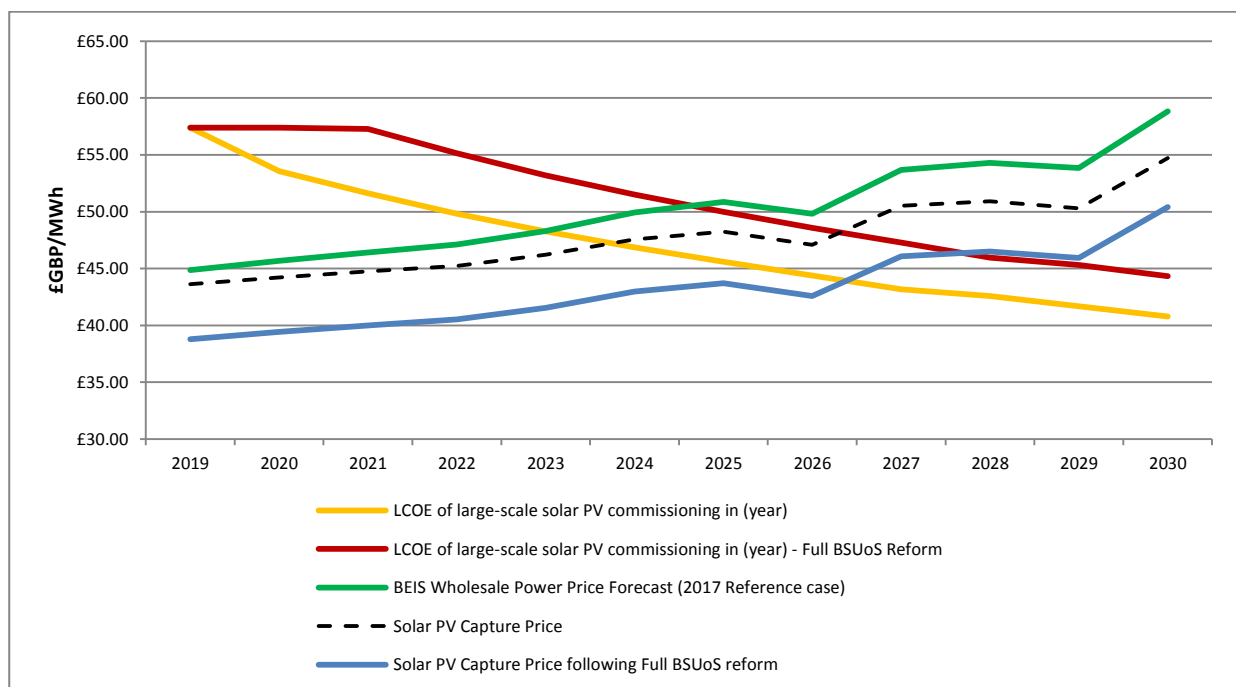
Yes. Given the low values at stake, we do not foresee any risk of market distortions arising from maintaining the Assistance for Areas with High Electricity Distribution Charges (AAHEDC) in the current form. As the net Residual Cash flow Reallocation Cash flow (RCRC) payment has tended to average approximately zero, we would not consider it to be a significant Embedded Benefit.

13. Are there any reasons we have not included that mean that the remaining Embedded Benefits should be maintained?

The TCR proposes either:

- a) TGR & partial BSUoS reform: TGR reform and removing the ability of smaller embedded generators to receive payments from reducing suppliers' contributions to BSUoS charges; or
- b) TGR & full BSUoS reform: TGR reform, removing the BSUoS payments, and requiring smaller embedded generators to pay BSUoS charges.

The arrangements under which our members may or may not currently be in receipt of BSUoS Avoidance Benefits represent a fair reflection of both the costs and benefits that DER places upon existing network infrastructure in terms of alleviated demand. Whilst variable renewable generation may at times require more active management than would conventional thermal generation, it bears repeating that solar generators already absorb the cost of this variability management in terms of uncompensated curtailment, exclusion from ancillary services markets, and the fact that they already receive a Capture Price below the average Wholesale price. This is a consequence of the currently inadequate capacity for the network to absorb weather-dependent generation at the volumes needed to attain the UK's legally-binding emissions reduction targets, and is significant liability for owners of unsubsidised renewables. This differential between Capture and Wholesale prices is expected to increase as increasing volumes of weather-dependent renewables are brought onto the system (See below).



The Impact of “Full” BSUoS reform on economic viability of fully unsubsidised large-scale solar PV: A further net loss of approximately £2.50/MWh in addition to the existing discount relative to the prevailing average Wholesale Price will severely impact project bankability, leading to higher financing costs and therefore higher LCOE

We do not consider either option a) or b) to be justified or proportionate, and have significant concerns with the Embedded Benefit review process itself and underlying modelling methodology. However, for the reasons set out in the response to (11.), it would be egregious for DER below 100MW and for variable renewable generation in particular, to bear the full cost of balancing the Transmission system whilst remaining excluded from the full benefits available to Transmission-connected generation.

Full BSUoS reform would not only impose an additional net per-MWh cost on DER generators of £4-5, but it would jeopardise the ability of solar PV developers in particular to obtain debt financing for new unsubsidised PV projects, increasing the average cost of financing and therefore the economic viability of unsubsidised PV. This effect on lifetime project LCOE is represented in the preceding graph. Moreover, unlike offshore wind, both solar and onshore wind remain completely excluded from future CfD auction rounds and therefore denied this critical price-floor protection – A detail which was notably overlooked in the Frontier Economics Impact Assessment. As the CfD mechanism is currently under review by BEIS, it is clear that any assumptions as to solar PV's future inclusion in the scheme would be premature. If, on the other hand, this omission is meant to suggest that solar PV and onshore wind generators would be expected to simply absorb the wholesale price impacts of Full BSUoS reform in terms of reducing the relative marginal cost differential compared to thermal generation, then this would call into question Ofgem's purported commitment to technology neutrality.

14. Do you agree with our proposed approach to transitional arrangements for reforms to:

a) Transmission and distribution residual charges

We fundamentally disagree with the proposed approach to transitional arrangements for transmission and residual charges. Changes to Transmission and Distribution residual charges should be aligned to changes to the access and forward-looking charges. This is of the utmost importance for the maintenance of market stability during the current climate of regulatory uncertainty, and the piecemeal approach to reform that Ofgem appear to be undertaking risks undermining the economic viability of new and existing projects. It is being proposed that residual charges should change on the basis of an unjustified assumption that access and forward-looking charges will be cost-reflective and appropriately incentivise flexibility and reduced consumption. This introduces extraordinary uncertainty across our entire sector, heightened by the decision not to include environmental concerns as a core principle within the Access and Forward Looking SCR. The alignment is also important for understanding charging implications on the achievement of other policy ambitions including BEIS' Smart Systems and Flexibility Plan, wider industrial strategy, and the achievement of the UK legally-binding reduction targets.

b) non-locational Embedded Benefits? Please provide evidence to indicate why different arrangements would be more appropriate.

Implementation of full or even partial reform to these embedded benefits would be extremely disruptive to our industry under any transitional arrangement. As industry has not received any advance notice that these reforms could take place, investment decisions across the sector have already been made based on the (evidently incorrect) assumption that some modicum of regulatory stability could be relied upon. As is rightly noted in the consultation document, a significant proportion of electricity for delivery in 2020-21 will have already been procured by suppliers, which would clearly negate a significant proportion of any supposed consumer benefits arising from early implementation. Again, it does not appear that this reality was at all reflected in Frontier Economics' modelling of embedded reform impacts.

In the regrettable event that Partial BSUoS reform is brought forward, we would strongly recommend that a more gradually phased approach be taken than that which is suggested in the TCR document, and see no compelling reason why implementation should begin before 2023, concurrent with implementation of outcomes from the NAFC review process as well as the introduction of the RIIO-ED2 price controls. The stated rationale for bringing forward these reforms as early as possible in order to maximise the supposed consumer savings that would result is a testament to the fragility of the evidence for any consumer or system benefit whatsoever.

15. Do you agree with our minded to decision set out? If not please state your reasoning and provide evidence to support your answer.

Specific impacts of proposed reforms to residual charges:

We take issue with the proposed reforms to residual charging on the following basis:

- The positions contradict both Ofgem's own principles as well as broader Government policy objectives
- There are egregious flaws in the modelling methodology and underlying assumptions
- The results of the consumer focus group, behavioural results, academic review, impact on investment and energy efficiency clearly do not justify Ofgem's minded-to position
- The position is profoundly misaligned with other policies including the Smart Systems and Flexibility Plan, industrial strategy, Clean Growth Strategy, and other Government priorities regarding innovation and manufacturing, as well as the Government's own legally-binding emissions-reduction targets
- **Contradiction of Ofgem principles**

With regard to Ofgem's stated commitment to fairness, we are concerned by the disproportionate impact these changes would have on the least energy-consuming and most vulnerable households and small businesses. Ofgem's principles also include the argument that a cost is fairer if it is more predictable, leading to a favouring of fixed or capacity based charges – There are many possible routes to "Predictability", including through improved knowledge of user consumption patterns (facilitated through the roll-out of smart meters and IHDs); secondly costs that unfairly impact customers do not automatically become "fairer" based on their continuation.

The disproportionate impact on users is apparent within the consultation itself. The £2 long-term saving as well as the £8 savings for median users is evidently unbalanced to the £60 possible savings from the highest domestic users alongside the ~£20 a year costs for lower users. Even in London, where the residual is negative, there would still be a £7 cost to low and median consumption as a result of these reforms. The redistribution of benefits and costs resulting from this reform are in direct contradiction to the protection of those who need it most; this is most clearly identified through how 'for a typical fuel-poor user with a low household income of less than £15k per annum, our Fixed option leads to bill increases of around £5 a year.'

As such, the principle of protection needs a more holistic approach, accounting for the broader policy context including the price cap and wholesale-driven supplier price increases that will soon lead to the increase thereof. Through these TCR reforms, households intentionally lowering their consumption as a result of a smart meter (the roll-out of which was posited on helping customers to identify situations where they're using a lot of energy), out of necessity, through energy efficient measures or onsite generation installed themselves or by landlords providing these measures to tenants all lose out. The results of the modelling indicate that domestic median customers pay £72 comparatively to £47 for customers with solar - indicating a £25 yearly residual benefit. EV's comparatively benefit by £30 from the fixed charges. This means proactive consumers who install solar to mitigate their high consumption from EVs all but lose this incentive from the residual charge.

It is also worth emphasising the extent to which this extremely complex and opaque consultation process excludes the stakeholders who will be most exposed to change, including vulnerable households.

Flawed and inadequate quantitative analysis

As has been stated elsewhere in this response document, the quantitative analysis that is heavily relied upon to justify the minded-to positions is not only flawed but is given too much weight in determining the consultations outcome.

- **Results (behavioural results, academic review, impact on investment and energy efficiency):**

This response has already highlighted the opposing findings of the consumer focus groups, which reported that consumers were ‘generally accepting of the current system for allocating network costs. Whilst they understood the rationale for a standardised charging system, most felt that volumetric charging offers is the fairest option for the most people’. The behavioural results reported in the Frontier analysis are also queried. Solar and storage are already marginal investments which have been significantly damaged by policy instability (including the end of the feed-in tariff and business rates). The graphic below highlights how a small business and warehouse would be affected by the previous business rates changes. The behavioural analysis on whether investment would be affected by changes to residual charges is void of any holistic consideration of the uncertainty these technologies already face. It is likely the Warehouse example would fall into LLFC2 of the proposed changes, resulting in an increase ~£800 residual charge, on top of the additional £5,000 in business rates already deterring some projects.



Considering this, the judgement made in Frontier’s paper that ‘fashion and branding e.g. prestige associated with being an early adopter’¹⁷ is more important than economics driving customer behaviour is outlandish, particularly when the results themselves indicate ‘the impact on the lifetime cost could be up to 15%’ for solar. We concur with the statement that ‘the area with the greatest potential for impact relates to solar, suggesting there could be value in considering a sensitivity in the wider system analysis for a small slow-down in solar take-up’ and urge Ofgem to commission and review this analysis before proceeding further with any proposed residual charging reform.

¹⁷ https://www.ofgem.gov.uk/system/files/docs/2018/11/distributional_and_wider_system_impacts_of_reform_to_residual_charges.pdf

- **Misalignment with Policy**

- The **Smart Systems and Flexibility Plan** emphasises Time-of-Yse tariffs as well as demand side response as critically important steps toward enabling a smarter, flexible and decarbonised energy system. Fixing the residual element will reduce the economic signals able to be sent to customers, especially as it is suggested for residual and access forward looking charges to be recovered 50% each. This is in direct opposition to the Plan, as well as parallel industry-led efforts (including through initiatives such as Flexibility First).
- **Innovation:** Solar is now a mature industry, meaning that those with these assets are looking for new revenue streams to maximise productivity. This extends beyond DSR to cutting-edge innovation such as P2P trading, which could be similarly affected by the proposed dampening of signals able to be sent to customers. In the context of an energy system in which innovation is severely constrained by a complex, onerous and uncertain regulatory framework, further barriers such as the proposed TCR reforms could ultimately end up dis-incentivising the kind of innovation which government, the regulator and networks themselves are ostensibly seeking to encourage.
- **Feed-in Tariff:** There is a strong view emerging within Government that flat-rate tariffs are not suitable for the emerging energy system. This was one of the primary justifications for ending the Feed-in Tariff export rate (a flat tariff).
- **Industrial Strategy's Building Mission:** Unlike building regulations, this target to halve all new build energy use by 2030 encompasses unregulated energy use. Modelling undertaken on behalf of the STA indicates that this can't be achieved without onsite generation. As such, the Government and Regulator cannot afford to actively discourage renewable generation such as solar PV, which will be necessary to achieve their ambitions (see attached document).

Specific impacts of proposed reforms to non-locational Embedded Benefits:

Over the past decade, our members have applied for and accepted distribution network connections under a prevailing charging regime in good faith, following proper due diligence and assuming a reasonable level of market risk. Given that solar PV has never been able to connect directly to the GB Transmission network, it is impossible that these connection decisions have been motivated by a market distortion, as is suggested in the TCR documentation. Although exempt from BSUoS charges, solar generators have also historically been completely excluded from grid balancing services markets and, unlike Transmission-connected generation, have faced the risk of significant and completely uncompensated curtailment of their output as part of normal network balancing operations.

We believe that despite the significant challenges our members have faced under it, this arrangement has been reasonably proportionate, and has functioned adequately in enabling a large volume of lowest-cost renewable generation to connect to the grid on condition of the risk of curtailment. These proposed reforms would now place exorbitant additional costs on solar generators, without any foreseeable benefit in terms of improved network access. Ultimately, if implemented these reforms would amount to a net transfer of funds from small-scale, distributed generation to large-scale transmission-connected generation, and it is extremely doubtful that any long-term consumer benefit whatsoever would be realised as a result.

The Impact Assessment developed by Frontier Economics suggests that distribution-connected renewables with new CfD contracts could recover this additional cost through higher CfD strike prices, which would of course negate a large proportion of any hypothetical consumer benefit. But as the most viable of renewable technologies, including all new onshore wind and solar, remain excluded from the CfD mechanism, it is these lowest-cost technologies which would bear the full impact of BSUOS reform. This is both a troubling contradiction of Ofgem's commitment to technology neutrality, and indicative of the risks of undertaking network charging reform initiatives like this as distinct from the overall market landscape.

Rather than taking a holistic view of the value that distributed renewable generation delivers to the overall energy system in terms of flexibility, reduced wholesale power prices, avoided network reinforcement costs and decarbonisation, Ofgem seem to be pursuing a narrowly-defined residual charging reform agenda, disconnected from far more wide-ranging network design considerations (for example, the parallel Review of Network Access and Forward-Looking Charges), and from the Government's own climate and energy policy goals.