Grid Edge Policy

Regulation · Energy · Consumers

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18 September 2018

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Dear Jon

Getting more out of our electricity networks by reforming access and forward-looking charging arrangements

Until the end of 2017 I was Senior Partner Networks at Ofgem with responsibilities that included network charging. Since leaving I have been working as a consultant through my company Grid Edge Policy and looking to contribute as a thought leader to critical debates on the transformation of the energy system. I am a visiting fellow at Oxford University on their Integrating Renewables Programme within the Oxford Martin School. In that capacity I have been researching a number of the issues around network charging and have recently published a paper on the topic[1]. I had shared an early draft of this paper with Ofgem and am pleased to see a number of the points I made there and in earlier consultation responses and articles have been addressed. In this cover letter I provide an overview of what I see as the key issues going forward and in the attached annex I provide answers to the specific questions raised in the consultation.

General reflections

A welcome if overdue focus - At a high level this consultation is very much to be welcomed. I have been making the point that Ofgem needs to prioritise looking at distribution network forward looking charges and access arrangements since the issue of embedded benefits was first raised. I argued that there were a wide range of other factors creating distortions between transmission and generation connected generation and that Ofgem should look at the issues in the round before taking steps which would disadvantage distributed generation. I also highlighted that distribution charging had not been looked at for over a decade during which time these networks have changed considerably, reflected in the fact that there are no specific distribution charges for generation and no account is taken of whether an area is demand or generation constrained. Ofgem now acknowledge these points as justifying a significant code review, which I fully support.

Need to align with TCR - I do however have concerns that the issues around network charging are being managed through two distinct projects and two significant code reviews. While Ofgem argues that thinking is joined up, and the Charging Futures Forum does bring together thinking on both, it

[1] https://www.gridedgepolicy.com/portfolio

still does not feel properly joined up. The two projects have identified sets of charging "principles" which while quite similar are actually couched in different language with slightly different emphases. And given that "simplicity" (however worded) is in effect an objective for both there should be a strong impetus to come up with charging structures that when combined are not adding unnecessary complexity. For example, the consultation talks about using capacity as a basis for allocating residual charges. However as highlighted in the TCR there are a number of different measures of capacity (coincident peak or not, ex post / ex ante). If Ofgem were to go with one metric for forward looking charges and another for the residual that would be adding unnecessary complexity. As such I have always argued that the starting point should be the forward-looking review given that the structure of charges should primarily be shaped by an understanding of the underlying cost drivers.

Need for a stronger consumer voice – While the Charging Futures Forum is a very welcome way of involving the wider stakeholder community in these debates there is a real challenge in ensuring the direct consumer voice is heard, particularly for small users (domestic and microbusiness). Changes to network charging have the potential to have much bigger impacts on consumer bills than almost any other change that Ofgem is currently contemplating and there is a risk of a real backlash if consumer views are not taken into account. Ofgem has put an emphasis on a stronger consumer voice in the RIIO process. Unusually (compared to other sectors and international experience) the structure of charges is not considered as part of the price control process. It is therefore imperative that Ofgem and industry find other ways to ensure consumer views feed into this debate.

Access rights

Unclear whether access rights trading makes sense for distribution – Ofgem appears to be considering trading of access rights in the distribution network without yet understanding the drivers of network investment. While there is an intuitive appeal in the idea that if a customer is not using the full capacity they requested it could be reallocated to someone else, my own understanding is that decisions about reinforcement at distribution level are taken – in line with engineering standards – based on the actual utilisation of the network not on capacity requested. Hence under-utilisation may well mean that DNOs are able to avoid unnecessary investment – in line with the efficiency incentives they face. As I have flagged previously[2] there is a need for Ofgem's thinking on network charging to be under-pinned by a full appreciation of engineering standard P2/6 (and the changes proposed) as this is what determines where networks invest. It may well be that different DNOs take different approaches but there would be little logic in trading "spare" capacity if it does not in practice exist and ultimately the trading led to additional costs for networks.

A wider range of connection products including financially firm arrangements is needed – While flexible connections were a welcome innovation that has allowed significant volumes of DG to connect that would not otherwise have been possible, the time is right to move to more sophisticated products. Currently, in most cases, customers with flexible connections have no clarity about how often they might expect to be curtailed and there is no limit on the DNO's ability to do so. As such this represents an open-ended risk for DG and a free source of flexibility for the DNO. Ofgem have highlighted the distortions this causes for the generator choosing between transmission and distribution connection but it also causes distortions in the flexibility market more broadly as the

[2] https://www.gridedgepolicy.com/blog/geeky-but-fundamental

DNO has no incentive to look to other sources of flexibility (or ultimately to reinforcement of the network) if they can simply curtail generators without cost. As Ofgem notes, this contrasts with transmission where the connect and manage regime means that transmission connected generators are compensated where they are curtailed. These curtailment payments provide a signal to the TO about the need for reinforcement (and a basis for evaluating such investment) that is absent in distribution.

Reviewing the charging boundary for distribution is core to RIIO – At present there is an artificial divide between assets that are invested in as part of general load growth which are covered by RIIO and reinforcement that is triggered by a new connection (where the connectee pays a share of the costs of reinforcement at a higher level). While there is no suggestion that DNOs are exploiting this distinction, it is somewhat artificial and can create problems in benchmarking and assessing spend by the companies. Aside from arguments about consistency with transmission there is potentially a benefit in simplification of RIIO that could be achieved if a "single till" model was adopted. Ofgem should explore this angle as part of its RIIO strategy work.

Forward Looking charges

The principles are uncontentious the challenge is how they are balanced – The principles set out in the consultation even if worded slightly differently to those for the TCR are essentially uncontentious and my Oxford paper highlights that these same principles have been adopted across jurisdictions and by a range of stakeholders. The problem is how to make the tradeoffs between them. So cost-reflectivity would point to highly granular charges (both locational and temporal, including seasonal variation) which are likely to be too complex for consumers to understand and respond to. My paper suggests that making the tradeoffs involves looking in practice at whether more complex charges would be passed on and responded to by customers, as well as looking at the materiality of different levels of granularity. This paper (in contrast to the TCR) does implicitly acknowledge this by referring to charges being "sufficiently simple, transparent and predictable to enable users to make decisions based on them". To understand where that balance lies requires thorough consumer research and engagement, reinforcing the point made above.

There is a need to distinguish short run and long run cost signals – In talking about forward looking charges Ofgem is not explicit about the timescales it is considering. Historically networks were essentially fixed assets with costs varying only in the long run and the focus was therefore on long run marginal cost. Equally customers had limited options in responding to price signals. All that is changing. With the new focus on flexible solutions the networks will more often be facing short term marginal costs to deal with capacity constraints – and customers themselves have many more options either managing their load behind the meter or providing flexibility services. It is therefore vital to be much clearer when talking about "forward looking costs" as to what time horizon is being considered.

Instinctively the decisions around reinforcement are likely to be linked primarily to capacity on the network and to reflect customers longer term choices about where to locate and what DER to invest in. Short term network costs will be driven much more by usage which is in turn a short-term decision by the user. So, for EVs, for example, there is a logic in a capacity charge to reflect the long-term costs they impose on the network and the decision as to whether to buy an EV or not. There then also needs to be short run usage related charges which send the signal on when is best to charge. The consultation makes brief reference to looking at signals for "investment and dispatch"

but the time dimension is an angle that needs further thought and to be extended beyond the implications for generation.

Understanding the distributional impacts is vital – Building on the point above about the need to give consumers a stronger voice in this process there is a need for full transparency around the distributional impacts of any change to network charging. Ofgem's most recent analysis of the distributional impacts of time of use charging for half-hourly settlement presented a Panglossian view of there only being winners from the process as no one who would be worse off under time of use charging would opt in to such an arrangement. This ignores the point that if those who are better off on a time of use tariff (because they have flatter profiles) opt onto it then the average to be recovered through standard charges for everyone else will be higher. If you have a higher cost to serve, ultimately in a competitive market that will be reflected in the price you pay. While it appears that there is relatively little variation between demographic groups in the "peakiness" of their demand there are big differences within groups. Ofgem may decide it is not concerned if these charges are more cost reflective and vulnerable groups are not being disproportionately affected. However, it is vital that it is transparent about the impacts that any changes could be expected to have on some customers' bills. Annex 2 provides an example of how this might be considered.

The work being taken forward by Frontier on distributional impacts[3] is crucial in understanding the distribution between broad user categories and is right to look first at the static impacts which are likely to be most significant. However at this level the conclusions are fairly self – evident (low users will be disadvantaged by a move to more fixed charges for example). Much more work will then be needed to understand the variation within these groups and among domestic consumers in particular.

I hope these comments are helpful and would be happy to discuss further.

Yours sincerely

Maxine Frerk

Director Grid Edge Policy

[3] As presented at the stakeholder event in April 2018

Annex 1: Consultation Questions

Question 1: Do you agree with the case for change as set out in chapter 2? Please give reasons for your response, and include evidence to support this where possible. (

I fully support the case for change. Distribution network have changed radically since these charges were last reviewed.

Question 2: Do you agree with our proposal that access rights should be reviewed, with the aim to improve their definition and choice? Please provide reasons for your response and, where possible, evidence to support your views. (

I agree with the proposal to review access rights. While flexible connections were a welcome innovation that has allowed significant volumes of DG to connect that would not otherwise have been possible, the time is right to move to more sophisticated structures. Currently, in most cases, customers with flexible connections have no clarity about how often they might expect to be curtailed and there is no limit on the DNO's ability to do so. As such this represents an open-ended risk for DG and a free source of flexibility for the DNO.

Question 3: Specifically, do you have views on whether options should be developed in the following areas as part of a review? Please give reasons for your response, and where possible, please provide evidence to support your views:

a) Establishing a clear access limit for small users, with greater choice of options (as considered under b) and c) below) above a core threshold – do you agree with our proposal in paragraphs 3.5-3.10 that this should be considered? Do you have views on how a core threshold could be set?

This clearly is an important issue in the context of EVs and the need for a fair allocation of the costs of accommodating them on the network (given it will primarily be better off consumers who acquire them initially). There is an intuitive appeal in setting a clear access limit that simply covers essential use.

However the question of what is a fair allocation of costs (and hence the idea of an access limit) is perhaps more complex in the case of heat pumps where there are already distortions in the choices between gas and electric heating because of the recovery of policy costs through electricity charges. It is important that in thinking through the implications of a change to access rights for small users thought is given to the implications this could have for heat de-carbonisation from a whole system view.

There are then practical challenges in setting a core level and in how that is communicated as well as what happens if the level is exceeded – whether that is that the supply cuts out (as happens in France if you exceed the size of the fuse) or excess charges (and in that case how would customers be alerted?). Engaging with customers on how this might work is vital as this would represent a major shift in how customers engage with the system. Ofgem should also look at the functionality available in smart meters around load limiting to clarify what is technically possible (without resorting to physical fuse changes).

b) Firm/non-firm and time-profiled access – do you agree with our proposal outlined in paragraphs 3.15-3.21 that these options should be developed?

Yes – see q2

c) Duration and depth of access, discussed in paragraph 3.25-3.32 - would these options be feasible and beneficial?

It is unclear how practical they would be but the issues around depth of access are important in the context of local energy which is disadvantaged by the current arrangements for network charging as noted below.

d) At transmission or distribution in particular, or are both equally important – as discussed in this chapter? (

I believe distribution has had less attention paid to it historically and is where potentially the greatest changes are happening – hence agree with a focus on distribution.

Question 4: Do you agree with the key links between access and charging we have identified in table 1? Why or why not? Do you think there are other key links we have not identified? Where possible, please provide evidence to support your views. (

Agree- it is helpful to try to make links in this way rather than view issues in isolation.

Question 5: Do you agree with our proposal that targeted areas of allocation of access should be reviewed? Please give any specific views on the areas below, together with reasons for your response. Where possible, please provide evidence to support your views:

a) Improved queue management as the priority area for improving initial allocation of access, as outlined in paragraphs 3.41-3.44?

This seems to make sense

b) Not to consider the potential role of auctions for initial allocation of access as part of a review at this time, as discussed in paragraph 3.44?

Agreed

c) To review the areas outlined in paragraphs 3.45-3.48 to support re-allocation of access? (

As noted in the cover letter Ofgem need to ensure that they properly understand what drives investment and whether what might be considered "unused" capacity on the distribution network is actually unused – or whether engineering standards such as P2/6 mean that the networks would not expect to build capacity to accommodate unused capacity. It is possible that different DNOs take different approaches.

It is also unclear how readily capacity could anyway be re-allocated between users on the distribution network given the very location specific nature of constraints.

It may also help to distinguish between what has historically been termed "capacity hoarding" (when someone gets a connection offer and sits on it without building anything) versus someone who may not use their full capacity.

The idea of trading short term curtailment requirements could be viewed as "re-allocation of access" but is probably better dealt with as part of exploring the nature of access rights and the interplay with other flexibility solutions.

Question 6: Do you agree that a comprehensive review of forward-looking DUoS charging methodologies, as outlined in paragraphs 4.3-4.7, should be undertaken? Please provide reasons for your response and, where possible, evidence to support your position. (

Definitely.

In addition to factors that have been floated to date there is also a need to look at "distance" as a cost driver. Distance is a driver of losses but is not reflected in current charging. This creates an obstacle to the development of community energy projects where local supply and demand can be balanced. Some communities are interested in doing this but are not rewarded for doing so despite the value it provides to the networks. Similarly it is clear the private wire solutions can only emerge as a competitor to existing networks where demand and supply are close together. Using existing network capacity must be a more economic solution but again without some way of rewarding local solutions (through some sort of virtual private wire solution for example) there is a distortion in the choices facing customers. In its Future Insight paper on local energy Ofgem suggested that the main benefits from local balancing would accrue to the distribution networks. As noted in my report for Scottish government on the Fintry local energy project[4], it is vital that this benefit is rewarded.

Question 7: Do you agree that the distribution connection charging boundary should be reviewed, but not the transmission connection boundary? Please provide reasons for your response and, where possible, evidence to support your position.

This makes sense.

Question 8: Do you agree that the basis of forward-looking TNUoS charging should be reviewed in targeted areas? If you have views on whether we should review the following specific areas please also provide these:

a) Do you agree that forward-looking TNUoS charges for small distributed generation (DG) should be reviewed, as outlined in paragraphs 4.19-4.23?

b) Do you consider that forward-looking TNUoS charges for demand should be reviewed, as outlined in paragraphs 4.24-4.27? Please provide reasons for your response and, where possible, evidence to support your position.

Any review of TNUoS should be done in the context of the wider differences between transmission and distribution connected generation.

Question 9: Do you agree that a broader review of forward-looking TNUoS charges, or the socialisation of Connect and Manage costs through BSUoS at this time, should not be prioritised for review? Please provide reasons for your response and, where possible, evidence to support your position.

No view

Question 10: Do you agree that there would be value in further work in assessing options to make BSUoS more cost-reflective, and if so, that an ESO-led industry taskforce would be the best way to take this forward?

No view

Question 11: What are your views on whether Ofgem or the industry should lead the review of different areas? Please specify which of SCR scope options A-C you favour, or describe your alternative proposal if applicable. Please give reasons for your view.

[4] http://smartfintry.org.uk/about-smart-fintry/resources/

I agree it is finely balanced but would advocate option B. The review of access rights for large users involves a review of the allocation of risks between customers and the DNOs and it is not clear that the DNOs can be expected to come forward with proposals that would increase their risk for example. There are also strong links to the review of forward looking DUOS. By contrast I am less convinced of the benefits to be achieved through the re-allocation of rights and hence less concerned about the loss of synergies there. It is still possible for Ofgem to look to industry to do much of the leg work but with Ofgem providing direction.

The other angle that might be considered is how the creation of more customer friendly connection offers could be incentivised under RIIO. In the paper I co-authored for Sustainability First on a low carbon incentive for RIIO[5] we noted that companies currently have no incentive to look for ways to help customers maximise the amount of low carbon energy generated from a flexible connection. Having a low carbon incentive could encourage networks to find creative solutions (as they did to the initial problem of how to facilitate connections).

Question 12: Do you agree with our proposal to launch an 'Option 1' SCR for areas of review that we lead on? Please give reasons for your view.

Agree – but I am concerned about the idea of having two separate SCR processes running on what should be a joined up project.

Question 13: Do you agree with the introduction of a licence condition on the basis described in paragraphs 5.11 and 5.12 and Appendix 5? Why or why not? Do you have any comments on the key elements set out in table 7 of Appendix 5a, or consider there are any other key elements which should be included? Please give reasons for your view.

While such joint licence conditions are probably almost unenforceable they are important in signalling to the companies the need for work to be done if that is the approach to be taken.

That said it is worth Ofgem considering is a standardised approach is really required across companies – it is simpler for customers but the situation on the ground varies between regions and the approach to flexible connections has developed through initiatives by individual DNOs with work then to encourage best practice to be adopted.

Question 14: Do you have any comments on the draft wording of the outline licence condition included at Appendix 5b? Please give reasons for your view.

No view

Question 15: What are your views on our indicative timelines? Do you foresee any potential challenges to, or implications of, the proposed timelines and how could these be mitigated?

The interplay with RIIO ED2 needs careful thought. The proposal is that change would be "signalled" in the ED2 strategy decision. This does not seem like a sound enough basis for companies to develop their RIIO business plans which they will need to start doing well in advance of the strategy decision.

Question 16: What are your views on our proposals for coordinating and engaging stakeholders in this work?

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5 http://www.sustainabilityfirst.org.uk/images/publications/other/Sustainability_First_Low_Carbon_Incentive_in_RIIO2_DIscussion_Paper_FINAL_web.pdf

The process for engaging stakeholders is to be welcomed but much more needs to be done to engage consumers directly and to ensure that the views of small users (domestic and microbusiness) are heard. This is a complex issue but will have huge ramifications for consumer bills and it is vital that they have a stronger voice in this process going forward. Ofgem and the industry should be developing a major programme of consumer research and engagement as a part of this process.

Annex 2: Exploring distributional impacts

As the potential for different tariff structures such as time of day pricing (higher prices during peak times) or higher fixed charges is examined, it is important that we explore the potential impact on different demographics (i.e. who would be most affected by the introduction of these changes).

As noted by Frontier it is important to distinguish the static impacts (ie what would happen to bills absent any behaviour change) from the dynamic impacts. The static impacts have the potential to be significant and will be the most immediately visible to consumers and hence need to be understood as a priority. The dynamic impacts will likely be dependent on the levels of automation and support provided to customers and hence harder to model.

In the report prepared for Scottish Government on the Smart Fintry project[6] we explored the differences in "cost to serve" (looked at purely in terms of the network costs under the current red-amber-green DUOS charges for half-hourly settled customers). This showed very significant distributional issues with winter time-of-use-weighted network charges varying from 3.7p/kWh to 8.2p/kWh for Fintry customers depending on their current usage profile – and highlights why this is such an important issue to explore.

The Fintry report also looked at the use of a simple metric of % energy consumed in the peak (in effect a load factor) as a way of readily identifying those customers who would see the biggest change in their bills on a move to time of use pricing. This is a simple way of explaining why some customers might win or lose from a change in tariff structure – as well as looking at low, medium and high usage as Frontier propose.

Given the small scale of the Fintry project I have been keen to use the wider datasets available to explore this. As a first step we have looked to identify whether any obvious differences exist between groups of different household income, and between households with members under the age of 5 or over the age of 65. The metric we have used is the percentage of the customer's total consumption occurred during the peak times between 1600 and 1900 hours on weekdays (while noting that the peak red period varies between DNOs). Weekend data is also shown for comparison. The data used is from the Customer Led Network Revolution - CLNR's report on 'Basic Profiling of Domestic Smart Meter Customers'.

Assuming that households with members under the age of 5 or over the age of 65 will be more likely to have household members at home during the daytime, we might expect to see a lower percentage of their total energy usage occurring during the peak hours. This same notion potentially goes for families with a lower average household income.

However an alternative to this hypothesis is that the cause of high energy usage that occurs in the peak hours is universal; for example, preparing for dinner, relaxation through use of technology such as television, etc[7].

The initial results shown in the figures below confirm what other studies have shown that there is minimal evidence of any significant difference in the percentage of total energy consumed in the peak period between these different demographics. Though there are differences of approximately

[6] http://smartfintry.org.uk/about-smart-fintry/resources/

[7] Work by Jacopo Torriti at University of Reading has looked at different energy uses and how these tend to focus around the evening peak across all socio-demographic groups.

half a percentage between each of these groups, and, moreover, these differences do match our hypothesis to some degree, we would not consider this to be statistically significant.

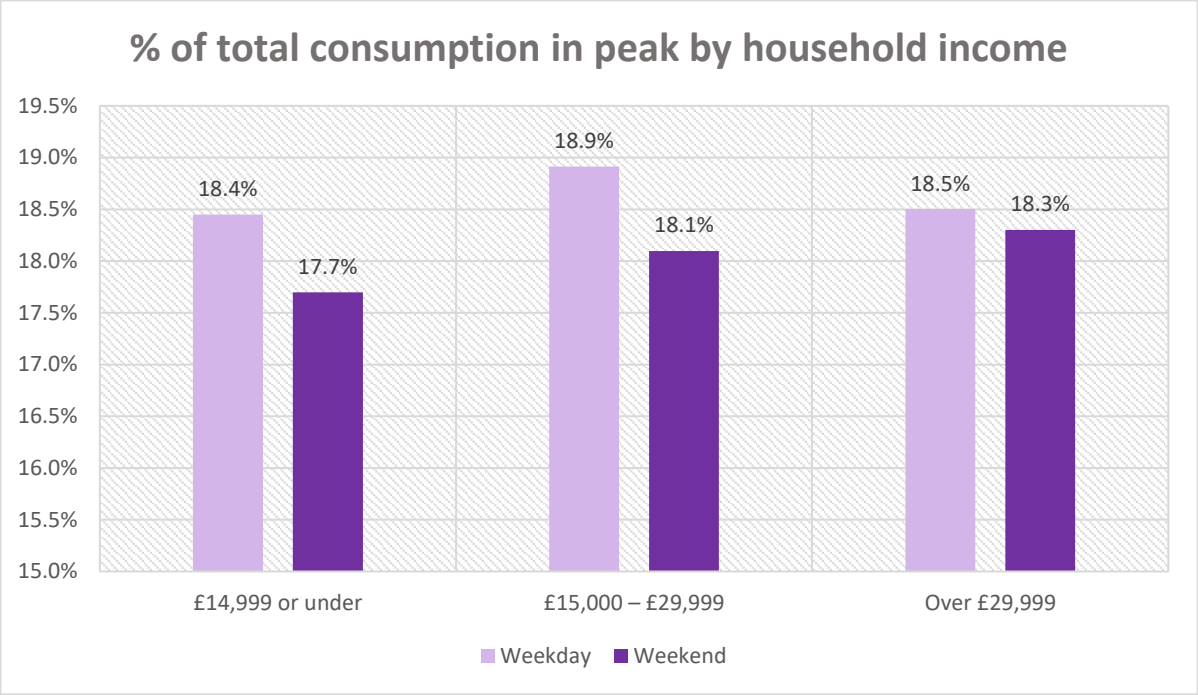

Figure 1 - % of total consumption by household income for weekdays and weekends.

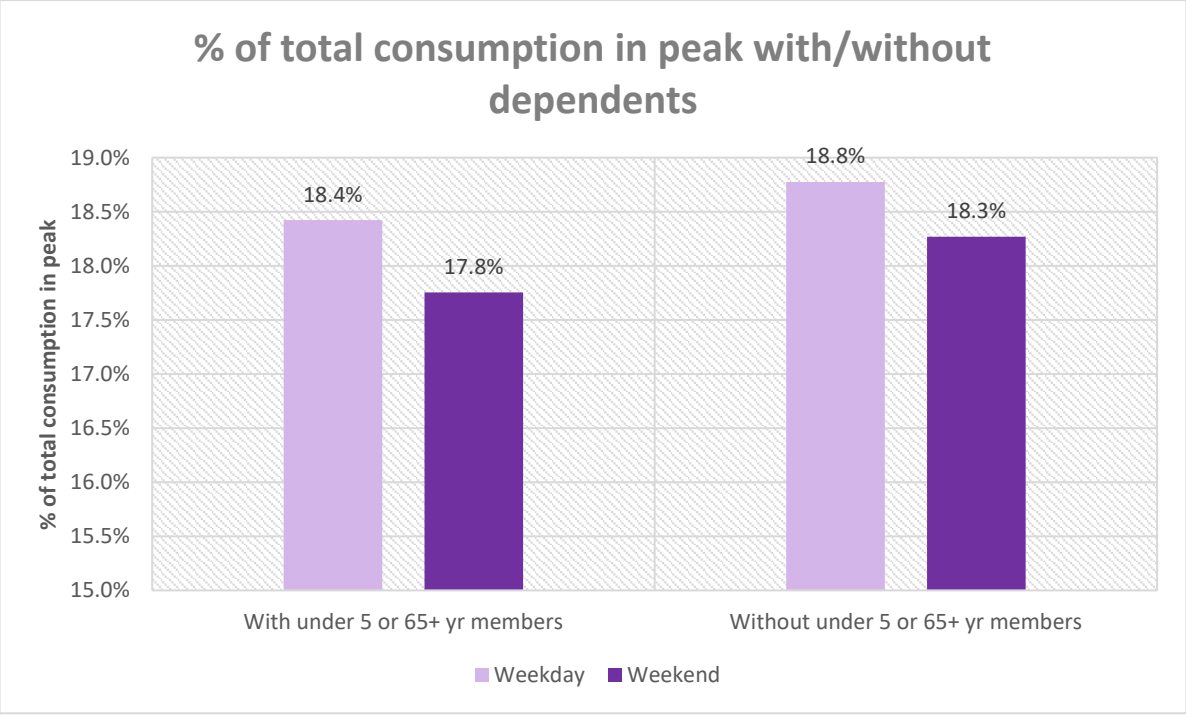

Figure 2 - % of total consumption for households with a member under 5 or over 65 years of age, and those without, for weekdays and weekends.

While these sorts of results might provide some comfort that there is no evidence that groups of vulnerable customers would systematically be disadvantaged by a move to time of use tariffs there could still be very significant impacts on individual customers which needs to be understood through further exploration of the individual customer level data.

In the context of this consultation there are also important questions around the impact of a move to a higher proportion of fixed or capacity charges. This will clearly have a bigger impact on low use customers and previous work[8] has clearly established that on average those on low incomes use less energy (albeit there are clearly exceptions to this rule and the advent of solar PV complicates the picture further).

[8] https://www.cse.org.uk/downloads/reports-and-publications/policy/energy-justice/understanding_high_use_low_income_energy_consumers.pdf