



What is Fair?

How should we pay for the energy system of tomorrow?

Discussion Paper
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Sustainability
first

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Executive summary

It is widely acknowledged that the energy system is in transition. This transition will play a key part in meeting the UK Government's target of net zero carbon emissions by 2050. As the technology and nature of energy demand changes so the underlying cost structure changes. There are currently a wide range of projects being led by Ofgem and BEIS looking at elements of this picture but no-one is looking at the cumulative distributional impacts of these reforms for current and future generations.

The energy price cap has in some respects provided a 'breathing space' in terms of energy affordability. However, fundamental questions about who pays for what - today and tomorrow - will need to be addressed if we are to move to a post price cap world. There are good reasons to be concerned that those in vulnerable circumstances may lose out through the energy transition and understanding how changes in charges could impact different groups is therefore important.

Equally the de-carbonisation imperative means that consideration needs to be given not just to how the direct costs of the energy system should be recovered but also how the resulting externalities should be reflected in charges. While this paper does not explore in any depth the issues around carbon taxes and other approaches, ultimately this should be part of the same conversation.

Turning back to the **direct costs of the energy system**, there has been a clear consensus (internationally and across stakeholders) that in thinking about charging structures, the broad criteria should be around cost-reflectivity, fairness and practicality. We would argue that to ensure environmental interests are considered, sustainability should also be explicitly included in these criteria. The challenge is then how to trade-off between these criteria and exactly what is covered in each case.

For example, Ofgem has pointed to the problem of customers with their own generation being able to avoid contributing to the recovery of fixed network and

policy costs which then end up being picked up by the rest of the customer base. Given that those on lower incomes are less likely to have their own generation and hence face increased charges, this was a source of concern and was also identified by Greg Clark in his speech last year where he proposed the "no free riders" principle.

However, the ready solution to this issue - to recover these costs through fixed charges - has been shown to be detrimental to customers on low incomes who typically have lower consumption (with the exception of those in electrically heated homes).

Dealing with costs and charges in an ad hoc and piecemeal way like this is likely to become increasingly challenging given the scale and pace of change needed in the move to net zero. It also raises fundamental questions about fairness within and between generations which need to be considered in the round.

In this paper we therefore look across the range of changes that are expected through the energy transition to try to provide a more comprehensive picture of what the **future of charging** might look like. We look in turn at the different underlying costs (both of the network and of the energy itself) which are currently charged to suppliers who may then recover them from end customers as they wish (except where the price cap applies).

We then set out the range of options that exist for how such fixed costs of the energy system might be recovered. While taxation has strong theoretical support, we recognise the practical and ideological challenges involved. Of the other options we can see merit in **a longer term move to capacity charging for electricity**, building on what we would expect to come out of Ofgem's work on cost-reflective charging. This would be less regressive than a simple fixed charge but thought needs to be given to some of the practical issues involved, including the implications for customers with electric heating. Capacity charges could be coupled with a basic energy allowance at a lower unit rate (effectively creating a rising block tariff) to encourage



demand side reduction and response and help address affordability concerns.

Alternatively, for behind-the-meter generation, the introduction of **a fixed charge for the right to export** could be a more targeted way to address the short-term concerns.

The other challenge presented by the energy transition is the need for clear **time of use signals** to bring flexibility on-stream and to promote the use of smart charging for Electric Vehicles (EVs) etc, without which infrastructure costs (both network and supply-side) could be significantly higher. The extent to which this is an issue will vary across locations. This may point to the need for more granular locational price signals which then raises questions of “fairness”, given the model historically has been one of costs being socialised across wide geographical regions.

There is no clear evidence to date that particular vulnerable groups would be disadvantaged on average by an underlying charging structure that took account of time of use patterns (which half-hourly settlement might facilitate). However, there could be very significant impacts at an individual level which need to be better understood and require better data to do so.

Whatever approach is adopted there will be winners and losers in any charging reform and mitigating action will be needed to help those on low incomes who are on the losing side. It is important that there is clarity between Ofgem and BEIS as to where responsibility for such mitigating action sits. Ofgem’s recent Strategic Narrative for 2019-23 commitment to ‘call-out’ policy gaps that affect consumers is to be welcomed in this regard.¹

Looking beyond electricity, the paper also highlights the challenges with **heat de-carbonisation** and the need to avoid distortions in the choices between different fuels from the way policy costs in particular are recovered based on electricity usage. With low income customers currently being unduly reliant on electric heating, early

action on this front could also be of particular value to these customers.

While not a focus of this paper there is a general recognition that longer-term to achieve heat de-carbonisation will need the cost of carbon to be reflected in the cost of gas for domestic heating. However this would clearly be problematic for those in or at risk of fuel poverty. More radical and innovative options such as personal carbon budgets can be seen as fairer and in the spirit of nationally set carbon budgets, and should be explored.

On the costs of the gas network, the challenges are perhaps more around inter-generational fairness. While the question of the future of heat remains open it is probably safe to assume that the gas networks will at least be scaled back in some areas. This risks leaving stranded assets which – it is assumed - will have to be paid for by gas customers of the future. Ofgem has not yet tackled this question in RIIO GD2 but has left the door ajar for companies to make the case for changes in depreciation rates. Further thinking on this issue is urgently needed.

Finally, while the focus of this paper is on the individual elements of charges that go into a customer’s bill it must be remembered that these are **charges levied on suppliers** who may then recover them from customers on whatever basis they choose (subject to the price cap where that applies). While in theory one would expect suppliers to mirror these cost structures in their tariffs they may not do so for a range of reasons – from practicality, through consumer preferences for simpler prices to the potential to recover high charges from sticky customers. Where there are important issues of fairness at stake there is a question of principle as to whether or how far the structure of charges should just be left to suppliers in a post price cap world.

As part of their thinking on the retail market review Ofgem are considering radical options such as customers having more than one supplier and different ways of dealing with “**universal service**” obligations. This

¹ <https://www.ofgem.gov.uk/system/files/docs/2019/07/our-strategic-narrative-2019-23.pdf>



thinking needs to actively be brought together with reflections on the charging structure, and consideration of future trends such as EV growth (and demands that are not yet widely discussed such as increased air conditioning), to understand the potential overall impact on consumers.

While these are technically complex issues it is important that the **consumer and citizen voice** is brought into the debate. Deliberative approaches can be used to help people engage with these sorts of issues and would provide valuable insights. A stronger steer from elected government is also crucial in this debate that goes beyond purely technocratic issues into wider policy considerations and trade-off and recognises the devolved and decentralised context that some of these debates will play out within. Absent this engagement, the public may be reluctant to accept decisions around future responsibilities and costs and 'procedural fairness' may not be seen to have been delivered.²

² <http://www.ukerc.ac.uk/publications/paying-for-energy-transitions.html>



Introduction

Sustainability First is a think tank and charity that works in the energy, water and waste sectors. We have significant experience of consumer and public interest issues, regulation and the demand side.

Over the years Sustainability First has carried out extensive work looking at questions of fairness and the transition to a more sustainable energy system. In particular it has carried out significant work on the role of the demand-side in the energy system (through the GB Electricity Demand Side project and its strategic support for National Grid's Power Responsive programme); it has explored in depth how public interest and fairness issues should be considered in the energy and water sectors (through the previous New-Pin and current Fair for the Future projects); it has looked at vulnerability questions (through Project Inspire) and at how to build a better "public interest" evidence base through smart meter data (through the PIAG project). In all cases these were multi-party projects with a strong emphasis on bringing stakeholders together to discuss and explore issues supported by quality research carried out by Sustainability First Associates.

Given our in-depth understanding of the energy system and the regulatory framework around it – combined with our concern to ensure de-carbonisation and vulnerability objectives are given due prominence – we have been concerned about the number of different projects aimed at reforming charges for elements of the energy system which are being considered in isolation and without a clear view of the cumulative implications for consumers.

The purpose of this paper is to try to look in the round at how the changes anticipated in the energy system might impact on how costs should be recovered and how consumers should pay for energy in the future.

When looking at each individual policy proposal in isolation radical solutions for how the end-customer

pays for energy are hard to justify, but when **looked at in-the-round** the case for a fundamental re-think is strong. This needs to span both the treatment of policy costs (which is for government) and the treatment of network charging and settlement in the wholesale electricity market (which is for Ofgem). This points to the need for a significantly more **joined-up approach** – including consideration of the **implications for the retail market of the future**, which is already a joint BEIS / Ofgem project, and longer-term thinking on the future of heat. In so far as this new vision needs to tackle issues of fairness and support wider policy goals – including the new government net-zero target – there is a need for a strong steer from government on how charging structures could support wider policy goals and on issues of affordability and fairness.

This paper does not involve new research but aims to **stimulate discussion** around these issues to help inform decisions by government and Ofgem, drawing on Sustainability First's track record of engagement on related issues.

The structure of this report is:

- 1) **context** in terms of the components of the energy bill today and the interplay between costs, charges and end-user tariffs
- 2) the key strands of **the energy transition** and what this means for costs and charging;
- 3) a discussion of the generally accepted **principles for charging** – cost reflectivity, practicality and fairness – to which we would argue should be added sustainability;
- 4) **options** for charging which seek to balance these criteria, including discussion of some of the practicalities around a move to capacity charging for electricity;
- 5) links to thinking on the **future of the retail market**;
- 6) getting the **process** right including ensuring an inclusive debate on these strategic issues and clarity of roles between Ofgem and government;
- 7) **conclusions**.

While the proposed changes will have major impacts on all players in the energy system including generators



and industrial and commercial customers, the main focus of this report is on domestic customers whose voice is less prevalent in these debates.

We would also note the important role of local authorities, communities and the broader public sector in helping deliver the energy transition, in the interests of the citizens they represent. While we have not had the resource to explore in any depth how different charging models might impact these organisations, it is important that their voices are also heard in this discussion.



Context

Current charging arrangements

The components of the energy bill

The current energy system follows what is known as a “supplier hub” model whereby the supplier is charged for use of the network, for the energy used, for the costs of keeping the system in balance and for government-imposed policy costs. They then charge the customer to recover these costs and their own costs and margin. The pie charts below show the breakdown of a typical bill between these different components.

Figure 1: Breakdown of gas bill (source: Ofgem website)

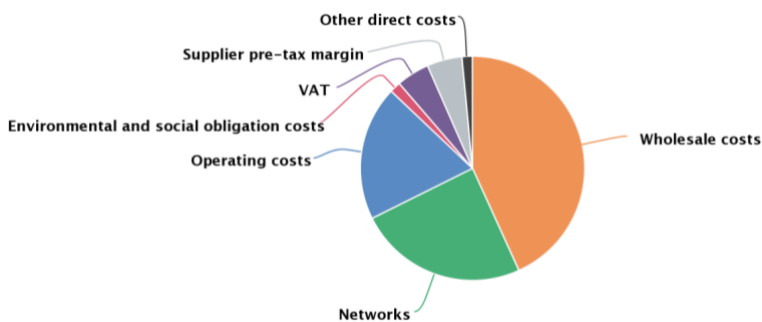
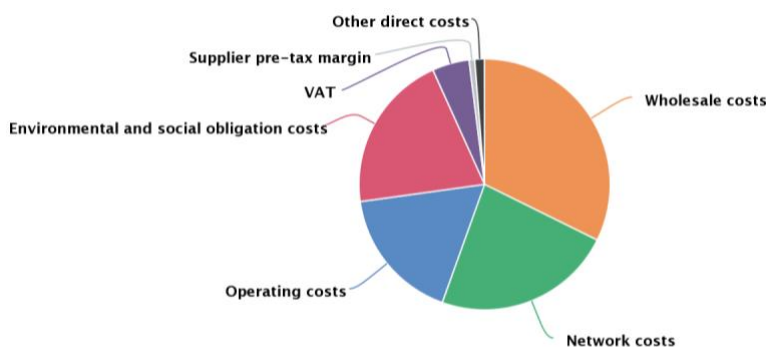


Figure 2: Breakdown of electricity bill (source: Ofgem website)



The structure of many of these underlying charges is set out in regulated industry agreements or in legislation. As such discussion on the future of charging tends to focus on the rules governing these underlying charges albeit that what really matters from a **customer perspective** is what they actually pay, which will not necessarily mirror that structure.

In terms of end customer tariffs, domestic customers typically pay a combination of a fixed charge and a unit rate. With the introduction of the default and PPM tariff caps Ofgem have had to determine, in effect, both the appropriate standing charge and the unit rate (which they do in practice by setting a maximum tariff for zero consumption and for average consumption). In determining the level of standing charge to use Ofgem set a figure based on current market levels and acknowledged that these were actually below what would be a cost reflective level but were concerned not to increase charges for those on low incomes. The current standing charge³ from October 2019 is £109 pa for gas (standard credit) and varies between regions on electricity between £92 and £106 pa (standard credit).

For larger industrial and commercial customers charges also include a capacity charge related to the level of capacity they requested when they ordered the connection. In some cases, they will also pay for their energy on a time of use basis, including currently paying Triad charges related to their usage in the three peak half hours during the winter period. There can also be charges for technical aspects such as reactive power.

³https://www.ofgem.gov.uk/system/files/docs/2019/08/default_tariff_cap_level_-_1_october_2019_-_31_march_2020.pdf



Network charges

Network charges (“use of system charges”) are set to enable the networks to recover the revenues that they have been allowed through the RIIO price control process. On electricity they cover the costs of distribution (DUOS) and transmission (TNUOS). On gas there are similarly separate charges for distribution and transmission.

Historically these charges have been set to try to mirror the long run marginal cost of the network in order to provide a price signal to users about the long run impact that their usage would have in terms of requirements for additional investment. Thus while the costs of the network can be seen as largely “fixed” in the short run, over time these costs would increase if utilisation, particularly at peak times, were to increase. Ofgem refers to these as “forward-looking costs”.

There is then a “residual” component of the network charge which is designed to enable the companies to recover their allowed revenues including recovery of and returns on historic investments. The current breakdown between these different elements of network charges is shown in Table 1 below.

Table 1: Breakdown of different elements of network charges

2016/17 Charges (£bn)	Transmission	Distribution
Connection	0.2	0.2
Use of system - Forward looking	0.5	4.0
- Residual / cost recovery	2.1	1.4
Total charges	2.8	5.6

Source: Charging Futures (2017) – Ofgem presentation

Separately there are charges for recovering the costs of balancing the electricity system (BSUOS) which an ESO led taskforce have concluded should be treated as a

cost recovery charge (in effect treating it as a fixed cost rather than trying to identify a relevant cost driver).

This illustrates that there is not necessarily a clear distinction between forward looking and residual costs. Similarly, in its latest working paper⁴ on forward looking charges on the distribution network, Ofgem set out the different approaches that could be taken from considering only short-term direct impacts of increased use to an “ultra long-run” allocative approach and including cost categories that are only loosely correlated with usage. If a narrow approach is taken then the residual will be very much higher and the importance and implications of how that is allocated increases. The questions are not neatly separable.

Wholesale electricity costs and the move to half-hourly settlement

Suppliers currently purchase energy (electricity) on a bilateral basis with settlement arrangements to ensure that the amount purchased reflects that which has been used by their customers with any difference paid for through “settlement”. Settlement is done on a half-hourly basis but historically for domestic and smaller business customers representative profiles of half-hourly usage have been used (which meant that even if suppliers could get their customers to reduce peak usage suppliers would not see any benefit in terms of reduced charges). Ofgem are currently running a major programme to move to market wide half-hourly settlement so that suppliers will face more accurate price signals in terms of the wholesale energy price (albeit only true half-hourly where the customer gives consent to use of their data for that purpose). Individual suppliers can elect to be settled on this basis now.

In addition, the move to half-hourly settlement will also impact other cost elements. In particular network charges and capacity-mechanism cost-recovery are defined as varying by time of day but for domestic customers the current use of profiles means that they are, in effect, a fixed p/kWh charge. With half-hourly

⁴ https://www.ofgem.gov.uk/system/files/docs/2019/09/000_-_working_paper_-_summer_2019_-_locational_charges_note_final.pdf



settlement the charges suppliers face for these elements will vary dependent on the actual time-of-use profile of their customers.

Policy costs

There are then a variety of what are generally termed “policy costs” relating to government social and environmental programmes as set out in Table 2 below. These can take the form of obligations on suppliers (where the level of the obligation depends on the size of their customer base) or more direct cost recovery mechanisms. In some cases small suppliers are exempt but this is being reviewed as part of the BEIS / Ofgem work on the future of the retail market.

Table 2: The range of existing mechanisms for recovering policy costs (including some examples where costs are recovered through taxation)

Recovered via customer bills	Recovered through taxation
Renewables Obligation (RO), Feed In Tariffs (FITs), Capacity Mechanism – recovered on the basis of electricity usage (p/kWh)	Commercial and Domestic Renewable Heat Incentive (currently running to 2021)
Energy efficiency policy costs – originally per customer but changed to usage basis (gas and electricity) with introduction of the Energy Company Obligation (ECO) following pressure from fuel poverty groups	EV subsidies (cars, charge-points)
Warm Homes Discount reflects customer numbers – obligation on electricity suppliers	Funding of R&D
	Scotland and Wales energy efficiency programmes

As can be seen from Figures 1 and 2 policy costs account for a much larger proportion of the electricity bill (20.4%) than they do on gas (1.6%).

In 2014 DECC produced a comprehensive report looking at the impacts of energy and climate change policies on energy prices and bills which included looking at the distributional impacts both in terms of who pays and who benefits⁵. However this analysis has not been updated since.

While policy costs are typically thought of as simply an overhead, some of them – in particular capacity market costs and FIT / Contracts for Difference - can be seen as reflecting the long-run marginal costs of delivering the required levels of (low carbon) generation capacity. Conceptually these could be seen in the same way as network capacity charges.



In contrast the policy costs associated with Warm Homes Discount or ECO are genuine “overheads” where the level of costs is not affected even in the long run by demand on the system.

Cost, charges and tariffs

The table below demonstrates the interplay between costs, charges and tariffs. Although these terms are often used interchangeably, there are important distinctions. The focus of the current policy debate is around the charges faced by suppliers while, as noted above, what matters ultimately is the tariffs that consumers are offered. As discussed in section 5 these may or may not reflect the underlying charges. By clarifying the linkages between different government, regulatory and company decisions the table helps highlight where responsibility lies for different decisions.

⁵https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/384404/Prices_Bills_report_2014.pdf

Table 3: A strategic framework for thinking about the relationship between costs, charges and tariffs

	Determined by..	Components
<p>COSTS incurred by industry (and to be recovered through bills rather than taxation)</p> <p style="text-align: center;"></p>	<p>Industry structure (but also reflecting engineering standards and RIIO rules). Policy costs (and bill-tax split) determined by government</p>	<ul style="list-style-type: none"> - generation, networks, retail, balancing, policy (social and environmental) costs - long run variable / short run variable / fixed costs - range of cost drivers - handling of externalities?
<p>CHARGES levied on suppliers (and design of obligations)</p> <p style="text-align: center;"></p>	<p>Charging statements and regulatory structures:</p> <ul style="list-style-type: none"> - Ofgem or BEIS policy decisions - industry self-governance for charging mods 	<ul style="list-style-type: none"> - rules for allocation of costs between broad groups (e.g. domestic / non-domestic) and then within groups - determines charges faced by each supplier based on customer volumes etc - fixed daily charge / kW capacity charge (of varying forms) / kWh unit charge (TOU or single rate)
<p>End-user TARIFFS (level and structure)</p>	<p>Set by suppliers in the market (within constraints set by regulation inc price cap)</p>	<ul style="list-style-type: none"> - domestic (standard and economy 7, pre-pay) / non-domestic - currently a mix of standing charge and energy (p/kWh) charge which can sometimes vary by time of day

Implications of the changing energy system

The energy system transition

As the energy system evolves we can expect to see changes in what drives costs in the system and in the choices open to consumers. It will be increasingly important that the right price signals are sent to encourage individual customer choices to be made that result in a more efficient energy system overall.

Thinking about the scale and nature of the changes that are happening, it is little surprise that this is raising new questions about how we should pay for our energy going forward. For example, we are seeing:

- Increased reliance on renewables which, in contrast to conventional generation, are more intermittent, non-dispatchable and close to zero-marginal cost to run (i.e. there are capital and operating costs but there is no “fuel” cost as there is with conventional generation).
- More local and self-generation including an interest in community scale solutions.
- A shift in the way electricity distribution networks are used – no longer simply distributing centrally generated electricity but needing to actively manage new sources of supply and demand on their networks.
- New sources of flexibility including demand side response and storage, facilitated by digitalisation and control systems.
- New sources of electricity demand supporting de-carbonisation of heat and transport, with EVs representing a potential heavy load on the system but also providing a further source of flexibility (‘batteries on wheels’). The potential for increased demand for cooling.

- An uncertain future for heat but with the likelihood that there will be increased electricity loads as part of any solution, with gas networks re-purposed or stranded (or in reality probably a combination of the two). All solutions for heat de-carbonisation involve significant new investment.
- Calls for ‘equitable decentralisation’⁶ and a range of approaches across the nations (e.g. Scotland’s December 2017 Energy Strategy and plans to establish an independent Energy Consumers Commission for Scotland⁷).

Implications for charging

What these changes then mean from an economic perspective in terms of the nature of charging is that:

- There is a desire to avoid recovering what are essentially fixed costs (either residual network charges or policy costs) through per unit charges because this distorts incentives. In particular this makes behind the meter generation (at either an individual level or as part of a private wire solution) look an attractive option for the consumer but without resulting in any savings in the system costs which then have to be picked up by consumers at large. Those who benefit will tend to be the better off in society (or businesses) who can afford the up-front costs of on-site generation.
- At the same time there is a genuine shift to lower marginal costs for the energy we use – indeed we recently saw negative wholesale prices for a period of over 9 hours⁸.
- However, this does not mean that electricity should be seen as becoming a free resource. There are still incremental (capital and

⁶ <https://www.labour.org.uk/wp-content/uploads/2019/03/Bringing-Energy-Home-2019.pdf>

⁷ <https://www.gov.scot/publications/energy-consumer-action-plan-putting-consumers-heart-scotlands-energy-transition/>

⁸ <https://www.current-news.co.uk/news/uk-negative-power-pricing-record-smashed-and-balancing-costs-spike-during-extraordinary-weekend>



operating) costs in providing sufficient network capacity and generation capacity to deal with peak load. These long-run price signals still need to be passed on to customers if we are looking for customers to make rational decisions about their peak usage. Over time this points to capacity (or peak demand) becoming significantly more relevant as a cost driver than total energy consumption.

- Moreover, the intermittent nature of renewable generation means we do still need dynamic time of use pricing or other ways to signal when there are short term shortfalls or surpluses in generation which could be met by demand side response or other forms of flexibility such as storage.
- Equally there is a need for price signals (or contractual arrangements) to provide flexibility services at the distribution network level and to the system operator. At the distribution network level these could be highly localised reflecting where there are particular constraints or problems on the system.
- In terms of heat de-carbonisation there is an expectation that greater reliance will need to be placed on electricity going forwards – even if in combination with gas through the use of hybrid heat pumps for example. At present this is a ‘difficult sell’ because, from a consumer perspective, gas is a cheaper way of heating your home, in part reflecting the fact that policy costs are primarily recovered through electricity bills (as shown in Figures 1 and 2). This distortion has been highlighted by the CCC, as discussed below, and points to the need to look at potential distortions from a whole system / cross-vector perspective, not just across electricity transmission and distribution as Ofgem have been doing to date.
- Looking longer term, hydrogen is likely to be a more expensive fuel source than conventional gas which will make any decision to move to hydrogen difficult to sell absent some sort of carbon tax to capture the externalities involved with conventional gas usage.

In summary **capacity is becoming more important as a driver of costs, time of use signals are becoming more**

important and there is a need for the first time to look across gas and electricity to support heat de-carbonisation.

With the rollout of smart metering there is now the capability to introduce much more sophisticated measurement and charging of end customer usage – including the sorts of capacity-based and time of use charging which are likely to be required - and to evaluate the effectiveness of any interventions.

While these are the high-level dynamics from an **economic perspective** there are wider issues that need to be considered in thinking about charging from a **consumer perspective**. Any structural changes in charges will inevitably create winners and losers, with a particular concern around the impacts on customers in vulnerable situations, as set out in the next section. This situation is further complicated as who wins and who loses will also be influenced by the ability of consumers to access the technology necessary to actively participate in future markets.



Charging principles

There are a wide number of academic and other studies, in GB and internationally, that consider the principles that should be adopted in considering charging. As set out in a paper for the Oxford University Integrating Renewables Programme⁹, the same broad principles are identified in almost all studies, as being:

- cost-reflectivity;
- fairness; and
- proportionality and practical consideration.

The paper finds that economic considerations and practicality feature in every instance – with fairness as a consideration in most, and a small number also identifying wider policy issues. In some of the jurisdictions considered energy companies are vertically integrated so these principles apply to end use pricing not just to network charging, which is Ofgem’s focus.

While there is a general consensus on the broad principles, questions remain on what should be considered under each of these headings (which are discussed in turn below) and how the trade-offs are made (which is considered further in section 4).

Our view is that given the imperative of a move to net zero, sustainability should be explicitly added to this list of high-level principles.

Cost reflectivity / economic considerations

In broad terms all commentators recognise the importance of sending cost reflective signals to encourage the efficient use of and future investment in the system. However, this has to be balanced against a requirement that is articulated explicitly by many

commentators (and is implicit for Ofgem) of ensuring recovery of regulated costs.

Following on from the principle of cost reflectivity Ofgem argues that fixed costs should be allocated so as to **minimise distortions** to the underlying cost reflective price signals. This is the essence of its Targeted Charging Review where it considers the residual element of network costs, which is needed to ensure full cost recovery but where there is no cost driver. This argument can also apply more widely to how other fixed costs in the system are recovered, including policy costs.

Historically for networks, cost reflectivity was seen as being about the long run marginal cost, reflecting the fact that costs were effectively fixed in the short run. Looking to the future there are more opportunities for consumers to respond to short term price signals and for distribution networks to use flexibility services to address short term constraints on the network – in the process reducing the need for costly reinforcement. Going forward the signals that are sent need to drive efficiency in *both* the **short and long term** when in practice these **signals may be in conflict** (e.g. a charge based on a high long run marginal cost may deter short term use that could be accommodated on the system). This needs more thought as part of Ofgem’s work on forward-looking costs but one way of reconciling these could be for fixed charges (or capacity charges) to provide the long-term price signal while time of use based energy usage charges (or contracts for services) provide the short-term signals.

Focussing on the long-run costs can also be seen as a fair way of allocating the costs of the system, to align broadly with what drives overall costs.

Practical considerations and proportionality

While cost reflective prices are seen generally as the theoretical ideal there is consensus among

⁹ <https://www.renewableenergy.ox.ac.uk/wp-content/uploads/sites/4/2018/09/oxford-network-charging-190818.pdf>



commentators that consideration also needs to be given to practicalities.

The range of factors identified in terms of practicality varies (and they are often individually listed as principles rather than being grouped under a broad practicality heading). But broadly they cover:

- implementation costs / feasibility (including availability of smart metering);
- transparency / simplicity / ease of understanding (as pre-requisites for an effective signal to trigger customer response);
- predictability (both to help consumers in planning but also as a pre-requisite for customer response);
- avoiding unnecessary price volatility, which includes future proofing charging structures / arrangements so that they are not subject to frequent change.

In particular practicality is often seen as the **determining factor in the level of granularity that should be adopted in a move to more cost reflective charges** – with highly temporal or locational granularity creating practical challenges, for suppliers’ billing systems and for customer communication – which may out-weigh the potential benefits at stake.

Given the limitations in bandwidth in all actors in implementing change, and the associated costs in doing so, taking a proportionate approach which prioritises the initiatives that will deliver the greatest net benefits is important.

Fairness and other considerations

Fairness is not identified as a criterion by all commentators and is a difficult concept that means different things to different people. It has a strong ethical and indeed political angle to it. It is often easier to identify examples of what is “not fair” than to define precisely what is fair.

In its review of network charging Ofgem said it would focus in particular on the implications for vulnerable

customers but also commissioned an academic review looking at how fairness might be interpreted. This identified three conceptual approaches:

- **Equality:** where everyone pays the same;
- **Equity:** where people pay according to the use made of the system; and
- **Affordability:** where people pay according to ability to pay.

Implicit in this and an important angle in the current debate is the sense that it would not be seen as fair if some people could avoid paying charges altogether, as is currently the case with customers who have their own generation and can avoid fixed network and policy costs recovered through unit rates. This is what Greg Clark talked about in establishing the “no free rider” principle under which all customers should pay their fair share of energy system costs. However, this still leaves open what would be considered a fair share.

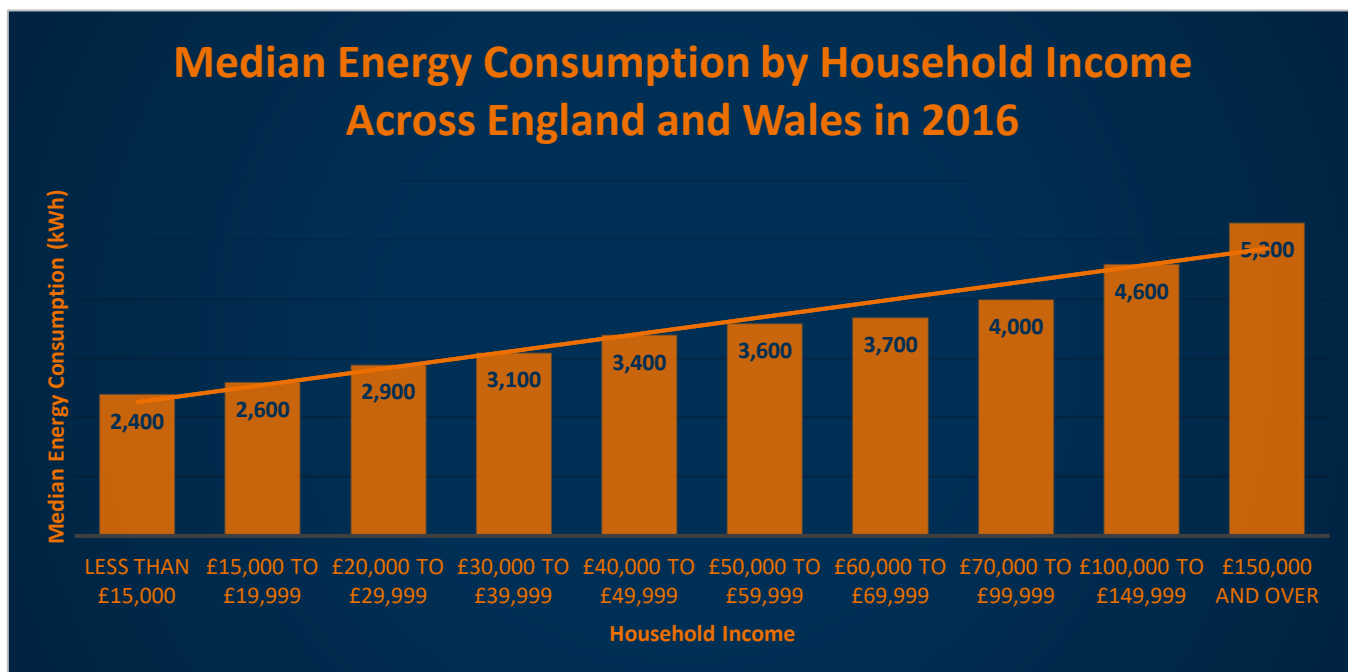
In Ofgem’s Targeted Charging Review (TCR) it considered the “no free rider” issue and proposed that the residual element of network charges (where there is no cost driver) should be recovered through a fixed charge which would mean that all domestic consumers would pay an equal amount. This in effect positioned the charge as entitling the consumer to use the system even if for the most part they generated their own energy. It was likened to insurance.

In its TCR proposals Ofgem sought to look at the impacts on different groups of vulnerable customers and concluded that there were winners and losers in all socio-demographic categories. However, what it missed was the **strong correlation between energy consumption and income which means that any move away from a usage-based charge towards fixed charges will tend to disadvantage those on low incomes**. This was highlighted in a report by Grid Edge Policy¹⁰ following a workshop hosted by Sustainability First.

¹⁰ Understanding the Impacts of Ofgem’s Targeted Charging Review – [Link](#)



Figure 1 – Median Energy Consumption by Household Income for England and Wales in 2016. Each median value is consistently greater than that of the previous household income. This is highlighted by the trend line shown in red. (source: Grid Edge Policy)



Given that in terms of charging issues, the most critical “fairness” factor should arguably be around the impacts on **customers in vulnerable circumstances** and in particular those on **low incomes**, moving to more reliance on fixed charges as the solution to the no free rider is problematic, whether in relation to network charges or policy costs. Instead the report points to the potential for **capacity charges to be less regressive than a simple fixed charge** as discussed further in section 4.

In considering the impacts of a move to half-hourly settlement and ultimately more time-of-use based charges the picture is more complex. A further report by Grid Edge Policy¹¹, drawing in part on earlier work by Sustainability First¹², showed that there is no obvious pattern in terms of demographics as to consumers’ profile of usage over the day with all groups showing, on average, a similar evening peak. However, there are very **significant differences in the pattern of usage between individuals** which would mean that the potential gains and losses faced by individuals could be very significant if these charges were reflected in end-user tariffs. Even if customers with peakier profiles chose not to move onto time-of-use tariffs, if suppliers saw them as having a higher cost to serve, they are likely ultimately to face higher charges. Further work is

¹¹ The Distributional Impacts of Half-Hourly Settlement – [Link](#)
¹² [https://www.sustainabilityfirst.org.uk/images/publications/other/Sustainability First - Discussion Paper by Jon Bird -](https://www.sustainabilityfirst.org.uk/images/publications/other/Sustainability%20First%20-%20Discussion%20Paper%20by%20Jon%20Bird%20-%20FINAL.pdf)

[Smarter fairer Cost-reflectivity and socialisation in domestic electricity prices - FINAL.pdf](#)



needed, with better data, to try to understand who the winners and losers are likely to be.

Since these reports were published Ofgem has committed in both its draft Vulnerability Strategy¹³ and its Strategic Narrative to do more to look at the distributional impacts of its policy decisions. This is welcomed as a shift away from looking at everything in terms of the “typical consumer”. However, as highlighted below what is also important is to look at the cumulative impact of changes - not just policy by policy.

Coming from a different angle, Sustainability First’s current **Fair for the Future project** is exploring changing expectations around fairness from a socio-political, environmental and economic standpoint. Our strawman ‘Sustainable Licence to Operate’ for the energy and water sectors is opening up a discussion around changing public expectations around fairness and what this means for roles and responsibilities for key actors. The strawman has also proposed a typology of fairness which we are now testing with stakeholders. Part of our hypothesis is that as fairness frequently involves balancing different interests, and questions of value judgment, it is essential that there is a step change in how stakeholders are engaged in deliberations as to what is fair – in a way that is meaningful to them. We return to this procedural fairness / process theme in section 6 below.

Other policy considerations – and the case for including sustainability

Looking across the literature, in terms of other policy considerations relating to charging, the one mentioned most often is promotion of **energy efficiency** (or more accurately demand reduction).

In other countries, for example, rising block tariffs (where you pay a higher unit rate for higher levels of consumption) have been used to promote energy

demand reduction, recognising that overcoming the consumer barriers to adoption of energy efficiency measures or behaviour change can also require an explicit incentive.

Another example – not explicit but widely understood to be a consideration at the time – is how the Triad element of transmission network charges¹⁴ played a role in reducing peak demand and avoiding generation margin issues (which is not strictly a consideration in setting network charges).

Ultimately where one is recovering fixed and common costs for which there is no cost driver there is no economic right answer and there is no reason why the recovery of these costs cannot be used to deliver wider policy goals (that might otherwise require the introduction of a specific incentive).

Thus, while Ofgem’s focus is on avoiding distortions in price signals for industry actors and creating a level playing field so that in particular different forms of flexibility and generation can compete on an equal footing, it remains open to government to decide that for wider policy reasons it wishes to tilt the playing field. For example, historically the levels of Feed-in Tariff were set at a generous level for domestic generation to stimulate consumer engagement in the energy market and encourage take-up of a new technology. If this remained a policy goal (or to avoid penalising those who have historically “done the right thing”) then removing the “distortion” that exists might simply mean that government would need to provide additional incentives to compensate.

Similarly levying policy costs based on electricity usage could be seen as a proxy for a stronger signal around the cost of carbon at a time when most electricity was fossil-fuel based.

Thus decisions on charging cannot be taken absent an understanding of their impacts on wider policy goals. In particular it remains open to government to decide that

after the event. Many users actively seek to anticipate when the Triad periods will arise and reduce demand in these periods to reduce their exposure to these costs. The Power Responsive Annual Report 2018 shows a Triad response of 2GW in 2017/18.

¹³ <https://www.ofgem.gov.uk/publications-and-updates/draft-consumer-vulnerability-strategy-2025>

¹⁴ For larger users, transmission charges are currently based on demand in the peak three half hours over the winter – assessed



the approach to allocation of fixed costs should support broader policy goals.

In our view, given government now has a legal target to achieve net zero emissions by 2050 – and given Ofgem’s acknowledgment in its Strategic Narrative of its duties to support de-carbonisation and to have regard to sustainable development - sustainability should be an explicit consideration in thinking about approaches to charging and cost recovery.

We would advocate that going forward sustainability should be added to the three principles that Ofgem and other commentators have historically adopted.

Sustainability is an important principle as it facilitates a more integrated approach to change, that balances environmental, social and economic outcomes, that is able to endure and deliver positive public interest outcomes over the short, medium and long-term. The UN’s Sustainable Development Goals, which the UK has committed to deliver by 2030, may provide a helpful framework here. It is worth highlighting that the recent 2019 UN SDSN assessment of UK delivery of the goals indicates that progress on reducing inequalities is stagnating.¹⁵

¹⁵https://s3.amazonaws.com/sustainabledevelopment.report/2019/2019_sustainable_development_report.pdf



Options for charging: finding the right balance

Trade-offs

As articulated in the last section, there is a broad consensus – across jurisdictions and across interest groups - about the **principles** that should be adopted in setting network charges (or in rate design more broadly) to which we would add sustainability.

There is also a general acknowledgment that some **trade-offs** are involved – for example in the level of granularity to which cost reflectivity should be taken - but with only limited discussion on how those trade-offs should be made.

In essence these trade-offs are a policy call and one would expect government to provide a clear policy direction, with Ofgem focussed on understanding how important in practice cost reflectivity is in a particular context as well as carrying out in depth distributional analysis.

The sorts of questions that one might ask in terms of assessing these trade-offs are often about the practical ramifications and context:

- If the discussion is around network charging how likely is it that any particular change in charging structure will ultimately be reflected in end user tariffs?
- How material are potential distortions in practice? What choices do customers have and how can they be expected to respond to price signals in practice?
- How are any distortions to be weighed against other considerations (e.g. if a move to more fixed charges is less distortive but results in poor paying more, as discussed above)?

- What other distortions exist in the system already that these distortions may reinforce / offset (e.g. lack of carbon tax / cap for gas – not pricing in the value of the externality)?
- What wider policy goals could these “distortions” help or hinder (including in terms of unintended consequences) that would otherwise require a separate policy intervention (e.g. FIT needing to increase if network cost savings fall? Incentivising EV users to adopt smart charging model? Overcoming inertia around energy demand reduction?)

An overview of US regulatory approaches (NARUC 2016) says “Rate design .. is often said to be more art than science”, noting that while there is often agreement on the goals and principles, parties will value and weight these goals and principles differently.

This reflects the view of one of the early thinkers in this space (Bonbright 1957) that “this attempt to make rates perform multiple and partly conflicting roles calls for wise compromise, and the key to wise compromise can seldom be found in any simple formula or in any simple measure of economic optima”.

In short, at present **much of the debate around charging led by Ofgem is seen as a technocratic issue debated among industry experts and economists, with consumer impacts buried in technical annexes of lengthy consultations.**

There is a **need for this debate to be broadened out to bring in both the voice of the consumer and wider policy considerations from government.**



Cost-reflective charges – how far to go?

Where there is a clear cost driver the economic argument is that charges should be set on a cost reflective basis. The trade-offs that need to be thought about here are essentially then around the balance between the three high level principles of cost reflectivity, practicality and fairness – plus we would argue sustainability. The sorts of issues that need to be thought through, some of which were touched on above, are:

- What level of **locational granularity** is practical and would be perceived as fair? Currently network charges are uniform across each DNO's licence area (except for some larger customers who pay site specific charges). These variations are typically reflected in retail tariffs. In practice the costs of the network might vary down to feeder level but this is likely to be a level of granularity that creates both practical challenges (would suppliers want to have prices that varied at that level) and perceived fairness. Moving from distribution network charges that are the same across a DNO area to a "postcode lottery" world, of granular locational prices would be politically hard to justify.

It may be easier to explain that customers in certain areas can earn additional rewards from providing flexibility services the network needs at a particular time (and which aren't needed in other areas) than to justify marked differences in tariffs. This might suggest the use of ancillary service contracts rather than time of use charging as the way to deal with short term, very location-specific constraints. However, there may be a case to move to somewhat smaller charging areas than the DNO region if the cost drivers vary materially, for example between net exporting and net importing parts of that DNO network.

- How should **capacity charges** be handled? There are a number of different ways in which capacity charges could be defined – looking at "booked" capacity or actual usage; looking at the customer's own peak usage or looking at their usage in the system peak; what

period it is measured over etc In terms of cost reflectivity the argument would be that one should look at the system peak judged after the event (as happens now with Triad charging) but from a customer perspective – and certainly for domestic customers - that is problematic as the customer cannot know in advance what their charges will be.

In all these cases while an understanding of the cost drivers from an economic and engineering angle is important, it is equally important to think through how they would be **viewed from a consumer perspective**. Trying to answer in practical terms whether differences in charges are likely to be passed through to customers and whether they would then be able to understand and respond to the price signals is key to understanding whether or not the move to more granular levels of cost reflectivity would be justified.

While regulators may not want to second guess how the market and customers will respond this does point to focussing on an overall direction of travel and looking to move progressively towards greater granularity rather than necessarily moving all the way at once.

Fixed cost recovery

In thinking about how to recover the fixed costs of the system (including policy costs), the economic argument is that this should be done in a way that minimises the distortions to the underlying cost signals. However again this needs to be balanced with considerations of fairness and practicality. Conceptually there are a range of options for dealing with this issue:

- **Taxation** is invariably favoured by academics¹⁶ as a way of recovering the fixed costs of the system – as it avoids distorting energy price signals and is less regressive. However, we recognise that this may not necessarily be an option open to government given wider economic considerations and priorities and possibly prevailing ideology. That said the precedent exists of the Renewable Heat Incentive where costs are recovered through

¹⁶ <http://www.ukerc.ac.uk/publications/funding-a-low-carbon-energy-system.html>



taxation so some scope does exist and a clearer framework for thinking about cases where funding through taxation could make more sense might be helpful, in particular given the scale of investment needed to meet net zero.

- Use of a **proxy** as a basis for allocation that doesn't create distortions in the energy market and is fairer than simply fixed charges. For example, there is some academic support¹⁷ for using **council tax bands** in a similar way to how non-metered households are charged in water. However, we recognise there would be practical challenges with such an approach and the council tax arrangements are themselves the subject of much criticism so such an approach is unlikely to secure wide support.
- Focus on **minimising distortions** (e.g. move to more fixed costs) and then address fairness issues directly (e.g. through schemes such as Warm Homes Discount). There are arguments for taking such an approach but the concerns are around whether the mitigation would happen in practice (given the lack of clarity in terms of responsibility between government and Ofgem discussed further in section 7) and the fact that Warm Homes Discount as a scheme does not cover all low-income households but tends to focus on low income pensioners.
- **Capacity charging** of some form - more practical as a proxy and less regressive than a fixed charge (though there could be material issues around electrically heated homes). Some of the practical considerations with different forms of capacity charges are discussed further below.
- Stick with current usage-based arrangements (accepted as broadly fair) and **address distortions directly** e.g. through a fixed charge for the right to export¹⁸

- Design a **new framework** with fairness built in from the start, for example:
 - **Universal service charge with exemptions for those likely to struggle to pay.** As with the option above on mitigation through Warm Homes Discount there would be issues with ensuring that the exemptions are effective. Identifying relevant groups for passporting is difficult especially given the dynamic nature of vulnerability. However, this could be considered if, for example, the retail market review led to the creation of new Universal Service Obligation (USO) or 'social' suppliers who could then be exempt from certain charges.
 - Some sort of **essential energy allowance charged at a lower unit rate** (e.g. as a quid pro quo for introducing a higher fixed or capacity-based charge). This would create the sort of rising block tariff that has been advocated in the past¹⁹ as both helping those on low incomes and encouraging energy efficiency. It would also build on the suggestion made by Dieter Helm in his Cost of Energy Review that fixed costs should be recovered through usage above that essential level. However, in contrast to Dieter's approach, this formulation would also see at least some fixed costs recovered through a capacity charge which would help address the "no free rider" issue in a way that his would not.

Capacity charges for electricity – what might they look like in practice?

In terms of market evolution, and as indicated above, there are good arguments on both economic and fairness grounds for considering separate capacity (kW)

¹⁷ E.g. MIT 2016 Utility of the Future

¹⁸ Pollitt 2016: Electricity Network Charging for Flexibility by Michael G Pollitt EPRG Working Paper 1623 (September 2016)

¹⁹ Ofgem discussion paper: Can energy charges encourage energy efficiency (2009) – [Link](#)



and time of use based energy (kWh) charges as a central element of any future charging structure. There are also good arguments for considering some policy costs (such as recovery of the Capacity Market and CfD costs) as essentially driven by capacity and hence they should be considered as part of this picture. While the form of a capacity charge may well come out of thinking on what actually drives costs at a distribution network level, there are important practical and customer considerations as well.

In thinking about how to define capacity, from a forward-looking cost perspective what matters is arguably the actual peak usage at a system level (ex post). However, this is only known after the event and hence is poor in terms of providing cost signals to customers because they have to judge when the peaks will be, as happens now with Triad. Triad information services help customers identify when Triad periods are likely to arise but, as noted in the Power Responsive Annual Report Triad events are becoming ever more challenging to predict. This is reflected in the number of observed Triad avoidance days, which has increased steadily since 2009/10, hitting a peak of 49 days in 2016/17.

An alternative is to determine the peak **ex ante** so that the measure of capacity is linked to the customer's maximum demand in the evening peak period for example. A further option is to link capacity to the individual customer's own maximum usage, whenever that occurs. However, from a cost perspective in planning the distribution network reliance is placed on the diversity of demand and encouraging customers to reduce demand at a time that is not the wider system peak risks customers shifting to that peak and actually increasing costs.

If capacity charges are being used as a way to recover fixed costs, then the considerations are rather different. Predictability remains important (so ex ante should be favoured over ex post) and in so far as fairness is a key consideration then charges based on the individual's maximum load at any time might be less open to cost-avoidance than a system peak based measure. However, for Economy 7 customers account should be taken of the fact that they are primarily using demand off peak and from a fairness perspective, given that

today these are typically low-income customers, one would not want them penalised by such a capacity charge.

From a **customer perspective** the easiest to comprehend would probably be something linked, in effect, to the maximum load that you can use at any one time. This is the model adopted in France where the standard contract requires even domestic customers to set out what "size" circuit they wish to pay for. Historically this was linked to fuse size but part of the business case for smart meters in France is that it would allow these maximum load settings to be reconfigured automatically.

Another important design question is **what happens if a customer exceeds the capacity they have contracted for**. In France if you exceed your booked capacity then the fuse trips and you have to reset it (after switching off some devices). Clearly alternative models could include paying a higher rate for any usage above the threshold. This may appear inherently more customer friendly than cutting customers off but risks customers being unaware that they have moved into a higher charge zone (analogous to exceeding your allowed minutes on a mobile phone package which has been a significant consumer issue). Alternatives of short interruptions with automatic restoration or load limiting could be ways of alerting customers that they have exceeded their limits and the market may be able to identify other innovative solutions.

Care would clearly be needed in **how such charges were introduced** in a market that is not familiar with them but it should be possible to start from a position where (as now) customers have a much higher capacity allocated than they are likely to need unless they are charging an EV. Customers could then elect to move to a higher or lower capacity but would be doing so on an informed basis.

In **Ofgem's proposals for a capacity charge** for the residual element of network charges it was proposing a very basic form of nominal capacity charge that was the same for all domestic users except Economy 7 customers or very high users. There was no basis for



their proposed higher charge for Economy 7 customers in general given that many do still consume less than the mean across all households. Moreover, the majority of their usage is off peak and hence their demand at peak times would not be so high - which arguably should be a relevant consideration even as a basis for allocating fixed costs. Clearly, in any reforms particular attention needs to be paid to the impacts on those currently in electrically heated homes given that they are more often on low incomes.

Thought also needs to be given to the implications for new loads such as heat pumps, given the wider goals of heat de-carbonisation, and also cooling, which is likely to be a growing source of demand over time (albeit probably more among the better off).

Gas networks and the challenge of heat decarbonisation

Almost all the debate currently on charging is focussed on electricity and the issues there are perhaps more immediate. However, the question of how to de-carbonise heat is a massive policy challenge and early thinking is needed on how charging structures might help or hinder this aspect of the transition.

One factor, alluded to above, is that with policy costs loaded onto electricity rather than gas, combined with the lack of a carbon price on domestic gas use, there is a **distortion in the relative cost of the two fuels that acts as a disincentive on customers considering shifting to electric heating** – and indeed with electric storage heating often being replaced by gas as a cheaper solution for those in fuel poverty.

As highlighted by the Committee on Climate Change²⁰ one of the short-term priorities for heat de-carbonisation at household level is to *“tackle the current balance of tax and regulatory costs across fuels, which currently weaken the private economic case for electrification”*. Ofgem’s proposal for a separate higher standing charge for Economy 7 customers in the

Targeted Charging Review is an example of such a distortion in the price signals across sectors.

While there is not the same “free rider” issue currently in gas a similar challenge could arise longer term. On the assumption that the longer-term solution for heat will see more customers on district heat networks and using electric heat pumps, the historic costs of the gas network will be left to be recovered over a progressively smaller customer base pushing up the charges for those customers. This raises fairness questions (including inter-generational fairness) and risks distorted price signals as the cost of building a new district heating network, which involves genuine incremental costs, may appear cheaper than using the existing gas network where the costs are sunk.

How such stranded costs should be dealt with is a difficult issue with no easy answer – charging the remaining customers is problematic as set out above, requiring companies to take a hit would undermine the regulatory principle that companies are entitled to recover their efficient costs and support from government is unlikely to be forthcoming. Ofgem have therefore signalled in the RII02 price control that they are looking to minimise stranding risk. What they have not done however is revisit the depreciation rate for gas network assets. Depreciation should be based on the useful economic life of the asset and, if there is a significant risk of stranding, the asset life should be reduced. This would push up costs in the short term but might be fairer from an inter-generational perspective. This needs proper consideration.

The drive to heat-decarbonisation also requires significant investment in R&D, in particular around hydrogen. How the costs of this should be recovered – whether through bills or taxation – is an important question. The cost recovery mechanism chosen may also potentially impact on the scale of the solutions being tested and the rate at which new thinking and practice is disseminated across the sector – important issues given the net zero 2050 goal.

²⁰ <https://www.theccc.org.uk/wp-content/uploads/2019/02/UK-housing-Fit-for-the-future-CCC-2019.pdf>



In gas then, the questions are rather different to those in electricity. In electricity the focus is on how the costs should be recovered and on what basis between different customer groups (which is a conventional charging question). In gas the question is about what those costs should be recovered year-on-year, and how the externality of carbon emissions should be taken into account. This tends to point to the need, for example, for a carbon tax which raises further questions as to how that could be done in a way that will not cause undue hardship given the poor quality of our housing stock and the prevalence already of fuel poverty.

More radical proposals such as personal carbon budgets or supplier demand reduction obligations have been considered in the past – and were often seen as “fairer” solutions²¹ – but we do not underestimate the practical challenges that such approaches would involve.

²¹ Tina Fawcett – Personal Carbon Trading: A policy ahead of its time? (Oxford University)



Links to thinking on the future retail market

As set out above, the discussion to date has focussed on the charges levied on suppliers, whereas what matters to customers – and is central to questions of fairness – is the end user tariffs that they face. This raises a question as to whether - or how far - suppliers can be expected to reflect the underlying charging structures in their retail tariffs – and if not whether that matters. This needs to be considered in the current context, as Ofgem proposes to lift the price cap, and also in the context of the more radical changes being considered as part of the BEIS / Ofgem thinking on potential new retail market models²².

Interplay between the underlying cost structures and end-user tariffs

Ultimately, in a competitive market, one would expect the structure of end-user tariffs to broadly reflect the underlying cost structure - but the energy market is still far from a fully competitive market. The extent to which end-user tariffs will reflect underlying costs will in part depend on what happens with the price cap and any restrictions Ofgem may impose – as well as consumer acceptability and market forces.

In theory if retail tariffs do not mirror the underlying cost structure this creates an opportunity for competitors to undercut prices for certain groups of customers where the cost to serve is lower. For example, if some suppliers did not fully reflect higher fixed charges in their end user tariffs but instead charged higher unit rates, then competitors who charged the higher fixed charges and lower unit rates

would have an advantage in seeking to attract higher usage customers.

There could, of course, be valid reasons why suppliers might not reflect the underlying charging structure in their retail tariffs. This could include the costs and complexity of implementing certain tariff structures – which is why practicality is an important consideration in thinking about network charging and policy cost recovery. There is little point in agonising over questions of fairness in the design of network charges if suppliers, for practical reasons, are unlikely to implement such charging structures.

Another consideration is customer appetite for innovative tariffs. If suppliers believe that consumers would prefer simpler tariff structures and would not want to be exposed to the uncertainty involved in dynamic pricing, for example, then suppliers could be expected to continue to offer simpler tariffs. However, where suppliers take this price volatility risk on then, on average, tariffs are likely to be higher.

Another consideration is where suppliers might face greater or different political pressure around fairness and implications for customers in vulnerable situations. It is notable that in setting the price cap Ofgem set the standing charge at a lower level than a cost reflective analysis would suggest on the grounds that the market level at that time was lower and Ofgem did not want to increase charges for low income customers.

In its stakeholder engagement working paper²³ for the Access and Forward Looking Charges project Ofgem presents feedback from suppliers that most of them are unlikely to reflect different network charging structures in their retail tariffs, for the sorts of reasons set out above.

Where particular concerns potentially arise is if suppliers structure their end-user tariffs in a way that makes economic sense for them – by recovering more of their costs from sticky customers or from customers

²² <https://www.gov.uk/government/consultations/flexible-and-responsive-energy-retail-markets>

²³ https://www.ofgem.gov.uk/system/files/docs/2019/09/000_-_working_paper_-_summer_2019_-_engagement_with_industry_stakeholders_final.pdf



seen as in some way less desirable. Given this was the behaviour identified by the CMA and which prompted the introduction of the price cap, the question for Ofgem / BEIS is how far they believe this problem has been addressed by other reforms introduced since.

Within this scenario, one might argue that the focus should just be on protecting customers in vulnerable situations – not all customers who fail to engage. This might be dealt with through the mitigations / exemptions that we have argued are necessary in any event.

Whether this can be seen as adequate protection is inextricably linked with how one interprets “fairness” in considering the approach to the underlying charges. If that definition extends beyond simply protecting customers in vulnerable situations then there is a logic in wanting to see that underlying cost structure mirrored in retail tariffs.

If policy makers were concerned that a failure to reflect the charging structure in retail tariffs was going to lead to outcomes that were unfair and undermined the policy objectives that they had in mind when setting the charges they **could choose to mandate the structure of retail tariffs** to reflect these. Alternatively, they might mandate that particular tariff structures should at least be included among the tariff choices that suppliers offer. Separating out the network charges so that they are a clear pass-through cost would be another way of tackling that specific aspect.

Mandating the structure of retail tariffs cuts across what should be a core competence for suppliers of designing innovative and engaging propositions for customers, including the tariff structures. If suppliers face appropriate, cost-reflective, charges then in principle they have the right incentives to try to motivate customers to change behaviour (or to attract customers who have a lower cost to serve).

That said, there could be arguments for mandating tariff structures **to facilitate customers comparing tariffs** and to make competition more effective. For example, this could involve setting the level and structure of any fixed charge which is simply treated as a pass through. Competition would then take place around the level of any unit charges reflecting the risk the customer takes on (i.e. whether it is a dynamic tariff or not) and how well the supplier manages its hedging strategy on the wholesale side. At one point in its 2010-2013 Retail Market Review (RMR) Ofgem was considering such an approach (supported by Which? as making price comparison easier) but it did not pursue it as it was considered to hinder innovation in tariff structures. Dieter Helm proposed a similar model in his Cost of Energy Review. The impact on innovation is likely to still be a concern but as part of a move from a price cap world it may be worth considering again. If this approach is not taken then the case for fine tuning network charges is less clear if they may never be reflected in the structure of retail tariffs.

In the joint Ofgem / BEIS Flexible and Responsive Energy Retail Markets consultation they acknowledge this issue and commit to keep it under review: *“We will also look at how network and system price signals are incorporated into tariff design to incentivise customers to use energy at lower-cost times, and any resulting impacts on innovation and competition in the market. We may then revisit whether recovering these costs via suppliers is the most effective recovery arrangement”*.

The question of whether there is any case for mandating particular retail tariff structures may also depend on the **pace of change that is needed to deliver on de-carbonisation goals**. While Ofgem and government have consistently ruled out forcing customers onto time of use tariffs (in part because of a fear of a backlash against smart meters as has been seen elsewhere), with the move to ‘net zero’ there may be a need for more radical action sooner. In some jurisdictions (including California and Spain²⁴) dynamic time of use tariffs (in particular reflecting variations in

²⁴ <http://www.frontier-economics.com/uk/en/news-and-articles/articles/article-i6106-time-to-pick-up-pace-of-dynamic-electricity-pricing/>



the wholesale energy cost) have been made the default for households but with customers able to opt out.

Potential new market models

Ofgem and BEIS are currently undertaking a fundamental review of the **role of suppliers**. Some of the issues that are being considered as a part of this could lead to very different market models in future which need to feed into thinking around charging. For example:

- Customers in future could have **more than one supplier** if for example they were to lease an electric vehicle with energy as a part of the package or if they wanted to engage in peer to peer trading for some of their energy needs. This then begs the question as to which supplier would be responsible for the fixed costs of the network and for policy costs. Could the recovery of those charges be handled separately and transparently (e.g. by the distribution network itself?) in which case it would be clearer that the structure of those charges would be passed through rather than, as now, left to suppliers to package as they see fit. Under such arrangements, there would also need to be clarity in terms of responsibilities for redress etc when things go wrong.

- Ofgem are also reflecting on the **extent to which all suppliers should be required, as now, to provide universal service or whether some suppliers should be able to elect to only serve particular market niches**. One option would be to appoint (perhaps through auction) suppliers who are willing to take on the additional responsibility of universal service, with those additional costs potentially recovered across all suppliers. However, if such an auction failed to attract sufficient interest, the idea of creating a new default energy retailer designed with the specific purpose of providing services for customers in vulnerable circumstances and those that struggle to engage in smart markets, and funded by cross subsidy from the wider customer base,

²⁵ A possible parallel from the pensions sector could be the establishment of Nest as a default pension provider specifically created by Government as part of its Automatic Enrolment Programme to meet the needs of those on low to moderate

could be explored. Customers would of course be able to switch away from such a provider.²⁵ In this model the challenge of addressing fairness and affordability could be passed on to the USO provider with exemptions from certain charges for these designated customers. However, the dynamic nature of vulnerability could make identifying such customers challenging.

- While this is being discussed by Ofgem in the context of the current market, the issues become particularly acute in the context of the transition and the need to ensure that these customers are not left behind. Citizens Advice "Future for All" work²⁶ has highlighted potential barriers as including digital exclusion, inability to afford up-front costs and lack of motivation and trust. If not engaged these customers risk paying a disproportionate share of the costs of the transition;

- Ofgem are also reflecting on the **role of aggregators and Third Party Intermediaries (TPIs)** and the part they might play in the future energy system, including whether they need to be regulated. In the context of network charging, questions arise on whether short-run location specific constraints are better addressed through underlying network price signals (i.e. through locational dynamic time of use kWh charges) which may or may not be passed on by suppliers to their end-customers - or through the separate procurement of flexibility services. This is closely linked with how the aggregator / TPI market is likely to develop - offering flexibility and bundled energy services separate from the main energy contract.

- Finally, from a consumer perspective there is a parallel and important debate happening on the **scope for selling energy as a service which is particularly relevant in the context of heat de-carbonisation**. In such a model, consumers would not be taking decisions on their energy consumption per se but may be choosing between different levels of thermal comfort (which may include the system making trade-offs between gas and

incomes who were otherwise not engaged in saving for retirement in defined contribution schemes.

²⁶https://www.citizensadvice.org.uk/Global/CitizensAdvice/Energy/Future%20for%20all_FINAL.pdf



electricity usage with a hybrid heat pump). How the various changes being considered above would play out in relation to such tariffs again needs thought although intuitively it should not create a problem and the supplier of the service would simply face the right incentives in thinking about how to manage that service.

Wider fairness considerations

Aside from the level of charges the other aspect of fairness that requires attention as part of a move to potentially more sophisticated tariff structures is **how to support customers in vulnerable circumstances who might otherwise struggle to engage**. While concerns are often voiced about customers in vulnerable customers who cannot shift their load, we should arguably be at least as concerned about customers in vulnerable circumstances whose profile means they have a lower cost to serve (e.g. they have a flatter profile as a result of being home all day) but who are not engaged in the market and hence do not stand to benefit.

More generally in terms of the retail tariffs that might emerge as a result of a shift to more cost reflective charges, there is a need to reflect on what might be seen as fair tariffs. A **principles-based approach, based around treating customers fairly**, would seem to make sense as providing the flexibility to accommodate innovations in tariffs while protecting customers (i.e. avoiding the prescriptive approach that was problematic in RMR). It is vital that principles-based regulations do explicitly cover tariff structures and that it is made clear to suppliers that they need to think about a wide range of factors in the way they structure and market these tariffs including:

- the **nature of the tariffs**: if they are capped or leave customers taking the risk on price spikes; the amount of notice given on changes in dynamic tariffs and how customers are informed of changes; any restrictions on interruptions / load limiting as a part of the offer;
- **facilitating informed choice**: aiding comparability for example by having some basic time of use tariff structures that are common across suppliers; avoiding over-simplification in communications e.g.

not placing undue reliance on typical consumption values; considering the steps that need to be taken when advising on tariff suitability and the extent of data history needed to support that – including the role of switching sites; providing guidance on how savings should be presented as being both with and without behaviour change;

- **accessibility of benefits by all customers**: whether pre-payment customers can access the full range of tariffs; ensuring that disengaged customers who would benefit from a time of use tariff are offered one.

On time of use tariffs Citizens Advice have advocated discounts for load shifting rather than, for example, dynamic peak prices which could see consumers very exposed to spikes in wholesale prices. This makes sense but with a central question over how far Ofgem wants to mandate or preclude particular tariff structures. Ensuring that the ‘treating customers fairly’ principle clearly applies to the design of these more innovative tariffs might be one way of mitigating the impacts without unduly restricting innovation.



Getting the process right

The previous sections have set out some of the options and issues around a way forward on how we should pay for the energy system of tomorrow, with some suggestions from us on where we see options more or less favourably. However, **this is not intended to be a blueprint for how we should pay for our energy going forward.**

As has been highlighted the issues are complex but of fundamental importance to the achievement of both our de-carbonisation goals and fair outcomes for customers in vulnerable circumstances and a fair energy system more generally. As such we set out below some of the process steps that we see as critical to resolving these questions and ensuring an effective debate:

The need to look at the full picture

Ofgem produced two helpful overview documents in late 2016 and 2017. The first, on ‘regulatory stances’ sets out the five key principles that under-pin Ofgem’s work to deliver strategic outcomes for consumers²⁷. In relation to consumers in vulnerable circumstances this set out that *“cost to serve is not the same for all groups of consumers, but the cost of energy should not be disproportionately more for consumers in vulnerable situations”*. The second, on Ofgem’s ‘regulatory strategy’ indicated how the different elements of its smart systems work programme fitted together²⁸. What this latter document did not do however was to look at the **cumulative impacts of these detailed and fundamental electricity market reforms from the consumer perspective** (beyond noting the move to principles-based regulation) and in particular it did not address the distributional impacts.

Since then Ofgem have consulted separately on:

- proposals for the Targeted Charging Review (addressing a specific element of network charges – the ‘residual’ element).
- initial thinking on the reform of network access and forward-looking network charges (covering other elements of those same network charges).
- the consumer impacts – including explicitly the distributional impacts - of half-hourly settlement.

In parallel, ahead of half-hourly settlement, they have recently also approved a distribution charging modification DC268, which will have potentially significant impacts on how distribution costs are recovered from suppliers in peak- and off-peak periods for smaller non half-hourly settled customers but with no explanation of how this fits into the wider strategic charging reforms that Ofgem is considering.

Since these documents were published Ofgem has produced a Strategic Narrative setting out much more clearly how it sees its role in de-carbonisation, reflecting its statutory duties including on sustainable development. **On the basis of this we would argue that sustainability should be given a stronger focus in the way Ofgem considers charging issues.**

In its Strategic Narrative (and also its Vulnerability Strategy) Ofgem committed to do more to understand the distributional impacts of its policies. To understand the scale of the distributional impacts it is vital that Ofgem looks across these different strands of work at the cumulative impacts and also works closely with government as they look separately at how policy costs should be recovered in the context of the “no free rider” principle.

Furthermore, to understand the scale of the distributional impacts for end-customers, Ofgem needs to look strategically, beyond these detailed and technical work programmes on electricity network charges, to consider potential implications of new business models and the future of energy supply,

²⁷ <https://www.ofgem.gov.uk/publications-and-updates/ofgems-regulatory-stances>

²⁸ <https://www.ofgem.gov.uk/publications-and-updates/our-strategy-regulating-future-energy-system>



including options to ensure fairness beyond the current price-cap.

As a part of looking at the full picture there is a need to think also about gas and the de-carbonisation of heat as well as the implication of new loads for transport, and cooling.

The need for a wider public debate on fairness and the principles for cost recovery in this new world

As highlighted above there is a broad consensus around the principles that should underpin charging but where the real challenge lies is in how to trade-off between them (which in part is a matter of judgment and values and in part depends on the specific case in hand) and how best to think about 'fairness' which is essentially a socio-political and ethical concept not an economic one.

It is for this reason that regulators have generally stayed away from distributional issues – but what Ofgem are having to do here, as they re-invent the regulatory framework through fundamental reform, inevitably takes them into that space as their reforms have significant impacts that they cannot ignore.

These are big issues – too big to relegate to the annexes of highly technical consultations. They merit a much deeper and more open debate than is possible through such consultations - on which consumer organisations with limited resources have only limited ability to engage.

There is therefore a **need for a far more strategic, deeper and richer debate about how we should pay for our energy system going forward and what is 'fair'**. This also includes issues of inter-generational fairness which Ofgem has no current framework for addressing but which comes up in the context of the RII02 price control both through some of the detailed financing changes but also in relation to the big question of potential stranding of the gas network. This links to the need for a consistent approach to charging in the short, medium and long term.

These are deeply technical questions but this should not preclude Ofgem from working to try to bring in a consumer and people centred perspective. There are many ways in which this could be done. For example, through use of deliberative techniques such as citizens juries where significant time is taken with the people involved to take them through all the issues and arguments and where they are specifically invited to consider things from a citizen (rather than personal) perspective. There are likely to be useful lessons from the joint Select Committees' Citizens Assembly, announced in June 2019, on combatting climate change and achieving the pathway to net zero.

The **alternative is for government, democratically elected, to take a stronger, strategic lead** on the distributional impacts arising from the re-balancing of network charges and wider approaches to policy costs and their reform.

The need for clarity on the respective roles of government and Ofgem around distributional issues

Historically major distributional issues around energy charging – and the potential rebalancing of charges - have been seen as being for government.

Going back to the early days of privatisation the principle was established whereby all customers in a DNO area would be charged the same for network usage regardless of the additional costs of reaching remote areas for example. It was government that led on the introduction of a subsidy for customers in the North of Scotland and government that put in place the Warm Home Discount social tariff (albeit building on a voluntary scheme that Ofgem had overseen).

That approach worked when the decisions taken by the regulator affected all customers equally (give or take). However, where we stand now is that the decisions being taken by Ofgem on technical issues such as fundamental reform of network charges may have very significant distributional impacts and create winners and losers across the board that may be difficult to unpick going forward.



In their Strategic Narrative²⁹, Ofgem do acknowledge this issue and indicate that they will be taking it into account in the way that we have been arguing that they should:

“We will find ways to establish the impact of our individual and combined regulatory decisions on different types of household consumers, including vulnerable ones. We will also take a cautious approach to unwinding cross-subsidies that benefit vulnerable consumers, particularly where demand is unresponsive to even sharp price signals”.

If changes are made, one solution would be for the adverse effects of the changes on consumers in vulnerable situations / low income customers to be mitigated by changes to the Warm Home Discount. But this leads to questions around where responsibility lies.

Ofgem would argue that decisions to provide support for customers in vulnerable situations through social tariffs is a role for government not the regulator (and questions around who should get such tariffs is indeed more appropriate for elected government). In its regulatory stances Ofgem makes clear that “government lead on those matters primarily oriented towards substantial cost redistribution”. While Ofgem says that it would “consider potential interventions and permit industry cross-subsidy where there is evidence that consumers in vulnerable circumstances are disproportionately affected” it sets the bar high for so doing.

However, at the same time, **government seem to argue that network charging reform is a technical matter for the regulator**, implicitly distancing itself from any strategic need to address unintended consequences and distributional ramifications and again the Strategic Narrative seems to point to government wishing to move away from direct decision making in the energy market. In its Strategic Narrative Ofgem commits to calling out policy gaps and this would seem to be a good example.

²⁹ <https://www.ofgem.gov.uk/system/files/docs/2019/07/our-strategic-narrative-2019-23.pdf>

As with the wider smart systems programme, the **answer is for Ofgem and government to work more closely together on this aspect of the transition**. It would seem right for government to provide a strong steer on the extent of protections desired for vulnerable low-income customers in terms of the impacts on bills and more widely on questions of ‘fairness’.

Government is anyway thinking about these issues as they look at how best to reform the way that policy costs are recovered to deliver on the ‘no free riders’ principle and also the challenge from the Committee on Climate Change about how the recovery of policy costs through electricity bills currently distorts the incentives around heat decarbonisation.

A degree of real politic is also needed here. Brexit and political instability may make it more difficult for government to take the lead in an appropriate and timely way. Yet again this points to the need for these issues to be considered by all actors in the round and for a broader debate on the merits of different models.

The need for better data to underpin policy making and regulatory oversight in this new data-driven world

The other challenge that emerges as one looks to explore the distributional impacts of these different policies is the **paucity of data that exists for policy makers** (and stakeholders) to use.

Sustainability First and the Centre for Sustainable Energy have been exploring the case for smart meter data to be available for public interest purposes (essentially for public policy) through a series of research papers and policy dialogue with a **smart meter data Public Interest Advisory Group (PIAG)**³⁰ comprising government, the regulator, consumer groups, industry actors and wider stakeholders. Our conclusion is that there are routes that government could take to obtain better data under their existing legislative powers and

³⁰ <https://www.smartenergydatapiag.org.uk/>



that they will be flying blind as they look to oversee an increasingly data driven sector if they do not do so.

The BEIS Energy Data Task Force published a proposed strategy for energy market data on 13 June 2019 and embodies a principle that market data (not customer data) should be 'presumed open' subject to sufficiently addressing consumer, cyber and / or commercial sensitivity. Ofgem is now actively considering how to take forward the EDTF recommendations in its own work and recently published a blog³¹ on big data and the importance it attaches to having the data it needs and managing it intelligently. But currently there is no good dataset that will allow policy makers (or those looking to engage in the debate) to properly understand the distributional impacts of a move to half-hourly settlement for example.

The need for radical, strategic thinking but from a consumer perspective

Recognising the fundamental changes that are taking place in the energy system there is a need for an **open-minded discussion around how we pay for the costs of our energy**. Radical change could well need radical new solutions / approaches, in particular so that certain customer groups are not left behind in the transition. Some different approaches have been floated over the years but dismissed as too big a shift. While practicality is important, if there ever was a time for a radical, strategic review of what the transition means for customers in terms of how energy system costs should be recovered and how the price-cap can fairly and credibly be ended, that time is now.

This means thinking about **how fixed costs should be recovered and how far cost reflectivity should be pursued** – but also how far these underlying cost signals should be encouraged / permitted / required to translate into end consumer tariffs, and where, within all this, the energy as a service model comes in as well as implications for the future retail market.

A proper public debate is now needed on how we should pay for energy going forward and to bring the consumer and citizen voice into the process (as Ofgem is committed to doing for RIIO2). Radical changes are hard and can impact different groups of customers in different ways. But Ofgem's reforms are doing that anyway under the guise of a technocratic exercise. In section 4 we set out a range of different ways that the fixed costs of the system could be recovered. While a move to capacity charges, for example, could be seen as disproportionate in the context of dealing with one specific element of charges it may not be so once one looks at charging in the round. Similarly, ideas such as an individual allowance of low cost energy - creating in effect a rising block tariff - have been debated previously and merit consideration once again as part of more radical reform.

We also highlight in the context of heat de-carbonisation the need to revisit ideas around a carbon tax or personal carbon budgets.

Of course, from a consumer perspective what matters is the form of the supplier tariff which may reflect the underlying network charge structure to a greater or lesser degree. This points to the need for joined-up thinking to include the potential reforms of the retail market as highlighted in section 5.

³¹ <https://www.ofgem.gov.uk/news-blog/our-blog/using-big-data-empower-energy-consumers>



Conclusions

We have not sought in this paper to present a blueprint for charging in the future. However, we do believe that a number of trends are important:

- a **focus on capacity** (kW) as well as energy consumed (kWh) is fundamental and would reflect what drives costs, avoid some distortions and potentially be fairer than a simple fixed charge. Further thinking is needed on different models and the consumer lived experience of this;

- **time-of-use price signals** will become increasingly important to drive the right behaviours around smart charging and the growth of demand side flexibility;

- there will be **winners and losers** and mitigating action is needed to protect those on low incomes in particular, with thought given to the ability of different groups to engage;

- there is a need to **look across gas and electricity** to ensure that the right signals are being sent to support **heat de-carbonisation** that an undue burden is not placed on electricity-only customers.

Sustainability First is generally supportive of the direction of travel as being to provide cost-reflective price signals to market actors which will drive innovation and help market actors to incentivise and motivate customers to play their part in keeping the energy system in balance, leading to a more efficient energy system overall. We also recognise that a greater proportion of system costs will be fixed going forward, as low marginal cost energy becomes increasingly prevalent. However we maintain that **energy efficiency and demand reduction remain absolutely crucial and should be supported through the structure of charging.**

Within this we have identified a number of questions that require further analysis and debate, in particular:

- Do we expect suppliers to reflect the underlying cost structure in their tariffs? And, if not, is that a problem?

- How do you best mitigate the effects of structural changes in tariffs for those on low incomes or in vulnerable circumstances? Whose role is it to identify who needs protection (Ofgem or government)?

- How do you pay for the significant costs of moving to net zero? At what point would higher costs being recovered through bills (rather than tax) become untenable?

- If you move to more emphasis on capacity charging what is the right form of capacity charge? Could that be combined with some low-cost essential energy allowance to create in effect a rising block tariff?

- What would be seen as fair in terms of differences in local charges at a very localised level? How far would differences in heating costs (allied to different technologies used in different areas) be seen as acceptable / equitable?

Overall, we are concerned to ensure that the **critical dual goals of de-carbonisation and maintaining affordability of energy (given it is an essential service) are not jeopardised by the cumulative impact of detailed market reforms and that the distributional impacts are properly understood.**

As such we wish to highlight some **fundamental requirements** needed to shape a more strategic approach going forward and ensure what we have termed **procedural fairness**:

- the need to look at the **full picture**
- the need for a **wider public debate** on fairness and the principles for cost recovery in this new world
- the need for **clarity on the respective roles of government and Ofgem**, in particular on **distributional impacts**
- the need for **better data** to underpin policy making and regulatory oversight in this new data-driven world
- the need for **radical, strategic thinking from a consumer perspective** including how the cumulative impact of the changes in input charges will ultimately be reflected in end-tariffs for customers.



About Sustainability First

Sustainability First is a think tank and charity that promotes practical, sustainable solutions to improve environmental, economic and social wellbeing.

We are a trusted convenor on energy and water issues and have a strong track record of bringing stakeholders together in multi-party projects in the public interest. Find out more about our work here:

<http://www.sustainabilityfirst.org.uk>

Sustainability First's Fair for the Future Project is helping to address the 'big picture' on fairness in the energy and water sectors. It has two workstreams: developing a 'Sustainable Licence to Operate'; and mapping political and regulatory uncertainty and risk as this relates to fairness and the environment.