Ofgem Forward Work Programme 2021/22 Consultation Response:

I am writing in response to your consultation on your Forward Work Programme for 2021/22, specifically with comments in relation to Point 5 Full Chain Flexibility and Point 6: Future of Retail.

I agree with the aims and objectives of the these Points but I believe there is a topic which is an important enabler to these but which is not currently mentioned specifically within your programme and I would suggest has received insufficient attention to date, not only within the Forward Work programme but more generally, broadly summarised:

Facilitating domestic flexibility by ensuring consumers can access and benefit from the load control capabilities of the UK smart metering system.

I would like to provide an outline of why I believe this topic is important, some of the current problems in this area and suggest more specific problem points which I believe Ofgem should consider as part of its future programme.

Background:

The roll-out of smart meters and market reforms to provide half-hourly metering and migration to market-wide half-hourly settlement (MHHS) are key enablers for domestic demand flexibility, allowing suppliers to offer new time of use (TOU) tariffs and potentially simple Demand-side Response (DSR) services in the future.

However crucial to domestic consumers engaging and using their flexibility to benefit from these reforms and new tariffs is the ease, or difficulty, with which they and their electrical appliances and equipment can receive and respond to signals; price signals from tariffs and control signals to help them automate their flexible loads and appliances. The availability of control signals for use by appliances and equipment simplifies the burden on the consumer when interacting with static TOU tariffs and is essential for interaction with DSR services and more advanced dynamic TOU tariffs.

I would suggest that unlocking domestic flexibility depends on solving two essentially different problems; the energy market reforms to address the metering and settlement problem and solving the signalling problem; simply stated, how do you get signals from a 'transmitter' in the energy system, typically the supplier and their tariff, to the 'receiver'; an appliance or a piece of equipment in the consumers home? In terms of the characterisation of this second problem, this is a telecommunications problem rather than a energy markets problem.

It is also a challenging telecommunications problem because of the requirement for inter-operability; 60+ domestic energy suppliers, hundreds of tariffs, hundreds of consumer equipment manufacturers, equipment which will be installed by tens of thousands of electricians and installers for millions of UK electricity consumers and all within the context of open, competitive markets which require that consumers can freely switch between any energy supplier and tariff, purchase equipment from any manufacturer, for installation by any electrician or installer and that equipment needs to be able to receive and operate with the signals provided by any supplier's tariff, a supplier and tariff which may change numerous times over the life of the equipment.

One solution, in theory, is the UK smart metering system which can provide a

standardised, secure telecommunication system for sending load control signals between the energy supplier to the consumer's home, using the load control capabilities within SMETS; the inclusion of Auxiliary Load Control Switches (ALCS) and Home Area Network connected ALCS (HCALCS), to allow the provision of load control signals to the consumer to use with their appliances and equipment. The supplier adopts the electricity smart meter (ESME), can configure the ALCS or HCALCS calendar which sets the default load switching times to reflect the consumers tariff periods or potentially consumer preferences, and can send Ad-hoc switching commands for DSR services or Dynamic tariffs.

In theory, the consumer connects equipment to the ESME using the ALCS or HCALCS, to receive the load control signals, allowing it to interact with the consumer's tariff, for example running automatically during off-peak periods, avoiding critical peak periods. It simplifies future tariff interaction as the ALCS/HCALCS calendars can be updated during tariff changes. It also means the equipment could respond to ad-hoc switching, to provide simple DSR services.

Barriers:

The UK smart metering could, in theory, be a solution for providing load control signals to support domestic flexibility but in practice, when you examine how consumers might access the load control signals, from the ALCS relay built-in to their smart meter or connecting devices to their HAN, when you trace the signal chain starting at the energy supplier through to consumer equipment, end to end and how the consumer's equipment is connected to the ESME, it is clear there are currently very significant barriers preventing consumers connecting their own equipment to receive these control signals.

Asking basic, simple questions demonstrates the problem:

1. Do UK smart meters make the ALCS control signal available to consumers to connect to their own equipment to, for example to suitable EV chargers or heat-pumps ? ***No, there is no accessible connection point for a consumer or installer to receive the ALCS signal on a typical SMETS-2 smart meter. Connections are behind the sealed meter covers, accessible only to the supplier and the meter provider. There is no consumer accessible connection point.***
2. Is there a process, or a standard request the consumer can raise with their supplier to get access to the ALCS load control signal from their smart meter in preparation for installation of an EV charge-point, or heat-pump or other flexible load. For example by the supplier providing a connection point accessible to the consumer's electrician? ***No.***
3. Can a consumer buy a HCALCs module and connect it to their HAN and use that instead? ***No – retailers are not offering HCALCs for sale. A consumer cannot connect devices to their HAN themselves, they would need to do this via the supplier or other DCC party.***

With consumers, installers and equipment manufacturers unable to access the load control signals from the UK smart metering system, it is not a currently a viable solution for controlling consumer equipment for most homes. Therefore when consumers and equipment manufacturers seek solutions for how loads and appliances can interact with energy tariffs, or participate in DSR services this forces the use of alternative solutions, either basic options like simple timer switches, or for smart appliances typically equipment-specific, proprietary controls using internet apps and portals, accessed via the consumer's

WiFi, broadband or mobile networks and this is rapidly emerging as the de-facto solution for new smart appliances.

Internet based solutions typically lack the very robust cyber security, interoperability and energy system integration that smart metering potentially provides but they have the crucial advantage of being a functioning solution which is easy to use and is flexible; it is possible for manufacturers to build internet-connected smart devices because the barriers to entry are low, and for a consumer to connect it to their broadband router and get it working in their home. Clearly this is the most crucial factor, it must work. But this isn't currently possible with devices using the smart metering system and unless something changes, it appears the smart metering system will not be used for load control in the emerging areas of EV charging, heat-pumps and new electrical heating installations, smart metering will largely be relegated to legacy, off-peak storage heating purposes.

Taking a wider view of access to signals from infrastructure, the current situation with UK smart metering shares features with telecoms back in the late 1970s before the market was liberalised. Consumers did not have a right to connect their own telephone equipment, did not have a demarcation point at the phone master socket where they could easily connect their own equipment. There was no consumer market for telephones because consumers could not connect them to the infrastructure.

Similarly today with smart meters; there is no default consumer right or means to access the load control signal from the ALCS relay built-in to their smart meter, is no demarcation point with a simple, standardised connection point to receive the load control signal and connect it to consumer equipment such as EV chargers or heat-pumps, or other flexible loads. There is no way for a consumer to connect a HCALCS to their HAN, so there are no retailers offering HCALCS devices for consumers to purchase.

Our rights as consumers to easily buy, connect and use telephony equipment in our homes came as a result of market liberalisation driven by Oftel now Ofcom, which has a statutory duty to encourage the availability of easily usable apparatus. Indeed the definitions within that act raise an interesting question, whether this duty on Ofcom might extend to smart appliances and smart equipment; these being apparatus which include the receiving of signals, transmitted by an electronic communications network, between things, for the actuation or control of apparatus:

Communications Act 2003, Section 10:

Duty to encourage availability of easily usable apparatus

(1) It shall be the duty of OFCOM to take such steps, and to enter into such arrangements, as appear to them calculated to encourage others to secure—

(a) that domestic electronic communications apparatus is developed which is capable of being used with ease, and without modification, by the widest possible range of individuals (including those with disabilities); and

(b)that domestic electronic communications apparatus which is capable of being so used is as widely available as possible for acquisition by those wishing to use it.

….

(4) In this section “electronic communications apparatus” means apparatus that is

designed or adapted for a use which consists of or includes the sending or receiving of communications or other signals that are transmitted by means of an electronic communications network.

...

(6) In this section "signal" includes—

(a)anything comprising speech, music, sounds, visual images or communications or data of any description; and

(b)signals serving for the impartation of anything between persons, between a person and a thing or between things, or for the actuation or control of apparatus.

I would suggest that Ofgem in seeking to encourage Full Chain Flexibility should consider adopting a similar principle and examine the current regulatory framework covering consumer access to smart meter load control signalling and their rights to easily connect equipment.

It is a broad area but there some specific topics which I would suggest Ofgem might wish to consider further as part of its future work:

1. Consumer access to ALCS signal from their smart meter:

Most SMETS-2 ESMEs have an ALCS relay already built into the meter; a small, low current switch capable of providing a control signal to a piece of connected equipment. Some suppliers already use this to control a power contactor, a high current switch, used to supply off-peak storage heating, immersion heaters, typically in those homes that had pre-existing off-peak heating circuits controlled by the previous meter. Most UK homes do not have off-peak electrical heating, so the ALCS relay is not connected to any equipment.

The electrical connections to the ALCS relay are located behind the meter covers, physically secured behind the utility seal which prevents the consumer, electricians and installers from accessing it. This control signal could be used to provide a simple TOU control signal to suitable EV chargers, heat-pumps, or other fixed equipment, indeed there are already some models of EV charger and heat-pumps on the market which could use this, but this is not currently possible because the signal is inaccessible to the consumer.

Looking outside the UK, French smart meter consumers can already do this. The French smart metering programme uses the 'Linky' smart meter, it also has a built-in control relay (referred to as the meter's 'dry contact'). The connections to this are accessible to consumers and electricians who can connect equipment to it and manufacturers are already producing products like smart EV chargers to use this.

Further, this capability is advertised to the consumer, see Enedis consumer information guide (in English): https://particulier.edf.fr/content/dam/2-Actifs/Documents/Documents-Site-Anglais/Notice_compteur_Linky_Monophase_anglais.pdf

A consumer in France can easily connect flexible loads and equipment to the control signals provided by their smart meter allowing it to automatically interact with their tariff, enabling a flexible energy system, something not currently possible in the UK, but which ought to be possible.

2. Consumer-focussed process for connecting devices to the HAN:

As consumers we take it for granted that we are free to purchase and easily connect devices to our home WiFi network; we can connect them and set them up ourselves without needing our broadband supplier's involvement or approval. The freedom, flexibility and efficiency this provides is why it is becoming the de-facto solution for smart appliances.

The current situation with the smart metering system and the process by which consumers purchase devices and how they might connect the devices to their HAN is very far from this level of simplicity and ease, indeed is it even possible for a consumer to purchase a HCALCS and connect it to their HAN?

I recognise that security aspects may mean smart metering can never match the simplicity of WiFi networks for device connection and set-up, but if it is going to be used for control of consumer devices then there has to be an efficient, standardised and above all easy process by which consumers can have devices connected to their HAN and configured for use.

3. All energy tariffs must include a default ALCS/HCALCS calendar that can be applied to the meter during tariff changes, to ensure interoperability with smart loads.

One of the principle benefits of using the smart metering system for load control is the interoperability it provides between the energy system, the consumer's tariff and the smart appliance. But for this to function requires energy suppliers ensure that smart meter ALCS and HCALCS calendars are correctly configured to match the consumers tariff.

The correct setting and updating of the ALCS and HCALCS calendars during supplier and tariff changes becomes important because it is likely to drive the default operation of any connected smart devices. If the calendar times do not reflect the tariff structure then the outcome for the consumer would be poor; unnecessarily higher costs by running outside off-peak periods or inconvenience of loads being switched at inconvenient or incorrect times.

Currently, with most consumers settled on a non-half-hourly (NHH) basis any ALCS calendars typically follow the meter's standard settlement configuration (SSC) and time pattern regime (TPR) which rarely changes.

But in the future, with the move to MHHS when meter points will not have fixed SSC/TPRs, and every TOU tariff may have different peak and off-peak times, then every time a consumer changes tariff this may require an update to their ALCS/HCALCS calendars to reflect their new tariff.

As an example, with NHH settlement a customer with an Economy 7 meter and tariff switching between suppliers will normally retain the same SSC/TPR and the same off-peak times even as they switch suppliers. But with MHHS there is no reason why this would be true, Supplier A may have an Economy 7 off-peak period 00:00-07:00, Supplier B may opt for 23:00-06:00, Supplier C may have 22:00 – 05:00....

This is already being seen with some of the new, innovative tariffs like EV charging tariffs where there is no standard off-peak duration or start time and where it is unclear whether

suppliers are always updating consumers ALCS calendars when they switch between these tariffs.

To ensure interoperability between smart appliances and tariffs, Ofgem should consider what requirements apply to suppliers to ensure that ALCS/HCALCS calendars are defined for all tariffs and that consumer's ALCS/HCALCS calendars are updated when consumers switch between suppliers and tariffs.

Conclusion:

In summary I would suggest that Ofgem, when approaching the energy system flexibility challenge broadens its focus, considering not only the typical energy market topics which dominate but also the telecommunications problem; how does that signal chain which starts in the energy market with the supplier and their tariff, passing through the smart metering system and ending at a piece of equipment in a consumers home, how does it function?, most importantly does it function? And what needs fixing to make it function?