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Which?

Technological change and innovation in the GB energy market - how might it be impacted by the default tariff price cap?

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Cornwall Insight has been commissioned by Which? to examine the possible impacts of the proposed default tariff price cap for energy on innovation (e.g. technological, commercial, contractual) in the sector.

In this report, we examine the underlying legislative framework in the energy sector, the rate at which innovation has occurred in the sector and its impacts on customers and customer engagement, and draw parallels with price caps in other energy markets and sectors.

We also gauge the possible outcomes of the cap through interviews with industry participants to ascertain their views and whether the cap will succeed in its objectives.

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Getting to grips with the intricacies embedded in energy and water markets can be a daunting task. There is a wealth of information online to help you keep up-to-date with the latest developments, but finding what you are looking for and understanding the impact for your business can be tough. That's where Cornwall Insight comes in, providing independent and objective expertise. You can ensure your business stays ahead of the game by taking advantage of our:

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1. Executive summary

Cornwall Insight has been commissioned by Which? to examine the potential impact that the proposed Domestic Electricity and Gas (Tariff Cap) Bill ("the Bill") on energy suppliers' default tariff products will have upon technological change and innovation in the GB energy market.

This report presents Cornwall Insight's findings, including interviews with participants across the energy sector to gauge their views on the default tariff cap and its implications, and examinations of the impact of price caps on innovation in other markets.

1.1 Background to the default tariff price cap

Announced in October 2017, the Bill introduces a requirement on Ofgem to cap energy tariffs for approximately 11 million households that are on their respective energy supplier's default tariff, such as their standard variable tariff (SVT) products – the objective being to keep these users' energy costs down.

Due for introduction by the end of 2018, the cap will remain in place until at least the end of 2020, during which time it will be subject to six-monthly review. Ahead of the end of 2020, Ofgem will make a recommendation to the Secretary of State as to whether the cap should be extended beyond this point, with the possibility of it being extended annually until 2023.

The cap follows the introduction of a similar arrangement for the 4 million customers on pre-payment meters (PPMs, the "safeguard" cap) in April 2017 – this being brought in at the recommendation of the Competition and Markets Authority (CMA). This followed the conclusion of its investigation into the GB energy market, in which it also rejected plans for a wider cap, such as that being introduced for default tariffs under the Bill. The PPM cap was subsequently extended at the end of 2017 to a further 2 million customers to cover customers of Warm Home Discount (WHD) mandated suppliers.

There is no specific reference in the Bill to the default tariff cap as a facilitator to innovation. Rather, the impact assessment for the cap[1] states, "*Strong competition is the best way to protect the interests of customers, drive good service, improve value and incentivise innovation*."

Published in May 2018 as part of the consultation documents, Ofgem's "Initial View on Impact Assessment"[2] on the default tariff cap describes innovation as relating to "*both improved product and service quality and enhanced process effectiveness*" as opposed to technological innovation per se. Ofgem's Policy Consultation document on the default tariff cap[3] states that, "*the most important thing we have in mind when making our decisions*" regarding the cap is the protection of customers on such tariffs, adding that this is the regulator's "*ultimate objective*".

1.2 Innovation in the energy sector

From the perspective of the energy sector, a distinction may be drawn between two types of innovation:

- **Evolution** of existing products and services, including smart home devices, development of comparison websites into app-based tools; and

[1] https://www.parliament.uk/documents/commons-committees/business-energy-and-industrial-strategy/Impact-Assessment-Draft-Domestic-Gas-and-Electricity-(Tariff-Cap)-Bill-29-November-2017.pdf
[2] https://www.ofgem.gov.uk/system/files/docs/2018/05/appendix_14_-_initial_view_on_impact_assessment.pdf
[3] https://www.ofgem.gov.uk/publications-and-updates/default-tariff-cap-policy-consultation-overview

- **Revolution** through disruptors joining the energy sector, such as peer-to-peer (P2P) trading through blockchain, localised approaches to energy generation and supply, collective engagement and cooperative purchasing.

The development of existing services has expanded through the increasing number of partnerships and joint ventures that have been undertaken by energy suppliers already active in the sector. As a result, this evolution has been undertaken largely within the confines of the existing legislative and regulatory framework (see Section 3).

Disruption, by contrast, has typically been the focus of new actors joining the energy sector with a view to trialling alternative approaches and business practices. Such companies include (among others) technology and software providers, automotive companies and battery storage providers.

To facilitate entry, Ofgem and those bodies responsible for industry codes have adopted a more flexible approach to regulation and code changes, as well as pursuing industry modifications that aid in the development of IT systems and practices intended to be more conducive to these different approaches.

1.3 Innovation and the role of regulation

As the body responsible for implementing the default tariff cap, the core challenges for Ofgem are to:

- Work with suppliers, customers and customer bodies to communicate the transitory nature of the price cap and promote the wider benefits of engagement;
- Ensure a proactive regulatory regime that both encourages the evolution of existing services and encourages disruptors to join the sector to provide new business models and technologies;
- Give disruptors a forum within which to test their ideas, potentially through local energy projects or an alternative structure, like its regulatory sandbox approach that it introduced in 2017;
- Minimise regulatory uncertainty from the cap by communicating effectively and decisively its plans for changes to the cap and its possible extension past 2020; and
- Provide clear insight on convergence of key industry workstreams due for implementation by 2020, the collective changes and how they interact with one another, given their different rates of implementation.

Addressing these points will help to foster an environment that facilitates entry, encourages innovation and yields economically advantageous outcomes for customers.

Energy suppliers' ability to innovate is determined – and to a certain extent, constrained – by the provisions of their supply licences. However, Ofgem is currently reviewing the "supplier hub" approach – in which the energy supplier is the main interface a customer has with the energy system – and whether it is still fit for purpose, particularly given the growing shift away from traditional retail business models (see Section 3.4).

In the face of a constantly evolving regulatory climate, one of the greatest challenges to innovation is that many potential fundamental changes to the industry are still in their early stages, and there is a concern – voiced by interviewees – that there is a lack of coordinated thinking from a legislative perspective.

"(There is) a lack of consistency and joined up policy making. It is very difficult for private capital to operate in this changing marketplace."

Anonymous

Overall, the experience to date of the interactions between regulation and disruptive business models is that legislative obligations may discourage untried and untested approaches, and there is therefore a risk that such new business models may be scaled back in the presence of such barriers – a view expressed by

Ofgem itself. This will delay or reduce the possible customer – and wider industry – benefits that could result from their introduction, or could scupper them completely.

A concern from the investors in the sector that were interviewed was that the introduction of the default tariff cap risked limiting possible rates of return in the sector, thereby affecting the ability to raise capital to fund investment in new business models and practices.

1.4 Price caps and innovation: Lessons from other markets

The experience from other markets (set out in more detail in Section 6) demonstrates that price caps are not necessarily incompatible with innovation, although they may limit the rate at which innovation occurs. Such outcomes depend upon a range of factors including (not exclusively):

- The underlying structure of the market;
- The structure of the cap itself;
- How suppliers react to the cap, and particularly how they seek to attract customers;
- The ability of disruptors and new providers to enter the market;
- The level of engagement from customers and their demand for innovation; and
- The flexibility (or lack thereof) of the underlying regulatory framework for the market.

For example, the water and sewerage supply industry in England and Wales has seen considerable innovation in the areas of recycling, flood detection and prevention and customer service – all within the boundaries of a price control structure. This shows that innovation can and does occur – doing so in a market that only explicitly incorporated it into its price control structure in recent years.

Likewise, the broadband and telephony market in the UK – where caps are based on facilitating entry rather than retail competition – has witnessed considerable customer and technology-led innovation, reflecting broader social and behavioural change and a growing disruptive influence. As a result, the regulatory regime has had to be flexible enough to adapt to both without comprising customer interests or quality of supply

The GB energy market's PPM cap (in place since April 2017) shows the ability of energy suppliers to be more innovative in their offers through, for example, online manageable, smarter-metered tariffs with easier access to top-up and emergency credit. Those suppliers that have already carved a niche as PPM specialists have diversified into other sectors, while the convergence of PPM tariffs around the cap has seen suppliers take new steps to differentiate their PPM brands.

The Italian energy experience is that innovation can and does occur in a smart meter enabled, retail price cap environment – and also one in which customer switching rates are not particularly high. The situation in the energy sector in California shows that while innovation has occurred under the tariff cap – in this case being driven by a combination of technological change, state subsidy and customer demand – the regulatory regime must be sufficiently flexible to accommodate this.

From the perspective of the default tariff cap, these examples demonstrate the potential for innovation in an arena within which customer engagement is actively promoted and new business models are given support to flourish – thereby yielding a virtuous circle of engagement, entry and innovation. The cap is therefore not an enduring solution to the perceived structural problems facing the sector and should not be presented as such, but rather as the transitory measure it is intended to be.

1.5 What impact will the price cap have on innovation for different industry groups?

The benefits from innovation are typically not uniform across and within the different participants in the energy sector. For example, experience from a range of markets and economic theory indicates that there will be first-mover advantages for those companies able to react and tap quickly and effectively into an

evolving market. Likewise, the use of internet-only tariffs by energy suppliers – which are commonly cheaper than their offline counterparts – shows that customers without online access may be disadvantaged.

The risks for **customers** in a rapidly-evolving market could include a mounting complexity of products that makes comparing providers more difficult, reduced customer choice in the presence of mergers and consolidation in the sector, and that those customers that continue to reject overtures to engage in the sector are "left behind" and fail to fully experience the benefits of innovation.

Ofgem's 2017 survey on customer engagement in the energy sector[4] notes that the characteristics of these "*contented conformers*" show that they are comprised of an older demographic with a lower than average household income and low levels of internet usage, i.e. those for whom saving money on their energy bills could be particularly beneficial. Such distributional impacts will represent a major challenge to Ofgem and Government in their consideration as to whether the cap will be judged a success.

Supplier responses to the default tariff cap will depend upon their individual business models – i.e. their approach to defending profit margins or their market share, or potentially exiting the industry completely. This will affect competition, customer choice and – in turn – innovation. The industry is already seeing suppliers change their stance towards their default products as part of wider measures to innovate and pursue greater engagement from customers, moving customers off such offerings onto fixed-term tariffs.

"You may see more consolidation and de facto switching through corporate deals [i.e. consolidation]," it was noted by one respondent – citing the merger between SSE and npower – while the cap was also cited by Flow Energy as one of the reasons for the sale of its business to Co-Operative Energy in April 2018.

Whilst under current industry rules and codes suppliers remain very important actors in the sector, the advancement of technology and new entrants in the smart home sector opens space for challengers to emerge, some of them already large and experienced operators in other domestic service sectors. As this unfolds, it is likely to put pressure on regulators and policy makers to think about how to accommodate them, and the benefits they could bring to consumers.

As well as being responsible for implementing the cap, as the sector **regulator**, Ofgem must foster an environment within which existing participants can allow their business models to evolve. Unlike the system of network regulation which - since 2013 - has incorporated specific streams to promote technological and commercial innovation, the default tariff cap does not contain any such direct provision to reward or support innovation.

From a regulatory perspective, one of the main challenges for Ofgem is to encourage the entry of **disruptors**. While the supplier hub model is designed for traditional business models, Ofgem has also stated that it may also be a barrier to their disruptive counterparts[5]. In the presence of such barriers, they may scale back the extent of innovation in their trials and aspirations such that they are compatible with the prevailing regulatory framework. For a completely new offering, these barriers can be particularly challenging and illustrate the potential in methods such as Ofgem's sandbox approach as a means by which to trial these in a more flexible regulatory structure.

At the same time, local energy models represent a crucial medium for proof-of-concept trials, in some instances these having been enabled by derogations to industry codes and other flexibility from the regulator. This less prescriptive approach will remain essential to ensure that such schemes are not discouraged.

1.6 Customer-facing innovation in a smart meter environment

Although an important catalyst to customer engagement and the ability of suppliers to offer innovative products and bundled offerings, the example of the Italian energy market (see Section 6.1.3) shows that smart

[4] https://www.ofgem.gov.uk/system/files/docs/2017/10/consumer_engagement_survey_2017_report.pdf
[5] https://www.ofgem.gov.uk/news-blog/our-blog/do-supplier-hub-market-rules-need-reform

meters may not be a panacea to the challenge of low levels of customer participation – an important point to note given the underlying environment in which the default tariff cap has been proposed.

Both the PPM cap and the default tariff cap will be in place until the end of 2020 in the first instance, this being the date by which energy suppliers are obligated to have offered all household the option of a smart meter. Having commenced earlier in the decade, the roll-out of smart meters is continuing, and while around 20% of the c.50 million gas and electricity accounts now have one, at the current rate of installation only half of GB accounts will have one by the end of 2020.

The deployment of smart meters is viewed as an important initial step in promoting customer engagement in the energy market, facilitating behavioural change and opening the door to a range of new tariff and product offerings. Some of these offerings are already available in the GB energy market, including:

- Time of Use (ToU) tariffs: By having different prices for energy at different times of the day, these are intended to incentivise customers to engage with the energy market by moving their consumption from higher to lower-priced periods, either by choice or through some degree of automation;
- Next Generation Intermediaries (NGIs): These include concierge services which can automatically switch suppliers on behalf of customers, as well as app-based systems;
- Integrated energy systems: In combination with a ToU tariff, incorporation of onsite generation and battery storage deployment in the home, as well as smarter charging of electric vehicles (EVs); and
- Bundled service offerings: Moving beyond the traditional business model of energy supply into areas such as home services (e.g. boiler repair), connected home products (e.g. smart thermostats) and other app-enabled and web-enabled products. This service-based approach has seen notable expansion in recent years.

To expand the potential for wider customer benefit, and to enable suppliers to offer these products and more to a wider market, the default tariff cap is therefore intended as a stop-gap measure. Evidence from the interviews gathered for this report indicates that smart meters and ToU tariffs together have the potential to be next main innovative step in the energy sector, but that this is dependent upon greater customer engagement and interaction.

"The key enabler is the smart meter rollout, but all of this relies on a degree of customer involvement, which can be enabled by smart meters. The customer interface and customer experience is very important. Customers need to buy into the concept of changing (their) behaviour,"

Supplier (Large)

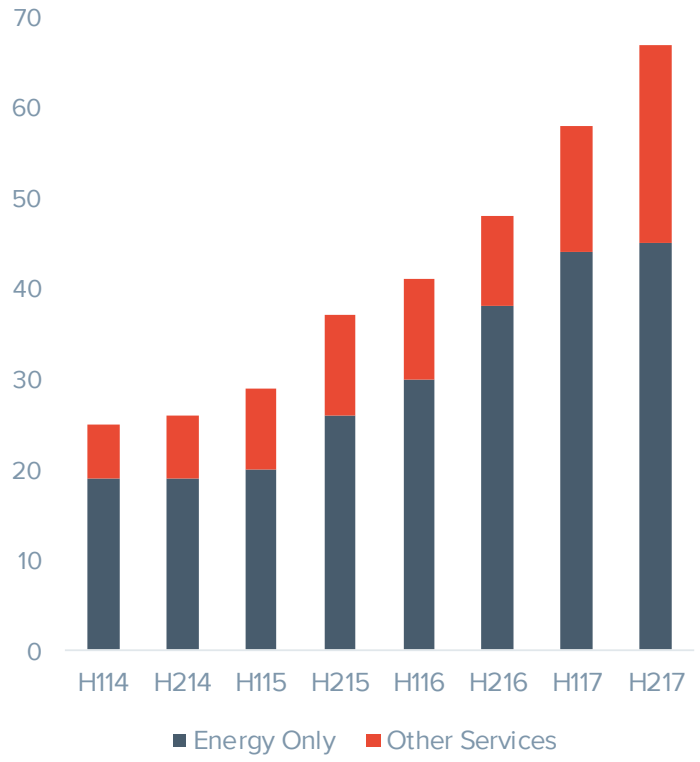
There are already a range of innovations that could benefit consumers, but there is potential for even greater benefit by combining these in a smart meter-enabled energy system in a connected home. Many suppliers have therefore already evolved their business model beyond an energy-only offering into one based around bundled services and more innovative products – aiming to grow consumer trust and loyalty over time. This holistic approach to energy and home services also serves the dual benefit of differentiating suppliers from one another, while helping to mitigate any pressure on retail margins that may result from the default tariff cap.

Looking at the experience of the industry to date (Figure 1), since the start of 2014 the proportion of suppliers providing more than just energy has risen from approximately a quarter to a third, with products relating to home services and the connected home seeing the most growth[6].

[6] Since the start of 2014, the number of domestic suppliers has increased from 25 to 67 as at the end of the first half of 2017

The development of bundled services means that there will be increased potential for different types of new entrants, with a growing technology focus rather than the traditional energy supply model. This will be driven by customer needs, technological advances and proactive responses from suppliers – enabling, and being driven by, greater customer engagement.

Figure 1. Number of suppliers participating in adjacent markets (Source: Cornwall Insight analysis)



"Smart meters are the most important enabler. There is a link between the price cap and the smart meter roll-out. If the price cap is set too low, suppliers may not have the funds to invest in these, and it could further compound disengagement,"

Supplier (Large)

In recent years, there has also been an increasing emphasis on "smarter" flexible arrangements at the local level. These could result in innovation projects being of greater interest to the increasing number of unconventional suppliers and other disruptive business models. Schemes here have included the growing use of self-supply to local businesses and residents and a broader deployment of technology to solve a problem specific to a part of the electricity network, e.g. insufficient capacity to accommodate the growing need for renewable generation.

In addition to the direct potential benefits of such innovations in the form of lower bills for participating customers, these innovative solutions can be used as a means by which to defer or scale back network expansion plans – thereby reducing investment costs and further benefitting customers. Given that such local projects are reliant on customer engagement, there is a risk that the price cap could be viewed as an enduring solution to energy costs, serving as a disincentive to participate in such innovative schemes.

Local energy projects provide a guide for communicating the benefits associated with engaging in the energy sector – whether such benefits are financial or (in the case of local schemes in particular) in terms of promoting broader social cohesion. Such communication could be through public forums, outreach programmes or direct door-to-door contact, and to mitigate the possibility of reduced engagement from customers who may perceive the price cap as a long-term solution to managing their energy costs.

"Most people will hear a very simple message - the Government is now looking after you when it comes to energy prices."

Supplier (Large)

Technology is also providing other methods for consumers to engage with the energy market, as the traditional price comparison website (PCW) business model is being supplemented by the emergence of next generation intermediaries (NGIs). These companies are based largely upon access to consumer data and/or a customer relinquishing control of their switching to the service provider, e.g. automated switching services and app-based comparison and switching tools.

1.7 Supplier innovation in response to the price cap

As stated, the development of supplier business models in response to customer needs and the rate of technological change – as well as the need to differentiate themselves from their competitors – is a strategic response. This was highlighted in the interview responses from the supply community, with the relevant companies presented as three archetypes:

- Archetype 1: Big Six supplier[7];
- Archetype 2: Medium-sized supplier[8]; and
- Archetype 3: Small supplier[9].

The underlying trend of innovation will continue under the default tariff cap, although the extent to which it is accelerated or slowed by the cap will depend upon the collective supplier response to the cap and their ability to adapt to customer needs. With smart meters seen as the catalyst to greater engagement, new and alternative business models represent perhaps the best way to tap into this opportunity.

Possible responses by each of the supplier types to the cap are therefore presented in Figure 2, these reflecting the behaviour witnessed in the sector to date and interviewee feedback.

"There are two extreme responses. First, extreme cost reduction to maintain the viability of your existing business. Secondly, a strategic response to the cap to diversify more quickly away from the traditional energy retail model. The first is a short-term response, the second longer-term. Unfortunately, the cap risks undermining innovation...if there is a short-term focus,"

Supplier (Large)

"It (the impact of the cap) will depend on the business model of the supplier - those who rely heavily on standard variable tariff customers will see negative impacts, those who have moved away and invested will do well,"

Supplier (Large)

In each of the cases in Figure 2, it is assumed that customers are encouraged to move from their respective supplier's default tariff and on to a new (and uncapped) product – a transition that is already underway, with some suppliers looking to remove their traditional default products completely (see Section 7).

Furthermore, while fixed term deals may become an energy supplier's new default option, in many instances, these uncapped fixed-term deals have been priced at similar levels to default offers – meaning that the cap will have relatively little financial benefit for those customers that do not choose to engage with the market once their fixed deal expires. Likewise, those customers that choose to remain on a default product will have some financial protection from the cap, but that by failing to engage, they will not experience the full benefits that could be yielded by engagement.

[7] Assumed to have more than 1 million customer accounts, this type of supplier has a relatively large proportion of its customer base on default products (no less than 25%) and therefore has a larger than average exposure to the cap. Archetype 1 suppliers have historically been reliant on revenues provided by their default tariff customer base.
[8] Assumed to have between 250,000 and 1 million customer accounts, this type of supplier has a smaller proportion of its customer base on default products (between 10% and 25%) and therefore has a material but not atypically large direct exposure to the cap.
[9] Assumed to have less than 250,000 customer accounts, this type of supplier has a little or no (no more than 10%) of its customer base on a default product, and therefore has a minimal direct exposure to the cap.

Figure 2. Supplier archetypes and possible strategic responses to the default tariff cap

Supplier Archetype	1: Big Six	2: Medium-sized	3: Small
Products	Introduce new products and/or tariff offerings to move customers off default tariff products	Introduce new products and/or tariff offerings to move customers off default tariff products	Introduce new products and/or tariff offerings to move customers off default tariff products (if applicable)
Bundled services	Yes - through acquisition or partnerships, potentially with companies outside of the energy sector	Yes - through joint ventures, potentially with companies outside of the energy sector	Yes - through joint ventures, potentially with companies outside of the energy sector
Focus	Reducing costs while defending market share, but accept that will lose some customers	Focus on reducing costs while targeting increased market share from customers leaving Archetype 1 suppliers	Focus on reducing costs while targeting increased market share from customers leaving Archetype 1 and Archetype 2 suppliers, but remain below 250,000 accounts May no longer be able to aggressively compete on price and may leave the sector
Merger or acquisition?	Merger with Archetype 1, possible takeover of lower archetypes	Possible merger with fellow Archetype 2 supplier or acquisition of Archetype 3	Possible takeover target for higher archetype suppliers
Examples	SSE, npower	First Utility, Ovo Energy	Flow Energy, Octopus Energy

Source: Cornwall Insight

"If the cap is too low, companies will be hit and there will inevitably be less money and less willingness to invest in new opportunities and could have a major cooling effect on the level of investment across the energy space. If it is set too high, then the money will still be there but it will be politically unacceptable and the energy suppliers will get the brunt of it and hamper investor confidence,"

Supplier (Large)

"It (the cap) will negatively impact cash availability and restrict the ability to make investments in innovation. It risks having customers just switching off from the market if they think that the Government is looking after them. The price cap in the UK is not going to help to attract investment,"

Supplier (Large)

As suppliers look to further differentiate themselves, they will seek new business models and partners to help them do so. The emergence of such opportunities will encourage companies from beyond the traditional energy space to join the industry as disruptors – a development which is likely to encourage further evolution of business models at the national level.

1.8 Price caps and innovation: The broader market context

There are broader regulatory factors and market changes that may overshadow the default tariff cap for certain parts of the energy market – a number of which coincide with decisions regarding the future of the cap. These include:

- The deadline by which energy suppliers are required to offer smart meters to domestic customers;

- Introduction of half-hourly settlement for electricity, which is intended to further augment the benefits of smart meters and ToU tariffs;
- Introduction of next-day energy switching, which is intended to promote greater engagement by customers;
- Changes to the supplier hub principle that has underpinned the energy sector since privatisation, and which may make it easier for disruptors to enter the market;
- Transition to subsidy-free, small-scale low-carbon generation that may influence the commercial attractiveness of investment by homeowners and the development of community and local energy schemes;
- Removal of the 'whole of market' requirement for price comparison websites to display all tariffs by default[10], which may affect the way in which supplier offers are presented in the future, and may affect smaller suppliers in particular;
- Central government targets for the electrification of transport, as well as broader structural developments regarding the UK Government's Industrial Strategy; and
- The possibility of a General Election in the early 2020s, which may yield considerable economic uncertainty and which may influence the decision of an incumbent Secretary of State as to whether to extend the cap.

As many of the industry's fundamental changes still in their early stages, there is a concern – voiced by interviewees – that there is a lack of coordinated thinking from a legislative perspective.

[10] Introduced in 2015 as a means by which to aid switching and tariff transparency, this requirement was an obligation on comparison sites to show all tariffs available in the market by default – even if a website user could not switch to them through the site in question (so-called "fulfillable deals"). The CMA subsequently recommended that having tariffs that could not be accessed through the site itself was confusing to customers and had adverse consequences for suppliers and comparison sites alike. Ofgem is currently consulting on removing this obligation with a view to doing so later this year.

2. The default tariff price cap proposals: Rationale and overview

The price cap for customers on default energy tariff products

- The default tariff price cap will be introduced by the end of 2018 and will be in place until the end of 2020 at the earliest;
- It will be subject to six-monthly reviews and will be formally reviewed at the end of 2020, at which point it may be extended annually until 2023;
- It will cover 11 million customers in England, Wales and Scotland who are currently on a default product, such as a standard variable tariff (SVT);
- It is being introduced following the establishment of a cap on customers on pre-payment meters (PPMs) in April 2017, this being implemented on the recommendation of the Competition and Markets Authority (CMA);
- However, the CMA did not recommend introducing a wider tariff cap, such as an arrangement covering default tariffs, stating that it would have adverse consequences for energy customers and for the industry as a whole;
- Industry participants interviewed for this report have stated that the cap is a politically motivated decision that is not compatible with a deregulated, competitive market structure.

Although still used for the regulation of network charging, price caps for customer tariffs in the GB retail energy markets were largely phased out at the start of the Century, having been used in the early post-privatisation years of the gas and electricity sectors. Here, the tariff caps were used as a transitional measure to protect consumers from the perceived market power of the then-incumbent formerly monopoly suppliers until a more competitive market structure had developed.

As presented in Section 6, this continues to be the rationale for applying such a price cap approach in a range of markets – including the network operations of the British energy market. Here, networks are treated as natural monopolies, i.e. an industry in which it is most efficient for production/operation to be concentrated in a single firm. To ensure that these natural monopoly companies do not collect excessive profits, they are subject to price controls, which – in in the case of electricity and gas networks – are overseen by Ofgem.

The current system used for GB network regulation is "RIIO" Revenue = Incentives + Innovation + Outputs[11]. This ties the **revenue** which network companies are eligible to earn to the delivery of specific **outputs** (such as reliability & availability, customer satisfaction, and safety); **incentives** to encourage the delivery of primary outputs through either additional or reduced revenues, and providing money to undertake **innovation**.

However, the proposed price cap for the 11 million customers in England, Wales and Scotland who are currently on a default product - such as a standard variable tariff (SVT) - will see the establishment of a cap in the retail market. While a price cap for customers of pre-payment meters (PPMs) was introduced on the recommendation of the Competition and Markets Authority (CMA) following its investigation into the energy sector[12], the CMA rejected the possibility of a wider tariff cap – stating that it would result in adverse consequences for customers. Specifically, the CMA warned that such a wider cap risked "*reducing the incentives of suppliers to compete, reducing the incentives of customers to engage and an increase in*

[11] The current RIIO price control runs for eight years, from 2013-21 for transmission and gas distribution companies, and 2015-23 for electricity distribution companies.
[12] https://assets.publishing.service.gov.uk/media/5773de34e5274a0da3000113/final-report-energy-market-investigation.pdf

regulatory risk." Despite this view, the Government confirmed its plans for the default tariff cap in October 2017.

2.1 Introduction of a "safeguard" price cap for pre-payment meter (PPM) customers

As stated, Ofgem introduced the PPM price cap (the "safeguard" tariff cap) in April 2017 at the direction of the CMA. The CMA's investigation into the GB energy market (which concluded in mid-2016[13]) identified a high level of detriment to PPM customers due to them facing actual or perceived barriers to switching, the technical restraints of PPMs, and low incentives for suppliers to actively compete for their business.

To protect these consumers until greater access to smart metering mitigated some of these issues, it directed that a transitional cap should be introduced to prevent PPM customers paying above a certain level annually, and that it should remain in place until the end of 2020. The level of the cap is updated every six months and is based on the CMA's methodology of supplier costs.

Initially covering around 4 million households using PPMs, Ofgem subsequently decided to extend the PPM price cap to also cover customers of Warm Home Discount (WHD) mandated suppliers who are on default tariffs and currently receive the WHD, or received it in the previous scheme year. This expansion was implemented in February 2018 and will end in December 2019, or when the government's broader cap comes into effect, whichever is first. The experiences of the operation of the PPM cap to date are presented in Section 6.1.1.

2.2 Introduction of a price cap for default tariff customers

Following the introduction of the PPM cap in April 2017, the possibility of a broader price cap was one that saw cross-party political support. First proposed by then-Labour leader Ed Miliband in 2013 and a manifesto commitment in the 2015 General Election, it subsequently became a manifesto commitment from the Conservative Government in the 2017 General Election – despite the rejection of such a move by the CMA.

Prime Minister Theresa May announced at her party's conference at the start of October 2017 that a temporary cap on default tariffs would be introduced[14], with the draft bill published thereafter[15]. This draft bill was subject to consultation and review by the BEIS Select Committee, following which the Government introduced its Domestic Gas & Electricity (Tariff Cap) Bill - enabling absolute price caps on energy bills to the House of Commons on 26 February 2018[16].

The Bill puts in place a requirement on Ofgem to cap energy tariffs at an absolute rate per unit of energy from as soon as possible in 2018 (expected to be in December 2018) and until at least the end of 2020, for customers in England, Wales and Scotland currently on their supplier's default energy tariff. The choice of 2020 as the initial expiration date for the cap reflects the fact that this is the deadline by which suppliers are required to offer smart meters to domestic customers.

In setting the cap, Ofgem will also consider the need to set it at a level that enables suppliers to "*compete effectively for supply contracts*", as well as "*the need to maintain incentives for customers to switch and the need to ensure that efficient suppliers are able to finance their supply activities*".

[13] https://www.gov.uk/cma-cases/energy-market-investigation
[14] https://www.conservatives.com/sharethefacts/2017/10/theresa-mays-conference-speech
[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/651268/CCS207_CCS1017179938-1_Draft_Domestic_Gas_and_Electricity.pdf
[16] https://services.parliament.uk/bills/2017-19/domesticgasandelectricitytariffcap.html

The link between competition in a market and innovation has been the subject of numerous theoretical studies and – in real world environments – innovation is a benchmark of a competitive market, this in turn benefitting consumers. While determining a specific causal relationship between competition, innovation and consumer benefit is not necessarily straightforward, new entry, greater customer choice and more varied products and service offerings can be expected in a market that breeds competition and innovation.

As far as the default tariff cap is concerned, there is no specific reference to it facilitating innovation, rather the impact assessment for the cap states[17] that, "*Strong competition is the best way to protect the interests of customers, drive good service, improve value and incentivise innovation*."

Although it will be in place until 2020, Ofgem will recommend whether it should be extended annually up to 2023. In line with the recommendations of the BEIS Select Committee that reviewed the draft legislation in late 2017, the Government will ensure Ofgem reviews the level of the cap every six months with a view to resetting it if needed[18]. These updates will be made every April and October to align with changes to the PPM cap. However, since implementation is expected to take effect in December 2018, the first cap period will therefore be less than six months[19].

At a high level, **the overall view from the interviewees for this report was that the impacts of the cap would depend upon the level at which it was set.**

"It (the cap) will work against consumer interests as (it) will dis-incentivise investment and switching, and will in turn work against innovation and customer service,"

Supplier (Large)

"If there is an appetite for consumers to engage with the energy market, then that appetite will remain (under the cap) and will be met by innovative retailers, regardless of whether the cap is there or not. The cap will just set a baseline around which competition and innovation adapt,"

Technology provider

As part of the consultation process on the draft bill, some energy suppliers made representation to the BEIS Select Committee warning of broader adverse consequences from the perspective of innovation. Several respondents expressed concern that the use of a cap risked jeopardising investment and innovation in the energy sector, with some suppliers also warning that the fact that the cap was to be introduced without a right of appeal to the CMA could compound this. Specifically, some suppliers identified the lack of independent review would adversely affect perceptions of risk in the sector – and in turn, the cost of capital, investor confidence and a willingness to innovate.

[17] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/683938/tariff-cap-bill-impact-assessment.pdf

[18] BEIS has also taken account of the Committee's recommendation to add in safeguards for the exemption of green tariffs from the cap. These ensure that where consumers make an active choice to opt for a green tariff it is only exempted where Ofgem is satisfied that the tariff supports the production of renewable energy.

[19] As per the existing price caps, Ofgem also intends to set a different cap level for each charging region, subdivided by meter type (single-rate electricity, multi-rate electricity, and gas). Additionally, it is intending to include further subdivisions by payment method (standard credit, direct debit, etc.).

In their response, Centrica noted[20], "*The risk to investment is intensified by the decision to remove appeals to an expert body (e.g. CMA). This provides investors with the confidence they need to invest…this may trigger concerns about setting a precedent for removing appeals to the CMA*."

However, some of the other respondents – including smaller suppliers – were of the view that the cap would in fact have the opposite effect. The cap, "*will act as a catalyst for overdue innovation and efficiency amongst suppliers (and) will target suppliers that have relied on customer apathy for profits*," according to Ovo[21]. This view was not wholly shared by the industry participants interviewed for this report, however.

2.3 Conclusions

The default tariff price cap is intended to serve as a transitory measure to protect the affected customers from what the Government views as excessively high energy bills. Running until the end of 2020 in the first instance, the cap will be subject to six-monthly review to ensure that – once introduced – it remains at an appropriate level.

On the issue of whether sufficient consideration had been given to innovation in the establishment of the cap, the responses were overwhelmingly negative – the view being that the introduction of the cap was a political rather than economic decision. Some respondents argued that the cap would not consider innovation anyway, as the two issues would be dealt with separately by the regulator and government.

Indeed, in addition to the recent round of consolidation in the energy sector which has included the planned SSE-npower merger, the introduction of the price cap has already been cited as being among the reasons for one of the market's newer suppliers – Flow Energy – to exit the market.

In its April 2018 statement on the sale of the business to Co-Operative Energy[22], the Ipswich-based company stated, "*The headwinds facing challenger suppliers, in particular the impact of the Government's price cap and the significant number of new entrants to the market pursuing aggressive pricing strategies, have continued to strengthen*."

The company also warned that its fellow small suppliers could struggle to survive financially following the introduction of the cap, and that it "*would be likely to have a significant adverse impact on consumers' propensity to switch suppliers*." As illustrated in the following sections of this report, this possible impact on consumer engagement, and hence switching, is a frequently voiced concern from interviewees.

[20] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/business-energy-and-industrial-strategy-committee/prelegislative-scrutiny-of-the-draft-domestic-gas-and-electricity-tariff-cap-bill/written/74705.html
[21] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/business-energy-and-industrial-strategy-committee/prelegislative-scrutiny-of-the-draft-domestic-gas-and-electricity-tariff-cap-bill/written/74618.html
[22] http://otp.investis.com/clients/uk/flowgroup/rns/regulatory-story.aspx?cid=1746&newsid=997804

3. Innovation under the current regulatory and legislative frameworks

Innovation in the energy sector and the role of regulation

- Innovation in the energy sector can be categorised as being an evolution of existing products and services or revolution through the advent of new products and services;
- While the development of existing services has typically been seen as down to incumbent suppliers and providers, revolution is normally synonymous with new entrants serving as disruptors to the market;
- As energy suppliers' ability to innovate is determined by their supply licences, companies have looked to push the boundaries of the prevailing regulatory structure through derogations to their licences;
- To trial new, innovative market arrangements and products, Ofgem has followed the financial services sector in instituting a "sandbox" approach in which existing regulatory practices can be relaxed;
- This approach has helped in the shift in emphasis on innovation becoming business-as-usual for companies, with traditional energy market participants looking outside of the sector for partners;
- The market has witnessed the entry of companies such as technology providers and new and alternative market structures as a result.

From the perspective of the energy sector, a distinction may be drawn between two types of innovation:

- **Evolution** of existing products and services, e.g. smart home devices, development of comparison websites into app-based tools; and
- **Revolution** through disruptors joining the energy sector, e.g. peer-to-peer (P2P) trading through blockchain, localised approaches to energy generation and supply, collective engagement and cooperative purchasing.

The development of existing services has generally been undertaken through those suppliers already incumbent in the energy sector. As a result, this evolution has occurred largely within the confines of the existing legislative and regulatory framework, and without the need for substantial changes to this.

Disruption, by contrast, has typically been the focus of new actors joining the energy sector with a view to trialling alternative approaches and business practices. Such companies have included (not exclusively) technology and software providers, transport companies and battery storage providers. This has necessitated a more flexible approach to regulation and changes to industry codes to facilitate such entry, as well as having industry systems that need to be compatible with these different approaches.

Energy suppliers' ability to innovate is determined – and to a certain extent, constrained – by the provisions of their supply licences. However, suppliers have sought to push the boundaries of the prevailing regulatory structure by seeking derogations to their licences, while Ofgem has followed the example of the financial services sector by instituting a "sandbox" approach to trial alternative market and licensing arrangements.

At the same time, network operators in the energy sector are also able to pursue innovative strategies through the provisions of their licences and specific funding arrangements. In both instances, the innovative models, products or business practices must be in the best interests of consumers.

More recently, and in response to the evolution of the energy sector, there has been a greater emphasis on innovation becoming business-as-usual for companies, with traditional energy market participants looking outside of the sector for partners to help them to offer alternative products and services. The market has witnessed the entry of companies such as technology providers and the growing advent of new and alternative market structures as a result.

This has been catalysed by broader economic and social policies, such as the October 2017 Clean Growth Strategy[23] and November 2017 Industrial Strategy[24], as well as those relating to the energy sector such as BEIS' "Upgrading Our Energy System: Smart Systems and Flexibility Plan[25]" and Ofgem's work to institute smarter markets.

As a result of these factors, a wide variety of community and local energy projects have emerged – many of which have trialled new approaches to energy supply and customer engagement. Commonly facilitated by some form of state support or external funding, such projects have often emerged in response to a locational need or challenge that requires addressing and which serve as test beds for new business models. Examples of these are presented in Section 4.7.

3.1 Supplier licence derogations

Energy suppliers have sought to innovate within the confines of their licences, but have also sought derogations from these licences – these being considered and granted by Ofgem – to pursue alternative approaches. Such derogations allow a supplier relief from certain obligations within a relevant licence, for example under the electricity supply licence Standard Licence Conditions (SLCs).

Derogations may be used to allow the licensee to undertake innovative projects or activities not permitted under the existing regulations. Several parties have received derogations in recent years for innovative products and activities, including the ability to trial alternative tariff products and structures, including:

- The ability to notify customers of a price change more quickly than allowed in a supply licence (14 days rather than 30) for Pure Planet's tariffs;
- The ability to offer discounts and specific tariffs to customers that own an EV, this being originally approved for use by Ecotricity before being made available to all suppliers; and
- The ability to offer niche tariffs to certain sections of a supplier's customer base.

Going forward, derogations are likely to become less important given the extent to which suppliers' offerings have evolved within the existing regulatory framework – the Ecotricity example being one such instance where a supplier-specific derogation was subsequently enshrined in all suppliers' licences. Suppliers now have much greater freedom over their product offerings, and providing that they can demonstrate how an action will result in a good outcome for consumers, the licence no longer prohibits specific behaviours.

At the same time, the licensing regime has also evolved through the "licence lite" model. Commercially rather than technologically innovative, this is intended to facilitate entry by allowing a company to become a supplier without the need to become a direct party to all the industry's codes. Although subject to very limited uptake since first being proposed in 2009, electric vehicle company EVenergi was granted the first "licence lite" in August 2017, partnering with Corona Energy to offer monitoring and automated switching services to customers in conjunction with its core EV financing business.

Considering how derogations are likely to work alongside the price caps, it is unlikely that the latter will have an impact over whether suppliers are granted derogations. However, any derogation granted would likely still require the supplier to comply with the cap.

More recent developments have seen energy network companies given specific incentives to innovate through the RIIO regime, while new structures have also been developed to help companies from outside of the energy sector to enter and trial new business models. Locally-based energy projects for example (see Section 4.7), which are becoming increasingly prevalent, provide benefits to the community in the form of low-

[23] https://www.gov.uk/government/publications/clean-growth-strategy
[24] https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future
[25] https://www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan

cost energy and lower energy bills, among other things. However, they can also provide direct financial benefits to those investing in them.

Despite the developments discussed above, interview respondents' opinions of the current regulatory climate were frequently negative as far as the impact on innovation was concerned, with the specific issue of the number of industry codes and the complexity of the legislation cited as problems. There were some positives, however, in terms of regulator-led attempts to promote engagement by customers and the use of more cost-reflective charging.

"Too much change (in regulation) is currently going on – (it) is creating investor uncertainty and therefore a hiatus in investment in innovation,"

Battery storage provider

"From a demand side response perspective, National Grid have been told to be technology-neutral and provide things like balancing services at lowest cost to consumer. They cannot give a leg up to any innovative technologies and so they cannot compete. The regulations do not allow you to nurture new technologies, so in five years' time (they) won't be there,"

Anonymous

A lack of clarity over potential changes to legislation and how they can affect company business cases and investment was noted by one interviewee, who commented, ***"Uncertainty within regulation is a barrier and doesn't make for a fantastic planning or R&D environment,"***

3.2 Faster switching for customers

Ofgem's work to increase the rate at which customers can switch supplier has been a focus of the regulator for several years; since 2013 it has made several changes to industry codes. The initial objective for the regulator was to introduce next-day switching with effect from 2019, replacing the current three-week timescale. However, these new measures are now scheduled for introduction by the end of 2020 – dovetailing with the smart meter, PPM and default tariff caps and half-hourly settlement timescales (see Section 3.6).

Ofgem hope that by facilitating switching – and ensuring that erroneous transfers are dealt with promptly and to the customer's satisfaction – it will improve competition and innovation and further support non-traditional and disruptive market entrants. The impact assessment on the proposed change[26] notes, "*More reliable and faster switching will unlock innovation, creating more competitive pressure and improving outcomes for consumers, both in terms of price and quality of service*." The regulator also notes that the financial benefits of this could be more than £1 billion.

A further potential development intended to encourage non-traditional business models, and particularly P2P trading, is a proposed modification to industry codes that will allow a customer to receive electricity from

[26] https://www.ofgem.gov.uk/system/files/docs/2017/11/delivering_faster_and_more_reliable_switching_impact_assessment.pdf

multiple suppliers[27]. This approach, which is contrary to the traditional structure of a one-to-one supplier-customer relationship (i.e. the 'supplier hub' model, discussed in Section 3.4), is designed to encompass services including P2P trading, community energy schemes and arrangements to facilitate EVs.

3.3 Regulating for the future energy system

Released in July 2017, BEIS' "Upgrading Our Energy System: Smart Systems and Flexibility Plan[28]" set out the Government's and Ofgem's work to institute smarter markets. The key themes of the plan included removing barriers to smart technology, enabling smart technology to increase penetration of GB homes and businesses, and making markets work more flexibly.

The plan takes the form of several actions to be made to enable storage and improve access to energy markets. In total, BEIS recommended 29 actions that were to be addressed as part of its plans to upgrade the energy system, including a focus on removing barriers to smart technologies and homes.

The overall aspiration from BEIS from a customer perspective is to tap into the interaction between technology and participation in the energy market, and the extent to which the former can serve as catalyst and enabler for the latter. In the instances highlighted by BEIS, the historic business-as-usual approach to areas such as networks, investment and regulation is perceived by them as an impediment to this objective.

Published in August 2017, Ofgem's "Our Strategy for Regulating the Future Energy System[29]" document set out how the regulator's strategic approach is intended to focus on supporting sustainable, resilient and affordable service to meet consumer needs, while also driving innovation and supporting the transition to a low-carbon system. In terms of local energy and innovation, the points included:

- Ofgem note that the key cross-cutting feature of the industry will be smart metering, which it sees as necessary for the full benefits of ToU tariffs and half-hourly settlement (HHS, see Section 3.6) to be realised; and
- On the issue of management of, and investment in, the energy network, Ofgem wanted to ensure that consumers and generators alike were exposed to the costs associated with their actions as a means by which to encourage changes in behaviour.

In April 2018[30], Ofgem used its Forward Work Programme for 2018-19 to outline its priorities for the coming 12 months, including the provision of a better-functioning retail market, facilitating change, and ensuring network companies deliver for consumers in a changing energy system. This includes work to facilitate and accelerate the transition to a smarter, lower-carbon and more flexible energy system, including future arrangements in network regulation, charging, access and wholesale markets.

On the area of innovation, Ofgem noted the growing number of suppliers offering products and services outside of the scope of the "traditional" energy supplier model. The regulator also makes the implicit connection between smart metering and price caps, stating that, "*Fundamental changes in the design of the retail market may be needed to unlock the full consumer benefits from smart metering, and in particular the data it provides, and new technology, and to allow price protections to be lifted.*"

Ofgem are already looking beyond the current price cap structure, stating that it will consider, "*new default arrangements that could replace the default tariff cap, and what consumer protection framework is needed in the future.*" A similar connection is made between innovation and competition, Ofgem stating that it intends to remove barriers to innovation as part of more fundamental reforms aimed at opening the energy retail sector to entities that do not have the conventional energy supplier model.

[27] https://www.elexon.co.uk/wp-content/uploads/2018/04/ELEXON-White-Paper-Enabling-customers-to-buy-power-from-multiple-providers.pdf
[28] https://www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan
[29] https://www.ofgem.gov.uk/publications-and-updates/our-strategy-regulating-future-energy-system
[30] https://www.ofgem.gov.uk/system/files/docs/2018/03/forward_work_programme_2018-19_0.pdf

3.4 The future of the "supplier hub" principle

When the electricity industry was privatised in 1990, the market was designed with suppliers as the main intermediary between customers and the energy system, this is known as the "supplier hub" model. The current market arrangements have evolved and developed around this principle and the supplier's role is now entrenched in legal frameworks, licensing arrangements and industry rules.

Since privatisation there have been significant changes in the energy market in respect of technology and the services offered including households generating, storing and selling energy back to the system and the introduction of smart meters and the use of data from these. These are enabling consumers to better understand and manage their energy usage, costs and to make changing supplier easier.

However, Ofgem believes the current regulatory framework constrains companies' innovation and likely forces them to move at a slower pace than they otherwise would. It is also believed to be a barrier to new entrants with disruptive business models entering the market. As such, the regulator issued a call for evidence on the future of the supplier hub concept in November 2017[31].

Future supply arrangements – Guiding criteria

As part of the call for evidence Ofgem detailed a number of guiding criteria for its consideration of potential market arrangements:

- Consumers can access energy supply and energy services however they choose to do so, without undue restriction;
- Consumers that do not actively engage in the energy market still receive a good quality of service and pay a reasonable price for their energy;
- Consumers, including vulnerable consumers, are adequately protected no matter how they access energy services;
- Bearing in mind the relevant data protection regulations, there are no undue barriers for consumers and wider market participants seeking to share access to their energy system data with other market participants;
- Firms offering intermediary and other services to consumers can compete on an equal basis;
- Costs of operating the energy system are recovered in a cost-reflective manner, and risks allocated and managed effectively.

Ofgem's consultation on the future of the supplier hub principle closed at the end of 2017 with the regulator's initial views scheduled for release in spring 2018. Due to Ofgem being required to undertake a thorough and considered review of changes to the system that underpin the prevailing market structure, it is likely that any changes would likely take effect after the initial expiration date for the default tariff cap at the end of 2020 and therefore would not have a material impact prior to that point.

Ofgem states that it wants a regulatory framework that allows for innovation and competition in the supply of energy and associated services, on the basis that the consumers' best interests are placed at the centre of all decisions. The regulator considers that now is an ideal time to undertake this review as the market is entering a period of price protection under the default cap, representing an opportunity to step back and consider whether the current arrangements work for consumers both now and in the future, while also delivering the amount of innovation and competition that Ofgem expects.

Given the opportunities for significant innovation across the energy system the regulator is examining the role existing traditional suppliers play and how customers access and manage their supply in new ways. As a result, Ofgem sought views through the (now closed) supplier hub consultation on:

- Barriers to innovation;
- Default supply arrangements for consumers that do not engage in the market; and
- Protection for all consumers, regardless of how they access their energy supply.

Echoing Ofgem's views, many industry participants have previously argued that the supplier hub arrangements have acted as a barrier to innovation by requiring unlicensed parties to become or partner with suppliers to deliver innovative offers and by placing increasing obligations on suppliers to deliver. However,

[31] https://www.ofgem.gov.uk/publications-and-updates/ofgem-seeks-views-reforms-supplier-hub-market-arrangements

the experience of Ofgem's regulatory sandbox (see Section 3.5.2) indicates that there is the appetite for broader engagement from beyond the traditional sector participants.

3.5 Trialling new products and business models through a sandbox approach

3.5.1 Ofgem's Innovation Link

Described by Ofgem as a "*one stop shop*" for advice on energy regulation for those market participants looking to trial new and innovative business models "*that do not fit neatly in to the existing regulatory framework*", the Innovation Link was launched in December 2016[32]. The goal of the scheme is to provide "*fast, frank feedback*" on the business case and its implications from a regulatory perspective. The criteria for support under the scheme are:

- **Innovation:** A proposition must include either technological or business model innovation;
- **Consumer benefit:** There should be clear benefit for consumers, e.g. lower energy bills, better customer service, increased competition in the market;
- **Background research:** An applicant must have already undertaken prior research into the regulatory implications of their proposal; and
- **Need for support:** An applicant must state on which specific aspect of regulation they need assistance – the scheme does not provide commercial or business advice.

The main tool used by Ofgem to date under the Innovation Link has been the Regulatory Sandbox.

3.5.2 Ofgem's Regulatory Sandbox

The purpose of this initiative, introduced by Ofgem in early 2017, was to create a forum within which to trial products and business models that were incompatible with prevailing licence conditions and less in line with traditional business models. Ofgem explained that this would provide a way to test innovative business propositions – particularly given the rate of technological advancement – with options for the "sandbox" including: bespoke guidance on negotiating regulatory hurdles; indications of its approach to relevant enforcement; or derogations from certain licence requirements.

It builds upon a similar approach used by the Financial Conduct Authority (FCA) that was introduced in June 2016[33] as a means by which to flex the prevailing rules of the financial sector to:

- Reduce the time, and potentially the cost, of delivering innovative ideas to the market;
- Reduce regulatory uncertainty and, in turn, the cost of capital faced by innovators;
- Enable more products to be tested and potentially introduced to the market, and;
- Allow the FCA to work with innovators to embed customer protection into new products and services.

The same underlying approach has been used by Ofgem, with their sandbox reflecting the possible limitations that technology could face as it is deployed across the energy supply sector. Under the sandbox approach, Ofgem provides advice as to the limits of existing regulations and the compatibility of any proposed new schemes with them, with the intention being to yield customer-facing trials that could operate temporarily outside of these rules. In using the sandbox approach, Ofgem anticipated that it would further its understanding of new business models and of the potential benefits to consumers.

The five projects that received approval from Ofgem under the first round of the sandbox (announced July 2017) were based around P2P trading using blockchain technology, alternative tariff structures utilising smart

[32] https://www.ofgem.gov.uk/about-us/how-we-engage/innovation-link
[33] https://www.fca.org.uk/firms/regulatory-sandbox

devices in the home, and the promotion of renewable and low carbon generation as a means of aiding self-supply.

Evidence from the first round of sandbox submissions showed that more than 70% (22 of 30) of those received could proceed within existing regulatory arrangements. It is unclear whether this is due to a lack of familiarity with the regulatory regime and/or the fact that 83% (25) of the applications for the sandbox came from organisations outside of the energy sector – therefore they may have lacked detailed knowledge of the prevailing regulatory regime from the outset – due to the depth of information released by Ofgem.

The second sandbox round saw an increase in the number of applications on the first round (37 compared to 30), indicating that – at this early stage of its operational life – the sandbox appears a popular avenue for exploring innovation. The regulator has not provided extensive detail on the reasons for its decisions regarding the proposed sandbox projects, other than to state that the proposals were innovative and had a "*realistic prospect*" of benefitting customers.

Furthermore, such projects are continuing alongside sandbox support. The Verv Banister House project being considered for Round Two support announced in April 2018 that it had completed the UK's first energy trade using blockchain, with 1kWh of electricity being sent from an array of panels producing excess power to a resident in another block within the estate[34].

Given that the rate of regulatory change in the energy sector typically lags well behind the rate of technological change, this dual-speed nature means that companies looking to develop an innovative proposition may be forced to scale back their plans to fit the regulatory and market environment, or even abandon them altogether.

As stated, Ofgem's feedback on this first round[35] noted that only 17% of the respondents were already active in the energy sector, with the non-energy applications for Round One coming from the following sectors: engineering (35%); digitech (11%); municipal/community (10%); finance (7%); academia (5%), and; other (15%).

With 22 of the 30 applications able to proceed within the existing regulatory arrangements, Ofgem noted that not all the barriers to innovation were within their regulatory remit (e.g. some were the responsibility of BEIS rather than Ofgem) – highlighting the need for cross-jurisdictional cooperation in considering any innovative trial.

Further information on other innovative projects at the local and community level is presented in Section 4.7, although those considered by the sandbox illustrate the ways in which participants are pushing the boundaries of the current regulatory framework in the move towards a smarter energy system.

3.5.3 Elexon Sandbox

Following the creation of Ofgem's regulatory sandbox, in November 2017 proposals were raised to allow similar alternative approaches to be trialled in the electricity industry through the Balancing and Settlement Code (BSC), administered by Elexon. This is a legal document which sets out the rules and governance for the balancing mechanism and imbalance settlement process in Great Britain.

The presence of the proposed Elexon sandbox will be of great importance to innovation as it will provide a "safe" environment for peer-to-peer and local trading, and the operation of multiple consumption and generation assets as a single entity (a Virtual Power Plant, or VPP[36]) to test ideas firstly without the need to become a BSC party. Currently all suppliers are required to accede to the BSC. At the time of writing, a decision on whether this approach will be introduced is pending and is not expected until late Q2 2018.

[34] https://verv.energy/news/weve-just-executed-the-uks-first-energy-trade-on-the-blockchain-as-we-look-to-power-a-london-social-housing-community-with-sunshine/
[35] https://www.ofgem.gov.uk/news-blog/our-blog/enabling-innovation-energy-sector
[36] A VPP is a network of decentralised assets such as small-scale (typically renewable or combined heat and power) generation sites, batteries and consumers that are operated collectively through a central IT control system but which are independent in their ownership and operation.

3.6 Significant Code Review (SCR) into Half-Hourly Settlement (HHS)

Electricity settlement: What is it?

- Electricity is traded on a wholesale market, with most trading undertaken in a forward market, with generators and suppliers entering into contracts with each other for every half hour period throughout the day. It is National Grid's responsibility to ensure that supply and demand match, which they achieve through the Balancing Market;
- Electricity settlement is the process by which electricity volumes are allocated to authorised parties for the purposes of assigning charges. The current electricity market design requires accurate quantification of power flowing onto and from networks in every half-hourly period of every day;
- For larger customers with meters capable of recording actual consumption every half an hour this is relatively straightforward. However, most meters are not currently capable of recording actual usage and so are instead settled on profiles - and, in turn, estimated bills;
- Initial settlement figures are determined within a day of consumption, but the entire process cannot be fully completed until estimated consumption figures are superseded by actual meter reads;
- As a result, the entire settlement process takes 30 months from start to finish for every half-hourly period in every day;
- The data from smart meters could replace the need for estimated bills, making the settlement process quicker, more efficient and less costly.

Ofgem launched its electricity settlement Significant Code Review (SCR) in July 2017, which is intended to develop and implement – subject to an impact assessment – half hourly settlement (HHS) for the wider market, including domestic and small business meters[37].

The regulator hopes that with the universal rollout of smart meters, mandatory half-hourly settlement could give suppliers the ability to offer price signals to encourage consumers to alter their behaviour and consume less during peak periods, alleviating pressure on the electricity network and reducing costs. Under current plans, this will be implemented from the end of 2020, in line with both the smart meter rollout and the default tariff cap's earliest end date.

One of the main benefits of a change in the settlement regime is the provision of price-signals to suppliers on the real costs of their customers' energy use. This is hoped to incentivise them to help customers shift their consumption away from peak periods, and is therefore a necessary – but not sufficient – condition for the introduction of ToU tariffs, these having different prices through the day reflecting the anticipated peaks and troughs in demand and supply. Additional information on these is presented in Section 4.2.

One of the major debates in the industry regarding these changes to the settlement regime is whether domestic customers should be fully exposed to cost-reflecting pricing that will be enabled by half-hourly settlement – particularly if they have not been adequately informed of the consequences of such a move. For example, if they chose a ToU tariff that was settled half-hourly, customers would be incentivised through price signals to move their consumption to lower cost periods – this being aided through battery storage and smart devices. If they were not able to respond to these signals (or were not wholly aware of them), they would be exposed to higher costs than may otherwise have been the case.

In the case of HHS, the use of cost-reflective charging should encourage and unlock innovation by exposing suppliers and customers to the true cost of energy. However, the unpredictable nature of these actual costs means that such an option may not be wholly compatible with a wider price cap regime.

How more frequent settlement for domestic customers would function in a price-capped world depends on the exact implementation route taken and how suppliers decide to design their tariffs to reflect the costs associated with the changes to industry rules. It is unlikely that ToU tariffs would be offered by suppliers to

[37] https://www.ofgem.gov.uk/publications-and-updates/electricity-settlement-reform-significant-code-review-launch-statement-revised-timetable-and-request-applications-membership-target-operating-model-design-working-group

price-capped customers given the difficulties of ensuring that they remained compliant with the cap for peak time usage.

Interviewees that commented on the issue of settlement reform were positive in terms of promoting innovation – subject to this being part of broader developments, i.e. smart meters and ToU tariffs. However, this was also seen as conditional upon wider customer engagement, otherwise the benefits would be limited.

3.7 Network Innovation Competition (NIC) and Network Innovation Allowance (NIA)

Over and above the provisions in their respective price controls (see Section 2), to further support the incentive to innovate Ofgem offers network companies a time-limited innovation stimulus package consisting of an annual competition (the Network Innovation Competition, NIC), a limited funding allowance (the Network Innovation Allowance, NIA) and a mechanism to fund the roll-out of successful innovation trials – the Innovation Roll-out Mechanism (IRM)[38], as presented in Figure 3.

Figure 3. RIIO-1 Innovation Stimulus

	Network Innovation Competition (NIC)	Network Innovation Allowances (NIA)	Innovation Roll-out Mechanism (IRM)
Purpose of scheme	To fund large flagship development and demonstration projects	To fund smaller research, development and demonstration projects	To facilitate the roll-out of proven innovations that meet certain requirements into BAU only when such a roll-out cannot be financed under other mechanisms in the price control or does not give commercial benefits to the network company during the current price control period
How finding is awarded	Companies submit bids and compete for project funding	Allowance set at the start of the price control based on the quality of the company's own innovation strategy	Companies submit applications to Ofgem
Funding available each year	£70mn for electricity networks for 2017-2021, £20mn for gas networks	Between 0.5% and 0.7% of network companies' allowed revenue in RIIO-1	Two application windows throughout price control period

Source: Ofgem

Introduced under RIIO (see Section 2), the NIC and NIA support innovation by network companies through providing funding to de-risk trials of innovative options that would otherwise not proceed. Projects including new technology, operational practices and commercial arrangements are all eligible. The NIC funds large development or demonstration projects; while the NIA funds smaller research and development or demonstration projects[39]. As part of the process, network companies must provide specific information regarding their project plans, objectives and potential partners for Ofgem to review.

The current set of RIIO controls for transmission and gas distribution (RIIO-1) run until March 2021 with those for their electricity distribution counterparts running until March 2023. Given these timescales, at present it is

[38] https://www.ofgem.gov.uk/network-regulation-riio-model/network-innovation/electricity-network-innovation-competition

[39] The NIC is a successor to the Low Carbon Networks Fund (LCNF) which ran under the electricity distribution price control which ran to March 2015.

unlikely that the network innovation provisions under the next set of controls (RIIO-2) will have significant interactions with the domestic price cap for two main reasons:

- Introduction of RIIO-2 will start in April 2021 for transmission and gas distribution, which is after the point at which the default tariff cap is initially scheduled to end, although still within the period within which it can be extended (i.e. 2023); and
- The current price caps both include an allowance for network costs, to ensure that suppliers can recover these charges. It is highly likely that the default tariff cap will contain a similar provision, and therefore the impact of any changes under RIIO are likely to be muted.

In the interviews undertaken, although only **two responses were received from network companies, the price cap was not seen as having an immediate impact on their operations – nor on their approach to innovation**. One respondent described it as, "***Way, way, way down the list of priorities...compared to the next (RIIO) review***," adding that they, "***cannot see a single reason why network innovation will be slowed down by the price cap***."

The future of the NIC and NIA is, however, in doubt following Ofgem's recommendations regarding the RIIO-2 control regime. In its proposals for RIIO-2[40], Ofgem said it is seeking to foster a culture within the network companies where innovation becomes business-as-usual over time, eliminating the need for specific funding mechanisms such as the NIC and NIA.

As such, to determine the need for separate innovation mechanisms, the regulator will consider whether companies have incorporated learning from innovation into their day-to-day operations. It stated that consumers should not have to fund innovation measures that companies would be reasonably expected to undertake as a matter of course.

3.8 Conclusions

There have been changes to the regulatory regime intended to promote innovation in the energy sector. These have been a combination of external pressures (in the form of technological advancement and broader social change), and internal pressures (as Ofgem has sought to ensure that the regime remains fit for purpose while opening the door for new and alternative market participants).

The latter of these objectives appears to have been aided by the regulatory sandbox approach, while the growing number of alternative market arrangements being trialled in the UK – typically using an innovative technological and/or commercial arrangement – shows the potential that is already being tapped.

"We have an organisation of the industry and its regulation that is set up to the old, conventional way of doing things with large power stations and not in a decentralised way,"

Supplier (Large)

"Ofgem is just a bit behind the curve. The regulator is regulating for today, but that doesn't mean that innovation won't happen,"

Anonymous

A point raised by several interviewees for this project related to the complexity of the regulatory regime and how this could be dissuading new entrants from outside of the sector. In the face of a constantly evolving regulatory climate, one of the greatest challenges to innovation is that not only are many of the industry's

[40] https://www.ofgem.gov.uk/publications-and-updates/riio-2-framework-consultation

fundamental changes still in their early stages, there is a concern – voiced by interviewees – that there is a lack of coordinated thinking from a legislative perspective.

Overall, the experience of regulation and disruptive business models are that the legislative obligations may discourage untried and untested approaches, and there is therefore a risk that such new business models may be scaled back in the presence of such barriers. This will delay or reduce the possible customer (and wider industry) benefits that could result from their introduction, or could scupper them completely.

Tools like the Ofgem sandbox are therefore important in allowing companies to develop their models, but cannot avoid the financial realities associated with the broader commercial risk in the energy sector that may result from the default tariff cap. It is therefore important that Ofgem work with innovators to ensure that such risks are minimised, and that it works with regulators from other sectors if needed to smooth the path for such disruptive options.

4. Technological and commercial innovation in the energy sector

4.1 Smart meters

Smart meters

- Under the current proposals, energy suppliers are required to offer a smart meter to every household and to take all reasonable steps to complete the roll-out of the technology by 31 December 2020;
- As at the end of 2017, there were approximately 10 million smart meters installed, just under half of which had been installed by British Gas;
- Due to interoperability issues, first generation smart meters may lose the functionality that makes them "smart" when a customer changes energy supplier, representing an impediment to their use;
- This problem should be addressed by second-generation smart meters, while there also plans in place to allow remote reconfiguration of smart meters to ensure that they retain the intended functionality.

GB energy suppliers are required to offer a smart meter to every domestic customer by 2020 in a move intended to promote greater customer engagement with the energy market and behavioural change[41]. This technological development is intended to be complemented by new commercial offerings, such as ToU tariffs that will encourage customers to adjust their usage profiles accordingly.

As far as the default tariff cap is concerned, as stated in Section 2.2, one of the underlying reasons for its introduction is to serve as a stop-gap measure until the roll-out of smart meters can mitigate what are viewed as some of the challenges associated with the current climate of the industry – notably a lack of customer engagement.

In and as of themselves, ToU tariffs are an important means by which to encourage engagement in – and behavioural change associated with – the energy sector. They also form an important but not essential element of alternative supply models based around a broader service offering beyond the traditional energy supplier model (see Section 5).

Evidence from the interviews gathered for this report indicates that smart meters and ToU tariffs together have the potential to be next main innovative step in the energy sector, but that this is dependent upon greater customer engagement and interaction (see below).

4.1.1 Background

A Government-led plan to deploy more than 50 million new "smart" electricity and gas meters was first put in place in 2009 and is taking place in three phases: the policy design phase ran from July 2010 to March 2011; the foundation stage began in 2011 for industry parties to build and test smart metering systems; and the main installation stage is ongoing.

The initial vision was that every home would have a smart meter by 2020 subject to common equipment, installation and operational standards. However, there is a perception that the Government has scaled back

[41] GBs largest businesses (>100kW demand) have been metered on a half-hourly (HH) basis since market opening, and as of April 2017 a further 170,000 meters (around 15% of national demand) have been HH metered and settled via Automated Meter Reading (AMR) equipment. Smart meters are planned to be rolled-out to all remaining customers (households and smaller businesses) and the market-wide Half-Hourly Settlement (HHS) Significant Code Review (SCR) seeks to ensure consumption data is used for settlement purposes around the same time the asset deployment is complete – see Section 3.6.

this commitment, with a current pledge to **offer** smart meters to every household by the end of 2020, with energy suppliers mandated to take all reasonable steps to complete the roll-out by this time.

BEIS is overseeing the regulatory, commercial and technical framework with Ofgem providing regulatory oversight. The aspects of these standards most relevant to this report are the Smart Metering Equipment Technical Specifications (SMETS), published in their original form in April 2012.

Although smart meters are free at the point of installation (i.e. there is no upfront charge associated with one), the costs associated with the wider roll-out are being recovered collectively by suppliers. The 2016 Impact Assessment for the smart meter rollout estimated the cost of this to be approximately £11 billion[42] (more recent figures indicate a number closer to £12 billion), while benefits are estimated to more than outweigh these costs by more than 50%.

The overarching argument for smart meters is that the transparency that they provide will yield to a behavioural change in conjunction with the financial incentive of a ToU tariff. There have been a range of studies on the issue of behavioural change[43] while Ofgem's Energy Demand Reduction Project (EDRP[44]) found that smart meters were successful "*more frequently and with larger percentage savings*".

Research undertaken into Google's Nest thermostat[45] showed that the asset's functionality had the potential to yield a reduction of approximately 5% gas consumption, representing an annual saving of up to £40 for larger homes. There are a range of estimates regarding the possible savings that can be achieved through smart meters, ToU tariffs and battery storage (or a combination thereof), with additional examples cited below.

4.1.2 Progress of smart meter roll-out

As at the end of Q1 2018, there were approximately 11 million smart meters installed, these being almost exclusively first-generation SMETS1 meters (see Figure 4). Therefore, based upon current deployment rates of approximately 400,000 meters per month, only half of GB accounts will have a smart meter by the end of 2020. However, after Q4 2017 saw the fastest quarterly deployment figures recorded since the roll-out programme began (with 1.32 million meters installed), the rate of installation slowed in Q1 2018 (to 1.25 million) – this being attributed by BEIS to adverse weather conditions at the start of the year[46].

SMETS1 meters were originally only planned to be installed in the foundation stage of the roll-out and up to 2016. Not all SMETS1 meters are currently interoperable between suppliers – this means that should a customer choose to switch supplier from the one that installed its smart meter, the meter may lose its smart functionality[47]. However, BEIS has confirmed that software is in development that will allow such "over-the-air" upgrades to be undertaken remotely without the need for a physical replacement of a meter.

[42] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/567167/OFFSEN_2016_smart_meters_cost-benefit-update_Part_I_FINAL_VERSION.PDF

[43] These include: European Environment Agency, "Achieving energy efficiency through behaviour change: what does it take?" EEA Technical *Report,* Luxembourg, 2013; The European Smart Metering Group (ESMIG) The potential of smart meter enabled programs to increase energy and systems efficiency: a mass pilot comparison, Helsinki, 2011.

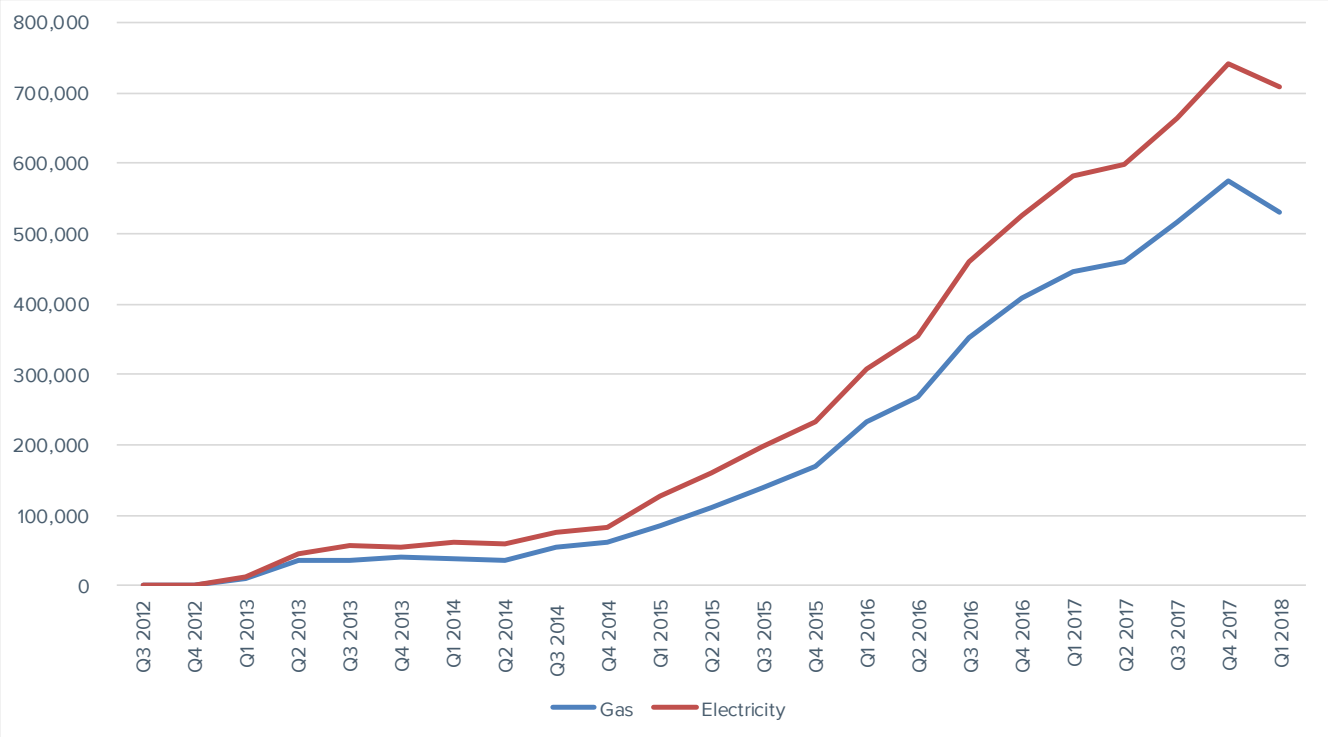
[44] https://www.ofgem.gov.uk/ofgem-publications/59105/energy-demand-research-project-final-analysis.pdf

[45] http://38r8om2xjhhl25mw24492dir.wpengine.netdna-cdn.com/wp-content/uploads/2017/11/311013-Evaluating-Nest-BIT-Exec-Tech-Summaries.pdf

[46] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712151/2018_Q1_Smart_Meters_Report_.pdf

[47] Based on information received by Elexon in early 2018, 95% of SMETS1 meters may be treated in this manner by a new supplier.

Figure 4. Smart meter installations by large suppliers



Source: BEIS

To date, there has been a low penetration of second-generation SMETS2 meters. In response to a written question to BEIS Minister Claire Perry in April 2018, it was confirmed that as of 17 April 2018 there were "*around 800*" gas and electricity SMETS2 of which "*around 290*" were operating in a live environment. The slow rate of deployment of these second-generation meters reflects delays in agreeing and implementing the protocols for switching suppliers for customers who have such a meter installed.

In a letter to suppliers in January 2018, BEIS confirmed that the end date for SMETS1 would be pushed back from 13 July 2018 to 5 October 2018[48], with 12 suppliers granted derogations to do this until January 2019.

"You would say that smart meters are in the middle of the roll-out - are they innovative or are they an enabler to innovation?"

Supplier (Large)

The most recent smart meter customer experience survey commissioned by BEIS, published in August 2017[49], shows that while there are high levels of satisfaction from those that have a smart meter, the issue of transparency regarding access to and use of data remains an underlying concern.

This is a commonly cited reason for those customers that have decided not to accept a smart meter[50], while there has also been a succession of adverse news stories regarding smart meter installation, particularly with suppliers failing to advise customers that their installation is not compulsory[51].

[48] https://www.which.co.uk/reviews/smart-meters/article/smart-meters-explained/smart-meter-roll-out
[49] https://www.gov.uk/government/publications/smart-meter-customer-experience-study-2016-18
[50] https://www.which.co.uk/consumer-rights/advice/do-i-have-to-accept-a-smart-meter
[51] https://www.moneywise.co.uk/news/2018-01-30/households-pressured-getting-smart-meters

4.1.3 Innovation and engagement in the smart meter era

The deployment of smart meters is viewed as an important initial step in promoting customer engagement and interaction with the energy market, promoting behavioural change and opening the door to a range of innovative tariff and product offerings. Some of these offerings are already available in the GB energy market including:

- Time of Use (ToU) tariffs: By having different prices for energy at different times of the day, these are intended to encourage customers to move their consumption from higher to lower-priced periods, either by choice or through some degree of automation;
- Next Generation Intermediaries (NGIs): These include concierge services which can automatically switch suppliers on behalf of customers, as well as app-based systems (see Section 5.4.3);
- Integrated energy systems: In combination with a ToU tariff, incorporation of onsite generation and battery storage deployment in the home, as well as smarter charging of electric vehicles (EVs) (see Section 5.2); and
- Bundled service offerings: Moving beyond the traditional business model of energy supply into areas such as home services (e.g. boiler repair), connected home products (e.g. smart thermostats and energy management systems) and other app-enabled and web-enabled products (see Section 5.3).

Customer-led engagement and innovation is expected to emerge from greater awareness of the savings that smart meters can provide, this having already been the subject of advertising campaigns by Smart Energy GB and individual suppliers. The growing deployment of electric vehicles and ToU tariffs may also raise awareness the wider lifestyle implications that having a smart meter may aid.

As a counterpoint, the smart meter rollout remains a contentious issue among a large proportion of energy consumers, while there is a possibility that this could be exacerbated by the introduction of the cap itself. This is because the transparency of the cap calculations may necessitate the cost per consumer of the smart meter being clearly identified on a per household basis.

Smart Energy GB has indicated that the smart meter programme represents approximately £20 of a typical dual fuel bill[52]. If smart meters are seen as failing to yield value for money, this may further affect public opinion on their introduction. The question of the critical mass of smart meters needed to achieve their types of benefits referred to in the Impact Assessment has been estimated at 70% as a minimum[53], which compares to a figure of 50% by the end of 2020 based on current installation rates (see above).

From a supplier perspective, innovation will be reflected in the way in which companies seek partnerships and/or invest directly in the sector themselves. As stated, their investment capability may be affected by direct impacts of the price cap (e.g. lower revenues from the share of their customer base on default products) or indirectly through its sectoral impacts (e.g. increased regulatory risk affecting share price and cost of capital).

The prospect of partnerships and the presence of disruptors may yield technology-led engagement and innovation, particularly given that Google already has a presence in the home services market through the Nest thermostat, while Netatmo's smart thermostat integrates with Amazon's Alexa to enable voice-activation and control of heating.

Participants interviewed for this report were of the view that smart meters had the potential to yield considerable benefits for customers, provided there was a suitable level of two-way engagement between customers and suppliers. There was also some conjecture as to whether, as an established technology, smart meters could be considered as innovative or an established technology. In this instance, they were perceived as both a catalyst for, and a prerequisite to, other forms of innovation.

[52] https://www.theguardian.com/business/2018/mar/26/embrace-smart-meter-rollout-or-go-bust-big-energy-firms-warned
[53] https://hansard.parliament.uk/Commons/2018-02-05/debates/C241A09F-77EF-468F-A558-17E10CF9C17B/SmartMetersBill

"For the majority of customers, energy is about helping them manage their home and life. Understanding and control of energy costs is part of this. The cap may help to drive down the costs of these technologies, depending upon reactions to it,"

Supplier (Large)

4.2 Time of use (ToU) tariffs

Time of Use (ToU) tariffs

- Smart meters are an effective prerequisite to a supplier's ability to offer a time of use (ToU) energy tariff, under which the rates a customer is charged varies on a within-day basis;
- At present, only four suppliers have offered ToU tariffs, although more are expected to emerge as the smart meter roll-out continues;
- The combination of smart meters and ToU tariffs were viewed by interviewees as having considerable potential in terms of innovation and broader product offerings, but realising this was conditional upon greater customer engagement.

It is predicted that two types of ToU tariffs will be used in the GB market, reflecting the experiences of other markets: stable tariffs, with consistently varying prices for each period; and dynamic tariffs, with prices and pricing periods which may change at short notice.

Cambridge Economic Policy Associates (CEPA) forecast prices which could change by over ±80% between peak and low-cost periods[54]. Ofgem has also published its own analysis of the distributional impacts and potential for behavioural change of moving to ToU tariffs. Its key findings included:

- Average customers in all groups but the two most affluent would benefit from bill savings, with expected behaviour change;
- The spread within each socio-economic group is far larger than the spread between the groups
- Some consumers within every group would suffer from a compulsory ToU tariff; and
- Under current conditions, only around 8% of consumers would be willing to take up ToU tariffs; this is due both to disengagement and the modest level of expected savings at around £8.60/year.

The addition of supportive technologies such as home batteries could massively increase potential savings, to £32 for static or £96 for dynamic tariffs. 70% of trial participants agreed that they would be more willing to take a ToU tariff if offered a battery, although CEPA note that batteries are currently too expensive to use in this manner.

By contrast, the differential between the cheapest fixed tariff and the most expensive default tariff during 2017 was more than £200, implying a greater immediate benefit from switching rather than battery installation (see Section 4.3).

The presence of a smart meter is an effective prerequisite for a ToU tariff – therefore, those suppliers that have installed such assets have a head-start in being able to offer these to their customer base. Despite the c. 11 million smart meters installed, just four suppliers – British Gas, Green Energy UK, Octopus and Usio – have offered these types of ToU products to date, commonly with smart meter installation included as part of the offering.

[54] https://www.ofgem.gov.uk/ofgem-publications/119455

British Gas offered free electricity for a specific day of the weekend, although it discontinued this tariff in May 2017 following its introduction in July 2016, while Green Energy UK offers a ToU tariff with peak, shoulder, and off-peak unit rates. The Octopus Agile tariff changes daily in line with wholesale market expectations. As at March 2018, Usio is offering six different ToU tariffs and with the ability to choose low carbon energy, these reflecting anticipated customer usage profiles, although these are described by the company as "*smart*" tariffs which "*allows us to continually bring you the best tariffs suited for your energy use*"[55]. Further to this, some suppliers have offered cheaper tariffs to customers willing to have a smart meter installed, to drive demand for smart meters.

Smart meters are not the only effective requirement for the growth in ToU tariffs, as supplier systems and those across the energy sector as a whole are not currently set up to accommodate them on a large scale. Innovation from a software perspective, such as that needed from a billing perspective, is therefore expected to facilitate the growth in ToU offerings since it will allow suppliers to charge for energy use in a different way to the traditional tariff structure, as will the proposed move to half-hourly settlement (see Section 3.6).

Participants interviewed for this report highlighted the benefits of ToU offerings, and while some sounded a more cautionary note, the common view was that – as a new offering – a broader push on engagement would be needed to promote awareness of them among the energy supply customer base. This included areas such as battery storage and the use of electric vehicles through measures such as vehicle-to-grid and grid-to-vehicle charging and discharging to take advantage of difference prices at different times of day.

"Time of use, and being able to let the consumer react flexibly, is going to be a big innovation and will drive efficiency. The model of the big transmission connected generation with suppliers sat in the middle and consumer at the end is outdated and inefficient,"

Anonymous

The challenge, as highlighted by interviewees, was squaring the circle of deploying smart meters, implementing ToU tariffs and getting customers to engage with both for the broader benefit of the energy system. A commonly cited view was that – as default tariff customers are typically disengaged customers – the initial growth in ToU tariffs would not be affected by the cap.

An issue would emerge, however, upon efforts to provide ToU products to customers that had previously been reluctant to engage with the energy market on cost grounds – specifically that these could stall without a focus on issues beyond price. However, as stated above, there is already a growing transition to customers seeking offerings in which energy is one component of a broader package. In addition, customers are already finding new ways to actively engage in the energy market, whether that is through app-based tools (see Section 5.4) or at the local level through community projects (see Section 4.7).

Several suppliers have also already launched smart pre-payment propositions. E.ON UK, Ovo Energy (now through separate brand Boost) and Utilita were early movers in this sector of the market, but many smaller suppliers have now followed (see Section 6.1.1). Recent entrants Eversmart and Avid Energy (owned by Prepay Power in Ireland) have built their propositions around smart prepayment, and it is also key to small suppliers Toto Energy and E. Other suppliers that appear to offer smart prepayment are Ecotricity, Spark, First Utility, Economy Energy, Robin Hood Energy and Our Power.

[55] http://usioenergy.com/tariffs/

4.3 Battery storage

Domestic scale battery storage

- The growth of battery storage in the domestic sector is occurring in conjunction with the increasing deployment of small-scale generation assets, such as roof-mounted solar;
- The current cost of the technology (typically in excess of £2,000 for a standalone battery asset) is proving prohibitive to the growth of its use;
- Interviewees stated that the innovative value of battery assets is in conjunction with smart meters and ToU tariffs to enable homeowners to charge and discharge at different times of day in response to price signals.

Domestic scale battery storage represents a growing market in the UK, with several companies moving into this sector. Such assets can be coupled with a property's on-site generation assets, typically a roof-mounted solar array. Alongside the battery asset would be a separate metering unit that can measure not only the battery operation, but also onsite generation and consumption activity, while the battery asset itself can also be controlled remotely if appropriately connected.

A ToU is essential to allow customers to maximise the financial benefits of the battery, i.e. to take advantage of the ability to either draw electricity from the network or store it from a property's on-site generation. On a fundamental level, the technology itself is still relatively expensive for domestic use with standalone battery systems typically costing more than £2,000[56], while most domestic batteries have an operational lifespan of ten years – which may be too short to allow customers to earn a return on their investment.

Beyond the benefits to the homeowner, there is the prospect of domestic storage systems being used centrally under contract by National Grid to help balance the wider electricity network – this potentially being in the form of both in-home storage and through electric vehicles discharging into the grid. This would again yield possible financial benefits to customers through some form of aggregated offering, i.e. offering supply back to the electricity network in the same way that a collective switch offers grouped consumption.

Such contracts typically require robust metering (second-by-second) and communication links to satisfy National Grid (as system operator) that assets will perform as required when called upon to manage wider system needs. As such systems are not currently present (as well as the cost of the technology), battery deployment is currently limited, with some of the trial projects for the assets presented in Section 4.7.

4.4 Electric vehicles (EVs)

Electric vehicles and the decarbonisation of transport

- Use of electric vehicle (EV) technology has increased in recent years, aided by falling costs of the technology, government support to decarbonise the transport sector, and rising customer demand;
- The electric vehicle sector is one that has seen growing entry by energy suppliers, either through acquisitions, partnerships or joint ventures;
- This has formed part of the wider availability of bundled energy services, aided by the use of battery storage and ToU offerings that can allow users to optimise the charging and discharging of their vehicles from the electricity network;
- The widespread use of electric vehicles is, however, seen as constrained by the availability of charging points and their impacts on the electricity network;
- Interviewees noted that, due to the specific lifestyle elements associated with vehicle purchases, the rise in EV use is not immediately expected to be affected by the default tariff cap.

[56] https://www.which.co.uk/reviews/solar-panels/article/solar-panels/solar-panels-and-energy-storage

Innovation in the electric vehicle sector, and the growth in their use, has been driven by broad global socio-economic and environmental factors. In the case of the UK, EVs have received significant policy attention recently - particularly around establishing charging infrastructure to support their continued development.

For example, in January 2018 the Government published its Automotive Sector Deal[57], which confirmed support for electric vehicles through £400 million of investment in charging infrastructure. Whilst BEIS reported that just five councils have made use of funding to develop charging infrastructure, many suppliers are proving less reluctant.

The expected increase in the uptake of such vehicles in the coming years will necessitate an increase in both the number and consumption of domestic charging points. As part of its work on the forthcoming National Infrastructure Assessment[58] – the National Infrastructure Commission is looking at how and when a national network of charging points for electric vehicles could be delivered.

From an energy supply perspective, in response to - and in conjunction with - the draft bill for a price cap on default products, supplier efforts to differentiate themselves and both retain and attract customers are evolving. The transport market is proving particularly enticing with suppliers seeking early-mover advantage and a means by which to offer innovative products (see below).

The different policy incentives for electric vehicles and the wider context of their introduction was referred to by several interviewees. However, the issue of lifestyle and customer choice was cited as a greater driver from the perspective of growth in the market for the electrification of transport – and resultant innovation in that market – than any factors related to the default tariff cap.

Such factors include:

- The cost of the car itself and its broader characteristics, e.g. model, safety, space, reliability, fuel efficiency, running costs, etc. Although most electric vehicles currently have a higher cost than their typical petrol and diesel counterparts, they currently have lower annual running costs and road tax requirements[59];
- Financial support for EVs through the Government's plug-in vehicle grant[60], this currently providing a contribution of up to £4,500 for non-commercial vehicles;
- Household income and number of residents, i.e. whether there is an EV available that meets your own domestic circumstances;
- Lifestyle and driving habits, e.g. an electric vehicle may be more attractive for urban commutes rather than longer journeys due to the ability to avoid longer charging periods – this itself being influenced by the availability of public recharging points;
- The extent to which the types available (pure electric, petrol hybrid, diesel hybrid, etc.) meet these circumstances and characteristics; and
- Local environmental and transport policy, notably in terms of the subject of air quality.

With the typical motorist owning a vehicle for approximately seven-and-a-half years[61], there is also the issue of when a motorist would replace their existing car (which would be expected to be a petrol or diesel model) with an electric vehicle.

Figures from the Society of Motor Manufacturers and Traders[62] (SMMT) show that the number of EVs and alternatively-fuelled vehicles (plug-in and hybrid) has increased from approximately 1.3% of all new registrations in 2011 to 4.7% in 2017, while those for the year to April for 2018 indicate that this has increased

[57] https://www.gov.uk/government/publications/automotive-sector-deal
[58] https://www.nic.org.uk/our-work/national-infrastructure-assessment/
[59] https://www.rac.co.uk/drive/advice/emissions/can-you-actually-save-money-going-electric-in-2018/
[60] https://www.gov.uk/plug-in-car-van-grants
[61] https://www.smmt.co.uk/2012/07/new-report-shows-real-impact-of-recession-on-motorists/
[62] https://www.smmt.co.uk/category/news/registrations/evs-afvs/

to 5.2% (See Figure 5). The total number of such vehicles registered has also increased year-on-year over this period, including in 2017 when the total number of vehicles registered fell.

Figure 5. New car registrations

Year	Total Plug-in and Hybrid Registrations	Total new car registrations	Of which Plug-in and Hybrid (%'age)
2012	27,154	2,044,609	1.3%
2013	32,715	2,264,737	1.4%
2014	51,847	2,476,435	2.1%
2015	72,768	2,633,503	2.8%
2016	88,881	2,692,786	3.3%
2017	119,786	2,540,617	4.7%
April 2018 YTD*	46,032	886,400	5.2%

Source: Society of Motor Manufacturers and Traders (SMMT)

This growing number of electric vehicles on the road therefore enables suppliers to be more innovative in their broader service offering, either directly or through partnerships. Some of the main acquisitions and partnerships in the sector have been:

- **Vattenfall**
  - November 2016: Launches inCharge public network in Northern Europe
  - June 2017: Acquires iSupply Energy and enters the GB domestic energy supply market
- **Engie**
  - March 2017: Acquires EV charging service provider, EV-Box
  - May 2017: Enters the GB domestic energy supply market
  - January 2018: Invests in vehicle-to-grid charging firm, Connected Energy
  - April 2018: Launches electric vehicle tariff in partnership with Mitsubishi
  - June 2018: Launches domestic electric vehicle tariff alongside an EV home charging point
- **Ovo Energy**
  - September 2017: Acquires ChargedEV and Indra Renewable Technologies, and establishes a partnership with Chargemaster
  - October 2017: Announces partnership with Nissan
  - November 2017: Announces partnership with Ubitricity
  - April 2018: Launches integrated supply, EV and storage offering to the domestic energy market
- **Shell**
  - October 2017: Acquires New Motion EV charging network
  - November 2017: Acquires IONITY EV charging network
  - December 2017: Acquires First Utility and enters the GB domestic energy supply market
- **Ecotricity**
  - October 2017: Expands Electric Highway charging network
- **E.ON UK**

  - November 2017: Launches E.ON Drive charging network
  - March 2018: Announces partnership with Nissan
- **Iberdrola (owner of Scottish Power)**
  - December 2017: Launches trial of EV charging system
- **Good Energy**
  - December 2017: Announces partnership with (Shell subsidiary) New Motion
  - February 2018: Announces partnership with Honda
- **Octopus Energy**
  - January 2018: Launches vehicle-to-grid charging trial

For example, Shell's acquisition of First Utility[63] in December 2017 closely followed its purchase of EV charging company New Motion in October 2017, as well as its partnership with charging infrastructure operator IONITY (a joint venture between BMW, Daimler, Ford and Volkswagen). The company is well placed to use these deals to further develop its public and domestic charging services, having announced the trial of rapid chargers at select forecourts in October 2017.

"Electric vehicles are the main innovation, then battery storage the next level down in combination with PV and time of use tariffs to promote flexibility,"

Supplier (Medium)

As with Shell, both Vattenfall and Engie preceded their GB domestic market entry with their securing of electric vehicle capabilities – through the launch of the inCharge network[64] and purchase of EV-Box[65] respectively. E.ON UK joined these ranks with its plan to establish 10,000 UK charge points by 2020[66]. With Ovo Energy and Ecotricity already offering established domestic and public charging propositions and Iberdrola[67] reportedly looking to join, the EV-enabled supplier space is already seeing notable growth.

The domestic charging of EVs represents a complimentary service to traditional energy supply, with a perceived specialism in this emerging market also a strong branding strategy. Meanwhile, establishment and operation of public charging networks offers an opportunity for suppliers to gain a foothold in an adjacent space, where their scale and existing infrastructure offers a competitive advantage.

With 70,000 new plug-in car registrations predicted for the UK in 2018[68], and EVs estimated to reach cost and performance parity with traditional combustion engine vehicles within the next ten years[69], this growing attention is unlikely to dissipate. With a growing number of suppliers looking to develop broader energy

[63] https://www.cornwall-insight.com/newsroom/all-news/shell-s-purchase-of-first-utility-marks-sams-coming-of-age?sector=power-supply&author=13
[64] https://corporate.vattenfall.com/press-and-media/press-releases/2016/vattenfall-launches-incharge-a-partner-based-charging-network-in-northern-europe/
[65] https://www.engie.com/en/journalists/press-releases/engie-acquires-ev-box/
[66] https://www.eon.com/en/freedomiselectric.html
[67] https://www.telegraph.co.uk/business/2017/12/27/scottish-power-owner-bets-electric-vehicles-will-offer-route/
[68] https://chargemasterplc.com/2017/11/08/1120/
[69] http://www.ey.com/gl/en/newsroom/news-releases/news-ey-europe-to-reach-off-grid-energy-parity-up-to-20-years-ahead-of-the-us

services proposition, the EV sector appears an increasingly attractive market for technology-focussed suppliers to diverge into.

From a regulatory and legislative perspective, the Government's Automated and Electric Vehicles Bill[70] currently progressing through Parliament requires all charging points to be smart chargers, capable of responding to remote signals. This explicitly includes the ability to adjust the rate of charging or discharging in a move that could encourage greater customer engagement in response to these remote signals – something that would be facilitated by smart metering technology and a ToU tariff.

This could in turn yielding more innovative ways for customers to make access to their vehicle charging points available for a financial incentive, although offering this capability is dependent upon a large enough number of EVs being present in the nation's vehicle fleet.

However, as interviewees noted, the typical underlying factors that determine when, whether and what kind of vehicle a person buys – whether electric or conventional fuel – are likely to be greater determinants on the EV sector than the price cap.

The network operators interviewed for this project highlighted EVs as a particular issue for them "***from a network perspective due to investment implications and grid issues***," but it was acknowledged that innovation in general required, "***fairly significant investment***" to achieve tangible benefits for customers. Taking the interviewees as a whole, those that expressed an opinion on this matter stated that they did not expect the default tariff cap to have a material impact on the growth in EV numbers, this being driven more by lifestyle issues, such as those highlighted above.

4.5 DNO to DSO transition: Looking to the future of the network

Energy network innovation

- The GB electricity network is undergoing a period of transition from one based around active management at the national level to active management at the distribution level;
- In addition to the specific provisions for innovation in the licences of network companies, the companies themselves are looking to fresh commercial and technological innovations as a means by which to deliver savings to customers;
- The transition to greater network flexibility and low carbon energy will increase the need for innovation as customer demands evolve;
- Due to these incentives and the nature of price controls for energy networks, the default tariff cap was not perceived as an influence on network innovation.

In November 2017, the Energy Networks Association (ENA) launched a consultation on its Electricity Network Innovation Strategy[71]. It set out how "*energy innovators*" can work with distribution network operators (DNOs) to provide up to £1.7 billion of benefits to the UK energy sector over the coming decade.

Distribution companies have also begun publishing strategies to transition to distribution system operators (DSOs), i.e. from a system of passive local balancing to a more active role. ENA's consultation argues that innovation projects by electricity network operators could deliver substantial savings to billpayers by ensuring networks evolve to meet new demands in the most cost-efficient way possible

The strategy identified five key trends that will require new innovative approaches from market participants. Shifting power generating sources and the resulting revolution in the utilities industry, the power of customer

[70] https://services.parliament.uk/bills/2017-19/automatedandelectricvehicles.html

[71] http://www.energynetworks.org/assets/files/electricity/futures/Open_Networks/14574_ENA_Open%20Networks%20Report_AW_v9_Web.pdf

choice and changing energy demands, and policy drivers relating to decarbonisation and a cleaner environment accounted for three of these trends. Two other key trends cited were the smart, flexible energy system and DSO transition, along with uncertainty amid more choice for the electricity network companies.

ENA stated that these trends will increase the need for innovation, but posed challenges which it condensed into five innovation themes:

- Networks improvements and system operability;
- Transition to a low-carbon future;
- New technologies and commercial evolution;
- Customer and stakeholder focus; and
- Safety, health and environment.

4.6 Innovation in supplier entry

Innovation as an enabler for supplier entry

- Entry into the supply sector has been facilitated by the development of pre-accredited (e.g. "plug and play") licences that reduce the time and resources associated with becoming a supplier;
- Such off-the-shelf licences are purchased as part of a wider package including software used for billing and invoicing;
- Pre-accredited licences have contributed to the rise in new entrants offering technological and commercial innovation, as a counterpoint to the Big Six;
- These new participants include local authorities that have become suppliers, building a business model in part by presenting themselves as a trusted entity familiar to local residents;
- Interviewees stated that the default tariff cap could impact innovation if it encouraged or discouraged such entry, and that it could also adversely affect the business models of newer suppliers – either directly or through reduced customer engagement.

4.6.1 "Plug and play" licences

In addition to providing a means by which to offer new services and an enhanced customer experience, technological innovation has also been a catalyst for entry through new methods that mitigate the regulatory and legislative challenges associated with becoming a supplier – the most well-known of these being in form of a pre-accredited supply licence.

This is a quicker, simpler, and lower-risk option than in-house accreditation, with reduced market entry times and less time and money spent on systems testing and accreditation – the main providers including Utiligroup, Ensek, Gentrack, Utiliteam and Junifer. Of these, Utiligroup has the most customers, with approximately 30 suppliers using their systems to enter the market.

As a means of promoting entry, and in turn greater supplier competition, the use of this licensing structure was seen as an important innovation but one that was not immediately apparent to customers. Looking at whether the default tariff cap results in a brake on the rate of new entrants, the general view was that while it would depend upon the level at which the cap was set, new participants were not immediately targeting default customers – and would therefore not have a significant adverse impact on their business model.

The majority of new entrants joining the supply sector have done so by procuring an off-the-shelf entry option known colloquially as "plug-and-play" when entering as a fully licensed supplier. This is where a specialist utility IT systems vendor gains an electricity supply licence and accedes to the core industry codes.

This prequalified licenced company is then sold onto the new entrant, and from this point forward the company assets are transferred to the new entrant, who can then go through Controlled Market Entry (CME). Once in the market, the IT system is used for billing and invoicing.

This forms the final stage of regulatory accreditation and demonstrates to market administrators that the new entrant understands how to register meters and manage associated data flows. This process results in the new entrant avoiding most the accession process itself. While the costs of purchasing a "plug-and-play" package are significant, this option is typically cheaper and less time consuming than undertaking the accreditation in-house.

The licensing/services provided by the systems provider differ by product, but typically include the management of the supplier's industry dataflows and processes, data hosting, and industry interaction gateways. Many new entrants take these services at the outset as it de-risks the potential to fall into non-compliance with some elements of industry codes and outsources the processing of industry dataflows into meaningful information (e.g. network company charges, customer metering problems etc.) that can be used by the new supplier.

The flexibility offered by pre-accredited licences has typically enabled small, new entrants to enter the market on more of a contestable basis than would otherwise be the case, allowing them to engage more on price competition or seeking to establish more of a niche in the sector.

One interviewee stated that while "***switching rates are pretty good at the moment, the problem with switching is that not enough people switch and there is a segregation between those who switch and those who don't.***" The subset of the customer base which does switch, they added, needs to grow but in a controlled manner.

Although new suppliers could attract elements of the disengaged customer base through more tailored offerings, this therefore assumes that the cap does not either discourage entry or encourage exit. However, as presented in Section 2.3, challenger supplier Flow Energy has already looked to leave the sector, citing the price cap as one of its reasons for doing so.

4.6.2 White label supply

Another trend has been the growing interest from local authorities (LAs) to take a more active role in the energy markets – in some instances through one of the alternative market structures presented in Section 4.7. This has typically been in the form of a "white label" arrangement, under which the authority partners with an existing licensed supplier, enabling an authority-backed company to provide tailored and branded energy tariffs to customers in its area while the licenced supplier manages the wholesale trading, billing and other elements associated with the activity.

The reasons behind this entry are many but basically boil down to looking at commercial structures to offer tailored energy tariffs to support local residents and businesses; as a means to facilitate development of and extract value from local low-carbon generation; and seeking an additional revenue stream as central government grant funding is removed.

The primary models adopted to date include fully licensed supply (e.g. Bristol Energy, Robin Hood), traditional white label supply (e.g. Peterborough, Cheshire East etc.), an emerging move towards "white label plus" (White Rose Energy) and the development of network solutions often incorporating heat networks. White label supply arrangements are not unique to the public sector, with the most well-known of these being the partnership of British Gas with Sainsbury's[72] and the SSE arrangement with Marks and Spencer[73].

[72] http://www.sainsburysenergy.com/
[73] https://www.mandsenergy.com/

Figure 6. White label suppliers (local authority and private sector)

White label supplier	Owner	Partner (if applicable)	Start Date	Reported number of domestic customer accounts
Angelic Energy	Islington Council	Robin Hood Energy	October 2017	None available
Brighter World Energy	Privately-owned supplier	Robin Hood Energy	October 2016	None available
Ebico	Certified social enterprise	Robin Hood Energy	January 2017	None available
EnergySW	Advantage SW (social housing)	Ovo Communities	November 2017	None available
Fairerpower	Cheshire East Council	Ovo Communities	March 2015	8,000 (30 September 2017)
Glide	Privately-owned supplier	Ecotricity	March 2007	None available
Great North Energy	Doncaster Council	Robin Hood Energy	November 2017	None available
Hebrides Energy	Community-interest company	Co-operative Energy	November 2016	None available
LECCY	Liverpool City Council	Robin Hood Energy	April 2017	None available
M&S Energy	SSE	-	August 2015	None available
Outfox the Market	Fischer Energy	-	September 2017	None available
Peterborough Energy	Peterborough City Council	Ovo Communities	June 2015	7,000 (30 June 2017)
Powershop	npower	-	January 2017	10,000 (11 August 2017)
RAM Energy	Derby City Council	Robin Hood Energy	September 2017	None available
Sainsbury's Energy	British Gas	-	February 2011	None available
Southend Energy	Southend-on-Sea Borough Council	Ovo Communities	May 2015	5,300 (31 March 2017)
White Rose Energy	Leeds City Council	Robin Hood Energy	September 2016	3,000 (6 January 2017)
Your Energy Sussex	West Sussex Council	Robin Hood Energy	February 2018	None available

Source: Cornwall Insight

A unique selling point for these suppliers has been their reputation and familiarity to customers at the local level. Rather than trying to attract customers on a price basis with highly competitive offerings, their strength is that they have the potential to attract disengaged customers who are otherwise reluctant to switch and will view the council as a more safe and recognisable entity.

Local suppliers therefore often do not seek to be the cheapest on the market, but price products that will still save the disengaged and vulnerable customer segments significant amounts compared to those served by the local incumbent. For example, Bristol Energy has previously stated on its website that, "*We save our customers on average around £200 per year on average on their energy bills*[74]," although it gives no explanation of exactly how it has derived this figure.

Traditional white label partnerships have been adopted by several local authorities — typically those of a smaller size — across Great Britain, but are often not a particularly attractive option, particularly for larger or more ambitious councils. They are most valuable for organisations seeking to enter the market who are resource-limited and wish to avoid exposure to risks within wholesale markets and the central trading arrangements, but which still allow them to develop a unique brand, suitable to local needs.

However, they primarily represent a route to market for an established supplier. To date, white label arrangements have effectively been sales commission-splitting arrangements, with local authorities for using their relationships and brands with local householders to help the established supplier acquire customers. There can still be consumer benefits from this arrangement, but they are likely to be significantly lower than from other routes to market.

Among the options that such arrangements can include are:

- A limited degree of flexibility in the tariffs it offers, both in structure and level, subject to the parameters of the parent supplier's systems (see below);
- Involvement in the smart meter rollout – and from previous announcements prioritisation of the rollout of smart meters to prepayment meter customers;

[74] https://bristol-energy.co.uk/media-center/our-quarterly-updates

- Potential to bring additional activities in-house, such as call centres and some billing activities; and
- Potential flexibility for contracting arrangements, whether with local generation or wholesale trading arrangements.

As part of the decentralisation of energy, such offerings represent an important means by which to offer alternative tariff solutions, new pricing models and promote engagement by consumers.

Some respondents mentioned the possible impact that the cap could have on the customer base that is eligible for the WHD, given that small suppliers[75] - such as many of the white-label providers – do not have a liability under the scheme and hence their customers cannot access it.

"There are only 14 obligated suppliers under WHD. If you look at improving engagement among vulnerable customers, there could be some real losers under the cap (if they switch to a supplier without a WHD obligation),"

Anonymous

4.6.3 Innovation and differentiation in alternative supplier models

Pre-accredited licences have facilitated entry, particularly in the form of smaller suppliers that have looked to compete on price. However, this has been complemented by product marketing and tariff strategies based upon these suppliers carving a niche for themselves as an alternative to the Big Six and medium suppliers. These have included:

- **Brilliant Energy**. The company launched at the start of July 2017, offering electricity only tariffs nationwide using a pre-accredited supply company from Utiligroup.
    - The supplier offers a "Payment Waiver" service, whereby the company will waive up to six monthly payments for customers that have been made redundant or have been signed off work by their doctor.
- **GnERGY**. The company entered the market in March 2013 through a pre-accredited supply solution with Utiligroup.
    - Set up by a group of 200 ex-Gurkhas, who pooled £600,000 to start the business, the business was initially focused on local supply, but in May 2014 the supplier announced its intention to supply nationwide. It intended to target the 80,000-strong Nepalese community in the UK, with customer service staff speaking Nepali and Hindi, as well as English.
- **Igloo Energy.** The company launched in the GB domestic market in April 2017. The company utilised a Ensek pre-accredited solution to set up the supply business. It initially offered electricity only, before adding gas in July 2017.
    - The supplier says it aims to use technology including smart thermostats and LED lights to help customers manage their energy consumption, marketing itself as "*the company with energy for the connected generation*".
    - Igloo Energy says on its website it will offer customers "*the latest range of smart products designed to make your home cheaper to run*", with smart meters "*coming soon*".

As they are reliant on a third-party for their billing systems, this fact can constrain the ability of these suppliers to offer certain tariff types (e.g. fixed, variable, pre-payment) if the IT infrastructure is not able to accommodate them. A similar situation exists for white label suppliers in that they are typically limited to the types of tariffs provided by their partner.

[75] Fewer than 250,000 domestic accounts

However, while the supplier can control the rates at which the tariffs are set, such plug-and-play licences may constrain the ability of those suppliers that use them to offer innovative tariffs without creating their own system architecture. This constraint may in turn accelerate the attempts by these suppliers to innovate in other ways such as those presented above, and by providing bundled offers.

In response to the demands of domestic customers and the desire of white label and pre-accredited suppliers to respond to these, it is expected that these calls for innovation will flow up the value chain to parent suppliers and system developers respectively. In terms of the ongoing demand for such approaches to market entry, it is unclear yet whether the cap will serve as an impediment or accelerant.

Having seen 16 suppliers enter the market in 2017, a further three have joined the domestic market in the calendar year to date (EVenergi under "licence lite", Utility Point and Gulf Gas & Power). According to Cornwall Insight information, there are at least a further five potential suppliers at various stages of entry: Alfa Smart Energy, Hebrides Energy (white label), Home Energy, Logicor Energy (plug and play) and Mongoose Energy.

4.7 Local Energy Markets (LEMs)

Community and local energy projects as a source of innovation

- Technological and commercial innovation has been evident in the GB market through a growing number of local energy market initiatives;
- These projects have typically developed in response to a specific local need or objective, e.g. to address network constraints or aid in the growth of low carbon generation, and have done so through local community engagement;
- Such projects have emerged with the support and participation of new and alternative participants, such as technology and software companies, and without the immediate need for smart meters and ToU tariffs – although such developments are present in some local schemes;
- Due to the locational nature of these projects, interviewees noted that they did not necessarily expect them to be affected by the default tariff cap;
- However, if the cap was perceived to be an enduring solution to energy market issues, it could discourage participation in local energy projects if it were viewed as an enduring rather than a transitory solution.

4.7.1 Growing profile of community and local energy projects

The current innovation focus on flexibility in smart electricity grids necessitates new approaches to local balancing, potentially in conjunction with the transition to more active network balancing at the distribution network level (see Section 4.5). A central part of the solution will be new local energy markets (LEMs), which will create and value flexibility on a local scale.

In the case of local energy projects that offer innovative tariff structures, we would not immediately expect these to be affected by the price cap. Given the feedback from some of the industry participants interviewed for this report that the default tariff cap may impede innovation and hamper engagement, local schemes may represent a means by which to arrest such adverse consequences.

A pressing priority for electricity distribution network operators is to achieve localised balancing and thereby avoid costly network reinforcement. This will become more critical as the uptake of low-carbon technologies continues, including the electrification of heat and transport. Local energy markets can therefore encourage wider stakeholder participation in trading different services, structured in both peer-to-peer and other alternative market arrangements. They can also can support energy decarbonisation by boosting the uptake of low carbon technologies.

The aim of a local energy market is to facilitate the use of local generation to meet local demand as far as possible, and to assist networks to accommodate an increasing amount of both without reinforcement. Small-scale generators – and self-generators – are gaining more options, as storage becomes increasingly affordable, to buy and sell energy services (see the **Energise Barnsley** case study for an example of such a

project). Service capacity could also be aggregated and sold outside the distribution network to support the transmission system.

The Government's July 2017 Smart Systems and Flexibility Plan[76] and the Electricity Networks Association's Open Networks Report, issued at the end of 2017[77], set out pathways over the next six years to open network service requirements to market at both commercial and domestic scales. Principally, these will aim to drive the push to localised balancing (i.e. collective balancing by consumers and generators confined to a specific geographic area within a distribution network), thus bringing more network service requirements to market.

Case Study: Energise Barnsley – battery storage and self-generation

- Project Windy: Energise Barnsley is a two-year project installing 40 Moixa batteries within a virtual power plant using Gridshare technology in social housing owned by operator Berneslai Homes. 30 of these properties have also been fitted with rooftop solar arrays;
- Trial participants are expected to see energy bills decrease 30% due to solar panels, and 20% more because of batteries, proving to be effective against fuel poverty;
- Northern Powergrid monitors the voltage and generation at the local substation. Residents are free to select their own energy supplier, though tenants would benefit from selecting a Time of Use tariff;
- Total costs of the project equal £250,000, funded by local DNO Northern Powergrid;
- Domestic batteries last 10-15 years, less than most renewable projects, making payoff of the asset a concern. However, costs of batteries have fallen from £6,250/unit to £2,500 plus VAT and installation. This is projected to decrease 60% from 2017 to 2030 for Li-ion batteries;
- Moixa currently offers £50/year payment for using the batteries as part of the VPP. The value and flexibility of VPP is expected to increase, meaning that payments to participants may follow.

http://www.energisebarnsley.co.uk/

"The cap does not necessarily need to focus on innovation. Look at community energy in terms of owning the means of production – how can you invest in renewable assets that aren't just panels on a roof. It is becoming quite local, diverse and fragmented which does not play into the national "one size fits all model,"

Technology provider

4.7.2 Introduction of non-energy providers and other disruptors

Technology vendors from outside the energy industry and digitally-connected communities will also make essential contributions to local energy market development as disruptors. Internationally, innovative new energy markets are being piloted regionally in Australia, the USA and Holland.

- UK
    - In addition to the SPEN FUSION project in Fife, a related project is being run by Centrica in Cornwall with the support of a £13m grant from the European Regional Development Fund –

[76] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633442/upgrading-our-energy-system-july-2017.pdf

[77] http://www.energynetworks.org/assets/files/electricity/futures/Open_Networks/14574_ENA_Open%20Networks%20Report_AW_v9_Web.pdf

the Cornwall Local Energy Market Trial. It recently signed up its first customer: a battery storage-assisted solar farm (See the **P.e.t.e.** case study for an example of such a project)

- Australia/New Zealand
  - Power Ledger, working in Australia and New Zealand, are trialling the world's first P2P blockchain-enabled energy trading platform across a regulated distribution network. Its white paper[78] states, "*blockchain-enabled P2P energy trading will transform energy networks into trading platforms and invoke a transactive economy that moves away from bilateral retail arrangements to multi-lateral trading ecosystems, preserving networks' relevance to consumers*".
- USA
  - In New York, LO3 Energy[79] is trialling the Brooklyn Microgrid (BMG), again underpinned by blockchain, and backed by a dedicated metering network. It says that the BMG "*operates by augmenting the traditional energy grid, letting participants tap into community resources to generate, store, buy, and sell energy at the local level*".
- Netherlands
  - The Universal Smart Energy Framework (USEF[80]) is a system within which smart energy devices are connected to an IT platform to enable them to be remotely controlled on a delegated authority basis. The intention is to better enable real-time management of the energy system, particularly during peak periods, the financial benefits of which are shared with participating consumers. The USEF arrangement is also being employed in the SPEN FUSION project, representing its first GB trial.

Case Study: The P.e.t.e. Project (Power. Energy. Technology. Efficiency) – integrated systems

- Upside Energy, Powervault and Mixergy will develop an integrated system using home battery systems, intelligent hot water tanks, and cloud Demand Side Response Services to provide a balancing service to the power industry;
- The plan is to install and operate 500 hot water tanks and 100 lithium-ion batteries in households to provide energy services including frequency response and demand turn-up;
- As well as selling these services to National Grid, some of the aggregated capacity will be used to balance local networks from which the project aims to explore new energy trading and revenue streams;
- The project consortium also includes The Eden Project who will identify households to participate, while the University of Oxford will be oversee the trial;
- The assets will be installed in households across Cornwall and London before July 2019;
- The project has received £2.5mn in funding from BEIS and Innovate UK to proceed.

https://upsideenergy.co.uk/2017/09/25/the-p-e-t-e-project-power-energy-technology-efficiency/

The development of local energy markets calls for extension of smart grids beyond their focus on the energy industry and increasingly into commercial building and domestic markets – the objectives of this being to reduce bills, support investment in generation assets, and provide a source of flexibility in production and consumption that can be developed into a revenue stream.

One mechanism employed to facilitate this is load disaggregation. As the name suggests, load disaggregation identifies the individual loads making up the overall demand for supply at any particular time.

[78] https://tge.powerledger.io/media/Power-Ledger-Whitepaper-v3.pdf
[79] https://lo3energy.com/
[80] https://www.usef.energy/

This enables energy usage by unmetered appliances to be attributed a portion of the overall supply meter reading, leading to greater understanding of the make-up of an electricity bill (see the **Bethesda Local Energy Club** case study), and serving as a scheme which is not wholly reliant on smart metering technology for each participating household.

Case Study: Bethesda Local Energy Club – ToU tariff

- This is a community energy project for residents, using a 100kW hydro generator providing about 500MWh/year, to approximately 100 households locally, managed (and sleeved) by Cooperative Energy;
- Smart meters measure half-hourly energy use, and an Energy Dashboard forecasts the likely generation so that users can adjust their demand to periods when hydro production is high;
- The project's initial report noted 19-29% savings on electricity bills, with 52% of customers' energy usage matched to hydro generation;
- Generation output is equally divided between households, according to their energy usage in the same half hourly period. Customers who more closely align consumption with peak generation of the hydro facility will therefore gain the most benefit;
- Balancing energy is provided under ToU tariff with four bands: 6am-11am, 12p/kWh; 11am-4pm, 10p/kWh; 4pm-8pm, 14p/kWh; 8pm-6am, 7.25p/kWh;
- The generator receives 7p/kWh, while consumers pay 7p/kWh for the units allocated to them from the scheme. The aim was to achieve a 32% improvement in generator revenues;
- This project is being replicated in two other locations in Wales, indicating financial viability and appeal to customers.

http://www.energylocal.co.uk/projects/

Many smart home devices are customer-oriented, helping to inform and guide their owners in their use of energy. As this develops a two-way understanding of individual consumption levels and how they are profiled, it could become feasible to identify opportunities for other products and services.

4.7.3 Engagement in community energy under the default tariff cap

As community and local energy projects commonly develop in response to a set of circumstances that is unique to a particular location, e.g. insufficient network capacity or island energy networks (the energy network on one or more islands, whether connected to the mainland or not), it is not immediately apparent that they will be adversely affected by the price cap – thereby remaining an important source of innovation driven by community groups themselves.

In the context of a wider business model, community and local energy projects also represent an important trial ground for innovative tariffs and business models, bundled service offerings and new partnerships. As the price cap is a potential catalyst to such approaches, opportunities should continue to present themselves, but will continue to rely upon customer engagement to proceed.

The risk that the price cap could be viewed by customers as an enduring solution to energy costs and that it would serve as a disincentive to engagement was highlighted by several interviewees for this project. It is therefore important that the potential benefits associated with participation in a local energy project be clearly communicated, whether these benefits are financial, in terms of promoting broader social cohesion, or both.

Such communication could be through public forums, outreach programmes or direct door-to-door contact, to mitigate the possibility of any reduction in engagement from customers who may perceive the price cap as a long-term solution to managing their energy costs.

On one hand, one of the challenges for innovative community and local energy projects is that they are typically underpinned by some form of financial support in the form of direct grants or ongoing subsidy. The latter is particularly prevalent in projects which have contain on-site generation assets, with the Renewables Obligation (RO) and Feed In Tariff (FiT) regimes providing support to large-scale and small-scale renewable projects respectively.

While legacy generation schemes, i.e. those that already exist or are in receipt of support, will continue to obtain this support for the first 20 years of their operating life, the GB energy sector is moving into a subsidy-free world with the RO having closed to new submissions in 2017 and the FiT regime closing in 2019. As this has a broader financial impact on the underlying business case for a community energy project, it may prove a greater consideration for project developers than the default tariff cap.

In recent years, there has been an increasing emphasis on "smarter" flexible arrangements. This could see proven innovation projects of greater interest to the increasing number of unconventional suppliers and other disruptors entering the marketplace. These include commercial and technological innovations involving:

- Self-supply, i.e. using locally-connected and on-site generation assets to supply energy directly to local residents and businesses, thereby avoiding the need to use the main electricity network and hence avoiding the costs associated with doing so.
    - The **Bethesda Local Energy Club** incorporates this in conjunction with its ToU tariff;
- Supply through a "private wire" arrangement, i.e. a small-scale local electricity network that operates independently from the main public network, incorporating generation, consumption and storage.
    - These arrangements have been present in the GB electricity market for several years, typically in response to constraints on the public electricity network and the charges associated with connecting to this;
- Wider incorporation of technology, aided and supported by changes to the regulatory framework. For example, by promoting greater responsiveness from end users through changes to the settlement process and application of a ToU tariff combined with storage capabilities, while new opportunities will also arise as policies to roll-out electric vehicles will increase pressure on existing power networks.
    - Ovo Energy's "*distributed energy system of the future*" (see Section 5.2) is one such application of this integrated approach; and
- Automated control technologies will open further opportunities, particularly if they are deployed on a large scale. By rewarding customers for relinquishing control of certain aspects of their energy use, this will enable tariff innovation and the opportunity for engaged customers to benefit from reduced consumption and for changing their usage patterns.
    - The FUSION initiative is one such example of this automated control approach

In addition to the direct potential benefits of such innovations in the form of lower bills for customers, there are also longer-term benefits through using the flexibility of locally-based resources to mitigate network reinforcement costs.

Such models have non-cost issues at the heart of their approach to market, being based more upon issues such as social cohesion and ensuring benefits to local communities. As innovative approaches often used to address a specific issue (e.g. network constraints) that may be adversely affecting customers, the cap's impact on them is not evident given the presence of such overarching issues.

In the case of local authorities as suppliers, the impact of the cap would largely depend upon their business model and the reasons for entering the sector in the first place. Given the observation above that such suppliers do not actively compete on price, then any incorporation of them under the price cap may adversely affect them.

Local energy projects also dovetail with other local initiatives such as smart cities, building local economic resilience and development and community engagement. These factors mean they have a natural interest in energy provision and investment, although it is unclear as to the extent to which this will be affected by the cap.

4.8 Conclusion

The rate and extent of technological and commercial innovation in the energy sector has increased in recent years and is set to intensify as the deployment of smart meters in the domestic sector expands. These will include the increased use and availability of ToU tariffs, battery storage and electric vehicles and – most importantly – through the combination of one or more of these assets (see Section 5).

The ability of customers to use one or more of these in an integrated manner was cited by several interviewees as having considerable potential to yield benefits to customers, with a growing number of suppliers offering some form of broader service incorporating them. Such products have been developed by suppliers through acquisitions, partnerships or joint ventures – notably in the electric vehicle sector, which has witnessed growing supplier interest in recent years.

With the cap and its possible extension dependent on customers being able to tap into the perceived wider benefits accorded by smart meters, the prospect of greater innovation under the cap will depend upon customer demand for such products and their wider desire to engage with the energy market, as well as the ability and willingness of suppliers to respond to them.

While smart meters and associated services are an important catalyst to innovation, they are not a prerequisite to it, as alternative business models and practices have developed through a growing number of local energy market initiatives. With many of these having developed in response to a specific locational or structural need in a given area, they have typically done so with the aid of grass roots community support and with the participation of new energy market entrants such as technology and software companies.

Due to the locational nature of these projects, interviewees noted that they did not necessarily expect them to be affected by the default tariff cap. However, interviewees note that the ability of suppliers and other market actors to participate could be adversely affected if the cap meant reduced funds to commit to such schemes. In addition, customers may be more reluctant to take part in such schemes if they believed the cap to be an enduring solution to energy market issues.

5. Bundling and beyond: A new frontier for energy suppliers

Supplier activity in the broader energy space (bundled offerings, connected homes, EVs)

- In the face of growing competition, technological innovation and a growing need to differentiate their products, energy suppliers are increasingly offering alternative products and services;
- These include home services such as heating and boiler cover, app-enabled and web-enabled products such as smart thermostats, and electric vehicles (EVs);
- Energy suppliers are entering this space through a variety of routes, such as direct investment or through some form of partnership or white label agreement;
- While innovative themselves to varying degrees, such offerings have considerable innovation potential when combined, which can help promote and engender loyalty among customers;
- Energy supplier partnerships are increasingly with companies that have not traditionally been participants in the sector, demonstrating the potential for innovation and new business models and products.

The potential rewards of the connected home market have seen numerous suppliers enter this space via a variety of routes to provide bundled service offerings – typically focused upon areas such as home services (e.g. boiler repair), connected home products (e.g. smart thermostats) and electric vehicles. Such offerings can range from the provision of smart or app-enabled thermostats to more integrated battery storage and electric vehicle products (see below).

The nature of competing solely on price is that a supplier cannot guarantee with certainty that it will always be the lowest cost offer. As such, this requires that suppliers seek to attract and retain customers in a way that does not involve prices. Suppliers therefore need to evolve beyond an initial lower cost offering into something that creates a deeper connection with the customer, e.g. more innovative products, thereby growing trust and loyalty over time.

This holistic approach to energy services also serves the dual benefit of differentiating suppliers from one another and retaining consumers, while also helping to mitigate any pressure on retail margins. The broader nature of the delivery offering through bundled services, and the manner with which suppliers interact with customers, is therefore a way in which the traditional energy supplier model is evolving.

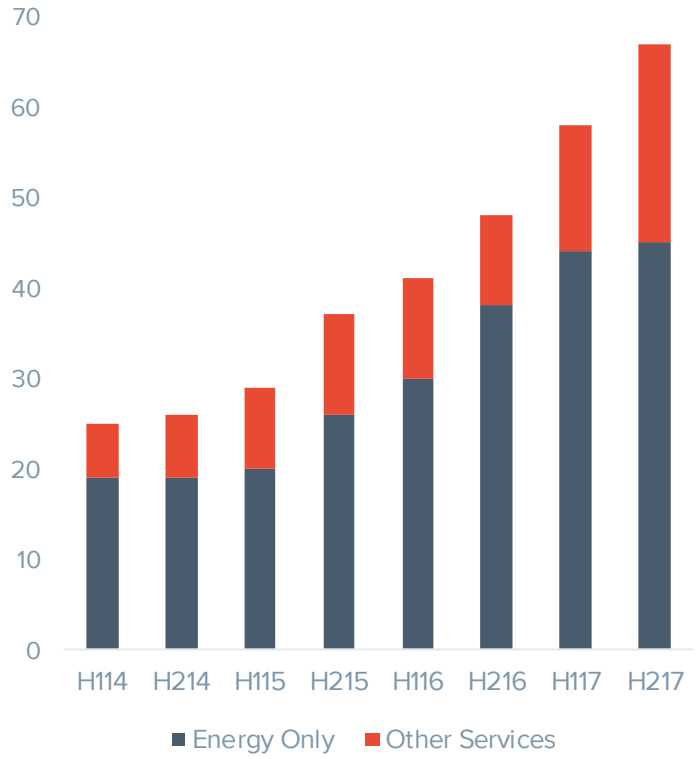
"The really innovative stuff is where you combine things. This could be the nub of the future energy system,"

Supplier (Large)

"The growing penetration of smart connected devices...creates commercial opportunities to manage energy and bundle it with other services (e.g. mobility, heat and comfort) that could transform the domestic energy supply market,"

Aggregator

Figure 7. Number of suppliers participating in adjacent markets, H114 to H117 (Source: Cornwall Insight analysis)



Looking at the experience of the industry to date (Figure 7), since the start of 2014, the proportion of suppliers providing more than just energy has risen from approximately a quarter to a third, with products relating to home services and the connected home seeing the most growth. During this time, the number of domestic suppliers has increased from 25 to 67 as at the end of the first half of 2017.

In other words, the proportion of suppliers providing more than just energy has risen from approximately a quarter to a third, with products relating to home services and the connected home seeing the most growth.

This trend has accelerated in the last 18 months, where the largest growth has been seen in he connected home and EV sectors, although growth has been evident across the spectrum of the energy sector's connected markets.

As with other elements of energy service provision, the question remains about potential disruptors in general and the role of tech companies in particular. Although companies like Google and Amazon do not currently offer these types of services directly in the UK, Amazon's US operations do currently offer smart home consultations[81].

Under this service, the company offers home visits from one of their employees (rather than a contractor) to undertake a review of how possible smart home products could be deployed and how these can be connected and operated through Alexa software. Trials of "*vetted and tested*" products can then be undertaken.

Google already has a presence in the UK home services market through the Nest thermostat. Having previously operated as an independent unit within Google parent company Alphabet, it was merged back into the Google hardware group in February 2018. In May 2018, it announced that it was launching its Project Sunroof[82] initiative - a system estimates savings using data from Google's Earth and Maps apps - in the UK in conjunction with E.ON.

"Penetration of (connected) devices will enable consumers to have far more control of their energy use and engagement with the energy system,"

Aggregator

Given the growing presence of new entrants to the energy sector, some respondents interviewed for this report argued that the rate of technological innovation was so rapid, the greatest innovation for consumers may not in fact have been invented yet.

[81] https://www.amazon.com/Smart-Home-Consultation-In-Home-Appointment/dp/B01N3JQ196
[82] https://www.google.com/get/sunroof#p=0

"We are at a place where mobile phones were in the 1980s and 1990s - you couldn't see what the future would be or what an iPhone would even look like. It is the evolution of the business models that will change. Energy could be a freebie in the same way that call minutes and data are in mobile phone contracts. How we describe what we want as customers as a service obligation rather than a commodity obligation is likely to change,"

Supplier (Large)

5.1 Bundled services, connected homes and innovation

Unlike the traditional electricity supply relationship in which the consumer has little interaction with their supplier other than to provide meter readings or pay a bill, the growing prevalence of digital tools has allowed suppliers and customers to develop a two-way relationship. This is increasingly epitomised by the "prosumer" model, in which customers have their own small-scale renewable generation assets on their property, making them both **pro**ducers and con**sumers** of energy.

"Connected devices may be a lifestyle product. Time of use (tariffs), battery storage and electric vehicles will all be disruptors in the energy value chain and how it works in future. There is a real danger that innovation is stifled or slowed (lower investment, lower customer engagement) under the cap. Electric vehicle engagement is driven by a separate set of parameters."

Supplier (Large)

The growing use of data, as epitomised by the connected home, will allow suppliers to offer contextualised and personalised products. Here, the role of such technological advances will be crucial, as they will in part determine the future of the energy system.

The potential implications for small-scale, decentralised generation as a force for change are already apparent through the prosumer approach, and this will grow exponentially with the increased deployment of battery technology, electric vehicles, and the growing prevalence of smart home technology. This includes the ability to generate and export electricity back into the network, or vehicle-to-grid and grid-to-vehicle capability, allowing for an effective holistic management of energy usage through the prosumer structure.

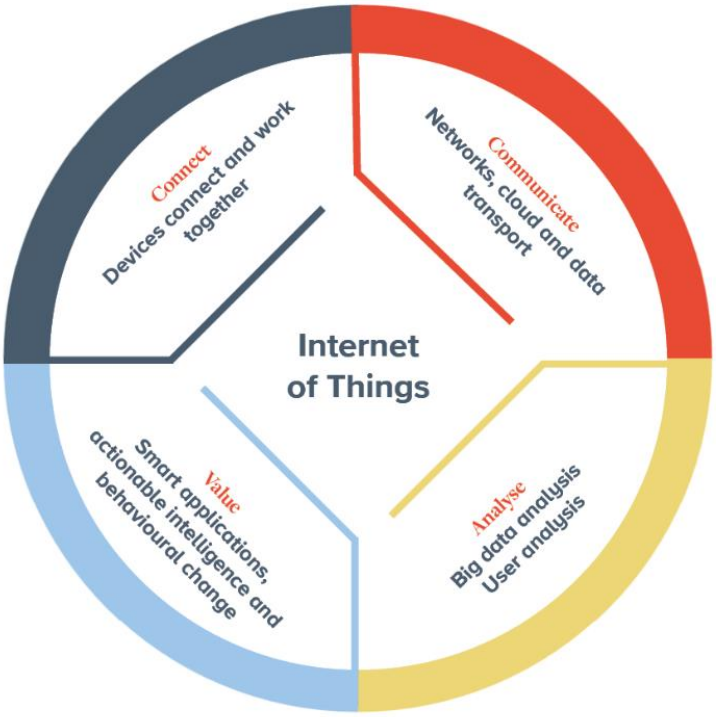
The relationship between the smart home, electric vehicle and energy supplier opens the door to the aggregation of home services and the need for a suitably robust online framework to manage the interconnection between the elements of the smart home. This represents a source of added value, such as:

- Transparency – i.e. visibility of how and when money is being spent, and where it is going.
    - Smart meter technology has the potential to be a key game-changer on this front;
- Control – i.e. extending out from the traditional focus on tariffs and choice of supplier, the growing number of suppliers with a social and environmental focus (see below) shows the attractiveness of such business models.
    - Again, smart meter technology can be a major source of change in this regard, provided that tariff structures evolve accordingly, which will require greater flexibility from supplier systems to allow these; and
- Ability for visible social media interaction with peers

- A recent survey[83] found that 76% of those surveyed were motivated by incentives to recruit their friends and family to energy service providers.

In this environment, the Internet of Things (IoT) has a key role to play in the evolution of the energy sector, i.e. the wireless connectivity of any device with internet access to one another as high-speed internet access becomes more widespread and the costs of technology decrease. This is not restricted solely to machines, but includes sensors that can interact with machines and respond accordingly.

Figure 8. The Internet of Things (IoT)



The fact that IoT is already in existence means that for energy suppliers the issue is about being able to evolve their offerings in such a manner that they are future-proof. The analyst firm Gartner has released estimates that, by 2020, there will be over 20 billion connected devices globally[84], while other estimates are that 1tn devices could be in place by 2025, raising considerable potential in terms of new products and services.

The myriad of devices that could be connected through IoT highlights a further dynamic for energy suppliers, that of cooperation with companies and service providers outside the traditional utility sector. The pace of technology and innovation are such that energy suppliers operating on their own may struggle to keep pace, necessitating strategic relationships that move them outside of their core service provision – as highlighted in the partnership models presented in Section 5.3.

At the heart of the smart home rests customer data. As the smart home develops, the extent and depth of data available will grow considerably. This rapidly expanding reservoir of user information clearly has incredible value. However, realising this value will be a challenge for suppliers and their partners given concerns over privacy and confidentiality, as well as cyber-security.

"We are just at the start of the technological innovation, as well as for the business models, so it is too soon to say what the "greatest" innovation is. It is more about the impact of digitisation and the impact of the Internet of Things,"

Supplier (Large)

Whilst under current industry rules and codes suppliers remain very important actors in the sector, the advancement of technology and new entrants in the smart home sector opens space for challengers to emerge, some of them already large and experienced operators in other domestic service sectors. As that

[83] "The New Energy Consumer: Architecting For The Future". Accenture 2014. This was a survey of 10,000 participants across 17 countries.
[84] https://www.gartner.com/newsroom/id/3598917

unfolds, it is likely to put pressure on regulators and policy makers to think about how to accommodate them, and the benefits they could bring to consumers (see Section 3).

While integrated home offerings represent an important means for suppliers to promote customer loyalty, Ofgem also recognise that it is important for customers to be able to switch more quickly if they are not happy with their supplier. Here, the regulator's faster switching programme is an initiative that aims to encourage consumers to engage with the energy market and to improve their experience of doing so. It fits within the broader reforms of the roll-out of smart meters and reform of the electricity settlement arrangements to support and leverage their benefits (see Section 3.6).

5.2 Connected (smart) homes

As suppliers move beyond this traditional model and look to become more innovative in their offerings, they are looking to do so through a combination of in-house development and partnerships with other organisations. The approach of suppliers to such products can be therefore separated as follows:

- In-house development: The supplier is developing its own range of connected home products or has purchased a connected home company;
- Strong partnerships: The supplier has entered into a strategic partnership with a technology company to offer products or services beyond bundled propositions;
- White label partnerships: The supplier offers third-party connected home products, provided through a partner or other commercial arrangement, under their own brand;
- Third-party bundles: The supplier offers third-party connected home products as value-added bundles to their existing propositions; and
- Smart storage: The supplier is, through one of the routes above, providing domestic battery storage services in conjunction with its tariff and/or renewable generation (typically solar PV) offerings
    - NB: This can be considered as one or more of the above offerings, but has been separated for completeness.

Examples of the current range of offerings are presented in Figure 9.

Utility Warehouse was one of the first companies to provide bundled offers, starting with its Discount Club in 2005 before formally launching its bundled product structure (gas, electricity, home phone, mobile and broadband) in November 2013. The company has reported reduced churn rates for customers on its bundled propositions, with other suppliers increasingly turning to similar bundled propositions.

Growth has been particularly apparent in the connected home market (see above), with 11 suppliers currently offering bundled connected home technology in partnership with third-party technology companies, e.g. EDF Energy's partnership with Amazon and Netatmo, offered alongside a 28-month fixed-term tariff.

"Smart meters are a prerequisite for other innovations. Time of use tariffs will always have a market, but it will be a niche one. Connected homes, once smart meters are in, is where the opportunities will lie."

Anonymous

As this activity develops, suppliers are becoming increasingly specialised, in their marketing and/or propositions, around a series of themes. Technology-focussed options have been a popular choice as domestic supply migrates towards a smarter market. Some suppliers want to lead the charge in this sector, hoping to gain the first-mover advantage.

This has manifested in a growing number of suppliers developing propositions around electric vehicles, storage, and the connected home, e.g. Ovo Energy's partnership with Nissan (see case study on the company's "***distributed energy system of the future***"). Additionally, several suppliers have joined Utility Warehouse in offering multi-utility services.

Figure 9. Domestic supplier routes to market and partnerships within the connected home sector

Category	Supplier	Smart product	Details
In-house development	British Gas	Hive range	Offers a range of smart home products, including home hub, smart thermostat, camera, switches, motion sensors and lightbulbs.
	E.ON UK	-	E.ON group acquired a minority share in Internet of Things (IoT) specialist Cuculus, whose focus includes smart home management systems.
	Ovo Energy	VCharge smart heating management system	Ovo Energy announced the acquisition of US energy technology company, Vcharge, whose technology controls electric storage heaters to manage usage and provide grid balancing services.
Strong partnerships	EDF Energy	-	Using in-house Blue Labs programme to develop smart home proposition, focussed on data analysis and automation.
	SSE	-	SSE announced a connected home partnership with Dixons Carphone in December 2016, with products set to be trialled in 2017. No new details have since emerged.
White label partnerships	Scottish Power	SP Connect smart	Effective white label partnership with Climote smart thermostat.
	EDF Energy	HeatSmart smart	Effective white label partnership with Netatmo smart thermostat.
	Flow Energy	Flow Home range	Effective white label partnership with fifth play smart home range.
Third-party bundles	EDF Energy	HeatSmart thermostat	28 month fixed tariff with £270 exit fees bundled with Netatmo smart thermostat and Amazon Echo hub.
	npower	Nest smart home partnership	Offers Nest Learning Thermostat and smart camera to customers at a discounted rate.
	E.ON UK	tado smart thermostat	Offers discounted tado thermostat bundled with new boiler purchases.
	SSE	tado smart thermostat	SSE advertises the tado smart thermostat on the Home Services section of its website.
	First Utility	Nest Learning	First Utility partnered with Nest to extend its smart home offering.
	Octopus Energy	Nest bundles	Octopus Energy are set to launch a partnership with Nest, with its full implementation currently delayed.
	Igloo Energy	tado smart thermostat	Offers smart thermostat bundle as added value bolt-on to tariffs.
	Co-operative Energy	geo Cosy thermostat	Offers bundle tariff with geo, offering a code for a free Cosy thermostat.
	Engie	PassivLiving smart thermostat	Offers bundle tariff with PassivLiving for its HEAT smart thermostat.
Smart storage	Ovo Energy	SolarStore smart battery storage	Partnership with Nissan to launch its battery storage proposition – Ovo SolarStore – for solar customers, as well as vehicle-to-grid charging for Nissan Leaf owners
	Tonik Energy	Powervault smart battery storage	Offers a trial, currently to customers with solar installations, for a Powervault battery with smart management technology
	Green Energy UK	Powervault smart battery storage	Offers bundled Powervault smart battery system with its Tide time of use tariff.

Source: Cornwall Insight

Alongside a technology focus, many new entrants have brought renewables-orientated business models to the market. This has seen a strong uptick in the number of suppliers operating under a sustainability theme, commencing with Ecotricity in 1995 before being joined by Green Energy (2001), Good Energy (2003), Green Network Energy (2016) and Pure Planet (2017) among others. Similarly, as the focus on fairness has developed within the market, the number of community-focused and locally-oriented suppliers has also increased (see Figure 6), as well as seeing companies such as People's Energy (2017), which was established through a crowdfunding scheme.

In addition to fully licenced suppliers, some companies have also used white label partnerships to develop specialities across these themes. Of note is Boost, the smart prepayment brand of Ovo Energy[85], which covers around 200,000 prepayment customers. Similarly, npower white label Powershop offers a technology-driven smart proposition where customers purchase energy "packs".

Although suppliers have pursued a variety of routes to market in the connected home, third-party bundles have dominated. These offer a low-risk point of entry for suppliers whilst also providing value-added products. Smart thermostats are the first technology to take off through the supplier channel. While all of the large suppliers are active in the connected home market, British Gas is the only supplier to have developed an in-house product range, through Hive. The supplier has sold around 750,000 devices as at December 2017 and intends to focus future strategy around these products.

Ovo Energy's "distributed energy system of the future"

- In April 2018 Ovo Energy launched its new bi-directional EV charging tool, which it states will allow greater flexibility in the way in which customers use and store their energy, as well as giving them the ability to sell any surplus electricity back the grid. As a result, the company states that EV owners "may never have to pay to be on the road again";
- Alongside this low-carbon transport initiative, the company revealed its smart charging, home energy storage and domestic electric heating products – these working in conjunction with its VCharge software to optimise the flexibility and minimise the cost of the devices to which it is connected, serving as a virtual power plant (VPP);
- Developed in partnership with Nissan, Ovo's Vehicle-to-Grid Charger has a 6kW charge and discharge capacity and will initially be offered as part of a two-year trial to 1,000 Nissan owners. It will be targeted in the first instance at Ovo customers buying the new Nissan LEAF and e-NV200 electric van models;
- Complementing the Vehicle-to-Grid charger, Ovo's 7kW Smart Charger for EVs is designed to respond to price signals with a view to charging at off-peak periods, while the company's new Home Energy Storage product will function in the same way to actively manage a household's energy use. In addition, the Heat Dynamo is an app-enabled electric heating tool, which Ovo states can be retrofitted to existing assets;
- The VCharge system, which was acquired by Ovo as a smart grid start-up in 2017, will link all of a home's connected energy devices and is designed to react instantaneously to changes in demand and supply – thereby providing flexibility and reducing potential strain on the electricity network.

5.3 Home services

The desire to change the nature of the customer experience can also be shown by the growing number of energy companies offering home services that complement the traditional energy supplier model while providing added value to their customer base. The range of home services varies by provider, but typically includes heating and boiler cover and engineering, and interior and exterior home repair and decoration (e.g. electrician, plumber, carpenter).

Having been at the forefront of this shift at the end of the century, Centrica has seen its home services division continue to grow. However, this followed an earlier attempt to diversify its operations into roadside assistance, financial services and telecommunications[86]. One of the main differences between the company's failed efforts in the last decade and the situation in which the energy sector currently finds itself is the role of technology and data to offered more personalised services.

[85] https://www.ovoenergy.com/boost

[86] Centrica's previous efforts involved the Automobile Association (bought in 1999 for £1.1 billion, sold in 2004 for £1.5 billion), the Goldfish credit card brand (bought in 2001 for £85.0 million, sold in 2003 for £112.5 million) and OneTel (bought in 2001 for £58.0 million, sold in 2005 for £152.4 million).

Of the Big Six, only E.ON UK is currently not offering home services. However, it formerly offered these, but this division of the business split from E.ON UK into Home Energy Services in 2013, which was then acquired by HomeServe in 2015.

Figure 10. Energy supplier home service provision

Supplier	Home service division/partner	Description of offering
British Gas	Local Heroes	Trusted local tradespeople, backed by 12-month guarantee
EDF Energy	Hoppy, Intana	Hoppy: Local tradespeople (through Plentific) Intana: Insurance services
First Utility	Bizzby	Home services
Ovo Energy	CORGI Homeplan	Heating and boiler cover
Spark Energy	Home Telecom	Telecommunications and broadband
npower	Allianz insurance and 0800 Repair Cover	Boiler and central heating care
ScottishPower	Domestic & General	Appliance care
SSE	SWALE Heating	Boiler, heating and wiring cover
Ecotricity	Ecotalk	Telecommunications and broadband

Source: Cornwall Insight

5.4 Innovation as a catalyst for customer engagement

Engaging customers in the energy sector

- Engagement is important in the context of the default tariff cap, given that Ofgem has proposed that the cap will be set at a level and in such a manner to ensure that there is still an incentive to switch suppliers;
- There are a range of ways in which customers can engage with the energy market and use these to switch, including price comparison websites (PCWs), collective switches or – more recently – next generation intermediaries (NGIs) or app-based products;
- At the same time, the ability to switch supplier has been made easier through the growing number of suppliers in the market, facilitated through pre-accredited supply licences, which reduce the time and complexity associated with entering the market;
- However, feedback from interviewees indicates that the cap may have the opposite effect and reduce incentives to engage and to switch.

In the domestic energy markets, consumers typically engage with the energy market to choose their supplier through one of the following ways:

- Through a price comparison website (PCW) or other digital comparison tool (DCT);
- Responding to a prompt made to them by suppliers, perhaps online or through the media or direct mail to their homes;
- Contacting potential suppliers directly, often triggered when they move to a new house; and
- Being approached face-to-face by a sales person, either in a public place or door-to-door.

A commonly cited view among interview respondents however was that the cap could make customers less engaged rather than more engaged in the energy market on the grounds that they would believe that the Government was “looking after them”. Poor communication of the existing state of the energy market was also given as another problem, particularly in terms of the options that are out there for consumers.

People will switch off to energy and stop switching and engaging (as a result of the cap). That couldn't have come at a worse time for any of the companies given the cusp of the innovation that we are on. We need the sector to be able to show the innovation that we are on, for example with smart meters. It will significantly act as a brake for innovation,"

Supplier

Different suppliers will access these channels to market depending on their respective strategies and scale. Larger suppliers will tend to have more choices available to them and also be more likely to have the resources to support them in house. After a series of mis-selling problems[87], the major suppliers stopped their doorstep selling activities during 2011 and 2012[88]. However, a number of smaller suppliers subsequently took up this practice and it has grown again as they have increased their market shares.

This change in market activity has been tracked by the 2017 edition of their annual Customer Engagement Tracking Survey undertaken for Ofgem[89] which indicates that the level of consumer engagement[90] in the energy market over the preceding 12 months had increased to 41%.

This increase has been largely attributed to an increase in switching supplier and comparing tariffs, while the demographics of Ofgem's sample shows that younger people, those deemed to be middle-class homeowner-occupiers[91] and frequent internet users are more likely than average to both have engaged and to have switched supplier. Conversely, older customers less frequently switch supplier but were found to be no less likely to switch tariff with their existing supplier.

This is important in the context of the default tariff cap given that it has been proposed by Ofgem that it will be set at a level and in such a manner that will ensure that there is still an incentive to switch suppliers. This is compounded by the fact that customers on such products are typically less engaged than other types of customers.

"Engaging people to move is the problem. The market is already highly competitive and putting artificial restrictions in place will not help that,"

Generator

5.4.1 Price comparison websites (PCWs)

Over the last two decades, comparison sites have emerged as an important tool in the energy sector and beyond, being seen as important routes to market for suppliers and as a means by which to promote broader engagement by consumers. These sites typically work on the same underlying business model, i.e. free at the point of delivery to customers, but with the companies (in this case, energy suppliers) to which these customers switch being charged a fee by the site operator.

Comparison sites in the energy sector, as with other areas, can be broken down into two groups: those that operate solely within the energy sector and those that operate across several other customer-facing areas,

[87] For example, on 23 April 2008 Ofgem began an investigation of alleged mis-selling by Npower, and on 30 January 2009 announced a fine of £1.8m. On 27 April 2010 Ofgem introduced stronger guidance on direct sales and marketing activities. In September 2010 Ofgem opened an investigation into the sales practices of four of the six major suppliers. Surrey County Council Trading Standards Department prosecuted SSE for misleading selling practices and on 10 May 2011 was found guilty on two counts.

[88] The timings of the announcements and withdrawals were as follows: SSE 8 July 2011, BG/Centrica 12 August 2011, EDF Energy7 Sept 2011, Npower 16 October, Scottish Power 21 October (the decisions of the last three suppliers to take effect from 30 November 2011) and E.ON UK 4 July 2012 to take effect after consultation.

[89] "Consumer engagement survey 2017." Ofgem (September 2017). https://www.ofgem.gov.uk/publications-and-updates/consumer-engagement-survey-2017

[90] Engagement is defined by Ofgem as "switching supplier, changing tariff or comparing supplier or tariff".

[91] Referred to as social classification "ABC1",

e.g. insurance, finance and telecommunications. In the UK, the sector is dominated by the "Big Five", (GoCompare, Compare The Market, MoneySupermarket, uSwitch and Confused.com) all of which operate on a cross-sector basis. In addition to the Big Five, there are a number of other large cross-sector sites, with a greater number of other participants being much smaller – typically classed as small or micro companies.

Based upon achieving the lowest cost outcome for their users, the traditional price comparison (or other intermediary) model will therefore need to adapt in the presence of the cap. We therefore consider the following assumptions:

- Taking the experience of the PPM cap as an indicator (see Section 6.1.1), supplier's default rates may converge around the cap, while the overall rate of uncapped tariffs will increase;
- With suppliers already moving customers off their traditional default offer and onto fixed term products (again, see Section 6.1.1), such products will typically be of 12-month duration with no exit fee, enabling the customer to leave at any time with no penalty;
- Suppliers will have to advise customers in advance of the expiration of any such 12-month deal; and
- Suppliers will have to advise those customers on their default product when that changes under the cap, i.e. every six months.

End of fixed term notices should be structured in a way that promotes engagement, building on the communication requirements introduced by Ofgem in 2014. Here, the insurance transparency rules that were introduced by the FCA in April 2017[92] may serve as a guide, these being brought in to encourage customers to shop around at renewal. Insurers and intermediaries must ensure that these notices:

- State the previous year's premium at renewal, thereby enabling an easier comparison with the renewal quote;
- Encourage the customer to check their cover needs and shop around for the best deal at each renewal date; and
- Identify those customers that have renewed four or more consecutive times and provide supplemental messaging intended to provide further encouragement to shop around.

Ofgem launched its latest consultation on the existing communication requirements for the energy sector in May 2018[93], advocating a less prescriptive approach to correspondence from suppliers than at present.

In doing so, Ofgem is hoping to promote greater innovation in communications as a way of promoting engagement, given that ToU tariffs and other business models of supply may not fit within the existing defined structures, e.g. app-based communication and other technologies that allow suppliers to contact their customers in different ways. A decision on changes is due by the end of 2018.

With the prospect of greater communication from suppliers to consumers and the expectation of fixed-duration tariffs becoming the new norm, there should be a more engaged customer base for all suppliers and particularly small suppliers to target as the (previously disengaged) default customer base across the industry declines. Furthermore, as the dates of revisions to the cap will be known, this gives comparison sites confidence regarding the timing of any statements or roll-out of changes to their sites.

5.4.2 Partnerships and alternatives

Comparison sites form only one part of the tools at the disposal of suppliers and customers in terms of being able to find alternative energy deals, with collective switches and cashback offers also commonly used both by comparison sites and as an alternative to them.

[92] https://www.fca.org.uk/publications/increasing-transparency-and-engagement-renewal-general-insurance-markets-ps16-21
[93] https://www.ofgem.gov.uk/system/files/docs/2018/05/policy_consultation_-_domestic_supplier-customer_communications_rulebook_reforms.pdf

Under collective switches, a group of (typically) domestic consumers is able to negotiate a special tariff by a collective switching auction. Auction operators specify the parameters of the process including consumer sign-up, timings, preferred tariff type and bidding arrangements for suppliers. Consumers sign up to participate in the process and, once the auction has occurred, need to opt in if they want to take advantage of a winning offer.

Having been kick-started by a government-backed initiative in 2012[94], collective switching grew in both interest and the number of switches, being seen as a means by which new entrants to the sector could quickly gain consumers by competing on price. However, since 2016, the state of the sector has changed, with the number of collective switches declining while the successful tariffs offered have rarely beaten the open market.

With small suppliers unable to absorb the increased customer numbers associated with a large collective switch and the larger suppliers unwilling to compete aggressively on price, they have been unable to attract the depth of participation seen in 2015. In addition, suppliers have also changed the way in which they approach collective switching – partly reflecting the role of local authorities in offering these – with switches being used to target specific regions of the country.

The fact that collective switches have, in recent months, failed to consistently yield a market-leading tariff may be reflected in the reduced number of such schemes, as may consumer apathy and the diminishing returns associated with them. There is also the issue of conversion associated with collective switches in terms of the number of customers that express an interest in such schemes and those that agree to sign up once they have received their personalised offer.

Previous research from Ofgem indicated that this can be anywhere between 8% and 23%[95], although other sources have revealed rates of up to 40%. Evidence regarding the reason for the conversion rates seen has focused largely on the level, extent and timing of communication made with customers throughout the collective switch process.

Ofgem has considered a number of methods to both address this and to promote customer engagement in general. The most recent of these – announced in February 2018 – is an opt-out (rather than opt-in) collective switch trial targeted at a specific section of customers that have not previously engaged with the energy market. As with PPM cap, this follows a recommendation from the CMA's probe into the energy sector to help disengaged customers switch to lower cost tariffs.

As part of the trial, Ofgem will use a "*consumer partner*" to calculate the savings and liaise with customers, which appears well-suited to a PCW or comparable customer-facing entity. If the trial is successful, this represents an area of opportunity for service providers – such as a PCW – to expand their presence in the sector.

There are several websites which pay consumers a fee if they click through to a third party website and buy a product or service from them. These cashback sites, such as Quidco and TopCashback, provide access to tariffs directly from suppliers or through a PCW, doing so for a monthly or annual management fee.

5.4.3 Next generation intermediaries (NGIs)

The next step in the evolution of comparison sites are next generation intermediaries (NGIs). These are based largely upon access to consumer data and/or a customer relinquishing control of their switching to the service provider. Examples include automated switching services and app-based comparison and switching tools.

94 "Cheaper Energy Together Fund: DECC Collective Switching Fund 2012-13." DECC 2012. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65579/6772-cheaper-energy-together-collective-switching-compe.pdf

95 "Protecting consumers in collective switching schemes," Ofgem 2014 https://www.ofgem.gov.uk/ofgem-publications/85960/collectiveswitchingfinal2correctedverspdf

In contrast to the comparison site business model, automated switching tools (also known as concierge services) operate on a subscription basis and are paid for by their customers. In the case of the two main such entities on the market, this is either an upfront fee with a promise of a guaranteed saving (Flipper) or a monthly subscription that only takes effect once a specific saving has been made (Switchd).

App-based switching tools (as opposed to comparison sites that offer switching services through an app as part of a broader package), are a small but growing part of the comparison market. Unlike comparison sites, their next generation counterparts are not as reliant on ongoing customer interaction. In this context, concierge intermediaries have an advantage by removing the perceived barriers of time and effort from the process, thereby helping customers to engage with the market. App-based comparison services, although still reliant on interaction, are more likely to tap into the digitally-literate younger market.

There are a growing number of switching services based upon the use of apps on smart phones and tablets. For the most part, they operate on the same basis as concierge services by virtue of being tariff trackers, but with switching based upon an app that requires consumer verification, rather than an automated delegated switching service, e.g. Flipper. These include the Dixons Carphone Group's Voltz and Energy Saver apps, Ovo Energy's Lumo and the privately-owned Onedox.

The more active customers – such as those seen as being more likely to use these types of innovations – were seen as a small subset of the total customer base in the report interviews, and these would continue to switch regardless of the introduction of the cap. A better approach would be to do more to encourage engagement and increase the pool of active customers, it was noted.

"It's hard to see how a cap will do anything other than reduce incentives to switch. To create incentives to switch, address the real barriers – make switching simpler, with fewer problems about billing errors etc, and give people meaningful compensation when there are problems in the switching process,"

Aggregator

"The cap is market-wide for default tariffs and would not cover the more active switching base. The market is still split between the active and inactive,"

Anonymous

5.5 Customer-facing innovation under the cap

The entry of the large tech companies, including Samsung, Google, Amazon, and Apple, in the home hub market – the central control point for many of the smart home offerings - provides an indication as to the direction of the market.

Competitive pricing and desire to achieve first mover advantages in this emerging market suggests the declining price of smart home systems will continue, aiding the proliferation of technology into the home through 2020. It also signals the potential for a new and powerful set of actors to enter the domestic energy services market.

"If the cap promotes non-price innovation which requires suppliers to harness consumer flexibility, it creates more of a market for us and more suppliers that don't have the ability to manage those sorts of risks that the old vertically integrated suppliers had,"

Technology provider

The link between the default tariff price cap and innovation can be considered in a number of ways, including the financial consequences, a business strategy perspective, and the ability or willingness of customers to engage with the market.

"Innovation will be overlooked (by suppliers) in favour of cost reduction rather than (on) products which could have a premium associated with these. Alternatively, the focus may be customer retention."

Anonymous

"Reduced supplier profits may reduce their ability to invest in innovation. However, it may also accelerate innovation, given the need to become more efficient,"

Battery storage provider

As outlined earlier, the reaction of suppliers to the cap will depend upon a range of factors including their respective business models, customer base and ability to attract partners. However, with partnerships opening the door to new sources of capital as well as fresh business opportunities, the cap could accelerate such arrangements and the services resulting from them.

According to the Bill, the default tariff cap will consider the need to create incentives for suppliers to compete effectively and improve efficiency, while ensuring that "*efficient suppliers*" can finance their activities. The issue of defining efficiency was a point that emerged from the interviews undertaken for this report, specifically that there may not be a single definition of efficiency and that this would instead depend upon the type of customer and the cost to service their account[96].

"The efficiency drive is aimed more at incumbents and their cost to serve. If the Big Six can compete more efficiently, then it should drive that. It would not necessarily drive efficiency for smaller suppliers as that would happen anyway,"

Supplier (Medium)

"Some suppliers will cut corners as far as possible to maintain their margin, for example. Some suppliers will be geared for technological change and could be better placed,"

Anonymous

The ability to easily and transparently compare energy tariffs is at the heart of the comparison site business model, as is the fact that there are financial benefits from switching. The possibility of fundamental change to the way in which tariffs may operate under a cap has – understandably – been criticised by the operators of such sites.

5.6 Conclusions

If a price cap were to result in suppliers setting tariffs that converged towards the cap (as has been seen under the pre-payment cap to date, see Section 6.1.1), this would reduce the benefits from switching and

[96] This is a result of additional working capital costs, bad debt costs, and administrative costs such as for call centres.

potentially harm comparison sites, as well as potentially reducing the need for customers to use them to compare tariffs in the first place. As smaller, new entrant suppliers use comparison sites as a means by which to attract customers, their business cases could be harmed also.

However, such a view ignores the possibility that suppliers may instead look to alternative and more innovative tariffs as a means by which to differentiate themselves from their competitors, thereby benefitting the more engaged customers that typically use such sites. In addition, it may accelerate efforts by suppliers to diversify away from energy-only offerings and bundled tariffs and service offerings.

This bundling makes the traditional price comparison website business model more challenging, but – as stated – it would be expected that the engaged customer base would increase under the cap. PCWs could also adapt to allow customers to create "virtual bundles" of products (e.g. as with mobile telephone packages of specific levels of call time, texts and data).

While comparison sites have facilitated engagement in the energy market, the use of one or more such site is still a time-consuming exercise. In this context, next generation intermediaries have an advantage by removing the perceived barriers of time and effort from the process, thereby helping customers to engage with the market.

Concierge services can therefore catalyse engagement through their initial interaction with consumers and then seek to retain that engagement through successful (in the context of cost reductions) switches. There is also the possibility that such next generation entities could also expand into the inert customer base with a suitably tailored product. For example, tech provider Swuto offered a service that allowed customers to switch family members who would otherwise be unable to change supplier, e.g. the elderly, vulnerable or those without online access. In this environment, the challenge for a concierge service is to establish a sound foothold upon which to build its presence in the sector – the same issue faced by app-based switching tools.

As with comparison sites, the fact that services such as Flipper rely on differentials between tariffs could see them adversely affected by the tariff cap. However, with new owners Wessex Water already targeting a move into other consumer-facing markets, the cap could accelerate this diversification. Again, based upon the information from Ofgem in its 2017 Customer Engagement Tracking Survey, one would expect that concierge services and app-based tools are used by a different demographic than the disengaged customer base that are seen as the likely beneficiaries of the default tariff cap.

Looking at disengaged customers, the ability of collective switches to promote engagement has resulted in greater participation in the energy market than would otherwise be the case. In partnering with organisations such as local authorities and social housing groups to develop such switches, comparison sites have been able to tap into a broader customer base, further expanding their reach. However, given the recent declining success of collective switches, the risk of a tariff cap reducing consumer interest in engaging with the energy market could see this recent trend continue. That said, collective switches may evolve to incorporate behavioural change (e.g. energy efficiency) as part of their offering, a move which may encourage customers to "buy in" to the switching process.

Companies which have sought to enter the energy market through use of a plug-and-play arrangement have typically sought to attract engaged customers, generally doing so in the first instance through low cost offers. From this perspective, they would not be expected to have a large number of customers on default arrangements and therefore may not be adversely affected by the cap. Indeed, if the cap were to promote engagement as expected under the Bill, it may be a catalyst to them obtaining new customers.

6.Price controls and innovation: Comparators with other markets

Among the purposes of price controls are the restriction of dominant monopoly power and the protection of customers. Here, innovation in the relevant market is either explicitly encouraged through a specific allowance in the price control, or implicitly as a consequence of growing market entry and competition as the role of the monopoly provider diminishes. The following examples show how other markets, energy and non-energy alike, have employed price caps and how innovation has evolved under this range of circumstances.

- GB Pre-payment Meter (PPM) energy cap
  - The PPM cap has been in operation since April 2017 and may serve as an indicator of how energy suppliers in the GB market could respond to the wider default tariff cap;
- Northern Ireland (NI) domestic energy market
  - Cited during debates in the House of Commons on the default cap as a retail price control that yields customer protection, this cap operates without an explicit commitment to innovation;
- Italy's "*tutela simile*" domestic electricity tariff
  - This price control operates in a market with high rates of smart meter deployment, but without the levels of customer engagement seen as important by Ofgem under the default cap;
- Retail energy market deregulation in the US state of California
  - As an energy market that embraced competition until 2001 supply crisis, California continues to offer commercial and technological innovation in the presence of price controls;
- Water and sewerage retail supply in England & Wales
  - Parallels can be drawn with the GB energy sector in the way in which innovation can help to address the challenges facing the water industry, i.e. network constraints, climate change; and
- Broadband and telephony in the UK
  - The sector has seen customer-led commercial and technological innovation, necessitating a highly flexible price control structure that does not hamper entry or innovation.

6.1 Energy

6.1.1 GB Pre-payment Meter (PPM) retail energy cap

Figure 11. GB Pre-payment Meter (PPM) energy price control: Summary

Service	Gas and electricity retail supply market for pre-payment meter (PPM) customers in GB
Affected companies:	All energy suppliers offering PPM tariffs to their domestic customers. This includes the Big Six, small and medium suppliers, and a number of pre-pay specialists
Customer base	Approximately 4mn customers on PPMs were originally covered by the cap when it was introduced in April 2017. It was subsequently extended to a further 2mn customers to cover customers of Warm Home Discount (WHD) mandated suppliers at the end of 2017.
Set by	Ofgem
Duration	Cap scheduled to end in 2020 Subject to review on a six-monthly basis with changes taking effect in April and October of each year
What is the cap?	A maximum allowable price of energy is set in advance of the six-month review cycle

Ofgem introduced the PPM price cap (also known as the "safeguard" tariff) in April 2017 at the direction of the CMA. The CMA's investigation into the GB energy market (which concluded in mid-2016) identified a high level of detriment to PPM customers due to them facing actual or perceived barriers to switching, the technical restraints of PPMs, and low incentives for suppliers to actively compete for PPM customers.

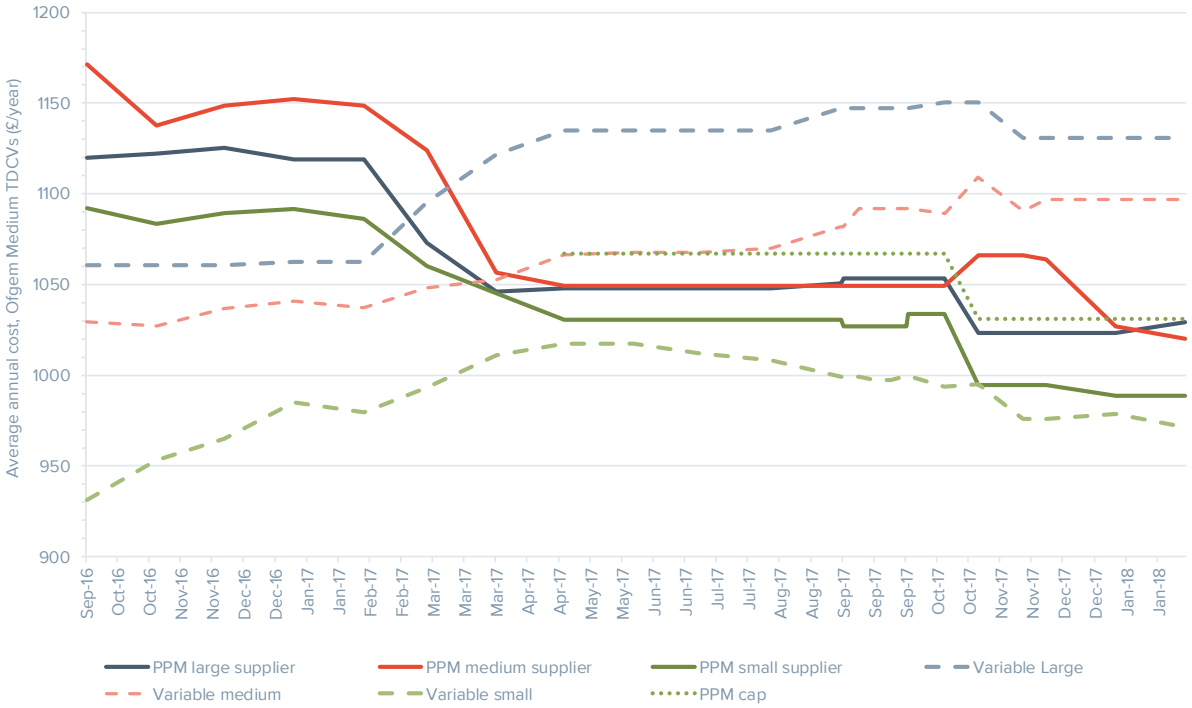
To protect these consumers until greater access to smart metering mitigated some of these issues, it directed that a transitional cap should be introduced to prevent PPM customers paying above a certain level annually, and that it should remain in place until the end of 2020.

This cap takes a "reference price and cost index approach", i.e. an initial level of the cap was set on a relative basis reflecting the outcome of the CMA's competitive benchmark analysis, and this will then be allowed to change over time according to movements in certain cost indices. The level of the cap is updated every six months and is based on the CMA's methodology of supplier costs.

Initially covering around 4 million households using PPMs, the cap was widened to a further 2 million customers through its extension to cover customers of Warm Home Discount (WHD) mandated suppliers who are on default tariffs from winter 2018-19[97].

Taking the experience from its first year of operation, PPM tariffs have largely settled into two groupings: the large and medium suppliers are pricing just below the cap, while smaller suppliers' offerings are between £40 and £60/year below the cap. This largely reflects the reduction in expensive tariffs, including all those from the large suppliers, and the practice of pricing to the cap.

Figure 12. GB Pre-payment Meter (PPM) and supplier default tariff offerings, September 2016 to Present



Source: Cornwall Insight analysis (costs are based upon Ofgem Typical Domestic Consumption Values (TDCVs) for gas and electricity customers)

97 https://www.ofgem.gov.uk/system/files/docs/2017/12/providing_financial_protection_to_more_vulnerable_consumers_0.pdf

As illustrated in Figure 12, Cornwall Insight research shows that, on average, the difference between the average PPM tariff and average default tariff has reversed in the period since the PPM cap was introduced – the latter now being cheaper than the former, i.e. uncapped tariffs have increased above their capped counterparts.

In addition, the difference between the cheapest and most expensive PPM tariffs has also narrowed. In the year to March 2017, this figure was nearly £200, while in the year to March 2018 it was an average of approximately £75[98]. This narrowing of prices (an outcome referred to by Ofgem in its Policy Consultation document on the default cap[99] as "*price dispersion*") largely reflects the reduction in expensive tariffs, including all those from the large suppliers, to the safeguard level initially and then reduction from October 2017 (figures for April 2018 are not available at the time of writing).

The persistence of at least some price differentials means that savings have still been presentable by suppliers offering the lower-priced deals. How those differentials arise has become a matter of some contention.

Generally – but not always – the biggest differentials have arisen due to lower cost tariffs from small suppliers that are exempt from the costs of WHD and ECO (those with fewer than 250,000 customer accounts[100]). This is especially true since October 2017, when at least four tariffs under £1,000/yr on average have been offered by small suppliers each month. In contrast, all of the 2016-17 ECO-liable suppliers have clustered at or just below the safeguard level.

One area of detriment raised by the CMA was the limited number and types of PPM tariffs in the market. Immediately after the implementation of the cap, the number of PPM tariffs fell as suppliers withdrew products. Suppliers with fewer than 50,000 customers (so 100,000 accounts in a dual fuel terms) do not have to offer PPM tariffs. Although the total number of tariffs in the market has since risen, this is largely due to increases in the number of suppliers in the market.

Suppliers are typically now offering one PPM tariff per fuel, with variable price structures the preferred option – in February 2018, only two suppliers offered fixed rate products. In comparison, in the months preceding the introduction of the cap at least seven suppliers offered multiple PPM tariffs, including a range of fixed rate products.

This development contrasts with the standard credit and direct debit market where fixed price tariffs have become the key product. A possible explanation for this outcome could be that the six-monthly review process for the PPM cap has discouraged suppliers from offering those fixed tariff products that would normally be of at least 12 months' duration.

The objective to cut bills for customers who would otherwise not have acted looks to have been achieved. Based on the most conservative estimates, the intervention will have saved PPM customers upwards of £150 million.

The cap has also led some suppliers to be more innovative in their PPM offers via online manageable, smarter-metered tariffs with easier access to top-up and emergency credit. This service has been matched on occasion by the Big Six but has still often remained a differentiator for smaller suppliers. In addition, traditional PPM specialists have diversified into other sectors, notably Utilita which has aggressively launched in to the SME market, and Economy Energy which has moved into the mobile telecommunications space.

At the same time, with less scope for price competition, other suppliers have taken steps to differentiate their PPM brands. Both Ovo Energy and Spark have launched dedicated smart PPM brands over the last nine months (Boost and Swift respectively). Smarter prepayment with its possibility of better service does at least allow suppliers to differentiate themselves.

Although targeted at a specific subset of the market, the example of the PPM cap does show the potential for innovation in a price control environment. However, a consistent comment throughout the interviews

[98] The gap rises when region-specific suppliers are included.
[99] https://www.ofgem.gov.uk/publications-and-updates/default-tariff-cap-policy-consultation-overview
[100] In June 2018, BEIS released a consultation on gradually reducing the WHD threshold to 150,000 accounts by 2020-21

is that individual supplier responses to the default cap will depend upon their own business models and customer portfolios.

The default cap has the potential to accelerate innovation if the PPM cap is a guide, with the challenger suppliers bringing in a new attitude to customer service and alternative products. Smart meters have served as an enabler to this, while competition and the pursuit of market share has also been apparent. In addition, the specialist PPM providers appear to have resorted to relatively higher cost methods of customer acquisition – potentially accelerating the need to become more efficient to maintain the margins on their customer base.

6.1.2 Northern Ireland (NI) domestic retail energy market

Figure 13. NI energy price control: Summary

Service	Gas and electricity retail supply market in Northern Ireland
Affected companies:	The incumbent monopoly suppliers in the pre-deregulation era, i.e. **Power NI** (electricity) - Greater Belfast Area **SSE Airtricity** (gas) - Greater Belfast Area **firmus energy** (gas) - Ten Towns area
Customer base	Domestic customers and most non-domestic customers: **Power NI:** customers with an annual electricity demand below 50MWh, i.e. domestic and small non-domestic customers, across credit and pre-pay meters alike; **SSE Airtricity and firmus energy**: customers with an annual gas demand below 25,000 therms (732,000 kWh) per annum, i.e. domestic and small non-domestic customers, again across both meter types
Set by	Utility Regulator for Northern Ireland
Duration	Ongoing, two year cycle for electricity, three years for gas Current electricity cycle ends March 2019 Current SSE Airtricity cycle ends March 2020 Current firmus energy cycle ends March 2019
What is the cap?	A maximum allowable price of energy is set annually in advance of the start of the year commencing April, which is subject to intra-year review

Innovation under the Northern Irish retail energy price cap is not accorded the same level of priority as controlling costs and the dominant positions of the pre-deregulation monopoly suppliers. There is no allowance for innovation in the cap formula, while the word "innovation" (or variants thereof) is not present in the latest price control documents from the sector regulator[101].

As with the GB experience with the NIC and NIA (see Section 3.7), innovation within the NI energy sector is encouraged at the transmission and distribution level (e.g. through the respective price controls for those charges) and at the wholesale level (e.g. through the upcoming Integrated Single Electricity Market, due to start operation in October 2018).

At the retail end of the market, innovation is viewed as a consequence of competition, which itself is seen as being represented by the extent of customer switching away from the incumbent suppliers. While the market shares of these companies have been eroded due to switching, evidence from the Consumer Council for Northern Ireland (CCNI) indicates that switching rates remain relatively low[102] but commonly on a par with those in mainland GB.

Default price capped rates are typically above their uncapped counterparts, thereby generating a financial incentive for customers to engage with the market and switch suppliers. Although increasing, the NI market

[101] https://www.uregni.gov.uk/sites/uregni/files/media-files/Power%20NI%20SPC17%20Decision%20paper%20Final.pdf
[102] A March 2017 study by the group ("Consumer Council for Northern Ireland – Energy Satisfaction & Switching. March 2017") showed that only one if four domestic electricity customers had switched supplier in the preceding three years.

does not possess the same level and number of tariff offerings as its mainland GB counterparts[103], meaning that while innovation in that area is limited, it is difficult to immediately attribute this to the price cap.

Product innovation in NI has historically focussed on payment methods, with the emergence of a pre-payment option as a lifestyle choice rather than solely as a debt management solution having emerged in recent years. There is also not the same marked differential between credit and pre-payment tariffs that is present in mainland GB. However, similar to GB, there is still a correlation between income and payment – at low incomes prepayment meters are the most common method of payment, whereas at higher incomes it is direct debit.

Correlation and causality in terms of the impacts of the price cap on innovation are therefore not wholly apparent. However, applying the Irish energy regulator's view that innovation is a consequence of competition, there are structural issues within the NI market that may themselves be impeding competition and hence innovation.

- **Geographical boundaries**. The segmented nature of the gas market across the Greater Belfast and Ten Towns areas means that competition is within those areas, not between them;
- **Dual fuel**. There is no true dual fuel product, which may be a limiting factor on innovation – either directly in terms of tariff offerings, or indirectly given that gas and electricity suppliers may not be able to join the other's market; and
- **Gas is not the main option for domestic heating**. Gas remains in a minority as far as its use for domestic heating is concerned. The primary fuel for home heating in Northern Ireland is heating oil (kerosene), with approximately 68% of households using it.

While innovation in the wholesale and network sectors of the Northern Ireland energy sector is apparent, that in the retail sector is limited by a combination of structural factors, market and geographical boundaries – and also the price cap. However, the extent to which this can be apportioned across these different elements is unknown.

6.1.3 Italy's "*tutela simile*" domestic retail electricity tariff

Figure 14. Italian energy price control: Summary

Service	Domestic retail electricity supply market in Italy
Affected companies:	26 domestic energy suppliers
Customer base	Subset of domestic and non-domestic customers
Set by	ARERA (Autorità di Regolazione per Energia Reti e Ambiente)
Duration	One year fixed term deal - the standard offer "tutela simile" tariff - available as a one-off, but due to be phased out in July 2019
What is the cap?	A maximum allowable price of energy which is offered on standard terms and conditions across all of the affected suppliers, the wholesale element of which is determined by the actions of a state-backed central purchasing body, the Acquirente Unico (AU).

Italy's system of electricity price controls is intended to serve the dual purpose of protecting customers while serving as a transitional arrangement to full market opening in 2019. The Italian electricity market is one in which smart metering is already a way of life, with the roll-out of the technology having commenced in 2001. As a result, by early 2017, more than 35 million customers have a smart meter while ToU tariffs were introduced as mandatory for residential users on the default *tutela simile* offer in 2010, such that approximately 28 million customers use them[104] - these being a two-rate tariff.

[103] These offerings are commonly supplemented through elements such as cashback offerings and shopping vouchers.
[104] https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2017/Expert%20Group%20Meeging%20Geneva/ITU%20Italy%20regulatory%20experience%20LoSchiavo%20rev1.pdf

Alongside the use of smart meters and ToU tariffs have been a raft of measures aimed at providing advice on energy efficiency and promoting behavioural change, thereby facilitating broader engagement with the energy sector. On the broader network side, ARERA's demonstration projects have included areas such as smart city initiatives, EV programmes, DSR and network charging.

From a consumer-facing perspective, the schemes include:

- *Diritti a viva voce*: A project headed up by consumer rights groups and ARERA to inform end users and raise awareness of energy issues; and
- *EnergoClub*: Established on a small scale in 2002 to promote best practice of energy use and the growth of low carbon generation, it now operates on a national level.

Evidence collected by the UK Government for the roll-out of smart meters in this country[105] showed that the introduction of this mandatory ToU tariff in Italy led to a reduction of approximately 1% in peak consumption over the period 2010 to 2012. This relatively small amount was attributed to lack of a sizeable differential between the peak and off-peak tariff rates and the fact that Italy has a relatively low per capita electricity consumption.

This is relevant in the context of the default tariff cap, given that smart meter deployment is an important part of the underlying rationale for its temporary nature. As the Italian market is already looking beyond first generation smart meters, the initial level of metering innovation has already occurred and has yielded customer and system innovation in a way that has largely been seen in the GB market on a limited or trial basis.

Although one of the perceived benefits of smart meters is to promote customer engagement and switching, the most recent figures from the Italian energy regulator[106] show that incumbent supplier Enel retained an 86.3% share in the standard offer market (domestic and non-domestic customers). Despite facing a lack of competition in this market, the company has stressed its commitment to innovation in a range of areas[107], including targets for the provision of DSR capacity, low carbon transport, smart lighting, battery storage and a move into the home services market.

This demonstrates the importance of ongoing engagement with customers to illustrate the possible benefits associated with smart meters and to continue to incentivise switching – an important consideration in the context of a UK engagement plan.

This relative lack of engagement may be due to the way in which the *tutela simile* regime operates in that the tariffs cannot be described as truly regulated nor are they technically a price cap, given that they hinge upon the actions of the state-owned energy purchasing body. A more appropriate description would perhaps be a price-setting intervention in the market, given that suppliers will effectively benchmark their standard and *tutela simile* rates to those implied by this purchasing activity. This congregation of rates may then discourage customer engagement and switching, effectively defeating the purpose of the controls themselves.

As a result, the Italian government is looking to reform the entire standard offer structure as part of its ongoing process of deregulation, looking to make it more consistent with the market choice regime into which it is expected to transition. Part of these plans are already in place through the time-limited nature of the *tutela simile* rates and the way in which consumers are incentivised to engage with the market once these expire.

The Italian experience is that innovation can and does occur in a smart meter enabled, price capped environment – and one in which customer switching rates are not particularly high. To address this latter

[105] https://assets.publishing.service.gov.uk/media/56ebdf6540f0b60385000002/Appendix_5.2_-_What_is_the_evidence_from_the_international_experience_of_smart_meters.pdf
[106] "Annual Report to the International Agency for the Cooperation of National Energy Regulators and the European Commission on the Regulators and to the European Commission on the Regulatory Activities and the Fulfilment of Duties of the Italian Regulatory Authority for Electricity, Gas and Water", July 2017 (https://www.ceer.eu/documents/104400/5988265/C17_NR_Italy-EN/34ae6d3c-d928-eef7-6841-7a0b3acbd44c"
[107] http://strategy2017.enel.com/files/presentation_en/1_Strategic%20Plan%202018-20.pdf

point, the price cap regime is being overhauled from 2019 in a move intended to yield a transition to market-based tariffs and greater customer engagement – which may in turn yield greater innovation. Mirroring the transitory nature of the GB price cap, Italy's revised price cap model will cease in 2019 with market-based tariffs becoming the new default.

6.1.4 Retail energy market deregulation in California, USA

Figure 15. Wholesale electricity price controls for the US state of California: Summary

Service	Electricity retail supply market in California
Affected companies:	Investor-owned utilities (Pacific Gas and Electric, Southern California Edison and San Diego Gas and Electric) and three smaller, "multi-jurisdictional utilities" (Bear Valley Electric Service,
Customer base	Approximately 75% of electricity sales in California are made on regulated charges to the state's 39.5mn residents
Set by	State regulator with overarching federal oversight
Duration	IOUs - Ongoing, three year cycle; Multi-jurisdictional utilities - varies
What is the cap?	A maximum allowable price of energy is set annually in advance of the start of the contract year

The Californian electricity market is one in which commercial and technical innovation has evolved in the presence of a price cap regime and despite the state's Enron-induced supply crisis, which led to the suspension of energy deregulation.

For those customers that want an alternative to regulated tariffs, retail choice is available in California in the form of the state's Direct Access (DA) programme. Under this, a minority of customers can purchase their electricity from an Electric Service Provider (ESP).

Although the Direct Access programme is limited to certain non-domestic customers, access to it is limited on a volume basis – this being calculated using the annual maximum load within specific geographic areas within the state. In addition, participation is not guaranteed and is instead based upon a lottery process[108], with the offer having typically been oversubscribed since 2009.

As with the situation in the GB market, California has seen both market and technological innovation emerge alongside the price control and DA options. The two main alternative approaches are:

- Community Choice Aggregators (CCAs). Typically not-for-profit public bodies, they determine the sources of electricity generation for their customer base. In other words, they are responsible for the energy mix, with transmission, distribution and other delivery elements remaining the responsibility of the relevant incumbent utility
    - CCAs are seen as an important way of pursuing renewable and low carbon generation, doing so in a manner that promotes community engagement and the sharing of the economic and social benefits of these assets;
    - Furthermore, mirroring the approaches of the aggregators, decentralised generation – notably in the form of roof-mounted solar – is also becoming increasingly prevalent in the state, with this being financially on a par with conventional thermal and fossil fuel assets.
- A rise in the number of prosumers, aided by regulatory support and alternative tariff options. These entities combine their distribution-connected PV assets with battery storage to reduce their call on energy from the main electricity network
    - This has been facilitated by the state's Self-Generation Incentive Program (SGIP) and its successor, the California Solar Incentive (CSI), the use of net metering and ToU tariffs.

[108] DA was previously based upon a "first-come, first-served" approach.

In March 2017, reports emerged that the California authorities were considering expanding the role of deregulation, with a White Paper following from the CPUC in May 2017[109]. Here, state regulator the California Public Utilities Commission (CPUC) warned that innovations and technological advances could see a creeping advancement of customer choice "*without a coherent plan to deal with all the associated challenges that competition poses*".

While the regulated tariff model is not seen as incompatible with the anticipated spread of innovation, the growing call for greater choice and rising demand for renewable energy in the state appear to represent a rising challenge to this traditional approach. The fact that the DA model is typically oversubscribed, that approximately one million customers receive energy through a CCA and that solar PV deployment continues to grow may therefore result in a possible re-think by the CPUC.

The Californian experience shows that while innovation has occurred under the price control – this being driven by a combination of technological change, state subsidy and customer support – the regulatory regime must be flexible enough to adapt to changing circumstances and growing customer demand for new offerings. The question is therefore whether the experiences of the early part of the century serve as a lingering impediment to the widening of market opportunities.

6.2 Other utilities

6.2.1 Water and sewerage retail supply (England & Wales)

Figure 16. Water and sewerage retail supply (England & Wales) price control: Summary

Service	Water and sewerage retail supply in England and Wales
Affected companies:	22 water service providers and 10 sewerage service providers
Customer base	Domestic customers and most non-domestic customers (England), specific obligations for Wales
Set by	The Water Services Regulation Authority (Ofwat)
Duration	Ongoing, five year cycle The current control (PR14) covers the period 2015 to 2020
What is the cap?	Price limits are set on a company-specific basis and cap how much revenue each company can raise from its regulated customer base, Ofwat determining this by reviewing how much it believes each water company needs to run its business efficiently. The controls are a variant of RPI-X price control regulation, i.e. an inflation metric ("RPI") adjusted for a factor ("X") intended to encourage efficiency, cost reduction and to promote consumer interests. This is referred to as "RPI-X+K", where "K" reflects the changes that Ofwat expect the companies to deliver over the five-year price control period. Ofwat currently applies a single price limit only to the retail prices of water and sewerage services, with PR19 set to yield five separate price controls.

Parallels can be drawn between the way in which innovation is seen as a means by which to address the challenges facing the water industry and those in the electricity sector in particular.

- Innovation in the culture of a water company is cited as a means to end, this being the ability to engage with customers through systems and processes, with this largely synonymous with technology;
- As with energy, smart metering technology, connected appliances and cross-sector opportunities are seen as important;
- In the same manner as the electricity network is dealing with constraints and curtailment due to the growth in decentralised generation, the water network is dealing with the challenges of population growth (particularly in south east England), leak detection and system reinforcement;

[109] "Consumer and Retail Choice, the Role of the Utility, and an Evolving Regulatory Framework," CPUC, May 2017.

- While the energy sector is dealing with climate change in terms of the growth of renewable and low carbon generation, the water industry is experiencing a comparable challenge in terms of water shortages and similar issues in terms of supply; and
- Reflecting the cross-sector approach to engagement, collaboration with customers, companies outside of the water sector and with other water companies is viewed by Ofwat as an important way of both promoting innovation and sharing benefits and learnings across the water industry.

Examples of innovative approaches in recent price control periods include:

- **Water quality monitoring.** Ensuring the provision of high quality drinking water is essential to those companies that provide it. Thames Water's work in this regard has considered specific modelling of population growth and consideration of a range of adverse effects[110];
- **Automated network management**. Water companies must be able to monitor flows in real time and mitigate possible problems before they escalate. South Staffordshire Water[111] has introduced data monitoring and telemetry measures to automatically redistribute water from other parts of its network;
- **Water recycling in new build properties.** Particularly a challenge in areas where the building of new homes is expected to increase, this is also an issue for construction in general. An example of this is Cambridge Water's work with the city council[112];
- **Leakage detection and flood warning**. The high cost and proliferation of leaks has seen innovation leading to the introduction of a range of measures, including acoustic sensing, satellite mapping and LIDAR[113]; and
- **Customer service and engagement.** Based around measures to save water and reduce bills, examples of this include South West Water's (SWW) Green Redeem[114] and Advizzo[115] measures.

The growth in competition and advent of alternative services within certain parts of the water retail sector has the potential to yield greater efficiencies that can feed through into individual companies and the sector as a whole. In addition, such circumstances can also impact the regulatory climate in a manner that can benefit the structure of the sector in a holistic manner, yielding a virtuous circle that yields further innovation in the water industry.

Although there is no **specific** incentive targeted towards innovation in water as in energy (through the NIA and NIC, see Section 3.7), the regulator's price control approach is seen as offering companies "*flexibility to design and deliver the best solutions for customers, without artificial constraints in the regulatory framework*[116]". However, the "K" factor in the "RPI-X+K" formula does incentivise innovation to the extent that it is a consequence of improved efficiency.

A comparator approach to innovation can be seen in Ireland, where the Water Services Innovation Fund operates on a similar conceptual basis to Ofgem's NIC and NIA. Introduced in December 2017, this €4 million fund is designed to subsidise and encourage innovative activity in the water sector which furthers at least one of the following objectives: provision of safe, secure and reliable water services, or cost-savings in providing services; increased customer understanding; energy savings; environmental or conservation benefits, or the reduction of climate change impacts.

The water supply industry in England and Wales is one which has seen considerable innovation in the areas of recycling, flood detection and prevention and customer service – all within the boundaries of a price control structure. While this may reflect the social and public health aspects of water service

[110] https://www.thameswater.co.uk/-/media/Site-Content/Thames-Water/Corporate/AboutUs/Our-strategies-and-plans/Water-resources/Document-library/Past-meetings/TSM-28-April-2017-Presentation-Final-redacted.pdf
[111] www.cambridge-water.co.uk/includes/asp/download_file.asp?id=353
[112] www.cambridge-water.co.uk/includes/asp/download_file.asp?id=352
[113] https://www.gov.uk/government/news/environment-agency-uncovers-landscape-with-laser-mapping
[114] https://www.greenredeem.co.uk/swwater
[115] http://www.southwestwater.co.uk/globalassets/document-repository/our-vision-2020-2050/sww-innovation_online.pdf
[116] https://www.ofwat.gov.uk/wp-content/uploads/2017/12/Driving-innovation-in-water-FINAL.pdf

provision, this shows that innovation can occur – even in a market that has not explicitly incorporated it into its price control structure until the last few years.

6.2.2 Broadband and telephony (UK)

Figure 17. Broadband and telephony (UK) price control: Summary

Service	Wholesale local access for retail broadband and telephony in GB
Affected companies:	Openreach
Customer base	33.5mn fixed line telephony connections in the UK and 25.3mn fixed broadband connections
Set by	The Office of Communications (Ofcom)
Duration	Currently three years (but subject to ongoing review)
What is the cap?	Charges for third-party access (TPA) to Openreach's infrastructure

The telecommunications industry has been subject to price control regulation since it was deregulated in 1984. This has evolved in line with the industry itself and as technology has enabled companies to offer new products and services. As the former incumbent state-owned monopoly, BT sees its charges and obligations to provide third-party access (TPA) to its network regulated by Ofcom. The price control regime is therefore a means by which to encourage entry, rather than being a cap or restriction on retail prices, as is the case in the default tariff cap.

The promotion of access is important as a means of encouraging entry and competition at the retail level, with the largest fixed telecommunications network owned by BT – Openreach with its traditional copper network – to which other providers have access to provide their own services to customers[117].

The market for Wholesale Local Access (WLA) for the fixed connections between local exchanges and customer locations – on which both broadband and fixed telephony services typically rely – is one such market that is regulated[118].

Under these controls, BT has seen its share of the broadband and telephony market decline, with some companies – notably Sky and TalkTalk – installing their own equipment in BT's network infrastructure through a process called Local Loop Unbundling (LLU)[119] which began in 2002. This is a process whereby BT has made its copper network available to other service providers on a regulated charge basis. This charge-setting process has evolved since the start of the century, but has generally focused upon ensuring network access as a means by which to encourage competition in the retail market.

Through this process, third parties can provide services directly to end users, allowing them to innovate and differentiate their products and services – potentially offering more advanced products, bundled products (e.g. landline, broadband, audio-visual) and potentially better customer service than would be received from the incumbent provider, in this case, BT. In addition, in setting these unbundling charges, Ofcom was keen to ensure that these third parties would be able to target infrastructure investment to help create a more innovative telecommunications market.

Potentially the greatest technological innovation in the sector has been the roll-out of broadband in the UK, which began in 2000 with Telewest (which merged with NTL, and was then ultimately acquired by Virgin Media) offering cable broadband with maximum speeds of 512kBps (kilobytes per second). This in turn contributed to, and was compounded by, commercial innovation in terms of product offering and a transformation in customer behaviour.

[117] Openreach operates in the GB market, and although BT operates in the Northern Irish market, it is subject to separate provisions there.
[118] The WLA market is typically judged to include copper loops, cable networks and optical fibre at a fixed location – but excluding mobile, fixed-wireless and satellite technologies.
[119] Virgin Media does not use BT's network as it owns and operates its own cable network.

A combination of growing technological advances, new entrants, evolving customer demand, societal change and a raft of initiatives has seen the Government's target of a universal service provision of basic broadband (2MBps) being achieved in 2017[120].

This change has not been without its problems however, with issues including the failure of BT to connect homes in line with its targets and claims in 2015 that the company's customers were facing delays of more than a year to have their broadband connected. In addition, there remain problems in connecting rural communities.

Despite this, competition and consumer choice have developed considerably over the same period, and particularly in the presence of faster broadband speeds. According to Ofcom's 2017 Communications Market Report[121], 81% of homes reported purchasing at least two of their communications services from the same supplier as a bundled offering, up slightly from 79% in 2016. The most common bundle was landline and broadband (34%) with triple-play packages of landline, broadband and TV only slightly behind at 33%.

With the ongoing changes to local access provisions occurring concurrently with the separation of Openreach from BT announced in March 2017, the two are expected to result in increased innovation and investment in the sector. Here, the price control regime is expected to evolve in line with the needs of the industry and in a manner that promotes competition and innovation. Although not viewed as a barrier to innovation *per se*, the approach is seen as needing to be flexible in line with technology and customer needs. Some of the resultant considerations from an energy perspective are presented in Section 7.

The broadband and telephony market in the UK has witnessed considerable customer and technology-led innovation, reflecting broader social and behavioural change. As a result, the regulatory regime has had to be flexible enough to adapt to both without comprising customer interests or quality of supply. As with water supply, the overarching desire to ensure effective infrastructure (in this case communications) for residents and businesses alike has likely been a contributing factor.

6.3 Conclusions

In the examples presented, innovation – whether technological, commercial or behavioural – has occurred in the respective price cap regimes. However, this has been to varying degrees and not necessarily directly due to the cap itself. Crucially, in some instances, the caps are being used as a transitory measure while competition emerges, rather than the rationale for the default cap, i.e. to protect disengaged customers in a market that has been open to competition for almost two decades.

In the case of the Northern Irish market, the way in which the gas and electricity price cap regime is structured across two geographically distinct areas – coupled with the continued prevalence of kerosene for heating across much of the population – has served as a brake on certain aspects of innovation.

Taking the view that competition, engagement (with switching as a proxy for this) and innovation are part of the same chain, the Italian price cap regime is one that both validates and defies this approach. Despite the mandatory roll-out of smart meters and the widespread use of ToU tariffs, switching rates remain low with incumbent supplier Enel retaining its pre-deregulation dominance. In the case of the default tariff cap, this demonstrates that smart meter installation is not a guarantee of engagement.

However, as stated, the Italian situation this may be due to the design of the cap (which is technically not a price cap, but a benchmarking tool), resulting in the plans to phase out the current control regime in favour of an unregulated market choice approach in 2019.

The Californian model has seen growing public interest for a choice other than a regulated rate, with this emerging despite the state's 2001 energy crisis. Here, social and behavioural change have combined with financial incentives and grass roots support to yield innovative supply models. Similar examples can be seen

[120] https://www.gov.uk/guidance/broadband-delivery-uk
[121] https://www.ofcom.org.uk/__data/assets/pdf_file/0017/105074/cmr-2017-uk.pdf

across the US, where deregulation has continued at differing paces due to the combination of state and federal oversight. In Texas, for example, approximately 85% of residents have access to the deregulated electricity supply market – the state having opened the sector to competition in 2002. By contrast, in Arizona, energy regulation was placed on hold in 2004, while in Arkansas the state legislature reversed the state's deregulation laws in 2003.

Looking at the non-energy examples, innovation in water has emerged as a specific area following the recommendations of the April 2009 "Independent Review of Competition and Innovation in Water Markets[122]", (more commonly known as the Cave Review) and which examined how competition and innovation could be promoted to encourage a better and more cost-effective outcome for customers.

In the telecommunications sector, technological and commercial change has been evident alongside widespread behavioural change and engagement. These issues have fed into a virtuous cycle of innovation and consumer choice under a price cap regime – albeit one in which the cap does not, unlike energy, relate to retail supply but rather TPA to network infrastructure.

[122] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69462/cave-review-final-report.pdf

7.Conclusions

Innovation is apparent within the energy sector in two primary forms: the evolution of existing supplier offers and the advent of disruptive businesses and technologies. The two forms are not mutually exclusive, particularly as the traditional energy supply model comes under increasing pressure to evolve in line with technology and customer demands.

The objective of the default tariff cap is to keep energy costs down for the 11 million customers on such products, while at the same time, providing incentives for suppliers to compete and customers to switch, and ensuring that efficient suppliers are able to operate successfully. Innovation is not explicitly incentivised under the cap.

The impacts of the default cap will depend upon a range of factors, including its design, the level at which it is set, and the way in which suppliers and customers alike react to it – hence a common response from interviewees regarding the cap and its impacts was, "*It depends*". Among the factors raised by interviewees on which it would depend included (not exclusively):

- The underlying structure of the market;
- The structure of the cap itself
- How suppliers react to the cap, and particularly how they seek to attract customers;
- The ability of disruptors and new providers to enter the market;
- The level of engagement from customers and their demand for innovation; and
- The flexibility (or lack thereof) of the underlying regulatory framework for the market.

From the perspective of innovation, however, the uncertainty surrounding the cap should be seen in the context of broader regulatory and technological change as well as customer lifestyle choices.

With disruptors, by their very nature, seen as a means by which to promote fresh ideas and approaches it is crucial that they have investor certainty and business confidence regarding the regulatory and commercial environment. Likewise, in the case of energy suppliers already in the industry, the prospect of a cap has already hit their share prices, which could reduce the funds that they have available to invest in innovation.

Customer needs will also drive innovation, but the default cap may have little bearing on the different elements of the smart home, but whether or not a customer has a smart meter will determine whether they can obtain the maximum value out of these components. Battery storage deployment will be dictated by the cost of the assets, EV purchases will – as with other vehicles – reflect a customer's lifestyle, while the purchase of a generation asset like a solar PV will be influenced by their cost and the availability of subsidies for them.

From the perspective of innovation, a concern from the investors in the sector that were interviewed was that the default tariff cap risked limiting possible rates of return in the sector, thereby affecting the ability to raise capital to fund investment in new business models and practices.

However, a technology provider commented, "***If there is an appetite for consumers to engage with energy, then that appetite will remain (under the cap) and will need to be met by innovative retailers, regardless of whether the cap is there or not. The cap will just set a baseline around which competition and innovation adapt.***"

Smart meters will serve as an enabler to extracting value from these assets in conjunction with a ToU tariff and other hardware and software, such as a smart thermostat. The question is therefore the extent to which Ofgem can successfully combine its obligations to police the default tariff cap and work with other entities to promote customer engagement through smart meters.

Where customers do not actively engage in the market, a well-designed package (e.g. ToU tariff, storage, onsite generation, innovative financing and control software) has the potential to reduce electricity costs for low-income and vulnerable households. The following conclusions may therefore be drawn:

- The default cap needs to occur alongside efforts to promote engagement in the energy market, thus expanding the engaged customer base and opening the door to more innovation;
- If not, there is a risk that the cap will reinforce this lack of engagement if customers believe that their interests are being looked after by the government; and
- There is an underlying risk that a previously disengaged customer will not engage simply because they have a smart meter installed.

We note, however, that there are concerns related to the distributional impacts of ToU tariffs. For example, levels of fuel poverty[123] remain high, and are particularly high in Scotland and areas without access to the gas network. Where fuel poor household has a ToU tariff, it may result in higher costs at times energy is most required (e.g. cold and dark).

Many participants warned of possible unintended consequences from the introduction of the cap. These included the risk of the alleged cross-subsidisation of non-default customers by default customers being reversed such that the net impacts were negative.

The experience to date of the PPM cap shows that suppliers have increased their (currently uncapped) default tariffs, with interviewees noting that this stance could be mirrored upon the introduction of the wider default cap. Here, customers would be moved from their default offer to a fixed tariff product that would be beyond the remit of the cap – this development already occurring:

- British Gas withdrew its SVT for new customers from 31 March 2018, introducing a default fixed tariff priced £25/year on average below its SVT. It will also offer customers nearing the end of existing deals the choice of at least two "*competitive*" fixed-term tariffs[124];
- On 14 March 2018, Scottish Power published a YouTube video on its plan to transition customers off of its SVT and highlighting its online direct debit control feature for customers[125];
- E.ON UK announced in September 2017 that it will no longer roll customers with smart meters onto SVT by default, and will instead will roll customers to a 12-month fixed term contract with no exit fee[126]
    - Existing E.ON UK SVT customers with, or who agree to have, a smart meter will be moved to a rolling fixed tariff, while those that actively choose not to will remain on the SVT; and
- SSE announced on 6 November 2017 that it will roll customers onto 12-month fixed default tariffs, rather than SVTs, "*from the early part of next financial year*"[127]. It is also exploring the possibility of no longer selling an SVT.

A general comment was that the cap would achieve the short-term objective of reducing bills for default customers but that the impact of any longer-term consequences – such as the possibility of cross-subsidisation – could not be predicted with any certainty.

[123] Fuel poverty in England and Wales is measured using the Low Income High Costs indicator, which considers a household to be fuel poor if: they have required fuel costs that are above average (the national median level); and were they to spend that amount, they would be left with a residual income below the official poverty line. In Scotland, the definition is: A household is in fuel poverty if, to maintain a satisfactory heating regime, it would be required to spend more than 10% of its income on all household fuel use. If this figure is over 20%, it is termed extreme fuel poverty.
[124] https://www.centrica.com/news/delivering-our-commitments-do-more-our-energy-customers
[125] https://www.youtube.com/watch?v=nA80TrxzX5M
[126] https://www.eonenergy.com/blog/2017/September/goodbye-standard-variable-tariff
[127] http://sse.com/newsandviews/allarticles/2017/11/steps-to-reduce-number-of-customers-on-standard-variable-tariffs/

Looking at supply competition, one of the main issues that emerged was the way in which suppliers could target their offerings around the price cap (as has been seen under the PPM cap to date), and whether this narrowing of tariffs would lead to less engagement. While the possibility of this tariff grouping was not consistently agreed upon, a common point was that different levels of tariffs were needed to promote engagement. "***Any kind of pricing differential is now seen as unfair and not right, but that is the definition of what a market is with customers looking to a better deal***," one supplier commented.

The fact that suppliers are already adapting their business models to customer needs and the rate of technological change – as well as the need to differentiate themselves from their competitors – highlights that change is already occurring. This was highlighted in the interview responses from the supply community, with the relevant companies presented as three archetypes:

- Archetype 1: Big Six supplier[128];
- Archetype 2: Medium-sized supplier[129]; and
- Archetype 3: Small supplier[130].

Possible responses by each of the supplier types to the cap are presented in Figure 18, these being reflective of the behaviour witnessed in the sector to date and also interviewee feedback. This highlights the way in which energy supplier business models may need to respond to the cap with consideration given to each company's characteristics, customer base and their ability to adapt.

Figure 18. Supplier archetypes and possible strategic responses to the default tariff cap

Supplier Archetype	1: Big Six	2: Medium-sized	3: Small
Products	Introduce new products and/or tariff offerings to move customers off default tariff products	Introduce new products and/or tariff offerings to move customers off default tariff products	Introduce new products and/or tariff offerings to move customers off default tariff products (if applicable)
Bundled services	Yes - through acquisition or partnerships, potentially with companies outside of the energy sector	Yes - through joint ventures, potentially with companies outside of the energy sector	Yes - through joint ventures, potentially with companies outside of the energy sector
Focus	Reducing costs while defending market share, but accept that will lose some customers	Focus on reducing costs while targeting increased market share from customers leaving Archetype 1 suppliers	Focus on reducing costs while targeting increased market share from customers leaving Archetype 1 and Archetype 2 suppliers, but remain below 250,000 accounts May no longer be able to aggressively compete on price and may leave the sector
Merger or acquisition?	Merger with Archetype 1, possible takeover of lower archetypes	Possible merger with fellow Archetype 2 supplier or acquisition of Archetype 3	Possible takeover target for higher archetype suppliers
Examples	SSE, npower	First Utility, Ovo Energy	Flow Energy, Octopus Energy

Source: Cornwall Insight

[128] Assumed to have more than 1 million customer accounts, this type of supplier has a relatively large proportion of its customer base on default products (no less than 25%) and therefore has a larger than average exposure to the cap. Archetype 1 suppliers have historically been reliant on revenues provided by their default tariff customer base.
[129] Assumed to have between 250,000 and 1 million customer accounts, this type of supplier has a smaller proportion of its customer base on default products (between 10% and 25%) and therefore has a material but not atypically large direct exposure to the cap.
[130] Assumed to have less than 250,000 customer accounts, this type of supplier has a little or no (no more than 10%) of its customer base on a default product, and therefore has a minimal direct exposure to the cap.

The underlying trend of innovation will continue under the default tariff cap, although the extent to which it is accelerated or slowed by the cap will depend upon the collective supplier response to the cap and their ability to adapt to customer needs (see Figure 19). With smart meters seen as the catalyst to greater engagement, new and alternative business models represent perhaps the best way to tap into this opportunity.

Figure 19. Reactions to the default tariff cap, their impacts on innovation and related regulatory issues

Factors that could accelerate innovation under the default tariff cap	Factors that could reduce innovation under the default tariff cap	What wider regulatory considerations are there?
Increased competition from existing suppliers, initially on price but increasingly on non-price factors and broader bundled offerings as suppliers look to innovate and differentiate themselves.	Competition could lead to consolidation and reduced customer choice.	To what extent will the traditional supplier model remain fit for purpose in the presence of bundled offers, disruptors, and innovative products and services?
Product innovation (i.e. moving customers off default tariffs), which will in turn promote engagement and open the door to broader bundled offerings, driving further innovation in the product space.	Reduced margins under the default tariff cap may limit financial capability to invest and to innovate.	Do bundled offers require more or less regulatory oversight and how can customer protection be assured? How do bundled products affect the customer's ability to switch supplier, e.g. payback periods on installed assets?
As Archetype 1 suppliers have historically been reliant on revenues provided by their default tariff customer base, they in particular will have to offer new products to retain customers.	Smaller suppliers may struggle to achieve margins in the presence of increased price competition, forcing them to exit the industry.	How do changes to the subsidy regime for small scale generation affect customer interest in products like roof-mounted solar? Will this reduce their attractiveness as a bundled offering or lead to greater pressure for cost reductions?
There will be a competitive advantage to those suppliers with lower costs (Archetype 2 and 3), which they may take advantage of – particularly through niche offerings.	As smaller companies commonly offer the most competitive tariffs from a price perspective, such exits could lead to an increase in tariffs.	How will competition and consolidation develop under the cap, and to what extent would a reduction in supplier numbers and customer choice be an acceptable price to pay for the cap?
Greater customer awareness of energy issues forces more rapid innovation as needs evolve	Reduced customer interest in engaging with the energy sector if the cap is seen as an enduring solution rather than a transitory one	Ofgem should recommend whether to keep or remove the default tariff cap but the Secretary of State should make the final decision - on what basis will the regulator say if the cap should be ended or extended?

Source: Cornwall Insight

It is important to note, however, that there are broader regulatory factors and market changes that may overshadow the effects of the default tariff cap for certain parts of the energy market – a number of which coincide with decisions regarding the future of the cap. These include:

- The deadline by which energy suppliers are required to offer smart meters to domestic customers;
- Introduction of half hourly settlement for electricity, which is intended to further augment the benefits of smart meters and ToU tariffs;
- Introduction of next-day switching, which is intended to promote greater engagement by customers;
- Changes to the supplier hub principle that has underpinned the energy sector since privatisation, and which may make it easier for disruptors to enter the market;

- Transition to subsidy-free, small-scale low carbon generation that may influence the commercial attractiveness of investment by homeowners and the development of community and local energy;
- Removal of the whole of market requirement for price comparison websites, which may affect the way in which supplier offers are presented, and may affect smaller suppliers in particular;
- Central government targets for the electrification of transport, as well as broader structural developments regarding the UK Government's Industrial Strategy; and
- The possibility of a General Election in the early 2020s, which may yield considerable uncertainty and which may influence the decision of an incumbent Secretary of State as to whether to extend the cap.

One or more of these factors may be of greater import to certain actors within the energy sector, while the prospect of a policy nexus at the end of 2020 may discourage innovation and investment in and as of itself.

Ofgem released its policy consultation documents on the default tariff cap at the end of May 2018[131], which contained the regulator's plans on the design and implementation of the cap, how it could be set and adjusted over its duration to reflect underlying changes in costs. The text also states that these factors should consider how to "*best achieve the Bill's intentions*", these having been presented in Section 2.

As previously stated, there is no specific reference in the Bill to the cap facilitating innovation. Published as part of the consultation documents, the "Initial View on Impact Assessment"[132] on the default cap describes innovation as relating to "*both improved product and service quality and enhanced process effectiveness*" as opposed to technological innovation per se.

With the draft impact assessment to be released as part of Ofgem's statutory consultation on its final proposes for the cap (provisionally scheduled for August 2018), the regulator has stated that the document "*will assess, in qualitative terms, the potential impact the default tariff cap is likely to have on non-price competition and suppliers' incentive and ability to innovate*."

Among the points noted by Ofgem in the Initial View document are that the default tariff cap could:

- Impact the ability of suppliers to compete on non-price factors, such as service quality, and to innovate their tariff offerings;
    - ***As highlighted by interviewees (and in line with the comments from Ofgem), this could both accelerate and constrain their strategies in this regard***
- Lead to reduced revenues for suppliers and constrain their ability to "*reinvest to fund innovation and improvements in customer experience*", thereby leading to adverse consequences for customers in the form of lower and less innovative customer service;
    - ***This was again raised by interviewees, both in terms of the direct supplier response and also from the perspective of available capital for investment in the energy sector***
- Mean that suppliers with a higher cost base (either as a result of their customer portfolio and/or specific tariffs or services) may no longer be able to operate in their current form and may ultimately leave the market;
    - ***The impact on different suppliers resulting from their own business models and cost base was also raised, while the prospect of suppliers exiting the industry has been epitomised by Flow Energy***
- Lead to a wider disengagement among customers due to what the regulator describes as a "safe haven" effect from the cap;

[131] https://www.ofgem.gov.uk/publications-and-updates/default-tariff-cap-policy-consultation-overview
[132] https://www.ofgem.gov.uk/system/files/docs/2018/05/appendix_14_-_initial_view_on_impact_assessment.pdf

- ***This reflects the point raised by interviewees that customers may believe that the Government is looking after their interests through the cap by giving them the lowest cost tariff***

- As a counterpoint, lead to greater focus by suppliers on non-price issues such as quality, customer service and alternative product offerings – a move that would necessitate increased investment and innovation in products and business models, particularly if suppliers are targeting previously disengaged customers – with smart metering and app-based products among the areas cited;
    - ***As with the case of supplier responses being dependent on their business strategy and cost base (as referred to above), this was also pointed out by interviewees***
- In line with the experience to date of the PPM cap, lead to some suppliers increasing their (uncapped) fixed tariffs to compensate for revenue lost from default tariff products. While the regulator describes this as a situation that "*might*" occur, it adds that it still expects competitive incentives to remain in terms of suppliers looking to acquire customers and that "*there should be more scope for innovation in service provision and offerings*".

One area where technology and innovation are referred to together in Ofgem's consultation is in promoting innovation in renewable generation through green or environmental tariffs. While the regulator proposes not to exempt environmental tariffs, it is considering derogations from the default cap where the supplier can demonstrate its tariff satisfies a set of criteria or outcomes relating to its cost and direct support for renewable technologies[133].

Looking at implications for the default tariff cap and price cap comparators from other sectors and countries, the core challenges for Ofgem are to:

- Ensure a proactive regulatory regime that both encourages the evolution of existing services and encourages disruptors to join the sector to provide new business models and technologies;
- Work with suppliers, customers and customer bodies to communicate the transitory nature of the price cap and promote the wider benefits of engagement;
- Give disruptors a forum within which to test their ideas, potentially through local energy projects or an alternative structure like its sandbox;
- Minimise regulatory uncertainty from the cap by communicate effectively and decisively its plans for changes to the cap and its possible extension past 2020; and
- Provide clear and forthright insight on how the convergence and interaction of several key industry workstreams at the end of 2020 may affect the cap and its duration.

[133] The outcomes stated by Ofgem are: By consumers choosing tariff, the supplier provides support for renewables "*materially beyond what is provided by subsidies, obligations or other mandatory mechanisms*"; the tariff costs the supplier "*materially more to provide compared to standard tariffs*" due to the renewable electricity generated as a result of the provision of that tariff, and; the supplier is able to provide "*unambiguous evidence that its tariff has materially higher cost than the cap and genuinely provides additional support for renewable energy*".

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23/04/18	2	Review of revised draft. No changes requested.
24/05/18	3	Document restructured in line with client feedback. Reviewed and approved

Approvals

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