

## Between a rock and a hard place? Price caps and flexibility.

Given the increasing complexity of the energy system, it is important that the significant advantages of flexibility enabled by cost-reflective tariffs are not ignored in the short-term by attempts to reduce consumer bills.

# DEeP RED

### Summary

Energy prices have been in the eye of the storm for some time in the UK. The weeks before the June 2017 general election saw both main parties promising retail price caps to consumers. This alarmed several analysts and economists in particular as the introduction of caps could stifle competition and innovation, and reduce opportunities for new entrants in the market. Others took this opportunity to emphasise the several failures of the liberalisation of energy markets in the UK. However, it is important that any measures to reform retail pricing and address potential consumer detriment are compatible with the broader context of the current constraints and future aspirations of the electricity system. For example, the desire to keep retail prices down for vulnerable consumers must be balanced against the need to manage the impact of intermittent supply and fluctuating demand on the efficient operation of the energy system. Forthcoming research on Distributional Effects of Dynamic Pricing for Responsive Electricity Demand (DEePRED) looks to inform these considerations.

## Between a rock and a hard place? Price caps and flexibility

After the general election, the Secretary of State wrote to Ofgem stating that the “endorsement of [the price protection] approach by an overwhelming majority of the electorate” constituted “good reason” to introduce a price cap without delay. Ofgem’s response, however, emphasised the importance of ensuring regulation was focused on improving the broader functioning of the energy market, without any reference to single measures in isolation. This situation provides an opportunity to reflect on the role electricity prices play in supporting the efficient functioning of the market. In particular to consider the balance between the use of tariffs to incentivise behavioural change and the desire to protect customers “on the poorest value tariffs”.

### The desire to keep prices down: vulnerable consumers

The most vulnerable consumers (the so-called “fuel poor”) are currently defined as those whose fuel costs are above the national median level and who are left with a residual income (net of fuel costs) below the official poverty line. More than 2.3 million households in England (around 10% of all households) are currently considered to be living in fuel poverty – this equates to an aggregate fuel poverty gap of £884 million. However, alternative methodologies for measuring fuel poverty suggest that the number of “fuel poor” households could be as much as twice this level.

Household income, household energy requirements and fuel prices are three important factors which determine whether a household is fuel poor. With the relative energy (in)efficiency of the homes they live in directly affecting those households’ energy requirements, it is no coincidence that the lowest proportion of homes with insulated cavity walls is found among “fuel poor” households.

Price caps have been suggested as a solution to concerns about the affordability of energy bills. However, it must be remembered that capping prices is only one of many ways of protecting vulnerable consumers from paying “too much” for their energy bills. Other options include increasing incentives on energy efficiency, strengthening and supporting the Home Energy Conservation Act, and enhancing the level of support for local councils’ initiatives.

### The attraction of flexible tariffs

Flexibility is required in UK electricity networks to mitigate the negative impacts on system costs and the environment of imbalances in demand and supply. In a decarbonised future, with new sources of demand (such as electric heating and transport) developing, the magnitude of peak demand is likely to remain a concern, particularly as the penetration of intermittent renewable generation continues to grow, causing capacity margins to remain narrow. However, flexibility could enable the system operator to shift demand to alternative periods, reducing the size of the peak, and to manage the even more frequently expected imbalance between supply and demand.

The residential sector provides substantial potential to offer flexibility. The sector is responsible for about one third of overall electricity demand and up to 40% of peak demand. During peak demand, electricity prices in wholesale markets can fluctuate from less than £0.04/kWh to as much as £0.31/kWh. This means that incentives to change consumer behaviour and mitigate the magnitude of these peaks, such as Time of Use tariffs, offer significant potential benefits to the system as a whole. This includes reducing the need for new generation and network capacity, as well as enabling responsive electricity demand. Time of Use tariffs would also help ensure that relative household costs reflect the impact of their consumption levels and behaviour on the energy system.

This flexibility comes at a price which ultimately has to be paid by households. This tension between the costs and benefits of flexibility contributed to Ofgem modifying the “embedded benefits” available for small generators connected to the distribution network. In June 2017,

Ofgem decided to remove generators' eligibility to earn around £47/kW from reducing net consumption during periods of highest system demand. This will be phased out over three years from 2018 and will be replaced with an alternative payment reflecting the benefit embedded generators offer the system, estimated at between £3/kW and £7/kW. Ofgem believes that these changes will prevent market distortion and reduce consumers' energy bills by up to £370m a year.

Lack of flexibility also comes at a price. Studies have estimated that, if flexibility is not pursued, and with 30GW of intermittent renewables and inflexible nuclear capacity in the system, up to 25% of wind energy may need to be curtailed to enable fossil fuel generation provide the required ancillary services. Moreover, the National Infrastructure Commission estimates the value of the technical potential of the flexibility market at around £8 billion per year for flexible technologies such as generation, interconnection, network technologies, demand side response, and storage.

### Balancing these needs requires careful consideration

Introducing truly cost-reflective (Time of Use) tariffs and keeping prices down for vulnerable consumers could be seen as conflicting objectives. The impact of cost-reflective pricing will vary between consumers, with those whose consumption is more concentrated at peak periods and who are unable to change their consumption patterns potentially paying significantly more. However, there are some options which enable consumers to benefit, rather than face increased costs, from offering flexibility. For example, a recent study commissioned by Citizens Advice suggests that critical peak rebates (under which customers are paid for reducing demand during peak periods) have been successful in other countries.

Either way, understanding the distributional effects of Time of Use tariffs is vital to ensuring affordability of energy bills while enabling more flexibility. Analysis of the distributional effects of Time of Use pricing is currently limited. A study by the Centre for Sustainable Energy in 2015 found that most consumers would see relatively small changes in their bills, but that some could see their bills increase by up to 20%. However, this study did not consider the effects on different socio-demographic groups, nor whether households actually had the flexibility to change their demand.

### Forthcoming Research on the distributional effects of Time of Use tariffs

The majority of research to date has focused on fuel poverty in relation to aggregate level of electricity consumption. But the EPSRC-funded research project "Distributional Effects of Dynamic Pricing for Responsive Electricity Demand (DEePRED)", which is led by Professor Jacopo Torriti (University of Reading) and which builds upon previous work conducted in conjunction with IPA, is seeking to improve understanding of the effects of dynamic tariffs on different socio-demographic groups. The overall objective of DEePRED is to identify clusters of users which might significantly benefit or be disadvantaged by the provision of demand flexibility. The project will analyse detailed time use activity data from the UK Office for National Statistics' Time Use Survey to derive information about the times of the day in which different groups of people occupy households and carry out energy-related activities. This data will be combined with other data (such as sunlight, number of household appliances and dwelling types) to derive load profiles to calculate how consumer bills may change for different groups of consumers on stylised Time of Use tariffs.

## How can we help?

IPA Advisory is well placed to advise clients on the implications of policy and regulatory developments across the full energy value chain in UK and EU energy markets. We have extensive expertise creating tailored, informed insight into policy and regulatory developments for a range of clients, including international institutions, energy ministries and government departments, sector regulators and competition authorities, market participants, investors and financiers.

We are intimately familiar with the dynamics of UK energy markets. Our staff have deep industry, policy and regulatory expertise with extensive experience combining our policy and regulatory risk analysis, mitigation strategy development, and expert energy system modelling. We have extensive experience modelling the evolution of energy markets to inform governments and policy makers and assist national sector regulators with assessments of the efficiency and effectiveness of current market arrangements. In addition, for over twenty five years, IPA has designed and developed bespoke market simulations for investors seeking to enter new markets and value investment opportunities in merchant, contracted and mixed markets. IPA is also currently a member of the DEePRED Advisory Board. Membership of this Board includes:



## What services have we recently provided?

- Computing the distributional impact of time of use tariffs enabled by the smart meter rollout, exploring opportunities for mitigating adverse impacts, and assessing international experience to inform consideration of potential policy gaps;
- Delivering analysis exploring potential routes to further EU market integration, as well as policies to harness the identified opportunities and mitigate associated risks. This involved particular emphasis on the role of interconnectors and demand side management; and
- Providing commercial and market support for a potential investment in embedded generation, including critically reviewing the proposed trading strategy and advising on various revenue streams (day-ahead trading, capacity market, balancing mechanism, and ancillary services).

## Who have we worked with?

- Office of Gas and Electricity Markets
- Department for Business, Energy and Industrial Strategy (and Department for Energy and Climate Change)
- Confidential investors

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