

# Beyond the Energy Crisis

How smart tariffs can reduce bills and cut emissions

Ed Birkett

Foreword by Rt Hon Dame Andrea Leadsom DBE MP





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## About the Author

### **Ed Birkett, Head of Energy and Environment at Policy Exchange**

Ed Birkett leads Policy Exchange's Energy and Environment Unit. Ed joined Policy Exchange in 2020 after spending a year at Harvard as a Kennedy Scholar. For the previous five years, he worked in the UK energy sector, most recently as a developer of large-scale solar and energy storage projects. He has an MEng in Engineering Science from the University of Oxford.

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### **Ed Birkett, Head of Energy and Environment**

Ed Birkett leads Policy Exchange's Energy & Environment Unit. Ed joined Policy Exchange in 2020 after spending a year at Harvard as a Kennedy Scholar. For the previous five years, he worked in the UK energy sector, most recently as a developer of large-scale solar and energy storage projects. He has an MEng in Engineering Science from the University of Oxford.

### **Benedict McAleenan, Senior Fellow, Energy & Environment**

Benedict McAleenan is a Senior Fellow in Policy Exchange's Energy & Environment Unit. Benedict is the Founder and Managing Partner of the strategy consultancy Helmsley Partners. He is a public policy adviser with 14 years' experience in policy development, political risk and thought leadership in the Energy, FMCG, Property, Manufacturing and Engineering sectors. Benedict has advised clients including National Grid, Centrica Energy, the Renewable Energy Association, Madison Square Garden Company, OVO Energy, Shell, Sainsbury's and Balfour Beatty.

### **Josh Buckland, Senior Fellow, Energy & Environment**

Josh is a Senior Fellow with Policy Exchange's Energy & Environment unit. Josh was previously Energy Advisor to the Secretary of State for Business, Energy and Industrial Strategy. In this role he provided expert policy and strategic advice to both Greg Clark and subsequently Andrea Leadsom on all major energy and climate issues. Josh spent two months working as a senior advisor within the COP26 Unit. Previously he held a number of other senior roles at the centre of Government, including spending three years in the Prime Minister's Policy Unit in No 10 Downing Street working on energy and environment issues. He was also Head of the Energy Policy team in HM Treasury.

### **Dr Ben Caldecott, Senior Fellow, Energy & Environment**

Ben is a Senior Fellow with Policy Exchange's Energy & Environment unit. Ben is the founding Director of the Oxford Sustainable Finance Programme at the University of Oxford Smith School of Enterprise and the Environment. At the University of Oxford, he is the inaugural Lombard Odier Associate Professor and Senior Research Fellow of Sustainable Finance, the first ever endowed professorship of sustainable finance, and a Supernumerary Fellow at Oriel College. Ben is also the founding Director and Principal Investigator of the UK Centre for Greening Finance & Investment (CGFI), established by UK Research and Innovation in 2021 as the national centre to accelerate the adoption and use of climate and environmental data and analytics by financial institutions internationally. Ben specialises in environment, energy, and sustainability issues and works at the intersection between finance, public policy, and academe, having held senior roles in each domain. Among his previous roles, he was Research Director for Energy and Environment at Policy Exchange between 2008 and 2009.



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## Foreword

By Rt Hon Dame Andrea Leadsom DBE MP

In 2008, a global credit crunch brought many of the UK's banks and financial institutions to their knees. The financial crisis exposed weaknesses in the business models of many banks, but also exposed flaws in the regulations that governed the sector.

At its heart, the financial crisis exposed two problems:

- Firstly, banks and their regulators had underestimated the risk of volatility in global financial markets, despite experiencing boom and bust many times before.
- Secondly, banks did not hold sufficient capital to weather the financial storm.

This year, rising global energy prices have exposed similar problems in the UK's retail energy sector. Since August, twenty-six energy suppliers have either exited the market or entered administration.<sup>1</sup>

Whilst there will be no direct UK Government bailout of energy suppliers, customers will still pick up a big bill for the current failures. By one estimate, failed suppliers will leave behind a bill of more than £3 billion. To pay for these failures, energy bills are set to increase by £120 per household over the next couple of years.<sup>2</sup>

The bill for failed energy companies is clearly significantly less than the cost of the bailing out the banks. However, there are parallels between the two crises.

In the energy sector, it is clear that regulations on suppliers' finances need to be strengthened to make sure that the current failures are not repeated.

Following the 2008 financial crisis, central banks strengthened regulations on banks, including through regular "stress tests" to make sure that banks won't go bust if market conditions change quickly.

As City Minister in 2014, I saw the damage that was done not just to balance sheets, but also to confidence in the financial sector. The introduction of stress tests for banks, and new requirements for higher levels of capital went a long way to restoring confidence.

As we recover from the 2021 energy crisis, the regulator Ofgem should implement similar "stress tests" for energy suppliers. This is the only way to rebuild confidence in the sector after nearly four million households have seen their supplier either exit the market or go into administration.

Alongside introducing stress tests for energy suppliers, the Government

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1. Ofgem (accessed 7<sup>th</sup> December 2021). *What happens if your energy supplier goes bust.* [Link](#). In addition, on 24<sup>th</sup> November 2021, Bulb entered the Special Administrative Regime (SAR) ([Link](#)).

2. Gosden, E. The Times (November 2021). *Households face £120 bill for failed energy groups.* [Link](#)

must make further reforms to reduce energy bills.

This report makes a number of interesting recommendations on smart tariffs and local electricity pricing. Smart tariffs have the potential to reduce bills for customers, especially as more customers buy electric cars and install electric heat pumps.

However, smart tariffs will only really work for customers if their devices can respond automatically. The Government is already doing great work by requiring all at-home electric vehicle chargepoints to be “smart”. Drivers want their cars to be sufficiently charged each morning, but they don’t care when charging happens during the night.

Smart chargepoints can schedule charging at the cheapest times, delivering savings for customers. Because electricity prices are lowest when the grid is cleanest, smart chargepoints will also help to cut carbon emissions.

This report recommends introducing similar “smart” regulations for heat pumps, which, like EV chargepoints, can also operate flexibly. I hope that the Government will consider this recommendation carefully as we move towards the Government’s target to install 600,000 heat pumps each year.

This year’s energy crisis is a major challenge for the UK’s retail energy sector. As with the banks following the 2008 financial crisis, the immediate priority must be to stabilise the sector. Once the sector is stabilised, the Government must press ahead with its ambitious reforming agenda. Despite the challenges this year, I am convinced that there is a bright future ahead for the UK’s innovative and competitive retail energy sector.

*Andrea Leadsom is the Member of Parliament for South Northamptonshire. Amongst other Government roles, she has served as Secretary of State for Business, Energy & Industrial Strategy from 2019 to 2020 and Minister of State for Energy from 2015 to 2016.*

## Executive Summary

2021 has been a chastening year for Great Britain's retail energy sector.<sup>3</sup> So far this year, twenty-eight energy suppliers have gone bust, leaving estimated debts of £3.2bn that will be recovered through higher household energy bills.<sup>4</sup> Most notably, Great Britain's seventh biggest energy supplier, Bulb Energy, entered administration on 24<sup>th</sup> November 2021.<sup>5,6</sup>

The main cause of these supplier failures is a rapid increase in wholesale gas and electricity prices as the global economy has emerged from the coronavirus pandemic. However, the current crisis has also exposed significant weaknesses in Ofgem's regulation of energy suppliers' finances.<sup>7</sup> This has impacted the ability of the market to withstand the wider price shock.

Because the financial and regulatory requirements on suppliers were relatively weak, many of the new suppliers that entered the market offered extremely cheap tariffs but did not adequately prepare for the risk of rapid changes in energy prices. Many suppliers were therefore unable to survive in the face of quickly rising wholesale prices this year.

In addition, there appears to have been a significant mismatch between the regulations imposed on suppliers (set by Ofgem) and the restrictions imposed on suppliers by the Energy Price Cap (introduced by the Government). Since 2019, the price cap has set a maximum price that suppliers can charge their customers who are on variable (or "default" tariffs).

Because the price cap is fixed for six months at a time, it prevents suppliers from quickly passing through rising wholesale energy prices to their customers. This means that suppliers need more financial reserves (including hedges) to withstand periods of rapidly rising energy prices, otherwise they risk bankruptcy during periods of rapidly rising wholesale prices. Ofgem's regulatory framework didn't explicitly require suppliers to hold sufficient financial reserves to mitigate this risk.

In the immediate term, the Government and Ofgem must ensure that the remaining suppliers are financially robust. The bankruptcies in the energy sector this year have parallels with the failure of banks during the 2008 financial crisis. As with the banks post-2008, this crisis requires stricter regulation of suppliers' finances so it can't happen again.

Once regulations on suppliers have been strengthened, the Government should reassess its priorities for the retail energy sector to ensure that they will reduce bills and support Net Zero. This should include updating the priorities identified in the Government's Retail Energy Strategy, published in July this year.<sup>8</sup>

In this report, we argue that "smart electricity tariffs" are the main way for the retail energy sector to support Net Zero. Smart tariffs offer

3. Energy policy in Northern Ireland is devolved, and the sector therefore operates independently of the energy sector in Great Britain. Northern Ireland's energy system is outside the scope of this report, although similar recommendations would apply.
4. Gosden, E. The Times (November 2021). *Households face £120 bill for failed energy groups*. [Link](#)
5. BBC News (November 2021). *Energy firm Bulb set to go into administration*. [Link](#)
6. BEIS (November 2021). *Bulb customers protected as energy provider enters special administration*. [Link](#)
7. This potentially includes both the regulations themselves and the enforcement of those regulations.
8. BEIS (July 2021). *Energy retail market strategy for the 2020s*. [Link](#)

customers lower prices during off-peak periods, which encourages customers and their suppliers to shift electricity demand to periods when prices are lower and the grid is cleaner. Without smart tariffs, we believe that the Government will struggle to deliver its commitment to a fully-decarbonised electricity system by 2035.<sup>9</sup>

### In the immediate term, the Government and Ofgem must ensure that suppliers are financially robust.

To ensure that the remaining energy suppliers are financially robust, Ofgem should subject suppliers to “stress tests” that simulate volatile market conditions. This would mirror central banks’ response to the 2008 Financial Crisis; central banks now regularly stress test financial institutions.

To pass these stress tests, energy suppliers would have to demonstrate that they would remain solvent even if energy prices increased rapidly. Suppliers would demonstrate this through hedging (buying electricity ahead of time) and by holding cash reserves, collateral or other contracts to cover any unhedged exposure.<sup>10</sup>

Crucially, any stress tests must incorporate the pricing restrictions that the Energy Price Cap imposes on suppliers; these restrictions appear to be a factor in the current bankruptcies, alongside the commercial and hedging strategies of those suppliers. Stress tests should be one part of Ofgem’s enhanced package of financial oversight, which could include more stringent requirements on new entrants and additional reporting requirements for existing suppliers.<sup>11,12</sup> In addition, the Government and Ofgem should review the price cap to see whether relatively minor changes to the rules could reduce the financial risk for energy suppliers. For example, the price cap could be updated more regularly (e.g. every three months rather than every six months).<sup>13</sup> This would allow suppliers to pass through changing wholesale prices to their customers more quickly, including both price rises and price falls.

### The retail energy market also needs to change because of Net Zero.

Today, retail energy policy is based on encouraging customers to switch between energy suppliers to find the cheapest deal. These suppliers typically offer similar tariffs, for example one- or two-year fixed-price tariffs. The Government argues that competition between suppliers, evidenced by switching, is the best way to reduce bills.

Switching is important because many suppliers have historically charged higher prices to their most loyal customers. However, the Net Zero agenda is shaking up the retail energy market, creating new risks and new opportunities for customers and suppliers. In addition, the current price cap structure has significantly reduced the risk of loyalty penalties.

Because of Net Zero, the UK energy system will increasingly rely on electricity generated from wind farms and solar farms. This supply is inherently more volatile than that from traditional coal- and gas-fired power stations because it depends on the weather.<sup>14</sup>

9. See: BEIS (October 2021). *Net Zero Strategy: Build Back Greener*. [Link](#). Page 78: “By 2035, all our electricity will need to come from low carbon sources, subject to security of supply, moving to a fully decarbonised power system whilst meeting a 40-60% increase in demand. Expected residual emissions will be limited to CCUS plants, unabated gas, and energy from waste.”
10. The stress tests should also consider the financial impact of the Supplier of Last Resort (SoLR) process on suppliers’ finances. Through SoLR, customers of failed suppliers are moved to new suppliers. This creates costs for the supplier acquiring the customers, although these costs can be recovered over time through the industry levy ([Link](#)). SoLR also creates costs for other suppliers, as the “Industry Levy” through an additional levy on all suppliers.
11. These new requirements must, of course, be balanced with encouraging new entrants and innovative business models. Evidence from this year suggests that the pendulum has swung too far towards encouraging new entrants, and too far away from ensuring financial stability of the sector as a whole.
12. Ofgem introduced new requirements on suppliers from January / March 2021, following its “Supplier Licensing Review”. Given that so many suppliers have failed since these new requirements were introduced, Ofgem should review whether additional regulations are required and/or whether the new provisions should be enforced more strictly. See: Ofgem (November 2020). *Decision on the Supplier Licensing Review: Ongoing requirements and exit arrangements*. [Link](#)
13. Ofgem has already started this process. See: Ofgem (November 2021). *Ofgem consults on adjustments to the energy price cap*. [Link](#)
14. Although, this year, we have experienced volatile international gas prices.

An increasingly volatile energy supply could lead to higher energy bills, as a fleet of “back up” power stations may be needed to deal with periods with little supply from wind and solar. On the other hand, the rapidly falling cost of new wind and solar farms means that customers could benefit from both lower bills and lower carbon emissions. However, this will only be possible if customers are encouraged to use more electricity when it is sunny or windy, and to use less when it is not.<sup>15</sup>

The good news is that many customers can play an active role in the electricity system by shifting some of their electricity usage to off-peak periods, for example overnight.<sup>16</sup> Smart Meters, combined with smart devices, are opening up new possibilities to reward customers for using electricity when it is more abundant.<sup>17</sup>

For example, many electric vehicle owners already take advantage of “smart electricity tariffs”, which offer lower prices at certain times of day, or a lower price in return for allowing their supplier an element of control over when they charge their car. Smart devices, such as a smart electric vehicle chargepoints, can automate the process, making smart tariffs low hassle and financially rewarding for customers.

As more suppliers offer smart tariffs, there is likely to be more differentiation between the tariffs offered by different suppliers. This means that customers will have new incentives to switch supplier or to switch to a new tariff offered by their current energy supplier.

Smart tariffs are also likely to make the market more complicated for customers, so additional protections may be needed to ensure that customers are not sold smart tariffs that are inappropriate for them or that they don’t understand.

### Smart tariffs and local electricity pricing are the key to lower prices and lower emissions.

Smart tariffs are effectively a modern version of “Economy 7” tariffs, which give customers seven hours of cheap electricity overnight. Economy 7 tariffs were introduced to encourage customers to run their electricity-hungry devices overnight; for example, many customers on Economy 7 tariffs have electrical storage heaters or electric boilers.<sup>18</sup> Running these devices overnight reduces demand for electricity at peak times, which means that less backup generation less will be needed, and network companies can build less new infrastructure; both of these save money for customers.

Following similar logic, smart tariffs would work well with heat pumps and electric vehicle chargepoints; the Government has ambitious targets to rollout both of these technologies. For many drivers it makes little difference to them exactly when their car is charged overnight, so long as it is fully charged in the morning. Similarly, many heat pump systems can be operated flexibly whilst still providing a warm home, especially if combined with thermal energy storage.<sup>19</sup>

The Government’s Retail Energy Strategy sees potential for widespread adoption of smart tariffs but only in the “long term” (late-2020s).<sup>20</sup> Given

15. Customers can also store energy at off-peak times and use it at peak times. This includes thermal storage (water tanks or heat batteries) and battery storage (including electric vehicles and Vehicle-2-Grid technology).

16. Some customers may be less able and/or less interested in shifting their electricity demand to reduce their bills. Policy must ensure that there is support available for these customers, and that they do not face disproportionate costs.

17. Note: For less-engaged customers, suppliers will be able to take more control over customers’ devices (with their permission). This means that smart tariffs, if designed right, could also benefit less-engaged customers.

18. There is some evidence to suggest that many customers do not engage with their Economy 7 tariff. See: Citizens Advice (September 2018). *False Economy*. [Link](#). Smart tariffs may drive higher engagement as customers have to “opt-in” to these tariffs. Smart tariffs are therefore typically used by already-motivated customers.

19. Thermal energy storage includes hot water tanks and heat batteries.

20. BEIS (July 2021). *Energy retail market strategy for the 2020s*. [Link](#). Pages 4-5.

the Government’s vision for a rapid rollout of EVs and heat pumps, the strategy feels like a missed opportunity to promote an equally rapid rollout of smart electricity tariffs.

The main recommendation in this report is to prioritise the uptake of smart tariffs. There are a number of ongoing initiatives that will help promote smart tariffs, including Smart Meters.<sup>21</sup> However, there is more that the Government can do, including introducing “local electricity pricing”.<sup>22</sup>

Under local pricing, wholesale electricity prices would rise and fall in different parts of the country at different times of day, reflecting local supply and demand.<sup>23</sup> For example, wholesale prices in Cornwall would likely fall during the middle of the day when output from local solar farms is high, whereas prices in Scotland would likely fall during windy nights, when the output of local wind farms is high but local demand is low.

With local pricing, wholesale electricity prices are likely to be more volatile from hour-to-hour, particularly during periods where the electricity network is constrained. This will create new incentives for customers and suppliers to adopt smart tariffs.

By combining smart tariffs with local pricing, customers and suppliers would be encouraged to work together to reduce energy bills and clean up the electricity grid, a win-win for customers and carbon emissions. For example, suppliers could develop local time-of-use tariffs, with low off-peak prices during the day in Cornwall and during the night in Scotland.

A major barrier to local pricing is a widespread view amongst policymakers that customers should not pay more for their energy just because of where they live. Modelling for Policy Exchange by Aurora Energy Research shows that, without mitigation, electricity bills in England and Wales could be 50% higher than those in Scotland under local pricing.<sup>24</sup> This would clearly be politically unacceptable.

In this report, we recommend measures to keep average bills for residential and small business customers the same in all parts of the country, whilst maintaining incentives for customers to respond to local supply and demand for electricity.

### “Green tariffs” also need reforming.

As the public has become more aware of climate change, energy suppliers have responded by offering “green” energy tariffs. For electricity, the rules currently require suppliers to buy green energy certificates (REGOs) to demonstrate that their tariffs are green.<sup>25,26</sup> This system worked well when renewable energy was only a small part of the generation mix, and when governments did not have policies to decarbonise their energy systems. However, this system now needs reforming to maintain public confidence.

Today, the price of renewable energy certificates is low compared to the wholesale electricity price,<sup>27</sup> which suggests that the current scheme does little to drive additional investment in renewable energy projects.<sup>28</sup> In addition, the current rules risk giving customers the false impression

21. For example, Market-wide Half-Hourly Settlement (MHHs) and Smart Meters.
22. Policy Exchange previously argued for local pricing in Great Britain’s wholesale electricity market in our 2020 report, *Powering Net Zero*. See: Policy Exchange (December 2020). *Powering Net Zero*. [Link](#)
23. Local pricing could also include the cost of the local electricity network, depending on how it is designed. This could be factored into the overall price that the customer pays, which would enhance the locational signal.
24. Aurora Energy Research (December 2020). *Impact of locational pricing in Great Britain: Research commissioned by Policy Exchange*. [Link](#) (Annex 1).
25. Ofgem (undated). *Guarantees of Origin (GoOs)*. [Link](#). In the UK, “GoOs” are known as “REGOs”. GoOs generated by renewable energy projects in the EU can be used in the UK, but the Government is expected to end this arrangement following Brexit. UK REGOs can no longer be used in the EU.
26. Strictly speaking, suppliers must demonstrate evidence of both “supply” and “additionality”. See Standard Licence Condition 21D of the Supplier Licence. [Link](#)
27. Cornwall Insight (September 2021). *Green certificate prices continue to rise amid BEIS proposals*. [Link](#). Latest survey found prices of £1.35/MWh.
28. The price of renewable energy certificates has risen substantially in recent months but remains low compared to the wholesale electricity price. This is discussed in more detail later in this report.

that once they have purchased a green tariff it doesn't matter when they use electricity as it is always 100% green.

In fact, even if a customer has a green tariff, they can still reduce their carbon emissions by using electricity at off-peak times. Conversely, customers will have higher emissions if they use more electricity during peak periods, when the grid is dirtier.<sup>29</sup>

Today, a tariff is considered green even if the wind and solar farms that back the tariff are not generating. For example, a tariff backed solely by solar farms could be considered green, even though solar farms clearly do not generate at nighttime.

As soon as possible, the Government should amend the rules around green tariffs so that any green claims are based on the percentage of low-carbon generation matched with their customers' actual demand in each half-hour trading period, rather than based on an annual average.<sup>30,31</sup> A tariff might go from being marketed as "100% green" to being marketed as "60% green", but the metric would be more accurate.<sup>32</sup>

In the medium term, more substantial changes are required to the rules governing green tariffs.<sup>33</sup> This should ensure that green tariffs can still work in a world of smart electricity tariffs and local electricity pricing. In particular, local pricing will require a new approach to green tariffs that considers the location of both generators and customers. For example, during periods when the power lines between Scotland and England are fully utilised, it is not credible to claim that a wind farm in Scotland is supplying customers in London.

Any new system is likely to be complex to develop, which could distract from other much-needed reforms such as implementing local electricity pricing. Therefore, the Government should task industry or an independent body with developing a new framework for green tariffs, which should be compatible with local pricing. Where possible, this new framework should be based on international standards, such as those under development.<sup>34</sup>

### **Increasing engagement is important; however, Government-mandated "switching" is unlikely to offer a comprehensive alternative to the Energy Price Cap.**

In its Retail Energy Strategy, the Government argued that the best way to reduce bills is to encourage customers to switch their supplier more regularly, or even to move customers automatically if they fail to switch. The Government hopes that, in the long term, these reforms could allow it to remove the Energy Price Cap.

The current crisis has shown that many of the cheapest suppliers were financially unsustainable, with over twenty-five now bankrupt.

Under the Government's proposed reforms, millions of customers would likely have been switched to these suppliers, even though they have proven to be financially unsustainable.<sup>35</sup> This would have created additional costs for all customers, as the cost of bankrupt suppliers is socialised through the Supplier of Last Resort (SoLR) and Special

29. In 2020, Great Britain's electricity grid had 26% lower emissions overnight compared to times of peak demand (e.g. evenings). See Figure 14: Average annual carbon intensity of GB electricity in 2020 (gCO<sub>2</sub>/kWh).

30. This change should be implemented through an amendment to "The Electricity (Fuel Mix Disclosure) Regulations 2005".

31. Suppliers will only be able to use their customers' actual demand once market-wide half hourly settlement is implemented in 2025. Until then, suppliers should use average profiles, as they do for settlement. This would still be a big improvement on the current system.

32. Alternative metrics including "percentage low carbon" (which includes nuclear) or "carbon intensity", measured in grams of CO<sub>2</sub> per kWh. Under this system, suppliers can make their tariffs greener by encouraging customers to use more electricity during periods of high wind and solar generation.

33. This could come out of the Government's current Call for Evidence. See: BEIS (August 2021). *Designing a framework for transparency of carbon content in energy products: call for evidence.* [Link](#)

34. For example, Google is piloting an international standard for "Time-based Energy Attribute Certificates" ("T-EACs"). See: Google Cloud (March 2021). *A timely new approach to certifying clean energy.* [Link](#)

35. The proposed reforms would also have encouraged suppliers to continue offering below-cost tariffs as a way of gaining new customers, further exacerbating the problem.



Administrative Regime (SAR) processes. In addition, these reforms could have created additional anxiety for vulnerable customers, who are most at risk of harm when their existing supplier fails.<sup>36</sup>

In light of these failures, the Government should put its switching proposals on hold.

We do not think that these switching reforms are the right answer. However, if the Government wants to revisit them in future, then it should only do this once the Government and Ofgem can demonstrate that the remaining suppliers are on a firm financial footing.

### Without reforms to switching, the Government is likely to want to keep the Energy Price Cap in place for longer.

In the short term, the Government should review how the price cap functions, as it is at least a contributing factor in the failure of so many suppliers this year. This should include reviewing whether the price cap can be updated more regularly, for example every three months rather than every six months. Ofgem has already started this review process.<sup>37</sup>

In the medium term, the Government could consider alternatives and more substantial changes to the price cap. For example, the Government could consider a “relative price cap”, something that Policy Exchange argued for in 2017,<sup>38</sup> and that the Financial Conduct Authority (FCA) is implementing for car and home insurance.<sup>39</sup> A relative price cap would prevent suppliers from offering cheap “acquisition tariffs”, which existing customers cannot access.

Alternatively, the Government could remove the price cap and instead introduce a “social tariff” for low-income customers. A social tariff is a subsidised tariff for low-income households, which could replace the current Warm Home Discount scheme.<sup>40</sup>

Unlike the current price cap, a social tariff offers no protections for wealthier households that are disengaged. A social tariff will only be acceptable if the Government and Ofgem develop tools to accurately identify the vulnerable and low-income customers who are eligible for the subsidised social tariff.<sup>41</sup>

### Fuel poverty campaigners will have concerns about these changes.

Any changes to the retail energy sector will understandably concern fuel poverty campaigners, who will worry about the impact on the four million households in Great Britain that are in fuel poverty.<sup>42</sup> In particular, campaigners are likely to be concerned about the impact of smart tariffs and local pricing, which could increase bills for some customers if they sign up to an inappropriate smart tariff or if they have particularly high electricity demand during peak periods.

On the other hand, smart tariffs and local pricing can undoubtedly reduce electricity bills overall. The challenge is to ensure that those who do not or cannot participate are not unduly affected.

To manage the risks around smart tariffs and local pricing, we recommend that local pricing is initially opt-in (between 2026 and

36. This risk includes loss of eligibility for certain bill subsidies such as the Warm Home Discount.

37. Ofgem (November 2021). *Overview of 19<sup>th</sup> November 2021 Price Cap consultations*. [Link](#)

38. Policy Exchange (April 2017). *Energy Price Cap should be relative, not absolute*. [Link](#)

39. Financial Conduct Authority (May 2021). *FCA confirms measures to protect customers from the loyalty penalty in home and motor insurance markets*. [Link](#)

40. Gov.UK (undated). *Warm Home Discount Scheme*. [Link](#). The Warm Home Discount was originally introduced to replace a previous, voluntary social tariff scheme. See Hough, D. House of Commons Library (May 2016). *Briefing Paper SN 05956: The Warm Home Discount Scheme*. [Link](#). Page 6.

41. The Government is proposing to expand data matching to identify low-income customers as part of the Warm Home Discount (WHD) programme. See: BEIS (Published June 2021). *Warm Home Discount: better targeted support from 2022*. [Link](#). Page 34 onwards.

42. England: 3.18 million ([Link](#)). Scotland: 619,000 ([Link](#)). Wales: 155,000 ([Link](#)). Total (GB): 3.954 million. Note: England, Scotland and Wales each use different definitions of fuel poverty.

2030).<sup>43</sup> This will give time for the Government and Ofgem to assess the impact of local pricing and to mitigate any adverse outcomes. In addition, there are already major changes afoot that will affect prices offered to customers.

Ofgem has recently proposed that, by October 2025, all customers will be “half-hourly settled” (HHS).<sup>44</sup> Under HHS, suppliers will be charged based on when their customers actually use electricity, rather than based on estimates and averages; this will encourage suppliers to offer customers different prices depending on when they typically use electricity, as already happens for business customers. Some customers will be able to reduce their bills by using more electricity during off-peak periods.

To manage the distributional impacts of half-hourly settlement, Ofgem may need to develop protections and/or compensation for customers who are particularly adversely affected. Local electricity pricing is a natural extension to the logic behind half-hourly settlement. Therefore, any protections developed for half-hourly settlement could potentially be extended to work with local pricing.

### The future of energy retail is smart tariffs.

After such a terrible year, the UK’s retail energy sector needs a new sense of purpose. By improving the financial stability of energy suppliers, the Government and Ofgem can restore much-needed confidence in the sector and in the concept of a privatised electricity sector. Beyond that, the Government must harness competition and innovation to reduce bills and to cut emissions; smart electricity tariffs are the way to do this.

Smart tariffs, combined with local pricing, will give customers and their suppliers the power to reduce their bills. The biggest benefits will flow to those customers who engage; however, by reducing electricity demand during peak periods, smart tariffs will harness engaged customers to lower bills for all.

In one estimate, BEIS estimates that “flexibility” could reduce electricity bills by up to £10bn per year by 2050 compared to an inflexible electricity system;<sup>45</sup> this could reduce retail electricity bills by around 5%.<sup>46</sup> Note that this figure includes flexibility provided by all sources, not just domestic customers.

### Policy recommendations

This report makes eleven specific policy recommendations for the UK Government. These recommendations are grouped under four themes, each containing short-term and medium-term actions:

1. Encourage smart tariffs to reduce bills and cut emissions;
2. Maintain and reform the Energy Price Cap, and enhance market stability;
3. Expand the regulatory framework to capture new market participants; and
4. Rollout of smart technology needed for smart tariffs.

43. As with any opt-in scheme, there is a risk of suppliers “cherry picking” customers. Specifically, some have raised concerns that only customers in Scotland would opt in (because, under local pricing, wholesale prices in Scotland are expected to be lower than those in the rest of Great Britain). However, our recommendations include a correction factor to equalise average bills in all parts of Great Britain. Therefore, the main risk is that highly flexible & engaged customers opt-in to local pricing, whereas disengaged customers do not.

44. Ofgem (April 2021). *Electricity Retail Market-wide Half-hourly Settlement: Decision and Full Business Case*. [Link](#)

45. BEIS and Ofgem (July 2021). *Transitioning to a net zero energy system: smart systems and flexibility plan 2021. Appendix I: Electricity system flexibility modelling*. [Link](#). Page 5.

46. Assumes annual electricity demand of 730 TWh/year in 2050 (Source: CCC, *Policies for the 6<sup>th</sup> Carbon Budget*, p.119. [Link](#)). Cost savings per MWh of £6bn-£10bn / 610 TWh = £8.20 – £13.70/MWh = 0.82-1.37p/kWh. Saving of 4%-7% vs. average current retail electricity price of around 20p/kWh, before the current price spikes.

The recommendations are summarised in Table 1.

**Table 1: Policy recommendations for the future of energy retail.**

Theme	Timeframe	
	Short term (2022-2023)	Medium term (2024 onwards)
#1: Encourage smart tariffs to reduce bills and cut emissions.	#1.2: Update the rules on “green tariffs” to be based on their customers’ actual demand (“24/7 energy matching”).	#1.1: Introduce local electricity pricing to encourage smart tariffs.  #1.3: Task industry or an independent body with developing a new framework for “green tariffs” that is consistent with local electricity pricing.
#2: Maintain and reform the Energy Price Cap, and enhance market stability.	#2.1: Maintain the price cap but consider relatively minor reforms such as updating the cap more regularly.  #2.3: Introduce financial “stress tests” for energy suppliers.  #2.4: Put proposed switching reforms on hold.	#2.2: Consider alternatives and more substantial changes to the price cap, for example a “social tariff” or a “relative price cap”.
#3: Expand the regulatory framework to capture new market participants.	#3.1: Improve regulation of third-party intermediaries (TPIs) by requiring suppliers only to work with TPIs that meet certain conditions.	#3.2: Ofgem should develop a regulatory regime for TPIs.  #3.3: Monitor the market for “Energy-as-a-Service” offerings and consider whether rule changes are needed.
#4: Rollout the smart technology needed for smart tariffs.	#4.1: Legislate to require all electricity-hungry devices to be smart, including heat pumps and air conditioners.	#4.2: Accelerate the rollout of smart grid technology, including live metering and control systems on local distribution networks.

### Note on “policy costs” and protecting vulnerable customers.

In addition to these recommendations, the Government and Ofgem will need to continue to act in the following two areas:

#### #1: Balancing “policy costs” across gas and electricity bills.

Today, the Government’s social and climate policies make up 23% of the average household electricity bill but just 2% of the average household gas bill.<sup>47</sup> This differential makes electrical heating systems (e.g. heat pumps) less attractive compared to gas-fired boilers, which is clearly a barrier to reducing carbon emissions.<sup>48</sup>

In the *Heat and Buildings Strategy*, the Government recognised this barrier, and committed to “[rebalance] energy prices to ensure that heat pumps are no more expensive to buy and run than gas boilers”.<sup>49</sup> BEIS is expected to publish a Call for Evidence on this topic shortly, with a decision expected during 2022.

The Government must ensure that any changes are fiscally sustainable as gas demand reduces over the long term. For example, if the Government moved all social and climate policies to gas bills, then as gas demand falls

47. See Figure 2 in Section 1. Includes social policies (WHD, ECO) and climate policies (FIT, ROC, CfD).

48. These charges also dampen the differential between the costs that suppliers face in peak and off-peak periods, which reduces the incentives that could be included in smart tariffs.

49. BEIS (October 2021). *Heat and Buildings Strategy*. [Link](#). Page 16.

a smaller number of customers will be left to pick up the bill. This would lead to either higher charges on remaining gas bills or a fiscal hole, neither of which is desirable.

In the *Net Zero Review*, HM Treasury identified a looming fiscal hole caused by declining revenue from Fuel Duty as more drivers buy electric vehicles.<sup>50</sup> For gas and electricity bills, the Government should design for falling gas demand from the start.

### #2: Protecting vulnerable customers with bill subsidies and subsidised home upgrades.

The recommendations in this report will protect vulnerable customers by maintaining and reforming the energy price cap. In addition, these recommendations aim to lower the overall cost of energy, which will benefit all customers; however, we recognise that the biggest benefits from smart tariffs and local pricing will go to engaged customers, particularly those with the funds and the knowledge to install and operate smart devices.

The Government's support for low-income households is primarily comprised of the subsidised bills (Warm Home Discount, Winter Fuel Payments) and subsidised home upgrades (Energy Company Obligation, Green Homes Grant).<sup>51</sup>

This is broadly the right approach, although more could be done to target support towards those who need it most. There appear to be a number of good measures in the Government's plans for the next phase of the Warm Home Discount scheme, which starts in April 2022.<sup>52</sup>

Next year, the Government may need to take additional action to protect low-income customers from rising wholesale gas and electricity prices, which mean that the Energy Price Cap is expected to rise substantially in April 2022. To tackle this, Policy Exchange has previously argued that the Government should consider a temporary increase in the Warm Home Discount.<sup>53</sup>

## Comparison with the Government's Retail Energy Strategy.

There are seven main areas where this report differs from the Government's Retail Energy Strategy, which was published in July 2021. These differences are listed in Table 2.

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50. HM Treasury (October 2021). *Net Zero Review Final Report*. [Link](#). Page 93.

51. Note that the Local Authority-led element of the Green Homes Grant remains in place. See: [Link](#).

52. BEIS (June 2021). *Warm Home Discount: better targeted support from 2022*. [Link](#). Note that different rules are expected to apply in Scotland.

53. Policy Exchange (September 2021). *Five options to reduce energy bills*. [Link](#)

Table 2: Differences between the Retail Energy Strategy 2021 and the recommendations in this report.

Proposal	Retail Energy Strategy (BEIS)	This report (Policy Exchange)
Promote new retail offerings, including smart tariffs.	<p>In the long term (“late 2020s”) the Government proposes to reform the market framework to support new business models (including energy-as-a-service offerings).</p> <p>The Government also proposes changes to “system costs and price signals” to incentivise behaviours that assist decarbonisation (e.g. charging of EVs overnight).</p>	<p>Policy Exchange argues that local pricing and smart tariffs should be the centrepiece of the Government’s strategy for the retail energy sector (Recc #1.1).</p> <p>We argue that these changes should start now, so that they can be implemented in the medium term (2024 onwards). We estimate that these changes would take around 5 years to implement.</p>
Reform “green tariffs”.	<p>In the medium term (2024 onwards), the Government proposes reforms to “green tariffs” to ensure that customers are accurately informed about their personal contribution to Net Zero.</p>	<p>In the short term (2022-23), Policy Exchange proposes short-term reform to the existing regulatory framework governing green tariffs. (Recc #1.2)</p> <p>In the medium term, Policy Exchange argues that industry or an independent body should be responsible for developing a framework for green tariffs that would work with local pricing. (Recc #1.3)</p>
Switching reforms: Opt-in and opt-out.	<p>The Government argues that these switching reforms should be trialled and/or introduced from the mid-2020s onwards.</p>	<p>Policy Exchange recommends putting the proposed switching reforms on hold (Recc #2.4).</p>
Consider alternatives and more substantial changes to the price cap, e.g. a “social tariff” or a “relative price cap”.	<p>The Government currently views switching as the main alternative to the price cap.</p>	<p>Policy Exchange argues that a “social tariff” or a “relative price cap” could be an alternative in the medium term. However, a social tariff would require a robust methodology to identify vulnerable and low-income households (Recc #2.2)</p>
Prevent suppliers from locking in customer to long-term “Energy-as-a-Service” deals.	<p>The Government and Ofgem have not yet proposed any changes to existing rules that protect energy customers.</p>	<p>Policy Exchange argues that, in the medium term, Ofgem and the Government should consider rule changes to ensure that customers are not unfairly locked into deals that combine hardware and energy (Recc #3.2).</p>
Require all EV chargepoints and heat pumps to be smart.	<p>The Government is currently only applying smart regulations to EV chargepoints, not heat pumps.</p>	<p>Policy Exchange argues that the Government should legislate to require all electricity-hungry devices to be smart, including heat pumps (Recc #4.1).</p>
Accelerate the rollout of smart grid technology, including live metering.	<p>Ofgem has approved investments in smart grids and live metering through the regulatory regime (RIIO).</p>	<p>Policy Exchange argues that the Government and Ofgem should prioritise investment the smart grid technology needed for smart tariffs (Recc #4.2).</p>

# 1. Introduction

## What is “energy retail”?

“Energy retail” describes the sale of electricity, gas and energy-related products and services to customers. This report focuses on sales to households and small businesses.<sup>54</sup> Within the retail energy market, energy “suppliers” are the only companies that can directly sell electricity and gas to customers (Box 1). Suppliers and other companies can both provide energy-related products and services to customers.

### Box 1: What are energy suppliers?

Energy suppliers are privately-owned companies that sell electricity and gas to customers, for example to households. All suppliers must hold a Supply Licence. The Supply Licence sets out the rules and regulations that suppliers must adhere to, including their responsibility to support “vulnerable customers”.

As of Q2 2021, the biggest domestic electricity suppliers in Great Britain were:

1. British Gas (17.6% of households)
2. E.ON Energy (17%)
3. OVO Energy (14.2%)
4. EDF Energy (11%)
5. Scottish Power (8.9%)
6. Octopus Energy (7.7%)
7. Bulb Energy (5.5%)

**Figures based on market share for domestic electricity, as of Q2 2021. Source: Ofgem.<sup>55</sup>**

The primary role of an energy supplier is to deliver affordable energy to customers with a high level of customer service. Suppliers that operate efficiently may be able to offer lower prices to their customers; this includes using technology and using hedging to minimise the cost of purchasing electricity and gas on the wholesale market. Increasingly, electricity suppliers are also able to offer lower prices to customers if they use more electricity during off-peak periods, for example overnight.

Energy suppliers can also contribute to other Government objectives, for example supporting decarbonisation and security of supply. The possible future roles of energy suppliers are explained in detail throughout this report.

54. Large businesses and industrial energy users are more likely to make bespoke arrangements for energy supply. These arrangements are outside the scope of this report.

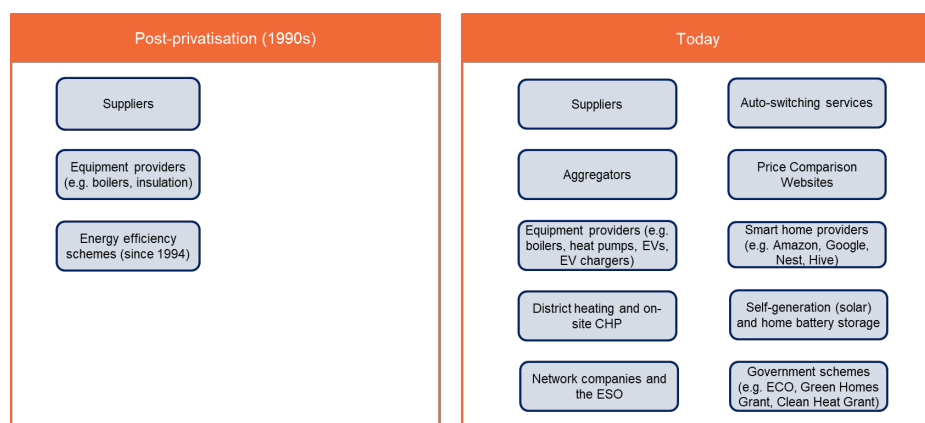
55. Ofgem (undated) *Electricity supply market share by company: domestic (GB)*. [Link](#). Companies with a market share of less than 5% include Shell Energy (3.3%), Utilita (2.6%), Avro Energy (2.0%), and Utility Warehouse (1.9%). The remaining 7.5% of the market is comprised of smaller suppliers. Note that market shares have shifted significantly in the last six months due to supplier failures and customers reallocated through SoLR.

Following privatisation in the 1990s, energy suppliers were the major players in the retail energy market. Equipment providers did interact with customers, for example installers of gas boilers, but mainly to provide maintain, or replace hardware.

Today, the number of participants in the retail energy market has grown to include price comparison websites, auto-switching services, aggregators and more. In addition, customers now have more options to participate in the retail energy market directly; customers can now participate through a combination of self-generation, for example using solar panels, storing electricity using batteries, and scheduling their devices using smart home systems, including those provided by global technology companies like Amazon and Google.

This explosion of market participants gives customers more options, but also poses challenges to the existing regulatory framework, as described later in this report.

**Figure 1: Participants in the retail energy market (1990s vs. today).**



Source: Policy Exchange analysis. Note: These terms are explained in the Glossary.

## Breakdown of a retail energy bill (before price rises in 2021)

The retail energy bill is comprised of multiple components (Table 3). Whilst suppliers control some components of the retail energy bill (operating costs and margin), other components vary based on market prices (wholesale costs), and others are strongly influenced by Government policy (social and climate policies, and taxes). Network costs are set by the energy regulator, Ofgem.

Table 3: Components of energy retail bill.

Component	Description
Wholesale costs.	Electricity is traded in the wholesale market between generators and suppliers. Wholesale electricity is traded in 30-minute blocks known as settlement periods. The wholesale price of electricity can vary significantly between settlement periods.  Similarly, gas is traded on the wholesale market between gas producers, shippers, storage owners and suppliers. Wholesale gas is traded in daily settlement periods. <sup>56</sup>
Network costs.	The cost of building and maintaining the electricity and gas networks is recovered from a range of market participants (including customers) through “network charges”.  For example, the cost of building and maintaining the electricity transmission system is recovered through Transmission Network Use of System (TNUoS) charges. <sup>57</sup>
Social and climate policies. <sup>58</sup>	Social policies: The cost of Government-mandated obligations to mitigate fuel poverty. Examples include the Warm Home Discount (WHD), <sup>59</sup> which provides discounted bills to fuel-poor households, and the Energy Company Obligation (ECO), <sup>60</sup> which requires suppliers to install free energy efficiency measures in the homes of fuel-poor customers.  Climate policies: The cost of Government programmes to support low-carbon energy projects is recovered from customers via suppliers. Examples include Feed-in-Tariffs (FiT), the Renewables Obligation (RO), and the Contracts for Difference (CfD) scheme.
Operating costs.	The cost of serving customers, including the cost of billing, customer service, debt collection and the cost of bad debt, and other overheads including staff and buildings.
Supplier pre-tax margin.	Profit before tax. According to Ofgem, in 2019 the large legacy suppliers made very little money or even a small loss from each customer served (Figure 2).
VAT.	Value Added Tax is charged at 5% on both domestic gas and electricity bills.

56. CMA (March 2015). *Energy market investigation: Gas and electricity settlement and metering*. [Link](#)

57. National Grid ESO (undated). *Transmission Network Use of System (TNUoS) charges*. [Link](#)

58. Ofgem describes climate obligations as “environmental obligations”.

59. GOV.UK (undated). *Warm Home Discount Scheme*. [Link](#)

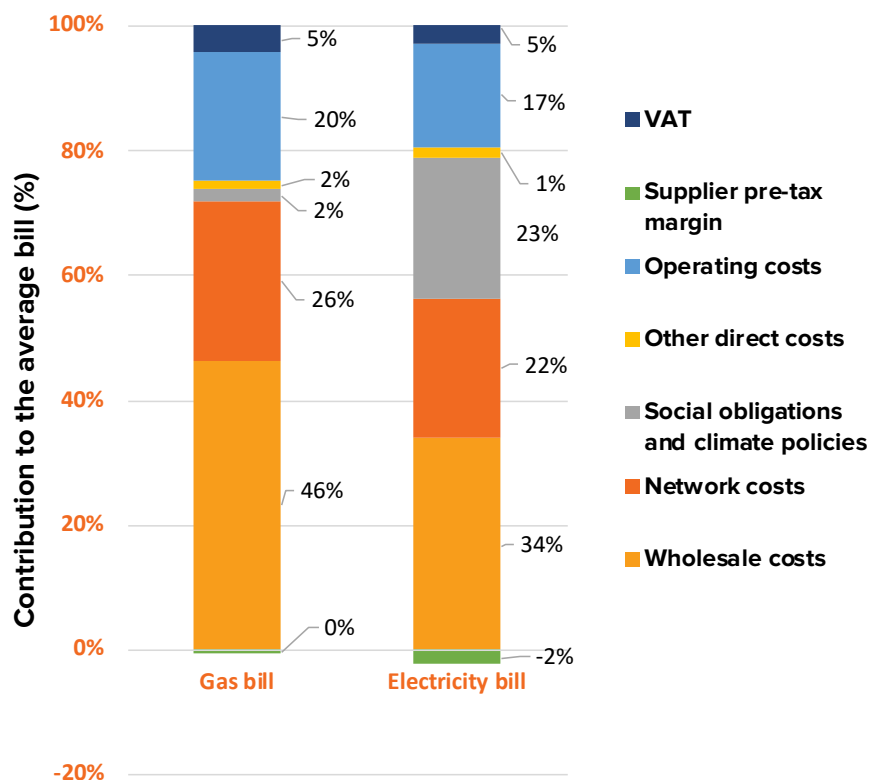
60. Ofgem (undated). *Energy Company Obligation (ECO)*. [Link](#)

The breakdown of the average gas and electricity bill is relatively similar (Figure 2). However, the cost of social obligations and climate policies makes up a much higher proportion of an average electricity bill (23%) compared to an average gas bill (2%). This difference primarily arises because the Government has chosen to recover most of the cost of social policies and subsidies for low-carbon energy projects from electricity bills



rather than gas bills.<sup>61</sup> Ofgem's analysis suggests that the largest suppliers are not making significant profits from selling gas (pre-tax margin of 0.5%) or electricity (pre-tax margin of -2.1%).

Figure 2: Breakdown of an average energy bill, for large "legacy suppliers" (2019). (Left) Gas bill. (Right) Electricity bill.



Source: Ofgem.<sup>62</sup>

Since 2010, the average annual domestic electricity bill has remained relatively constant in real terms (Figure 3). This reflects a balance between rising electricity prices (measured in p/kWh) and falling electricity demand (measured in kWh/household/year).

Upwards pressure on electricity bills has come from rising carbon prices and new Government policies, particularly subsidies for low-carbon energy projects; the cost of energy subsidies is expected to level off at around £10bn per year by the early 2020s, similar to current levels.<sup>63</sup>

These levies are likely to increase further when the new Hinkley Point C nuclear power station is commissioned later this decade. However, the cost of offshore wind has fallen so far that the Government expects projects secured in the latest Contracts for Difference round to make payments to customers (via their suppliers), thus putting downwards pressure on bills.<sup>64</sup>

Domestic electricity consumption has fallen around 20% since 2010, driven by tighter energy efficiency standards on lighting and domestic appliances.<sup>65</sup> In the longer term, household demand for electricity is likely

61. The rationale for putting the costs of decarbonisation on electricity bills were: (1) almost all households have electricity, whereas not all have natural gas. This ensures that all customers pay for decarbonisation. (2) most of the Government's climate policies were focused on reducing emissions in the electricity sector. This rationale is changing as the cost of social and climate policies on electricity bills is becoming a barrier to decarbonisation.

62. Ofgem (accessed August 2021). *Infographic: Bills, prices and profits*. [Link](#)

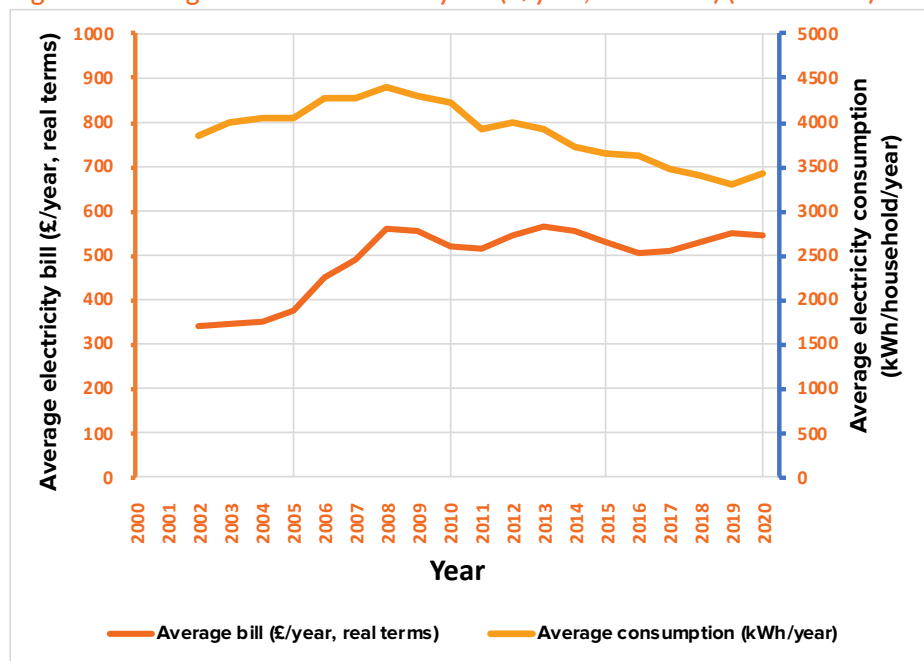
63. Based on HMT (November 2017). *Control for Low Carbon Levies*. [Link](#). Forecasts low carbon levies of up to £8.7bn per year (2011-12 prices) – equivalent to approximately £10.5bn per year in 2020 prices (based on Bank of England [Inflation Calculator](#)).

64. BEIS (updated October 2019). *Contracts for Difference (CfD) Allocation Round 3*. [Link](#). (B) Estimated notional monetary budget impact.

65. Evans, S. Carbon Brief (January 2019). *Analysis: UK electricity generation in 2018 falls to lowest level since 1994*. [Link](#)

to rise due to increasing adoption of electric vehicles and electric heating systems, particularly heat pumps.

Figure 3: Average domestic electricity bill (£/year, real terms) (2002-2020).



Source: BEIS.<sup>66</sup>

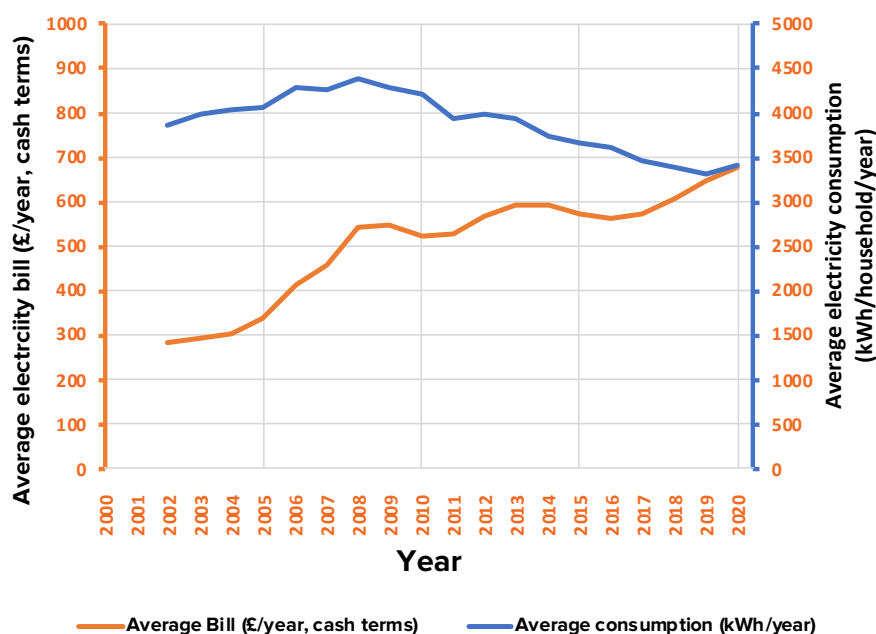
Average gas bills have fluctuated significantly from year to year, driven by changes in European and global gas prices and annual variation in demand depending on the weather (in cold years, households use significantly more gas for heating). As with electricity consumption, domestic gas consumption is trending downwards; reductions in gas consumption are likely driven by improved energy efficiency of new homes, retrofits of existing homes, and installation of higher-efficiency condensing boilers;<sup>67</sup> however, there are concerns that many new boilers do not operate in condensing mode due to incorrect setup.<sup>68</sup>

66. BEIS (updated June 2021). *Annual domestic energy bills*. [Link](#). Table QEP 2.2.5.

67. Evans, S. Carbon Brief (June 2014). *A detailed look at why UK homes are using less energy*. [Link](#)

68. Alsop, J. The Heating Hub (March 2020). *Why our condensing boilers do not condense*. [Link](#)

Figure 4: Average domestic gas bill (£/year, real terms) (2000-2020).



Source: BEIS.<sup>69</sup>

During 2021, gas and electricity prices have both risen, driven by higher wholesale prices for gas, coal and carbon in the UK, Europe and globally. These recent price rises are discussed in more detail in Section 2.

## Energy retail versus other retail

The retail energy sector is highly regulated compared to other sectors such as supermarkets, satellite TV companies, mobile phone providers and others. One reason for this is that energy bills are a significant proportion of households' expenditure (Figure 5). The average dual fuel energy bill (based on the current Energy Price Cap) is £106 per month. With the exception of housing costs, only Council Tax is a bigger household bill.<sup>70</sup>

There are also distributional concerns with energy bills, because lower-income households spend more of their income on energy.<sup>71</sup> In addition, energy bills can be difficult to understand, with customers having to negotiate potentially unfamiliar terminology, including: "standing charges", "unit charges", and "kilowatt-hours" (kWh).

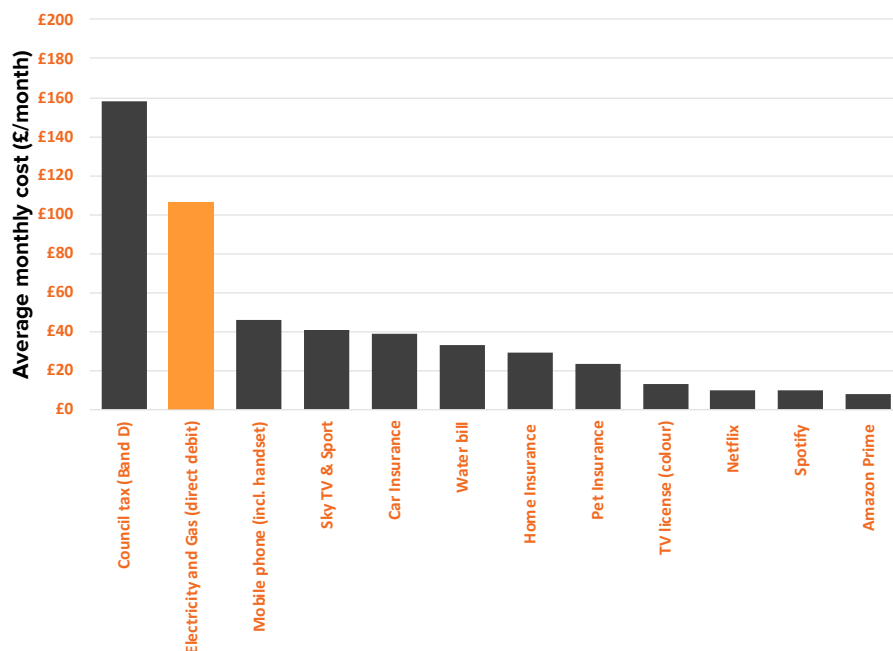
Taken together, these factors help to explain why governments are particularly nervous about making big changes to the retail energy market.

69. BEIS (updated June 2021). *Annual domestic energy bills*. [Link](#). Table QEP 2.3.5.

70. Note: this chart does not include transport costs.

71. Marshall, J. Resolution Foundation (October 2021). *Bills, bills, bills: How rising energy costs will impact some more than others and what the Government can do about it*. [Link](#)

Figure 5: Comparison of various monthly bills. (Orange) Average dual fuel energy bill at the price cap. (Black) other household bills.



Sources: Ofgem; National Statistics; Money Advice Service; others.<sup>72</sup>

## History of energy retail

### State-owned energy sector (1950s-1990).

In 1948, the Great Britain’s electricity sector was nationalised and put under the control of the British Electricity Authority (BEA). In 1957, the BEA was renamed as the Central Electricity Generating Board (CEGB), which owned and managed electricity generation and transmission in England and Wales until privatisation in 1990. The CEGB sold electricity to regional state-owned monopolies called “Area Boards”, which owned the regional distribution networks and supplied electricity to customers.<sup>73</sup> Similar arrangements applied in Scotland.

### Privatisation (1990s onwards).

Great Britain’s electricity sector was privatised from 1990 onwards, when the CEGB was split into multiple companies, which were then sold to private investors. The privatisation agenda was included in the Conservative Party’s manifesto for the 1987 General Election, which was followed by the 1988 Energy White Paper and the Electricity Act 1989.<sup>74,75</sup>

As well as privatising the CEGB, the Government also privatised the “Area Boards” in 1990s. Post-privatisation, these companies were known as “Regional Electricity Companies” (RECs). The RECs owned and operated the regional distribution networks and supplied all customers within their region. Between 1998 and 1999, the Government introduced competition in electricity supply, which allowed customers to choose their electricity supplier.<sup>76</sup>

72. Gas and electricity bills: Ofgem ([Link](#)). Council Tax: National Statistics ([Link](#)). Car Insurance, water bills: Money Advice Service ([Link](#)). Others: various.

73. Newbery, D. and Pollitt, M. Journal of Industrial Economics (September 1997). *The restructuring and privatisation of Britain’s CEGB – Was it worth it?* [Link](#) (Page 8)

74. Horrocks, S. and Lean, T. British Library (November 2011). *National Life Stories: An oral history of the electricity supply industry.* (Pages 25-28).

75. Legislation.gov.uk (undated). *Electricity Act 1989.* [Link](#)

76. Harker, M., and Price, C. Centre for Competition Policy (November 2006). *Introducing Competition and Deregulating the British Domestic Energy Markets: A Legal and Economic Discussion.* [Link](#). Page 4.

As part of the Utilities Act 2000, the Government required the RECs to split into two separate businesses: one that owned the regional electricity network (a regional monopoly) and one that owned the electricity supply business (which was now subject to competition). The 2000 Act also established the Office for Gas and Electricity Markets (Ofgem) as the joint regulator of the electricity and gas industry in Great Britain.<sup>77</sup>

Great Britain's gas sector was privatised through a similar process to the electricity sector, although with different dates. The gas sector was privatised through the Gas Act 1986, which privatised British Gas.<sup>78</sup> In 1994, the gas transmission network was split off from British Gas as established a separate company, Transco.<sup>79</sup> The gas transmission network is currently owned by National Grid Gas Transmission (NGGT), part of the National Grid group of companies.<sup>80</sup> Competition in domestic gas supply was announced 1994 and introduced over two years from 1996-1998.<sup>81</sup>

Following privatisation, transitional price controls were introduced. In 2002, these price controls were fully removed by the regulator Ofgem.<sup>82,83</sup>

Over the years, the roles and responsibilities in Great Britain's energy sector have evolved significantly. Current roles and responsibilities are as shown in Table 4. These roles are subject to change. For example, the Government has proposed reforms to system operation and the governance of industry codes.<sup>84,85</sup>

77. Harker, M., and Price, C. Centre for Competition Policy (November 2006). *Introducing Competition and Deregulating the British Domestic Energy Markets: A Legal and Economic Discussion*. [Link](#). Page 5.
78. Legislation.gov.uk (undated). *Gas Act 1986*. [Link](#).
79. The Evolution of the gas industry in the UK (undated). [Link](#). Page 5.
80. National Grid (undated). *Gas Transmission*. [Link](#)
81. Harker, M., and Price, C. Centre for Competition Policy (November 2006). *Introducing Competition and Deregulating the British Domestic Energy Markets: A Legal and Economic Discussion*. [Link](#). Page 4.
82. Harker, M., and Price, C. Centre for Competition Policy (November 2006). *Introducing Competition and Deregulating the British Domestic Energy Markets: A Legal and Economic Discussion*. [Link](#). Page 5.
83. Littlechild, S. (March 2019). *Promoting competition and protecting customers? Regulation of the GB retail energy market 2008-2016*. [Link](#)
84. BEIS (July 2021). *Proposals for a Future System Operator role*. [Link](#)
85. BEIS (July 2021). *Energy code reform: governance framework*. [Link](#)

Table 4: Roles and responsibilities in Great Britain’s energy sector.

Role	Electricity	Gas
Generators	Privately-owned companies owning power stations, wind farms etc.	Privately-owned gas producers and shippers.
Transmission network owners (“TOs”)	3 privately-owned regional monopolies. <sup>86</sup>	1 privately-owned GB-wide monopoly: National Grid Gas Transmission (NGGT).
Distribution network operators (“DNOs”)	14 regional monopolies, owned by 6 private companies. <sup>87</sup>	12 regional monopolies, owned by 4 private companies. <sup>88</sup>
Supply to customers (“suppliers”)	Privately-owned companies. Most supply both electricity and gas. Some supply to only either business or residential customers.	
System Operator	National Grid Electricity System Operator (National Grid ESO).	National Grid Gas Transmission (NGGT).
Energy regulator	Office for Gas and Electricity Markets (Ofgem).	
Policy	Department for Business, Energy and Industrial Strategy (BEIS).	
Industry codes	Various Licences (e.g. the Supply Licence) require licensed parties to sign up to various “industry codes”. These codes are governed by a combination of industry and Ofgem.	
Competition regulator	The Competition and Markets Authority (CMA). <sup>89</sup> Unlike Ofgem, the CMA’s remit is much broader than just gas and electricity markets.	

### The “Big Six” energy suppliers

Historically, the retail energy market has been dominated six suppliers (Figure 6). These six companies, known as the Big Six, were the remnants of the six Regional Electricity Companies (RECs) that owned the regional distribution networks and supplied all customers in their area prior to competition in the retail energy market.<sup>90</sup>

During the 2000s, the market share of the Big Six remained at nearly 100%, despite the market having opened to competition in the late 1990s.<sup>91</sup> By 2019, the market share of the Big Six had fallen to around 70%, with the other 30% of the market served by new entrants including OVO Energy, Bulb Energy, First Energy (now called Shell Energy), Utilita, Octopus Energy, and Utility Warehouse.

In 2019, E.ON purchased nPower and subsequently retired the nPower brand.<sup>92</sup> In January 2020, OVO Energy acquired the retail energy business of SSE, increasing OVO’s market share from 4% to 16%.<sup>93</sup> These changes mean that Great Britain’s retail energy market is now dominated by the “Big Seven” (British Gas, E.ON, OVO, EDF, Scottish Power, Octopus Energy and Bulb Energy), which have a combined market share of over 80%.<sup>94</sup>

90. Uswitch (undated). *Bix six energy companies guide*. [Link](#)

91. Customers could and did switch between suppliers, but there very few new entrants to the market.

92. E.ON Energy (May 2021). *E.ON completes migration of two million former npower customers to E.ON Next in record speed*. [Link](#).

93. Lempriere, M. Current News (January 2020). *OVO completes acquisition of SSE Energy Services*. [Link](#)

94. Listed in order of market share.

86. National Grid Electricity Transmission (NGET) (England and Wales); SSE (North Scotland); Scottish Power (South Scotland).

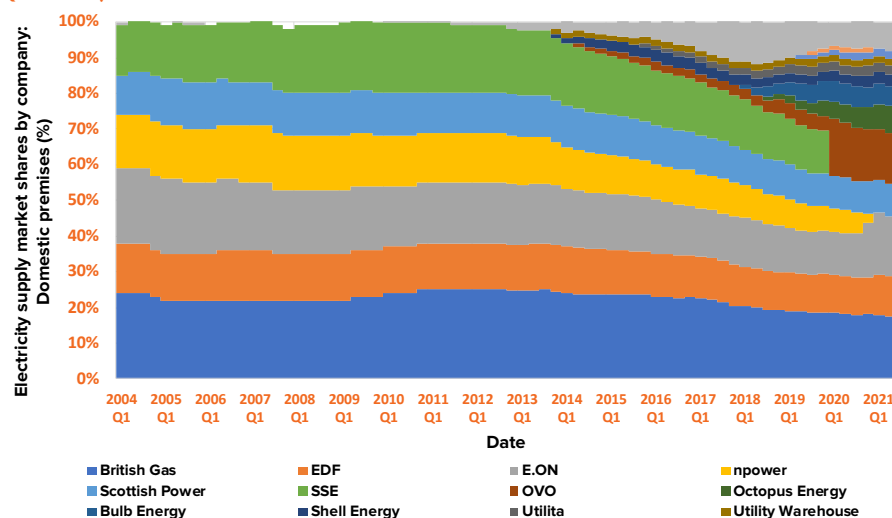
87. SSE Networks; Western Power Distribution; UK Power Networks; Northern Powergrid; Electricity Northwest; SP Energy Networks.

88. Cadent; Northern Gas Network; West & West Utilities; SGN.

89. Gov.uk (undated). *Competition and Markets Authority*. [Link](#)

In November 2021, Bulb Energy entered administration.<sup>95</sup> This is discussed in more detail in Section 2.

Figure 6: Market share of electricity supply to domestic premises (Q1 2004 – Q2 2021).



Source: Ofgem.<sup>96</sup>

## Regulatory framework

The Department for Business, Energy and Industrial Strategy (BEIS) Energy is responsible for energy policy in Great Britain.<sup>97</sup> BEIS implements policies through legislation and regulation, for example the *Energy Act 2013* and the *Warm Home Discount Regulations 2011*.

Great Britain's gas and electricity markets are regulated by the Office for Gas and Electricity Markets (Ofgem). In the retail energy market, Ofgem regulates suppliers through the Supply Licence. Ofgem also administers programmes on behalf of the Government, including: the Warm Home Discount (WHD); the Energy Company Obligation (ECO); the Renewables Obligation (RO); and the Default Tariff Cap (more commonly known as the "Energy Price Cap"). Ofgem also leads programmes of industry change, for example to promote digitalisation of data in the energy sector and to enhance data sharing between market participants.<sup>98</sup>

The dividing line between energy policy (set by BEIS) and regulation (set by Ofgem) is not always clear. This is one reason why BEIS and Ofgem often work together on various programmes, including the recently-published *Smart Systems and Flexibility Plan 2021*.<sup>99</sup>

The Competition and Markets Authority (CMA) also plays a role in Great Britain's energy sector. The CMA can undertake investigations into the functioning of the energy market, as it did between 2014 and 2016.<sup>100</sup> The CMA also adjudicates on appeals by energy companies against decisions made by Ofgem.<sup>101</sup>

95. BBC News (November 2021). *Energy firm Bulb set to go into administration*. [Link](#)

96. Ofgem (undated). *Electricity supply market shares by company: Domestic (GB)*. [Link](#)

97. Energy policy in Northern Ireland is devolved.

98. Ofgem (undated). *Energy data and digitalisation*. [Link](#)

99. BEIS and Ofgem (July 2021). *Transitioning to a net zero energy system: smart systems and flexibility plan 2021*. [Link](#)

100. Competition and Markets Authority (updated February 2018). *Energy market investigation*. [Link](#)

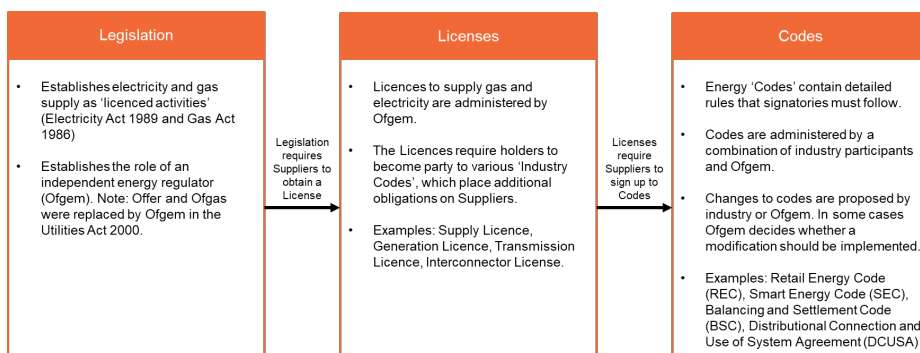
101. Competition and Markets Authority (updated August 2021). *Energy Licence Modification Appeals 2021*. [Link](#)

### Supply Licences.

Energy retail in Great Britain is governed by a combination of legislation, licences, and industry codes (Figure 7). Legislation establishes energy supply as a licensed activity, which means that suppliers can only operate if they hold a Supply Licence. The Supply Licence imposes conditions on suppliers, for example on how they market their tariffs.<sup>102</sup> The Licences also require suppliers to sign up to various industry codes, which impose additional responsibilities on licence holders.<sup>103</sup>

The rules were designed for a system where customers primarily interact with the retail energy market through their energy supplier; hence the existing rules are sometimes known as the “Supplier Hub” model.<sup>104</sup>

Figure 7: Legislative and regulatory regime for energy suppliers in Great Britain – the “Supplier Hub” model.



Source: Policy Exchange analysis.

### Social obligations and climate policies.

The Government uses energy suppliers to deliver wider policy objectives, including social policies (e.g. mitigating fuel poverty) and climate policies (e.g. subsidies for low-carbon generation technologies).

Social policies include the Warm Home Discount (WHD), which requires suppliers to offer rebates to certain groups of “fuel poor” customers.<sup>105</sup> The WHD is a subsidy for fuel-poor customers that is paid for by all other customers.<sup>106</sup>

The Energy Company Obligation (ECO) aims to reduce fuel poverty by making the homes of the fuel poor more energy efficient. Under ECO, suppliers are required to install energy efficiency measures such as additional insulation in lofts or walls.<sup>107,108</sup> ECO is therefore a combination of a social policy (to reduce fuel poverty) and a climate policy (to reduce carbon emissions from heating homes).

The Government also uses suppliers to collect money that it uses to pay subsidies to low-carbon energy projects like wind, solar, biomass and nuclear. These climate policies include the Feed-in Tariff (FiT), the Renewables Obligation (RO),<sup>109</sup> and the Contracts for Difference (CfD) scheme.<sup>110</sup> Suppliers each pay a share of these climate policies that is proportionate to the amount of electricity that their customers use.<sup>111</sup>

The Government has closed both the FiT and RO schemes to new

102. Ofgem (undated). *Licences and licence conditions*. [Link](#)  
 103. Ofgem (undated). *Industry codes and standards*. [Link](#)  
 104. Ofgem (July 2018). *Future supply market arrangements – response to our call for evidence*. [Link](#). Page 2: “We call this the ‘supplier hub’ model because the supplier is positioned as the primary intermediary between consumers and the energy system”.  
 105. Ofgem (undated). *Warm Home Discount (WHD)*. [Link](#)  
 106. Different UK nations use a different definition of “fuel poor”.  
 107. Ofgem (undated). *Energy Company Obligation (ECO)*. [Link](#)  
 108. Which? (July 2021). *Energy Company Obligation (ECO)*. [Link](#)  
 109. Ofgem (undated). *Renewables Obligation (RO)*. [Link](#)  
 110. Low Carbon Contracts Company (undated). *The CfD Scheme*. [Link](#)  
 111. Almost all costs are recovered from electricity bills. Very few costs are recovered from gas bills.



projects; therefore, the CfD scheme is the Government's primary subsidy/support regime for new projects. Under the CfD scheme, projects compete for contracts in auctions that are held approximately once every two years; the next CfD auction is planned for the first half of 2022.<sup>112</sup>

## The Energy Price Cap

In 2001/02, Ofgem assessed that the domestic gas and electricity markets were functioning effectively; prices had fallen, around 40% of customers had switched supplier since the market opened to competition, and suppliers were offering "a much greater range of tariffs, services and payment options". Therefore, Ofgem decided to remove all remaining price controls for domestic customers, instead relying on competition to protect customers from overcharging.<sup>113</sup>

Over the following decade, Ofgem implemented a number of changes to reduce the premium paid by "disengaged customers". The Government and Ofgem define disengaged customers as those who are usually on their supplier's default tariff, which is typically more expensive. "Engaged customers" are defined as those who regularly switch supplier or opt-in to the lowest-cost tariffs.<sup>114</sup>

## Political concerns about rising energy prices (2013).

In 2013, rising energy prices put the retail energy sector under increased scrutiny. Rising bills were largely driven by higher wholesale gas prices; however, there were also concerns amongst politicians that other factors were at play.

The then-Prime Minister David Cameron identified the culprit as the rising cost of social obligations and climate policies levied on suppliers; to address the issue, Cameron allegedly told his Ministers to "get rid of all that green crap".<sup>115</sup>

In the 2015 General Election, the Conservative Party won an outright majority. Following the election, the Government closed various subsidy schemes ahead of schedule.<sup>116</sup> In 2017, the Government pledged a moratorium on new subsidies for low-carbon energy projects until the total cost of subsidies started to fall.<sup>117,118</sup>

The Then-Leader of the Opposition Ed Miliband identified a different culprit; he argued that energy suppliers were ripping off their customers and making excessive profits. At the 2013 Labour Party Conference, Miliband pledged to cap electricity prices for two years if the Labour Party won the 2015 General Election.<sup>119</sup>

A version of these proposals was included in the Labour Party's 2015 Manifesto, which also included a commitment to require the Big Six to legally separate their supply business from their generation assets.<sup>120</sup>

112. CfD Allocation Round 4: Resource Portal (undated). *Longest timeline*. [Link](#). See also: *Shortest Timeline*.

113. Ofgem (July 2002). *Ofgem Annual Report 2001-2002*. [Link](#). Page 39.

114. Littlechild, S. Network (June 2017). *Competition and Price Controls in the UK Retail Energy Market*. [Link](#).

115. Kirkup, J. UnHerd (December 2019). *The "green crap" lessons of 2013*. [Link](#)

116. BBC News (June 2015). *Onshore wind farms cancelled as subsidies cut*. [Link](#)

117. Carbon Brief (November 2017). *Autumn Budget 2017: Key climate and energy announcements*. [Link](#)

118. HM Treasury (November 2017). *Control for Low Carbon Levies*. [Link](#)

119. Labour List (September 2013). *Transcript: Ed Miliband's 2013 conference speech*. [Link](#)

120. Labour Party (2015). *The Labour Party Manifesto 2015*. [Link](#). Page 26/86.

### Investigation by the Competition and Markets Authority (2014-2016).

Alongside political concerns, Ofgem and the CMA were taking an increased interest in the sector. In 2013 and 2014, Ofgem, the CMA, and the Office of Fair Trading (OFT) undertook an assessment of the retail energy sector for domestic and small business customers.<sup>121</sup> Following this assessment, Ofgem referred Great Britain's energy market to the CMA for an investigation.<sup>122</sup>

The CMA's investigation ran between 2014 and 2016. As part of the investigation, the CMA proposed changes to a wide range of market rules, including introducing a price cap for customers with "prepayment meters".<sup>123</sup> The CMA found that prepayment customers were generally paying more for their energy use than those on standard meters, and that these households were more likely to be classed as "vulnerable customers".<sup>124</sup> The price cap for those with prepayment meters was introduced in April 2017 and is now administered by Ofgem.<sup>125</sup>

The CMA's energy market investigation cited three major barriers to effective competition in the domestic energy market (Box 1). These three features provide a useful scorecard against which to assess future market reforms, although they are perhaps overly focused on switching rather than other elements of customers' engagement with their energy usage.

#### Box 1: Features identified by the CMA as giving rise to the "Domestic Weak Customer Response Adverse Effect on Competition" (AEC).

- a) Customers have limited awareness of, and interest in, their ability to switch energy supplier, which arises in particular from the following fundamental characteristics of the domestic retail gas and electricity supply markets:
  - i. the homogeneous nature of gas and electricity; and
  - ii. the role of traditional meters and bills
- b) Customers face actual and perceived barriers to accessing and assessing information arising, in particular, from the following aspects of the domestic retail gas and electricity markets:
  - i. the complex information provided in bills and the structure of tariffs; and
  - ii. a lack of confidence in, and access to, price comparison websites (PCWs) by certain categories of customers, including the less well-educated and the less well-off.
- c) Customers face actual and perceived barriers to switching, such as where they experience erroneous transfers which have the potential to cause material detriment to those who suffer from them.

Source: Competition and Markets Authority (CMA).<sup>126</sup>

121. CMA (June 2014). *Joint review of competition in the energy market*. [Link](#)

122. CMA (Updated February 2018). *Energy market investigation*. [Link](#)

123. Prepayment meters require customers to pay for their electricity before they use it (rather than in arrears as with normal meters). Prepayment meters are typically topped up using a "key" or a "smart card", or potentially using an app. For more information, see: <https://www.cse.org.uk/advice/advice-and-support/prepayment-meters>

124. This was in part because the structure and technology of the traditional prepayment meter market meant that it could never be as competitive as for other payment types (i.e. Standard Credit / Direct Debit). Smart meters are expected to improve the situation for prepayment customers.

125. Ofgem (February 2017). *Ofgem sets prepayment price cap to protect over four million households least able to benefit from competition*. [Link](#). Page 1, Paragraph 4.

126. CMA (published December 2016). *Energy Market Investigation (Prepayment Charge Restriction) Order 2016*. [Link](#). Paragraph 4. Note that additional "AECs" were cited in the CMA's decision to impose the cap on prepayment tariffs.

## The Domestic Gas and Electricity (Tariff Cap) Act 2018.

In the 2017 General Election, both the Conservatives and Labour committed to further shake up the retail energy sector. The Conservative Party promised to extend the prepayment cap to all customers on default tariffs, in order to “protect customers who do not switch against abusive price increases”.<sup>127</sup> This commitment was arguably similar to the Labour proposals from 2015, with the key difference that the cap would be set by Ofgem based on changes in underlying energy prices, rather than a temporary freeze in prices as proposed by the Labour Party. The 2017 Labour Party Manifesto included proposals to nationalise various parts of the energy sector, including establishing at least one state-owned energy supplier in each region of Great Britain.<sup>128</sup>

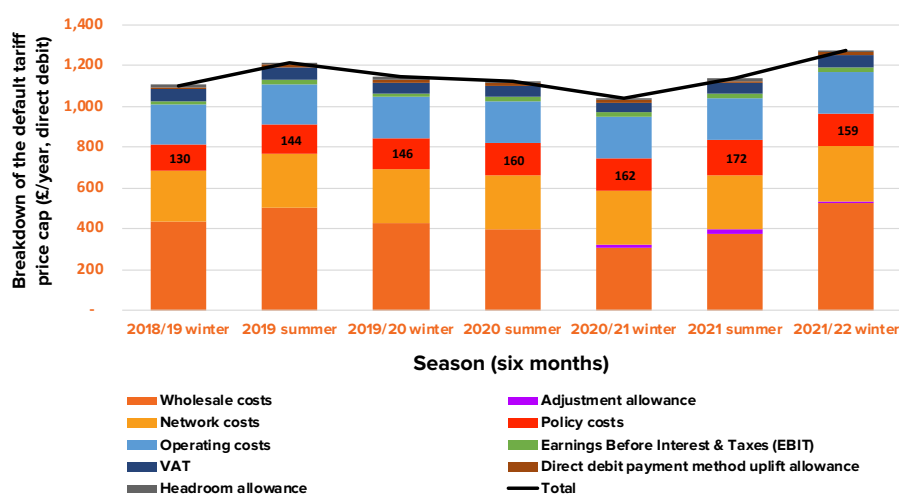
Following the 2017 General Election, the Conservative-led Government legislated for its proposed Energy Price Cap through the *Domestic Gas and Electricity (Tariff Cap) Act 2018*.<sup>129,130</sup> The legislation required Ofgem to implement a cap on suppliers’ Standard Variable (SVTs) and Default Tariffs from January 2019. The level of the cap is currently updated every six months.

The price cap applies to standing charges (measured in p/day) and unit rates (measured in p/kWh) charged by suppliers. Customers who use more energy will pay more than the cap, and vice versa for those who use less.

The cap was presented as a temporary measure that would protect customers until more effective competition developed in the domestic energy market. Because the price cap was intended to be temporary, the legislation only allows the cap to remain in place until 2023 at the latest.<sup>131</sup>

Since 2019, the price cap has been between around £1,000 and £1,200 per year for a typical user (Figure 8). However, the cap is expected to increase sharply from April 2022, as discussed in Section 2.

**Figure 8: Breakdown of the Energy Price Cap for those paying by Direct Debit (£/year).**



Source: Ofgem.<sup>132,133</sup>

127. Conservative Party (2017). *The Conservative and Unionist Party Manifesto 2017*. [Link](#). Page 62.

128. Labour Party (2017). *Labour Party Manifesto 2017*. [Link](#). Page 20.

129. Legislation.gov.uk (undated). *Domestic Gas and Electricity (Tariff Cap) Act 2018*. [Link](#)

130. BEIS (July 2018). *Press release: Victory for consumers as cap on energy tariffs to become law*. [Link](#)

131. The legislation can be amended to allow the price cap to remain in place beyond 2023. See [Link](#).

132. Ofgem (undated). *The Default Tariff Cap*. [Link](#)  
Note: The price cap is slightly higher for prepayment customers due to higher underlying costs of serving these customers.

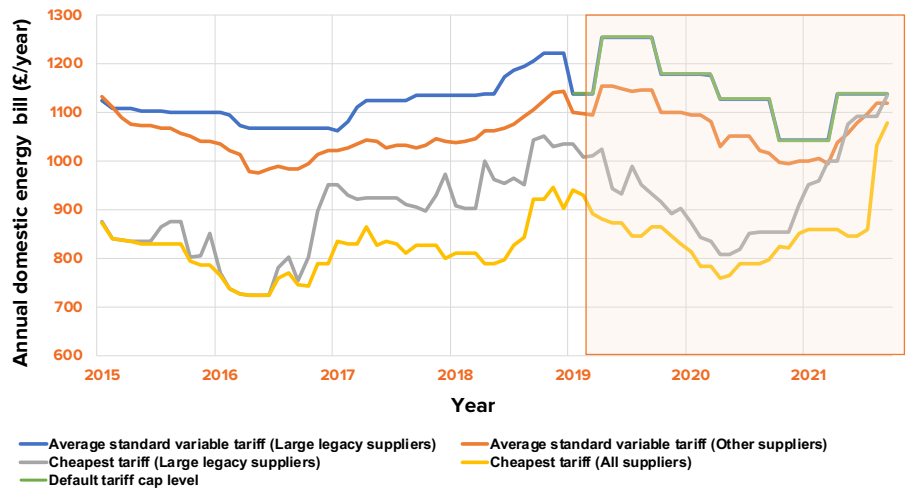
133. Ofgem (August 2021). *Record gas prices drive up price cap by £139....* [Link](#)

The impact of the Energy Price Cap is not entirely clear. In the two years before the price cap was implemented the average SVT of the large legacy suppliers (the Big Six / Big Five) was £88 per year higher than for other suppliers (Figure 9). In the two years following the introduction of the cap (2019-2020), the premium fell only slightly to £80 per year.

However, some legacy suppliers have cited the Energy Price Cap as putting downwards pressure on their profitability, implying that they would have charged higher prices if the cap was not in place.<sup>134</sup> Since the cap’s introduction, the large legacy suppliers have typically priced their standard variable tariffs at or very close to the cap. Ofgem’s decision on the price cap methodology noted that it had set the “operating cost allowance below large suppliers’ historical costs, sharpening incentives to reduce costs”.<sup>135</sup> This may be one reason why large legacy suppliers have priced at or near the cap.

For customers who actively switch to the best deals, the price cap does not appear to have had a major impact. Data from Ofgem (Figure 9) shows that the difference between the SVT offered by legacy suppliers and the best fixed-price deal on the market has remained stable since 2015 at around £300 per year. However, this metric should be treated with caution, as the best deals on the market were often offered by suppliers that have subsequently gone bankrupt, suggesting that the best tariffs were priced at a significant loss to attract customers.

Figure 9: Domestic energy bill by company and tariff type (January 2015 – September 2021). Shaded area (2019 onwards) covers the period with the price cap in place.



Source: Ofgem.<sup>136</sup>

134. Gosden, E. The Times (July 2021). Price cap on energy bills to be extended. [Link](#)  
 135. Ofgem (November 2018). Default tariff cap: decision – overview. [Link](#). Page 6.  
 136. Ofgem (undated). Retail Market Indicators. Chart: Retail price comparison by company and tariff type: Domestic (GB). [Link](#)  
 137. BEIS (updated June 2021). Quarterly domestic energy switching statistics (Table 2.7.1). [Link](#). Note: figures do not include switching payment method when staying with the same company, or where a customer switches to another offer provided within the same parent company.

There were concerns that the price cap would lead to falling engagement with the energy market, which would be demonstrated by a fall in the proportion of customers switching their supplier. However, data from BEIS shows that proportion of customers switching their electricity and gas supplier each year has risen from around 10% in 2014 to around 20% in 2020.<sup>137</sup>

It is difficult to disaggregate the impact of the price cap on switching, compared to other factors such as the rise of price comparison websites and auto-switching services. There are also other planned changes that could affect switching rates. In 2022, the industry-wide “Switching Programme” is expected to go-live. The programme aims to improve customers’ experience of switching supplier.<sup>138</sup>

The main trend observable in Ofgem’s data is that, during the first half of 2021, the cheapest tariff offered by the large legacy suppliers has risen sharply and is now very similar to their Standard Variable Tariffs. Further increases in wholesale energy prices mean that, at time of writing (Q4 2021), all fixed-price deals are at a significant premium to the price cap. The impact of these recent price rises is described in Section 2.

## Smart Meters and Half-Hourly Settlement (HHS)

In addition to the Energy Price Cap, the ongoing rollout of Smart Meters is one of the major policy drivers in energy retail over the last five years.

### Smart Meters.

A “Smart Meter” is an electricity or gas meter that can record and share real-time consumption with a customer and their supplier. Smart Meters can also receive information from suppliers; for example, a supplier can send updated tariff information to a customer’s Smart Meter. The customer can then view this information on their “in-home display” (IHD).<sup>139</sup> Smart Meters offer a range of potential benefits, including:

- Automatically sending meter readings to suppliers, so that customers no longer have to take them;
- Allowing customers to see their real-time energy consumption (in kWh and £), which may help them to save energy and/or budget more effectively;
- More accurate forecasts of electricity and gas demand, which could help the ESO and the gas system operator to balance the electricity and gas systems; and
- Enabling customers to participate more in the electricity market, for example through time-of-use tariffs (TouTs); TouTs could allow customers to reduce their bills and reduce the cost of integrating variable generation from wind and solar.

The main criticism of Smart Meters is the cost of installing them. In 2019, the Government estimated that the rollout would cost £13.5bn by 2034; the Government expects the Smart Meter programme to deliver a net benefit of £6bn over the same period.<sup>140</sup> Some have raised privacy concerns, and the programme has experienced technical issues, including the earliest Smart Meters (“SMETS1”) losing functionality when a customer switched supplier.

The Smart Meter rollout was legislated for in the Energy Act 2008, with the first meters installed in 2011. Under the legislation, suppliers are

138. Retail Energy Code Company (RECCo) (undated). *RECCo’s Switching Programme Implementation Project*. [Link](#)

139. Hinson, S. House of Commons Library (October 2019). *Energy Smart Meters (Briefing Paper 8119)*. [Link](#). Page 4.

140. Hinson, S. House of Commons Library (October 2019). *Energy Smart Meters (Briefing Paper 8119)*. [Link](#). Page 3.

required to install Smart Meters in a rising proportion of their customers' homes, or face penalties such as fines.<sup>141</sup>

As of March 2021, Smart Meters were installed in around 45% of homes in Great Britain; around 80% of these are operating in “smart mode”, whereas 20% are operating as “traditional” meters (i.e. requiring manual meter readings from customers).<sup>142</sup>

Since 2017, a centralised communications network for Smart Meters has been available; the network is operated by the Smart Data Communication Company (Smart DCC), a privately-owned monopoly that is part of Capita plc.<sup>143</sup>

All new Smart Meters (“SMETS2”) are automatically connected to the Smart DCC network, which should ensure that these meters remain ‘smart’ even if a customer switches their supplier. In addition, suppliers and the Smart DCC are gradually transitioning old “SMETS1” meters to the centralised network.

In around 5% of Great Britain’s homes, the Smart Meter is too far from the home to communicate with the customer’s in-home display, which prevents customers from receiving real-time information on their electricity and gas consumption; examples including large blocks of flats where the Smart Meters are in a single meter room, for example in the basement.

To serve these properties, suppliers have formed a company, *Alt HAN Co*, that is developing alternative communications protocols to increase the range of the “Home Area Network” (HAN) of Smart Meters.<sup>144</sup> Unless these issues are addressed, some customers may not fully benefit from Smart Meters.

### Half-hourly settlement (HHS).

One impact of Smart Meters is that they allow suppliers to be charged (“settled”) for the electricity that their customers actually use in each 30-minute trading period, rather than using average profiles; this system is known as “half-hourly settlement” (HHS).<sup>145</sup>

Today, all large- and medium-sized business users are settled half hourly. This means that some businesses may pay more or less than others, depending on what times of day they use electricity. HHS also creates incentives for suppliers and customers to work together to reduce electricity consumption at peak times.

Multiple companies (including suppliers) offer services to these customers to help them reduce their bills, for example by installing on-site generation and/or battery storage, or through “demand-side response” (DSR) technologies that can shift demand away from peak periods. Examples of DSR include large fridges and air conditioners in supermarkets, which can be operated flexibly.<sup>146,147</sup>

By default, domestic and small business customers are currently “non half-hourly settled”. This means that, by default, suppliers and customers have no incentive to shift demand to off peak periods, as they won’t be paid to do so. The exception is the 2.7 million UK households that have an

141. Hudson, C. Which? (October 2020). *Energy smart meter installation roll-out faces further setbacks*. [Link](#)

142. BEIS (May 2021). *Smart Meter Statistics in Great Britain: Quarterly Report to end March 2021*. [Link](#)

143. Data Communication Company (undated). *About DCC*. [Link](#)

144. Alt HAN Co (undated). *About Alt HAN*. [Link](#)

145. The settlement process for gas is somewhat different. Wholesale gas is traded in daily settlement periods. Larger gas customers (e.g. industrial users) are metered and settled daily. Smaller customers are not metered or settled daily.

146. Ambrose, J. *The Guardian* (August 2019). *Asda signs up its fridges to keep the UK warm this winter*. [Link](#)

147. Grundy, A. *Current News* (June 2019). *Tesco trials opening up fridges or frequency response*. [Link](#)

“Economy 7” meter, which offers seven hours of cheaper electricity each night, typically starting between 11pm and midnight.<sup>148,149</sup>

Domestic customers can **opt-in** to half-hourly settlement (known as “elective HHS”); this allows them to access “smart electricity tariffs”, which vary by time of day or allow suppliers to take some control over their customers’ devices; the role of “smart tariffs” is discussed later in this report.

In April 2021, Ofgem published its final decision to introduce market-wide half-hourly settlement (“MHHS”) by the end of 2025. By October 2025, Ofgem will require all suppliers to settle their customers using their consumption in each half hour trading period, unless customers opt-out. MHHS will only apply to customers who have a Smart Meter.<sup>150</sup>

## The Retail Energy Strategy 2021

The first chapter of the Government’s Energy White Paper, published in December 2020, focused on reducing energy bills and carbon emissions.<sup>151</sup> The White Paper promised a range of new policies, several of which were launched in July 2021 as part of the Government’s Retail Energy Strategy, *Energy Retail Market Strategy for the 2020s*.<sup>152</sup>

Despite setting out some new initiatives, the strategy offers little to reduce bills in the short term; most of the key measures would start until 2024 at the earliest. In addition, the strategy does little to tackle the looming challenges posed by Net Zero, particularly how the retail energy market should change to accommodate rising uptake of electric vehicles and heat pumps.

Table 5 shows BEIS’ summary of the key goals and actions in the Retail Energy Strategy. Helpfully, this timeline shows how the Government is planning to prioritise various reforms.

148. BEIS (Updated June 2021). *Annual domestic energy bills*. [Link](#). Table 2.2.5 (Average annual domestic electricity bills by various consumption levels).

149. EDF Energy (undated). *7 facts about Economy 7 meters, tariffs and times*. [Link](#)

150. Ofgem (April 2021). *Electricity Retail Market-wide Half-hourly Settlement: Decision and Full Business Case*. [Link](#)

151. BEIS (published December 2020). *Energy white paper: Powering our net zero future*. [Link](#). Chapter 1, Pages 18-37.

152. BEIS (July 2021). *Energy retail market strategy for the 2020s*. [Link](#)

Table 5: BEIS' summary of key goals and actions in the Retail Energy Strategy.

Short term (present onwards)	Medium term (2024 onwards)	Long term (late 2020s)
<p>#1: Protecting consumers from excessive loyalty penalties from disengagement, with a temporary price cap.</p> <p>#2: Addressing barriers to engagement with the market, for instance with Ofgem's Faster Switching Programme.</p> <p>#3: Address market distortions, such as the Energy Company Obligation (ECO) and Warm Home Discount (WHD) thresholds, to level the playing field and improve competition.</p> <p>#4: Ensure there is suitable protection for consumers engaging with third parties (such as brokers or price comparison websites).</p>	<p>#5: Ensure consumers are accurately informed about their personal contribution to Net Zero, with an initial focus on "green tariffs".</p> <p>#6: Significant progress on laying building blocks to enable new business models, e.g. Smart Meter rollout, half-hourly settlement.</p> <p>#7: Cost reduction in low carbon technologies, such as heat pumps. Continued growth in electric vehicle ownership.</p> <p>#8: Prompt consumers to consider alternative tariffs/services, improving competition and engagement, through opt-in switching.</p>	<p>#9: Market framework supports the development of new business models that support net-zero (such as heat as a service or peer to peer energy trading), which can make use of the digitalised physical infrastructure.</p> <p>#10: Ensure there is an appropriate regulatory framework to facilitate this whilst protecting consumers.</p> <p>#11: System costs and price signals complement new business models and incentivise consumer behaviours that assist decarbonisation, e.g. charging of EVs overnight.</p> <p>#12: Potentially more action (e.g. through opt-out switches) to nudge consumers and suppliers towards more competitive and/or low carbon products.</p>

Source: BEIS. Reproduced from the Retail Energy Strategy.<sup>153</sup>

The actions in the Retail Energy Strategy can be summarised in three key themes: Harnessing engaged customers; protecting disengaged customers; and enhancing and maintaining market-wide customer protections (Table 6).

153. BEIS (July 2021). *Energy retail market strategy for the 2020s*. [Link](#). Pages 4-5.



Table 6: Policy Exchange summary of the Retail Energy Strategy.

Theme	Timeframe		
	Short term (2021-2023)	Medium term (2024 onwards)	Long-term (late 2020s)
Harness engaged customers.	-	Reform “green tariffs”.	Promote new retail offerings, including smart tariffs.
Protect disengaged customers.	Maintain price cap.	Opt-in switching reforms.	Opt-out switching reforms.
Enhance and maintain market-wide customer protections.	Expand regulatory framework to cover TPIs.	-	Wider reform of regulatory framework to enable smart tariffs.

Source: Policy Exchange interpretation of BEIS’ Retail Energy Strategy.<sup>154</sup>

The Retail Energy Strategy included consultations on:

- Trials of “opt-in” and “opt-out” switching, under which the Government or a Government-appointed company would change a customer’s supplier automatically if certain conditions were met.<sup>155</sup> These reforms would target the “loyalty penalty” faced by customers that do not switch supplier or opt-in to a fixed-price contract; historically fixed-price contracts have been cheaper. Opt-in and opt-out switching are explained in Box 2 and Box 3 respectively.
- Extending and reforming the ECO and WHD schemes that support low-income customers with subsidised energy efficiency measures and subsidised bills.

Shortly after publishing the Retail Energy Strategy, BEIS published consultations on:

- Improving the transparency of “green tariffs” to prevent “greenwashing”. These measures would focus on tariffs that are marketed a “green” or “100% renewable” based on suppliers buying REGO certificates from renewable energy projects.<sup>156</sup>
- Considering reforms to the regulatory framework governing the retail energy sector to ensure that third-parties are appropriately regulated.<sup>157</sup>

154. BEIS (July 2021). *Energy retail market strategy for the 2020s*. [Link](#). Pages 4-5.

155. BEIS (July 2021). *Energy retail: opt-in and testing opt-out switching*. [Link](#)

156. BEIS (August 2021). *Designing a framework for transparency of carbon content in energy products: call for evidence*. [Link](#)

157. BEIS (August 2021). *Third-party intermediaries in the retail energy market: call for evidence*. [Link](#), see Figure 1: Participants in the retail energy market (1990s vs. today), which shows how the number of participants in the retail energy sector has grown since privatisation.

### Box 2: What is opt-in switching?

Under opt-in switching, the Government would set up a government-run or government-appointed price comparison service. If customers opt-in to this service, then they will be periodically switched to a new energy supplier that offers a lower price. Opt-in switching would compete with existing privately-run price comparison websites and auto-switching services.

Between 2016 and 2019, Ofgem trialled opt-in switching. During the trial, Ofgem sent customers letters and emails prompting them to switch to a cheaper tariff.<sup>158</sup> Ofgem also trialled “collective switching”, which offered customers an exclusive tariff only available through the collective switching programme. Suppliers are incentivised to participate in collective switching because it allows them to acquire a large number of customers without spending a lot of money on advertising.

The Government is planning to start implementing opt-in switching by 2024.<sup>159</sup>

### Box 3: What is opt-out switching?

Opt-out switching is similar to opt-in switching. However, under opt-out switching, customers who have not switched supplier recently will be moved to a new supplier automatically, unless they explicitly opt-out.

Opt-out switching would be a major reform that would require new legislation. Opt-out switching would move customers to a new supplier without their explicit consent, something that BEIS notes only currently happens when their supplier goes bust (through the Supplier of Last Resort process).<sup>160</sup>

The Government is planning to test opt-out switching from 2024 onward. A wide-scale rollout of opt-out switching could take a number of years, subject to successful results in the testing phase.<sup>161</sup>

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158. Ofgem (September 2019). *What works in increasing engagement in energy tariff choices*. [Link](#)

159. BEIS (July 2021). *Energy retail: opt-in and testing opt-out switching*. [Link](#), page 5.

160. BEIS (July 2021). *Energy retail: opt-in and testing opt-out switching*. [Link](#), page 51.

161. BEIS (July 2021). *Energy retail: opt-in and testing opt-out switching*. [Link](#), page 5.

## 2. Energy retail in 2021: Price rises and supplier failures

During 2021, rapid increases in wholesale gas and electricity prices have led to an unprecedented rate of suppliers failing and exiting the market. These supplier failures suggest that current regulations are too lax; in addition, these failures mean that the Government will need to make changes to its recently-published Retail Energy Strategy.

### Rising wholesale gas and electricity prices have caused more suppliers to fail than usual.

Since January, UK wholesale natural gas prices have increased fourfold, from 50 p/therm to over 200 p/therm in October (Figure 10).

The International Energy Agency (IEA) attributes rising gas prices to “a rapid economic rebound from last year’s pandemic-induced recession, weather-related factors, and some planned and unplanned outages on the supply side.” They state that the price increases are “not related to efforts to transition to clean energy”, but caution that more investment is needed in the energy sector, “both to meet near-term energy needs and long-term transition goals”.<sup>162</sup>

Rising gas prices have fed through to similar increases in the wholesale price of electricity, because gas-fired power stations are typically the marginal producer of electricity and therefore set the electricity price most of the time.

Figure 10: UK natural gas futures (p/therm).



Source: ICE.<sup>163</sup> Nov21 contract, accessed 13th October 2021.

Higher wholesale gas and electricity prices have increased costs for energy suppliers. These rising costs are less of a problem for those suppliers that

162. International Energy Agency (October 2021).

163. ICE (accessed 13<sup>th</sup> October 2021). UK Natural Gas Futures (NOV21). [Link](#)

have bought sufficient gas and electricity in advance, known as “hedging”. However, rising prices present a significant challenge to others.

There are two factors preventing suppliers from raising prices quickly to cover the increase in wholesale prices:

### #1: The Energy Price Cap:

- The price cap is set based on historical forward energy prices. If suppliers have bought energy in advance, in line with the formula used to set the price cap, then their underlying costs will be broadly in line with the Energy Price Cap. However, if they have not comprehensively hedged their exposure, then suppliers will be facing costs that are significantly higher than the cap.<sup>164</sup>
- The price cap will be updated in April 2022, based on forward energy prices observed during the second half of 2021. Analysts at *Cornwall Insight* estimate that, if current high wholesale prices persist, the price cap will increase by 30% in April 2022 (£1,660 vs £1,277 for a typical dual-fuel customer).<sup>165</sup>
- Fixed-term contracts offered by suppliers, which are not subject to the price cap, are currently priced at around £2,000 per year for an average customer. This is £750 per year higher than the current price cap (Figure 11).
- Because fixed-term contracts are now more expensive than variable ones, more customers will not be renewing their fixed-price deals and will be moving onto variable-priced deals (which are price capped). Suppliers may not have expected this, and therefore may not have hedged this risk.

### #2: Customers on fixed price deals:

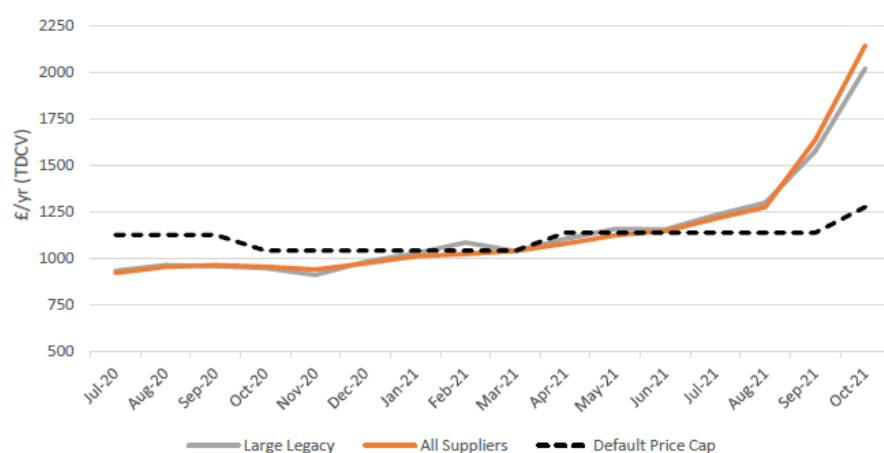
- Many customers have signed up for fixed price deals lasting 12 months or more. If suppliers have not bought enough energy in advance, then they will need to buy more in the short-term markets, where prices are currently high.

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164. Note that, in order to hedge effectively, suppliers need to be well capitalised, as trading partners will want collateral to manage the risk of the supplier defaulting.

165. Lowrey, C. *Cornwall Insight* (October 2021). *The gravity of the default tariff cap and the impact of the SOLR process.* [Link](#)

Figure 11: Comparison of fixed-term contracts (solid lines) vs. the Energy Price Cap (dashed line).



Source: Ofgem (analysis of data from Energy Helpline).<sup>166</sup>

Higher wholesale energy prices have contributed to several suppliers ceasing trading over recent months (Table 7). Since August 2021, twenty-five suppliers have stopped trading and Bulb Energy has entered the Special Administrative Regime; between them, these suppliers served approximately 3.9 million households, comprising around 15% of the market.

Even after these bankruptcies, there are approximately twenty-five suppliers active in the market for domestic customers.<sup>167</sup> However, the high rate of failure suggests that many in the sector were underprepared for volatile energy prices, particularly in the face of the restrictions on price increases imposed by the Energy Price Cap.

166. Ofgem (November 2021). *Reviewing the potential impact of increased wholesale volatility on the default tariff cap: November 2021 policy consultation*. [Link](#). Page 25.

167. Ofgem reports that, as of Q2 2021, there were 49 active suppliers in the domestic energy retail market ([Link](#)). See chart: "Supplier entries and exits in the domestic energy retail market (GB)". Since then, approximately 25 suppliers have left the market (Table 7).

Table 7: Energy suppliers that have recently exited the market or been placed into administration.

Date stopped trading / entered administration	Supplier	Domestic customers served
December 2021	Zog Energy	11,700
November 2021	Entice Energy	5,400
	Orbit Energy	65,000
	Bulb Energy	1,700,000
	Neon Reef	30,000
	Social Energy Supply	5,500
	CNG Energy	0. <sup>168</sup>
	Omni Energy	6,000
	MA Energy	0. <sup>169</sup>
	Zebra Power	14,800
	Ampoweruk	600
	Bluegreen Energy Services	5,900
October 2021	GOTO Energy	22,000
	Daligas	9,000. <sup>170</sup>
	Pure Planet	235,000
	Colorado Energy	15,000
September 2021	Enstroga	6,000
	Igloo Energy	179,000
	Symbio Energy	48,000
	Avro Energy	580,000
	Green Supplier Limited ("Green")	255,000
	People's Energy	350,000
	Utility Point	220,000
	PFP Energy	82,000
	MoneyPlus Energy	9,000
August 2021	Hub Energy	6,000
<b>Total</b>		<b>Total: 3.86 million</b>

Source: Ofgem.<sup>171</sup> Note: Bulb has been placed into a "Special Administrative Regime".<sup>172</sup>

171. Ofgem (undated). *What happens if your energy supplier goes bust*. [Link](#)

172. BBC News (November 2021). *Energy firm Bulb set to go into administration*. [Link](#)

173. Ofgem (October 2016). *Supplier of Last Resort: Revised Guidance 2016*. [Link](#)

174. See evidence from Adam Scorer, CEO of National Energy Action, to the BEIS Select Committee (September 2021). *Oral evidence: UK Gas Market, HC 741*. [Link](#). Page 13.

168. CNG Energy Limited served 41,000 non-domestic customers.

169. MA Energy served 300 non-domestic customers.

170. Includes non-domestic.

When suppliers fail, Ofgem automatically moves their customers to a new supplier; there is no interruption to a customer's electricity and gas supply. This process is known as the Supplier of Last Resort (SoLR).<sup>173</sup> For many customers, the SoLR process is relatively hassle-free and does not result in significant additional costs. However, there are additional risks for low-income and vulnerable customers who go through the SoLR process. For example, there are additional risks for customers who have agreed debt repayment schedules, receive the Warm Home Discount or those with a prepayment meter.<sup>174</sup>

So far this year, the SoLR process has worked as expected, with new suppliers appointed in a timely fashion. However, suppliers are incurring substantial costs through SoLR, including the cost of buying energy (which are currently very high) and the cost of honouring existing customer credit balances.

Suppliers will recover costs incurred as part of the SoLR process via an “industry levy” on all customers’ bills. The timing and level of the industry levy is hard to estimate.<sup>175</sup> The CEO of Ofgem recently told the BEIS Select Committee that the levies “appear on bills after about 15 to 19 months, or even slightly longer”.<sup>176</sup> On 1<sup>st</sup> December 2021, Ofgem announced that SoLR claims will be paid out from May 2022 onwards, as long as claims are submitted by 6<sup>th</sup> December 2021.<sup>177</sup>

Similarly, many of the suppliers that have gone bankrupt owed money to Ofgem for climate policies such as the RO and FiT. As with the cost of the SoLR process, these costs will be recovered from customers and their suppliers in future.<sup>178</sup>

The SoLR regime is primarily designed to work with the failure of smaller suppliers. For larger suppliers, the SoLR regime may not be appropriate due to the large upfront costs that would be incurred by the new supplier and the administrative burden of moving millions of customers to a new supplier in a short period of time.

Therefore, for larger suppliers, the Government can appoint a special administrator to run the supply until a buyer can be found or the customers can be transferred to a new supplier; this process is known as the “Special Administrative Regime” (SAR).<sup>179</sup>

In November 2021, Bulb Energy entered the Special Administrative Regime.<sup>180</sup> The administrator will now try to rescue or sell Bulb, or to transfer its customers to new suppliers. In the interim, the company is likely to require funding from the Treasury. This funding can be provided through a combination of grants, loans, indemnities and guarantees.<sup>181</sup> Media reports suggest that the Government has set aside £1.7bn to support Bulb through special administrative process.<sup>182</sup>

At the end of the administration process, any outstanding costs are likely to be recovered from customers through a levy on customer bills.<sup>183,184</sup>

### Given the pricing restrictions imposed by the Energy Price Cap, regulations on suppliers were too weak.

The main lesson from the supplier failures in 2021 is that too many suppliers were under-hedged and/or under-capitalised to cope with rapid increases in wholesale energy prices. Without the price cap, many more suppliers would likely have survived as they would have been able to pass through price increases to their customers sooner, limiting any losses.

Given that there is a price cap, the regulator Ofgem should have imposed more stringent requirements on energy suppliers. These should have included a combination of hedging and holding capital, collateral or other contracts to cover changes in wholesale energy prices.

In 2019, to address known weaknesses in the market, Ofgem tabled

175. Lowrey, C. Cornwall Insight (October 2021). *The gravity of the default tariff cap and the impact of the SOLR process.* [Link](#)

176. BEIS Select Committee (September 2021). Business, Energy and Industrial Strategy Committee: Oral evidence: UK Gas Market, HC 741. [Link](#). Question 47.

177. Ofgem (December 2021). *Decision letter on supplier of last resort levy claims.* [Link](#)

178. Ofgem (April 2021). *Renewables Obligation (RO) Buy-out Price, Mutualisation Threshold and Mutualisation Ceilings for 2021-22.* [Link](#).

179. Kleinman, M. Sky News (September 2021). *Energy regulator Ofgem puts advisers on stand-by for emergency rescue role.* [Link](#).

180. BBC News (November 2021). *Energy firm Bulb set to go into administration.* [Link](#)

181. Ofgem (February 2017). *Memorandum of Understanding: Energy Supply Company Administration.* [Link](#). See Page 4, Para 14.

182. Sky News (November 2021). *Taxpayers left with £1.7bn bill as Bulb, UK's seventh-biggest energy firm, collapses.* [Link](#)

183. See: DECC (January 2013). *Impact Assessment: Energy supply company administration rules.* [Link](#). Page 3, Paragraph 3.

184. See: Ofgem (April 2021). *Electricity Transmission Standard Licence Conditions 08/04/2021.* [Link](#). Page 305. Condition C24. The levy would be implemented through higher network charges.

new proposals for regulating existing energy suppliers to “strengthen our regulatory regime, drive up standards among energy suppliers and minimise industry and consumer exposure to financial risks and poor customer service”.<sup>185</sup>

The new requirements took effect in the first quarter of 2021. Given the widespread failures of energy suppliers this year, these requirements clearly need to be reviewed further. As well as considering new requirements, this review should consider whether the existing requirements were enforced sufficiently.

In a speech in October 2021, Ofgem CEO Jonathan Brearley acknowledged that, “as a result of the last few months, we will need to regulate the energy market differently”. This could include, he said, “an approach to regulation which is more focussed on the business models that enter and operate in our energy market, and on the risk they carry”.<sup>186</sup>

Later that month, Ofgem published an Open Letter to suppliers setting out plans to consult on changes to the price cap methodology, as well as identifying areas for potential reform, including “moving to a more prudential regulatory regime”.<sup>187</sup>

Also in October 2021, the CEO of Centrica, Great Britain’s largest energy supplier, wrote that “energy companies need to be regulated like banks to prevent another crash”.<sup>188</sup> The challenge for the Government and Ofgem is to impose more stringent regulations without damaging the innovation and competition that new entrants and smaller players bring to the market.

In November 2021, Ofgem published five consultations on the Energy Price Cap,<sup>189</sup> including consultations on the impact of wholesale price volatility and on updating the price cap more regularly in “exceptional circumstances”.<sup>190,191</sup>

Market failures during 2021 suggest that the balance had shifted too far towards promoting new entrants and smaller suppliers, which has led to billions of pounds of losses by failed suppliers that will now be recovered from all customers’ energy bills.

185. Ofgem (November 2020). *Decision on the Supplier Licensing Review: Ongoing requirements and exit arrangements*. [Link](#)

186. Ofgem (October 2021). *Jonathan Brearley speech at Energy UK Annual Conference 2021*. [Link](#)

187. Ofgem (October 2021). *Open Letter: Rising wholesale energy prices and implications for the regulatory framework*. [Link](#)

188. O’Shea, C. Times Red Box (October 2021). *Chris O’Shea: Energy companies need to be regulated like banks to prevent another crash*. [Link](#)

189. Ofgem (November 2021). *Ofgem consults on adjustments to the energy price cap*. [Link](#)

190. Ofgem (November 2021). *Price Cap – Consultation on the potential impact of increased wholesale volatility on the default tariff cap*. [Link](#)

191. Ofgem (November 2021). *Price Cap – Consultation on the process for updating the Default Tariff Cap methodology and setting maximum charges*. [Link](#)



## 3. Energy retail in the future energy system

Over the last decade, the UK's electricity system has rapidly transitioned to lower-carbon sources. In future, the UK's entire energy system will need to decarbonise by transitioning away from oil and gas and towards clean sources of electricity and hydrogen. This transition will change the role of energy retailers and customers, with much more focus on shifting electricity demand to periods of abundant generation from variable low-carbon electricity sources such as wind and solar.

### The future energy system

To achieve Net Zero, the Climate Change Committee forecasts that UK electricity demand will more than double by 2050 (Figure 12). By using more electricity, the UK will significantly reduce its consumption of natural gas and oil (76% and 85% reductions by 2050 respectively).

By 2050, the generating capacity of solar PV and offshore wind could increase by six and ten times respectively, driven by Government policies like the UK Emissions Trading Scheme (UK ETS) and the Contracts for Difference (CfD) auctions.<sup>192</sup>

On the demand side, by 2050 there could be heat pumps installed in around 20 million homes around 30 million electric vehicles (EVs) on the UK's roads.<sup>193</sup> The Government has already committed to phase out the sale of new petrol- and diesel-only cars and vans by 2030 (and 2035 for all hybrids),<sup>194</sup> and has announced further policies to support low-carbon heating systems in its recent *Heat and Buildings Strategy*.<sup>195</sup>

Net Zero will therefore require electricity to be the backbone of the future energy system, with generation dominated by variable wind and solar, and increased demand due to more EVs and electric heating systems such as heat pumps.

This energy system will require much more flexibility from the demand side, both to balance variable output from wind and solar and to ensure that local electricity networks are not overwhelmed by new sources of demand.

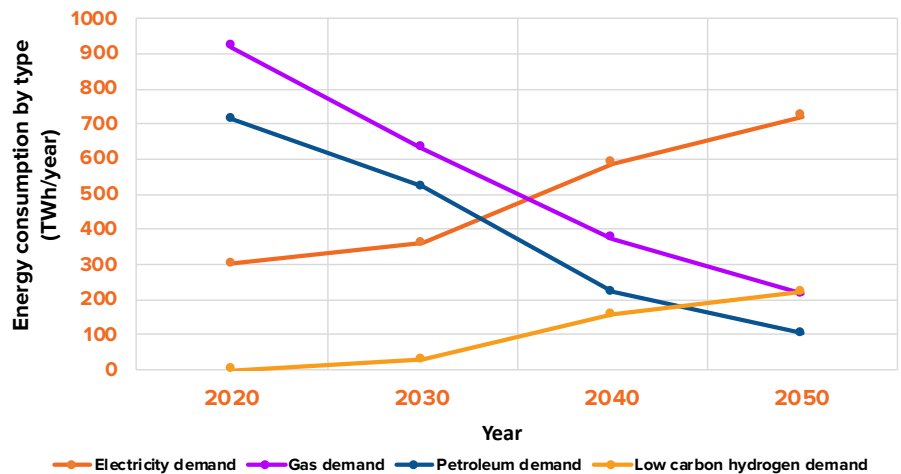
192. National Grid ESO (July 2021). *Future Energy Scenarios 2021: Downloadable FES resources*. [Link](#). See the three of the four FES scenarios that achieve Net Zero emissions by 2050. See Table SV.22

193. National Grid ESO (July 2021). *Future Energy Scenarios 2021: Downloadable FES resources*. [Link](#). See the three of the four FES scenarios that achieve Net Zero emissions by 2050. See Tables CV.14 (heat pumps) and CV.35 (EVs).

194. DfT (July 2021). *CO2 emissions regulatory framework for all newly sold road vehicles in the UK*. [Link](#). Note the 2030 phase-out date will not apply to some hybrid vehicles, which will be able to be sold until 2035.

195. BEIS (October 2021). *Heat and Buildings Strategy*. [Link](#)

Figure 12: Projection for the future UK energy system (2020-2050).



Source: CCC (Balanced Net Zero pathway).<sup>196</sup>

### Risks from an inflexible energy system

The rapidly falling cost of wind and solar means that these technologies have the potential to reduce the cost of electricity. However, an electricity system dominated by wind and solar presents new challenges, specifically intermittency, seasonality and the geographical concentration of resources; for example, the best wind resources are mainly in the north of Great Britain and the best solar resources are mainly in the south.

Today, domestic electricity demand is relatively inflexible, which means that there are relatively few customers increasing their demand to soak up excess wind and solar generation or conversely reducing demand at times of low supply. This is mainly because there are few incentives for customers to flex their demand for electricity.

If the demand side does not become more flexible, then the Electricity System Operator will increasingly need to pay wind and solar farms to turn off during periods of high production, which would increase energy bills.<sup>197</sup>

Market conditions during the coronavirus lockdown in spring and summer 2020 showed warning signs that Great Britain’s electricity market is not prepared for a future with more wind and solar. During lockdown, the market share of wind and solar rose due to lower electricity demand; this caused “system balancing costs” to rise significantly, as the ESO had to intervene in the electricity market to keep the system stable.<sup>198,199</sup>

In many ways, the conditions during lockdown were a preview of the future electricity system. For more discussion of this topic, see Policy Exchange’s 2020 report, *Powering Net Zero*.<sup>200</sup>

196. CCC (December 2020). *The Sixth Carbon Budget. 4. Supporting information, charts and data.* [Link](#)

197. There are, of course, other types of flexibility that are likely to be available in future. For example, hydrogen electrolyzers can run predominantly at times of high output from wind and solar farms.

198. Ofgem (August 2020). *Open letter on our review of high balancing costs during spring and summer 2020.* [Link](#)

199. Policy Exchange (June 2020). *Electricity markets under pressure.* [Link](#)

200. Policy Exchange (December 2020). *Powering Net Zero.* [Link](#). See pages 24-26: The impact of COVID-19 of the GB electricity market.

#### Domestic customers can make a significant contribution to flexibility.

BEIS' recent *Smart Systems and Flexibility Plan 2021* estimates that "flexibility" could reduce electricity bills by up to £10bn per year by 2050 compared to an inflexible electricity system;<sup>201</sup> this could reduce retail electricity bills by around 5%.<sup>202</sup> For context, £10bn per year is approximately equal to all current subsidies for renewable energy projects.<sup>203</sup>

BEIS' analysis includes flexibility provided by short-term energy storage (typically lithium-ion batteries), EV charging, heat pumps, industrial demand-side response, and electricity interconnectors.<sup>204</sup> Note that this analysis does not include the potential benefits of dynamically managing the distribution network, which will require access to real-time network monitoring and more participation from households.<sup>205</sup>

Households are expected to make a significant contribution to demand flexibility through smart EV chargers and smart heat pumps, as well as through electrical and thermal energy storage. BEIS expects smart EV charging to reduce peak electricity demand by around 10 gigawatts (GW), compared to a scenario where EV drivers start charging as soon as they get home. Heat pumps are expected to make a smaller but still significant contribution to flexibility.<sup>206</sup> If customers do not provide this flexibility, then more generation, networks and energy storage will need to be built, increasing energy bills.

#### The evolving role of energy suppliers

The primary role of suppliers is to deliver affordable energy to customers, whilst delivering high levels of customer service. Today, suppliers can achieve this in two main ways:

- 1. Reducing their cost to serve each customer:** For example, by developing more efficient software platforms and by encouraging customers to move to more efficient payment methods such as Direct Debit.
- 2. Efficient hedging of future energy costs:** Suppliers buy a certain proportion of their customers' electricity and gas demand ahead of time, known as "hedging". Suppliers that hedge effectively may be able to offer lower prices to their customers. Hedging (and fixed-priced contracts) also help to reduce the risk of price shocks for customers.

Suppliers also have a major coordinating role. Suppliers interact with their customers, the regulator Ofgem, the Government, network companies, generators and other industry bodies.

Despite the cost of electricity varying significantly from half hour to half hour,<sup>207</sup> there is currently limited potential for customers to save money by using electricity at different times of day. As described earlier in this report, there are 2.7 million customers who currently have an Economy 7 tariff/meter, an early form of time-of-use-tariff. A smaller number of

201. BEIS and Ofgem (July 2021). *Transitioning to a net zero energy system: smart systems and flexibility plan 2021. Appendix I: Electricity system flexibility modelling.* [Link](#). Page 5.

202. Assumes annual electricity demand of 730 TWh/year in 2050 (Source: CCC, *Policies for the 6<sup>th</sup> Carbon Budget*, p.119. [Link](#)). Cost savings per MWh of £6bn-£10bn / 610 TWh = £8.20 - £13.70/MWh = 0.82-1.37p/kWh. Saving of 4%-7% vs. average current retail electricity price of around 20p/kWh, Before the current price spikes.

203. HM Treasury (November 2017). *Control for Low Carbon Levies.* [Link](#)

204. BEIS and Ofgem (July 2021). *Transitioning to a net zero energy system: smart systems and flexibility plan 2021. Appendix I: Electricity system flexibility modelling.* [Link](#). Pages 12-15.

205. BEIS and Ofgem (July 2021). *Transitioning to a net zero energy system: smart systems and flexibility plan 2021. Appendix I: Electricity system flexibility modelling.* [Link](#). Pages 10, including footnote 19.

206. BEIS and Ofgem (July 2021). *Transitioning to a net zero energy system: smart systems and flexibility plan 2021. Appendix I: Electricity system flexibility modelling.* [Link](#). Pages 16.

207. Electricity is traded in 30-minute Settlement Periods.

customers have actively opted for a time-of-use-tariff, which is enabled by elective half-hourly settlement.

In future, wholesale electricity prices are expected to become more volatile as more wind and solar are built, which will increase the system benefits of flexibility.<sup>208</sup> In addition, customers and suppliers will be able to capture this value thanks to the Smart Meter programme and Ofgem's recent decision to implement market-wide half-hourly settlement (MHHS) by the end of 2025.<sup>209</sup>

### “Green tariffs” are under the microscope

In response to rising public awareness and concern about climate change, many energy suppliers now offer “green” energy tariffs; these green tariffs typically apply to electricity, although some suppliers also offer “green gas”.<sup>210</sup>

When a supplier offers a green electricity tariff, they are typically buying certificates from renewable energy generators like wind and solar farms on behalf of their customers; these certificates are known as Renewable Energy Guarantees of Origin (REGOs). Renewable energy generators earn one REGO for each megawatt hour (MWh) of electricity that they generate.<sup>211</sup>

Generators can sell REGOs to suppliers alongside the energy sold through a Power Purchase Agreement (PPA). Alternatively, generators can sell the REGOs separately to the electricity produced. In both cases, suppliers can use the REGOs to evidence their “100% renewable” electricity supply.

The REGO scheme is governed by the *Electricity (Fuel Mix Disclosure) Regulations 2005*,<sup>212</sup> which were implemented as part of the EU's Second Energy Package.<sup>213</sup> These regulations are implemented through the Supply Licence (Standard Licence Condition 21).<sup>214</sup>

There is no equivalent scheme for gas, and suppliers typically evidence 100% “green gas” through carbon offsetting, for example by supporting tree planting, or by buying biogas.

There are increasing questions surrounding the use of REGOs to demonstrate 100% renewable energy supply. Some critics argue that green tariffs are “greenwashing” and do not lead to additional renewable energy generation.

According to the consultancy *Cornwall Insight*, as of July 2021 the price of REGOs was £1.35 per MWh, just a few percent of the current wholesale electricity price.<sup>215</sup> This suggests that REGOs do not currently provide significant support to new renewable energy projects.

Regardless of whether energy customers sign up to a green energy tariff, they are already making a significant contribution to Net Zero through climate policies that are paid for through a levy on electricity bills. This levy is used to subsidise renewable energy projects through the FiT, RO and CfD schemes. Customers currently pay approximately **£10bn per year** in climate policies, adding **£128 per year** on the average household energy bill.<sup>216</sup> In addition, customers are already paying a carbon price through the cost of the UK Emissions Trading Scheme (UK ETS), which is

208. US Office of Energy Efficiency and Renewable Energy. Via Energy.GOV. (May 2018) *Analysis: Impacts of High Variable Renewable Energy Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making*. [Link](#)

209. Ofgem (April 2021). *Electricity Retail Market-wide Half-hourly Settlement: Decision and Full Business Case*. [Link](#)

210. The term “green gas” can include both biogas (methane produced from biological sources and carbon offsetting (e.g. tree planting)).

211. Ofgem (undated). *Guarantees of Origin (GoOs)*. [Link](#). In the UK, “GoOs” are known as “REGOs”.

212. DECC (Published February 2013). *The Electricity (Fuel Mix Disclosure) Regulations 2005*. [Link](#). Page 4 (Explanatory Note): “These Regulations amend the standard conditions in electricity supply licences in Great Britain in order to give effect to Article 3.6 of Directive 2003/54/EC concerning common rules for the internal market in electricity...”

213. Florence School of Regulation (June 2020). *The Clean Energy for all Europeans Package*. [Link](#). “The Second Energy Package was adopted in 2003 and contained two Directives and one Regulation; the second electricity Directive 2003/54/EC, the second gas Directive 2003/55/EC, and Regulation (EC) No 1228/2003...”

214. Ofgem (undated). *What is Fuel Mix Disclosure (FMD)?* [Link](#).

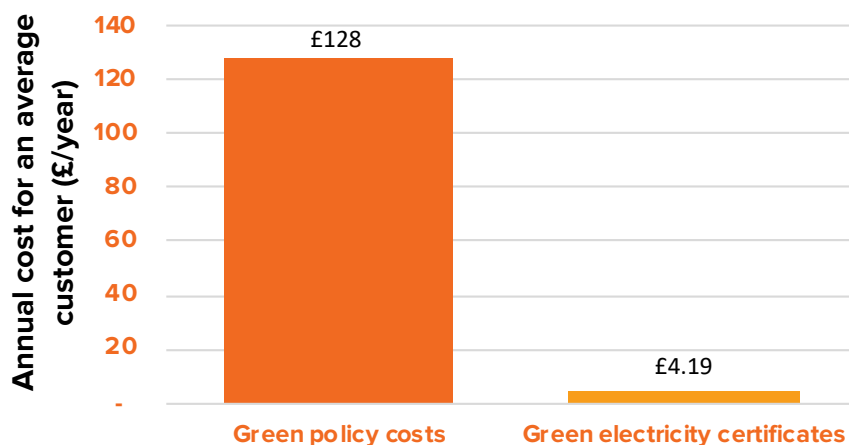
215. *Cornwall Insight* (September 2021). Green certificate prices continue to rise amid BEIS proposals. [Link](#). Latest survey found prices of £1.35/MWh.

216. Based on HMT (November 2017). *Control for Low Carbon Levies*. [Link](#). Forecasts low carbon levies of up to £8.7bn per year (2011-12 prices) – equivalent to approximately £10.5bn per year in 2020 prices (based on Bank of England Inflation Calculator).

included in electricity bills.

Today, the cost of buying green certificates for a customer is approximately £4 per year, or 30 times less than customers currently pay towards renewable energy subsidies through existing levies on their electricity bills.<sup>217</sup>

**Figure 13: Annual cost of green electricity certificates vs. green policy costs (£/year). For a typical dual-fuel energy bill.**



Source: Policy Exchange analysis of the Energy Price Cap (Ofgem) and latest REGO prices (Cornwall Insight),<sup>218</sup>

#### Government policy is the biggest driver of decarbonisation in the electricity sector.

The UK Government incentivises low-carbon generators through the Contracts for Difference (CfD) scheme and carbon pricing (the UK ETS and the Carbon Price Support tax).

Some defenders of the REGO scheme argue that, once sufficient customers sign up to green tariffs, the price of REGOs will rise to the point that they incentivise the construction of new renewable energy projects. This is correct, although the supply of renewable energy in the UK is expanding so quickly that this threshold may never be achieved.

Earlier this year, two suppliers called on the Government to tighten rules on the marketing of green energy tariffs. Scottish Power and Good Energy argued that suppliers should only be able to market tariffs as green if they are backed by Power Purchase Agreements (PPAs) with renewable energy generators.<sup>219</sup>

PPAs provide a more direct link between suppliers and renewable energy generators; however, it is also unclear whether PPA-backed green tariffs would directly contribute to supporting new renewable energy generators. For example, suppliers could sign PPAs exclusively with existing generators rather than new ones.

217. Author's calculations using Ofgem (February 2021). Default tariff cap level: 1 April 2021 to 30 September 2021. [Link](#). See spreadsheet: Model - Default tariff cap level v1.8.xlsx. See tab: "3d PC", Section 2. Environmental Costs = RO, CfD, FIT.

218. Energy Price Cap (Ofgem). [Link](#). REGO prices (Cornwall Insight). [Link](#).

219. Good Energy (May 2021). *Come Clean on Green: Scottish Power and Green Energy call time on energy greenwashing*. [Link](#)

Alternatively, suppliers could sign short-term PPAs or PPAs that are indexed to the wholesale electricity price rather than a long-term fixed-price PPA; neither of these would significantly help investors to finance new projects. Therefore, there is a risk that any move to PPA-backed green tariffs could replace so-called “REGO greenwashing” with “PPA greenwashing”, rather than driving significant new investment in renewable energy projects.

In August 2021, shortly after the publication of the Retail Energy Strategy, the Government published a Call for Evidence on *A Framework for Transparency of Carbon Content in Energy Products*, focused on the current system of REGOs and potential improvements or replacements.<sup>220</sup>

Environmental claims made by suppliers are currently regulated by Ofgem through “Standard Licence Condition 21D” of the Supply Licence.<sup>221</sup> Claims may also be subject to regulation by the Competition and Markets Authority,<sup>222</sup> the Advertising Standards Authority,<sup>223</sup> and potentially others.

The Government has a number of options to reform green tariffs, including requiring green tariffs to be backed by PPAs or requiring “24/7 energy matching”.<sup>224</sup> Alternatively, the Government could consider deemphasising the role of green tariffs in favour of other ways that customers and suppliers can contribute to decarbonisation, as explained below.

Suppliers will increasingly contribute to decarbonisation by helping customers to shift demand rather than through green tariffs.

Regardless of how the Government chooses to resolve the current arguments about green tariffs, suppliers’ contribution to Net Zero will increasingly depend on how effectively they help customers to move their demand to periods of higher renewable energy generation. This could involve encouraging customers to charge their EVs at times of high wind and solar production, or conversely encouraging customers to reduce their demand for electric heating or air conditioning at times of peak demand.

Data from National Grid ESO shows that Great Britain’s electricity is substantially cleaner at certain times of day.<sup>225</sup> During 2020, the average carbon intensity during the early hours of the morning (midnight – 4am) was 26% lower than the average carbon intensity during the peak hours (6pm-8pm) (Figure 14). The regional carbon intensity figures are significantly more volatile, particularly in areas such as Scotland that host many wind farms.

220. BEIS (August 2021). *Designing a framework for transparency of carbon content in energy products: call for evidence*. [Link](#)

221. Ofgem (December 2014). *Decision to modify the Standard Licence Conditions (SLCs) of the electricity supply licence by inserting a new condition, SLC 21D*. [Link](#)

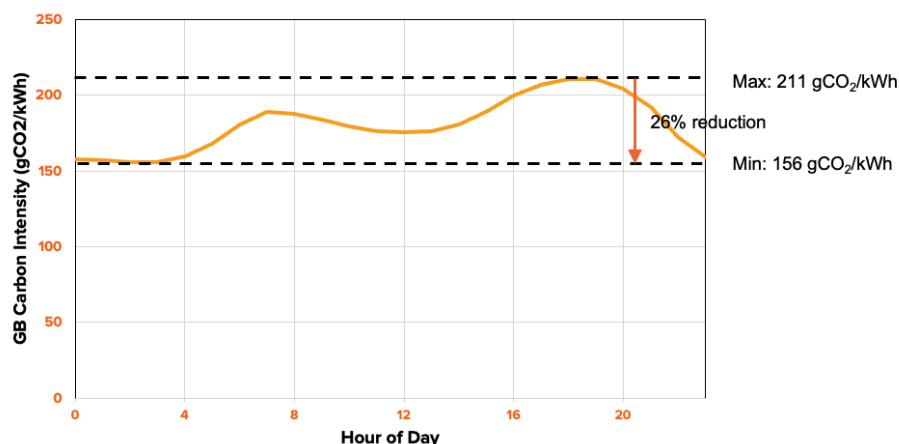
222. CMA (May 2021). “Green” claims: CMA sets out the dos and don’ts for businesses. [Link](#)

223. Advertising Standards Authority (December 2015). *Green claims in advertising*. [Link](#)

224. With 24/7 energy matching, a supplier would need to demonstrate that their customers’ demand is met with renewables in all hours of the year. For example, Google has a target for “24/7 carbon-free energy” for its data centres by 2030. [Link](#)

225. Carbonintensity.org.uk (Undated). *Carbon intensity API*. [Link](#). Developed by National Grid ESO and partners.

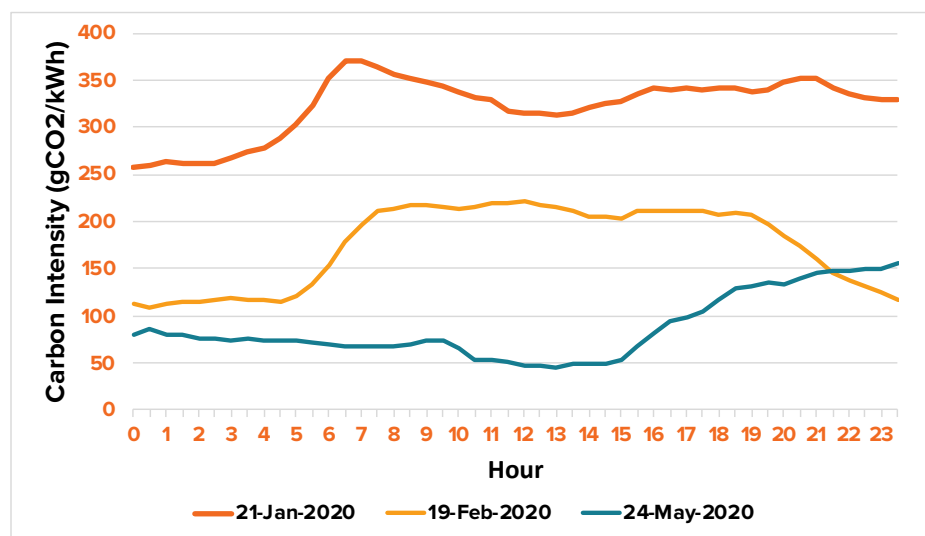
Figure 14: Average annual carbon intensity of GB electricity in 2020 (gCO<sub>2</sub>/kWh).



Source: National Grid ESO.<sup>226</sup>

Carbon intensity also varies significantly from day to day. For example, on 21<sup>st</sup> January 2020, the average carbon intensity of the GB electricity grid was 323 gCO<sub>2</sub>/kWh; whereas on 24<sup>th</sup> May 2020, the average carbon intensity was just 87 gCO<sub>2</sub>/kWh (Figure 15).

Figure 15: Carbon intensity of GB electricity for selected days in 2020 (gCO<sub>2</sub>/kWh).



Source: National Grid ESO.<sup>227</sup>

This analysis suggests that customers could make substantial carbon savings by shifting demand to different times of day or even from one day to the next. There is a major role for Government to ensure that prices are aligned with decarbonisation, so that electricity prices are cheapest at times when the grid is cleanest. The Government and Ofgem could also consider measures to improve the tracking of carbon in the electricity system, as recently highlighted by the Energy System Catapult.<sup>228</sup>

226. Ibid (author's calculations using data from National Grid ESO)

227. Ibid (author's calculations using data from National Grid ESO)

228. Energy Systems Catapult (December 2021). *Accurately tracking carbon in electricity markets.* [Link](#)

## 4. The future of energy retail: Enablers and barriers

Energy retailers have a major role to play in delivering an affordable, secure and Net Zero energy system, in particular through encouraging customers to shift their electricity demand. However, to fully harness the potential customers to contribute to Net Zero, the market will need to change.

Retailers will need to offer innovative products to customers who can shift their electricity demand. Retailers will also need to work with Ofgem and the Government on how to manage the real and perceived risks of hardship for low-income customers, which could be exacerbated in a world of more complex tariffs.

One way to encourage customers to shift their electricity demand is by providing them with information. For example, National Grid ESOs “Carbon Intensity App” allows customers to see the real-time emission intensity of the electricity grid.<sup>229</sup> In theory, customers could increase their electricity demand during periods when the grid is cleanest, for example by doing their washing or charging their electric vehicle. The major downside of this approach is that it relies on the altruism of customers, which is likely to limit the number of customers prepared to make sustained behaviour changes.

Alternatively, energy retailers could reward customers for shifting demand by offering them lower prices; wholesale electricity prices are typically lower during periods of high wind and solar generation (when there is more supply) or during off-peak periods (when there is less demand). This approach is known as “smart pricing”, implemented through “smart electricity tariffs”.

Retailers will need to design their smart tariffs and products to be to meet the needs and wants of their customers, or else take up is likely to be low.

### Enablers of the future of energy retail

#### Enabler #1: Smart pricing.

Smart pricing describes a range of electricity tariffs that charge customers a different price depending on when they consume electricity. Smart tariffs can be classified as “static time-of-use”, “dynamic time-of-use”, “managed” or “type-of-use” (Table 8). A number of energy suppliers already offer smart tariffs, all of which are enabled by Smart Meters.<sup>230</sup>

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229. National Grid ESO (April 2020). *Introducing our Carbon Intensity app*. [Link](#)

230. The exception is Economy 7 tariffs, which rely on legacy Economy 7 electricity meters.



Table 8: Types of smart electricity tariffs.

Tariff type	Description	Examples
Static time-of-use	Electricity price varies by time of day. The price is set ahead of time, hence the description “static”. Example tariff: <ul style="list-style-type: none"> <li>• Peak (19 hours per day): 20 p/kWh</li> <li>• Off-peak (5 hours per day): 5 p/kWh</li> </ul>	British Gas: <i>Electric Drivers</i> Bulb: <i>Smart tariff trial</i> EDF: <i>GoElectric</i> E.ON: <i>Charge EV</i> Good Energy: <i>Green Driver</i> Greener Energy UK: <i>TIDE</i> Octopus Energy: <i>Go Economy 7</i> . <sup>231</sup>
Dynamic time-of-use	Electricity price varies by time of day. The price varies depending on the underlying wholesale price of electricity, which is affected by weather patterns, commodity prices, plant availability and more. Example tariff (Octopus Agile): <ul style="list-style-type: none"> <li>• Each evening, prices are published for the next 24 hours, based on wholesale electricity prices.</li> <li>• 48 x 30-minute pricing periods each day.</li> </ul>	Octopus Energy: <i>Agile</i> . <sup>232</sup>
Managed	Suppliers offer customers a lower price for their electricity, in return for having some control over when customers use their devices. Example tariff (Octopus Energy: Tesla Energy Plan): <ul style="list-style-type: none"> <li>• Available to customers with solar panels and a Tesla Powerwall home battery.</li> <li>• Tesla and Octopus Energy control the charge / discharge of the battery to minimise charging costs and to maximise the value of solar production.</li> <li>• In return, customers are offered a significantly cheaper electricity tariff (10-12p/kWh depending on location).</li> </ul>	Octopus Energy: <i>Tesla Energy Plan</i> . <sup>233</sup>  OVO Energy: <i>Drive Anytime</i> . <sup>234</sup>
Type-of-use	Price depends on the “type” of device using the electricity. For example, a lower rate for electricity used to charge an electric vehicle. Example tariff (OVO Energy: Drive Anytime): <ul style="list-style-type: none"> <li>• Customers pay a lower fixed rate for electricity consumed by their electric vehicle (5 p/kWh).</li> <li>• Only applies to energy consumed when the vehicle is in smart charging mode (hence this is also a “managed tariff”).</li> <li>• Requires a compatible electric vehicle chargepoint for control and metering purposes.</li> </ul>	OVO Energy: <i>Drive Anytime</i> . <sup>235</sup>

231. Offered by all suppliers to those with Economy 7 electricity meters.

232. Octopus Energy (undated). *Introducing Agile Octopus*. [Link](#)

233. Octopus Energy (undated). *Tesla Energy Plan: Frequently Asked Questions*. [Link](#)

234. OVO Energy (undated). *OVO Drive + Anytime*. [Link](#)

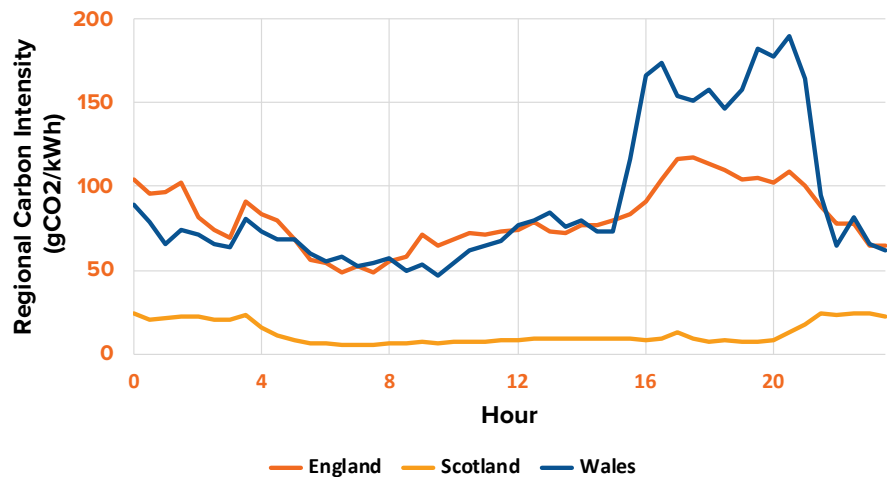
235. Ibid.

**Smart pricing could incorporate local electricity pricing.**

Under local electricity pricing, wholesale electricity prices would vary in different parts of Great Britain. Wholesale prices would more closely reflect local supply and demand for electricity. For example, prices would be lower in Scotland during periods when there is high generation from Scottish wind farms; currently, wind farms are paid to turn off during periods of high generation that cannot be exported to England without overloading the electricity network.

Data from 31<sup>st</sup> October 2021 shows a large variation in regional carbon intensity (Figure 16). On this day, there were high winds across Great Britain. The carbon intensity of electricity produced in Scotland was very low, whereas the carbon intensity of electricity produced in Wales was significantly higher, particularly in the evening. Under local pricing, prices would have been significantly lower in Scotland on this day; suppliers and customers could take advantage of these lower prices if the customer had a smart tariff with local pricing.

**Figure 16: Regional carbon intensity of GB electricity on 31<sup>st</sup> October 2021 (gCO<sub>2</sub>/kWh).**



Source: National Grid ESO.<sup>236</sup>

Local pricing exists in many international electricity markets, including many markets in the United States, New Zealand and Singapore. In most of these markets, local pricing applies only to generators, whereas customers pay a national or a regional price; policymakers are often reluctant to extend local pricing to customers for fear that customers would see any regional variations as unfair. These different pricing systems are explained in detail in Policy Exchange’s 2020 report, *Powering Net Zero*, which also considered the role of locational network charges.<sup>237</sup>

In Great Britain, smart tariffs and local pricing for domestic customers have been trialled through various pilot schemes, including:

236. Carbonintensity.org.uk (Undated). *Carbon intensity API*. [Link](#). Developed by National Grid ESO and partners. Author’s calculations.

237. Policy Exchange (December 2020). *Powering Net Zero*. [Link](#)

- **Project Shift:** a collaboration between UK Power Networks and three energy retailers.<sup>238</sup> This project trialled three different types of smart tariffs that would encourage customers to charge their electric vehicles during off-peak periods; some customers used “smart charging” managed by the energy retailer. Initial results show that all three smart tariffs showed a significant change in when electric vehicles were charged, suggesting that smart tariffs are an effective way to reduce electricity demand in times and places where the network could be overloaded.<sup>239</sup>
- **Cornwall Local Energy Market:** a three-year project run by Centrica to test how local electricity trading could reduce costs and carbon emissions.<sup>240</sup> As part of the Local Energy Market, small generators and customers could sell the ability to increase/decrease their generation/demand to help manage constraints on the local network (known as “flexibility”). Participants included battery storage, solar farms, wind farms, and a business that makes ice for local fishing vessels; the operator of the ice plant was able to make substantial savings by concentrating operations during periods of high local generation.<sup>241</sup>

Both Project Shift and the Cornwall Local Energy Market are examples of “flexibility markets”, which operate across all regions of Great Britain’s distribution networks (Box 4).

### Box 4: What are “flexibility markets”?

All Distribution Network Operators (DNOs) operate flexibility markets. In a flexibility market, small generators, storage providers and households are paid to increase/decrease their electricity generation/demand in response to local constraints on the network. DNOs procure services from flexibility providers through competitive tenders.<sup>242</sup>

Flexibility providers are awarded contracts that comprise an availability payment (measured in £/MW/year) and a utilisation payment (measured in £/MWh). Providers can be offered multi-year contracts up to five years’ long.<sup>243</sup>

Flexibility markets are effectively a form of local electricity pricing. However, one downside of flexibility markets is that they operate largely independently to the main wholesale electricity market (which has a national price). Because the markets are not co-optimised, they risk introducing inefficiency that could raise overall electricity bills. Local electricity pricing overcomes this problem by allowing wholesale electricity prices to vary locally within a national optimised market.

However, local electricity pricing is a major reform that would take several years to implement. Flexibility markets are therefore a good solution in the short term, as they allow small-scale generators and households to contribute to reducing network congestion and reducing bills.

Even if local electricity pricing was implemented, there would still be a residual role for flexibility markets to resolve hyper-local constraints that cannot be represented in a nodal wholesale electricity market.<sup>244</sup>

238. UK Power Networks (UKPN) (undated). *Shift*. [Link](#)

239. UK Power Networks (UKPN) (February 2021). *Project Shift: Progress report, January 2021*. [Link](#)

240. Centrica (undated). *Cornwall Local Energy Market*. [Link](#)

241. Centrica (undated). *The Future of Flexibility: How local energy markets can support the UK’s net zero energy challenge*. [Link](#). Page 11.

242. Energy Networks Association (November 2021). *Flexibility Services*. [Link](#)

243. Scottish and Southern Electricity Networks (undated). *Flexibility service calls*. [Link](#). See “SSEN SLC 31E – Flexibility Services Procurement Statement”. Pages 7 and 8. Providers are offered either a one-year rolling agreement, or a four-year agreement with an optional one-year extension.

244. Nodal wholesale electricity markets cannot represent all hyper-local network constraints for the following reasons, amongst others: (1) Computational complexity of having 10,000s of nodes would take too long to solve. (2) market power in hyper-local markets with very few participants. Note that market power can be addressed in a number of ways, including applying bidding controls to market participants that are identified to have excessive market power – however, it may be difficult to identify market power at a hyper-local level, so other approaches may be needed.

To further test the potential for smart pricing, the Government has launched the “Alternative Energy Markets Programme”.<sup>245</sup> Through the AEM programme, the Government plans to trial alternative ways of recovering network charges and policy costs. Few details have been released, but the AEM programme is likely to include smart electricity tariffs.

One downside of the AEM programme is that trials are not expected to be completed until 2025, so any resulting changes will take several years to implement. Existing models of local pricing are likely to be quicker to implement, for example those used in parts of the United States. In addition, the AEM programme has a relatively restricted scope that does not include evaluation of local electricity pricing.<sup>246</sup>

### Enabler #2: Smart devices.

Smart pricing is necessary but not necessarily sufficient to encourage customers to shift their electricity demand to off-peak periods. To take advantage of smart pricing, customers could choose to run their appliances at certain times of day or during windier periods (e.g. dishwashers or washing machines). However, manual scheduling is only likely to appeal to a small proportion of the population.

To increase the take up of smart devices, energy retailers and appliance manufacturers are increasingly selling devices that can be controlled remotely. For example, many home EV chargepoints can already be scheduled to operate during the low-price period offered by a static time-of-use tariffs. Some chargepoints can also be optimised to operate during low-price periods offered by dynamic tariffs (which can occur at any time of day) or can be controlled by an energy retailer as part of a managed tariff.

Smart tariffs will be particularly important for new low-carbon technologies (LCTs) such as home EV chargepoints and electric heating systems such as heat pumps and thermal storage. These LCTs are expected to significantly increase the electricity demand of households that install them.

The main challenge with smart devices is to ensure that they are fairly accessible to customers across all income levels, all types of tenure (rental, leasehold, freehold) and to all use cases (homes & businesses). For smart devices to work properly, customers will also need access to other infrastructure, in particular reliable broadband and Smart Meters.

To promote smart charging for electric vehicles, the Government has announced plans to regulate chargepoints, so all new chargepoints have smart charging capabilities.<sup>247</sup> Under the Government’s plans, the smart charging requirements will come into effect during 2022.

### Barriers to the future of energy retail

The future of energy retail will require substantial changes to the current market. This creates new opportunities but also new risks. These new risks include the regulatory framework breaking down and new risks for vulnerable energy customers.

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245. BEIS (June 2021). *Alternative Energy Markets (AEM) Programme*. [Link](#)

246. See scope at: BEIS (June 2021). *Alternative Energy Markets (AEM) Programme*. [Link](#).

247. DfT and Office for Low Emission Vehicles (July 2021). *Electric vehicle smart charging: government response*. [Link](#)

### Barrier #1: Risk of regulatory framework breaking down.

Market conditions during 2021 have exposed weaknesses in the regulatory framework for energy retailers, specifically the weakness of the financial viability tests for energy suppliers.

One area where the future energy retail market could expose new weaknesses is the rise of “third-party intermediaries” (TPIs). TPIs perform functions that were either previously undertaken by energy suppliers or new services that were not conceived of when the Supply Licence regime was introduced.

TPIs include auto-switching services, price comparison websites, energy aggregators and smart home providers.<sup>248</sup> Unlike energy suppliers, TPIs are not bound by Ofgem’s Supply Licence and associated industry codes. This means that TPIs often face less regulation than licensed energy suppliers, even if they are undertaking the same activities.

For example, the Supply Licence requires suppliers to help customers “to easily compare and select appropriate Tariffs within its offering, taking into account that Domestic Customer’s characteristics and/or preferences”.<sup>249</sup> These conditions do not apply to TPIs such as price comparison websites, although Ofgem does maintain a list of “Ofgem-accredited price comparison websites”.<sup>250</sup>

As part of the Retail Energy Strategy, the Government has issued a Call for Evidence on the role of TPIs in the energy sector.<sup>251</sup> The Call for Evidence makes several references to “load controllers”, also known as aggregators. These organisations control the operation of a large number of devices. For example, an aggregator could control the smart charging of a large number of electric vehicles that are charging at homes or workplaces.

EV charging is expected to have a major impact on the local and national electricity network. The Government will want to ensure that aggregation of loads is properly regulated, whether these services are provided by licensed energy suppliers or specialist aggregators.

Policymakers must also ensure adequate protection for customers where energy retailers are offering bundled products that may include energy and the installation and/or financing of low-carbon technologies such as EV chargepoints or heat pumps. These new “Energy-as-a-Service” (EaaS) offerings could offer substantial savings; EaaS offerings were explored in the *Recosting Energy* project, led by Laura Sandys CBE.<sup>252</sup>

### Barrier #2: Maintaining customer protection in a world of smart tariffs.

As described above, the future of energy retail is likely to be dominated by smart tariffs, including static and dynamic time-of-use tariffs, managed tariffs and type-of-use tariffs. The common feature with these smart tariffs is that they more directly expose customers to the underlying cost of their electricity usage. For example, under a time-of-use tariff, a customer who charged an electric vehicle during the evening peak period (4-7pm) would pay significantly more than a customer who charged overnight.

Smart tariffs therefore have the potential to reduce electricity bills, but

248. These terms are defined in the Glossary.

249. Ofgem (accessed 12<sup>th</sup> September 2021). *Electricity Supply Standard Licence Conditions Consolidated*. [Link](#). Condition 25.3. Page 194.

250. Ofgem (undated). *Switching energy tariff or supplier*. [Link](#)

251. BEIS (August 2021). *Third-party intermediaries in the retail energy market: call for evidence*. [Link](#)

252. Sandys, L. and Pownall, T. *Recosting Energy* (January 2021). *Recosting Energy: Powering for the Future*. [Link](#), [Link](#)

only if they are used correctly. There is a risk that customers do not fully understand what is being offered and sign up to a tariff that is inappropriate for their needs; this risk is likely higher for vulnerable and/or traditionally disengaged customers.<sup>253</sup>

To accommodate smart tariffs, future regulations must address the balance between encouraging innovative tariff and protecting customers from any new risks. The Government and Ofgem must also consider how the Energy Price Cap may need to change to accommodate smart tariffs. For example, how can the price cap be adapted to work with time-of-use tariffs?

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253. Citizens Advice (July 2017). *The Value of Time of Use Tariffs in Great Britain*. [Link](#)

## 5. Policy recommendations

The Government’s Retail Energy Strategy sets out twelve actions, grouped into short, medium and long term. The key actions are summarised in Table 9.

**Table 9: Policy Exchange summary of the Government’s Retail Energy Strategy.**

Theme	Timeframe		
	Short term	Medium term (2024 onwards)	Long term (late 2020s)
Harness engaged customers.	-	Reform “green tariffs”.	Promote new retail offerings, including smart tariffs.
Protect disengaged customers.	Maintain price cap.	Opt-in switching reforms.	Opt-out switching reforms.
Enhance and maintain market-wide customer protections.	Expand regulatory framework to cover TPIs.	-	Wider reform of regulatory framework to enable smart tariffs.

Source: BEIS.<sup>254</sup>

The Retail Energy Strategy aims to harness the retail energy sector to contribute to lower bills and Net Zero. However, there are two areas where the strategy potentially falls short, particularly in the light of the widespread supplier failures during 2021:

1. The proposed switching reforms may never be sufficient to act as a replacement for the Energy Price Cap.
2. Prioritising switching reforms appears to be getting in the way of higher-impact market reforms such as smart tariffs, which have a low priority in the strategy (as these reforms are planned for the late 2020s).

Given the widespread failure of energy suppliers during 2021, there a strong case to review the *Retail Energy Strategy*. This report uses the framework in the strategy as a starting point, and makes recommendations on which workstreams should be prioritised and how they should be implemented.

254. BEIS (July 2021). *Energy retail market strategy for the 2020s*. [Link](#)

The recommendations in this report are grouped under four themes and are explained in detail below:

1. Encourage “smart tariffs” to reduce bills and cut emissions;
2. Maintain and reform the Energy Price Cap, and enhance market stability;
3. Expand the regulatory framework to capture new market participants; and
4. Rollout the smart technology needed for smart tariffs.

### Theme 1: Encourage smart tariffs to reduce bills and cut emissions.

As explained above, the rollout of smart electricity tariffs will be the key change in the future retail energy market. To harness these tariffs, the Government needs to create more incentives for customers to help balance the electricity grid, for example by shifting electricity demand to off-peak periods.

There are already several programmes in place to encourage smart tariffs, including the Smart Meter rollout and Ofgem’s decision to implement market-wide half-hourly settlement by October 2025.<sup>255</sup> However, neither of these initiatives will address the need for more locational price signals, which are needed to address the rapidly increasing cost of network constraints. Locational signals are explored in more detail in Policy Exchange’s 2020 report, *Powering Net Zero*.<sup>256</sup>

Domestic customers can contribute to resolving these constraints, for example by charging their electric vehicles when output from local wind and solar farms is high. However, they will only do this if the right price signals are in place.

Policy Exchange has previously argued that the Government should implement “local electricity pricing” in Great Britain’s wholesale electricity market.<sup>257</sup> The advantage of this model is that it has operated in many US markets for over ten years, so many of the pros and cons are already known.

In general, markets with local electricity pricing have not extended this to domestic customers, due to fears about distributional impacts on lower-income customers and the potential for big regional variations in prices. This report recommends policies to overcome these concerns, allowing local pricing to be extended to domestic customers.

### To address distributional concerns, local electricity pricing for domestic customers and small business customers should initially be opt-in.

Many regulatory changes in Great Britain’s electricity market involve transitional periods, where changes initially only apply to certain classes of customer. For example, half-hourly settlement (HHS) only initially

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255. Ofgem (April 2021). *Electricity Retail Market-wide Half-hourly Settlement: Decision and Full Business Case*. [Link](#)

256. Policy Exchange (December 2020). *Powering Net Zero*. [Link](#).

257. Policy Exchange (December 2020). *Powering Net Zero*. [Link](#).



applied to generators and the largest industrial users. Over time, Ofgem has extended HHS for smaller customer classes. By October 2025, HHS will apply to all customers with smart meters. In the run up to 2025, customers can (through their supplier) elect to be half-hourly settled, which enables smart tariffs.

A similar approach should apply for local electricity pricing, following the timeline below:

April 2026	Implement local electricity pricing in the GB wholesale electricity market. Applies to all generators and large customers. <sup>258</sup>
	Local electricity pricing is opt-in for domestic and small business customers. Customers that do not opt-in are settled against a regional or national price. <sup>259</sup>
April 2030	Implement local electricity pricing for all customers, including households and small businesses.

During the period between 2026-2030, the Government and Ofgem should review the impact of local pricing on customers who have opted-in or opted-out, including any distributional impacts. This would allow Ofgem to put in place any mitigating measures required, building confidence that the system will work for all domestic and small business customers.

As with any opt-in scheme, there is a risk of suppliers “cherry picking” customers. Specifically, some have raised concerns that only customers in Scotland would opt in (because, under local pricing, wholesale prices in Scotland are expected to be lower than those in the rest of Great Britain). However, our recommendations include a correction factor to equalise average bills in all parts of Great Britain (see below).

Even when local pricing is rolled out to all customers, this does not mean that all customers will need to have smart electricity tariffs (customers will still be able to choose flat-rate tariffs); however, there will be more incentives for suppliers to work with customers to design smart tariffs that can reduce bills and green the grid.

### To address concerns about regional variation in prices, households should face the same average bill, regardless of where they live in Great Britain.

The second main concern with local electricity pricing is that it could lead to substantial variations in electricity bills in different parts of the country. Understandably, many feel that this would be unfair given that people aren’t expected to choose where they live based on prevailing electricity prices, which may change as old power stations are closed and new generators are built.

This argument is weaker for large energy users, for which energy is a large proportion of their input costs. To meet Net Zero as cost-effectively as possible, the Government should encourage large industrial users to locate in areas with lower electricity prices.

258. Timeline from: Policy Exchange (December 2020). *Powering Net Zero*. [Link](#)

259. See e.g. New York State, where customers are settled using regional prices, whereas generators are settled using local prices. Or e.g. Italy, where customers are settled using a national price, whereas generators are settled using regional prices.

It is likely that, under local electricity pricing, prices would be lowest in the UK’s coastal industrial hubs, which have access to cheap electricity from nearby offshore wind farms; these hubs include Teesside, Humberside, the east coast of Scotland, Merseyside, North Wales and East Anglia. Local electricity pricing could therefore help to drive the Government’s Levelling Up agenda.

As part of Policy Exchange’s 2020 report, *Powering Net Zero*, Aurora Energy Research modelled two scenarios for Great Britain’s electricity system:

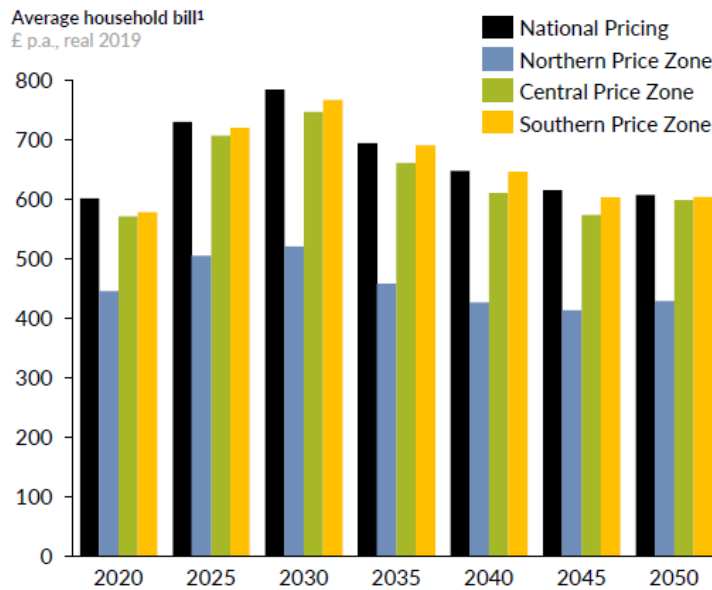
1. Continuing with national pricing; or
2. Moving to a system of regional pricing with three price zones.

Aurora found that regional pricing could reduce overall bills by £2bn per year, although the benefits would be biggest for those in the north of Great Britain (Scotland); average household electricity bills in the north of Great Britain could be £200 or one-third lower than those in the rest of the country (Figure 17). Regional price variation on this scale is unlikely to be politically acceptable.

Today, there are relatively small regional variations in retail electricity prices, mainly due to regional differences in network charges and losses. Some politicians have raised their concerns in Parliament that any regional variation in electricity or gas bills is unacceptable.<sup>260</sup>

We have therefore recommended measures below that would make average domestic electricity bills the same in all parts of the country, whilst maintaining many of the benefits of local pricing.

**Figure 17: Average household electricity bill in Great Britain. Using national pricing (black) or regional pricing with three price zones (blue, green, yellow).**



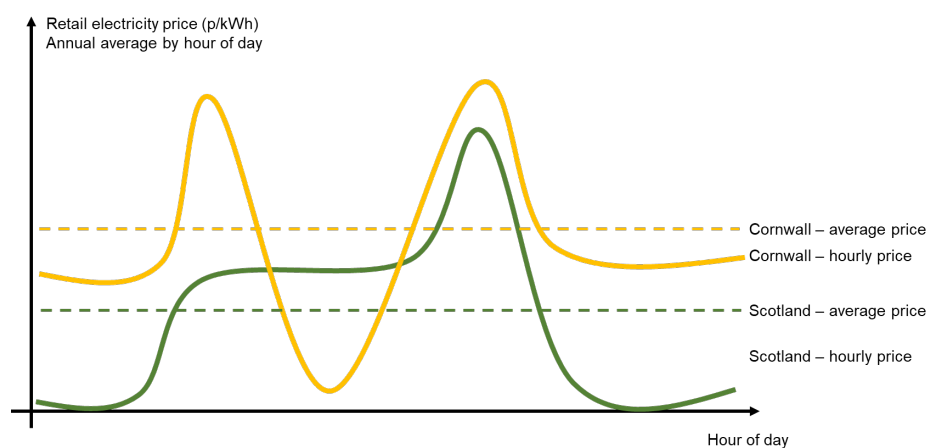
Source: Aurora Energy Research.<sup>261</sup>

260. Hansard (July 2016). *Westminster Hall debate: Energy Network Charges*. [Link](#)

261. Aurora Energy Research (December 2020). *Impact of locational pricing in Great Britain: Research commissioned by Policy Exchange*. [Link](#) (Annex 1).

Under local pricing, the daily shape or prices would likely vary significantly in different parts of the country (Figure 18). For example, prices in Scotland would tend to be lower during winter nights, when it is particularly windy, whereas prices in Cornwall would tend to be lower during summer days, when it is particularly sunny.<sup>262</sup>

**Figure 18: Indicative hourly prices by hour of day in Scotland and Cornwall under local pricing. Not corrected for differences in average prices.**



*Note: Policy Exchange illustration, not based on quantitative modelling.*

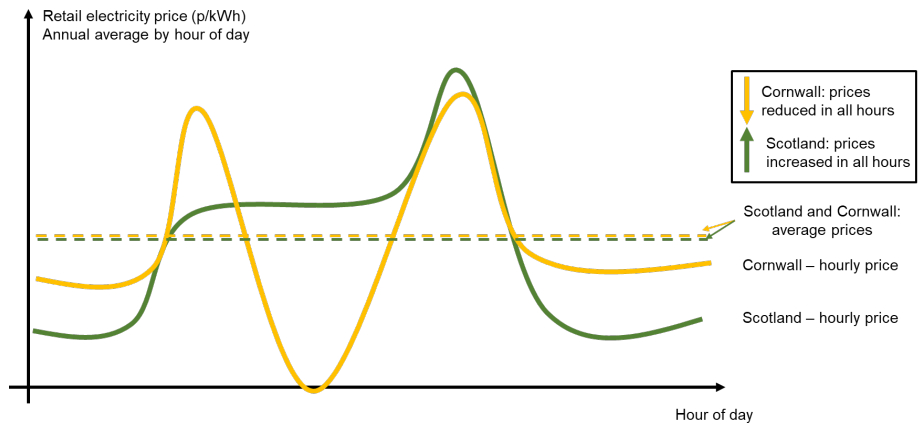
To equalise electricity bills in all parts of Great Britain, the Government and Ofgem could implement a local correction factor, measured in p/kWh. This correction factor would adjust for the expected average differences in electricity prices in each region. The correction factor should be the same in all hours of the year, so it would equalise average bills whilst maintaining the shape of prices in each local area. Customers opting for a single-rate electricity tariff would likely pay a similar price in each region.<sup>263</sup>

Using the illustrative example of Cornwall and Scotland, prices in Scotland would be adjusted upwards and prices in Cornwall would be adjusted downwards (Figure 19). Customers opting for a smart tariff would pay more or less than the average depending on when they predominantly use electricity, and on how much of their electricity demand they can shift to off-peak periods.

262. Because there are lots of wind farms in Scotland and lots of solar farms in Cornwall.

263. Customers may pay more or less depending on when they typically use electricity. However, this could already happen under market-wide half-hourly settlement, which is planned to be introduced by October 2025.

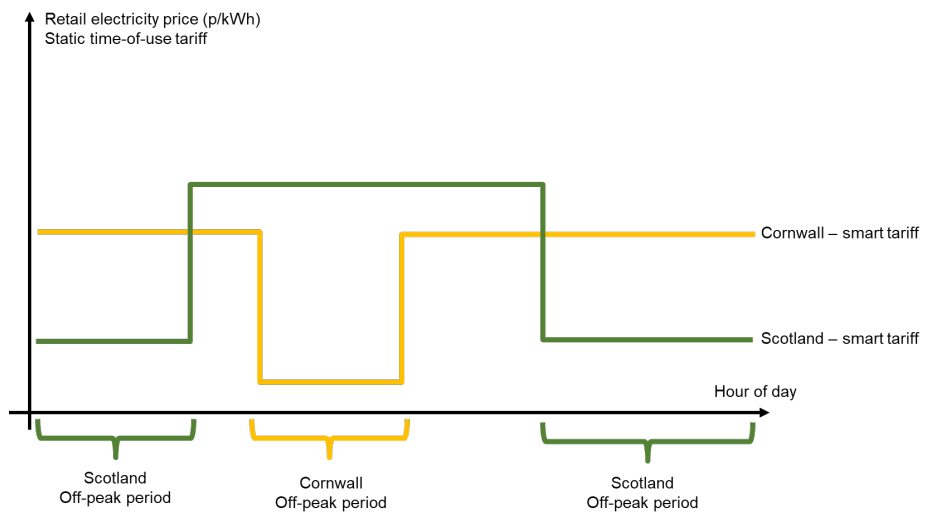
Figure 19: Indicative hourly prices by hour of day in Scotland and Cornwall under local pricing. Corrected for differences in average prices.



Note: Policy Exchange illustration, not based on quantitative modelling.

Even with the correction factor applied, the daily shape of prices in each location would be very different, encouraging different behaviour from customers, generators and energy storage providers. For example, suppliers may offer customers in Cornwall a tariff with an off-peak period during the middle of the day, whereas they may offer customers in Scotland a tariff with an off-peak period during the night (Figure 20). This would influence when customers charge their electric vehicles and run their electric heating systems.

Figure 20: Indicative smart tariffs (static time-of-use) by hour of day in Scotland and Cornwall under local pricing.



Note: Policy Exchange illustration, not based on quantitative modelling.

**Recommendation 1.1:** Introduce local electricity pricing, including for domestic customers. Initially, this should be opt-in for households. To ensure fairness, bills should be adjusted so that the average bill for residential customers is the same in all parts of Great Britain.

### Green energy tariffs need to be reformed.

Today, many energy suppliers offer their customers “green tariffs”. These tariffs are evidenced by matching their customers’ demand to an equivalent number of REGO certificates on an annual basis.<sup>264</sup> There are two main drawbacks to the current arrangements:

1. The price of REGOs is low. This suggests that green energy tariffs are doing little to encourage companies to build new renewable energy projects.
2. The messaging around green tariffs risks confusing customers about how best to reduce their carbon footprint through their electricity consumption. If a customer already has a green electricity tariff, they may incorrectly believe that there is nothing more they can do to reduce the carbon footprint of their electricity consumption. However, customers can drive substantial reductions in both carbon emissions and energy bills by shifting their electricity demand to off-peak periods and/or periods of high generation from wind and solar farms, as described earlier in this report.

In addition, it is no longer clear what problem green tariffs are trying to solve. In the early years of the renewable energy rollout, voluntary green tariffs provided a useful way for willing customers to help fund projects in the absence of Government policy. However, the Government has now implemented significant policies to decarbonise the electricity sector, including the UK Emission Trading Scheme, the Contracts for Difference scheme, and stricter pollution controls on coal- and gas-fired power stations. These policies are working; between 2013 and 2020 the carbon intensity of Great Britain’s electricity grid fell by two-thirds,<sup>265</sup> and the Government recently committed to a zero-carbon electricity grid by 2035.<sup>266</sup>

### New standards for “green tariffs” could create confusion and loopholes.

The Government recently issued a Call for Evidence on *Designing a Framework for Transparency of Carbon Content in Energy Products*.<sup>267</sup> This Call for Evidence recognises the downsides of the current approach to green tariffs (REGOs) and explores potential replacements, including requiring green tariffs to be backed by Power Purchase Agreements (PPAs) with generators or “24/7 Energy Matching”, which would require suppliers to demonstrate that their customers’ electricity needs have been met with renewable energy in each half-hourly trading period.

Both of these approaches could improve transparency, and 24/7 energy matching would be a significantly higher and more credible hurdle to demonstrating that a tariff is green. However, these approaches both have significant issues:

264. REGO = Renewable Energy Guarantee of Origin.

265. National Grid ESO (April 2020). *Introducing our carbon intensity app*. [Link](#). See figure “The Decarbonisation of British Electricity”.

266. BEIS (October 2021). *Plans unveiled to decarbonise UK power system by 2035*. [Link](#)

267. BEIS (August 2021). *Designing a Framework for Transparency of Carbon Content in Energy Products*. [Link](#)

### #1: Issues with PPA-backed green tariffs:

This option would require energy suppliers to directly contract with renewable energy generators. This would likely benefit large incumbent suppliers, which are more likely to be vertically integrated (i.e. already own some wind and solar farms) or to have strong balance sheets that would allow them to sign long-term PPAs. Conversely, PPA-backed green tariffs could disadvantage smaller suppliers, which are less likely to be vertically integrated.<sup>268</sup>

In addition, it is not clear that PPA-backed green tariffs would deliver any additional renewable energy. Suppliers could sign PPAs exclusively with existing generators, or they could sign short-term PPAs or PPAs indexed to the variable wholesale price of electricity – none of these types of PPAs would materially help companies to finance new renewable energy projects.

### #2: Issues with 24/7 energy matching:

A green tariff backed by 24/7 energy matching would require suppliers to contract with a fleet of generators and storage providers that could dispatch to meet the demand of their customers at all times.

One risk with this approach is that suppliers might be encouraged to dispatch their portfolios inefficiently. For example, a supplier may not discharge their batteries to meet high prices in the wholesale market (exacerbating shortages) because their customers' demand is expected to increase a few hours later.

Energy bills would be lower overall if the supplier discharged their batteries to meet the highest prices and then relied on other generators to meet their customers' demand a few hours later. This issue could be mitigated through trading of credits, although this would be complicated as there are 17,520 trading periods each year.

In addition, 24/7 energy matching would only be credible if suppliers were required to consider the location of customers in relation to their contracted generators. For example, a wind farm in Scotland could not credibly be said to be supplying electricity to customers in London during periods when the power lines between Scotland and England are at maximum capacity. This would require “locational 24/7 energy matching”, which adds further complexity.

Finally, 24/7 energy matching would lead to arguments about what types of energy storage are considered green. For example, a supplier may have to demonstrate that their batteries were charged using only renewable energy and likewise that any green hydrogen used was produced using renewable energy.<sup>269</sup>

The monitoring and verification process for 24/7 energy matching could easily become a major administrative burden that would be disproportionate to the value that it provides in reducing emissions.

Despite the potential complexity of 24/7 energy matching, Energy Systems Catapult recommends an “outcome-based decarbonisation obligation applied to all entities purchasing electricity” to drive decarbonisation.<sup>270,271</sup>

268. PPA-backed green tariffs could also reduce liquidity in the wholesale market, if they encourage vertically-integrated energy companies to trade within their own portfolio, rather than trading in the wholesale market. This would depend on how the rules are designed.

269. Today, a supplier does not have to worry about storage, because REGO-matching is performed on an annual basis. This means that REGOs produced in one half-hour period can be used to “green” demand in another half-hour period many months apart.

270. Energy Systems Catapult (March 2021). *Rethinking Electricity Markets: EMR2.0: a new phase of innovation-friendly and consumer-focused electricity market design reform*. [Link](#). Page 62/101.

271. Day, G. Energy Systems Catapult (November 2021). *Can we mandate electricity markets to deliver a decarbonised grid by 2035?* [Link](#)

Depending on how the obligation is defined, it could be used to implement 24/7 energy matching. ESC argues that the obligation could “combine with (or potentially replace) the UK ETS to drive complete electricity sector decarbonisation”.

### The Government should take a two-stage approach to reforming green tariffs.

**In the short term**, the Government and Ofgem should make two amendments to the *Electricity (Fuel Mix Disclosure) Regulations 2005* to ensure public confidence in green energy tariffs:

1. Any supplier offering a “green tariff” should be required to disclose the average fuel mix based on their customers’ actual demand.<sup>272</sup> For example, in a period when there is no solar output (overnight), the contribution of solar would be zero. This will produce a more realistic estimate of how much of a customer’s demand from renewable or nuclear sources. For example, suppliers may start offering tariffs that are “60% renewable” or “88% low carbon”, based on how closely how their customers’ actual consumption matches output from renewable or nuclear energy projects that they have bought electricity from. Suppliers could also badge their tariff with a particular carbon intensity, measured in grams of CO<sub>2</sub> per kWh (gCO<sub>2</sub>/kWh).
2. Under this new system, supplier fuel mix disclosures will become more administratively burdensome. Therefore, fuel mix disclosures should become voluntary. Only suppliers that want to claim a “green tariff” should be required to make fuel mix disclosures.

**Recommendation 1.2:** In the short term, the Government should update the rules on “green tariffs” to be based on their customers’ actual demand (“24/7 energy matching”). These changes should be implemented by amending the *Electricity (Fuel Mix Disclosure) Regulations 2005*.<sup>273</sup>

**In the medium term**, smart tariffs and local electricity pricing (Recommendation 1.1) will require a more sophisticated approach to reporting and verifying green tariffs, as these tariffs should also take into account the location of both generators and customers.

There is likely to be an enduring demand for green tariffs from some suppliers and some customers. However, the process of reporting and verifying green tariffs under local pricing is likely to be complicated. If the Government and Ofgem lead this process, then the time and effort involved may distract from other, higher-priority initiatives such as local pricing, stress tests for energy suppliers and reforms to the Energy Price Cap.

Therefore, the Government should task industry or an independent body with developing a framework for green tariffs that is compatible with local pricing. Where possible, this new framework should be based

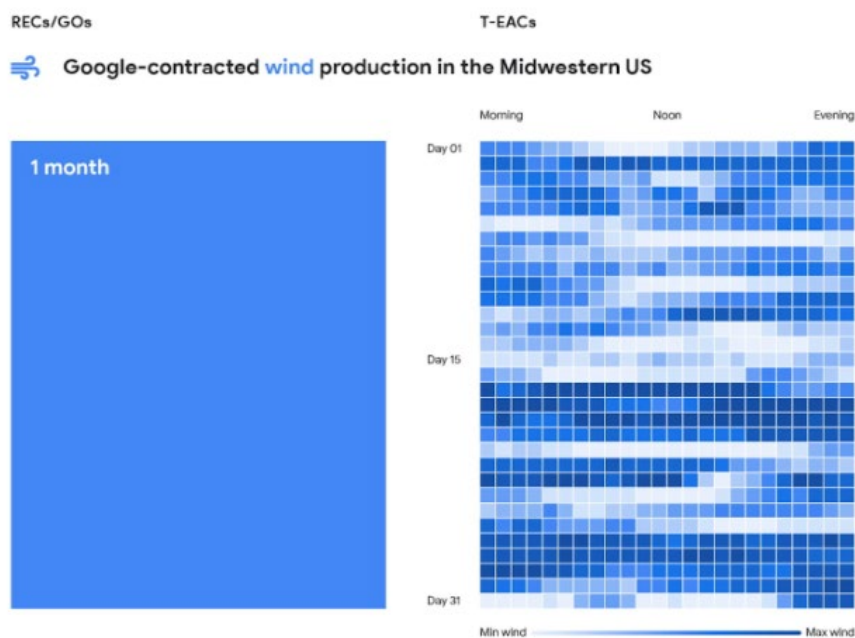
272. For customers that are non-half-hourly settled (non-HHS), suppliers should be required to use average profiles, which are currently used to “settle” non-HHS customers.

273. For customers that are non-half-hourly settled (non-HHS), suppliers should be required to use average profiles, which are currently used to “settle” non-HHS customers.

on international standards under development; for example, Google is piloting a concept called Time-based Energy Attribute Certificates (T-EACs) for hourly energy matching, including in markets with local pricing.<sup>274</sup> This approach produces a more nuanced and robust estimate of how green a tariff is (Figure 21). Any new framework would likely rely on enhanced “carbon tracking” in the electricity system; the details of a potential carbon tracking system as discussed in a recent report by the Energy System Catapult.<sup>275</sup>

As discussed earlier in this report, there is little reason to think that a loss of green tariffs will slow down decarbonisation of the electricity sector. Therefore, if a robust new framework for green tariffs cannot be developed then the advertising of green tariffs should end.

Figure 21: Indicative example of two approaches to measuring a “green tariff”. (Left) Based on REGOs. (Right) Based on 24/7 energy matching.



Source: Google.<sup>276</sup>

Smart tariffs and local pricing will encourage suppliers and customers to have a more nuanced conversation about how they can work together to reduce emissions and save money by shifting their demand to periods when the grid is cleaner, and prices are lower. This conservation might happen sooner if the concept of green electricity tariffs was removed entirely.<sup>277</sup>

**Recommendation 1.3:** In the medium term, the Government should task industry or an independent body with developing a framework for “green tariffs” that is consistent with local electricity pricing. If this is not possible, then the advertising of green tariffs should end.

274. Google Cloud (March 2021). A timely new approach to certifying clean energy. [Link](#)

275. Energy Systems Catapult (December 2021). Accurately tracking carbon in electricity markets. [Link](#)

276. Google Cloud (March 2021). A timely new approach to certifying clean energy. [Link](#)

277. Customers should still be free to make additional voluntary payments to their supplier to fund new renewable energy projects or carbon offsetting initiatives, but this should be itemised on their electricity bill.



## Theme 2: Maintain and reform the Energy Price Cap, and enhance market stability.

The Energy Price Cap is undoubtedly a factor in the current widespread failure of energy suppliers. In response, several energy suppliers have called for the cap to be scrapped.<sup>278,279</sup>

However, the price cap provides significant protection to customers who do not switch their energy supplier; customers may not switch supplier for a variety of reasons including lack of information or other perceived barriers.<sup>280</sup> Ofgem estimated that the Energy Price Cap would save the eleven million customers on Standard Variable Tariffs around £1bn per year, or £76 per customer per year.<sup>281</sup>

In the short term, the Government and Ofgem should consider relatively minor reforms to the Energy Price Cap that can reduce the financial burden on suppliers. For example, the price cap could be updated more regularly (e.g. every three months rather than every six months).

Because the price cap is only updated once every six months, there is a significant lag between changes in underlying costs (e.g. wholesale prices) and changes in the level of the cap. Ministers have made a virtue of the fact that the price cap is currently protecting customers against rapid increases in energy bills over the winter.<sup>282</sup> However, this is not what the price cap is designed to do.

The price cap is designed to protect disengaged customers from loyalty penalties rather than to dampen price volatility. Suppliers could have reasonably been expected to have hedged ahead of time for their customers on Standard Variable Tariffs (which are price capped). However, it is less reasonable to expect suppliers to fully hedge the future energy needs of customers who are on fixed-priced deals that are going to expire shortly; fixed-price deals are not price capped and these customers are more likely to switch supplier at the end of their deal.

The CEO of Scottish Power has argued that “up to two million homes are expected to move to a price cap tariff [SVT] in the coming months” as their fixed-rate deal expires.<sup>283</sup> This will put significant financial pressure on energy suppliers, who now have to offer loss-making tariffs to customers that they may not have expected to retain once their fixed-price deals expired.

By updating the price cap more regularly, for example every three months rather than every six, the Government would reduce the financial pressure on energy suppliers when prices change rapidly, whilst continuing to ensure that the loyalty penalty remains low.<sup>284</sup>

If the Government wants to reduce volatility in energy bills, then it should consider stand-alone measures that are specifically designed to do this.

**Recommendation 2.1:** In the short term, the Government should maintain the Energy Price Cap. However, the Government should consider minor reforms to the cap, for example updating it more often.

278. Munbodh, E. *Mirror* (September 2021). *Four more energy firms set to collapse due to gas shortages as bills tipped to rise £280.* [Link](#)

279. Thurston, A. *The Energyst* (October 2021). *“Scrap the price cap”, urges Scottish Power’s boss.* [Link](#)

280. For example, some renters may not know that they are allowed to switch energy supplier.

281. Ofgem (November 2018). *Default tariff cap: decision – overview.* [Link](#)

282. Hoffman, N. *PoliticsHome* (October 2021). *Kwasi Kwarteng says the energy price cap will not be moved.* [Link](#)

283. Ambrose, J. *The Guardian* (October 2021). *Expect 18 more months of rising energy bills, UK householders warned.* [Link](#)

284. Note that this change is unlikely to be implemented in the next few months, and therefore doesn’t solve the immediate problems in the sector.

### In the medium term, “social tariffs” or a “relative price cap” may offer alternatives to the current price cap.

The main alternatives proposed to the current Energy Price Cap are a “social tariff” or a “relative price cap”.<sup>285</sup> The Government could implement both of these measures concurrently; however, this may overcomplicate what is already a very complicated market.

#### Option #1: Social Tariff

A “social tariff” would require suppliers to offer lower prices to low-income customers, funded through higher prices for other customers.<sup>286</sup> The current market effectively already includes a social tariff, implemented through a combination of the Energy Price Cap and the Warm Home Discount (WHD) scheme.<sup>287</sup> A social tariff scheme could replace the Energy Price Cap and the Warm Home Discount scheme.

However, the main advantage of a social tariff is that it would continue to protect vulnerable customers whilst reducing Government intervention (by removing the market-wide price cap). By removing the price cap, suppliers would be able to change prices more quickly when underlying prices change, but only for customers can afford it. This would likely have reduced the number of suppliers going bankrupt during 2021.

For a social tariff scheme to work effectively, it would need high-quality data to identify low-income customers. As part of the Warm Home Discount scheme, energy suppliers currently have access to data from the Department of Work and Pensions (DWP) on which of their customers receive Pension Credit.<sup>288</sup> This allows suppliers to automatically grant a discount to around 95% of households in receipt of Pension Credit (the “Core Group”).<sup>289</sup> From April 2022, the Government is planning to extend data matching for households in receipt of other benefits.<sup>290</sup>

If this expanded data matching exercise is successful, then a significant hurdle to social tariffs will have been overcome. However, it will likely take a couple of years to evaluate whether changes to the WHD have been successful, which means that it is likely to be a few years before the Government can implement a social tariff. In addition, the Scottish Government is planning to implement its own Warm Home Discount scheme, which will also need to be considered in the design of any social tariff.<sup>291</sup>

One downside of removing the Energy Price Cap is that it would likely result in rising loyalty penalties for any middle- or high-income customers who are disengaged. So long as low-income customers are protected through a comprehensive social tariff, then this risk is one that the Government could consider taking in the medium term as a way to reduce its involvement in the energy sector.

In addition, a social tariff may fail to help a large proportion of fuel-poor customers. Government data suggests that 50% of fuel-poor customers in England are not currently eligible to receive the WHD as part of the “broader group” (which is intended to help those who receive means-tested benefits).<sup>292</sup>

285. Other options are available. See: Citizens Advice (March 2020). *When the cap no longer fits: a discussion paper on protecting energy consumers when the price cap ends*. [Link](#)

286. Ambrose, J. The Guardian (October 2021). *Expect 18 more months of rising energy bills, UK householders warned*. [Link](#)

287. This means that low-income customers pay less for their energy than equivalent customers not in receipt of the Warm Home Discount.

288. Specifically the “guaranteed element” of Pension Credit.

289. The remaining 5% must apply for the Warm Home Discount. See: BEIS (June 2021). *Warm Home Discount: better targeted support from 2022*. [Link](#). Page 34.

290. Group currently known as the ‘Broader Group’). In future, this will be known as ‘Core Group 2’.

291. BEIS (June 2021). *Warm Home Discount: better targeted support from 2022*. [Link](#). Page 11.

292. BEIS (March 2021). *2019 fuel poverty detailed tables under the LILEE indicator*. [Link](#). Table 36.

## Option #2: Relative Price Cap

When the price cap was originally proposed, Policy Exchange argued that it should be “relative, not absolute”.<sup>293</sup> Under a relative price cap, suppliers would not be allowed to charge loyal (or disengaged) customers significantly more than new customers; to implement this, the Government would set a cap on the *differential* between the highest and lowest price offered by each supplier.<sup>294</sup>

The advantage of this system is that it would simultaneously reduce Government intervention in the energy market whilst tackling loyalty penalties. In fact, a relative price cap could tackle loyalty penalties better than the current system, which relies on Ofgem setting the price cap at an appropriate level. A relative price cap is also easier to calculate than the current price cap, which would also free up significant resources within energy suppliers and Ofgem to work on other projects.

In addition, a relative price cap would discourage suppliers from offering unsustainably low prices. Until recently, many suppliers offered fixed-price tariffs at significantly below their standard variable tariff (SVT). Many of the suppliers that offered the cheapest tariffs have gone bankrupt, suggesting that these were loss-leading tariffs in many cases. A relative price cap, combined with more stringent regulation on suppliers (see Recommendation 2.3), would encourage suppliers to only offer tariffs that are financially sustainable.

Similar measures are being implemented in other industries, specifically home and motor insurance. In May 2021, the Financial Conduct Authority (FCA) implemented new rules that will require insurers to offer the same price to new customers as they offer to existing customers who are renewing their policies.<sup>295</sup> The FCA estimates that these new rules will save customers £4.2 billion over ten years. John Penrose MP has argued that these rules should be extended to the energy sector.<sup>296</sup>

These rules for insurers are not without controversy, and the details of any relative price cap in the energy sector will need to be carefully considered to ensure that they don’t completely remove the incentive for customers to shop around.<sup>297</sup>

There is also a risk that, with a relative price cap, some large legacy suppliers would charge significantly more than new suppliers, allowing them to make big profits from existing customers but accepting that they would be unlikely to grow their market share by attracting new customers. The Government should monitor the impact of the relative price cap being introduced in the car and home insurance markets, to see if this risk materialises.

Finally, any relative price cap must be designed to work with new offerings including smart tariffs. It should still be possible to require suppliers to offer existing customers the same deals that would have been available to them if they were a new customer, similar to the measures implemented in the insurance industry.

293. Policy Exchange (April 2017). *Energy price cap should be relative, not absolute*. [Link](#)

294. Developing a relative price cap will be complicated by market wide HHS (which will allow suppliers to offer customers tailored prices) and locational pricing. However, it should still be possible to require suppliers to offer existing customers the same deals that would have been available to them if they were a new customer.

295. FCA (May 2021). *FCA confirms measures to protect customers from the loyalty penalty in home and motor insurance markets*. [Link](#)

296. Website of John Penrose MP (October 2021). *John’s full Beesley Lecture – Power to the People*. [Link](#)

297. Daley, J. Financial Times (May 2021). *Solving the insurance ‘loyalty penalty’ will penalise many*. [Link](#)

**Recommendation 2.2:** In the medium term, the Government should consider alternatives to the price cap, for example a “social tariff” or a “relative price cap”. Before introducing a social tariff, the Government would need to demonstrate that low-income customers can be identified accurately.

### Many suppliers were not prepared for spikes in wholesale energy prices.

One reason that so many suppliers have failed during 2021 is that they were not sufficiently prepared for rapid increases in wholesale energy prices. Many suppliers were either insufficiently hedged or were insufficiently capitalised to cope with rapid price increases. Several companies and commentators have argued that the Energy Price Cap is the main culprit in these bankruptcies; the counterargument is that suppliers were aware of the restrictions imposed by the price cap and should have planned accordingly.

The main failing in the retail energy sector is therefore the mismatch between the price cap and Ofgem’s regulation of energy suppliers. In response to the 2008 financial crisis, central banks now regularly “stress test” the finances of major banks and other financial institutions; this helps to ensure that systemically important financial institutions are able to withstand rapid changes in market conditions.<sup>298</sup>

If Ofgem had conducted similar stress tests on energy suppliers, they may have identified that many suppliers were in a weak financial position and were unable to withstand volatile energy prices.<sup>299</sup>

Between 2018 and 2020, Ofgem reviewed the conditions attached to Supply Licences as part of the *Supplier Licensing Review*.<sup>300</sup> The review led to new conditions that Ofgem argued would:

1. Promote more responsible risk management;
2. Improve governance and increase accountability; and
3. Enhance Ofgem’s market oversight.

*Source: Ofgem.*<sup>301</sup>

Surprisingly, Ofgem’s “Decision Document” on the new licence requirements did not mention the impact of the energy price cap on suppliers’ ability to pass through any rapid increase in underlying costs.

Given the widespread failures this year, these rules clearly need to be looked at again; Ofgem has acknowledged that changes are needed.<sup>302</sup> When reviewing the rules, the Government and Ofgem should focus on ensuring that suppliers are able to withstand rapid changes in energy prices.

We recommend that Ofgem should subject suppliers to periodic “stress tests”, similar to those used by the Bank of England to ensure the financial stability of financial institutions. Ofgem’s review did introduce powers for the regulator to request independent audits of a supplier’s financial position; however, there is clearly now a need for regular, formalised stress tests.

298. Bank of England (undated). *Stress testing*. [Link](#)

299. During 2020 and 2021, Ofgem requested additional information from suppliers as part of its COVID-19 monitoring plan. It appears that this information was mainly used to assess the impact of COVID-19 on suppliers and their customers, including concerns that more customers would fall into debt and “self-disconnect” their electricity and gas supply. See: [Link](#) (Page 8).

300. Ofgem (November 2018). *Supplier Licensing Review*. [Link](#)

301. Ofgem (November 2020). *Decision on the Supplier Licensing Review: Ongoing requirements and exit arrangements*. [Link](#)

302. Ofgem (October 2021). *Open Letter: Rising wholesale energy prices and implications for the regulatory framework*. [Link](#)

These stress tests should be complemented by other enhanced requirements, including more due diligence on new entrants and more proactive and standardised reporting by suppliers. If suppliers fail a stress test, then they should be given time to meet the requirements before being retested. If suppliers repeatedly fail stress tests, then Ofgem should be able to revoke a supplier's licence.

Some may argue that these new requirements on energy suppliers would be excessive and risk shutting out potential new entrants. However, the experience of 2021 is that the pendulum has swung too far in favour of new entrants; the resultant supplier failures have led to billions of pounds of costs that will be socialised and recovered through higher energy bills for all customers. These socialised costs will wipe out some of the gains achieved through introducing competition in the retail energy sector and should not be allowed to happen again.

**Recommendation 2.3:** The Government and Ofgem should introduce financial “stress tests” for energy suppliers.

### The Government's proposals on switching are unlikely to offer an alternative to the price cap.

In its Retail Energy Strategy, the Government proposed introducing “opt-in” and “opt-out” switching over the next five years or so. The Government argues that, in the long term, these switching reforms could be part of a package of measures that would allow them to remove the price cap.

However, these proposed reforms have a number of disadvantages, which mean they may never be sufficient to act as a replacement for the Energy Price Cap. In particular:

- **Opt-in switching** relies on disengaged customers to actively participate in the energy market, so is unlikely to capture the most disengaged customers. In addition, opt-in switching seeks to set up a government-run or government-appointment alternative to commercial price comparison websites (PCWs) and auto-switching services. Given that there is an active market for these services, it is not clear what market failure the Government is trying to address. Therefore, before implementing opt-in switching, the Government should address any identified weaknesses with these services by expanding the regulatory framework (see Recommendation 3.1).
- **Opt-out switching** would be a major Government intervention in energy market, which is likely to generate significant pushback from the energy industry. In addition, the current raft of supplier failures suggests that there are major risks in the Government moving customers to other suppliers, as there is a reasonable risk that the new supplier will go bankrupt. Despite the Supplier of Last Resort (SoLR) protecting customers when their supplier goes bankrupt, supplier failures can still cause problems for customers, including potential loss of eligibility for the Warm Home Discount

(as some suppliers have different eligibility rules) and potential complications related to repayment plans for those behind on their energy bills.

In addition, these proposed reforms would act as a major distraction to industry, Ofgem and BEIS, at a time when the sector needs to focus on recovering from the supplier failures during 2021 (see Recommendation 2.2) and accelerating progress on Net Zero through measures such as local electricity pricing (Recommendation 1.1). Therefore, the Government should put its proposed switching reforms on hold.

**Recommendation 2.4:** The Government should put its proposed “switching reforms” on hold. There are significant drawbacks to these proposals which mean that they are unlikely to offer a comprehensive alternative to the Energy Price Cap.

### Theme 3: Expand the regulatory framework to capture new market participants.

As the number of participants in the retail energy market has grown, the regulatory framework has not kept up. Today, energy suppliers are subject to regulations that are designed to protect customers. These regulations are implemented through the Supply Licence, including 539 pages of Standard Licence Conditions for electricity supply and 391 pages for gas supply.<sup>303</sup>

However, other participants in the retail energy market fall outside of Ofgem’s regulatory powers, including “price comparison websites” (PCWs), “auto-switching services”, “bill splitters” and more. TPIs also include organisations that control customers devices; these “load controllers” will be increasingly important as more customers purchase electric vehicles and heat pumps, as these can put significant stress on local electricity networks. These “third-party intermediaries” (TPIs) are only regulated through a combination of generic consumer protection legislation and voluntary industry codes of practice.<sup>304</sup>

In the financial services sector, the Financial Conduct Authority (FCA) has closed this regulatory gap by requiring TPIs to be authorised before conducting certain regulated activities.<sup>305,306</sup>

In the medium term, Ofgem should develop a comprehensive authorisation regime for third-party intermediaries. However, this will take several years, as the Government will likely need to give Ofgem new statutory powers. Citizen’s Advice has previously recommended introducing an authorisation regime for TPIs.<sup>307</sup>

In the short term, Ofgem can drive up standards of TPIs by requiring suppliers to only deal with TPIs that meet certain conditions. For example, Ofgem could potentially require suppliers only to engage with “Ofgem-accredited” price comparison websites.<sup>308</sup>

308. Ofgem (undated). *Switching energy tariff or supplier*. [Link](#). Section 2: Find tariffs and suppliers. [Link](#)

304. BEIS (August 2021). *Third-party intermediaries in the retail energy market: call for evidence*. [Link](#). Page 36.

305. *Ibid*, p.35.

306. FCA (Updated May 2021). *List of financial activities we regulate*. [Link](#)

307. Citizen’s Advice (March 2020). *Stuck in the Middle: How to improve protections for people using energy third party intermediaries*. [Link](#)

In a recent consultation, BEIS notes that Supply Licence conditions SLC 0 and SLC 25 impose conditions on suppliers “and their representatives” to customers fairly and not to mislead them.<sup>309</sup> BEIS believes that the definition of representatives captures some TPIs.

Expanding the existing approach would only be appropriate in the short term, as it will place an additional regulatory burden on suppliers, who will be required to vet and monitor all third-parties that they work with. In addition, this approach risks creating ambiguity for suppliers, who may interpret licence conditions differently.

**Recommendation 3.1:** In the short term, improve regulation of third-party intermediaries by requiring energy suppliers only to deal with TPIs that meet certain conditions.

**Recommendation 3.2:** In the medium term, the Government should give Ofgem new powers to develop a regulatory regime for third-party intermediaries. Where possible, these regulations should be harmonised with regulations on TPIs in other sectors (e.g. telecoms, water, financial services).

### Customer protections may need to evolve to accommodate “energy as a service” offerings.

In future, suppliers are increasingly likely to offer customers “Energy-as-a-Service” (EaaS) offerings, which combine energy and hardware.<sup>310</sup> For example, an energy supplier could offer a customer a bundled deal of £100 per month that included a heat pump and the electricity needed to run it.

EaaS offerings are likely to appeal to customers, as they allow customers to finance and operate new low-carbon technologies through a single monthly payment. The risk with EaaS offerings is that customers may find it difficult to evaluate what they are being offered, which increases risk of mis-selling and/or customers signing up to offerings that are not appropriate for their situation.

To reduce this risk, deals that combine hardware and energy should show a clear breakdown of the energy and hardware elements. In addition, for the energy component of the service, customers should be able to switch to another energy supplier after a reasonable time period.<sup>311</sup>

For now, Ofgem should monitor the market to see what EaaS offerings suppliers and other market participants bring forward. As part of any new regulations on TPIs (Recommendation 3.2), Ofgem should evaluate whether rule changes are needed to regulate Energy-as-a-Service offerings. Ofgem should also consider whether any elements of the Supply Licence regime place unnecessary barriers to EaaS offerings.

309. BEIS (August 2021). *Third-party intermediaries in the retail energy market: call for evidence*. [Link](#). Page 34.

310. Sandys, L. and Pownall, T. *Recosting Energy* (January 2021). *Recosting Energy: Powering for the Future*. [Link](#), [Link](#)

311. I.e. longer-term contracts should be permitted to finance hardware (similar to mortgages, car loans, etc.).

**Recommendation 3.3:** Where market participants sell “Energy-as-a-Service” (EaaS) offerings, they should show a clear breakdown of the energy and hardware elements. In addition, for the energy component, customers should be able to switch to another energy supplier after a reasonable time period. Ofgem should monitor the market and evaluate whether any rule changes are required to protect customers or to allow EaaS offerings.

### Theme 4: Use smart technology to facilitate smart tariffs.

Smart tariffs are a major enabler of the future of energy retail. However, customers will only fully benefit from smart tariffs if their devices can automatically respond to prices; for example, an electric vehicle chargepoint could operate on a fixed schedule or could be controlled by a supplier to operate during the hours when electricity is cheapest.

#### Rules on “smart devices” should be extended

The Government is already implementing rules that will require all electric vehicle chargepoints sold in the UK to have certain “smart” capabilities including charging at off-peak times by default, a randomised delay function to help ensure grid stability.<sup>312</sup>

There is a good argument to extend these rules to other electricity-hungry devices, in particular heat pumps. The Government’s Heat and Buildings Strategy, published in October 2021, includes a target to install 600,000 heat pumps per year by 2028, up from around 35,000 per year currently.<sup>313</sup>

By operating flexibly, heat pumps could reduce energy bills and carbon emissions. In the 2021 “Future Energy Scenarios”, published by National Grid ESO, flexible use of domestic heating reduces peak electricity demand by between 7.3 GW and 17.7 GW.<sup>314</sup>

To ensure that heat pumps are used as effectively as possible, the Government should introduce mandatory smart capability for new heat pumps. The Government should consider extending these rules to other devices that use a lot of electricity, for example, air conditioners. These rules will particularly help renters, who have less choice over which heating and cooling systems are installed in their homes.<sup>315</sup>

To regulate EV chargepoints, the Government is using existing powers under the *Automated and Electric Vehicles Act 2018*.<sup>316</sup> For heat pumps and other devices, the Government may need to take new powers; these powers could be taken in a future Energy Act.

**Recommendation 4.1:** The Government is currently implementing “smart” requirements for electric vehicle chargepoints. These rules should be extended to other electricity-hungry devices including heat pumps and air conditioners.

312. DfT and Office for Low Emission Vehicles (July 2021). *Electric vehicle smart charging: government response*. [Link](#). Pages 16-18.

313. BEIS (October 2021). *Heat and buildings strategy*. [Link](#). Page 11.

314. National Grid ESO (July 2021). *Future Energy Scenarios*. [Link](#). Page 147. Note: this figure includes flexibility provided by “storage heaters, hybrid heat pumps, district heating, and thermal storage”.

315. Without regulation on smart devices, landlords may choose not to install smart devices in their properties (as these devices are likely to cost slightly more). Renters/tenants would then have to pay higher bills. See: Citizens Advice (January 2021). *Demanding attention: Managing risks with demand-side response, to improve customers experience tomorrow*. [Link](#). Page 6.

316. Legislation.gov.uk (undated). *Automated and Electric Vehicles Act 2018*. [Link](#)



### The future energy system needs a smart electricity grid.

The main recommendation in this report (Recommendation 1.1) is for the Government to introduce local electricity pricing, and to extend this to domestic customers over time. For local electricity pricing to work, the Electricity System Operator (ESO) and the Distribution Network Operators (DNOs) need to monitor local electricity flows in real time.

Today, the ESO and the DNOs have live monitoring for electricity substations on the transmission network (400kV and 275kV) and for Extra High Voltage (EHV) substations on the distribution network (132kV and 33kV). However, at lower voltages (11kV and 400V), the ESO and the DNOs do not typically have access to live monitoring of critical parameters such as power flow and voltage.

A lack of visibility at lower voltages means that the network companies have to estimate whether or not the network is overloaded; this leads to a conservative approach to network planning and operations, with networks upgraded before they are fully utilised and small-scale generators such as wind and solar farms being turned off more frequently. Ultimately, this increases customer bills. These issues are clearly explained in Western Power Distribution's "2021 Sensors and Measurement Strategy".<sup>317</sup>

If network companies had access to live metering, then they could make better use of the existing network, reducing upgrade costs; they could also offer more connections to small-scale generators and storage providers, which would reduce both costs and carbon emissions. In addition, live metering is a prerequisite for extending local electricity pricing to lower voltage electricity networks.

In a recent report, the Energy Systems Catapult argued that local pricing should be initially implemented for the transmission network, and potentially extended to the lower voltage distribution network over time as monitoring, digitalisation and data on the distribution network improves.<sup>318</sup>

In their submissions for next price control period (covering 2023-2028),<sup>319</sup> the DNOs are expected to ask for significantly more funding to install live metering and control systems at lower voltage substations. We recommend that Ofgem should look favourably on these investments, so long as they are targeted in the most congested areas of the network (where they will provide the most immediate benefit).

**Recommendation 4.2:** Accelerate the rollout of smart grid technology on Great Britain's electricity networks, including live metering and control systems on local distribution networks.

317. Western Power Distribution (July 2021). *2021 Sensors and Measurement Strategy*. [Link](#).

318. Energy Systems Catapult (October 2021). *Introducing nodal pricing to the GB power market to drive innovation for consumers' benefit: Why now and how?* [Link](#). Pages 11-12.

319. Ofgem (undated). *Electricity distribution price controls 2023-2028 (RIIO-ED2)*. [Link](#)

## Summary of policy recommendations

Table 10: Policy recommendations to lower energy bills and green the grid.

Theme	Timeframe	
	Short term (2022-2023)	Medium term (2024 onwards)
#1: Encourage smart tariffs to reduce bills and cut emissions.	#1.2: Update the rules on “green tariffs” to be based on their customers’ actual demand (“24/7 energy matching”).	#1.1: Introduce local electricity pricing to encourage smart tariffs.  #1.3: Task industry or an independent body with developing a new framework for “green tariffs” that is consistent with local electricity pricing.
#2: Maintain and reform the Energy Price Cap, and enhance market stability.	#2.1: Maintain the price cap but consider minor reforms such as updating the cap more regularly.  #2.3: Introduce financial “stress tests” for energy suppliers.  #2.4: Put proposed switching reforms on hold.	#2.2: Consider alternatives and more substantial changes to the price cap, for example a “social tariff” or a “relative price cap”.
#3: Expand the regulatory framework to capture new market participants.	#3.1: Improve regulation of third-part intermediaries (TPIs) by requiring suppliers only to work with TPIs that meet certain conditions.	#3.2: Ofgem should develop a regulatory regime for TPIs.  #3.3: Monitor the market for “Energy-as-a-Service” offerings and consider whether rule changes are needed.
#4: Rollout the smart technology needed for smart tariffs.	#4.1: Legislate to require all electricity-hungry devices to be smart, including heat pumps and air conditioners.	#4.2: Accelerate the rollout of smart grid technology, including live metering and control systems on local distribution networks.

These recommendations are designed to harness the enablers of and tackle the barriers to the future of energy retail, which were identified in Section 3. Table 11 maps the themes to the relevant enablers and barriers.

Table 11: Mapping recommendations to enablers and barriers.

Recommendations	Enablers and barriers
Theme #1: Encourage smart tariffs to reduce bills and cut emissions.	Enabler 1: Smart pricing
Theme #2: Maintain and reform the Energy Price Cap, and enhance market stability.	Barrier 2: Maintaining customer protection
Theme #3: Expand the regulatory framework to capture new market participants.	Barrier 1: Regulatory framework breaking down
Theme #4: Rollout the smart technology needed for smart tariffs.	Enabler 2: Smart devices

## Comparison with the Government's Retail Energy Strategy

There are seven main areas where this report differs from the Government's Retail Energy Strategy, which was published in July 2021. These differences are listed in Table 12.

Table 12: Differences between the Retail Energy Strategy 2021 and the recommendations in this report.

Proposal	Retail Energy Strategy (BEIS)	Policy Exchange recommendations (this report)
Promote new retail offerings, including smart tariffs.	<p>In the long term (“late 2020s”) the Government proposes to reform the market framework to support new business models (including energy-as-a-service offerings).</p> <p>The Government also proposes changes to “system costs and price signals” to incentivise behaviours that assist decarbonisation (e.g. charging of EVs overnight).</p>	<p>Policy Exchange argues that local pricing and smart tariffs should be the centrepiece of the Government’s strategy for the retail energy sector (Recc #1.1).</p> <p>We argue that these changes should start now, so that they can be implemented in the medium term (2024 onwards). We estimate that these changes would take around 5 years to implement.</p>
Reform “green tariffs”.	<p>In the medium term (2024 onwards), the Government proposes reforms to “green tariffs” to ensure that customers are accurately informed about their personal contribution to Net Zero.</p>	<p>In the short term (2022-23), Policy Exchange proposes short-term reform to the existing regulatory framework governing green tariffs (Recc #1.2).</p> <p>In the medium term, Policy Exchange argues that industry or an independent body should be responsible for developing a framework for green tariffs that would work with local pricing (Recc #1.3).</p>
Consider alternatives and more substantial changes to the price cap, e.g. a “social tariff” or a “relative price cap”.	<p>The Government currently views switching as the main alternative to the price cap.</p>	<p>Policy Exchange argues that a “relative price cap” or a “social tariff” could be an alternative in the medium term. However, a social tariff would require a robust methodology to identify vulnerable and low-income households (Recc #2.2).</p>
Switching reforms: Opt-in and opt-out.	<p>The Government argues that these switching reforms should be trialled and/or introduced from the mid-2020s onwards.</p>	<p>Policy Exchange recommends putting the proposed switching reforms on hold (Recc #2.4).</p>
Prevent suppliers from locking in customer to long-term “Energy-as-a-Service” deals.	<p>The Government and Ofgem have not yet proposed any changes to existing rules that protect energy customers.</p>	<p>Policy Exchange argues that, in the medium term, the Government should consider rule changes to ensure that customers are not unfairly locked into deals that combine hardware and energy (Recc #3.2).</p>
Require all EVs and heat pumps to be smart.	<p>The Government is currently only applying smart regulations to EV chargepoints, not heat pumps.</p>	<p>Policy Exchange argues that the Government should legislate to require all electricity-hungry devices to be smart, including heat pumps (Recc #4.1).</p>
Accelerate the rollout of smart grid technology, including live metering.	<p>Ofgem has approved investments in smart grids and live metering through the regulatory regime (RIIO).</p>	<p>Policy Exchange argues that the Government and Ofgem should prioritise investment the smart grid technology needed for smart tariffs (Recc #4.2).</p>

# Glossary of Terms

Term	Definition
24/7 energy matching	A system of verifying “green” electricity supply. Under 24/7 energy matching, a supplier would have to demonstrate that their customers’ electricity demand has been met with renewable/low-carbon energy sources in every trading period.
Aggregator	Company that coordinates or “aggregates” generation and/or demand from a large number of generators and/or customers. For example, an aggregator could “aggregate” the response of EV chargepoints at hundreds of homes to reduce demand at peak periods.
Auto-switching service	Company that automatically switches customers between energy suppliers.
Balancing Mechanism (BM)	Market that the ESO uses to balance supply and demand for electricity in real-time. The ESO uses the BM to resolve network constraints.
BEIS	Department for Business, Energy & Industrial Strategy. UK Government department responsible for business, energy and industrial strategy.
Big Six	The six legacy gas and electricity suppliers in Great Britain (Centrica, E.ON, nPower, Scottish Power and SSE). Note: E.ON has since purchased nPower and retired the brand. And, OVO Energy has bought the domestic supply business of SSE.
Biogas	Gas produced from biological sources (e.g. food waste, crops). Same chemical element (methane) as “natural gas”, otherwise known as “fossil gas”.
Climate Change Committee (CCC)	Independent statutory body advising the UK and devolved governments on emissions targets and preparing progress reports to Parliament.
Carbon dioxide (CO <sub>2</sub> )	Carbon dioxide (CO <sub>2</sub> ) is the main component of man-made greenhouse gas emissions. The vast majority of man-made CO <sub>2</sub> emissions come from the burning of fossil fuels.
Competition and Markets Authority (CMA)	The UK’s independent competition regulator. The CMA can undertake investigations into Great Britain’s energy market. The CMA also hears appeals by network companies against certain decisions made by the regulator Ofgem.
Constraint costs	Constraints on the electricity network occur when a power line cannot transmit any more electricity. When this happens, the network is said to be “constrained”. To resolve constraints, the ESO pays generators to turn down. These costs are called “constraint costs”.
Contracts for Difference (CfD)	Main support scheme for renewable energy generators in Great Britain. Generators receive a fixed price for their electricity, with payments based on the difference between the wholesale price and a fixed “Strike Price”.
Default Tariff Cap	Technical name for the Energy Price Cap. See <i>Energy Price Cap</i> .
Distribution Network Operator (DNO)	DNOs own and operate Great Britain’s regional electricity distribution networks. There are six DNOs in Great Britain (Electricity North West, Northern Powergrid, SP Energy Networks, SSE Networks, UK Power Networks, Western Power Distribution).  Also applies to gas distribution networks (known as “GDNs”). The GDNs are: Cadent Gas, Northern Gas Networks, SGN, and Wales & West Utilities.
District Heating	A communal heating system that heats multiple buildings using a shared pipe network that contains hot water.
Economy 7	A tariff that offers customers seven hours of cheap electricity per day, typically overnight. Economy 7 tariffs are accompanied by a bespoke Economy 7 meter. Economy 7 meters are no longer installed.
Electric Vehicle (EV)	EVs include cars powered by batteries (BEVs) and plug-in hybrids (PHEVs), which have both a battery and a petrol/diesel engine.

Electricity Market Reform (EMR)	A significant recent programme of electricity market reform in Great Britain. Implemented through the Energy Act 2013.
Electricity System Operator (ESO)	See <i>National Grid ESO</i> .
Emissions Trading Scheme (ETS)	A scheme that sets a cap on the maximum level of emissions from particular industries in a region. Emitters must purchase “ETS permits” and the number of these available declines over time, in order to reduce overall emissions in that region. Companies can trade emissions permits. The UK and EU both operate an ETS.
Energy-as-a-Service (EaaS)	Traditional energy supply sells customers energy as a variable community charge (e.g. pence per kWh of electricity or gas). EaaS is different, because it offers customers “outcomes” rather than selling them a commodity. For example, an EaaS contract could offer customers a guaranteed minimum temperature in their house over the winter period, in return for fixed monthly payments.
Energy Company Obligation (ECO)	A Government-mandated programme that requires suppliers to install free energy efficiency measures in the homes of fuel-poor customers.
Energy Price Cap	The Energy Price Cap sets a maximum price that suppliers can charge their customers who are on a supplier’s variable (of “default”) tariff. The price cap was implemented through the <i>Domestic Gas and Electricity (Tariff Cap) Act 2018</i> . The price cap is set by Ofgem and is currently updated every six months.
Energy retail	See <i>retail electricity market</i> .
Feed-in Tariff (FiT)	A subsidy scheme for small-scale renewable energy projects, particularly small solar farms and solar panels installed on domestic rooftops. The FiT scheme is closed to new entrants
Flexibility	Flexibility describes customers/generators that increase/decrease their generation/demand to help balance the electricity grid. Customers and generators are typically paid to provide these services, including through local “flexibility markets”.
Fuel poverty / fuel poor	Customers who struggle to afford their gas and electricity bills. The four UK nations each use a different definition of fuel poverty.
Gas Distribution Networks (GDNs)	See <i>DNOs</i> .
GB electricity market	The electricity market covering Great Britain (England, Scotland and Wales).
Gigawatt (GW)	One gigawatt (1 GW) equals 1,000 megawatts (1,000 MW)
Green Homes Grant	A Government scheme that offers homeowners, social landlords and local authorities money to install energy efficiency measures in buildings. The Green Homes Grant started in September 2020. The residential element of the Green Homes Grant was closed in March 2021
Green tariff	An electricity tariff that is matched to low-carbon generation using renewable energy certificates, known as REGOs. See <i>REGOs</i> .  May also refer to “green gas”, which could refer to biogas and/or conventional gas matched to carbon offsets.
Half-hourly settlement (HHS)	For customers with smart meters, suppliers can be settled based on their customers’ actual consumption in each half-hourly trading period. This is known as “half-hourly settlement”.
Heat pump	A device used to warm water and/or air using a refrigeration cycle. For home heating, a heat pump typically warms water using heat extracted from the outdoor air.
Hedging	A risk management strategy used to reduce energy suppliers’ exposure to volatility in future wholesale gas and electricity prices.

Industry levy	A levy on energy suppliers that is used to recover the cost of suppliers that have gone bankrupt. Typically refers to the levy used to recover the cost of the SoLR process. See <i>Supplier of Last Resort</i> .
Kilowatt (kW)	Measure of installed capacity. The maximum instantaneous output of a generator. 1 kW = 1,000 Watts (W)
Kilowatt-hour (kWh)	Measure of energy. For example, a customer that generates 1 kW of electricity for one hour consumes 1 kWh of electricity.
Local pricing	A wholesale electricity market split into a large number of nodes. For example, the California electricity market has approximately 10,000 pricing nodes.
National Grid Electricity System Operator (National Grid ESO, or ESO)	The Electricity System Operator for Great Britain, a company within the National Grid group, is responsible for balancing the electricity system's supply and demand to ensure a stable, high-quality supply of electricity. The ESO is also responsible for many aspects of network planning and procures a range of "system balancing services" on behalf of energy users.
Net Zero	A target of zero overall greenhouse gas emissions across an economy or for a company. For example, the UK Government has committed to Net Zero emissions across the UK by 2050. The "Net" in Net Zero refers to a balance between positive emissions (e.g. from burning fossil fuels) and negative emissions (e.g. from planting trees or capturing carbon dioxide from the air).
Market-wide Half Hourly Settlement (MHHS)	An Ofgem programme to introduce HHS for all domestic customers by October 2025.
Megawatt (MW)	1 MW = 1,000 kW
Megawatt hour (MWh)	1 MWh = 1,000 kWh
Network costs / network charges	The cost of building and maintaining the electricity and gas transmission and distribution networks. These "network costs" are recovered from both generators and customers through "network charges".
Network company	A transmission owner (TO) or a distribution network operator (DNO)
National pricing	A wholesale electricity market with the same price in all locations in each time period (i.e. a single bidding zone). For example, Great Britain uses national pricing.
Nodal pricing	See <i>Local pricing</i> .
Ofgem	The Office for Gas and Electricity Markets (Ofgem) is the regulator for gas and electricity in Great Britain.
Policy costs	The cost of Government policies that are recovered from energy bills through suppliers. Policy costs include "climate change policies" (also known as "environmental policies") and "social policies", which includes the WHD and ECO schemes.
Price comparison website (PCW)	A website that customers can use to compare tariffs from multiple energy suppliers.
Regional pricing	A wholesale electricity market split into a number of zones that cover a geographical region of that market. For example, the Italian electricity market has 6 zones.
Relative price cap	A policy that would cap the difference between the most expensive and least expensive tariffs offered by energy suppliers.
Renewable Energy Guarantee of Origin (REGO)	A scheme for verifying electricity generated by renewable energy projects. Projects earn one REGO for each MWh of electricity generated. Suppliers can use REGOs to evidence a "green" energy tariff.
Renewables Obligation (RO)	A subsidy scheme for renewable energy projects that closed to new entrants in March 2017. Under the scheme, projects earned money by selling Renewable Energy Certificates to energy suppliers.
Renewables Obligation Certificates (ROCs)	See <i>Renewables Obligation</i> .

Retail electricity market	Electricity supplied to customers, including domestic customers and small businesses. Retail electricity is more expensive than wholesale electricity because it includes network charges and the cost of subsidies and fuel poverty obligations.
Self-generation	Electricity and/or heat generation by households, for example using solar panels or solar-thermal water heaters.
Settlement	Energy suppliers are billed (or “settled”) for how much energy their customers use in each trading period. For customers without Smart Meters, suppliers are billed based on estimated consumption in each trading period.
Smart home service	A digital service (typically app-based or online) that can control certain electrical devices in a home. For example, a smart home service could control boilers, heat pumps, electric vehicle chargepoints, lights, etc.
Smart Meter	A “Smart Meter” is an electricity or gas meter that can record and share real-time consumption with a customer and their supplier.
Smart electricity tariff	An electricity tariff that offers customers lower prices during certain periods, for example off-peak. Smart tariffs include time-of-use tariffs (TouTs).
Social and climate policies	See “policy costs”. Includes the cost of the CfD, FiT and RO schemes.
Social tariff	A “social tariff” would require suppliers to offer lower prices to low-income customers, funded through higher bills for other customers.
Standard Variable Tariff (SVT)	A supplier’s default tariff. Unlike fixed-price tariffs, suppliers can change the price of their SVT when they choose, subject to the cap imposed by the Energy Price Cap
Standing charge	A fixed, daily charge on gas and electricity bills, measured in pence per day (p/day).
Stress test	A test designed to assess the financial health of a company in the face of potential future market shocks. For example, the Bank of England stress tests banks and insurance companies.
Supplier	A licensed company that supplies customers with gas and/or electricity. To be a supplier, a company must hold a “Supply Licence” and sign up to various industry codes.
Switching	A customer “switches” their energy supplier when they move to a new supplier. Customers can also switch to a new tariff offered by their existing supplier, for example from a variable tariff to a fixed-price tariff.
System balancing services	The ESO procures system balancing services to manage the technical parameters of the electricity network to prevent blackouts. These services include frequency regulation, voltage control, inertia, and constraint management.
Third-Party Intermediary (TPI)	A company that provides energy services to customers <u>but is not a regulated “supplier”</u> . Includes <i>aggregators, auto-switching services, price comparison websites</i> and more.
Time-of-use tariff (TouT)	An electricity tariff that varies at different times of day. TouTs can be static (i.e. vary according to a published schedule) or dynamic (changing based on underlying wholesale prices, which can vary significantly from one day to the next).
Transmission Owners (TO)	The privately-owned regional monopolies that own the electricity transmission networks in Great Britain. The TOs are National Grid Electricity Transmission (England and Wales), Scottish Power (South Scotland), and SSE Networks Transmission (North Scotland).  Also applies to the gas transmission network, which is owned by National Grid Gas Transmission (NGGT).
Uniform pricing	See <i>National pricing</i> .
Unit rate	The incremental price that customers pay for each additional unit of electricity or gas consumed, measured in pence per kWh (p/kWh).



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Vulnerable customers	Energy customers in a “vulnerable situation”. In the Electricity Supply Standard Licence Conditions, Ofgem describes a vulnerable situation as a customer in a situation where they are: <ul style="list-style-type: none"><li>a. Significantly less able than a typical Domestic Customer to protect or represent his or her interests; and/or</li><li>b. Significantly more likely than a typical Domestic Customer to suffer detriment or that detriment is likely to be more substantial.</li></ul>
Warm Home Discount (WHD)	A Government bill subsidy scheme that offers a bill rebate of £140 to certain low-income customers.
Wholesale electricity market	Main market for generators and suppliers to buy and sell electricity. Prices do not include network charges and the cost of subsidies (see <i>retail electricity market</i> ).
Winter Fuel Payments	A Government scheme that pays some older people between £100 and £300 per year over winter to help with heating bills.
Zonal pricing	See <i>Regional pricing</i> .



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Policy Exchange  
8 - 10 Great George Street  
Westminster  
London SW1P 3AE

[www.policyexchange.org.uk](http://www.policyexchange.org.uk)