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Industry and Regulators Committee

1st Report of Session 2021–22

The net zero transformation: delivery, regulation and the consumer

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Industry and Regulators Committee

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Declaration of interests

See Appendix 1.

A full list of Members' interests can be found in the Register of Lords' Interests:
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Evidence is published online at <https://committees.parliament.uk/work/1320/ofgem-and-net-zero/publications/> and available for inspection at the Parliamentary Archives (020 7219 3074).

Q in footnotes refers to a question in oral evidence.

SUMMARY

The Government has made a bold commitment to reaching net zero by 2050, enshrined in legislation, and to running a net zero power system by 2035. Official estimates by the Climate Change Committee (CCC) states that by 2030 investment needs to be ramped up to £50 billion a year—approximately a third of core NHS funding—across the whole economy to achieve net zero. This will include investments in new forms of energy generation and usage and in adapting and optimising existing infrastructure. We are not persuaded that the necessary level of policy detail is in place to achieve these commitments. There is a very large gap between the ambitious targets and the extensive investment required from businesses and individuals. We have been told that there is substantial UK and international private capital waiting to fund new technologies, but clarity is needed if we are to take advantage of it.

Given the scale of change involved in transforming the energy system by 2035, the Government must act urgently to make the necessary decisions and set out the detailed policies and funding models to allow investment to flow into the sector. We recognise that it is too early to know exactly what technologies will work, requiring a roadmap that allows for adjustment over time whilst giving sufficient certainty for investment. These details include: ensuring sufficient generation to meet the potential two- to threefold expansion of electricity demand, forecast in the Sixth Carbon Budget; a decision on the role of hydrogen in the heating system; the building of carbon capture and storage facilities to decarbonise natural gas; the development of new nuclear—including Small Modular Reactors—to replace existing reactors; and the provision of backup facilities, including stand-by generation and storage, to ensure continuous supply to cope with the intermittency of wind and solar power.

If the power system is not decarbonised by 2035, reaching net zero by 2050 will be extremely difficult. There was widespread scepticism from witnesses that the target will be met without further policy detail. Failing to deliver on such a target would have significant negative consequences and would see the UK lose out on potential industrial benefits in terms of technology and jobs which could result from having a leadership position in the global energy transition. Equally an absolute commitment to meeting these targets is likely to require accepting significant additional costs for consumers and taxpayers. These policy trade-offs need to be managed at the highest level of government.

A clear indication of how and when we pay for the transition is crucial to encourage investment. The transition will require substantial funding and we are concerned that any component falling on billpayers falls disproportionately on lower-income groups. Charges on bills are only a fraction of the required amount and the Government has yet to explain how the remainder will be raised. The Government needs to set out clearly how the transition will be paid for and we believe government borrowing should be one of the options it considers, especially given considerations of intergenerational fairness. The Government's current plans to use a Regulated Asset Base (RAB) model for funding nuclear—requiring current billpayers to pay from the moment of construction—will add to impending cost rises.

Responding to climate change is a crucial part of energy policy but cannot be pursued in isolation from the Government's responsibility for ensuring a secure energy supply. In a more weather-dependent, renewables-based system,

security will be delivered by having a diverse range of sources of energy, from the traditional such as nuclear and natural gas, increasingly matched by carbon capture and storage, to newer technologies such as hydrogen, demand flexibility and storage. The Government must set out how it will ensure a secure supply of energy, including what public policy instruments and funding models will be used for each activity it intends to rely on. The aim in each case should be to establish a business model with sufficient credibility to secure large-scale private sector investment. As part of this, the Government should set out what role it envisages gas playing in the future energy system, given its important status as a backup, and how it will ensure an affordable supply of gas, given the issues caused by the current high price.

A suitable institutional architecture is crucial to delivering the transition. The current arrangements are not sufficient and the Government needs to address this immediately. To provide the necessary political and policy leadership across Whitehall, an Energy Transformation Taskforce within government responsible for co-ordination, strategic planning and delivery monitoring—reporting directly to the Prime Minister through a Cabinet sub-committee—should be established. Any delay is highly likely to lead to failure to meet the net zero target given the lead time for complex infrastructure projects and the lifespan of any assets put in place now. The Taskforce must be set up at the heart of government to progress the urgent decisions necessary for the transition and to advise on and monitor their implementation across all departments and agencies.

We welcome the Government and Ofgem's proposals for an independent Future System Operator (FSO), responsible for the planning and design of a secure, decarbonised energy system, using its technical expertise to report to the Government and Ofgem on what is needed to enable this. However, the FSO will also need to be given clear direction by the Taskforce, to ensure technical experts are not being asked to make political decisions.

Ofgem will play a significant role and it is important to review its responsibilities to ensure it is not a barrier to a net zero energy system. We do not believe that Ofgem should have a co-ordinating or political role in the transition; it should maintain its existing responsibilities for economic regulation and consumer protection. Explicit reference to having due regard to net zero should be added to its duties, bringing it in line with other regulators and ensuring its regulation does not act as a barrier to decarbonisation. However, it is inevitable that there will be political or distributional trade-offs in Ofgem's meeting its objectives, so the Government must give greater guidance to Ofgem in how to manage these trade-offs in the planned but long-delayed Strategy and Policy Statement.

The energy system is changing dramatically, moving from a centralised model with little consumer involvement to a decentralised system where consumers can generate and store energy and provide flexibility to the grid. However, the regulatory system can be too slow and difficult to change. Ofgem is often too cautious in its approach to allowing new business models into the retail energy market and a static set of codes and licences hampers attempts to innovate in ways that can help consumers through the transition. We are also concerned that network price controls have the potential to stifle investment at the exact moment it is most needed. Ofgem must be more open to innovative new companies and to enabling investment. The governance of the energy system is the product

of a previously more settled era and needs to become more responsive to the dynamic transformation required to implement the transition to net zero.

Consumer protection should remain central to Ofgem's work. The recent spate of failing energy suppliers is evidence that it has failed in this regard, having focused excessively on customer switching as one narrow measure of competition in the sector. This has led to short-term price competition that, combined with a lack of regulation over the sustainability of companies who have entered the retail energy market, has created greater cost and uncertainty for consumers. Recent events have shown how important energy costs are to the cost of living. Ofgem needs to implement a robust approach to the licensing and supervision of suppliers, akin to the supervisory regime that financial services are subject to—including capital requirements and a fit and proper persons test—while remaining open to new business models that benefit consumers. In a marketplace of new services and product offerings, Ofgem's regulation will be crucial in upholding standards and ensuring that confusion and a lack of knowledge on the part of consumers does not lead to exploitation.

Consumers will have a crucial role in the transition and the Government will need to engage them in supporting net zero, including adapting their energy usage. Currently, there is confusion on what is expected of consumers, the measures needed for the transition and how we will foot the bill at a time of high energy costs. The Government must set out and explain what is expected of citizens, how much it might cost them both as taxpayers and billpayers, how it might impact their lifestyles and what benefits there will be.

The net zero transformation: delivery, regulation and the consumer

CHAPTER 1: INTRODUCTION

Background

The UK's energy sector

1. The energy sector comprises several participants including: the generators and producers of gas and electricity; the suppliers of that energy to consumers who purchase the electricity or gas from the generators/producers; and the distribution and transmission networks that transport that gas and electricity to the consumer.
2. The Office of Gas and Electricity Markets (Ofgem) is the UK's energy regulator, covering both the electricity and gas sectors. It operates within a statutory framework set by Parliament that establishes its duties, including a primary duty to protect the interests of current and future consumers. Ofgem regulates energy suppliers and their interaction with consumers through supply licences and operates the default tariff cap which the Government introduced in 2018, adjusting the cap every six months to take account of underlying energy costs. Ofgem also regulates monopoly energy networks through its price controls and network charging regime, which limits the amount of money that can be earned by network companies over the length of a price control period, in order to manage the potential impact on consumer bills.

The timeline for net zero

3. The Government legislated in 2019 for the target of reaching net zero carbon emissions by 2050.¹ The Government subsequently legislated in 2021 to bring the Sixth Carbon Budget into law, with a target of reducing emissions by 78 per cent by 2035 compared to 1990 levels.² When setting the Sixth Carbon Budget, the Climate Change Committee (CCC)—an independent statutory body that advises the UK Government and devolved governments on emissions targets and reports to Parliament on progress made in reducing emissions—outlined that it would require a fully decarbonised energy system by 2035.
4. In its Net Zero Strategy, published 19 October 2021, the Government confirmed that it would set the target of a fully decarbonised power system by 2035, subject to security of supply. The Net Zero Strategy³, which set out the Government's overall approach to reaching net zero across the economy

1 The Climate Change Act 2008 (2050 Target Amendment) Order 2019 ([SI 2019/1056](#))

2 The Carbon Budget Order 2021 ([SI 2021/750](#))

3 HM Government, *Net Zero Strategy: Build Back Greener* (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf [accessed 23 February 2022]

and society, and the Heat and Buildings Strategy,⁴ which set out a number of policies aiming to decarbonise buildings, including housing, include a number of policies and targets that relate to the energy sector.

Our inquiry

5. The Industry and Regulators Committee launched its inquiry on 23 June 2021. We received a number of written submissions and held oral evidence sessions with 21 panels of witnesses from June to November. We are grateful to all our witnesses. We also thank our Special Advisers Nick Butler and Anthony Pygram.

Structure of this report

6. This report considers the institutional architecture required to support the transition to net zero, including the role of Ofgem within it. Chapter 2 provides an overview of the main participants in the energy market and a summary of some of the issues that need to be settled for a plausible transition. The question of how the transition is to be funded is also considered.
7. Chapter 3 reviews the institutional architecture supporting that transition, focusing in particular on the role of the proposed Future System Operator (FSO), co-ordination between the various organisations with a role to play in securing net zero and the strategic planning and delivery monitoring necessary to reach net zero. The chapter also considers whether a statutory duty to promote net zero should be added to Ofgem's remit.
8. Chapter 4 considers in more detail the role of Ofgem. It reviews the operation of the price cap, the readiness of consumers for the transition to net zero, the importance of engaging with consumers and the potential for an increasingly decentralised energy-as-a-service market. Finally, we consider Ofgem's role as a consumer protection body, particularly in light of recent energy supplier failures.
9. **We make this report to the House for debate.**

4 Department for Business, Energy and Industrial Strategy, *Heat and buildings strategy*, CP 388 (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1044598/6.7408_BEIS_Clean_Heat_Heat_Buildings_Strategy_Stage_2_v5_WEB.pdf [accessed 23 February 2022]

CHAPTER 2: THE CHALLENGE OF THE NET ZERO TRANSFORMATION

Missing policy implementation detail on the transition to net zero

10. Given an ambition to achieve net zero by 2050, detailed policies to secure that end are crucial. Most of our witnesses recognised that the Government's targets were ambitious, but all agreed that greater detail is needed on implementation. Before the October release of the Net Zero Strategy, Catherine Mitchell, Professor of Energy Policy at the University of Exeter, told us that there was a "real problem" of decisions being avoided. Chris Stark, CEO of the Climate Change Committee (CCC), told us that that the decade to 2030 is crucial, given that investment in high-carbon assets now ensures their continued use, meaning that it is important for the Government to come forward with policies to promote further investment in low-carbon options now. As Mr Stark said: "This is the point when we need to see the policies."⁵
11. Following publication of the Net Zero Strategy⁶, the Heat and Buildings Strategy⁷ and the Net Zero Review⁸ in October 2021, witnesses disagreed about the extent to which the announcements provided enough clarity regarding the path to net zero. Tim Lord, Senior Fellow at the Tony Blair Institute for Global Change, argued that there was now "a lot more clarity than there was ... the Government [is now] translating that [goal] into a clearer set of targets on a sectoral basis, for example by saying that they want to achieve a zero carbon power sector by 2035."⁹
12. In its subsequent independent assessment of the Net Zero Strategy, the CCC welcomed the ambition of the Strategy and its setting out of how the Government will tackle some of the major cross-cutting challenges involved in the transition.¹⁰ The CCC also welcomed the fact that across the economy the Government had proposed or begun to implement credible mechanisms to drive delivery and rapidly scale up private investment. However, the assessment set out some key issues that needed to be resolved quickly to make the Strategy a success, noting that the Government has not put forward plans for a Net Zero Test for policy and planning decisions. The CCC also raised concerns that there was less emphasis on demand-side measures than in the Committee's scenarios, potentially making the transition harder.

5 [Q 61](#)

6 HM Government, *Net Zero Strategy: Build Back Greener* (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf [accessed 23 February 2022]

7 Department for Business, Energy and Industrial Strategy, *Heat and buildings strategy*, CP 388 (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1044598/6.7408_BEIS_Clean_Heat_Heat_Buildings_Strategy_Stage_2_v5_WEB.pdf [accessed 23 February 2022]

8 HM Treasury, *Net Zero Review: Analysis exploring the key issues* (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026725/NZR_-_Final_Report_-_Published_version.pdf [accessed 23 February 2022]

9 [Q 141](#)

10 Climate Change Committee, *Independent Assessment: The UK's Net Zero Strategy* (26 October 2021): <https://www.theccc.org.uk/publication/independent-assessment-the-uks-net-zero-strategy/> [accessed 23 February 2022]

Business models

13. Simon Virley, Head of Energy and Natural Resources at KPMG, told us that the Net Zero Strategy is very helpful in providing the direction of travel, but given the amount of capital needed, more detail is required on policy and regulation to unlock the scale of investment as there are gaps that investors want to see filled as soon as possible.¹¹ The details witnesses referred to most often were those relating to the funding models (often referred to as “business models”) for new technologies, decisions on encouraging forms of energy generation, such as nuclear, and reform of the energy market. Darryl Murphy, Head of Infrastructure at Aviva Investors, told us that the “capital is there, but those models are not yet ready”.¹²
14. The Government has a range of potential interventions to choose from in order to reduce investment risk and support viable business models in each chosen area of technology investment. Those described by witnesses included carbon pricing, Contracts for Difference (CfDs), adjustments to regulatory investment returns and co-investment as well as tax incentives and direct subsidies. The choice of intervention will need to be matched to each technology in order to create the right incentives and will impact how much of the cost falls on consumers or taxpayers and how much falls on current or future generations.
15. Mr Virley told us that hydrogen was a clear example of the need for business models:

“The Government have given a very clear signal in the hydrogen strategy about the important role that hydrogen is going to play in getting to net zero, but my clients are still waiting for the detailed business models: i.e., what is the subsidy rate that will be available to convert industrial plants to hydrogen? We have been waiting for that for some time.”¹³

Mr Virley also called for the Government to establish a business model for long-duration storage¹⁴, suggesting that the cap-and-floor regime¹⁵ used for interconnectors could be appropriate. Mr Murphy outlined that investment in storage is “quite difficult” as it is a new technology but noted that progress is being made on carbon capture, use and storage. Mr Lord argued that “the incentives are not there to get capital flowing” into the technologies that will be needed for the net zero transition, particularly hydrogen, carbon capture and storage and domestic heat pumps.¹⁶ National Grid’s Claire Dykta also called for clarity on business models for new technologies such as hydrogen and carbon capture and storage as an enabling condition in the next couple

11 [Q 167](#)

12 [Q 167](#)

13 [Q 167](#)

14 Long-duration energy storage encompasses a group of current and new technologies, including batteries, that can be used to store energy for prolonged periods, with the aim of providing flexibility to the electricity grid to manage the variability caused by intermittent, weather-based sources of renewable energy.

15 Ofgem operates a cap and floor regime for the development of electricity interconnectors in the UK, which link the UK’s electricity grid to other countries, allowing for the import and export of electricity. The regime was introduced to reduce the financial risks to developers of interconnectors, by setting a yearly maximum cap and minimum floor that the interconnector can earn over a 25-year period. Top-up payments are made to the developer if generated revenues are lower than the floor and the developer pays back any revenues in excess of the cap.

16 [Q 143](#)

of years. As Mr Virley concluded: “It is all about the implementation—the detail now of those business models to unlock the investment.”¹⁷

16. Mr Virley also said that he was “puzzled” that the Government does not use carbon pricing to provide a greater price signal, suggesting that hydrogen and carbon capture and storage would be less reliant on subsidy in such an environment. He argued that the Government should give greater long-term clarity on carbon pricing rather than announcing prices annually at the Budget, suggesting that this is a “big gap”.¹⁸

The energy mix

17. There is an expectation that the increased use of electricity in transport, buildings and industry will lead to increased overall demand for electricity. In the Sixth Carbon Budget, the CCC estimated that in its Balanced Pathway, electricity demand “rises 50% to 2035, doubling or even trebling by 2050”.¹⁹ Alongside the target to decarbonise the power sector by 2035, this will require a large increase in the generation of low-carbon electricity.
18. The Government plays a key role in determining the amount of energy the UK generates, and from what sources. It does this through its management of two policies, and markets that flow from them, that are influential in deciding how energy is generated in the UK: Contracts for Difference and the Capacity Market.
19. The Contracts for Difference (CfDs) scheme is the Government’s main mechanism for supporting low-carbon electricity generation.²⁰ CfDs pay developers of renewable energy projects with high upfront costs and long lifetimes a flat rate, indexed to the market, for the electricity that they produce over a 15-year period. This provides direct protection from volatile wholesale prices. CfDs are allocated to companies through auctions. So far, there have been three rounds of auctions, with a fourth having begun in December 2021. At each auction, the Government decides how much electricity it aims to secure and how much funding is available to secure it. The Government argued that the fourth allocation round will secure more renewable electricity capacity than the previous three rounds combined and is open to an expanded number of renewable energy technologies.²¹
20. Lord Adair Turner, Chair of the Energy Transitions Commission, told us that the Government needs to outline the specific CfDs auction schedule through the 2020s that will deliver the target of 40 gigawatts (GW) of offshore wind by 2030.²² Solar Energy UK called for more frequent auctions, and for decisions about the CfD to be aligned with the delivery of carbon budgets and the net zero target.²³

17 [Q 167](#)

18 [Q 170](#)

19 Climate Change Committee, *The Sixth Carbon Budget* (December 2020): <https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf> [accessed 23 February 2022]

20 Department for Business, Energy and Industrial Strategy, ‘Contracts for Difference’ (December 2021): <https://www.gov.uk/government/publications/contracts-for-difference/contract-for-difference> [accessed 23 February 2022]

21 Department for Business, Energy and Industrial Strategy, ‘Biggest ever renewable energy support scheme opens’ (13 December 2021): <https://www.gov.uk/government/news/biggest-ever-renewable-energy-support-scheme-opens> [accessed 23 February 2022]

22 [Q 82](#)

23 Written evidence from Solar Energy UK ([ONZ0017](#))

21. On 9 February 2022, the Government announced that from 2023, it would move to annual CfD auctions, rather than every two years as they have been held previously. The Government argued that this underlines its commitment to “accelerating the deployment of low-cost, low-carbon electricity generation.”²⁴
22. The Government also provides support for more traditional fuel-based energy generation through the Capacity Market. The Capacity Market ensures a secure electricity supply by providing payments to reliable sources of electricity capacity to ensure they deliver energy to the system where it is needed, particularly at times when weather-based renewables are not providing enough electricity to the grid.²⁵
23. Mr Lord called for broader institutional reform of the electricity generation market, which he argued is “structured around fossil fuel technologies” that have low construction costs but high running costs, emphasising that the new technologies that are needed have the opposite characteristics. He also suggested that generation, networks and consumers have been treated very separately, outlining that in “the next phase of the transition, you are going to see those three elements of the system having to come together in very different ways”. He called for Ofgem and the Government to lead a process of “fundamental reform”, suggesting that this has to happen quickly because of the time that it would take.²⁶
24. Juliet Davenport, Founder of Good Energy, a renewable energy supplier, set out the benefits of rethinking the way the Capacity Market works, arguing that new benefits including customer flexibility and batteries are being “isolated in a separate marketplace”, instead calling for them to be reflected in the wholesale market to ensure better pricing for consumers and greater flexibility to the grid.²⁷
25. The Government also has a role in deciding the role that technologies such as nuclear energy will play in the system and providing the incentives to ensure sufficient capacity. Paul Spence, Director of Strategy and Corporate Affairs at EDF Energy, said that EDF wanted detail on “the Government’s view on how much nuclear they would like to see and the mechanism that is going to be used to support the financing of that nuclear project.” He suggested that a different financing mechanism is needed to the Hinkley Point C nuclear power station project as it would be too large a burden on EDF’s balance sheet, stating that a regulated asset base (RAB)²⁸ structure would be a way of recognising some of the costs as the project is carried out.²⁹ In October 2021, the Government announced that it would introduce the RAB model

24 Department for Business, Energy and Industrial Strategy, ‘Government hits accelerator on low-cost renewable power’ (9 February 2022): <https://www.gov.uk/government/news/government-hits-accelerator-on-low-cost-renewable-power> [accessed 23 February 2022]

25 Department for Business, Energy and Industrial Strategy, ‘Capacity Market’ (1 March 2019): <https://www.gov.uk/government/collections/electricity-market-reform-capacity-market> [accessed 23 February 2022]

26 [Q 142](#)

27 [Q 115](#)

28 The Regulated Asset Base (RAB) model is used by the UK to enable the delivery of infrastructure in a number of areas, including in energy networks. The RAB model allows the costs of infrastructure delivery to be charged to consumers through their bills, with the level of costs incurred, investment allowed and returns received by the company overseen by a regulator to ensure value for money. In the case of energy networks, Ofgem provides this oversight.

29 [Q 108](#)

for nuclear power projects, introducing the Nuclear Energy (Financing) Bill to Parliament.³⁰

26. Jake Rigg, Director of Corporate Affairs at National Grid Electricity System Operator (ESO), which operates the UK's electricity system and ensures security of supply, said that all of the ESO's scenarios for the future energy system "have an increased role for nuclear from today".³¹ Chris O'Shea, CEO of Centrica, argued that "nuclear is an essential part of electricity generation", alongside other technologies. He argued that "we have to get going to understand the mix that we want", noting the lead times for building nuclear power plants and other energy infrastructure.³²
27. This large increase in the amount of energy that the UK needs to generate, alongside the intermittent, weather-based nature of much of the UK's renewable energy, raises the issue of security of supply. The Committee heard differing views on the level of risk that a more renewables-based system poses for security of supply, with some arguing that the technology and data in the system can manage any increased risks,³³ while others suggested that there are "new opportunities and new challenges" to security of supply in a more renewables-based system and that this more complex system may increase costs.³⁴
28. Sir Dieter Helm, Professor of Economic Policy at the University of Oxford, outlined that this is because renewables create a "decentralised, zero-marginal-cost, disaggregated energy system", with a much larger number of generators and the ability to have more flexible demand and storage.³⁵ He argued that there needs to be large, centralised nuclear power stations and other plants, alongside more decentralised elements of renewables, flexibility and storage; "if you diversify your portfolio, you reduce the total risk of the portfolio".³⁶
29. Alejandro Hernández, Head of the Renewable Integration and Secure Electricity Unit at the International Energy Agency (IEA), also emphasised the importance of using demand flexibility, enabled by batteries in electric vehicles and households and by electric heating, to ensure greater security in the energy system by helping reduce consumption at moments of scarcity. He also emphasised the need for "an efficient basket of technologies" to enable security with a large share of renewables.³⁷ Mr Rigg, from the UK's system operator, also emphasised the need for a diverse energy mix that includes storage.³⁸
30. We also heard that there will be a continued role for fossil fuels in the energy system in the medium term, both in making blue hydrogen and when abated

30 Department for Business, Energy and Industrial Strategy, 'New finance model to cut cost of new nuclear power stations' (26 October 2021): <https://www.gov.uk/government/news/new-finance-model-to-cut-cost-of-new-nuclear-power-stations> [accessed 23 February 2022]

31 [Q 133](#)

32 [Q 111](#)

33 [Q 18](#)

34 [QQ 43, 74](#)

35 [QQ 43, 45](#)

36 [Q 45](#)

37 [Q 123](#)

38 [Q 133](#)

with carbon capture and storage.³⁹ Chris O’Shea, CEO of Centrica, outlined that the UK operates in a global gas market and does not produce all of its own gas, meaning that the UK is partially dependent on international supplies. He argued that “the more that we are self-sufficient in energy, the more insulated we are from ... price shocks”, suggesting a role for gas in the future because of its speed and responsiveness. However, he indicated that this does not have to be natural gas and could be zero-carbon hydrogen.⁴⁰ However, Mr Rigg suggested that “it is clearly part of the shift to net zero to be moving away from gas”, arguing that demand-side response is crucial to reducing the UK’s dependence on it.⁴¹

Offshore wind and the planning system

31. Claire Dykta, National Grid’s UK Head of Strategy, told us that the foundational energy infrastructure needs to be in place this decade, calling for the energy National Policy Statement, the institutional governance and the regulatory framework to be settled over the next two years. She argued that these are foundational issues and without clarity there is a danger of missing the delivery of the infrastructure; if this is not delivered this decade, “you are already in catch-up mode”.⁴²
32. Ms Dykta also said that there is a significant challenge in delivering the targeted 40GW of offshore wind generation by 2030, given that currently the UK only has 10GW of offshore wind generation and it takes approximately nine years to deliver new wind energy infrastructure.
33. Another significant component of delivering the offshore wind target is the planning regulations involved. Ms Dykta told us that:

“it is really important that we have clarity in the planning regime, and in national policy statements, so there is a very clear commitment to that infrastructure being delivered that then allows the network companies to deliver it so that it is an enabler to net zero and does not become a blocker.”⁴³
34. A similar point was made with respect to nuclear by Tom Samson, CEO of Rolls-Royce SMR, a consortium of investors majority owned by Rolls-Royce which has plans to build several small modular nuclear reactors. He stated that the main obstacle is “the planning process in trying to deliver at pace ... Working through the mechanisms to unlock some of those barriers in planning, siting and future locations for SMRs is very important.”⁴⁴

Decarbonising heat

35. A number of witnesses suggested that progress in decarbonising heat is slow. Dr Tony Ballance, Director of Regulation and Strategy at Cadent Gas, argued that the moving back of a potential mandate on hydrogen-ready boilers from 2025 to 2026 in recent announcements could work against the urgent need to develop hydrogen, arguing that an earlier decision would send a signal to

39 [QQ 91–92](#). Blue hydrogen is produced mainly from natural gas combined with heated water in the form of steam. This creates hydrogen and carbon dioxide meaning carbon capture and storage can be used to store the carbon.

40 [Q 111](#)

41 [Q 133](#)

42 [Q 136](#)

43 [Q 132](#)

44 [Q 183](#)

manufacturers. He argued that without a signal from government, “there is an unwillingness to go into full-scale production”.⁴⁵ Mr Lord also expressed concern that the decision on hydrogen on the gas network has been pushed back to 2026 and emphasised that the incentives for consumers to move to heat pumps are “not there at the moment” due to policy costs being focused on electricity bills rather than gas bills.⁴⁶ However, Chris O’Shea, CEO of Centrica, emphasised that there are some homes for which heat pumps are not an option due to a lack of insulation and the need for a water tank.⁴⁷

36. James Richardson, Chief Economist at the National Infrastructure Commission (NIC), said that there are still major questions to be answered following the publication of recent Government documents, including what level of insulation will be needed to efficiently operate heat pumps, whether hydrogen for heating will be available as a source of heat for all homes, what this means for the continuing use of the gas network, and how to deliver these major changes in people’s homes.⁴⁸ Sustainability First’s Maxine Frerk also said that for the purposes of heat decarbonisation decisions are needed on how building standards need to evolve to accommodate the need for flexibility, not just energy efficiency.⁴⁹
37. Ofgem Chief Executive Jonathan Brearley argued that the biggest and most fundamental issue is the heat transition, suggesting that more work is needed but that decisions will need to be taken “relatively soon, because that transition needs to start”.⁵⁰
38. Joanna Whittington, Director-General of Energy and Security at the Department for Business, Energy and Industrial Strategy (BEIS), said that the most important way to get investment into the sector is to have “the right business models”. She argued that Contracts for Difference have been successful in promoting wind and solar power and explained that the Government is “working on business models to support the other technologies”. She said that the 2035 target for a decarbonised power system “will require all the generating technologies to play their part”, pointing to the RAB model for nuclear and ongoing work on carbon capture and storage.⁵¹ In relation to the electricity generation market, Ms Whittington accepted that new generating technologies might require “changes to the Capacity Market and how those mechanisms work. That will then feed into the regulatory system”.⁵²
39. Rt Hon Greg Hands MP, Minister for Energy, Clean Growth and Climate Change, contested the argument that policy implementation detail was lacking, maintaining that “many commentators in other countries said that the net-zero strategy from the UK was a model for others to follow”. The Minister further reiterated some of the announcements contained in the Net Zero Strategy and the Heat and Buildings Strategy.⁵³ In relation to security of supply, the Minister argued that the best way to approach the issue is to have diverse sources of supply that are “home-grown” as much as is possible.

45 [Q 96](#)

46 [Q 148](#)

47 [Q 109](#)

48 Supplementary written evidence from the National Infrastructure Commission ([ONZ0057](#))

49 Supplementary written evidence from Sustainability First ([ONZ0058](#))

50 [Q 186](#)

51 [Q 211](#)

52 [Q 225](#)

53 [Q 211](#)

He argued that there is a big role for increasing renewables and nuclear in improving security of supply. In relation to gas, he emphasised the need to “value” the 50 per cent of consumption that is met by the UK’s domestic production, as well as maintaining relationships with friendly international suppliers of gas, such as Norway.⁵⁴

40. **Given the timescales involved in complex infrastructure projects and the life expectancy of newly built energy assets, the current decade is crucial to the ambition of achieving net zero by 2050. While we welcome the targets set in the Government’s Net Zero Review, we do not believe that the necessary policy detail is in place to achieve those targets, with further detail needed to encourage the scale of investment required to decarbonise the energy system while maintaining energy security.**
41. *We call for clarity from the Government in the following areas:*
- *a business model to support the development of long-duration storage technologies;*
 - *the overall funding envelope and business model for carbon capture, usage and storage (CCUS);*
 - *the funding mechanism for the deployment of small modular reactors (SMR);*
 - *business models and financial support for hydrogen conversion;*
 - *an accelerated decision on the role of hydrogen in heating;*
 - *the future role of the gas distribution network;*
 - *funding incentives to deliver heat pumps;*
 - *funding to support the energy efficiency of homes; and*
 - *a review of the non-financial barriers to the deployment of 40GW of offshore wind by 2030.*
42. *The Government should set out by the end of 2024 the roadmap by which it will deliver the energy mix it envisages for achieving net zero in a secure way, including setting out the funding structures for any new technologies that the Government aims to rely on. This roadmap needs to be dynamic, recognising that technology developments over time may result in differing incentives and priorities becoming appropriate. The Government should also set out the role it intends gas to play in the future system and where it will source this from, given security of supply and price volatility in international markets. Given the ongoing requirement for gas, the Government must take all steps to facilitate the exploration and exploitation of our own resources.*

Who pays: taxpayers vs. billpayers

43. In its Sixth Carbon Budget, advising the Government on how to meet its climate change objectives, the Climate Change Committee outlines a

“Balanced Pathway” that involves “a large sustained increase in investment, adding around £50 billion annually by 2030”, noting that the largest increases are for low-carbon power capacity, retrofitting buildings and the added costs of batteries and infrastructure for electric vehicles. The CCC argue that the required increase in investment can be delivered “largely by the private sector” and that in later years the savings in fuel costs will offset the upfront costs of the initial investment. The CCC outlined their estimate that the net annualised resource cost of reaching the net zero target in 2050 has fallen to “less than 1% of GDP by 2050”, a reduction on previous estimates to reflect more detailed modelling and the falling costs of low-carbon technologies.⁵⁵

44. Professor Helm set out the debate around the costs of net zero, noting that there are “a lot of people out there who think that it will not cost very much at all to decarbonise”. He suggested that the idea put forward that it might cost 1 per cent of GDP or under to decarbonise is “nonsense”, arguing that such figures assume that there will be no failures in government policy. He said that there are high costs and it will be “very expensive”, arguing that the Government needs to be up front with the public about this.⁵⁶ Mr Stark agreed that an important aspect of the level of costs is “good policy-making to drive investment in a low-risk way for investors”.⁵⁷
45. Although there is uncertainty and debate about the exact cost of the transition—uncertainty that may be impossible to resolve with any degree of precision—the question of how the large-scale investment necessary for the transition is funded is unavoidable. This is often framed in terms of how much should be funded from general taxation versus charges added to consumers’ energy bills.
46. Our witnesses nearly all agreed that bills are unjustly regressive as a primary source of that funding, taking proportionately larger amounts from those with the fewest resources.⁵⁸ Mr O’Shea set out the amount that these taxes add to the average consumer’s bill: of the approximately £1,000 average bill in 2020 for a dual-fuel gas and electricity household, £176 was “government policy costs”, which provide the funding for environmental and social policies pursued by the Government, such as the Warm Homes Discount and the Energy Company Obligation, by recouping them from consumer energy bills.⁵⁹
47. Whilst agreeing in general about the broadly regressive nature of charges on bills, Lord Turner noted that there were complexities in assessing their impact and that it was not a simple matter of the poorest paying most. Usage patterns vary in complicated ways with fine-grained demographic characteristics:

“While richer people tend to use much more energy, when you look at the real details, you end up with a very granular picture. You particularly end up with households of retired older people who tend to be at home all the time, whereas richer people who were working, at least until Covid, were spending some of the time out of the home at the office. If

55 Climate Change Committee, *Sixth Carbon Budget* (December 2020): <https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf> [accessed 23 February 2022]

56 [Q 48](#)

57 [Q 55](#)

58 [QQ 13](#), [23](#), [26](#), [34](#), [58–60](#), [79](#), [83](#), [110](#), [148](#), [150](#)

59 [Q 110](#)

these retired people are in badly insulated buildings, they tend to have large energy bills. They may also be in houses that are quite expensive to bring up to a high level of insulation.”⁶⁰

48. These distributional matters also relate to the question of how customers are charged. Ms Frerk noted that Ofgem have proposed that the costs for the energy infrastructure that enables electric vehicles should be recovered from all energy billpayers. Yet “the bottom decile of customers has 35% car ownership. In the top four deciles, it is 90% car ownership. If you get all customers to pay for the reinforcement of the networks, you will hit those on low incomes hardest.”⁶¹
49. However much is added to consumer bills in the form of charges, we were told by Flint Global’s Josh Buckland that such funding could not raise enough to pay for all aspects of the transition: “We are now talking about the need for a really substantial increase in investment, and that means you cannot fund the entire transition through energy bills.”⁶² Adding charges to bills also poses a risk of turning consumers against action to tackle climate change:
- “It is unsustainable to assume that you can continually add to bills between now and 2050 without having a direct impact on consumers that is viewed as unacceptable, and that also leads to a significant pushback on the support for climate action.”⁶³
50. Most witnesses stated that there was therefore an important role for general taxation. Mr Stark told us that: “One of the lead options to avoid [the] regressive impact ... is to move some of those costs potentially from the consumer bill to general taxation”.⁶⁴ Some said there was also a role for government borrowing and a carbon tax.⁶⁵ No witness, though, told us that the transition should be funded entirely from general taxation; Ms Frerk concluded that “with a bit of political realism, recovering some costs through the bills is inevitable.”⁶⁶
51. Asked about the funding of the transition, the Minister, Rt Hon Greg Hands MP, accepted that the Government’s analysis published in October 2020 “was on the costs of net zero rather than how they get paid.”⁶⁷ Although the Government has committed to publishing a call for evidence on fairness and affordability,⁶⁸ this will focus only on issues relating to how costs are allocated between electricity and gas bills and “options to expand carbon pricing”,⁶⁹ not on broader questions concerning who will fund all of the investment needed to reach net zero. On the timing of this call for evidence,

60 [Q 83](#)

61 [Q 83](#)

62 [Q 148](#)

63 [Q 150](#)

64 [Q 59](#)

65 [QQ 13, 84, 141, 148](#)

66 [Q 83](#)

67 [Q 222](#)

68 Department for Business, Energy and Industrial Strategy, *Net Zero Strategy, Build Back Greener* (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf [accessed 23 February 2022]

69 [Q 222](#)

the Net Zero Strategy says only that the Government will launch it “with a view to taking decisions in 2022”, with no further detail.⁷⁰

52. The Net Zero Review stated that if additional public investment is needed to support decarbonisation, it “may need to be funded through additional taxes or reprioritised from other areas of government spending”. The Review firmly rejected the idea of funding the investment needed for net zero through increasing government borrowing, which it argued would damage intergenerational fairness and push up the cost of the transition.⁷¹ The Treasury has also outlined the potential need to introduce new charges and taxes to pay for the loss of revenue from fuel duty and other emissions-based taxes. However, the Business Secretary has said that tax rises are not inevitable and that the aim is to “bring people along with us” rather than imposing “additional costs and burdens” to pay for new commitments.⁷²
53. ***We strongly urge the Government to set out how the transition will be funded. In doing so, it should explicitly set out the distributional consequences for any funding proposals. Funding the transition primarily through charges to billpayers is regressive and involves invidious trade-offs, making some consumers pay for investments that will not directly benefit them.***
54. ***There are a number of ways in which the Government can support energy investment. We urge the Government to consider the full range of funding options including the UK Infrastructure Bank, the British Business Bank, carbon pricing, co-investment, investment subsidies, investment tax relief and Contracts for Difference.***
55. ***We also call on the Government to reconsider its opposition to the use of government borrowing, due to its suitability for this type of investment financing, and because future generations will be the main beneficiaries of net zero investment.***
56. ***We support the Government’s plans to publish this year a call for evidence on fairness and affordability. We call on the Government to publish this as soon as possible and commit to consulting on more detailed proposals by the end of 2022.***

70 Department for Business, Energy and Industrial Strategy, *Net Zero Strategy, Build Back Greener* (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf [accessed 23 February 2022]

71 HM Treasury, *Net Zero Review: Analysis exploring the key issues* (October 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026725/NZR_-_Final_Report_-_Published_version.pdf [accessed 23 February 2022]

72 ‘Green revolution in UK will not inevitably mean tax rises, says minister’, *London Evening Standard* (20 October 2021): <https://www.standard.co.uk/news/politics/green-revolution-in-uk-not-inevitably-mean-tax-rises-minister-b961473.html> [accessed 23 February 2022]

CHAPTER 3: INSTITUTIONAL ARCHITECTURE AND CO-ORDINATION

Co-ordination in government and the public sector

Current levels of co-ordination

57. Given the scale of the energy transformation outlined in the previous chapter, we looked at whether the institutional architecture of government and the energy sector was fit for the task and whether there is sufficient co-ordination within government and between the Government and other stakeholders.
58. Dr Jeffrey Hardy, Senior Research Fellow at Imperial College London and a former Head of Sustainable Energy Futures at Ofgem, suggested that there is a “question of big strategic direction or vision that we do not have at the moment”, noting that responsibility is split across a number of government departments, the regulator and network operators. He said that “nobody owns the future and gives that coherent vision”, which is a “really important thing that we are missing”.⁷³ Several other witnesses agreed that the energy sector is very siloed.⁷⁴
59. Chris Stark, Chief Executive of the Climate Change Committee, argued that “there is a greater need generally for better co-ordination”, particularly in relation to heat decarbonisation.⁷⁵ Chris O’Shea, CEO of Centrica, said that “we have to think about how we co-ordinate the efforts for net zero”, adding that “having a co-ordinated, overarching plan with a regulator or something else focused purely on that can only be helpful to pull together the many different interested parties”. He said that “having something that focuses on this is incredibly important and will help us to achieve better results”.⁷⁶
60. David Gray, a Director at the Regulatory Policy Institute and a former Chair of Ofgem, argued that “I do not think co-ordination works well”, outlining that “we already have the technology for all new housing to be energy-neutral ... yet there is no co-ordination between BEIS and the housing ministry”. He told us that in his final year as Chair of Ofgem, “I tried to get some traction” between departments on this issue but was unsuccessful. “People were interested but the structures somehow did not lead to anything happening.”⁷⁷
61. Josh Buckland, Partner at Flint Global, told us that “co-ordination within government, across departmental boundaries, is always a challenge but it is better than it was”, noting that “committees have been set up and there is a better level of co-ordination”. He said that during his time as Special Adviser to Greg Clark, then-Secretary of State for Business, Energy and Industrial Strategy, there was good co-ordination between individual organisations, outlining that the challenge is co-ordinating multiple decision-makers, which “is where the current framework does not bear itself well in the net zero context”.⁷⁸ Tim Lord, Senior Fellow at the Tony Blair Institute for Global Change and a former BEIS official, agreed that co-ordination has improved

73 [Q 1](#)

74 [QQ 13](#), [106](#), [139](#), written evidence from Cadent Gas ([ONZ0019](#)), E.ON ([ONZ0043](#)) and Energy UK ([ONZ0054](#))

75 [Q 62](#)

76 [Q 109](#)

77 [Q 160](#)

78 [Q 144](#)

with the introduction of Cabinet committees, but argued that the challenge “is not necessarily one of structure so much as clear political direction and prioritisation.”⁷⁹

62. Mr Gray suggested that the obstacle to reaching net zero is “bandwidth—the ability of the organisations concerned to handle it”.⁸⁰ KPMG’s Simon Virley agreed: “we are not set up yet for the delivery of net zero because of a lack of bandwidth in key areas, which means that we will just move too slowly in order to hit the Government’s targets”.⁸¹
63. Jonathan Brearley, CEO of Ofgem, suggested that “it is fundamental to hitting our net-zero goals that we have the Whitehall co-ordination that we need”, but said that “I do think that there is co-ordination there now”. He told us that Ofgem “would like to develop a common understanding, with government and the industry” of how ambitions might play out in different areas, arguing that this would make it easier to build infrastructure and hold companies to account.⁸²
64. The Minister, Rt Hon Greg Hands MP, explained that “BEIS does not own all these policy levers—far from it. We need to work well with a whole host of government departments ... in all these areas, particularly on heat and buildings”.⁸³ Ms Whittington explained that the Government sees a need for greater co-ordination to move at the necessary pace and reflect the new technologies in the energy system and the interdependencies between them.⁸⁴
65. **The changes needed to ensure the transition to net zero by 2050 are transformational, not gradual and incremental. There is insufficient co-ordination within Government on net zero, as well as evidence of insufficient bandwidth in BEIS to tackle the full range of issues associated with the transition.**

Improving co-ordination

66. Some witnesses were sceptical of the need to establish a new institution, suggesting that this is “precisely the wrong way of dealing with this problem”. Professor Helm argued that the UK already has the institutions needed to achieve net zero and ensure security of supply, arguing that this should be directed by an independent system operator taking instruction from the Government and the Climate Change Committee.⁸⁵
67. Lord Turner, Chair of the Energy Transitions Commission, said that he is “wary of suggesting that the answer to the problem is to create a new body”, suggesting that “the Committee on Climate Change has the overall strategic view and does that well”⁸⁶, while Mr Buckland outlined the risk that any new body becomes “just another entity to co-ordinate”.⁸⁷

79 [Q 144](#)

80 [Q 159](#)

81 [Q 167](#)

82 [QQ 186, 188](#)

83 [Q 212](#)

84 [Q 212](#)

85 [QQ 42, 46](#)

86 [Q 85](#)

87 [Q 144](#)

68. Other witnesses emphasised the importance of the Government retaining decision-making responsibilities. James Richardson, Chief Economist at the National Infrastructure Commission (NIC), argued that:
- “in the end these decisions are so important and so political that only Government Ministers can make them ... you cannot hand that to a technocratic delivery agency and just expect them to get on with it. Ultimately the Government are going to have to take those big strategic decisions and set them out”.⁸⁸
69. Laura Sandys, Chair of the Government’s Energy Digitalisation Taskforce, suggested that another institution is not needed, arguing that “BEIS needs to be a little bit more of a conductor of the orchestra. Otherwise you end up again with this multiplying of different roles and responsibilities”.⁸⁹
70. However, a number of witnesses called for a new body to be created to drive the energy transition. Claire Dykta, UK Head of Strategy at National Grid, said that “there is an organisation missing that would take responsibility for converting ... overarching objectives into deliverable plans”, with the obligation to think across different sectors and impacts.⁹⁰ Other witnesses argued in favour of a body focused on the delivery of policy.⁹¹ Mr Gray said that he was struck by the contrast with the water sector, where the Environment Agency “is the driving force for a lot of the environmental work”. He said that in the energy sector “that government implementation body does not exist... there is just a missing piece somehow”.⁹²
71. Mr Virley called for “the creation of an expert delivery body... what I call a national energy agency”, which he described as “the Bank of England for energy”. He said that the agency would be “accountable to government for the energy system that we are going to need to get to net zero”. He said that the Government and Ofgem’s proposal for a Future System Operator (FSO) “could become the basis of that delivery body”, expressing concern that it is set to be established in 2026. He advocated setting it up in shadow form before putting it on a statutory footing at “the first parliamentary opportunity”.⁹³ These proposals are discussed in more detail later in this report.
72. Others argued that the body should have responsibility for providing a strategic plan and co-ordinating between government departments and other agencies. Catherine Mitchell, Professor of Energy Policy at the University of Exeter, argued that “there should be a new, higher entity”, an energy transformation commission, providing greater co-ordination and resolving complex issues, and reporting into the Cabinet Committee on Climate Change.⁹⁴ Darryl Murphy, Head of Infrastructure at Aviva Investors, said that a “guiding mind, particularly around delivery, will be welcome”.⁹⁵ Tom Samson, CEO of the Rolls-Royce Small Modular Reactors (SMR) Consortium, said that there is not currently a body responsible for delivering clean energy in the UK, calling for the establishment of “a very

88 [Q 68](#)

89 [Q 161](#)

90 [Q 135](#)

91 [QQ 47](#), [85](#) and written evidence from E.ON ([ONZ0043](#))

92 [Q 164](#)

93 [Q 169](#)

94 [Q 1](#)

95 [Q 169](#)

small, dedicated team, but with clear accountability, focus and drive” to deliver the necessary low-carbon capacity.⁹⁶

73. **The scale of the net zero challenge requires urgent action across the economy and across a range of government departments and public sector bodies. We are concerned that there is insufficient co-ordination and strategic direction in relation to reaching the target, particularly in translating high-level targets into detailed, deliverable policy. However, it is key that any co-ordination function does not create new and unnecessary levels of bureaucracy, and instead helps to drive cohesive decision-making at a political level, while directing and overseeing implementation of detailed policy.**
74. *We propose the creation of an expert taskforce, following the example of the Vaccine Taskforce—but on a longer term footing—responsible for economy-wide strategic planning, cross-departmental co-ordination, implementation of some agreed policies and operational delivery monitoring in relation to the net zero transition by all departments and agencies. Given the inherent uncertainty of the transition, the taskforce model provides the agility necessary to adapt to a rapidly changing landscape.*
75. *The transformation taskforce will need to address politically sensitive policy issues, including public spending commitments, so—following the model of the Vaccine Taskforce—cannot be independent of Government. The taskforce should report directly to a Cabinet Committee chaired by the Prime Minister which would agree the strategy and key policy components and authorise any Government financing. The taskforce, housed within the Cabinet Office, will then have the authority to translate the policy into detailed policy implementation covering all Government departments. The taskforce should be set up immediately given the urgent need for action on net zero within the next few years.*

The role of the Future System Operator

76. The electricity grid connects electricity generators and consumers. The Great Britain grid is formed of two types of network: the high-voltage transmission network, which connects large power stations over longer distances with the lower-voltage distribution networks, which connect to consumers locally and integrate smaller power generators. The GB grid is owned by a series of transmission and distribution network operators, all monopolies of specific areas, and covers England, Scotland and Wales.
77. The electricity transmission network is managed across England, Scotland and Wales by the National Grid Electricity System Operator (ESO), which is legally separated from National Grid’s commercial operations. As the system operator, National Grid ESO is legally required to manage the transmission network, ensuring there is enough supply to meet distribution networks’ demand at all times and planning for future balancing.⁹⁷ The gas transmission network is operated by National Grid Gas.⁹⁸

96 Q 177

97 House of Commons Library, *Electricity Grids*, Briefing Paper, [Number 8472](#), 8 January 2019

98 National Grid, ‘Gas Transmission’: <https://www.nationalgrid.com/uk/gas-transmission/> [accessed 23 February 2022]

78. In January 2021, Ofgem published a review of GB system operation to assess whether the right governance framework is in place to deliver the UK’s net zero emissions targets. Ofgem recommended that the ESO should be made independent of National Grid Group and should be given additional responsibilities to provide independent advice to government on how best to achieve net zero and to play a more active role in designing and planning the future energy system, ensuring a level playing field between different parts of the energy network and energy services.⁹⁹
79. Following this review, Ofgem and BEIS published a consultation on proposals for a Future System Operator (FSO) in July 2021, seeking views on proposals for all the current National Grid ESO responsibilities to be carried out by an expert, impartial FSO with responsibilities across the electricity and gas systems.¹⁰⁰ The consultation proposed that the FSO provide independent advice to government, undertake network planning and long-term forecasting, as well as market strategy functions. The consultation sought views on the new roles and functions of the FSO, whether the independent FSO should be privately owned or an independent public sector body, and the phasing of its introduction. The consultation ran until September 2021.
80. Jonathan Brearley, CEO of Ofgem, outlined that Ofgem sees “a big role for strategic planning in how we build the system that we need to support the generation that we want to build” and is “very hopeful that the role of the Future System Operator will be able to help us, as a sector, to have a much wider, more co-ordinated and strategic plan”.¹⁰¹
81. Ms Whittington outlined the Government’s view that “there is a really important role for a Future System Operator that provides that co-ordination, if we are to move at the pace needed in order to hit those ambitious targets”. She emphasised that this would build on the ESO’s “really good technical knowledge of how the system works ... recognising the role it can play in delivery as a body that is expert in operating the systems of today”, while outlining the need for “very strong democratic accountability” due to the significance of decisions in this area.¹⁰²
82. Some witnesses called for the FSO to take on responsibility for co-ordinating net zero more widely across the economy. As noted in the previous section, Mr Virley proposed that the FSO could form the basis of his proposed “national energy agency”, with responsibilities covering power, heat, transport and industry.¹⁰³ Professor Helm argued that the main institution for the “delivery of the detail” should be the system operator, suggesting that this should be a “standalone agency”, charged with achieving targets set by the Climate Change Committee and the Government in relation to carbon targets and security of supply.¹⁰⁴ Mr Buckland said that if the FSO proposals “can be done well, it is an organisation that could do the co-ordinating role”.¹⁰⁵

99 Ofgem, ‘Review of GB energy system operation’ (January 2021): <https://www.ofgem.gov.uk/publications/review-gb-energy-system-operation> [accessed 23 February 2022]

100 Department for Business, Energy and Industrial Strategy/Ofgem, *Proposals for a Future System Operator role* (July 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004044/energy-future-system-operator-condoc.pdf [accessed 23 February 2022]

101 [Q 186](#)

102 [QQ 212–213](#)

103 [QQ 169, 174](#)

104 [Q 42](#)

105 [Q 144](#)

83. However, other witnesses were more sceptical of the FSO’s ability to perform a wider, more political co-ordinating role. Ms Sandys outlined that she is “not against a Future System Operator at all” but said that some of the roles and responsibilities that the FSO might run are “political and they are trade-offs”, involving decisions about potentially increasing consumer bills to ensure secure energy supplies or promote decarbonising the energy system. She emphasised that “it is incredibly important that you do not put technical and operational people in the role of having to make those trade-offs. We have to be quite separate”. Mr Gray argued that while it may be coherent to set up the FSO as a co-ordinating and implementing body, this is not necessarily a good fit for the technical skills currently present in the system operator.¹⁰⁶
84. While the issue of a wider co-ordinating role in relation to net zero was more contentious, most of the evidence we heard supported the FSO proposals due to the need for greater strategic co-ordination in the energy sector, particularly in energy networks. Dr Tony Ballance, Director of Regulation and Strategy at Cadent Gas, a gas distribution network operator, set out “the need for much greater system planning and optimisation ... where there is a need to really strengthen what we have”.¹⁰⁷ He said that currently, in relation to system planning issues:
- “There is a lack of that in the sense of someone thinking about the capacity that we need in the electricity distribution and transmission networks and the equivalent on the gas side, and how we ensure that we get the right balance of scenarios there. That is where some new form of system planning needs to come in”.¹⁰⁸
85. Joe Perkins, Senior Vice-President and Head of Research at Compass Lexecon, suggested that creating “an independent system architect role ... as opposed to the very narrow system operator that we see at the moment”, could “make a fundamental difference”.¹⁰⁹ Ms Dykta said that the National Grid is largely supportive of the FSO proposals, which she described as “a very positive step forward”. Jake Rigg, Director of Corporate Affairs at National Grid ESO, said that establishing the FSO is “an absolutely critical step on the path”, suggesting that the FSO will provide clarity for market participants.¹¹⁰
86. However, Guy Jefferson, Chief Operating Officer at ScottishPower Energy Networks, argued that “from a planning perspective there is expertise in all the transmission operators and distribution operators ... I do not see that replicating it in an FSO would necessarily be very efficient or effective.”¹¹¹ Professor Helm suggested that the Government and Ofgem’s proposed FSO is “a very big system operator”, taking on responsibility for the day-to-day operation of the system as well as capacity planning and implementation of objectives. He outlined his preference for a “small, focused transfer of the job of auctioning and modelling the systems and inviting the various players to come forward with options in order to achieve those objectives”.¹¹²

106 [Q 161](#)

107 [Q 88](#)

108 [Q 90](#)

109 [Q 12](#)

110 [Q 135–6](#)

111 [Q 106](#)

112 [Q 47](#)

87. National Grid ESO currently has responsibility for balancing the system and ensuring security of supply in the short term, including by operating the Capacity Market. National Grid ESO's Jake Rigg noted that the Government is looking at long-term responsibility for security of supply in its consultation on the FSO, arguing that it is "really important we start locking that down quite quickly". Ms Dykta said that in relation to security of supply, "there are some gaps that would definitely benefit from greater clarity in roles and responsibilities".¹¹³ However, Mr Lord emphasised that depoliticising decisions in relation to security of supply by giving them to the system operator is difficult.¹¹⁴ Other pieces of written evidence endorsed the FSO having a role in ensuring security of supply.¹¹⁵ However, the Minister, Rt Hon Greg Hands MP, told us that it is "primarily the responsibility of government to make sure that we have security of supply in the long term".¹¹⁶
88. ***There is clearly a role for the Future System Operator in considering both the electricity and gas networks and providing greater planning of their future needs to ensure security of supply. We urge the Government to move promptly in establishing the Future System Operator and call for it to have clear objectives and responsibilities to avoid increasing complexity in the governance of the energy sector. Nonetheless, we believe that the Future System Operator should not have a wider role in co-ordinating the net zero transition; political trade-offs in this area should be decided by the Government.***

Ofgem and its role in the net zero transition

Ofgem's remit

89. Ofgem explained that it "provides regulatory frameworks, along with the design and support of institutional and market frameworks, to enable net zero at least cost, support innovation and protect consumers."¹¹⁷
90. The Committee received evidence that Ofgem has an important role to play in the transition, although as Electricity North West, a distribution network, noted "the role of Ofgem is vital, though [it] is not the single leading role", emphasising that the regulator will "enable, facilitate and support the delivery of Government policy".¹¹⁸ Centrica also argued that Ofgem has a "critical role to play" but cannot meet the target "singlehandedly".¹¹⁹ BEIS, in its own written submission, set out the Government's belief that "Ofgem has a key role" in ensuring the UK meets its net zero target, setting out that Ofgem's remit "is likely to expand" to include regulating heat networks.¹²⁰ Since then, BEIS has announced its intention to appoint Ofgem as the regulator of heat networks.¹²¹

113 [Q 134](#)

114 [Q 146](#)

115 Written evidence from Fred. Olsen Renewables ([ONZ0024](#)) and Sustainability First ([ONZ0035](#))

116 [Q 224](#)

117 Written evidence from Ofgem ([ONZ0021](#))

118 Written evidence from Electricity North West ([ONZ0006](#))

119 Written evidence from Centrica ([ONZ0026](#))

120 Written evidence from the Department for Business, Energy and Industrial Strategy ([ONZ0023](#))

121 Department for Business, Energy and Industrial Strategy/Ofgem, *UK government announces major expansion of heat networks in latest step to power homes with green energy* (December 2021): <https://www.gov.uk/government/news/uk-government-announces-major-expansion-of-heat-networks-in-latest-step-to-power-homes-with-green-energy> [accessed 23 February 2022]

91. However, we heard differing views on whether Ofgem’s overall role should be expanded or narrowed. Mike Thompson, the Climate Change Committee’s Chief Economist, noted the increasing integration of energy with transport and heat, including the potential for “cars sitting on driveways acting as batteries and putting electricity back into the grid.” He argued that there is a “need for real integration and a regulator that can think from a systems perspective”, suggesting that hydrogen and heat networks should be within Ofgem’s remit.¹²²
92. Dhara Vyas, Head of Future Energy Services at Citizens Advice, said that Ofgem’s remit is “quite narrow” in the broader context of net zero, calling for its remit to be expanded to include heat networks, which she argued would be “crucial if we are to get to net zero”.¹²³ SSE, an energy supplier, argued that Ofgem must play a “strategic co-ordination role” as the sector regulator, considering and resolving wider barriers to investments across the industry.¹²⁴ Citizens Advice¹²⁵ and the Social Market Foundation¹²⁶ called for Ofgem to be given responsibility for regulating third-party intermediaries, given their current and expanding future role in the market.
93. Professor Mitchell in contrast argued that “Ofgem should be reduced back to being an economic regulator, so that the complex decisions that it gets into, to do with social and environmental stuff, can be left to the co-ordinating body”.¹²⁷ Professor Helm suggested that in a world where the system operator is given greater responsibility for delivering net zero and security of supply, “Ofgem can largely be abolished”. While noting that Ofgem’s price controls for energy networks will need to be continued, he suggested that “we do not need a whole Ofgem to do that”, outlining that Ofgem’s previous responsibilities in the area of generation have already moved across to the system operator.¹²⁸
94. E.ON argued that with the Government’s proposed Future System Operator playing the role of system architect, Ofgem should focus on enforcement, customer protection and economic regulation, broadening its consumer protection to new sectors including heat networks, price comparison sites, flexibility providers and other emerging service models.¹²⁹ Mr Virley said that if his proposed delivery body was set up, “Ofgem’s remit would be smaller. It would be to ensure value for money from the delivery of those infrastructure investments”.¹³⁰
95. Jonathan Brearley, CEO of Ofgem, said that “planning the system and setting how it evolves should not really be done by the regulator. The regulator’s job is to make sure that that is done efficiently and effectively by the companies concerned.”¹³¹
96. ***Ofgem has an important role to play in enabling the transition. However, we believe that Ofgem’s primary focus should remain***

122 [Q 62](#)

123 [Q 23](#)

124 Written evidence from SSE Group ([ONZ0052](#))

125 Written evidence from Citizens Advice ([ONZ0012](#))

126 Written evidence from the Social Market Foundation ([ONZ0018](#))

127 [Q 1](#)

128 [Q 46](#)

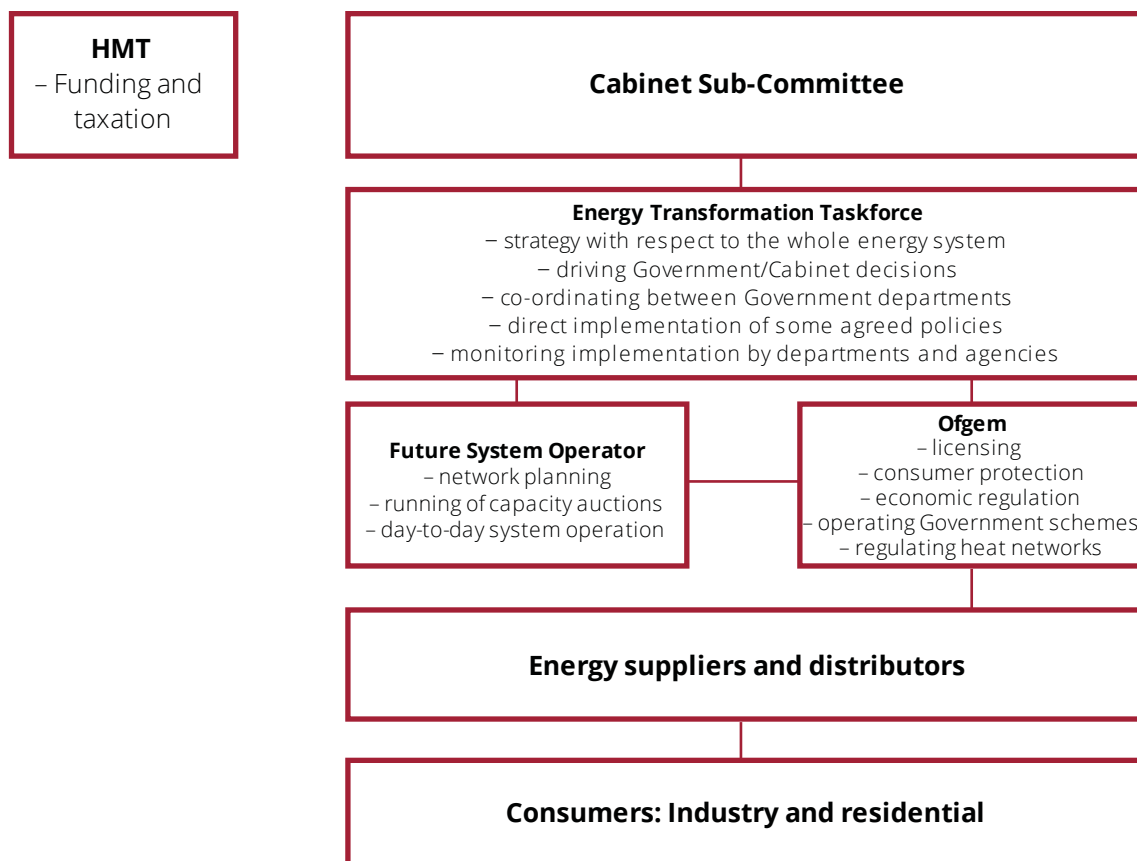
129 Written evidence from E.ON ([ONZ0043](#))

130 [Q 174](#)

131 [Q 186](#)

on its supplier regulation, economic regulation and consumer protection responsibilities. While we recognise that these may need to be expanded to cover new technologies and services, we do not believe that Ofgem needs to be given a more strategic role in planning the energy system; this role should instead be the responsibility of the Future System Operator.

Figure 1: Proposed institutional architecture



Giving Ofgem a statutory duty in relation to net zero

97. Ofgem’s primary duty, laid out in statute, is to “protect the interests of existing and future consumers in relation to gas conveyed through pipes and electricity conveyed by distribution or transmission systems”. This objective is to protect these interests “taken as a whole, including their interests in the reduction of greenhouse gases and in the security of the supply of gas and electricity to them”.¹³² Ofgem has outlined that its principal duty “permeates our whole approach to regulation: it obliges us to evaluate almost any situation or proposed change in the first instance through the lens of energy consumers.”¹³³ This duty guides Ofgem when making decisions and trade-offs in its regulatory framework between the three objectives of decarbonisation, affordability and security of supply, often referred to as the energy ‘trilemma’.

132 Ofgem, ‘Our powers and duties’ (July 2013): <https://www.ofgem.gov.uk/publications/our-powers-and-duties> [accessed 23 February 2022]

133 Ofgem, ‘Ofgem strategic narrative: 2019–23’ (July 2019): <https://www.ofgem.gov.uk/publications/ofgem-strategic-narrative-2019-23> [accessed 23 February 2022]

98. Some witnesses argued that Ofgem has been given an overly long and complex set of duties. Dr Hardy outlined his experience over four and a half years at Ofgem, where he “found that it was quite difficult to get decisions taken while balancing out all Ofgem’s duties without ending up in a bit of a fudge or a mess”, as “it is too complex as a set of duties”.¹³⁴ Catherine Waddams, Emeritus Professor at Norwich Business School, said that there should be “real reform” of Ofgem’s duties, setting out that they have expanded and “you cannot meet all of them simultaneously”, a view reflected by Centrica.¹³⁵ Mr Perkins said that net zero involved “a wide range of trade-offs” that technocrats are not well-placed to make.¹³⁶
99. A number of witnesses told the Committee that the net zero target should be included explicitly within Ofgem’s statutory duties. Dr Hardy said that he would “put net zero up top”, balancing out its other duties against the context of “hitting that legislated carbon target”.¹³⁷ Professor Mitchell said that “net zero has to be the *raison d’être* of Ofgem” and argued that “delivering on legally enshrined commitments to decarbonise” should form part of Ofgem’s principal duty. She said that Ofgem “has very opaque duties, which can be judicially reviewed and so forth, so it very much self-constrains, but then it also tends to take the middle way”.¹³⁸
100. Ms Dykta said that “while it is just a duty to protect consumers, without the explicit reference to net zero, there is a danger that decisions are very short-term in nature”, focusing on short-term costs for consumers and not the long-term costs of not achieving net zero.¹³⁹ Mr Rigg explained that National Grid ESO is strongly in favour of Ofgem having net zero in its statutory duties, suggesting that it is “quite odd that it does not” when other regulators have such a duty. He argued that its absence “holds back the system in certain ways”, particularly in relation to offshore network investment.¹⁴⁰
101. The Climate Change Committee’s Mr Stark said:
- “Giving Ofgem a net zero responsibility seems like quite a sensible step because that gives it a different outlook. It will think more strategically about the changes that lie ahead so that we can minimise the cost to the consumer in the long run.”¹⁴¹
- Flint Global’s Mr Buckland, however, added that whilst there “is value in giving Ofgem a mandate that includes a net zero target” as “it will allow them to think about those trade-offs, ... it does not necessarily make [the] trade-offs any easier”, arguing that the Government has “a role in setting how Ofgem should approach those trade-offs”.¹⁴²
102. Matt Copeland, Head of Policy and Public Affairs at National Energy Action, said that if Ofgem’s remit is expanded to have “that greater net-zero focus, that cannot come at the cost of its current obligations to protect vulnerable

134 [Q 1](#)

135 [Q 21](#) and written evidence from Centrica ([ONZ0026](#))

136 [Q 14](#)

137 [Q 1](#)

138 [QQ 2, 10](#)

139 [Q 136](#)

140 [Q 136](#)

141 [Q 62](#)

142 [Q 146](#)

consumers in the energy market”.¹⁴³ Andrew Large, Chair of the Energy Intensive Users Group said that Ofgem should have greater duties with regard to international competitiveness and to work with the Government in support of the net zero agenda, “rather than finding itself in a position where its regulatory approach and the Government’s industrial strategy might butt up against each other and end up producing some perverse outcomes”.¹⁴⁴

103. Cadent Gas’ Dr Tony Balance said that he “would not be against a net-zero duty” but argued that “in adding to the duties, we have probably to some extent moved away from the original construct of what the regulators were there to do”, outlining that he is “more of a proponent of sharpening up what the regulator is there to do, which in essence is to ensure that customers get best value for the outcomes that the regulated utilities are supposed to deliver”.¹⁴⁵
104. The NIC’s Mr Richardson felt that while “there needs to be a clear signal from government to the regulator that net zero is part of its job”, that “in fairness to Ofgem, it is acting as if it is anyway, so I do not think this lack is causing any problems”.¹⁴⁶
105. Jonathan Brearley, CEO of Ofgem said that Ofgem is open-minded about whether it should be given a primary duty to achieve net zero, arguing that “I and the board have been very clear that we see net zero as fundamental to our existing duty”. He said that “we feel that we are behaving as if we have those goals as part of the statutory duty that we have”, while noting that there may be a benefit to clarifying that. However, he emphasised that “you have to be careful not to distort the trade-offs that we might have to make along the way”.¹⁴⁷
106. The Minister, Rt Hon Greg Hands MP said that “Ofgem’s current duty to consumers encompasses net zero”, as “that is obviously in the interest of consumers. On the face of it, I do not see a necessity to change the statutory definition of Ofgem’s role for it to be able to take account of net zero.” He said that he “would be nervous about changing that fundamentally”, arguing that “it is extremely important that consumers can have confidence that this market is well regulated and has good oversight, and Ofgem performs that very well”.¹⁴⁸
107. In January 2022, the Government published a policy paper on economic regulation¹⁴⁹ and the Business Secretary published an open letter to the chief executives of Ofgem, the Water Services Regulation Authority (Ofwat) and the Office of Communications (Ofcom), setting out the Government’s strategic priorities for the utilities sectors.¹⁵⁰ In his letter, the Business Secretary asked that the regulators review their regulatory frameworks for

143 [Q 27](#)

144 [Q 35](#)

145 [Q 102](#)

146 [Q 69](#)

147 [QQ 189, 194](#)

148 [Q 214](#)

149 Department for Business, Energy and Industrial Strategy, *Economic regulation policy paper* (January 2022): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1051261/economic-regulation-policy-paper.pdf [accessed 23 February 2022]

150 Department for Business, Energy and Industrial Strategy, ‘Strategic priorities and cross-sectoral opportunities for the utilities sectors: open letter to regulators’ (January 2022): <https://www.gov.uk/government/speeches/strategic-priorities-and-cross-sectoral-opportunities-for-the-utilities-sectors-open-letter-to-regulators> [accessed 23 February 2022]

their compatibility with the Net Zero Strategy’s pathways to 2050 and the interim carbon budgets, reporting back by summer 2022. In the policy paper, the Government announced that it will launch a review of utilities regulators’ statutory duties in 2022, considering the need for duties to be coherent, covering price quality, resilience and the environment.

108. ***We recognise that Ofgem’s current leadership sees net zero as fundamental to its existing duties. To ensure that, on an enduring basis, the appropriate focus is given to net zero within its competing priorities, we recommend that Ofgem’s duties should be amended to include explicit reference to having due regard to the net zero target. While Ofgem maintains that net zero considerations already factor into its decision-making, adding net zero explicitly to its statutory duties will serve to make this clear.***

The need for a Strategy and Policy Statement

109. The Energy Act 2013 provides that the Secretary of State for Business, Energy and Industrial Strategy “may designate a statement as the Strategy and Policy Statement”, setting out the strategic priorities of the Government in formulating energy policy and the particular outcomes to be achieved. The Act provides that Ofgem “must have regard to the strategic priorities set out in the Strategy and Policy Statement when carrying out regulatory functions”.¹⁵¹
110. In the Energy White Paper, published in December 2020, the Government committed to “set out our vision for energy as a guide to Ofgem, by consulting in 2021 on a Strategy and Policy Statement for the regulator”. The White Paper stated that the strategic priorities will include “delivering a net zero energy system while ensuring secure supplies at lowest cost for consumers”, which will “enable not just Ofgem, but energy consumers and industry as well, to better understand the Government’s ambitions for the energy sector”.¹⁵²
111. Mr Perkins said that despite there being the scope for this “strategic policy steer” in legislation, it “has never happened”. He said that “in principle [a Strategy and Policy Statement] could be quite a strong lever to help give a steer as to the quite difficult trade-offs that Ofgem has to manage and how it should balance them”.¹⁵³ Professor Waddams noted that Ofwat has a strategic policy statement and must outline how it is responding to that annually.¹⁵⁴
112. Mr Buckland emphasised that issues relating to affordability, decarbonisation and security of supply “are political trade-offs, and that is where the Government have a role in setting how Ofgem should approach those trade-offs”. He said that the statement “would have to be relatively high level, because you need, critically, to defend and support the independence of the regulator, but the advice on trade-offs will at least allow Ofgem to

151 Energy Act 2013, [Part 5](#)

152 Department for Business, Energy and Industrial Strategy, *Energy White Paper: Powering our net zero future*, CP 337 (December 2020): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf [accessed 23 February 2022]

153 [Q 21](#)

154 [Q 21](#)

act in accordance with that”.¹⁵⁵ Tim Lord, Senior Fellow at the Tony Blair Institute for Global Change agreed that the trade-offs are “fundamentally political” suggesting that “that dialogue between government and Ofgem is potentially more valuable in making those decisions than simply giving it a duty to consider net zero in a slightly rhetorical and opaque sense, as opposed to when we are looking at specific decisions.”¹⁵⁶

113. Sustainability First’s Maxine Frerk argued that Ofgem can have a short-term perspective on investment, but that guidance from the Government can lead to a longer-term view. She said that even with a net-zero objective, some of the steer on investment must come from government, outlining that equivalent guidance given to Ofcom states that “where there is a trade-off to be made, the priority is to make sure that the focus is on investment and not on short-term bill reductions”. She suggested that in practice, this will mean “Ofgem having a slightly different mindset. It is not always going to be able to have the same level of evidence to support a bid for investment in transmission network as it did previously”.¹⁵⁷
114. A number of other witnesses and submissions emphasised the benefits of the publication of a Strategy and Policy Statement, with very few arguing against its publication.¹⁵⁸ Even Professor Mitchell, who argued that the Statement “is not going to be legally enforceable”, welcomed that it was set to be published,¹⁵⁹ although some submissions expressed concern that the Statement would not prove sufficient.¹⁶⁰
115. Jonathan Brearley, CEO of Ofgem, said that “getting a clear idea ... of the shared ambition that underpins this makes our job much more coherent ... We respect the fact that, ultimately, the big trade-offs need to be made by government, not by the regulator”.¹⁶¹
116. Ms Whittington said that the Strategy and Policy Statement means that “we can be really clear of the link between what government wants to see for the sector, particularly in the context of net zero, and what the regulator needs to deliver”. She said that it is “really important that government is then clear about what you take” from its policy documents and how that is reflected in regulation. The Minister, Rt Hon Greg Hands MP, told us that the Government may not be able to meet the commitment to publish the Statement for consultation in 2021 but outlined that “we will do it quite soon”.¹⁶²
117. The Government recently published a policy paper on economic regulation,¹⁶³ and the Business Secretary wrote an open letter setting out the Government’s

155 [QQ 146–7](#)

156 [Q 146](#)

157 [Q 86](#)

158 [QQ 24](#), [35](#), [136](#), [163](#) and written evidence from the Global Infrastructure Investment Association ([ONZ0014](#)), SGN ([ONZ0015](#)), Mineral Products Association ([ONZ0027](#)), EDF ([ONZ0032](#)), ClientEarth ([ONZ0045](#)), RWE ([ONZ0048](#)) and Aldersgate Group ([ONZ0050](#))

159 [Q 2](#)

160 Written evidence from Scottish Renewables ([ONZ0002](#)), RenewableUK ([ONZ0049](#)) and RES ([ONZ0055](#))

161 [Q 194](#)

162 [Q 214](#)

163 Department for Business, Energy and Industrial Strategy, *Economic regulation policy paper* (January 2022): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1051261/economic-regulation-policy-paper.pdf [accessed 23 February 2022]

strategic priorities for the utilities regulators, including Ofgem.¹⁶⁴ The Business Secretary set out priorities including promoting growth, delivering a fair deal for consumers and fostering sustainability. However, in its policy paper, the Government notes that the Business Secretary's letter is "intended to complement existing sector specific guidance to regulators", which is not in place for Ofgem. The policy paper also set out that the Government will consider "whether it should issue further strategic guidance to the regulators to provide greater clarity and certainty on regulators' status and role within the broader regulatory framework as statutory guidance to which the regulators must have regard."

118. ***Adding net zero to Ofgem's remit would not offer sufficient guidance for making judgements regarding trade-offs. For this reason, we emphasise the urgency of publishing the promised Strategy and Policy Statement. The Strategy and Policy Statement must provide further clarity on how Ofgem should make trade-offs between affordability, net zero, security of supply and the interests of current versus future generations in its regulatory decisions; these trade-offs are political in nature and the Government needs to clearly set out how Ofgem should approach these issues.***

¹⁶⁴ Department for Business, Energy and Industrial Strategy, 'Strategic priorities and cross-sectoral opportunities for the utilities sectors: open letter to regulators' (January 2022): <https://www.gov.uk/government/speeches/strategic-priorities-and-cross-sectoral-opportunities-for-the-utilities-sectors-open-letter-to-regulators> [accessed 23 February 2022]

CHAPTER 4: REGULATION, INNOVATION AND THE CONSUMER EXPERIENCE

Price controls

119. The UK's transmission and distribution network companies operate as regional monopolies, and as network costs comprise a part of consumer energy bills, they are subject to price controls operated by Ofgem. These price controls are called 'RIIO' (Revenue = Incentives + Innovation + Outputs) and apply over a particular period of time. The controls cap the maximum revenue that can be collected from customers, with incentives for remaining under the cap and penalties for exceeding it. Ofgem also allows a managed increase in network costs to upgrade the system.¹⁶⁵
120. The newest set of price controls, RIIO-2, came into force for electricity transmission, gas distribution and the ESO in April 2021; those for electricity distribution network operators will come into force in 2023. To address criticisms that the first RIIO price control was too long, at eight years, the new price controls only cover a five-year period. In its final determinations, published in December 2020, Ofgem allowed £30 billion of up-front funding, with a further £10 billion held "on standby" for future green energy projects under a new uncertainty mechanism, which aims to address the issue of potential technology change occurring during the price control period.¹⁶⁶ Ofgem also expects network companies to make efficiency savings to reduce prices for consumers.

Enabling investment

121. We received numerous pieces of evidence, particularly from network companies, arguing that Ofgem is overly cautious when allowing 'anticipatory' investment in energy networks that may be needed to enable the transition, especially given the forecast increase in demand for electricity with the electrification of heat and transport, but for which there is not a direct and immediate need now. ScottishPower Energy Networks' Guy Jefferson explained that the decarbonisation of heat and transport will mean significant investments in the network, arguing that "we need to invest prior to need ... to get the network ready" for increased demand.¹⁶⁷ EDF welcomed recent moves by Ofgem that recognise the need for anticipatory investments in networks, arguing that "significant investment will be required to ensure networks do not become a barrier to achieving net zero" and calling for this approach to be "maintained and developed over time".¹⁶⁸
122. A number of witnesses argued that allowing anticipatory investment and adapting price controls could reduce long-term costs.¹⁶⁹ National Grid ESO argued that a statutory duty to achieve net zero would "allow Ofgem to more

165 House of Commons Library, *Electricity Grids*, Briefing Paper, [Number 8472](#), 8 January 2019

166 Ofgem, *RIIO-2 Final Determinations for Transmission and Gas Distribution network companies and the Electricity System Operator* (December 2020): <https://www.ofgem.gov.uk/publications/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator> [accessed 23 February 2022]

167 [Q 88](#)

168 Written evidence from EDF Energy ([ONZ0032](#))

169 Written evidence from the Institution of Engineering and Technology ([ONZ0013](#)) Solar Energy UK ([ONZ0017](#)), Oil and Gas UK ([ONZ0029](#)), ScottishPower ([ONZ0033](#)), Hitachi ABB Power Grids ([ONZ0034](#)), Confederation of British Industry ([ONZ0037](#)), RenewableUK ([ONZ0049](#)), Aldersgate Group ([ONZ0050](#)) and National Grid ([ONZ0051](#))

readily consider the use of anticipatory investment”, suggesting that this would “help to ensure that timely action is taken now, and future consumers are protected from inflated bills caused by delays in delivering net zero investments”.¹⁷⁰

123. Professor Jenkins said that Ofgem “has been quite cautious historically... the old standard of allowing investment only if there is evidence that it is definitely needed will not work here”. She called for Ofgem to be allowed to take more risks in allowing investment.¹⁷¹ Mr Thompson said that “there is a danger that Ofgem historically has been very focused on keeping costs down”, suggesting that there is “a need for a different attitude that says we will oversize and we will sign off anticipatory investment where there is a clear potential for it to make costs lower in the future.”¹⁷² Lord Turner agreed that a new mindset was needed to approve investments ahead of demand, suggesting that a net zero objective would enable this.¹⁷³
124. Dr Ballance argued that while “five-year and eight-year windows... are good timeframes for looking at medium-term plans ... they are less good at longer-term investment profiles”. He encouraged Ofgem “to look hard at how to regulate for the longer term”. He suggested that the energy sector is more restrictive than the water sector in allowing investment, calling for a more flexible, speculative and long-term mindset.¹⁷⁴
125. Mr Rigg emphasised the need for the regulatory framework to enable investment in assets such as wind farms and networks, arguing that there are “specific examples of where that is not in place” and that this “has driven up overall capital costs”.¹⁷⁵ Ms Dykta said that the industry only has “certainty on around £400 million of the £10 billion that is needed to deliver” the infrastructure for the UK’s target of 40GW of offshore wind by 2030. She suggested that this uncertainty “places greater risk and greater cost on consumers” through delays in delivery and by making the UK less attractive to investors.¹⁷⁶
126. Speaking from the perspective of financial investors, Darryl Murphy, Head of Infrastructure at Aviva Investors, said that the relationship between private investors and Ofgem has “been a little strained”. He argued that the regulatory asset base model for energy networks “and regulated companies generally in the UK has probably been the single, biggest success in mobilising private sector capital”. However, he emphasised that to mobilise capital, “the regulator has to be supportive of encouraging that long-term investment”.¹⁷⁷
127. Others were more supportive of the current framework. Mr Perkins said that early in the RIIO-2 process, he thought Ofgem “might be being too severe”, meaning that investors would not want to come forward due to lower costs of capital and incentive packages. However, he suggested that “those worries might be overblown”, noting National Grid’s recent acquisition of the Western Power Distribution network at a seemingly significant premium as evidence that “people are prepared to invest ... even with tougher price

170 Written evidence from National Grid Electricity System Operator ([ONZ0020](#))

171 [Q 16](#)

172 [Q 62](#)

173 [Q 86](#)

174 [QQ 89, 97](#)

175 [Q 136](#)

176 [Q 137](#)

177 [Q 174](#)

controls from Ofgem”.¹⁷⁸ Citizens Advice argued that the incentives provided by the price controls are “more than sufficient” to invest, demonstrated by recent prices paid to acquire network businesses. Instead, they argued that the rewards for investing under the price controls are too high, with network companies able to make higher than necessary returns, costing consumers more than it should.¹⁷⁹

128. Jonathan Brearley, CEO of Ofgem, said that “there is always a debate, particularly with the network companies, about how much investment is needed and what the rates of return might be to shareholders as a result of that.” He suggested RIIO-2 allows “a huge amount of investment”. He accepted the argument that more up-front, anticipatory investment is needed, but argued that “that does not mean that we do not put a robust economic framework around it and make sure that projects ultimately deliver value for money for net zero in the long run”.¹⁸⁰
129. Ms Whittington outlined the need to ensure networks have the capacity to meet an “almost doubling of demand for electricity by the end of 2050”. She argued that Ofgem’s price regulation “supports the expansion of the onshore networks, but the question is really what we can do to invest ahead of need in order to minimise the overall impact and make the system as efficient as possible”.¹⁸¹

Uncertainty mechanisms

130. Witnesses also raised concerns about the new uncertainty mechanisms that have been introduced in RIIO-2. Uncertainty mechanisms in price controls allow for the funding arrangements to respond to change, through re-opening a decision. They allow for network companies to receive additional allowances in response to increased certainty about a requirement and can also allow Ofgem to reduce an allowance made in the original price control decision. Re-openers can be for five main reasons, including to change allowances when there is more certainty on the need for, or the cost of, a project, and to adjust allowances in the price control in line with the actual volume of work needing to be done.
131. Mr Jefferson argued that uncertainty mechanisms might cause delays in decision-making, suggesting that “some of them are fine at low level and allow us to crack on, but for others, when expenditure gets higher ... there is another process to go through”. While he said that he has “no problem with that ... we have to make sure that that is done in an efficient way”.¹⁸²
132. Dr Ballance said that “there are some positives” in the uncertainty mechanisms allowing companies to bring forward new investments before the next price control period but argued that there is a risk of becoming more “short-termist” by reviewing decisions on shorter timeframes. He argued that the regulator “does not have to try to second-guess every last bit of investment that you might need to make over the next five years”, suggesting “a framework that allows, with some controls, the ability of

178 [Q 22](#)

179 Written evidence from Citizens Advice ([ONZ0012](#))

180 [QQ 194](#), [206](#)

181 [Q 211](#)

182 [Q 97](#)

network companies to seek to bring forward or accelerate investment in particular areas without having had it prescribed by Ofgem”.¹⁸³

133. Mr Rigg said that “we cannot let things such as uncertainty mechanisms ... allow us as a system to prevaricate”.¹⁸⁴ KPMG’s Simon Virley suggested that “undoubtedly, there has been a shift from what used to be *ex ante* price regulation for seven years to, essentially, rolling price reviews that, in the words of one of my clients, never end. You are constantly in discussion with the regulator”. He argued that it “remains to be seen” whether this secures the necessary investment.¹⁸⁵
134. Jonathan Brearley, CEO of Ofgem, explained that RIIO-2 was designed “differently, because we have made it much more flexible and adaptable”. He argued that Ofgem will be open-minded about allowing investment through uncertainty mechanisms, arguing that the regulator “will turn that around, we hope efficiently and effectively, to make sure that that can be built on time.” He said that he understands “why investors are nervous, because they do not have all the money in their pockets right now” but argued that this is a more effective way of allowing companies to bring forward investments in this price control, rather than waiting for the next one.¹⁸⁶
135. **We are concerned that the price controls regime has the potential to discourage investment at exactly the point when it is needed most. Ofgem needs to ensure that its price controls allow the appropriate level of investment ahead of need and do not restrict investments that are necessary to enable the transition.**
136. *We recommend that Ofgem commit to carrying out a review of its use of uncertainty mechanisms, their effectiveness, the regulatory burden they have placed on energy networks and their impact on investment. This should be done in time to allow any conclusions to be reflected in the decisions it makes for its next price control periods.*

Decentralisation and flexibility

How the system is changing

137. Professor Helm noted that in the past the energy system was straightforward, with “big power stations around a centralised grid” but “the world we are in now is almost completely different” with that demand becoming more active. He suggested that the current system was not designed with that in mind and so “the architecture we have is not the framework within which to solve these issues”.¹⁸⁷
138. Kristoffer Böttzauw, Director General at the Danish Energy Agency, set out his expectation that “we will go from a fossil-fuel based economy with large-scale centralised production to a decentralised producer and consumer environment, and you will see prosumers both producing and using energy at the same time.” He argued that “we need to look at our energy system in a new way and at how to integrate the different sectors of our energy system ...

183 [Q 97](#)

184 [Q 137](#)

185 [Q 174](#)

186 [QQ 194](#), [206](#)

187 [Q 45](#)

in the years to come. The energy sector and the energy infrastructure need to be able to be decentralised and integrated at the same time.”¹⁸⁸

139. Alejandro Hernández, Head of the Renewable Integration and Secure Electricity Unit at the International Energy Agency, agreed that supply and demand will interact differently in future. Using the words of a US operator, Mr Hernández said: “We are going from systems in which we used to schedule supply and forecast demand to exactly the opposite: we will go to systems in which more and more we will forecast supply and then schedule demand.”¹⁸⁹

140. Mr Rigg outlined that the ESO has two principal targets concerning net zero. The first is that “by 2025, we need to be able to operate the grid and the energy system in such a way that we can operate it with zero-carbon power for a short period of time”. The second is that “by 2035 we want to be able to do that all of the time.” He argued that these are “really stretching targets and necessitate a huge amount of change”, including the “need to generate energy differently and move it around differently”.¹⁹⁰ Good Energy’s Juliet Davenport said that:

“We now have a system that generates power from over a million small power stations that are connected to the distribution grid, and we fundamentally have not shifted the mode by which we are going to deliver it. We absolutely know that households will not just be a meter on the end of a grid; they will be integrated into the system, and we do not have any regulation that takes that into account.”¹⁹¹

141. Asked whether he agreed that achieving net zero will require a move to a more decentralised model, and that regulation will need to change, Jonathan Brearley, CEO of Ofgem, said he did in principle, outlining that the regulator sees “a much bigger role for distributed generation ... for batteries and for demand-side response”. He suggested that “these things are very hard to plan strategically. You need to allow them to evolve in the system you have”, agreeing that regulation will need to change to adapt to this.¹⁹²

142. Ms Whittington said that the Government expects decentralisation “to be a really important part of how we meet net zero”. She explained that “anything we can do to reduce demand for electricity means that we have to build less network, less storage, less generation capacity, so it is clearly in the long-term interests of consumers”. She argued that “you do not need to move from a centralised to a decentralised system, but you need to have a system that allows centrally dispatched, centrally operated systems, with the national transmission system, to work in parallel with a distributed system”.¹⁹³

Codes and licences

143. Many of the detailed rules that facilitate the gas and electricity systems are set out in a series of codes that govern different areas.¹⁹⁴ In the retail energy

188 [Q 120](#)

189 [Q 120](#)

190 [Q 130](#)

191 [Q 115](#)

192 [Q 195](#)

193 [Q 217](#)

194 Department for Business, Energy and Industrial Strategy/Ofgem, *Energy code reform: governance framework* (July 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004005/energy-code-reform-consultation.pdf [accessed 23 February 2022]

market, the gas and electricity supply licences set out the conditions that all energy suppliers must adhere to in order to supply energy to consumers in addition to the codes.¹⁹⁵

144. Industry codes contain the contractual rules and governance agreements that define the terms under which participants can access networks and operate in the market, technically and commercially. In addition to complying with the licence to operate in the market,¹⁹⁶ granted by Ofgem, a company supplying electricity has to comply with six of the ten different industry codes (the other codes are focussed on the generation side, or specifically on gas).¹⁹⁷ The codes are overseen by eight different code administrators. They are also dynamic documents, each code with its own membership panel¹⁹⁸ which assesses proposed changes to the code.
145. Ms Sandys argued that the energy sector is “very, very prescriptive”, describing the codes system as being “absolutely about what colour socks you wear on a Thursday and how you look on a Friday”. She called for “a change in regulatory approach and structure—to be agile, to be anticipatory and to regulate for risk not process”.¹⁹⁹ She also outlined that business models in the retail energy market are “vanilla”, arguing that “they are the same and in many ways they are shaped around a licence condition”.²⁰⁰
146. David Gray, a former Chair of Ofgem, argued that the codes and licences are “two sets of documents that underpin everything in the energy market and they both need to change completely”. He argued that the licences and codes are “all designed for the industry that we had after privatisation, which was a relatively steady-state industry, and they were not designed for an industry facing transformation”. He explained that “they were designed to be difficult to change, to avoid interference from the Government and the regulator, and so we have an inappropriate system that is designed to be difficult to change”. He argued that it “would require a substantial legislative programme to take on this complexity of industry codes and licences and reduce them to the level of simplicity required”, describing such changes as “basic enablers of all the stuff that has to happen with net zero”.²⁰¹
147. Talking about the current retail energy market issues, Jonathan Brearley, CEO of Ofgem, noted that “at the moment, our licensing regime allows us to move at a pace that is very challenging in the short-term environment that we have been working in”. Mr Kenward also said that Ofgem is “looking, with government and the grid, for example at the codes that the system runs on to see if they can be simplified and channelled towards effective delivery

195 Ofgem, ‘Licences and licence conditions’: <https://www.ofgem.gov.uk/industry-licensing/licences-and-licence-conditions> [accessed 23 February 2022]

196 The electricity supply licence is 540 pages long. The gas supply licence, which has a significant overlap of obligations (but has some gas-specific obligations, and lacks other requirements, for example relating to environmental levy obligations), is 391 pages long.

197 An electricity supplier must be a party to and comply with: the Distribution Connection and Use of System Agreement; the Connection and Use of System Code; the Balancing and Settlement Code; and the Retail Energy Code. It must also comply with the Distribution Code, and the Grid Code.

198 For example, the Balancing and Settlement Code Panel has 15 members, the Grid Code Panel has 18 members. Membership varies but typically includes an independent chair, industry members, lay members, consumer representatives, and a representative from Ofgem.

199 [Q 161](#)

200 [Q 154](#)

201 [QQ 158–159](#)

of net zero. Code reform is one of the bits of the machinery that we are looking to to help enable the transition”.²⁰²

148. BEIS and Ofgem published a consultation in July 2021 on reforming the energy codes framework, accepting that the codes “were designed to deal with a more predictable energy system and have seen only incremental changes over time”.²⁰³ The changes aim to introduce a strategic function to set a clear direction for code reform, which “will allow the codes to facilitate the significant changes required to transition to a cleaner energy system, such as code consolidation and simplification.” The preferred option outlined in the consultation would be to designate Ofgem as the strategic body, which would develop and annually publish a strategic direction for the codes.
149. Ms Whittington explained that the Government sees codes reform as “an incredibly important part of what needs to change to deliver net zero”, outlining that “that is why we set out a potential role for Ofgem in providing that strategic direction, as well as reform of the code management function. As and when we have legislation, we will be looking to see what we can take forward in that space.” The Minister, Rt Hon Greg Hands MP, said that “we have a commitment to a We have a commitment to a third session energy bill, which could be a place to put this kind of legislation”.²⁰⁴
150. **Given the scale of change set to take place in the energy sector, we are concerned that the governance of the energy system, and in particular its licences and codes, is slow-moving and resistant to change.**
151. *We recommend that codes and licences be simplified and reformed in such a way that they are able to adapt to a fast-changing sector and enable the energy transition and are pleased that this is under active consideration by the Government and Ofgem. If this requires legislation, the Government should ensure that this is brought forward swiftly.*

Marginal pricing

152. Greg Jackson, Founder and CEO of Octopus Energy, argued that there is “an emerging world in which the reality is that renewable generation is cheaper ... but the system we are creating is failing to expose those low prices to consumers at times when they are available”. He suggested that “National Grid and the distribution networks prevent us deploying billions of pounds in new generation to bring consumers billions of pounds of cheaper electricity”, calling for wholesale market reform to allow routes to market for innovation. In particular, he called for “marginal cost access to the distribution and transmission networks for green generation and green consumption”, rather than the average price basis that they currently run on. He suggested that currently, even cheaply generated green electricity has “to pay a very high average cost to access literally empty capacity on the network”, making it more expensive to transport it to consumers. He argued the need for a process that would enable cheaper prices for using empty capacity, citing the example of discounted air travel when there are empty seats.²⁰⁵

202 [QQ 195, 198](#)

203 Department for Business, Energy and Industrial Strategy, *Energy code reform: governance framework* (July 2021): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004005/energy-code-reform-consultation.pdf [accessed 23 February 2022]

204 [Q 217](#)

205 [QQ 114–115, 118](#)

153. Laura Sandys, Chair of the Government’s Energy Digitalisation Taskforce, said that currently, in the energy system “we reward only the commodity; we do not reward the consumers” for providing value to the system through flexibility or storage. She said that one of the important roles for the regulator is to “allow the value to flow to those consumers, and that means looking not just at the levelised cost of electricity but at whole systems, putting the right incentives in for the distribution to deliver that value to consumers”.²⁰⁶
154. Mr Gray agreed that pricing on the transmission and distribution system “has to become much more granular” but noted that this “involves turning what used to be a fairly dumb ... distribution network into an intelligent network more akin to the national transmission system that is able to send pricing signals and react to events, and that does require a lot of investment.”²⁰⁷ Chris O’Shea, CEO of Centrica, set out the need for “full penetration of smart meters” to enable consumer flexibility. He accepted that Centrica has had problems in getting consumers to install a smart meter, arguing that there is a need to communicate the benefits to customers.²⁰⁸ National Grid and National Grid ESO also agreed that the net zero target could not be achieved without “a very large-scale take-up of smart meters”.²⁰⁹
155. Jonathan Brearley, CEO of Ofgem, emphasised that putting in place a more flexible system “will save billions of pounds a year” but argued that what is critical is “making decisions quickly about the build of network infrastructure, but not just assuming that putting copper in the ground is the right answer to meet all our net-zero ambitions.” He argued that to enable this more flexible system, “you have to find some way of rewarding people for participating in that”, suggesting that Ofgem thinks that this can be done by local networks or through tendering. He said that “there is a very different market model out there that we need to evolve towards. Ofgem is really committed to doing that”.²¹⁰

Future energy business models

156. We heard from many witnesses that to enable flexibility and help consumers with decarbonising their energy use, current retail energy business models may have to change. Dr Jeffrey Hardy, Senior Research Fellow at Imperial College London, said that the energy system is “crying out for businesses or organisations that can come in and help those disengaged customers” through the transition. He suggested that ideally, businesses would “take away the pain of up-front costs so it can be accessible to all. They will probably spread those costs over much longer contracts, a little like we do for new mobile phones”.
157. Dr Hardy explained that companies could also provide a broader service known as energy-as-a-service, setting out that such a proposition could involve taking on the price risk, the up-front costs and the responsibility of running kit in a flexible manner “in return for consumers ceding a little control over some of their devices”. However, he noted that

“we cannot do that service at the moment, because the relationship with energy suppliers is one of selling a commodity where switching is the

206 [Q 155, 165](#)

207 [QQ 156, 166](#)

208 [Q 113](#)

209 [Q 131](#)

210 [QQ 186–187, 195](#)

thing you have to do as often as possible. You cannot be locked into a contract; you cannot have this long-term relationship.”

He suggested that thought needs to be given to “what a supply licence looks like in the future and what sorts of business models are going to be allowed to have these relationships with consumers”, as “without those intermediaries taking away the complexity and taking consumers with them on these zero-carbon journeys, we are not going to get anywhere very fast.”²¹¹

158. Lynne Gallagher, CEO of Energy Consumers Australia, noted that in Australia, “the first wave of innovation was all about complexity and thinking that that is what you wanted to engage with. The next wave is making it simple”. She said that one of Australia’s companies has a new offering:

“They operate your electric vehicle, they operate the battery, they earn money in wholesale markets and in our ancillary services markets, and in return they pay your electricity bill for you. They account to you each week to show you how much they have made and how much they have paid for your bill, so that people can see whether they are ahead or behind. That is the promise: ‘no bill’.”²¹²

159. Mr Jackson stressed that there could be “a great opportunity for some households and businesses” in reducing their energy usage when the UK is short of energy supply in return for lower bills. He argued that they “could opt out any time they wanted so they could carry on using electricity if they needed to”. He outlined that Octopus Energy supplies electric car owners in the UK with dynamic tariffs, explaining that:

“Almost invariably, once they have got used to the idea that an electric car is going to charge when it is cheap, they think about other things such as the washing machine, or leaving the dishwasher until just after peak and doing it at 8 pm rather than 7 pm, because they have suddenly realised that these opportunities exist. I think we are on the cusp of this change, but we could do dramatically more to drive it.”²¹³

160. Mr Kenward explained that Ofgem’s consumer data “shows that [electric vehicle] owners are far more willing to have those sorts of smart-charging arrangements in place”, suggesting that there may be a shift as consumers acquire new assets.²¹⁴ Good Energy’s Juliet Davenport suggested that new services could put “the customer more in control than ever before in reducing their costs”, explaining that “through vehicle-to-grid charging, we estimate that you can earn £300 a year from having an electric vehicle. Suddenly these technologies become an income generator rather than just a cost.”²¹⁵

161. Mr Gray said that “what we need in the future is a rather different type of business ... the important thing is to make it simple for the consumer so that ... they are buying a service that they can understand and the rest is made to work in the background.”²¹⁶

211 [Q 3](#)

212 [Q 30](#)

213 [QQ 117, 119](#)

214 [Q 202](#)

215 [Q 119](#)

216 [Q 154](#)

162. Asked whether the existing energy suppliers are able to innovate in this space, Ms Davenport felt that “you will get better innovation from external challenge than internal”, suggesting that the role of newer suppliers “is to come in and take that space”.²¹⁷ Ms Sandys suggested that the energy market should be opened up to new entrants from outside the energy sector, suggesting that companies that innovate well “are the ones that are going to win the sector but I am not sure it is what is called a supplier as we have today”. Mr Gray agreed that “it will not be the sort of supplier that we have today” that provides these services going forward.²¹⁸
163. Witnesses also expressed concerns about the openness of the regulatory framework to new entrants and business models. Flint Global’s Josh Buckland said that “the current regulatory environment does not necessarily outlaw” new supplier models, such as energy-as-a-service, “but it makes it much harder, because the ability for regulation to adapt in the timeframe that is required is not currently there.”²¹⁹ Ms Sandys gave an example:
- “Tesco and Sainsbury’s looked at the energy market a while back ... and they said, ‘We cannot exercise any of our creativity, any of our supply chain pressures and any of our new propositions in this market because the regulation is too tight for us to exercise our skills’.”²²⁰
164. Dr Hardy noted that Ofgem “already has some ability to create some space” for new supplier models through its regulatory sandboxes, “whereby businesses can try out some of these novel propositions today”. He said that this process “needs to be accelerated and, if a sandbox proves to be successful, a business should be allowed to continue with that proposition”, as at the moment, these propositions have to stop at the end of each trial.²²¹ EDF’s Paul Spence said that Ofgem’s regulatory sandbox works, but “probably needs to work faster”. He said that “we need to get faster at the process of operating the sandbox and trying things for real with real people”.²²²
165. Mr Spence did, however, point out that EDF, for example, is “actively working on trials with groups of customers, looking at how these technologies interact and then helping to work out what propositions work better or less well for customers”. He said that EDF is “determined to be ready” for new entrants in this space, and to “help some of our customers to be the ones who can benefit from those new opportunities”.²²³
166. Some witnesses raised concerns about the readiness of consumers themselves for new models. Ms Sandys focused on consumer protection as “in many ways energy will no longer be an island.” She argued that “we need a social tariff”, along the lines of the “broadband-type model, where you end up with a very boring service but it is the essential service.” Mr Gray agreed, telling us that
- “there will be a category of consumers who will not want to know and there will have to be a baseline regulated tariff, a regulated distribution

217 [Q 119](#)

218 [Q 158](#)

219 [Q 151](#)

220 [Q 157](#)

221 [Q 3](#)

222 [Q 113](#)

223 [Q 113](#)

tariff, feeding through into a regulated price for a group of vulnerable customers who simply cannot or will not take part.”²²⁴

167. Mr Spence emphasised the “need to ensure that there are consumer protections, and a proper understanding of the implications of some of these future models as well, with the right protections in place for that”. Mr O’Shea referenced Centrica’s problems in getting some customers to take a smart meter, arguing that those consumers “probably will not want a company ... being involved in how their appliances are working”.²²⁵
168. Professor Jenkins suggested that “a lot of the innovative behavioural things that people talk about do not work for vulnerable consumers”, as the average vulnerable consumer will not know about the tools to manage energy use and will not be able to afford them.²²⁶ Dhara Vyas, Head of Future Energy Services at Citizens Advice, outlined the need to ensure “everyone can engage with it and that people are not left behind on the journey”. She argued that the increasing innovation and complexity in the market require “consideration of how Ofgem works with other regulators for people to engage with these sorts of things”, particularly in relation to finance and technology.²²⁷
169. Jonathan Brearley, CEO of Ofgem, agreed that with the provision of heat pumps, smart chargers and electric vehicles, “new business models will emerge. Whatever we do, we need to make sure that the framework is adaptable about that”. He recognised that the industry will need to change, suggesting that retail energy suppliers will have a significant role to play in helping consumers to change their behaviour. He said that Ofgem has “to be adaptable. We have to allow business models to grow in a controlled way and then make sure that we have protections in place as we see the kinds of risk that might come to customers.”²²⁸
170. On the other hand, Mr Brearley also emphasised that “the existing suppliers are really important in this, and you are already seeing a changing landscape of companies that are trying to develop new offers for their customers”. He said that “there is a lot we have to do as a regulator to make sure that those new offers make sense”, noting that further reform is needed to ensure agile tariffs represent value for money. He acknowledged that there is a trust issue in the sector but argued that the relationship suppliers have with customers “can be used to drive some of the changes we are seeing”. He also outlined that “you really want people who will offer to do things differently”, noting that Tesla is now offering energy services.²²⁹
171. Ms Whittington said that the Government wants to see innovation in the sector in relation to new products, such as heat pumps and electric vehicles, and to provide the incentives for a more flexible, low-cost system. She said that “there is a really important part of the future vision for energy retail that beds them into the net-zero piece ... they should be agile businesses that take account of the data”.²³⁰

224 [QQ 154, 158, 162](#)

225 [Q 113](#)

226 [Q 15](#)

227 [Q 29](#)

228 [QQ 196, 199](#)

229 [Q 201](#)

230 [QQ 219, 221](#)

172. *It is clear that the service that retail energy companies provide will have to change to help consumers through the transition, including by providing new products and services that enable them to spread up-front capital costs and to realise the value of providing flexibility to the grid. However, it is far from clear that the industry or the regulator are ready to adapt their approaches in this way. Ofgem must ensure that its regulation allows new models to benefit consumers through its regulation of activities carried out by suppliers, its expectations of industry and through enabling more granular pricing. Ofgem should also make it easier for successful firms to make use of existing mechanisms to support innovation, such as the regulatory sandbox.*
173. *While these new models have the potential to benefit consumers, we have heard that not all consumers will have the desire or capability to engage with them and that they may bring new risks. Ofgem must strike a balance between allowing new entrants and models into the retail energy market, while enabling an appropriate level of consumer protection for all consumers, no matter what service they are receiving.*

Consumer readiness and engagement

174. Consumers have an important role to play in the net zero transition. Chris Stark, Chief Executive of the Climate Change Committee, said that “the consumer aspect of this is absolutely central to the success of the transition overall”²³¹, while Ms Sandys argued that “citizens will have a veto on net zero, so if we do not get this right we can all forget it”.²³²
175. National Grid ESO’s Jake Rigg said in relation to the way that consumers will use energy that “it is very clear that that plays a central role in any of our scenarios”. While he noted that there are varying degrees of consumer response within differing future energy scenarios²³³ produced by the ESO, “it is significant, around six gigawatts, in some of the more ambitious scenarios within that. It is really key that we keep pushing on that”.²³⁴
176. Ms Vyas said that the vast majority of people support the goal of reaching net zero, “but they do not necessarily know what the changes will mean for homes and their living situation”. She noted that less than 40 per cent of people thought that they would need to change the way they heat their home, whereas the Climate Change Committee has “predicted that 90% of homes will need to install low-carbon heating systems, so there is a real knowledge gap”. She said that “net zero will be possible only if people can work out how to make changes that are right for their homes. If they cannot afford to and have a bad experience, we will not get there”.²³⁵
177. Ms Gallagher said that consumers “expect the future of energy to be clean and expect to play a role in that transition, but they also expect it to be affordable”. She argued that consumers “need to be willing to buy into”

231 [Q 59](#)

232 [Q 157](#)

233 National Grid Electricity System Operator, *Future Energy Scenarios 2021* (July 2021): <https://www.nationalgrideso.com/document/202851/download> [accessed 23 February 2022]

234 [Q 130](#)

235 [Q 23](#)

changing social and business practices, which are “not something that you can impose on them”.²³⁶

178. Dr John Constable, Energy Editor at the Global Warming Policy Forum, argued that “rather than having a confrontation with the public, it would be better if the Government, through a system of checks and balances, stress-tested their policies to see whether they were likely to be acceptable to the public in the longer term.” He suggested that “the current policy costs are likely to be so high that public resistance will mean that we do not and cannot meet net zero”.²³⁷
179. Tim Lord, Senior Fellow at the Tony Blair Institute for Global Change, said that “consumer understanding of the impacts of their energy use is low. I do not blame consumers for that. It is because some of these issues have not been explained very well over a period of many years.” He explained that
- “about half of people do not realise that their gas boilers produce greenhouse gas emissions. It seems unreasonable in that circumstance to expect them to be signing up to decarbonising their heating unless that is properly explained to them.”²³⁸
180. Mr Buckland expressed concern about media characterisations of net zero as a burdensome cost, noting that “there is a significant cost and transition challenge”. However, he suggested that the end state “is as good if not better than the current state. You should have lower-cost technologies, and stability in your pricing environment for technologies because they should not be driven as much as by volatile international markets”. Noting other benefits around technology innovation, he argued that “there is a positive story that government can tell about how the opportunity sits”.²³⁹
181. Witnesses expressed concerns about the energy industry’s record of engaging with consumers. Mr Jackson said that the smart meter roll-out is “a great example of the change that we need to see in the way the energy sector understands consumers ... we were forcing smart meters on people. We were not talking about how they could benefit them in a meaningful way”.²⁴⁰ Mr Lord noted that “clearly there is a variability in the quality of the consumer offer and the marketing of that consumer offer in the sector.”²⁴¹
182. Lord Turner outlined demographic variables relating to electric vehicles, as those without driveways will pay a higher price for their electricity on public chargepoints.²⁴² Ms Frerk argued that “those on low incomes will be much more worried about heating and much less worried about transport. It is about the winners and losers”. She said that “some early signals about the end of gas boilers, and perhaps a rebalancing of tariffs between gas and electricity, would send the signal in the same way that the announcement about the end of [Internal Combustion Engine] vehicles has got everybody thinking about the fact that we have to make that change.”²⁴³

236 [Q 23](#)

237 [QQ 73, 75](#)

238 [Q 151](#)

239 [Q 147](#)

240 [Q 119](#)

241 [Q 152](#)

242 [Q 83](#)

243 [QQ 81–82](#)

183. Mr Buckland explained that different consumer groups will have different needs, with some hyper-engaged consumers who engage with new technologies, less engaged consumers who want problems solved for them, and those “who simply do not have the ability to engage and will clearly need different levels of support.” Mr Lord also outlined that accessibility is “hugely important”, arguing that unless thought is given to how different groups will access services, there will be challenges later.²⁴⁴ Matt Copeland, Head of Policy and Public Affairs at National Energy Action, said that there is “a real skills gap in the provision of really good advice to help people to decarbonise their homes”. He said that this advice “is really needed, especially for the poorest, most vulnerable households, which will need hand-holding through this process”.²⁴⁵
184. However, there were differing views on who is responsible for communicating with consumers about the transition. EDF’s Mr Spence emphasised the need to make the case for change to consumers, stressing that “it has to be an emotional campaign as well as a rational campaign”. He said that they “have to persuade each consumer that it is in their interests to take the steps they need to take at the moment”, arguing that he “would like that to be a combined effort with the Government, with our regulator, and for the industry as well, and for each company to make that case.”²⁴⁶
185. Ms Davenport argued that there is a role for the Government, the regulator and innovative companies in “having that energy conversation with customers”, arguing that “everybody has a role in this”.²⁴⁷ Mr Lord said that responsibility for this is “not just on the energy sector; that is on the Government and other communicators as well”. Mr Buckland suggested that companies “have a responsibility to support government and Ofgem to create the pathways for the different segmented customers”.²⁴⁸ Witnesses outlined several things that could help consumers with the transition. Mr Lord highlighted the importance of improving information, suggesting that while replacing heating systems is a significant challenge, “if we can make it easy for them to do that and explain why it needs to happen, and do it in a phased way so that we are doing the easier bits first and the harder bits later, I think you can engage consumers on that journey”. He also emphasised the need to “automate some of these things” with new business models.²⁴⁹
186. Jonathan Brearley, CEO of Ofgem, said that “there is no single answer” to the question of whose job it is to persuade consumers to take up low-carbon options. He set out that “there is a big role for government and for Ministers to persuade people. We need to work much more closely with agencies outside the regulator and government to encourage people to make changes”. He did not think that “Ofgem or government will necessarily have the persuading power we need to make some of the changes we need”, arguing that “this is where you need a dynamic and competitive sector ... there is no greater force than companies designing products in such a way that people actually want to put them into their home to make some of this happen.”²⁵⁰

244 [Q 151](#)

245 [Q 25](#)

246 [Q 113](#)

247 [Q 119](#)

248 [QQ 151–152](#)

249 [Q 152](#)

250 [Q 200](#)

187. Mr Brearley also argued that “you probably need more public information ... to help people understand the choices and trade-offs they might need to make”. He said that his experience of refurbishing his own home had shown him “how complex these things can be for someone who is steeped in the energy sector”.²⁵¹
188. The Minister, Rt Hon Greg Hands MP said:
- “I would suppose that public awareness in the UK of net zero is probably higher than in many, if not most, other developed countries. We are making sure that people understand what we mean by net zero, what we mean by progress and the actions we need to be taking, as a Government and all the way down to individuals.”²⁵²
189. He said that “we need to make sure that information gets out there on how you can make an informed choice in this space”. He emphasised that “we are trying to go with human nature” in encouraging consumer action, giving the example of heat pumps, where he argued that the timeframe for introducing low-carbon heating matches the average life of gas boilers.²⁵³
190. Ms Whittington added that “we should do all we can to use the energy retail businesses to make the case, to provide the different products and to get people to adopt this new technology because they want to, not because they are told to.” She also outlined that “the Net-Zero Strategy had a really important strand about helping businesses and consumers make green choices more easily”, including Simple Energy Advice, a government-supported scheme providing bespoke online advice to people about these choices. She emphasised that it is “also beholden on people in the energy industry to be that extra voice that sits alongside it”.²⁵⁴
191. ***Without acceptance by consumers the transition will not be possible. They are set to be key participants, but need greater clarity, information and guidance in order to play their part and realise the benefits. The Government needs to take the lead in clearly setting out the need for consumers to take action and what it expects them to do—for example, with respect to heat pumps—as well as providing incentives to decarbonise energy use. This will allow Ofgem to set out its expectations for energy companies, and for those suppliers to adapt their offering to customers. Ofgem must ensure that energy suppliers do not disproportionately penalise those consumers unable to engage with the changing energy market.***

Retail energy market regulation

192. In recent months, the price of energy has increased dramatically, both in the UK and elsewhere. This has been led by an increase in wholesale gas prices, but electricity prices have followed as gas is one of the fuels used to generate electricity. In the UK, low levels of wind, outages at nuclear plants, and a fire that shut down a key electricity interconnector have all contributed to a need for greater use of gas power stations, and therefore higher prices.²⁵⁵

251 [Q 201](#)

252 [Q 212](#)

253 [QQ 222, 226](#)

254 [QQ 221–222](#)

255 House of Commons Library, *Cost of gas and electricity*, [Debate Pack 2022–0010](#), 17 January 2022

This has led to widespread concern and knock-on impacts for both retail and commercial energy consumers.²⁵⁶

193. Rising prices has caused difficulty for retail energy suppliers, who are limited in their ability to pass on price rises to customers by the default price cap, introduced in 2018,²⁵⁷ which Ofgem operates and updates every six months to reflect wholesale energy costs.²⁵⁸ A total of 28 energy suppliers collapsed in Great Britain in 2021,²⁵⁹ including Bulb Energy, the seventh largest energy supplier, which collapsed in November.²⁶⁰
194. Speaking in October 2021, Chris O’Shea, CEO of Centrica, said that in addition to customer price increases, energy suppliers going out of business adds up to £2.5 billion of costs, which “will be reclaimed and go on every customer’s bill over 2022 and 2023 at £100 per customer”. He called for financial services-style regulation of energy suppliers, including “adequate capital and adequate risk management policies”, a fit-and-proper-person test and ring-fencing of customer deposits. He acknowledged that “some of the competition that has come into [the retail] market has been excellent” but argued that companies have been allowed to enter the market with few or no checks, suggesting that rather than improving the market, these suppliers have provided “an illusion of competition”. He argued that “what we see today was entirely foreseeable”, noting that the retail energy industry “has lost money for the past five years”.²⁶¹
195. Mr Spence said:
- “The leadership of both BEIS and Ofgem know and agree what is required today, and some of the things that we have talked about are being consulted on and are going through the process at the moment, but perhaps not as quickly as I would like and as quickly as needs to happen. There is an element whereby collectively we need to prioritise and accelerate putting in place these different arrangements.”²⁶²
196. Octopus Energy’s Greg Jackson argued that “the reality is that periods of disruption lead to dislocation” but acknowledged that “we could have minimised the damage done by those exiting retailers by some simple prudence”.²⁶³ Mr Buckland said that “the current crisis sped up a trend that was already there”, noting that while the rate of price increases was a surprise, “the underlying market structure of relatively poorly capitalised companies in some areas of the market was clearly going to unlock change at some stage, and that is what has happened.” He also called for “a slightly more financial services regulatory-type model”, involving regular capital requirements on companies that hold customers’ money.²⁶⁴ Mr Lord raised

256 House of Commons Library, *The energy price crunch*, Research Briefing, [Number 9340](#), 14 January 2022

257 [Domestic Gas and Electricity \(Tariff Cap\) Act 2018](#)

258 Ofgem, ‘Check if the energy price cap affects you’ (January 2022): <https://www.ofgem.gov.uk/information-consumers/energy-advice-households/check-if-energy-price-cap-affects-you> [accessed 23 February 2022]

259 Ofgem, ‘Building energy market resilience’ (December 2021): <https://www.ofgem.gov.uk/publications/building-energy-market-resilience> [accessed 23 February 2022]

260 House of Commons Library, *Cost of gas and electricity*, [Debate Pack 2022-0010](#), 17 January 2022

261 [QQ 111-112](#)

262 [Q 112](#)

263 [Q 115](#)

264 [Q 149](#)

the concern that if gas prices reduce, “then a load of new companies come in, hedge at much lower prices and take all those customers back”.²⁶⁵

197. Mr O’Shea argued that one of Ofgem’s key pushes has been switching, “which effectively means that Ofgem’s assessment of success in the market was customers being dissatisfied with their supplier, which I find a very strange concept”. He said that “as recently as a couple of months ago we had a retail market strategy that called for more competition. I would be happy to have more competition, as long as every entrant could satisfy their commitment”.²⁶⁶
198. Mr Spence outlined that some customers were serially switching, and that this “cannot be the definition of a good market through a period where one of the things that energy companies are going to be asked to do in future is to help their customers on their journey to net zero”. He argued that the potential new activities energy companies will be asked to do “are things that suggest a longer-term relationship, and, in that world, it cannot be right to be pushing in the same way” for more.²⁶⁷
199. Mr Buckland said that the current structure of the retail market is driven by short-term price competition, arguing that while that is valuable for consumers in the short term, “customers are now paying for the failure of some of those poorly capitalised companies”.²⁶⁸ Mr Lord argued that in the long term, the right models in a net zero context “have to involve long-term investment, long-term relationships with companies”. He suggested that “the way that the market is structured at the moment and the incentives provided are precisely the opposite of that: switch quickly and choose purely on the basis of short-term cost”.
200. Mr Lord concluded that “a key challenge is how we make sure that the barriers to entry into this market are appropriate to provide consumer protection, but not so high that we prevent new business models coming in and providing the kind of innovation we need”.²⁶⁹
201. Jonathan Brearley, CEO of Ofgem said that “the scale of change in gas prices ... is dramatic”, at “five times the cost that we would have expected previously”, arguing that this is “an enormous shock for the retail sector”. He said before the price rise, Ofgem was “introducing new rules about financial responsibility” with “new licence conditions that talked about financial responsibility and a fit and proper test, but the economics changed so quickly that our focus really had to be on making sure that customers were looked after”. He argued that “we have a retail sector that needs to become much more financially resilient” and is “more able to handle shocks like this in the future”.²⁷⁰
202. Mr Brearley outlined that “we need a very different way of regulating the retail sector ... that means having very sharp, focused capital adequacy, but also the rules in place as to what you do once someone breaches that”. He set out the need for a fit and proper test, the ability to adapt the price cap in volatile scenarios, and new rules on hedging, arguing that “we have to be

265 [Q 149](#)

266 [Q 112](#)

267 [Q 112](#)

268 [Q 149](#)

269 [Q 149](#)

270 [Q 196](#)

really clear and sharp about how we apply these rules”, suggesting that while “your commercial strategy is always your own ... the rule has to be that, if you choose to take risk, you have to have the capital available to be able to underpin a wide range of scenarios”. He argued that “stress tests need to be very wide”, as “a 500% increase in the price of gas is certainly not something we have seen before in the market ... but we need to be ready for that in the future”.²⁷¹

203. Mr Brearley was however conscious of “not regulating in a way that leaves you with a vanilla company ... we need room for start-ups and for different approaches to be made”.²⁷²
204. The Minister, Rt Hon Greg Hands MP said that he “would have expected energy suppliers to be properly hedged”. He argued that “many of those companies have been able to ride out that rise in prices so far because they have been well hedged and have approached it with a sensible hedging strategy”.²⁷³
205. Ms Whittington said that switching “is certainly a metric of engagement, but... it can be both positive and negative engagement”. She suggested that the Government’s aim is “a market that delivers fair outcomes for consumers. That means good prices, a variety of tariffs and high-quality customer service, but we also want a market that delivers for net zero”. She called for an “evolution of a retail market and there is no single metric that properly reflects that. I would not say that switching on its own was a good way of judging it. That has not been the government position.”²⁷⁴
206. In December 2021, Ofgem set out a series of measures aiming to increase resilience in the retail energy market, including the launch of financial stress testing for suppliers from January 2022, strengthening existing controls on ‘fit and proper’ requirements, tightening rules around the protection of credit balances and renewables levies, and consulting on new financial license requirements in Spring 2022.²⁷⁵ Ofgem also consulted on requiring suppliers to pause expansion beyond certain milestones until it is satisfied that they are financially resilient, adapting the methodology of the price cap to better handle energy market volatility, and set out that it is considering asking government for additional powers to be able to take “rapid and appropriate action” when suppliers are unable to meet the new requirements being established.
207. In the same month, BEIS published a consultation on the future of the energy retail market to reflect recent events, seeking feedback on: how the retail market can help achieve the best outcomes for consumers, no matter how they engage; how energy companies can help drive the private investment needed to achieve net zero; and how the retail market, its underpinning regulatory framework and the price cap, may need to evolve to enable a lowest-cost, flexible and resilient energy system that continues to protect consumers. The Government intends to refresh the current energy retail

271 [QQ 196–197](#)

272 [Q 198](#)

273 [Q 218](#)

274 [Q 219](#)

275 Ofgem, ‘Building energy market resilience’ (December 2021): <https://www.ofgem.gov.uk/publications/building-energy-market-resilience> [accessed 23 February 2022]

market strategy, with the aim of publishing an updated strategy as soon as possible, once the market has stabilised.²⁷⁶

208. **Becoming a more adaptive regulator must not come at the expense of consumer protection. The recent collapse of a large number of suppliers has highlighted substantial failings on the part of Ofgem. We welcome Ofgem’s recognition that change is needed to restore trust in the retail energy market and urge the regulator to prioritise the introduction of a robust regulatory framework akin to the financial services sector for energy companies holding large amounts of customer money, including adequate capital requirements and a fit and proper persons test. Nonetheless, the regulator must be careful to strike the right balance between resilience and innovation, ensuring that new requirements do not preclude new entrants and business models from the retail energy market.**
209. **The promotion of switching and short-term price competition without adequate financial oversight contributed to energy supplier failures. We welcome that the Government and Ofgem recognise the need for broader objectives for the retail energy market, including enabling net zero. New business models may require longer-term relationships between customers and suppliers and this must be based partly on greater trust in those firms.**
210. *Ofgem should publish a detailed approach to supervision once these changes are in place, to make its new requirements clear and enable greater scrutiny of its performance.*
211. *While competition will remain an important feature of the retail energy market, the Government and Ofgem should set out their expectation that companies should compete on their overall service and value to customers and not just on price. The use of switching as a singular metric of competition should be abandoned. It is the ease of switching rather than actual switching which supports competition; high switching may be an adverse measure of customer service rather than something to be encouraged. Indeed, if firms are to help customers manage the energy transformation this may require longer term contractual relationships.*

276 Department for Business, Energy and Industrial Strategy, ‘Future of the energy retail market: call for evidence’ (21 December 2021): <https://www.gov.uk/government/consultations/future-of-the-energy-retail-market-call-for-evidence> [accessed 23 February 2022]

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Below is a list of all of the Committee's conclusions and recommendations (recommendations appear in italics).

The challenge of the net zero transformation

1. Given the timescales involved in complex infrastructure projects and the life expectancy of newly built energy assets, the current decade is crucial to the ambition of achieving net zero by 2050. While we welcome the targets set in the Government's Net Zero Review, we do not believe that the necessary policy detail is in place to achieve those targets, with further detail needed to encourage the scale of investment required to decarbonise the energy system while maintaining energy security. (Paragraph 40)
2. *We call for clarity from the Government in the following areas:*
 - *a business model to support the development of long-duration storage technologies;*
 - *the overall funding envelope and business model for carbon capture, usage and storage (CCUS);*
 - *the funding mechanism for the deployment of small modular reactors (SMR);*
 - *business models and financial support for hydrogen conversion;*
 - *an accelerated decision on the role of hydrogen in heating;*
 - *the future role of the gas distribution network;*
 - *funding incentives to deliver heat pumps;*
 - *funding to support the energy efficiency of homes; and*
 - *a review of the non-financial barriers to the deployment of 40GW of offshore wind by 2030. (Paragraph 41)*
3. *The Government should set out by the end of 2024 the roadmap by which it will deliver the energy mix it envisages for achieving net zero in a secure way, including setting out the funding structures for any new technologies that the Government aims to rely on. This roadmap needs to be dynamic, recognising that technology developments over time may result in differing incentives and priorities becoming appropriate. The Government should also set out the role it intends gas to play in the future system and where it will source this from, given security of supply and price volatility in international markets. Given the ongoing requirement for gas, the Government must take all steps to facilitate the exploration and exploitation of our own resources. (Paragraph 42)*
4. *We strongly urge the Government to set out how the transition will be funded. In doing so, it should explicitly set out the distributional consequences for any funding proposals. Funding the transition primarily through charges to billpayers is regressive and involves invidious trade-offs, making some consumers pay for investments that will not directly benefit them. (Paragraph 53)*
5. *There are a number of ways in which the Government can support energy investment. We urge the Government to consider the full range of funding options including the UK Infrastructure Bank, the British Business Bank, carbon pricing, co-*

investment, investment subsidies, investment tax relief and Contracts for Difference. (Paragraph 54)

6. *We also call on the Government to reconsider its opposition to the use of government borrowing, due to its suitability for this type of investment financing, and because future generations will be the main beneficiaries of net zero investment.* (Paragraph 55)
7. *We support the Government's plans to publish this year a call for evidence on fairness and affordability. We call on the Government to publish this as soon as possible and commit to consulting on more detailed proposals by the end of 2022.* (Paragraph 56)

Institutional architecture and co-ordination

8. The changes needed to ensure the transition to net zero by 2050 are transformational, not gradual and incremental. There is insufficient co-ordination within Government on net zero, as well as evidence of insufficient bandwidth in BEIS to tackle the full range of issues associated with the transition. (Paragraph 65)
9. The scale of the net zero challenge requires urgent action across the economy and across a range of government departments and public sector bodies. We are concerned that there is insufficient co-ordination and strategic direction in relation to reaching the target, particularly in translating high-level targets into detailed, deliverable policy. However, it is key that any co-ordination function does not create new and unnecessary levels of bureaucracy, and instead helps to drive cohesive decision-making at a political level, while directing and overseeing implementation of detailed policy. (Paragraph 73)
10. *We propose the creation of an expert taskforce, following the example of the Vaccine Taskforce—but on a longer term footing—responsible for economy-wide strategic planning, cross-departmental co-ordination, implementation of some agreed policies and operational delivery monitoring in relation to the net zero transition by all departments and agencies. Given the inherent uncertainty of the transition, the taskforce model provides the agility necessary to adapt to a rapidly changing landscape.* (Paragraph 74)
11. *The transformation taskforce will need to address politically sensitive policy issues, including public spending commitments, so—following the model of the Vaccine Taskforce—cannot be independent of Government. The taskforce should report directly to a Cabinet Committee chaired by the Prime Minister which would agree the strategy and key policy components and authorise any Government financing. The taskforce, housed within the Cabinet Office, will then have the authority to translate the policy into detailed policy implementation covering all Government departments. The taskforce should be set up immediately given the urgent need for action on net zero within the next few years.* (Paragraph 75)
12. *There is clearly a role for the Future System Operator in considering both the electricity and gas networks and providing greater planning of their future needs to ensure security of supply. We urge the Government to move promptly in establishing the Future System Operator and call for it to have clear objectives and responsibilities to avoid increasing complexity in the governance of the energy sector. Nonetheless, we believe that the Future System Operator should not have a wider role in co-ordinating the net zero transition; political trade-offs in this area should be decided by the Government.* (Paragraph 88)

13. *Ofgem has an important role to play in enabling the transition. However, we believe that Ofgem's primary focus should remain on its supplier regulation, economic regulation and consumer protection responsibilities. While we recognise that these may need to be expanded to cover new technologies and services, we do not believe that Ofgem needs to be given a more strategic role in planning the energy system; this role should instead be the responsibility of the Future System Operator. (Paragraph 96)*
14. *We recognise that Ofgem's current leadership sees net zero as fundamental to its existing duties. To ensure that, on an enduring basis, the appropriate focus is given to net zero within its competing priorities, we recommend that Ofgem's duties should be amended to include explicit reference to having due regard to the net zero target. While Ofgem maintains that net zero considerations already factor into its decision-making, adding net zero explicitly to its statutory duties will serve to make this clear. (Paragraph 108)*
15. *Adding net zero to Ofgem's remit would not offer sufficient guidance for making judgements regarding trade-offs. For this reason, we emphasise the urgency of publishing the promised Strategy and Policy Statement. The Strategy and Policy Statement must provide further clarity on how Ofgem should make trade-offs between affordability, net zero, security of supply and the interests of current versus future generations in its regulatory decisions; these trade-offs are political in nature and the Government needs to clearly set out how Ofgem should approach these issues. (Paragraph 118)*

Regulation, innovation and the consumer experience

16. We are concerned that the price controls regime has the potential to discourage investment at exactly the point when it is needed most. Ofgem needs to ensure that its price controls allow the appropriate level of investment ahead of need and do not restrict investments that are necessary to enable the transition. (Paragraph 135)
17. *We recommend that Ofgem commit to carrying out a review of its use of uncertainty mechanisms, their effectiveness, the regulatory burden they have placed on energy networks and their impact on investment. This should be done in time to allow any conclusions to be reflected in the decisions it makes for its next price control periods. (Paragraph 136)*
18. Given the scale of change set to take place in the energy sector, we are concerned that the governance of the energy system, and in particular its licences and codes, is slow-moving and resistant to change. (Paragraph 150)
19. *We recommend that codes and licences be simplified and reformed in such a way that they are able to adapt to a fast-changing sector and enable the energy transition and are pleased that this is under active consideration by the Government and Ofgem. If this requires legislation, the Government should ensure that this is brought forward swiftly (Paragraph 151)*
20. *It is clear that the service that retail energy companies provide will have to change to help consumers through the transition, including by providing new products and services that enable them to spread up-front capital costs and to realise the value of providing flexibility to the grid. However, it is far from clear that the industry or the regulator are ready to adapt their approaches in this way. Ofgem must ensure that its regulation allows new models to benefit consumers through its regulation of activities carried out by suppliers, its expectations of industry and through enabling more granular pricing. Ofgem should also make it easier for successful firms to make*

use of existing mechanisms to support innovation, such as the regulatory sandbox. (Paragraph 172)

21. *While these new models have the potential to benefit consumers, we have heard that not all consumers will have the desire or capability to engage with them and that they may bring new risks. Ofgem must strike a balance between allowing new entrants and models into the retail energy market, while enabling an appropriate level of consumer protection for all consumers, no matter what service they are receiving.* (Paragraph 173)
22. *Without acceptance by consumers the transition will not be possible. They are set to be key participants, but need greater clarity, information and guidance in order to play their part and realise the benefits. The Government needs to take the lead in clearly setting out the need for consumers to take action and what it expects them to do—for example, with respect to heat pumps—as well as providing incentives to decarbonise energy use. This will allow Ofgem to set out its expectations for energy companies, and for those suppliers to adapt their offering to customers. Ofgem must ensure that energy suppliers do not disproportionately penalise those consumers unable to engage with the changing energy market.* (Paragraph 191)
23. **Becoming a more adaptive regulator must not come at the expense of consumer protection. The recent collapse of a large number of suppliers has highlighted substantial failings on the part of Ofgem. We welcome Ofgem’s recognition that change is needed to restore trust in the retail energy market and urge the regulator to prioritise the introduction of a robust regulatory framework akin to the financial services sector for energy companies holding large amounts of customer money, including adequate capital requirements and a fit and proper persons test. Nonetheless, the regulator must be careful to strike the right balance between resilience and innovation, ensuring that new requirements do not preclude new entrants and business models from the retail energy market.** (Paragraph 208)
24. **The promotion of switching and short-term price competition without adequate financial oversight contributed to energy supplier failures. We welcome that the Government and Ofgem recognise the need for broader objectives for the retail energy market, including enabling net zero. New business models may require longer-term relationships between customers and suppliers and this must be based partly on greater trust in those firms.** (Paragraph 209)
25. *Ofgem should publish a detailed approach to supervision once these changes are in place, to make its new requirements clear and enable greater scrutiny of its performance.* (Paragraph 210)
26. *While competition will remain an important feature of the retail energy market, the Government and Ofgem should set out their expectation that companies should compete on their overall service and value to customers and not just on price. The use of switching as a singular metric of competition should be abandoned. It is the ease of switching rather than actual switching which supports competition; high switching may be an adverse measure of customer service rather than something to be encouraged. Indeed, if firms are to help customers manage the energy transformation this may require longer term contractual relationships.* (Paragraph 211)

APPENDIX 1: LIST OF MEMBERS AND DECLARATIONS OF INTEREST

List of members

Lord Allen of Kensington
 Lord Blackwell
 Baroness Bowles of Berkhamsted
 Lord Burns
 Lord Cromwell (from 19 January)
 Lord Curry (until 19 January)
 Baroness Donaghy
 Lord Eatwell
 Lord Grade of Yarmouth
 Lord Hollick
 Baroness Noakes (until 19 January)
 Lord Reay
 Lord Sharkey
 Lord Trefgarne (from 19 January)

Declaration of interests

Lord Allen of Kensington
Non-Executive Chairman and Non-Executive Director, Balfour Beatty plc

Lord Blackwell
Shareholding in Greencoat UK Wind plc, below the threshold for registration in the Register of Lords' Interests
Shareholding in National Grid plc, below the threshold for registration in the Register of Lords' Interests

Baroness Bowles of Berkhamsted
No relevant interests declared

Lord Burns
Shareholding in Royal Dutch Shell plc
Shareholding in National Grid plc

Lord Cromwell
Shareholding in Royal Dutch Shell plc B SHS
Shareholding in BHP Billiton plc
Shareholding in Rio Tinto plc
Shareholding in National Grid plc
Shareholding in NextEra Energy Inc, below the threshold for registration in the Register of Lords' Interests
Shareholding in TotalEnergies SE, below the threshold for registration in the Register of Lords' Interests Lord Curry

Baroness Donaghy
No relevant interests declared

Lord Eatwell
No relevant interests declared

Lord Grade of Yarmouth
No relevant interests declared

Lord Hollick
Director, Honeywell International Inc
Shareholding in Honeywell Inc

Baroness Noakes

Shareholding in BHP Group plc

Shareholding in BP plc

Shareholding in Rio Tinto plc

Shareholding in Royal Dutch Shell plc

Shareholding in IMI plc

Lord Reay

Shareholding in Rio Tinto plc

Shareholding in Royal Dutch Shell plc, below the threshold for registration in the Register of Lords' Interests

Lord Sharkey

No relevant interests declared

Lord Trefgarne

No relevant interests declared

Specialist advisers

Anthony Pygram

Former Director at Ofgem (2011–2020)

Nick Butler

No relevant interests to declare

APPENDIX 2: LIST OF WITNESSES

Evidence is published online at <https://committees.parliament.uk/work/1320/ofgem-and-net-zero/publications/> and available for inspection at the Parliamentary Archives (020 7219 3074).

Evidence received by the Committee is listed below in chronological order of oral evidence session and in alphabetical order. Those witnesses marked with ** gave both oral and written evidence. Those marked with * gave oral evidence and did not submit any written evidence. All other witnesses submitted written evidence only.

Oral evidence in chronological order

**	Professor Catherine Mitchell, Professor of Energy Policy, University of Exeter	QQ 1–11
*	Dr Jeffrey Hardy, Senior Research Fellow, Grantham Institute for Climate Change, Imperial College London	
*	Joe Perkins, Senior Vice-President and Head of Research, Compass Lexecon	QQ 12–22
*	Catherine Waddams, Emeritus Professor, Norwich Business School	
*	Cloda Jenkins, Professor of Economics, University College London	
*	Dhara Vyas, Head of Future Energy Services, Citizens Advice	QQ 23–32
*	Matt Copeland, Head of Policy and Public Affairs, National Energy Action	
*	Lynne Gallagher, Chief Executive Officer, Energy Consumers Australia	
*	Andrew Large, Chair, Energy Intensive Users Group	QQ 33–40
*	Sir Dieter Helm, Professor of Economic Policy, University of Oxford	QQ 41–54
*	Chris Stark, Chief Executive, Climate Change Committee	QQ 55–63
*	Mike Thompson, Chief Economist, Climate Change Committee	
**	James Richardson, Chief Economist, National Infrastructure Commission	QQ 64–69
*	Dr John Constable, Energy Editor, Global Warming Policy Forum	QQ 70–80
*	Lord Adair Turner, Chair, Energy Transitions Commission	QQ 81–87
*	Maxine Frerk, Associate, Sustainability First	
**	Dr Tony Ballance, Director of Regulation and Strategy, Cadent Gas	QQ 88–107

- * Guy Jefferson, Chief Operating Officer, ScottishPower Energy Networks
- * Chris O’Shea, CEO, Centrica [QQ 108–113](#)
- * Paul Spence, Director of Strategy and Corporate Affairs, EDF Energy
- * Juliet Davenport, Founder and Director, Good Energy [QQ 114–119](#)
- * Greg Jackson, Founder and CEO, Octopus Energy
- * Kristoffer Böttzauw, Director General, Danish Energy Agency [QQ 120–129](#)
- * Alejandro Hernández, Head of Renewable Integration and Secure Electricity Unit, International Energy Agency
- ** Claire Dykta, UK Head of Strategy, National Grid [QQ 130–140](#)
- ** Jake Rigg, Director of Corporate Affairs, National Grid ESO
- * Josh Buckland, Director, Flint Global [QQ 141–153](#)
- * Tim Lord, Senior Fellow (Net Zero), Tony Blair Institute for Global Change
- * David Gray, Vice Chair, the Regulatory Policy Institute [QQ 154–166](#)
- * Laura Sandys, Non-Executive Director, Energy Systems Catapult
- * Darryl Murphy, Head of Infrastructure, Aviva Investors [QQ 167–175](#)
- * Simon Virley, Head of Energy and Natural Resources, KPMG
- * Tom Samson, CEO, Rolls-Royce SMR [QQ 176–185](#)
- * Jonathan Brearley, CEO, Ofgem [QQ 186–209](#)
- * Neil Kenward, Director, Strategy and Decarbonisation, Ofgem
- * Rt Hon Greg Hands MP, Minister for Energy, Clean Growth and Climate Change, Department for Business, Energy and Industrial Strategy [QQ 210–226](#)
- * Joanna Whittington, Director-General, Energy and Security, Department for Business, Energy and Industrial Strategy

Alphabetical list of all witnesses

- Aldersgate Group [ONZ0050](#)
- * Aviva Investors ([QQ 167–175](#))
- John Derek Blacklock [ONZ0003](#)
- Stephen Browning [ONZ0041](#)
- ** Cadent Gas ([QQ 88–107](#)) [ONZ0019](#)

**	Centrica (QQ 108–113)	ONZ0026
**	Citizens Advice (QQ 23–40)	ONZ0012
	ClientEarth	ONZ0045
*	Climate Change Committee (QQ 55–63)	
*	Compass Lexecon (QQ 12–22)	
	Confederation of British Industry	ONZ0037
	Cut Carbon Not Forests	ONZ0010
*	Danish Energy Agency (QQ 120–129)	
*	Dr David Deller, Senior Research Associate (Centre for Competition Policy), University of East Anglia	ONZ0005
**	Department for Business, Energy & Industrial Strategy (QQ 210–226)	ONZ0023
**	EDF Energy (QQ 114–119)	ONZ0032
	Electricity North West	ONZ0006
	Elexon	ONZ0046
**	Energy Consumers Australia (QQ 23–32)	ONZ0044
**	Energy Intensive Users' Group (QQ 33–40)	ONZ0047
	Energy Networks Association	ONZ0025
*	Energy Systems Catapult (QQ 154–166)	
	Energy UK	ONZ0054
	Enertechnos	ONZ0022
	E.ON	ONZ0043
*	Flint Global (QQ 141–153)	
	Frontier Economics	ONZ0004
	Global Infrastructure Investor Association	ONZ0014
**	Good Energy (QQ 114–119)	ONZ0042
*	Grantham Institute for Climate Change, Imperial College London (QQ 1–11)	
*	David Gray, Vice Chair, the Regulatory Policy Institute (QQ 154–156)	
*	Sir Dieter Helm, Professor of Economic Policy, University of Oxford (QQ 41–54)	
	Hitachi ABB Power Grids	ONZ0034
	Independent Renewable Energy Generators Group	ONZ0009
	International Energy Agency (QQ 120–129)	
*	Cloda Jenkins, Professor of Economics, University College London (QQ 12–22)	
*	KPMG (QQ 167–175)	

*	Lux Nova Partners	ONZ0036
	Rosemary Macklin	ONZ0038
	MCS Charitable Foundation and MCS Company	ONZ0008
	Mineral Products Association	ONZ0027
	Professor Catherine Mitchell, Professor of Energy Policy, University of Exeter (QQ 1–11)	
*	National Energy Action (QQ 23–40)	
**	National Grid (QQ 130–140)	ONZ0051
**	National Grid Electricity System Operator (QQ 130–140)	ONZ0020
**	National Infrastructure Commission (QQ 64–69)	ONZ0057
	Ocean Winds	ONZ0016
*	Octopus Energy (QQ 114–119)	
**	Ofgem (QQ 186–209)	ONZ0021
	Oil and Gas UK	ONZ0029
	Ombudsman Services	ONZ0040
	Ørsted	ONZ0053
	OVO group	ONZ0001
	RenewableUK	ONZ0049
	RES Group	ONZ0054
*	Rolls-Royce SMR (QQ 176–185)	
	RWE	ONZ0048
	ScottishPower Energy Networks (QQ 88–107)	
	ScottishPower	ONZ0033
	Scottish Renewables	ONZ0002
	SGN	ONZ0015
	Social Market Foundation	ONZ0018
	So Energy	ONZ0031
	Solar Energy UK	ONZ0017
	SSE	ONZ0052
**	Sustainability First (QQ 81–87)	ONZ0035 ONZ0058
	The Association of Decentralised Energy	ONZ0011
**	The Global Warming Policy Forum (QQ 70–80)	ONZ0030
	The Institution of Engineering and Technology	ONZ0013
*	Tony Blair Institute for Global Change (QQ 141–153)	
	John Tulloch	ONZ0039

- * Lord Adair Turner, Chair, Energy Transitions
Commission ([QQ 81-87](#))
UK Energy Research Centre and EnergyREV [ONZ0056](#)
- ** Catherine Waddams, Emeritus Professor, Norwich
Business School ([QQ 12-22](#)) [ONZ005](#)
Wales & West Utilities [ONZ0028](#)

APPENDIX 3: CALL FOR EVIDENCE

The Industry and Regulators Committee is launching an inquiry into the work of Office of Gas and Electricity Markets (Ofgem), a non-ministerial government department which regulates the UK's gas and electricity markets.

Having initially focused on protecting the interests of consumers, Ofgem has increasingly been given responsibilities in relation to other areas, particularly the security of the UK's energy supply and decarbonisation. In the Energy White Paper, the Government committed to including a requirement for Ofgem to carry out its regulatory functions in a manner consistent with securing the Government's policy outcomes, including "delivering a net zero energy system while ensuring secure supplies at lowest cost for consumers", in its proposed Strategy and Policy Statement for Ofgem.

This inquiry will consider Ofgem's role in the transition to net zero and whether changes are needed to its objectives and powers or its role in the wider energy system. The inquiry will also examine how net zero relates to Ofgem's other responsibilities such as affordability and the security of the UK's energy supply, how Ofgem considers the interests of consumers, and Ofgem's relationship to Government and Parliament.

The Committee is seeking evidence on the following questions:

1. What role should Ofgem play in the transition to net zero? What changes, if any, should be made to its remit, responsibilities and resources?
2. How well does Ofgem balance environmental objectives against its responsibilities in relation to affordability for consumers?
3. How well does Ofgem fulfil its obligations to consumers? Does Ofgem take consumer views into account sufficiently, particularly those of vulnerable consumers?
4. What implications will the transition to net zero have for the security of the UK's energy supply? How does Ofgem currently manage issues relating to security of supply?
5. Is Ofgem's current system of price controls appropriate? Does it provide sufficient incentives to invest in the context of the transition to net zero?
6. Is the current system of governance for the UK energy market appropriate to secure the transition to zero? What improvements could be made and what role should Ofgem play?
7. Are Ofgem's duties and powers appropriate and sufficiently clearly defined? Do Ofgem's objectives conflict and, if so, how should any conflicts be managed?
8. Is Ofgem's relationship to Government and Parliament appropriate? Are there issues related to the split of responsibilities, transparency or accountability?
9. How does Ofgem compare to similar bodies internationally? What lessons can be drawn from the experience of other countries or jurisdictions?
10. Are there any other aspects of Ofgem's work that the Committee should consider?