Making a positive difference for energy consumers

Net Zero, Energy and Transport Committee
Scottish Parliament
Edinburgh
EH99 1SP

By email only

Email: [EMAIL REDACTED]

16 January 2024

Dear Mr Mountain,

Ofgem's response to 'Scotland's Electricity Infrastructure: inhibitor or enabler of our energy ambitions?'

Firstly, please allow me to apologise to you and all of the Committee members for the delay in issuing this response. Ofgem always aim to respond to communications in good time and I can assure you such a delay will not occur again.

Appendix 1 to this letter contains our written responses to all questions that were applicable to Ofgem.

Yours sincerely,

Akshay Kaul
Director General for Infrastructure

Appendix 1: Ofgem Consultation Response to Net Zero, Energy, and Transport Committee

Scotland's Electricity Infrastructure: inhibitor or enabler of our energy ambitions?

Modernising the grid

1. An expanded National Grid is a direct and inevitable consequence of decarbonising our energy supply to achieve net zero: it is a public good. The approach of seeking to match Grid capacity to current usage is now outdated as policy, and should be replaced by the principle of prudential investment in Grid capacity in anticipation of future need, and in order to meet the 2045 net zero target. The Committee calls for this changed approach to be signalled clearly and strongly by governments and Ofgem. Amongst other things, this would also increase long-term public and investor confidence in our renewables industry.

Ofgem response:

Ofgem fully supports this statement. The scale of the challenge of net zero means that the electricity network needs to be built in anticipation of the expected increase in low-carbon electricity demand. Network companies are already planning for and investing in this future with the support of Ofgem, for example through the Accelerating Onshore Electricity Transmission framework (ASTI), which initially applies to around £20bn of investment. Ofgem will robustly examine the performance of networks in delivering new infrastructure and will intervene where necessary.

To get the best out of our energy system we need to ensure the national and local arrangements for system planning and operation work together to optimise the system as a whole, including both national and more local solutions. Ofgem is reforming distribution system operation governance arrangements to ensure they are fit for purpose for the future system and work effectively alongside the Future System Operator (FSO). This includes recent consultation on proposals for new regional energy strategic planners (RESPs), which would liaise cross-vector and nationally to facilitate a whole system approach, developing regional strategic plans. To do this they must coordinate, facilitate and ensure effective participation across actors from the national to the local level, making sure local democratic bodies have a key role and that a place-based understanding is central to how the regional energy system is planned.

At the transmission level, the Electricity System Operator (ESO) is developing a Centralised Strategic Network Plan (CSNP) to identify the network upgrades needed to meet 2035 and 2050 targets for decarbonisation. In December 2023, Ofgem set out how the Future System Operator will implement the new Centralised Strategic Network Plan (CSNP) from 2026 which be critical to targeting investment under RIIO-3.

This will be an independent, coordinated, and longer-term plan to build onshore, offshore and cross border transmission electricity networks required to decarbonise the power system – as well as the future gas transmission network.

The CSNP will lay down a firm plan for the transmission network development for the first 12 years to 'lock in' investments and a longer-term 25-year outlook to achieve net zero by 2050, including assessing options to reduce long-term costs for consumers.

2. For the same reasons, a clear statement of intent about, and plan of action for, speeding up Grid connection is also needed from governments. It is unacceptable that developers are being asked to wait upwards of a decade for a connection. It is also completely at odds with ambitions to grow a world-leading renewables sector.

Ofgem response:
Ensuring generation assets can connect when and where they are needed will be crucial in achieving net zero, as well as in delivering affordability for consumers and maintaining security of supply. Currently, developers looking to connect renewable energy projects to the electricity grid are facing waits of more than 15 years, threatening the UK's net-zero ambitions. In recent years, the time it takes for developers to connect renewable energy projects to the national grid has increased. Britain currently has a connection queue based on a first-come, first-served approach which means that stalled, unviable and often highly speculative projects are blocking ready-to-go solar, wind and other renewable schemes.

Significantly speeding up electricity grid connections for renewable energy projects, as well as accelerating the building of our transmission network infrastructure, are two of the most important factors in ensuring Britain can achieve a net zero energy system by 2035.

In response to this challenge, Ofgem has issued a Connections Action Plan, joint with the UK Government, to take a leadership role in addressing the reform and streamlining the connections queueing process, and aims to reduce the average delay a project faces to connect to the transmission network from 5 years to 6 months. This sits alongside the UK Government's Transmission Acceleration Action Plan which seeks to accelerate the rate of electricity transmission network build.

The Connections Action Plan lays out a framework of ambitious actions to significantly reduce connection timescales and ensure a timely transition to net zero. Our plan focuses on raising entry requirements; removing stalled ('zombie') projects; better allocating available network capacity; holding network companies and ESO to account and aligning the process with long-term strategic planning.

This plan is also a call for network companies, the system operator, and the sector as a whole to deliver a major step change in the pace of connections; strengthening incentives, obligations, and requirements to do so. It also asks connections customers to be realistic and flexible in their connection requirements, and to engage on our proposals as they develop.

We are supportive of the industry initiatives to take forward tactical initiatives, such as the ESO's five-point plan and the Energy Networks Association industry programmes, aiming to clear the existing connections backlog. We also welcome the ESO's longer-term reform work. As part of Ofgem's work plan, the regulator will monitor the performance of these short-term initiatives, ensuring that they are delivering against commitments, and intervening if they are not. Ofgem will also be using its own connections reform work plan to build upon ESO's consultation, complementing existing work rather than duplicating it.

3. We call on the Scottish Government to work with the UK and Welsh Governments, Ofgem and National Grid ESO to:
• enshrine and publicly promote Grid expansion in anticipation of need as a joint long-term, strategic goal of GB energy policy, setting out how this is to be achieved, and
• promote a plan of action (including investment and legal change where needed) to bring down average waiting times for Grid connection.

Ofgem response:

In the review of GB energy system operation published in January 2021, Ofgem recommended to Government that the system operators are given additional responsibilities and that the system operator for the electricity is made fully independent from the transmission network owner. In April 2022, Ofgem and Government published a joint decision setting out our collective commitment to proceed with the creation of the FSO, as an expert, impartial body with an important duty to facilitate net zero while maintaining a resilient and affordable system.

As a trusted and expert body at the centre of the gas and electricity systems, the FSO will play an important role in coordinating and ensuring strategic planning across the sector. It will have an ambitious long-term vision and provide independent advice to government and Ofgem. Further, the FSO will adopt a 'whole system' approach within the energy system through responsibilities in operating, strategic network planning, long-term forecasting, and market strategy. Through these roles, the FSO will drive progress towards net zero while maintaining energy security and minimising costs for consumers.

4. The Committee is also specifically concerned by evidence of a "first come first served" approach to Grid connections that can mean delayed or speculative projects in the line for a connection act as a block on others, and that it is smaller or less established players in the renewables sector that disproportionately suffer because of this. We agree with views that a more proactive regulatory approach to queue management is needed. We ask the Scottish Government whether it accepts this evidence and, if so, what action it can take, including by way of making representations to the UK Government or Ofgem, to address this.

Ofgem response:

Ofgem have acknowledged the challenges faced as a result of the current 'first come, first served' approach, with the publication of our Connections Action Plan. Two key areas of the Action Plan are removing stalled ('zombie') projects and better allocating available network capacity.
We recently took a code modification decision (CMP 376) to require National Grid ESO to introduce queue management milestones for all parties in the transmission queue. These are being implemented by National Grid ESO and are being introduced to both existing and future grid connection agreements. This will terminate stalled projects that are blocking the queue for high-voltage transmission lines, allowing ready-to-go generation and storage to enable net zero can be fast-tracked.

These new milestones, will result in contract terminations, which will free up capacity. As part of our Connections Action Plan, we will ensure that those projects that are ready to connect will be accelerated.

5. We direct the above conclusions and recommendations to the UK Government and to Ofgem for comment.

Ofgem response:

Please see responses to questions 1 to 4.

6. The Committee welcomes the UK Government's amendment of the Energy Bill to impose an express mandate on Ofgem to support the achievement of net zero, for which there was much support throughout this inquiry. We hope this helps clarify the central role that reaching net zero must play in Ofgem's strategic planning, decision-making and overall regulatory approach.

Ofgem response:

Ofgem acknowledges the Committees response to the Energy Bill, now Act, providing a statutory net zero duty to our mandate. With Ofgem's principal objective being to protect the interests of existing and future energy customers, the incorporation of this net zero duty is both welcomed and necessary.

In turn consumers will be best protected by building a low-carbon, low-cost energy system, limiting exposure to volatile gas markets and ending dependence on fossil fuels. The aim of the Act is to protect consumers and reach net zero – by unlocking investment, accelerating planning decisions, building new infrastructure and paving the way for innovation and technology. This will be achieved by:

- **Net zero duty**: amending the regulator's existing duties by including reference to the net zero targets and five-year carbon budgets in the Climate Change Act 2008. This requires Ofgem to consider how its decisions may assist the Secretary of State in meeting the UK Government's net zero target, while protecting the interests of existing and future consumers
- **New system operator:** establish a Future System Operator and Independent System Operator – with responsibilities in both the electricity and gas systems, ensuring efficient energy planning, enhancing energy security, minimising cost to consumers and promoting innovation. The Bill imposes a duty on the Future System Operator to respond to requests for advice, analysis or information from government or Ofgem
- **Heat networks:** appointing Ofgem as the new regulator for heat networks in Great Britain
- **Energy codes:** new governance framework for energy codes – this will move responsibility from industry committees to "code managers" directly accountable to Ofgem. This will give Ofgem strategic powers to protect consumers and create competition
- **Hydrogen transport and storage:** establishing new business models for hydrogen transport and storage to remove market barriers, like high upfront costs, and unlock investment with long-term revenue stability
- **Multi-purpose interconnectors**: introduce a new legal definition for multi-purpose interconnectors into the Electricity Act 1989
- **Energy intensive industry**: give government powers to compensate energy intensive industries for a portion of their network charging costs – funded via a charge on all licenced electricity suppliers called the EII Support Levy

- **CO2 transport and storage**: establishing an economic regulation model with statutory objectives and legal powers for Ofgem as the economic regulator of CO2 transport and storage. This will unlock private finance and remove investment barriers for novel technology

Creating the infrastructure

7. The Committee continues to be concerned by evidence consistently pinpointing Scotland's planning system as a major block on our net zero ambitions, given the momentum that will be required to build the new generating and transmitting infrastructure needed to ensure that our energy supply is decarbonised by 2045. We accept that development of this sort can be controversial, particularly at community level, and support a planning system that permits robust interrogation of any major proposal and gives local people a say.

Ofgem response:
N/A

8. We note and welcome evidence that the Fourth National Planning Framework introduced earlier this year will make a positive change. But NPF4 cannot, on its own, address concerns over:
• Depleted human resources at planning authorities, including the loss of many experienced planning professionals from the public sector in the last decade;
• Complexities within planning legislation and policy that mean that many find the process painstaking, costly and confusing;
• Different working practices across Scotland's 34 planning authorities, and differences across authorities in levels of experience and knowledge in handling major renewable developments.

Ofgem response:

Ofgem agrees that it is essential that national and local arrangements for network planning work together effectively to optimise the energy system as a whole. Ofgem has welcomed the ambitious and highly detailed programme to remove barriers to planning, set out by Electricity Networks Commissioner Nick Winser.

Overcoming the challenges highlighted by the Committee in question 8 will be critical in allowing Scotland to maximise the speed at which it can move towards net zero.

9. We ask the Scottish Government for a progress report on three recommendations from an earlier inquiry that the Scottish Government has accepted, or accepted in principle:
• on the "Climate Intelligence Service" that the Scottish Government has this year committed to setting up jointly with the local government sector. As well as seeking a general update on progress in establishing the Service, we also ask how the Service can promote a consistent approach, and a sharing of knowledge, on the effective handling of applications for renewable energy or electricity transmission projects by planning authorities;
• on creating a new route into the planning professional for school leavers via an apprenticeship system; and
• on defining planning as a STEM (science, technology, engineering, mathematics) subject within the tertiary education system.

Ofgem response:

N/A

10. We also ask the Scottish Government to set out what changes it could make to the planning system in relation to applications for renewable generation or electricity transmission that would streamline and simplify the process for all (applicants and other affected parties), and which do not require primary legislation. In particular, we ask the Scottish Government to respond to views that the system would benefit from setting defined temporal "milestones" for planning authorities to meet when handling such applications.

Ofgem response:
N/A

11. We also ask the Scottish Government to respond to industry views that there is a currently a skills gap in Scotland, with not enough people with the right skills to work on the pipeline of renewable and transmission projects that will be needed to decarbonise the energy sector by 2045. We endorse the Economy and Fair Work Committee's recommendation (from their inquiry into the Just Transition in Grangemouth) that the Scottish Government must set out clearly how it will deliver a skills agenda to meet the challenge of transitioning to a net zero energy supply.

Ofgem response:
N/A

12. The Committee welcomes the ambition of setting a 5 GW target for green hydrogen in the draft Strategy but asks the Scottish Government to note and respond to evidence that it must more clearly map out a plan for how this is to be achieved for this ambition to have more credibility with industry and potential investors. This should include mapping out what role green hydrogen could play in helping decarbonise Scotland's main industrial emitters of greenhouse gases, whether in the short or longer term.

Ofgem response:
N/A

13. The Committee asks the Scottish Government to respond to views from industry that, in not proposing targets for increased solar, tidal and wave energy, or for battery production, the draft Strategy has missed an opportunity to send a signal to the markets that these sectors have governmental backing, and that this should be rectified when the Strategy is finalised.

Ofgem response:
N/A

Intergovernmental co-operation and differences

14. A successful Scottish energy policy requires the Scottish and UK Government to be broadly agreed on common goals and to work together. We note that the UK Government has welcomed the Scottish Government's draft Energy Strategy.

Ofgem response:
N/A

15. The Committee recognises that reform of transmission charging raises complex issues and must fit into a whole-system consideration of how Grid maintenance and expansion is financed. However, a long-term strategic switch to offshore and onshore wind, green hydrogen and other forms of renewable energy changes Great Britain's energy generation map and raises questions as to whether charging for transmission based on relative remoteness is consistent with net zero goals. We note that Ofgem appear to have an open mind on revisiting the principles currently underlying the charging regime. It is now past time for this issue to be resolved, and for a clear view on the overall direction of travel on transmission charging to be set out. We request an update on proposed reforms from Ofgem and from the UK Government.

Ofgem response:
The energy system is changing as capacity connecting to the electricity system increases significantly and how we use the network evolves. The UK Government is also considering proposals for electricity market reform and there are upcoming changes to strategic network planning to enable the substantial amount of network build needed for net zero, ahead of need. Set in the context of fundamental system change and policy reform, we have been considering how network costs should be recovered through network charges and how network charging signals contribute to both investment decisions and how market participants and consumers use the energy system. We are considering whether reform is required and how changes to the design of transmission charging could provide more effective signals.

Our future energy system will look very different to the one our current charging framework was designed to serve. Renewable generation will be the backbone of a larger future power system, with substantial investment in generation capacity and flexible assets at all voltage levels needed to deliver a fully decarbonised power system. Many large new generation assets, particularly offshore wind farms, will be located in parts of the network with relatively low levels of electricity demand.

A significant expansion of the transmission network is planned for the next two decades, to accommodate this geographically dispersed generation. Even with significant network expansion, the major changes to how and where we use and produce electricity mean our networks will continue to be constrained under certain conditions and in particular locations.

The shift to a renewable-dominated energy supply will be accompanied by a significant increase in the number of storage assets connected to the system. These assets will be technologically and geographically diverse. They will provide a range of system services, such as responding to fluctuations in renewable energy supply and energy demand, over a range of time horizons, from very rapid response to longer, inter-seasonal storage. Some storage assets will also play a role in the management of electricity network constraints. An increasing proportion of generation and storage capacity is connecting to the distribution network, with this trend expected to continue.

The shift towards a larger number of smaller, distribution-connected assets is having a significant impact on electricity network energy flows. In the past, flows from the transmission network to the distribution network dominated. Now, energy increasingly flows from parts of the distribution network to the transmission network. This is evidenced by the increasing need for transmission network reinforcement to enable the connection of distributed generation, with more than 70% of grid supply points now affected by transmission-level constraints.

Coordinating investments across energy and network assets, to maintain system reliability and minimise consumer costs during this system transformation will be challenging. To address these challenges, it is important that new energy assets (generation, demand and storage) connect in locations that provide overall benefits to consumers (where this is considered to be in their interests when taken as a whole). It is also vital that existing and new assets operate in ways that make best use of available network capacity. Together, this can support the most efficient use of the transmission networks, allowing necessary network expansion to be proportionate and lower cost.

Transmission charging arrangements are one of the policies and signals that drive investment decisions by electricity network users. Locational signals that best reflect the physical realities of the system and support optimal network development may be achieved through a combination of potential reforms to wholesale markets, transmission network access rights, investment incentive schemes (such as Contracts for Difference reform) and electricity network charges for transmission and distribution.

Ultimately, future transmission charges will need to work coherently with these wider market signals, and system planning arrangements. Work is therefore underway to:

- improve the current Transmission Network Use of System (TNUoS) charging methodology to ensure the TNUoS regime remains fit-for-purpose for the system we have today and will have over the next decade, and
- consider more fundamental reform to the purpose and role of transmission charges, which is the focus of Ofgem's Strategic Transmission Charging letter that was published in September 2023. Any fundamental reforms would be developed to complement changes pursued by Government through the REMA programme.

We note that work is also underway to examine wider reforms, primarily through the UK Government's Review of Electricity Market Arrangements (REMA).

The UK Government's REMA programme aims to identify and implement reforms to GB electricity markets to unlock the necessary investment in and drive efficient operation of a secure, low carbon electricity system, ensuring that our electricity markets are fit for purpose over the period to 2035 and beyond.

REMA is seeking to improve locational signals, for both investment and operational decisions, to efficiently deliver a decarbonised power system and balance an increasingly complex system, securely and at low cost. Improvements in the signals sent through network charges (as part of a wider charging review) may be a key element of this. REMA has the potential to directly impact the future role for transmission charges, with different outcomes influencing the benefits of alternative options for TNUoS design. Similarly, different long-term TNUoS design options will impact the expected benefits of certain options being considered through REMA.

Ofgem is supporting the UK Government in its consideration of market reform options by providing expert advice on options under consideration and the interdependencies between them. As part of this we are also considering access reform options, which, like TNUoS reforms, fall under Ofgem's remit. Whilst the REMA process will influence our programme of work, there is also the potential for TNUoS reforms to influence decisions made by the UK Government under the REMA programme. To this end, any work that Ofgem progresses on strategic charging reform and access reform will be aligned temporally with the UK Government's work on REMA, to facilitate effective decision making.

Investment signals indicate where to invest and what to invest in. Our view is that transmission charges, through both connection charges and use of system charges, can be designed to effectively influence investments by signalling the long-run costs associated with certain assets, in particular

locations in the network.

This signal can influence both new investments, as well as retirement and repowering decisions for existing assets. Cost-reflective charging ensures that network users whose investment decisions affect the capital costs of building and maintaining transmission network infrastructure face a locational signal that reflects this. This is intended to support the development of an economically efficient system at lowest cost to the consumer.

Ofgem has just completed a consultation on our proposals for transmission charging and will be announcing our views shortly.

16. The Committee is disappointed that the Scottish and UK Governments appear not to have resolved their differences over order-making provisions inserted into the UK Energy Bill that may affect the consenting regime for offshore energy projects in Scottish waters. We repeat our concerns about the potential "chilling effect" on investment if the regulatory regime for this type of development is perceived to have become complex and overlapping and call on both governments to continue to work towards a common understanding in this area, before these new powers under the Energy Bill, as enacted, are used.

Ofgem response:

N/A

17. The Committee notes views that pumped storage hydro should become a more significant component of Scotland's, and Great Britain's, future energy mix, as a means of increasing baseload and storage capacity within a decarbonised system. The Committee is not satisfied that the UK Government has made clear during this inquiry whether it is minded to intervene to provide assurance to potential private investors looking to invest in pumped hydro projects, such as at Coire Glas. We invite it to provide this clarity in its response to this report.

Ofgem response:

N/A

18. We also ask the Scottish Government to set out what ongoing action it is undertaking to support the viability of the Coire Glas scheme, and what further action it could take.

Ofgem response:

N/A

Engaging the public and communities

19. As this report has made clear, an expanded National Grid is a public good, and a necessary one, in response to the climate crisis. There is an urgent need for a national conversation, led by the Scottish Government, on what this change will mean: for Scotland as a whole and for different regions of Scotland. This should also include an informed discussion of the benefits and costs (including whole-life carbon costs) of different possible courses of action. All of this would be

putting into practice the strategic "whole system approach" to energy decarbonisation that stakeholders have agreed is necessary.

Ofgem response:

Ofgem agrees that we face significant challenges in reaching the goal of net zero which will require a robust national conversation. This is why Ofgem in January 2021 recommended to the UK Government that the system operators should be given additional responsibilities and that the system operator for electricity be made fully independent from the transmission network owner. In April 2022, Ofgem and Government published a joint decision setting out our collective commitment to proceed with the creation of the FSO, as an expert, impartial body with an important duty to facilitate net zero while maintaining a resilient and affordable system.

As a trusted and expert body at the centre of gas and electricity systems, the FSO will play an important role in coordinating and ensuring strategic planning across the sector. It will have an ambitious long-term vision and provide independent advice to government and Ofgem. Further, the FSO will adopt a 'whole system' approach within the energy system through responsibilities in operating, strategic network planning, long-term forecasting, and market strategy. Through these roles, the FSO will drive progress towards net zero while maintaining energy security and minimising costs for consumers.

20. The Committee believes that this should be backed up by a long-term spatial plan, produced in collaboration with network operators, Ofgem and the National Grid providing a best estimate of the scale and type of new infrastructure that will be needed and where it is likely to go, so that the public can see upfront what changes are likely and the reasons for them. Identifying opportunities for self-sufficiency in energy in remote or off-grid communities could be another goal of the plan, and it should identify remaining gaps in the distribution network where there is capacity to repower or expand smaller sites through community energy projects.

Ofgem response:

Ofgem agrees with this approach as well and has introduced Regional Energy Strategic Planners (RESPs) as part of our reforms to the energy network to ensure there is appropriate accountability and effective coordination for strategic planning at a sub-national level.

The RESPs will be responsible for developing a regional whole system strategic plan that is coherent with national and local net zero ambitions and energy security priorities, and that supports achieving the most cost-effective decarbonisation outcomes derived from, and informing, the individual plans of local actors.

In developing a strategic plan, we expect the RESPs to develop an aggregated regional view using a wide range of inputs - for example national forecasts, electricity and gas network operator data, heat networks, local plans (e.g. Local Area Energy Planning (LAEP) in England and Wales, Local Heat and Energy Efficiency Strategies (LHEES) in Scotland) and relevant exogenous sources. The inputs should be cross-vector and we would expect the inputs to expand over time, responding to the evolution of policy (e.g. CCUS and Hydrogen) where this influences network infrastructure planning. The output will be a strategic plan which is spatial and supports infrastructure investment planning and a set of key planning assumptions for use in constituent actors' planning. Beyond that, the granularity and form of the output will be developed further in the detailed design phase.

At a transmission level, Ofgem is supportive of the Strategic Spatial Energy Plan (SSEP) announced by the Prime Minister to locationally plan future energy demand and generation and so inform future transmission infrastructure needs. This comes out of the Energy Commissioner recommendations, which led to the Transmission Acceleration Action Plan.

The SSEP is expected to be delivered in 2025. This plan will be the input into the Centralised Strategic Network Plan (CSNP). The CSNP is a new role for the FSO, to take a broad, whole energy system view (onshore and offshore) for GB to transforming the pace and scale of transmission infrastructure planning. Ofgem published the decision on how the CSNP should be produced in December 2023. A full CSNP will be published in 2026 informed by the SSEP.

In advance, the ESO is developing its transitional CSNP (TCSNP2) which is to connect a further 20 GW of offshore wind (mainly in Scotland) to facilitate the 2035 net zero power system target, on top of the 50 GW of offshore wind by 2030.

21. The Committee is supportive of the principle of mitigatory measures for community benefit for any locality directly and significantly impacted by Grid development, recognising that it is important to get right the detail of any scheme that would put this into practice. This too must be part of this national conversation.

Ofgem response:

N/A

22. The Committee asks the Scottish Government for an update on its work to simplify and streamline the net zero funding landscape, in order to make it more accessible at the volunteer and community level, particularly in respect of community energy projects.

Ofgem response:

N/A

23. We reiterate our call for a planning process for energy transmission and generation projects that is more streamlined and reaches an endpoint more quickly, without diluting an individual or community's right to interrogate or challenge a proposal that directly affects them. No one's interest is served by lengthy delay, uncertainty and planning blight.

Ofgem response:

The journey to net zero demands radical changes across the energy system. Changes in the way we heat our homes, power our vehicles, and generate electricity are already happening. These changes will require significant new investment, especially in electricity network infrastructure, which will mean changing how the system is planned and operated at the national and sub-national levels. Ofgem recognises these changes and will work worth the UK and national governments on the development of the energy grid going forward.

We feel that there are three major system functions that are critical to delivering this transition effectively: energy system planning, market facilitation of flexible resources, and real time operations. These functions must be delivered by institutions with the right competence and skillsets and which are appropriately incentivised to deliver net zero at pace and at least cost. Critically there

must be clear accountability and effective coordination. The challenge of delivering effective governance is in flight at the national level and must also be reflected at the local.