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28 September 2021

To whom it may concern,

Proposals for a Future System Operator role

Scottish Renewables is the voice of Scotland's renewable energy industry, working to grow the sector and sustain its position at the forefront of the global clean energy transition. We represent around 260 organisations across the full range of renewable energy technologies in Scotland and around the world, ranging from energy suppliers, operators and manufacturers to small developers, installers, and community groups, as well as companies throughout the supply chain.

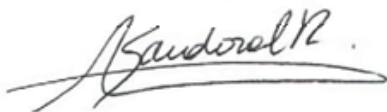
Scottish Renewables welcomes the opportunity to provide our view to BEIS and Ofgem into the consultation on proposals for a Future System Operator role.

In responding to this consultation, we would like to draw your attention to the following points:

- We welcome the creation of a Future System Operator (FSO). We believe that as net zero progresses and the system becomes increasingly more electrified, the need for new functions will emerge.
- We support the creation of a publicly-owned model, highly independent, classified within the public sector, but with operational independence from government.
- We think that there is a case to keep functions in both the electricity and gas systems, but considering that the system of the future is expected to be driven by flexible and low carbon technologies, we expect that the functions that refer to gas will become less important with time.
- Most of the areas where the consultation proposes enhanced roles and new functions are welcome. However, the fact that the energy system of the future will be driven by renewables is missing. We believe that specific skills and roles are needed to forecast and analyse a renewable-based electricity system planning.
- The government should focus efforts on developing an economically efficient transition to net-zero, improving price signals to incentivise electricity assets to locate efficiently in the system, network charging reforms, and the electricity market reform.

Scottish Renewables would be keen to engage further with this agenda and would be happy to discuss our response in more detail.

Yours sincerely,



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1. Do you agree that net zero will create the need for new technical roles in the electricity and gas systems, and require a new approach to energy system governance?

Yes, we believe that the energy transition will require that the current electricity and gas system evolve to a more integrated energy system that will become increasingly more electrified with the need of new functions to emerge. We think that as we move to net zero a new approach to energy market development and network planning must be taken to fulfil the complexity that a more flexible and renewable-based energy system will bring to the network.

2. Do you agree that the establishment of a Future System Operator is needed to fulfil the kinds of technical roles needed to drive net zero?

Yes, we think that a new entity is needed to fulfil the kind of technical roles that are needed to drive net zero. Today, we can see that Ofgem carry out their regulatory functions in a manner which is inconsistent with securing the government's policy outcomes. While the Government is advocating for net zero, which will require the development of a more localised and decentralised energy system, the regulator keeps implementing policies that are centralising the energy system. (We provide evidence about the issues with the current system-wide decision-making, which is linked with the regulator, in question 5).

We believe that a Future System Operator (FSO) could act as an independent entity that could feed into Ofgem and BEIS providing targeted advice based on its expertise on the impact of different potential decisions on the energy system. Today, it is necessary that behind any policy decision-making, holistic analyses are carried out, which must include the complexity of all the interconnected variables that a flexible and renewable-based energy system require. Therefore, we think that an FSO will fill the missing piece to drive progress towards net zero while maintaining energy security and minimising costs for consumers.

3. Do you agree that a Future System Operator should have roles in both the electricity and gas systems?

Yes, we believe that a FSO with roles in both the electricity and gas systems will fulfil the expertise needed in the energy system. The electrification of heat and transport will require a transition that needs to be achieved in a coordinated way, hence an FSO with roles in both electricity and gas will help with this transition. Nevertheless, we would like to highlight that we expect the roles in gas to become progressively less important as we move toward a more electrified low-carbon energy system.

It is not clear if including the day-to-day operation of the gas network into the FSO should happen at this stage. However, this should be kept under review. If a significant hydrogen network develops, then this should move into the remit of the FSO.

4. Do you agree that a Future System Operator should be entirely separate from National Grid plc?

Yes, we think that the FSO must be entirely separate from National Grid. We support the FSO being a publicly owned organisation, operationally independent from government or political interference – akin to Ofgem. We think that government influence should be used to oversee strategic functions, especially to align obligations with government policies such as net zero, but government influence should not be used for short term operational influence that could affect the work efficiency of the FSO. The funding mechanism could also mimic Ofgem mechanisms to help protect the FSO's independence.

5. What issues are there with existing institutional arrangements in the UK energy system in relation to system-wide decision-making and planning?

Today, the existing institutional arrangements in the UK energy system make it very difficult to meet the operability challenges of a low carbon energy system. Current governance arrangements mean that distribution networks, the system operator and other parties such as Ofgem do not coordinate as effectively as they should. This makes it more difficult to achieve the best outcomes for the system as a whole. The current system-wide decision making and planning lacks the coordination and analysis to accommodate the level of flexibility and low carbon technologies required. Additionally, coordination across markets hasn't kept up with the level of decentralisation that the electricity system needs. Signals from the existing market framework are unlikely to bring forward the level of flexibility and renewable deployment required to achieve net zero at lowest cost.

The 2020 Energy White Paper¹ states that the electricity system of the future is expected to have generation coming from many smaller and less predictable sources, with power lines and storage aided by smart digital tech. This system is expected to be decentralised, interconnected, and with customers empowered and participating. This means that the electricity system of the future will be much more complex, so the decision-making process needs to be responsive and agile enough to react to these changes.

Today, Ofgem policy decision-making lacks strategic ambition when it comes to “net-zero at least cost to the consumer”. We can see that ongoing regulation does not facilitate the deployment of renewables and flexibility across the system, and given the scale of investment in wind generation expected in the coming years to meet the Government’s climate targets, this additional cost will ultimately be passed on to consumers. To ensure that Ofgem plays a full role in enabling the achievement of net-zero and adopts a long-term approach to securing energy supply at the lowest cost to consumers, a change in legislation is essential. As the scope of net-zero extends across our society and economy, putting in place legislation that requires all regulatory bodies to enable the achievement of net-zero in the delivery of their remits would prevent the need to amend the legislative framework for each regulatory body. This would also help Ofgem work hand in hand with the FSO.

An example that shows that regulation is not aligned with net zero is the current Transmission Network Use of System (TNUoS) regime. Scottish Renewables has evidenced² that the current charging methodology is not fit for purpose to meet either the Scottish Government or UK Government’s net-zero climate targets. This is also damaging to consumers and providing barriers to the deployment of renewable energy across the UK and especially in Scotland, where the charges to generators are higher than elsewhere in the UK.

Another example can be seen in the current *Access and Forward-looking Charges Significant Code Review (SCR)*, where as part of the policy decision making process, Ofgem ignores many variables that a renewable planning system needs. Consequently, the proposal is based on a cost analysis that does not reflect the complexity of the energy planning network. Although we welcome that some unrealistic assumptions were acknowledged in this SCR, we need more than a recognition of flaws. We have commitments that must be met by 2030, so regulation needs to move forward at a pace to facilitate the delivery of government commitments and it should not constrain those under any circumstance.

The achievement of our net-zero target will require a significant increase in the pace of change, particularly in the energy sector. The long timeframes of Ofgem’s current decision-making processes are incompatible with the speed of change net-zero will require. For example, Ofgem launched its Significant Code Review in December 2018 and this process has still not been completed. Experience indicates that Significant Code Reviews take a minimum of five years. As substantial progress will have to be made in decarbonising the energy sector by 2030, timeframes of five years or more to implement regulatory change in an environment where key targets need to be achieved in eight years’ time is

¹ <https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future>

² <https://www.scottishrenewables.com/publications/861-tnuos-key-points-and-explainer>

untenable. As such there needs to be significant changes in how Ofgem operates if it is to have the agility and pace the achievement of net-zero will require.

6. What examples/case studies are you aware of where net zero delivery in one part of the energy system did not adequately account for cross-system impacts or costs?

TNUoS is a great example of this. As set out below, the current TNUoS regime is not fit for purpose to meet the Government's net zero climate targets. The way that TNUoS is designed encourages generators to locate close to the demand, which was appropriate for a fossil fuel-based system but now leads to disproportional charges by location as we move toward a renewables-based energy system.

TNUoS charges have gone up significantly in recent years and it represents a cost that developers cannot control. This is in combination with a predicted substantial rise in transmission charges over the next five years, with the differential between northern and southern projects also amplifying. According to a recent report by SSEN Transmission, a wind farm in the north of Scotland currently pays £5.50 per unit of energy as part of the locational TNUoS charges compared to an equivalent wind farm in Wales getting paid £2.80 per unit³. This increased cost that TNUoS imposes makes Scottish projects less competitive, encouraging generators to install projects in the south of the UK without considering where the best renewable resources are located to deliver the lowest cost pathway to achieving net zero. This system does not match the decentralised, smart and decarbonised energy system of the future. It also ignores the very real planning constraints in England that mean that the deployment of onshore wind projects in England is highly unlikely.

A recent report by RIDG⁴ showed that the UK has among the highest locational charges in Europe; indeed, one of the few countries that charges a locational element for transmission charges. This is putting UK generators in Scotland at a disadvantage to European generators. As we become more interconnected with Europe, the TNUoS methodology is incentivising the system operator to import (potentially more carbon intensive) power over the interconnectors, at the cost of lower deployment of renewable generation in GB, and increasing reliance on the interconnectors for security of supply.

TNUoS volatility increases the cost of capital of projects, and given the scale of investment in wind generation expected in the next years, this additional cost will ultimately be placed onto energy consumers to pay.

Along with amplified locational signals, volatile and unpredictable TNUoS charges are also harming renewable investment. In research conducted by SSEN Transmission they found:

- Generators see swings in their TNUoS charges typically over 50% up or down each year.
- Charges are unpredictable – Using National Grid's own data, the average forecast error underestimated the actual charge by one third.

This volatility is in sharp contrast to the total revenue allowed of the Transmission Owners (TOs) that TNUoS charges are set to recover. The cumulative allowed revenue of NGET, SPEN and SSEN Transmission has been stable, within 5% of £2.5 billion, over the past five years. Investors need cost certainty and clear, forecastable TNUoS when planning and delivering long-term investments at lowest cost to the UK consumer. We also note that price volatility is a significant challenge for operational sites, where projects have been built and financed at a specific point in time based on the best view of TNUoS. These projects cannot react to changes in locational signals and therefore volatility in TNUoS costs simply adds risk to the projects. Volatility and unpredictability are not unique to Scotland but

³ <https://www.ssen-transmission.co.uk/news-views/articles/2021/2/ssen-transmission-calls-for-reform-of-unfair-and-volatile-charging-regime/>

⁴ https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/210524_tnuos_paper_final_for.pdf

experienced by all generators regardless of technology or location. This uncertainty leads to increasing risk margins for developers, ultimately increasing costs that will be passed on to consumers.

7. Where should government focus in our efforts to improve systems thinking and coordination across the energy system?

Government should focus efforts on **developing an economically efficient transition to net-zero**. This must be a long-term approach with strategic ambition where the renewable deployment must be aligned with the Climate Change Committee (CCC) views. This vision must also be integrated by institutions such as Ofgem, network companies and the FSO who also need to work in coordination to achieve the deliveries that net zero requires.

Other efforts should focus on **price signals to incentivise electricity assets to locate efficiently in the system**. Current network costs are not passed on in a way that incentivises the optimal low carbon technologies and flexible behaviour among network users. Ofgem's latest network charging reforms have lacked renewable resource planning, which become significantly more important as we move toward a low carbon energy system. For example, in the network charging reform, we would have expected to see consideration of factors such as strength of locational signal, location allocation of capacity, the benefits of a diverse mix of generation, planning regimes across the country, the impact on repowering decisions and increase risk profile for developers. These are variables that for a fossil fuel-based energy system were not relevant, but for a renewable-based system, become essential as ignoring any of them could constrain renewable energy deployment.

We would like to highlight that the **network charging reform** is a priority for our industry. The significant code review was launched in 2018 and the process is still ongoing, generating uncertainty for developers. The recent *Access and Forward-Looking Charges Significant Code Review (SCR): Minded to position consultation*, proposed a possible review of TNUoS, which we think may require another SCR, but it is unclear if this will happen and when. Government should focus efforts on improving coordination and system thinking in the ongoing and upcoming networks charging reform. Timelines of five years or more to implement reforms will put the 2030 delivery commitments at risk. Today, TNUoS is one of the main challenges that developers face, and if quick fixes are not realised, this will jeopardise the opportunity to deliver net zero at least cost.

Finally, another important priority is the **electricity market reform**. In the 2020 Energy White Paper, government recognised that the electricity market needs to incentivise the right behaviours from generators and offer value for money to consumers. The document stated that the market needs to incentivise both significant levels of new investment and efficient operation, in a system which mixes existing generation with increasing levels of renewables and the flexible technologies which complement them. We strongly agree with this statement and believe that this is a priority area that government should focus on.

8. Do you agree that the FSO should undertake all the existing roles and functions of NGENSO? If not, please explain why.

We think that it would be important to keep existing expertise but the outcomes of the FSO are expected to go beyond the current functions of NGENSO. We expect that people employed by the FSO could look ahead of the energy planning system and take into account the energy system as a whole, which must include all the variables that a flexible and low carbon energy system will need, something that we haven't seen performed by NGENSO so far. We also expect them to be innovative and work in coordination with other parties across the energy system.

We think that the current work that the NGENSO does in relation to the code administration is not efficient enough. For example, for the Connection and Use of System Code (CUSC), the CUSC panel ranks which modifications are important, and based on that, they decide how much resource these modification needs and how quickly they progress. This leads to the delay of a series of modifications

that are classified as less important, modifications that were sometimes raised months ago (or even years ago). On the other hand, other code administration ensure that they have enough resource to deliver all the code modifications in a timely fashion, thus it is not understood why the CUSC is the only code that has to prioritise its modifications and why it is not just resourced to progress them all. In this context, we believe that if the FSO is going to keep the code administration as part of the current role it plays in NGESO, it needs to improve its standards, or their code administration duties should go to someone else.

9. Do you agree there is a case for the FSO to undertake the long-term strategic functions outlined in Option 1? Please elaborate and provide any views on the functions we have outlined in Option 1.

Option 1 of the consultation proposes that the FSO should undertake the following current gas strategic network planning, long-term forecasting and market strategy functions:

- **strategic network planning:** undertaking long-term network capability assessment, needs case production, optioneering, economic options assessment, and publication of the Annual Network Capability Assessment Report (ANCAR), the Gas Ten Year Statement (GTYS) and Gas Future Operability Planning (GFOP);
- **long-term forecasting:** undertaking medium to long-term gas supply and demand forecasting, as an output of the Future Energy Scenarios (FES), which provides an input into the Gas Winter/Summer Outlook publications; and
- **market strategy functions:** leading market participants in developing gas market strategy, publication of the Gas Market Plan (GMaP), and leading Future of Gas (FoG) forums.

We think that there is a case to keep these functions as part of the transition toward a low carbon energy system, but we would like to note that considering that most of these functions refer to gas, we would expect they become less important with time. In the 6th Carbon Budget⁵ the Climate Change Committee (CCC) recommends the phase out of unabated gas by 2035. Therefore, unless there is a quick deployment of CCUS or hydrogen in the next 10 years, our view is that most energy generation will come from renewables, technologies that are proven and ready to increase capacity generation into the energy mix.

10. Do you agree that there is not currently a case for the FSO to undertake all GSO roles and functions, including real-time gas system operation, as outlined in Option 2? If you do not agree, please explain why.

Yes, we think that there is not a case to include real time system operation and associated activities as part of the FSO in the short term. The operational roles are different to strategic network planning, forecasting, and market functions. We recognise that there is a coordination that must be made through the planning system operation, but we do not see a case for them to be together. However, if an extensive network supported by green hydrogen were to develop in future years, this may open the need of bringing the hydrogen system operator into the FSO at a later stage.

11. Do you have views on the proposal for an advisory role? What organisations do you consider would benefit from the provision of advice by the FSO? Who should bear the costs of providing that advice?

We think that the FSO should definitely have an advisory role that could benefit Ofgem, government and it could also be extended to local authorities. Nevertheless, the remit for support given to local authorities should be carefully considered. Although integration between local heat / transport plans

⁵ <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

and national strategic planning would be welcome, if the FSO were to act as an energy consultancy to local authorities, the resources for this function should be ringfenced so they do not risk detracting from other essential FSO functions such as strategic national planning.

With respect to who should bear the cost of providing that advice, we suggest that costs should be recovered in a fashion akin to Ofgem – through an energy supplier levy.

12. Do you have any views on the other areas where we are considering new and enhanced roles and functions for the FSO (outlined in section 3.2)?

Section 3.2 of the consultation proposes some enhanced functions in areas that are mostly welcome. This includes **hydrogen, CCUS, heat and transport decarbonisation, energy data and engineering standards and energy code development**. The document states that legislation will provide the remit for the FSO, potentially through setting out high-level roles for the FSO. We believe that legislation will be an important instrument to provide direction and alignment with net zero.

The new and enhanced roles from the consultation include advisory aspects, providing policy makers and wider stakeholders with technical advice, recommendations, and analysis across a range of issues, including decarbonisation. Additionally, it is expected that primary legislation could be introduced to impose a duty on the FSO to provide advice or information when requested by UK Government, Ofgem, or other organisations. We welcome that primary legislation could be used to impose a duty on the FSO to provide high level advice to those organisations. We think that the advisory role of the FSO will be one of the most important roles of this new entity.

Section 3.2.3 of the consultation provides some examples of “potential” FSO functions in whole system planning and network development. We believe that some of those examples are in the right direction but the fact that the future energy system will be driven by a renewable-based energy system is missing. We would like to highlight the functions that the FSO should undertake, which are the ones we believe are needed to drive net zero.

- 1. Holistic and coordinated (onshore and offshore) network planning:** We agree with this proposed function and believe that is greatly needed for the future network planning.
- 2. Renewable-based electricity system planning:** As mentioned in our answer to question 5, this is one of the main issues that has been missed in previous policy decision making. A renewable-based electricity system is quite different from a fossil fuel-based system, thus it needs detailed assessment and analysis. Decision-making should facilitate the allocation of renewables in the system and not constrain this in any way.
- 3. Providing technical advice and evidence-based recommendations to Ofgem, government and the CCC.** We think that this proposed function is very important once point 1 and point 2 are considered in any technical advice.
- 4. Staying abreast of new technologies and identifying areas where new technology is needed (such as identifying options for hydrogen storage locations).** We agree with this proposed point and believe that is an area of analysis that Ofgem have missed in its decision making in the last few years.
- 5. Critically evaluating investment proposals as part of the price control process.** We agree with this proposed function.
- 6. Enhanced electricity network planning and Network Options Assessment (NOA) process,** such as critically evaluating and challenging the full range of possible options for addressing system needs (commercial non-network alternatives) and developing an overall electricity transmission network design. We agree with this proposed function.

Section 3.2.4, 3.2.5, 3.2.6 and 3.2.7 of the consultation provide an insight of the new and enhanced functions that the FSO should undertake around driving competition in energy networks, energy market design, coordination with distribution networks, heat and transport decarbonisation, data, system operability, engineering standards and energy code development. We think that most of these roles are needed to drive net zero, so they are mostly welcome. However, as mentioned in our answer to question 8, it is not clear if the energy code development should be kept in the FSO, but if it is, it must improve its standards to make the process for all code modifications more efficient.

13. What are your views on our proposed characteristics and attributes of a future system operator and how the models presented would deliver against them? Are there other characteristics or attributes that we have not yet considered?

We agree with all the characteristics proposed in the consultation that include:

- technically expert, with an in-depth understanding of the electricity and gas systems and the ability to access and use sector-wide knowledge;
- operationally excellent, with an ability to act with agility and adapt in the context of net zero;
- accountable to consumers and the public, delivering within a robust regulatory regime set by Ofgem, and within the strategic policy context set out by the Government in the Strategy and Policy Statement;
- independently minded, by acting – and being perceived to act – without undue influence from other energy interests or Government; and
- resilient, both operationally and financially.

However, we think that the following characteristics are missing:

- Technical expertise with an in-depth understanding of driving a complex flexible and renewable-based energy system in the planning network and in the system as a whole.
- It needs to be innovative and embrace innovation
- Digital
- Transparency – and possibly subject to freedom of information (FOI) rules

14. Are we considering the right organisation models for the FSO? And why?

Section 4.3 of the consultation proposes the following two organisational models:

- a standalone privately owned model, independent of energy sector interests; or
- a highly independent corporate body model, classified within the public sector, but with operational independence from government.

We believe that to avoid conflict of interest, a highly independent corporate body model, classified within the public sector, but with operational independence from government is more appropriate. A public model would help with data transparency and would also help to impose any legally binding duty related to support delivery of net zero which would be much more difficult to achieve with a private model.

A publicly-owned model also ensures that the organisation would seek to deliver the right outcomes for the energy system, rather than seeking to meet the requirements of its price control framework. Even the best-designed incentive scheme cannot match the changing needs of the energy system perfectly.

A publicly-owned model also avoids risk of any impression of bias towards one technology or commercial arrangement or another – this is particularly important with regard to advice-giving.

15. Are we considering the right elements for the FSO's regulatory and accountability frameworks? And why?

We agree with the regulatory framework proposed in section 4.3.1 of the consultation. The new FSO, either public or private, should incorporate legislation, any designated Strategy and Policy Statement (SPS), licences and codes, and funding through network charges.

We think that the proposed objectives of the FSO also seem sensible. These include:

- operating the electricity system to maintain a secure, reliable supply to consumers;
- taking a whole system perspective to ensure progress toward net zero;
- reducing costs for current and future consumers by encouraging the development of an efficient system; and
- protecting the interests of existing and future consumers

We believe that the fact the FSO must look at the system as a whole to ensure progress toward net zero will help government and Ofgem to make more informed decisions about the whole system cost of different technology choices and will enable the development of a more co-ordinated energy system.

We welcome the proposal that for a public model, the SPS will be able to provide operating context and strategic focus, which wouldn't be the case in a private model. We think that imposing legally binding duties on the FSO will be important to align responsibilities with net zero and it will also help to coordinate with Ofgem, which will also face legally binding duties coming from the SPS.

We also agree with ensuring that it should keep under review relevant government policy initiatives or other developments in the energy sector that are likely to impact on the FSO's work including those which occur or emerge between the reviews of a designated SPS.

16. Do you have views on the level of shareholding or control involving other 'energy interests' and the FSO at which a conflict of interest would become a concern?

The FSO should have no commercial link to other private interests.

17. Are we considering the right implications of our proposals for Elexon and Xoserve?

No comments.

18. What is your view on the preferred implementation approach? Please explain why.

We agree with the phased implementation approach. This would help with the transition in a more coordinated way. It is our view that keeping existing capability and functions of the NGESO, followed by adding new roles and functions as discussed in question 12 will help with coordination between the existing energy system and the flexible and low carbon energy system of the future.

19. Based on the areas where we are considering new and enhanced roles and functions for the FSO, which of these should be prioritised for development? Please explain why.

We think that the whole system **planning and network development** should be prioritised, and this should include the six points addressed in our answer to question 12. One of the main issues we have identified was the system-wide decision making and planning, which currently lacks coordination and analysis to accommodate the level of flexibility and low carbon technologies required to meet our climate targets (see our answer to question 5). Therefore, we think there is a strong case to prioritise this area.

Another area that we think should be prioritised is the **advisory role** of the FSO. The whole system planning and network development is linked with policy decision making that is carried out by Ofgem, thus the advisory role will be an important input to help Ofgem to take more informed policy decisions.

We also think that **heat and transport decarbonisation** is an equally important priority, but the outcomes of this are linked with the 2 areas mentioned previously. This is mainly because heat and transport will become more electrified to be decarbonised, hence these sectors will require significant

deployment of low carbon technologies, deployment that is currently constrained due to issues in the planning and network development.

20. What do you believe are the risks to implementation? How can these be mitigated?

We support a phased implementation, but quick fixes should be sought now to prepare the ground for the separation, such as placing a licence requirement on the existing ESO in relation to delivery of net zero whilst minimising costs to consumers.

21. Do you have any comments on potential implications of implementation for you, your organisation, or other stakeholders?

No comments.

22. What is your view on the position there are likely to be cost savings across the energy system from an increased “whole system” view, as described in paragraphs 47-52 of the IA? If so, is the potential magnitude of savings illustrated fairly in the IA? If not, why not?

We strongly agree on the position that there are likely to be cost savings across the energy system from an increased “whole system view”. We welcome that in the impact assessment (IA), the model includes the input from the CCC in the 6th Carbon Budget and that it assumes that the electricity network will increase in size up to 2050, while the natural gas network is expected to decline across all scenarios considered.

The 6th Carbon Budget anticipated that an energy system driven by low carbon technologies will generate cost savings in the long term, particularly associated with operational cost savings in buildings, surface transport, and electricity supply. With a simple analysis of economy of scale, it is predictable that if the electricity network increase in size, costs will be reduced due to large deployment of low carbon technologies and learning by doing effect.

Additionally, assuming that the energy system of the future will be smart and with flexible technologies balancing the high volume of variable output technologies, it would be expected that the system as whole would be more efficient. The recent Smart and Flexibility Plan 2021⁶ released by BEIS shows that a smarter a flexibly system is an opportunity and will reduce cost by up to £10bn a year by 2050, a statement that was confirmed with a previous report⁷ from the Imperial College London and Carbon Trust.

25. Do you think that the distribution of impacts is fairly represented, with impacted groups correctly identified? Outlined in table 5 of the IA.

Yes, we think that table 5 shows a fair representation about the distribution of impacts.

⁶ <https://www.gov.uk/government/publications/transitioning-to-a-net-zero-energy-system-smart-systems-and-flexibility-plan-2021>

⁷ [An analysis of electricity flexibility for Great Britain.pdf \(publishing.service.gov.uk\)](#)