



BEIS/Ofgem
A smart, flexible energy system: A call for evidence
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SUMMARY

Climate change is one of the greatest threats to wildlife, and inappropriately located or designed energy infrastructure can also have negative impacts on wildlife. As the UK's leading nature conservation organisation, and a founding member of the Renewables Grid Initiative, the RSPB works to promote environmentally sensitive grid development that enables the further steady growth of renewable energy. Enabling a smart and flexible energy system is a vital part of facilitating a smooth transition to a renewable energy future in order to mitigate climate change and avoid carbon lock-in. Whilst new and upgraded connections will be required, the UK should also be ensuring it achieves optimal use of existing generation and grid infrastructure, thus avoiding unnecessary impact on our wildlife during the energy transition.

We therefore support the strategic approach the Government is taking, with Ofgem, to identify and address the challenges that are currently holding back the energy transition. We are encouraged to see that this call for evidence covers a wide range of issues from the benefits of storage, smart appliances and low emission vehicles, to the need for more coordinated network planning and operation.

We welcome the positive intention of the call for evidence, and much of the content. However, we highlight three risks which require caution by Ofgem and the Government:

- a. removing policy and regulatory barriers, in particular relating to planning for storage, could lead to increased potential for environmental damage
- b. inadvertently encouraging greater electricity demand through support for smart appliances, and
- c. losing the strategic oversight of the whole energy system currently held by National Grid as a result of changes to the roles of transmission and distribution system operators.

We set out our full response below.

OVERVIEW

1. **The RSPB and the RGI:** The RSPB welcomes the joint call for evidence from the Department of Business, Energy & Industrial Strategy and Ofgem on a smart flexible energy system. With over 1.1 million members, the RSPB is one of the UK's leading nature conservation organisations. We are also a founding member of the Renewables Grid Initiative (RGI), a unique collaboration of environmental NGOs and transmission system operators from across Europe focused on promoting transparent, environmentally sensitive grid development to enable the further steady growth of renewable energy and the energy transition.
2. **Climate change:** Climate change is one of the greatest threats to wildlife. Globally, one in six species is at risk of extinction by 2100 under business as usual scenarios¹. The RSPB's work on the impacts of climate change on European wildlife (see our recent [science review](#)), highlights that we are already seeing significant impacts. Future projections clearly show us that, overall, wildlife will face a much tougher environment, and big challenges, as a result of changing climate. There is therefore a pressing need to reduce global greenhouse gas emissions to avoid levels of climate change that seriously affect wildlife.
3. **The energy transition in harmony with nature:** In doing so, we must ensure that the urgent transition to a low carbon economy is in harmony with nature. Our 2016 report [The RSPB's 2050 Energy Vision](#) highlights that the transition to 100% low carbon electricity in the UK will require the development of a smarter, more flexible energy system. Whilst new and upgraded connections will be required, the UK should also be ensuring optimal use of existing generation and grid infrastructure, thus avoiding unnecessary impact on our wildlife during the energy transition. We are therefore encouraged to see the Government and Ofgem taking a strategic and proactive approach to addressing some of the challenges our current energy system poses to a successful transition to a stable global climate by developing this call for evidence.
4. **Energy storage:** We support, in general, efforts to allow energy storage to play a greater role in the energy system, thus helping to better balance supply and demand as the energy generation mix becomes increasingly varied and decentralised. We do however have some concerns about suggestions in this document that changes in relation to the planning framework may be necessary. Whilst we recognise and support the desire to provide clarity, to remove disincentives and to allow for emerging technologies, it is essential that our planning system remains an effective mechanism to protect against environmental degradation. Therefore:
 - We consider that the [Scottish Planning Policy](#) is clear in its support of energy storage facilities, that this is sufficient and does not require amendment.
 - It could be helpful, subject to general environmental safeguards remaining in place, for the Overarching National Policy Statement on Energy to be updated to take account of the developments in energy storage technology, and for the National Planning Policy Framework and/or Guidance to make explicit reference to 'energy storage', similar to the Scottish approach.
 - Any attempt to define the term 'energy storage' to provide clarity needs to ensure appropriate planning scrutiny remains for all storage facilities with the potential to have

¹ Urban, M.C. Accelerating extinction risk from climate change. *Science*. 348, 6234. 571-573 (2015)
<http://science.sciencemag.org/content/348/6234/571>

environmental and social impacts, irrespective of whether they are large civil engineering works or not.

- The current thresholds in relation to the planning consent process energy storage must follow are in our view satisfactory and should not be altered at this time. However, should it be considered absolutely necessary to amend how the size of a storage facility is determined for planning purposes, any determination would need to take into account the scale of impact on the environment. This should cover both local (e.g. physical size, design, construction) and global (e.g. design and material type/source) impact as extraction of some of the materials required for energy storage, for example lithium, may have wider environmental impacts, see our detailed evidence in question 5 below.

5. **Role of the Government and Ofgem:** Additionally we would like to highlight that we consider both the Government and Ofgem to have important roles to play in facilitating the transition to a smarter system. Some of the changes to our energy system that are needed will cause significant disruption to the status quo. Therefore innovation in all the areas covered by this consultation will need to be nurtured with the use of multiple hard and soft policy levers such as many of the proactive actions suggested in this call for evidence, as well as initiatives that will help trigger a behavioural shift in relation to energy (see our answers to questions 15, 25 and 33). It is also important that during this transition the Government encourages innovation not solely on the basis of cost reduction. To ensure the long-term sustainability of the UK's energy system, innovation must focus on reducing lifecycle impact of technologies, optimal energy usage, and overall energy demand reduction. For example, the Government should be careful to ensure the uptake of smart appliances focuses on demand shifting, not further demand creation.
6. **Efficient grid development:** Maximising the grid network efficiencies available will reduce the total amount of new generating capacity that needs to be deployed as part of the renewable transition, thus protecting wildlife. We therefore consider that increased coordination between distribution system operators, transmission system operators and the system operator is essential and we support actions by the Government and Ofgem to facilitate this happening as soon as possible. However, we also suggest that care is taken with any changes to the current structure of roles and responsibilities so as to ensure a holistic oversight of the UK's energy system remains. Strategic oversight allows for identification of optimal national direction-setting and losing this could result in slow and/or sub-optimal, improvements to the network as a whole.
7. More detail on these points is provided in our specific answers to the consultation questions below.

RESPONSE TO QUESTIONS

Question 1: Have we identified and correctly assessed the main policy and regulatory barriers to the development of storage?

Our answer is broadly yes, but with caveats. It remains essential that our planning system scrutinises any project with high potential environmental and social impacts and that efforts to remove disincentives for investor confidence do not undermine this.

To ensure the optimal development of energy storage for the long-term sustainability of the UK's energy system, policy frameworks should avoid prioritising one, or a select few, forms of storage technology. Innovation in storage technologies with low lifecycle impact and optimal energy

conversion, beyond those already established, or recently emerging as front-runners (see answer to question 5 for specific evidence on this point), should be encouraged. We therefore suggest that paragraph 3.3.11-12 of the [Overarching National Policy Statement for Energy](#) could helpfully be updated to recognise the increasing viability of energy storage technologies for providing balancing services thus reducing the total new electricity capacity required in the UK.

We consider that the [Scottish Planning Policy](#)² which is broadly supportive of 'energy storage' is a positive and helpful framework that makes clear that the development of storage facilities is desired. We would expect that it should provide sufficient confidence to investors and clarity for planning authorities and does not require amendment (please see our answer to question 5 for our views on clarifying what is meant by 'energy storage'). [The National Planning Policy Framework](#) and/or Guidance could also therefore helpfully refer to 'energy storage' explicitly, for example in paragraph 97 of the Framework and paragraph 001 of the [Renewable and Low Carbon Energy Guidance](#). This could provide greater clarity to planning authorities and give investors in more innovative storage technologies more confidence that England is supportive of development in this area whilst maintaining appropriate scrutiny of projects.

Question 5: Do you agree with our assessment of the regulatory approaches available to provide greater clarity for storage?

Our answer is broadly yes, but with caveats. Energy regulation needs to adapt to allow new models to develop, but government should be careful not to allow energy solution providers to bypass regulation at the expense of potential environmental damage.

We support efforts to allow energy storage to play a greater role in the energy system, thus helping to better balance supply and demand as the energy generation mix becomes increasingly varied. However, it is essential that our planning system remains an effective mechanism to protect against environmental degradation. Consequently, the current frameworks and thresholds (based on megawatt capacity as a proxy for likely impact) are, in our view, satisfactory and should not be altered at this time.

Additionally we would like to highlight the following points:

- Any attempts to define energy storage need to ensure appropriate planning scrutiny of all storage facilities with the potential to have environmental and social impacts remains, irrespective of whether they are large civil engineering works or not. For example by ensuring explicit reference to energy storage in paragraph 001 of the Renewable and Low Carbon Energy guidance.
- Should it be considered absolutely necessary to amend how the size of a storage facility is determined for planning purposes, any determination would need to take into account the scale of impact on the environment, both local (e.g. physical size, design, construction) and global (e.g. component material life-cycle analysis). Particular care should therefore be taken with the consideration of any 'exemptions' to having to follow due process so that sufficient scrutiny is maintained.

Specifically on the sustainability of different types of storage facilities, we would like to highlight evidence in relation to the life-cycle impacts of lithium-ion batteries. The reserves of concentrated lithium of the world are mainly in shallow saline lakes in the high-elevation Andean deserts of Argentina, Chile and Bolivia. These lakes are important sites for three flamingo

² (see for example paragraphs 154, 156 and 167)

species, including the globally threatened Andean Flamingo (*Phoenicoparrus andinus*)³. Research on the wider sustainability of batteries (including toxicity, scalability and recycling) is also ongoing⁴. These potential challenges remain a hurdle to ensuring a truly clean and sustainable flexible future energy system and we consider that Government has a responsibility to ensure that end-to-end environmental impact of developments are taken into account in decision-making.

Question 15: To what extent do you believe Government and Ofgem should play a role in promoting smart tariffs or enabling new business models in this area?

The UK Government have a role to play by setting a bold long-term vision for the UK's energy future, and being clear that smart tariffs are part of this vision. As recognised by the Government in many forums, the smart meter roll out alone will not automatically lead to flexible energy use by domestic consumers. Smart tariffs are an important price signal mechanism that will better reflect the value of energy and encourage widespread changes to behaviour. Without more flexible energy use by domestic customers, the energy system will struggle to adapt to the high levels of low carbon generation that are needed for the UK to play its part in mitigating climate change. As demonstrated by the Government's approach to smart meter roll-out, social mobilisation around such a significant technology/behaviour shift needs to be driven and encouraged by a national mandate in order to be successful. Unless the national vision and reasoning is clear, it is likely that industry will be less inclined to offer smart tariffs for lack of a market for them, and consumers will be less motivated to accept smart tariffs offered by industry.

Ofgem, as the regulator of the gas and electricity market, has a role to play in encouraging suppliers to provide smart tariff options and to explain the benefits to consumers. Ofgem must ensure suppliers have the flexibility to provide smart tariffs to consumers with the ability to manage their demand. It could go as far as requiring all suppliers to provide at least one smart tariff option, and to require them to promote it on the basis of it helping the energy system adapt to renewable energy, not solely on the grounds of consumer cost savings. Ofgem could also extend the 'Be an Energy Shopper' campaign to highlight the benefits of smart tariffs to consumers with the ability to adjust their demand patterns.

Question 25: Can you provide evidence to show how existing Government policies can help or hinder the transition to a smart energy future?

A large factor in the transition to a smart energy future will be the transformation to smart home energy networks, including smart appliances, which will require significant social mobilisation or enforcement. Recent energy efficiency policy levers provide applicable examples for the smart energy transition.

The Energy Companies Obligation, a mandated requirement of energy suppliers, has been successful in achieving improvements to a large number of properties that would otherwise have remained untreated. In comparison, the Green Deal, a voluntary financial incentive failed to encourage householders to make changes to their properties, for a variety of reasons as highlighted in the 2016 [Better Homes report](#) from Bright Blue. Lessons can be learnt from the issues experienced by the Green Deal and should be used to help design revised or new policy

³ Sutherland, W.J et al. Horizon scan of global conservation issues for 2011. *Trends in Ecology and Evolution*. **26**, 1. 10-16 (2011) - <http://www.conservation.cam.ac.uk/sites/default/files/file-attachments/Horizon%20Scanning%20TREE%202011.pdf>

⁴ Larcher, D. & Tarascon, J-M. Towards greener and more sustainable batteries for electrical energy storage. *Nature Chemistry*. **7**,19–29 (2015) - <http://www.nature.com/nchem/journal/v7/n1/full/nchem.2085.html>

initiatives (for both the fuel-poor and able-to-pay sectors) which take a broader strategic approach to supporting home improvements, including the installation of smart appliances and electric vehicle charging infrastructure.

We also welcome the effort of the government and Ofgem to evaluate the participation of demand-side response (DSR) in the Capacity Market as this is critical to achieving the flexibility needed to accommodate high-levels of renewable energy. However, we suggest the Government needs to widen the scope of this evaluation to address the risk of other forms of generation bidding into the auction undermining investment in more flexible forms of generation. In the recent capacity market auction, existing coal fired power secured £128 million of capacity contracts. This support for coal power stations via the Capacity Market not only risks drawing potential investment away from alternative technological solutions, but also undermining the Government's commitment to phase out unabated coal power. To streamline government policies and ensure that coal phase out is achieved in a smooth and efficient manner, RSPB recommends that coal fired power stations should be excluded from participation in the T-4 Capacity Market auction. Taking this action would subsequently encourage increased investment in DSR.

Question 28: Do you agree with the 4 principles for smart appliances (interoperability, data privacy, grid security, energy consumption)

Yes we agree with these 4 principles, in particular we are pleased to see the inclusion of the 'energy consumption' principle. As a society we should be taking every opportunity to 'de-energise' our daily activities⁵. It is essential that in moving to a more flexible energy system we do not unnecessarily increase electricity demand.

Question 31: Are there any other barriers or risks to the uptake of smart appliances in addition to those already identified?

Yes.

There is a risk that the use of smart appliances will not only be employed for shifting demand, but that the idea of smart appliances will encourage the installation of unnecessary levels of appliances, or their unnecessary use, for the sake of 'soaking up' excess generation at times of low demand. This would be a sub-optimal approach. Ensuring energy demand is reduced as far as possible is essential to ensuring a low-cost and secure decarbonised supply that is in harmony with nature. The encouragement of smart appliances should therefore

- focus on the improvement of existing daily 'essential' appliances,
- seek to prevent over-energising our daily lives simply to create a new sub-market in the appliances industry, and
- ensure energy waste is avoided.

It is also worth noting that truly smart appliance technology that can intelligently engage with a smart grid is not yet fully established. Additionally Government needs to acknowledge the barrier that continued consumer complacency to smart energy behaviour poses, irrespective of financial incentives – see answers to question 15 and 33 for our views on how this should be addressed.

⁵ <https://www.foe.co.uk/sites/default/files/downloads/de-energising-society-102383.pdf>

Question 33: How might Government and industry best engage electric vehicle users to promote smart charging for system benefits?

To ensure electric vehicles can be successfully employed for system balancing, Government and industry must ensure that participating in smart charging is simple for the user, and that there is transparency and trust. Pilot schemes would also help to promote the concept.

The UK Government has previously done significant work on behavioural insights⁶ and further afield, work is also being done specifically in relation to social mobilisation around energy issues⁷. These insights could prove helpful to the issue of smart charging of electric vehicles. Achieving engagement is complex but some key issues include, making the benefits to the individual easily understood and (if possible) guaranteed, requiring minimum disruption to daily lives, and demonstrating peers engaging with the alternative i.e the change becoming the norm. We suggest a few practical actions the Government could take which we consider would help promote smart charging:

- Ensure messaging around the vehicle-to-grid concept is appropriate to the audience.
- Ensure that industry players who operate smart charging ports for system balancing, are trusted, ideally with certification/assurance.
- Support pioneering smart-charging pilot schemes to demonstrate the concept's potential, recruiting whole streets to convert to electrical vehicles and sign up to smart-charging. This is ideally suited to delivery by local government, but will likely require central government support.

Question 45: With regard to the need for immediate action:

a. Do you agree with the proposed roles of DSOs and the need for increased coordination between DSOs, the SO and TOs in delivering efficiency network planning and local/system wide use of resources?

Yes, we agree that there is a need for immediate action by the DSOs, SO and TOs to increase coordination in short and long-term network planning to ensure the most efficient use of all available resources is achieved and that this should include:

- developing a formalised framework to ensure the network planning process takes into account whole system requirements and the needs of the wider range of stakeholders.
- the DSOs feeding into the System Operability Framework.

Maximising the grid network efficiencies available to us, will reduce the total amount of new generating capacity that needs to be deployed as part of the renewable transition, thus protecting wildlife.

Question 46: With regard to further future changes to arrangements:

a. Do you consider that further changes to roles and arrangements are likely to be necessary?

We do not have a view on whether further changes are necessary. However, we suggest that changes which might result in any loss of holistic oversight of the UK's energy system could result in slow/or sub-optimal improvements to the network as a whole.

b. What are your views on the different models?

We would like to highlight that the focus of any network planning should be to deliver the 'optimal' solution, not just the most economic. By 'optimal', we mean the solutions which

⁶ <http://www.behaviouralinsights.co.uk/publications/>

⁷ <http://pics.uvic.ca/sites/default/files/uploads/publications/FINAL%20Social%20mobilization-Sussman%20Gifford.pdf>

deliver environmentally, socially *and* economically. When we refer to ‘environmental’ considerations, these should always cover ecological impact, as well as carbon emission reductions e.g. avoidance of unnecessary grid infrastructure.

iii. Do you have any initial thoughts on the potential benefits, costs and risks of the models?

Both models proposed in relation to network planning have benefits, and we do not have a strong view as to which is the preferred approach. The holistic oversight that the SO is able to take in forming recommendations for the DSOs would allow for a strategic approach to this, ensuring the national system as a whole develops to an optimal state. There is therefore a risk that the single party planning approach would result in a loss of essential strategic oversight and could lead to sub-optimal outcomes at the national-level due to a lack of coordinated planning between regions. However the challenges faced when coordinating transmission and distribution level planning across multiple parties remains. If the benefits of a single-party approach to distribution and transmission are desired, a hybrid model could be beneficial. Such a model might involve one party providing a strategic framework that sets the direction of travel whilst the single parties responsible for both distribution and transmission within a region are required to ensure regional network planning contributes to national optimality. In this model, the party with strategic oversight would play a coordinating role to draw the regional parties together.