

## Energy Systems Catapult Response to the National Grid Consultation: Electricity System Operator (ESO) Forward Plan

### Introduction

1. This response is submitted on behalf of the Energy Systems Catapult (ESC). The ESC supports innovators in unleashing opportunities from the transition to a clean, intelligent energy system. We are part of a network of world-leading centres set up by the government to transform the UK's capability for innovation in specific sectors and to help drive future economic growth.
2. By taking an independent, whole energy systems view, we work with stakeholders across the energy sector (consumers, industry, academia and government) to identify innovation priorities, gaps in the market and overcome barriers to accelerating the decarbonisation of the energy system at least cost. In doing so, we seek to open up routes to market for innovators, as well as supporting them to understand how their products, services and value propositions fit into the transforming energy system.
3. The ESC is working with the UK government and local authorities to deliver the *Smart Systems and Heat (SSH) Programme*, determining the most effective means of decarbonising the UK's 27 million homes and contributing to the target of an 80% reduction in the UK's Greenhouse Gas emissions by 2050. The ESC is also leading the *Future Power System Architecture (FPSA)* project in collaboration with the Institution of Engineering and Technology (IET). This project seeks to determine the functions that will be required to enable a future, low carbon, power system to operate in the face of transformative change, and hence to enable recommendations to be made that will inform policy and regulatory considerations.
4. This response is structured around the four roles identified for the ESO:
  - Managing system balancing and operability
  - Facilitating competitive markets
  - Facilitating whole system outcomes
  - Supporting competition in networks.
5. For each of these roles, we will provide comments and proposals on the ESO's strategic aims, its activities and deliverables for 2018/19 and the proposed performance metrics.
6. If you wish to discuss the contents of this submission, please contact Tony Diccico at: [tony.diccico@es.catapult.org.uk](mailto:tony.diccico@es.catapult.org.uk)

## Overview

7. The gas and electricity supply industry faces significant change over the next 20 – 30 years as the decarbonisation of electricity generation, heating and transport gathers pace. These changes will require a more coordinated approach across electricity networks and also more cross-vector coordination. The role of the electricity SO will be critical to the efficient operation of smart energy networks.
8. The ESC supports the intent in the ESO Forward Plan: *“to put customers at the heart of everything we do”* and to facilitate effective competition in balancing services markets and the provision of energy networks. We fully support the adoption of a **whole system** approach to system operation. There needs to be greater coordination between the ESO and Distribution Network Operators (DNOs) and (eventually) Distribution System Operators (DSOs). This ‘whole system’ approach has been considered by the IET and ESC as part of the FPSA project. We believe that the findings of the FPSA project can be used to facilitate the development of a more coordinated approach between an independent SO and the network owners/operators.
9. We believe that the ESO should be *“thinking more widely”* about how it can reduce the costs of balancing the electricity system. We agree that there should be more transparency of the ESO’s actions through better information provision, however there must also be safeguards in place to prevent any market participants using this additional information from taking advantage of a dominant position, for instance any generator or demand-side provider located behind a network constraint.
10. There is limited mention of the Open Networks project. We see this as a critical mechanism to ensure that system operational needs and functionality are developed appropriately between transmission and distribution networks for the whole system - by whole system, we include all the flexible demand-side resources that both transmission and distribution will interact with.
11. Regulating the ESO and measuring its performance will be key. We support Ofgem’s ambition to simplify the regulatory framework by potentially bringing all the different elements together under one consistent package. However, the complexity of the ESO’s future role may make this difficult: there is trade-off between introducing a number of separate, meaningful and measurable incentives and trying to reduce complexity by reducing the number of incentive arrangements. We believe that it is appropriate to concentrate on the ESO’s key tasks i.e. ensuring security and stability of electricity (and energy<sup>1</sup>) supply, optimising the costs of balancing the electricity system and facilitating competition on its and other electricity networks.

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<sup>1</sup> There are potential implications for gas supply by the actions that the electricity SO takes to balance the electricity system.

## Managing system balancing and operability

12. It would seem inappropriate for the ESO to be incentivised on managing costs over which it may not have much control, and/or it is difficult to measure actual performance. The ESO is best-placed to manage the costs of balancing the electricity system, although in future, the SO will become more reliant on actions taken by DNOs/DSOs to balance their networks. This added uncertainty, and having to take a whole system approach, will make setting a meaningful incentivised balancing target very difficult.
13. We support the **ESO's strategic aims** to expand the range and transparency of information it provides on current and future market opportunities for service providers. It is also important to improve the accuracy of forecast information on demand and renewable output to allow parties to better balance their short-term market positions.
14. The **2018/19 deliverables and actions** listed in the ESO Forward Plan, which are designed to meet the ESO's strategic aims for managing system balancing and operability, seem logical and sensible. We support more stakeholder engagement through webinars and operational forums and the publication of monthly reviews of balancing costs and the ESO's performance against its targets.
15. In terms of the **proposed performance metrics** as described in the Forward Plan: Technical Annexe, we do not intend in this response to go through every metric in detail. However, the key principles that the ESO should adopt are aligning its deliverables to what is relevant to the market and which drive tangible value to consumers and service providers. Another important factor will be continuous improvement as the ESO gains more experience of how the markets are developing, enabling it to set more challenging targets over time. An important part of this will be an effective review process: it may be appropriate for a third-party such as Elexon to evaluate how effective the ESO has been in achieving its targets, rather than the ESO itself.
16. We support the proposal to introduce a half-hourly BSUoS forecast so as to improve the information that stakeholders have to make better-informed balancing decisions. However, we recognise the difficulty that the ESO will face in ensuring that these forecasts are accurate and wonder if a performance measure which tracks the accuracy of BSUoS forecasts versus outturn values could be introduced at some stage, as inaccurate forecasts may lead to sub-optimal balancing actions by stakeholders and actually increase risk premia. An important factor in giving confidence to the market will be the monthly reporting of balancing costs so that stakeholders can see that the ESO has acted appropriately and effectively in balancing the electricity market.

## Facilitating competitive markets

17. We support the increased use of **competitive markets** to reduce the residual costs of balancing and believe that this can be facilitated through effective performance management of the ESO by Ofgem. We agree that the ESO has a pivotal role in the electricity market and should take a more active role in understanding the needs of market participants and shaping the future development of the market arrangements. The ESO should work closely with Ofgem and the proposed Consultative Board (a new body proposed in the 2017 Ofgem consultation: *Industry Code Governance: Initial consultation on implementing the Competition and Markets Authority's recommendations*) to provide strategic direction to the development of the industry codes and market arrangements, whilst allowing market participants to take the lead in proposing changes to these codes and arrangements.
18. We support the **ESO's strategic aims** to continue to improve its administrative functions in code administration and network charging, using the principles of Open Governance to facilitate a more strategic approach to the development of market governance frameworks. We think that it is important to improve the competitive provision of balancing services, moving to market-based frameworks and reducing the barriers to entry for all, especially smaller players.
19. The **2018/19 deliverables and actions** listed in the ESO Forward Plan, which are designed to meet the ESO's strategic aims for facilitating competitive markets, seem logical and sensible. We support the intention to use the ESO annual conference and Flexibility Forum to develop markets and expand participation – it will be especially important to target new entrants, using trade bodies and other institutions to promote your message.
20. In terms of the **proposed performance metrics** as described in the Forward Plan: Technical Annexe, many of these metrics for facilitating competitive markets rely on obtaining stakeholder feedback on how satisfied they are with the various services that the ESO provides. There is a danger that the views of all stakeholders, especially smaller players, will not be adequately reflected and that the performance measures will not be a true reflection of actual performance.
21. We recognise and fully support the measures (numbers 13 and 14) which are designed to facilitate competition across system boundaries and drive the ESO to facilitate an increase in the number of proposed non-transmission solutions to transmission issues. It is difficult to say whether the proposed target (for Measure 13) of up to three new (non-transmission) solutions is the right measure but given the pace of change likely, it might be necessary to increase this target in future years.

## Facilitating whole system outcomes

22. The rise of intermittent and distributed generation and new loads such as heat pumps and electric vehicles will require a **whole system** approach to system operation. There needs to be greater coordination between the ESO and Distribution Network Operators (DNOs) and (eventually) Distribution System Operators (DSOs). The development of distribution-connected generation and demand could be inhibited by network

constraints or require costly upgrades unless actively managed by intelligent matching of supply, demand and network capabilities.

23. In the longer-term, energy vectors will become increasingly interconnected, such as through gas boilers hybridised with electric heat pumps, petrol engines hybridised with batteries for vehicle motive power, multiple energy conversion assets in heat network energy centres, etc. At times of electrical system stress, it should be possible to switch gas/electricity hybrid heat pumps to operate on gas, thus creating electrical demand reduction. This will require greater co-ordination, not just between electricity network operators but also between gas and electricity system operators.
24. The 'whole system' approach has been considered by the IET and ESC as part of the FPSA project. We believe that the findings of the FPSA project can be used to facilitate the development of a more coordinated approach between the ESO and the network owners/operators. We also provided our views on the development of smarter, more flexible energy system in the 2017 BEIS/Ofgem Call for Evidence: *A Smart, Flexible Energy System*, supporting the greater use of smart technology, demand side aggregation and energy storage.
25. We support the **ESO's strategic aims** to join up network design and operation processes across transmission and distribution to ensure that the most efficient decisions are made across all networks, reducing the overall investment needed in new networks. We support the rollout of regional plans across Great Britain which will enable this joined-up development and operation of transmission and distribution networks.
26. The **2018/19 deliverables and actions** listed in the ESO Forward Plan, which are designed to meet the ESO's strategic aims for facilitating whole systems outcomes, seem logical and sensible. We welcome the intention to improve the information provided through the Future Energy Scenarios, Ten Year Statement and Networks Options Assessment engagement processes which should improve the transparency and usefulness of information for customers, service providers and those planning to connect to the transmission or distribution network. A potential big win from greater co-operation with other network companies is better co-ordination and planning of maintenance programmes which should reduce inconvenience and costs for network users.
27. The **proposed performance metrics** for facilitating whole system outcomes (measures 15-17) do not appear, at first glance, to be that onerous for the ESO. For instance, for Measure 15: Connections Agreement Management, the target is that 60-70% of connection agreements should be updated within 9 months of notification of a change to the transmission network that affects a generator's contract with the ESO. We would question whether the percentage figure could be higher, and/or the 9-month timeframe reduced. We appreciate, however, that the achievement of this metric depends on the actions of the transmission operator and also the customer in signing the new connection agreement in a timely fashion.

## Facilitating competition in networks

28. The ESC supports the general principle that users of the energy networks should bear the costs that they impose on the system. We believe that to deliver the full benefits of flexibility, price signals will need to develop to reflect the value to our energy system of smart technologies and processes. We also believe that the provision of appropriate signals in smart tariffs, charging and other industry arrangements such as half-hourly settlement have the potential to signal flexibility needs to consumers and generators and reduce the need for new electricity networks.
29. We support the **ESO's strategic aims** to maximise competition in the provision of electricity networks and the use of alternative solutions to installing more network capacity.
30. We support the **2018/19 deliverables and actions** listed in the ESO Forward Plan, to develop through consultation and then enact an expanded Network Options Assessment process to cover transmission, distribution and smart control options to deliver network capability. We believe that Home Energy Management Systems and storage could provide solutions which will partially negate the need to augment network capability – these should be fully considered as part of the future Networks Options Assessment.