
Energy Systems Catapult Response to the Ofgem Consultation: *Future arrangements for the electricity System Operator: the regulatory and incentives framework*

Introduction

1. This response is submitted on behalf of the Energy Systems Catapult (ESC) - we have also submitted a response to the related Ofgem consultation: '*Future arrangements for the electricity System Operator: its role and structure*'. The ESC is an independent company whose remit is to create innovation in UK energy markets and to create business opportunities. The ESC is looking at a "whole systems approach" and is responsible for the delivery of the **Smart Systems and Heat (SSH) Programme** on behalf of the Energy Technologies Institute (ETI).
2. The ESC is working with the UK government and local authorities to deliver the 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 SSH Programme is developing a cost-effective area-by-area deployment approach. A modelling framework ('*EnergyPath™ Networks*') has been developed that allows the design of the most cost-effective energy system in a local area, including energy efficiency interventions for the homes in that area. We have worked with Newcastle City Council to develop a Local Energy Plan that seeks to reduce carbon emissions by 90% by 2050. We are also working with Bridgend County Borough Council and the Greater Manchester Authority to develop similar local energy plans. We believe that this approach can lead to a significant reduction in carbon emissions from heat in buildings.
3. Another key element of the SSH programme is the development of a Home Energy Management System (HEMS) which will allow the smart operation of domestic heating and other applications. HEMS will enable innovative new business models and allow the householder to automatically control energy usage and potentially help to balance the energy system. To realise the benefits from HEMS, new energy supply licence arrangements and consumer protection will need to be developed to allow energy service providers to offer levels of comfort rather than merely supplying kWh of energy. Digitalisation may also have a key role, with ICT enabling integration and sophisticated customer interaction through the acquisition and use of data and information.
4. 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.

5. If you wish to discuss the contents of this submission, please contact Tony Diccico at: tony.diccico@es.catapult.org.uk

Summary

6. The electricity system is complex and ‘always on’, and the integration of new functionality will need to be undertaken in a systematic way to ensure compatibility and to avoid destabilisation. This will require concerted and coordinated attention in view of the many timing interdependencies, triggers and tipping points. The rise of intermittent and distributed generation and new loads such as heat pumps and electric vehicles could be inhibited by network constraints or require costly upgrades unless actively managed by intelligent matching of supply, demand and network capabilities.
7. The ESC and IET have carried out a study of international power systems as part of the Future Power System Architecture (FPSA) project¹. This **International Study** looked at the main system level challenges facing the electrical power sectors of Germany, Ireland, the United States of America and South Korea. The study found that the challenges faced by the GB electricity sector are similar to those faced in the other countries reviewed, however none of these countries face the extent of the challenges as the UK. We believe that there may be useful evidence from the FPSA project that Ofgem should consider when finalising the regulatory and incentives framework for a legally separate SO.
8. Much new functionality is concerned with interactions that span the whole system – from smart appliances beyond customers’ meters to the largest thermal power stations. This integration runs counter to today’s stratification of system architecture that, to a large extent, compartmentalises generation, transmission, distribution and consumers. An effective response will require new organisational and governance capabilities to establish and energise this whole-system approach necessary for transforming GB’s power system architecture. Therefore, we support a more holistic, whole system approach to incentivising the SO going forward, and believe that the SO should only be incentivised in areas where it can make a discernible (and measurable) improvement to system performance and cost management.
9. As the interactions between these markets deepen, some level of coordination will be necessary across electricity, gas, biofuels, petroleum supply and heat networks. We support the increased use of competitive markets to reduce the residual costs of balancing and believe that this can be facilitated through effective incentivisation of the SO. We agree that the SO has a pivotal role in the electricity market and an independent SO should take a more active role in understanding the needs of market participants and work with network operators to deliver a whole system approach to energy market operation.

¹ *Future Power Systems Architecture Project* – A report commissioned by the Department of Energy and Climate Change (2016). www.es.catapult.org.uk/fpsa

10. We support transparency and simplicity in incentivising the SO and believe the number of current schemes to incentivise the SO need to be reduced. We believe that principles-based regulation will generally be more effective than prescriptive regulation, although a mixture of both may be appropriate for incentivising the SO to manage balancing costs effectively. It would seem appropriate to take a longer-term view when designing incentive schemes to remove the driver on the SO to take short-term actions that reduce short-term system costs, in order to meet the incentive target, but which may actually increase costs in the longer-term.
11. The current BSIS incentive scheme relies heavily on setting a forecast target that is representative of outturn balancing costs – this is a difficult task to achieve and can mean that the incentivisation actually is pretty meaningless as it is difficult to see exactly how the SO has influenced the outturn costs. This situation is made worse as the SO's own models are used to calculate the target; in effect the SO is providing the key information that is used to set its own incentive target. We believe that it would be more appropriate for an independent party such as Elexon to hold the key information and run the models used to calculate the forecast target, and for an independent body to assess the SO's performance against the target. This independent body could be chaired by Ofgem with representatives from trade bodies such as Energy UK, the Renewable Energy Association, and organisations representing innovators, storage and other balancing services providers.

Detailed Response to Questions

Background and Objectives (Chapter 1)

Question 1: Do you agree with our objectives for the future SO regulatory framework? Are there any missing?

12. We agree with the proposed objectives for the future regulatory SO framework as described in paragraph 1.13: these objectives are designed to drive behaviour by the SO to maximise efficiency of the whole electricity system, support efficient trade-offs between operational and investment costs and give stakeholders confidence that the SO is acting transparently and in the best interests of the system and consumers. We believe these objectives cover the fundamental requirements for the future role of a legally separated SO.
13. 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 SO's future role may make this difficult: there is a 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 SO's key tasks i.e. ensuring security and stability

of electricity (and energy²) supply, optimising the costs of balancing the electricity system and facilitating competition on its and other electricity networks.

Question 2: How can we best transition to a SO regulatory framework which meets these objectives? When should changes be made?

14. We agree with the proposed timescale of legal separation of the SO by April 2019: all other changes, including licence changes, that need to be made to the regulatory framework for incentivising the separated SO are driven by this timescale. It seems appropriate that from April 2021, when the current RIIO transmission price control and the Electricity Market Reform (EMR) incentive scheme end, a consistent package for regulating all the SO's costs can be introduced.
15. We believe that Ofgem should introduce a new incentive scheme on NGET's external balancing costs from April 2018, before the legal separation in April 2019. It would seem appropriate to try to move towards the type of structure of the incentive scheme that would be best for the longer-term regulation of the SO's external balancing costs, for instance, this might be a more principles-based rather than a prescriptive incentivisation.

Review of the current framework (Chapter 3)

Question 3: What lessons can be learned from our previous approaches to regulating the SO? What are the key areas where changes might be needed in future?

16. The main lessons to learn from the previous approaches to regulating the SO are that the value to the system and consumers of the price control and incentive schemes is totally dependent on setting targets that are realistic and representative, and which promote the right behaviour by the SO to achieve them. Taking the Balancing Services Incentive Scheme (BSIS) as an example, this scheme relies heavily on setting a forecast target that is representative of outturn balancing costs – this is a difficult task to achieve as there are many factors that can lead to these outturn costs being much higher or lower than expected. Only some of these factors can be influenced by remedial actions taken by the SO. This has led to some years where the SO has easily met its target and earned the maximum incentive payment, and others when the SO has missed the target by a wide margin and had to make significant payments back to consumers.
17. So, an important lesson is that setting a hard target for incentivised balancing costs may not be appropriate, especially as we move to a system where balancing the system will be more complex due to more intermittent generation on the system and more generation/demand response connected at the distribution level. It would seem inappropriate for the SO to be incentivised on reducing balancing costs over which it may not have much direct control. A more effective approach might be to introduce a more principles-based form of regulation rather than hard targets for reducing balancing costs. One option is to base the target on a desired range of outturn costs with an ex

² There are potential implications for gas supply by the actions that the electricity SO takes to balance the electricity system.

post evaluation of how successful the SO was in acting to reduce balancing costs, taking account of any limitations or unforeseen events during the incentive period. The incentive period could be three-years (or longer) to provide the signals to the SO to take a longer-term view and avoid short-term actions that may increase costs in the long run.

18. Another important lesson is that there are too many separate incentive schemes: there is obviously a trade-off between introducing a variety of separate, meaningful and measurable incentives and trying to reduce complexity by reducing the number of incentive arrangements. We believe that the incentives placed on the SO to innovate and engage with stakeholders have worked well and should be continued.
19. Another important consideration is the assessment of performance against the incentive targets. It does seem perverse that the SO's own models are used to provide the key information used to set the target for incentivised balancing costs. A better solution would be for an independent party such as Elexon to hold the key information and run the models used to produce the forecast. It would also seem sensible for an independent body to assess the SO's performance against the target. This independent body could be chaired by Ofgem with representatives from trade bodies such as Energy UK, the Renewable Energy Association, and organisations representing storage and other balancing services providers.

Future Framework Design (Chapter 4)

Question 4: Do you believe we need to introduce more clarity about what we expect from the SO under its obligations? How should this clarity be provided? To what extent should we set prescriptive or principles-based requirements?

20. There are several ways that clarity can be provided to the SO: these can range from clearer licence conditions and guidance to setting hard targets, either financial or non-financial (e.g. KPIs). The ESC generally supports the move towards using 'principles based regulation', rather than a prescriptive rules-based approach, as the former provides more flexibility in meeting obligations and targets while still providing appropriate signals to govern behaviour and conduct.
21. 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. Given the complexity and breadth of the SO's role, it would seem appropriate to use a number of different approaches to regulate and incentivise it.

Question 5: Should we place financial incentives on the SO? If so, in which areas? And what form should they take?

22. It would seem inappropriate for the SO to be incentivised on managing costs over which it may not have much control and/or it is difficult to measure actual performance. We agree with Ofgem that the SO 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. This leads to the adoption of a more 'discretionary' approach, rather than 'target-based' incentive. However, a target-based incentive does provide the discipline to keep costs as low as possible, and so one option is a mix of both approaches where a target is set based on a desired range of outturn costs. Any incentive payment would be based on how successful the SO was in keeping outturn costs within the desired range plus an additional payment (or penalty) based on an ex post evaluation of how successful the SO was in acting to reduce outturn balancing costs, given the market and system conditions prevailing during the incentive period.

23. The ESC believes that it is important to continue to incentivise the SO on its performance in engaging customers and other stakeholders as this will help to drive competition, innovation and efficiency. A continuation of the financial incentive arrangements as included in RIIO-T1 would seem appropriate.

Question 6: Should we introduce more non-financial incentives on the SO? What approaches should be taken? Do you support the introduction of a set of KPIs, and if so, what should these KPIs be?

24. As stated above, we support a mix of approaches to incentivise the SO. Non-financial incentives can play an important role in incentivising effective behaviour, especially where there is a risk that poor performance will have a damaging reputational effect. We support the introduction of KPIs to evaluate the SO's performance and suggest that these are based on the four areas listed in the related Ofgem consultation: '*Future arrangements for the electricity System Operator: its role and structure*', where the SO's role needs to evolve to both facilitate and respond to a transforming electricity system i.e.:

- Improving the SO's performance as the residual balancer.
- Playing a greater role in the development of competitive markets.
- Taking a lead in whole system thinking and actions.
- Supporting competition in the delivery of new network capacity.

Incentive scheme governance (Chapter 5)

Question 7: How should SO incentives be governed in the future? Would you support a greater role for stakeholders in this process? How can we introduce more transparency around incentives?

25. The ESC supports a greater role for stakeholders in the governance of SO incentives going forward. As already stated, we suggest the formation of an independent body to assess the SO's performance against the external balancing target – this could be extended to cover other incentive arrangements. This independent body could be chaired by Ofgem with representatives from trade bodies and other energy industry organisations.