nationalgrid

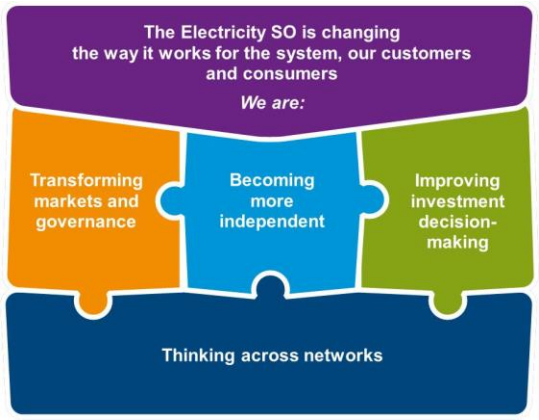
The future of the Electricity System Operator

Viewpoint on the regulatory and incentives framework

September 2017

This viewpoint is part of our customer and stakeholder engagement on the regulatory and incentive framework for the electricity system operator 2018-21. It focuses on the role of financial incentives in driving consumer benefits and considers where most value could be delivered for consumers from the incentive regime.

We welcome your views on the ideas in this paper.



1. Overview

Introduction

From April 2018 until the start of the next RIIO price control period in 2021, the electricity system operator (ESO) will be subject to a new regulatory and incentives framework (this will not affect the existing provisions in RIIO (Revenue = innovation + incentives + outputs) relating to the SO's internal operating costs and regulated rate of return)[1]. With the rapid introduction of new technologies and business models and the fast-changing operating environment, the period is a crucial one with the opportunity to deliver great value for consumers and society. The regulatory and incentives framework can support the new roles the ESO will play to facilitate industry transformation that works for all and can drive consumer benefits, harnessing the legal separation of the ESO in 2019. It also presents an opportunity to develop innovative new approaches that can be tested and evolved for the next RIIO price control period.

[1] For more details, please see Ofgem's February 2017 consultation document and July 2017 working paper at https://www.ofgem.gov.uk/publications-and-updates/future-arrangements-electricity-system-operator-regulatory-and-incentives-framework and https://www.ofgem.gov.uk/publications-and-updates/future-arrangements-electricity-system-operator-working-paper-future-regulatory-framework

We would like to understand the views of our customers and stakeholders on how the regulatory framework could drive consumer and customer value in the priority areas that customers have identified. This is part of our contribution to the dialogue on the potential new framework for ESO regulation. Ofgem's working paper[2], published in July 2017, sets out that the new framework is likely to include:

- New principles to clarify obligations on the ESO
- A process for stakeholder engagement, including the publication of regular reports and key performance indicators
- Monitoring and regularly published assessments of ESO performance
- Financial incentives to drive benefits for consumers

Alongside this viewpoint we have published an open letter response to the wider themes in Ofgem's working paper[3]. We welcome the opportunity to improve transparency and engage our customers and stakeholders to better serve their needs as part of this new framework. We are already redesigning our business planning and reporting cycles to support the proposed new framework and this year we intend to publish an initial draft of a forward plan for the ESO to support and complement Ofgem's further engagement with industry on the SO's regulatory framework and incentives.

In this document we focus primarily on financial incentives as an important driver of activity and behaviour that will reinforce the roles and principles for the ESO that have been developed by Ofgem. Well-designed financial incentives have a key role in aligning the interests of a shareholder-owned ESO with those of consumers. We hope this paper is a useful contribution to the debate.

The role of the ESO

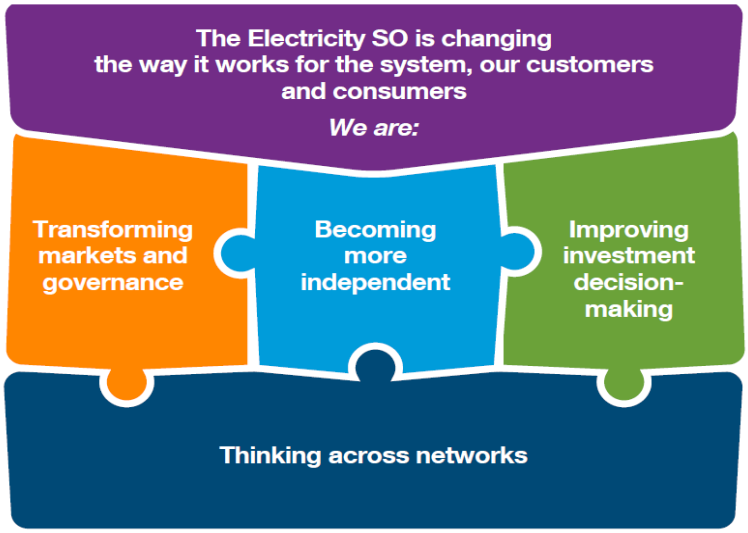
The ESO in Great Britain is a for-profit, shareholder-owned organisation that from April 2019 will be a legally separate entity within the National Grid group. The ESO makes sure that electricity is transported safely and efficiently from where it is produced to where it is consumed. We ensure that supply and demand are balanced in real time and we facilitate the connection of assets to the transmission system. We work with our customers and stakeholders to shape the future of the energy market, providing analysis and insight into the changing nature of supply, demand and networks. We also facilitate changes to the market frameworks to accommodate new technologies and ways of working, while considering how our own role should evolve over time. The role of the ESO is fundamentally linked to the underlying energy market structure and, as this has changed, the role of the ESO has grown and evolved.

[2] https://www.ofgem.gov.uk/publications-and-updates/future-arrangements-electricity-system-operator-working-paper-future-regulatory-framework

[3] http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/The-changing-Role-of-the-electricity-System-Operator/

The Future Role of the System Operator (FRSO) Programme was established by National Grid to ensure that the ESO is well placed to respond to the exceptional rate of change in the energy industry that we are currently experiencing. The transformational intent of the programme is summarised in diagram 1 below and with more information available on our website[4].

Diagram 1: Future Role of the System Operator programme overview



The role of financial incentives in regulating the ESO

As a monopoly, the ESO is regulated by Ofgem to ensure that it acts for the benefit of consumers. The regulatory and incentives framework is set up to ensure this happens by aligning the ESO's interests with those of consumers. Robust financial incentives have a crucial part to play in focusing the ESO on delivering benefits for consumers and driving transformational improvement above and beyond 'business as usual'.

In a market where firms are competing for customers, those who meet the needs of customers and provide a high standard of service are generally rewarded through more revenues and higher profits (than their less successful competitors). These profits are earned through winning new customers and retaining existing ones. Those who innovate or who can provide goods and services more efficiently than others may be able to capture additional rewards from these activities. This drives a focus on achieving high standards and innovation from such firms. In the absence of competitive pressures, these effects can be simulated for a regulated monopoly through the introduction of financial incentives. For example:

- Under a price control, a regulated company's expected efficient costs are set in advance and agreed with the regulator. The company may then be allowed to keep a portion of any further savings made on these costs in order to encourage efficiency. Conversely, the company may have to bear a portion of any overspend. The RIIO-T1 price control on the SO's internal costs is an example of this kind of incentive.
- Specific incentive schemes may reward the delivery of particular outcomes. The rewards to the company may be a function of the consumer benefits delivered. These may be subject to a cap and/or a floor to manage the risk and uncertainty associated with the incentive. The current balancing services incentive scheme (BSIS) on the SO is an example of this kind of incentive.

[4] http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589941069

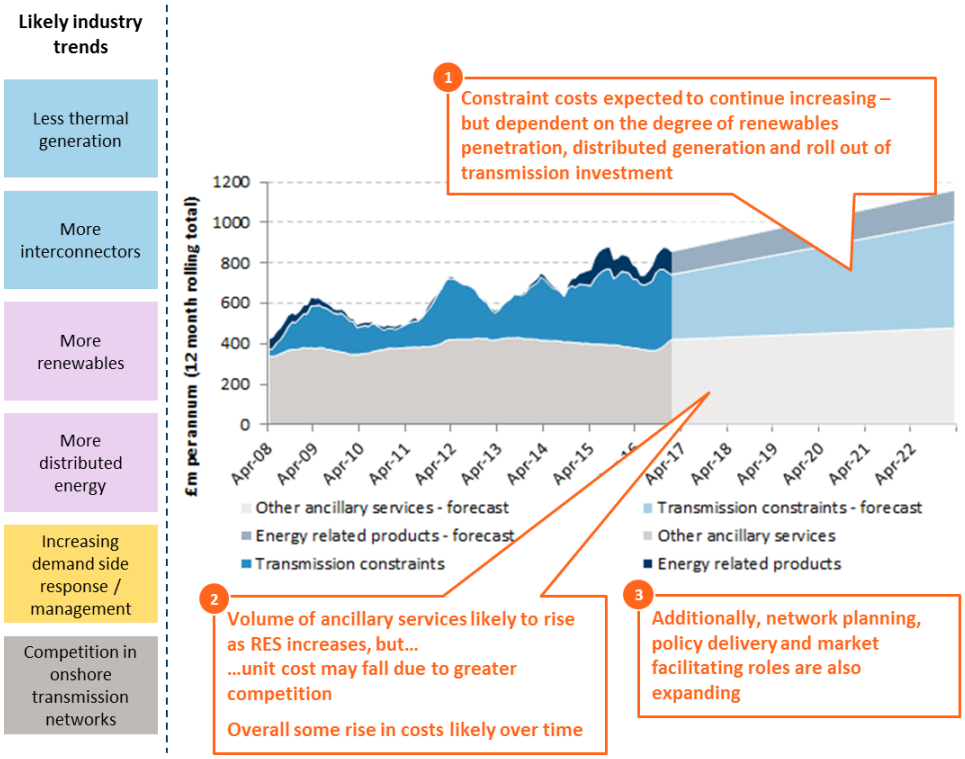
- Evaluative incentive schemes assess performance in a particular area after a set period and the regulator may decide to grant a reward payment if certain criteria have been met. An example is the RIIO stakeholder engagement incentive which rewards network companies for their stakeholder engagement performance, based on set criteria.

The first kind of incentive mimics the pressure that a competitive market places on companies to be more efficient, while the second and third could be used to drive innovation and better standards of service for customers. Outcomes-based incentive schemes such as those described in the second bullet above may be more applicable where such outcomes are measurable and where there is general consensus of the type of behaviour that will drive consumer benefit. More evaluative schemes may be used where direct outcomes are less measurable and/or quantifiable or when it is more difficult to define, with much precision, the behaviour which you want to incentivise. Regulators have generally preferred outcome-based incentive approaches as they set clear expectations for the regulated body which allows for a sharpened focus on performance against a benchmark.

Priorities for the 2018-2021 regulatory framework

The regulatory regime should focus the ESO to take action in areas where most consumer value is at stake. We have sought the views of customers and stakeholder as to which areas these might be. We have also analysed how the ESO's role might evolve without these actions, given the industry trends we are seeing. This evolution is shown in Diagram 2 below. Our analysis indicates that, all other things being equal, balancing costs could be on an upward trend.

Diagram 2: Possible evolution of costs borne by consumers under status quo assumptions



Source: FTI consulting

A review of incentive schemes for electricity system operators around the world, including independent system operators in the US, indicates that there are potential incentive designs that could help drive the ESO to tackle the upward pressures on costs, and target action at areas where potential consumer value is greatest. These areas of greatest potential consumer value include new opportunities for incentives to consider whole system (transmission and distribution) network planning, a revised and simplified balancing cost incentive scheme, SO-specific customer and stakeholder incentives and potentially a greater role in managing wider market issues for the benefit of consumers. The ESO's current incentives[5] do not cover the majority of these areas. To date, the focus of financial incentives has been primarily on constraint costs. Further benefits could be realised for consumers by using the tool of financial incentives more broadly to target actions in areas such as:

- a defined role in managing the EU relationship and related energy policies post BREXIT and incentivising wholesale market design initiatives
- new, longer term activities (e.g. market design changes) that will promote greater competition and economic signals to the market.
- a preliminary incentive structure in the SO's identification of system needs on an investment timescale
- SO stakeholder / customer specific engagement activities to develop industry wide cooperation etc.

We have looked at the areas where potential for consumer value is greatest and identified ESO activity that, potentially with associated incentives, could drive positive outcomes to realise this value. We then formed these ESO activities into packages of work that are outlined in the second part of this document.

Our proposals are wide-ranging, reflecting the focus of the new regulatory regime on the performance of the ESO across all of its roles and principles, driving results where there is the most consumer value to be gained. We have also considered how incentives could drive transformational change and consumer benefits in the longer term, consistent with the investment we are making in the Future Role of the SO Programme[6].

In its July working paper, Ofgem sets out seven proposed principles that would underpin four areas in which the ESO's role needs to evolve:

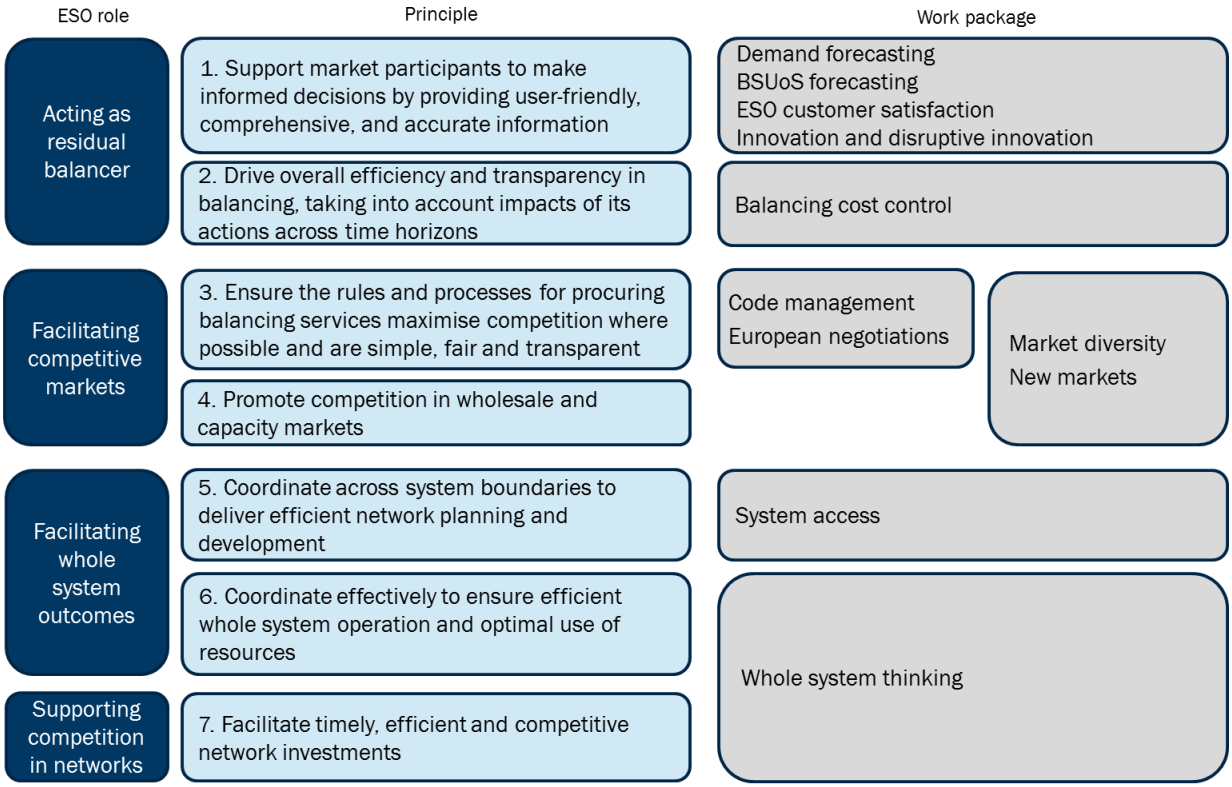
- Acting as a residual balancer
- Facilitating competitive markets
- Facilitating whole system outcomes
- Supporting competition in networks

The work packages we propose also align to the principles and roles in Ofgem's working paper as illustrated in the diagram below.

[5] For 2017-18 the ESO is subject to a one-year interim incentive scheme that consists of an updated Balancing Services Incentive Scheme (BSIS) modelled balancing cost target, an amended wind generation forecast incentive and introduction of a new system operator-transmission owner (SO-TO) funding mechanism to promote better SO-TO coordination as well as the existing suite of EMR incentives. For more information please see https://www.ofgem.gov.uk/system/files/docs/2017/03/final_proposals_for_electricity_system_operator_incentives_from_april_2017.pdf

[6] http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589941069

Diagram 4: alignment of work packages to ESO roles and principles



The 12 packages have not necessarily been designed to be taken forward at the same time. In particular, some may be combined or substituted for others (for example, the new markets and market diversity proposals). They form the foundation for work to consider which subset of proposals could form a coherent package of financial incentives within the overall new framework developed by Ofgem that will support and maintain the momentum for ESO transformation. We present them all in this Viewpoint document to help inform the debate and discussion on the role that financial incentives can have in helping to drive positive outcomes for consumers.

Our view, informed by discussions with our customers and stakeholders, is that there would be benefits to consumers in putting in place a regime that combines a small number of discrete, mechanistic incentives that drive a sharp focus in high-

value areas with wider, more evaluative measures that could capture the totality of the ESO's role. This would be in keeping with regulatory practice for comparable organisations to the ESO in other countries and sectors. We will share our further thinking on this later this year when we publish our draft forward plan for the ESO.

Across all of our thinking the concepts of transparency and consumer value have been paramount. We have developed our proposals with the customer in mind (while cross checking that customer value aligns with end consumer value). In keeping with our stakeholders' focus on cost, we have included options for incentives to manage the significant costs of balancing the electricity transmission system.

We have considered the lessons learned from previous incentive schemes and sought to identify where incentives can drive the biggest benefits for consumers in a transparent manner. As Ofgem set out in its working paper, the 2018-21 period could be used to try new, innovative regulatory approaches that could potentially form part of a more enduring regulatory scheme after 2021. Some of our incentive ideas also

promote a trial approach by encouraging new ways of working, for example across the boundary between the transmission and distribution systems, or in code management.

We welcome views on the proposals in the second part of this document, and any further thoughts on what the ESO should prioritise during the 2018-21 period, and how the regulatory framework could support this. In particular, for each proposal:

1. Would the proposal contribute to achieving the principles?
2. Would the proposal deliver customer and consumer value?
3. Do you agree with the proposed incentive structure? Can you foresee any unintended consequences of an incentive in this area?

We would also be grateful for views on:

4. How could we ensure that a package of incentives taken from our proposals drives the desired behaviour in the ESO and delivers positive outcomes for consumers?

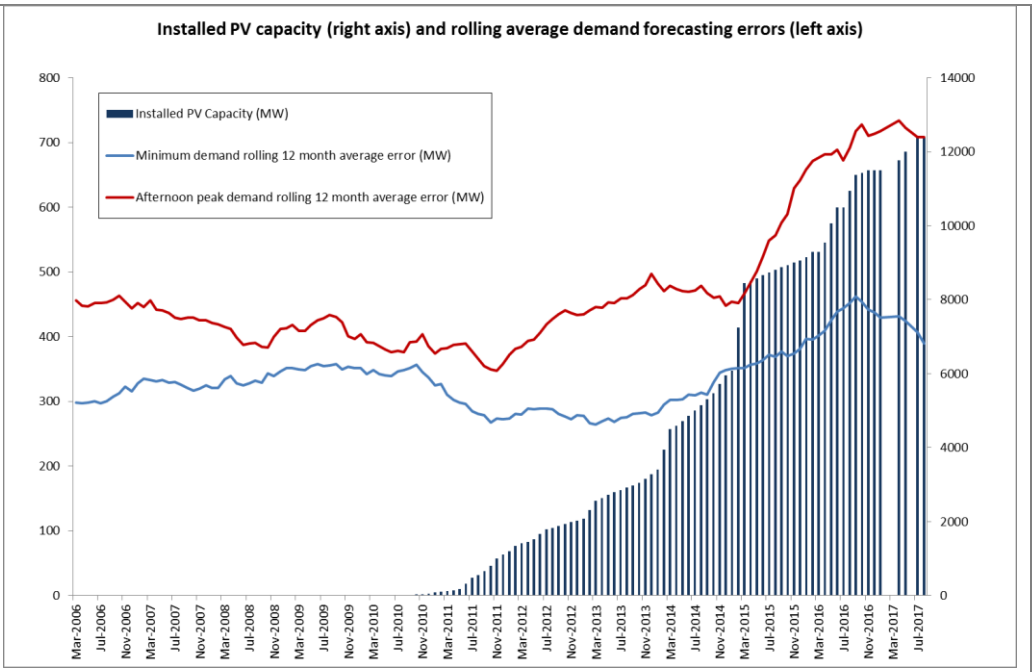
Please email these to box.soincentives.electricity@nationalgrid.com by 16 October.

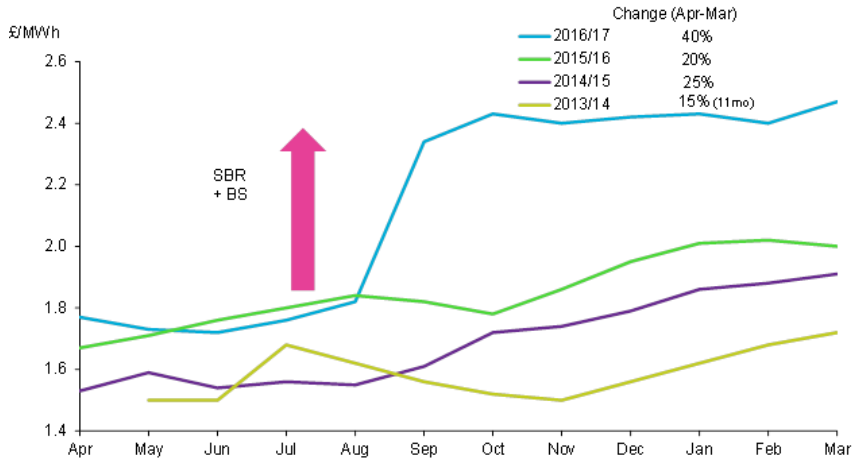
Next steps

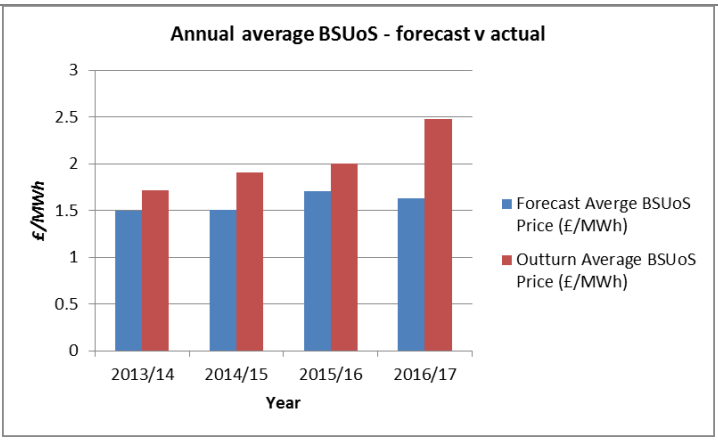
The new regulatory regime for the ESO will be in place from April 2018. Ofgem intend to consult on the proposed framework later in the year with a statutory consultation on changes to the SO licence being published by the end of 2017. This year we intend to publish an initial draft of a forward plan for the ESO that will show how our core roles plus incentivised activities can deliver against our principles. We will seek views on our draft plan to support and complement Ofgem's further engagement with industry on the SO's regulatory framework and incentives. We hope that this paper, alongside additional feedback from customers and stakeholders, will provide a useful input into this work.

2. Work package and incentive proposals

Work package	Electricity Transmission Demand Forecasting
Objective	To improve forecasting capability and accuracy.
Principle	Support market participants to make informed decisions by providing user-friendly, comprehensive, and accurate information
Rationale	The ESO needs to support market participants to make informed decisions by providing user-friendly, comprehensive and accurate information. One of the areas in which we can do this is through improvements in electricity transmission demand forecasting. The demand forecasts (including individual weather components) provided by National Grid to the market have a direct and significant impact on the end consumer as less accurate forecasts can potentially lead to: • Higher risk premia on all contract types to mitigate financial exposure to within-day price volatility. • An 'uncertainty premium' on balancing prices (as a higher proportion of actions are taken closer to real time) and an increase in balancing actions (as demand forecast inaccuracy feed directly into reserve holdings). This increase compounds the effects of higher balancing costs introduced from heightened intermittency. • Lower market efficiency (including greater imbalance) particularly for smaller participants who lack the ability (or funds) to employ meteorologists/purchase additional forecasts. • Potential for capacity market procurement inefficiency through inaccurate longer term forecasts The level of accuracy needed from our forecasts to minimise these impacts is difficult to achieve and therefore investment is required in new techniques, utilising industry leaders to review fundamental forecasting principles. As such, extensive changes are required across the whole supply chain requiring a strong incentive to drive this. The graph below reviews forecasting performance, as measured by a rolling average forecasting error for minimum and afternoon peak demand. It shows an increase in the afternoon peak demand error that correlates with the growth in embedded solar photovoltaic (PV) capacity. A review of the error in our forecasts for minimum demand (overnight), where PV is less of a factor, shows a smaller increase which is related to the growth in embedded wind and other non-weather dependent embedded generation.

	 Improved transmission demand forecasting could potentially benefit charging forecasts and network investment decisions in the medium to longer term. This could also facilitate aims aligned with whole system objectives. Ultimately, a strong financial incentive to deliver a step-change improvement in the accuracy and utility of our forecasts to the market would drive increased investment in tools and capability needed to protect the consumer against the material risks of inaccuracies growing as the volume of distributed weather-dependent generation increases.
Consumer Benefit	Inaccurate energy forecasts can result in suboptimal procurement of balancing services by the ESO and inefficient balancing actions being taken by the market. These additional costs are subsequently borne by the consumer. Initial analysis indicates that a reduction in the mean absolute error of the day-ahead forecast by 200MW (closer to previous levels) could see savings of £15-20m pa from balancing actions alone. Total consumer benefit from improvement in energy forecasts at all relevant timescales is estimated to be multiple tens of millions per annum.
Potential structure of incentive	Incentive based on a measure such as the mean absolute error of transmission system demand, potentially weighted to forecasts with greatest market impact and benchmarked against competitor forecasts.

Work package	BSUoS Forecasting Accuracy
Objective	Drive a step-change in Balancing Services Use of System charge (BSUoS) forecast accuracy to reduce risk premia applied to consumer bills and allow stakeholders to reflect the BSUoS price in their submitted prices.
Principle	Support market participants to make informed decisions by providing user-friendly, comprehensive, and accurate information
Rationale	The ESO needs to support market participants to make informed decisions by providing user-friendly, comprehensive and accurate information. One way in which this could be done is through more accurate BSUoS forecasting. The BSUoS forecast is used by customers and consumers to provide a forward view of BSUoS charges which are then reflected in the generators' prices and consumer bills. This is one of the key interactions with our customers and can influence their pricing and operational behaviours. Customers have told us that they see two main issues with our BSUoS forecasts. First, as shown by the graph below, the estimated annual charge is subject to some volatility throughout the year with a tendency to be underestimated at the beginning of the year. (The increase in the forecast annual charge in 2016-17 was due to one-off changes in supplemental balancing reserve and black start costs). In-year forecasts of Annual Average BSUoS  Secondly, overall, our forecasts tend to underestimate BSUoS (as shown by the graph below).

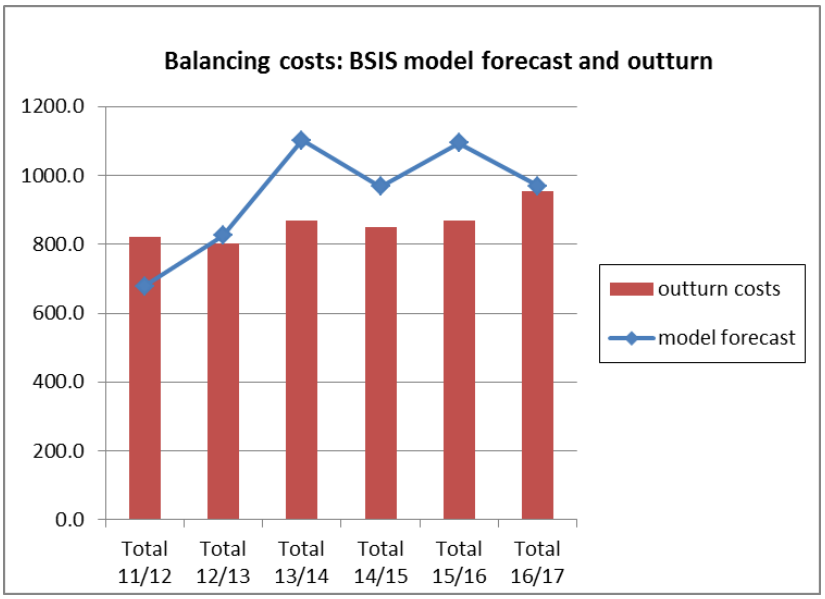
	 Customers through industry workgroups, including a live CUSC modification, have requested that BSUoS prices be fixed to manage the uncertainty of the charges. In the absence of a change in the legal framework[7] to fix BSUoS charges, an appropriate incentive would further encourage the development of better forecasting within the ESO, therefore providing more effective guidance to market on the likely BSUoS charges on a daily, monthly and annual basis. Additional investment or incentives could enable the provision of additional forecasts such as half-hourly forecasts. An incentive would also encourage greater focus on factors that contribute to BSUoS costs that may be brought more under the control or influence of the ESO such as TO outage management.
Consumer Benefit	Consumers benefit depending upon the structure of the contract with their supplier. • Consumers with "pass-through" contractual arrangements benefit from greater transparency and certainty of their costs due to an improved forecast by the ESO; whereas • Consumers on fixed or variable term contracts benefit from greater certainty of costs being provided to their supplier resulting in greater competition and the reduction of risk premia within their pricing. Additionally all consumers benefit from the reduction of risk premia for BSUoS within the wholesale price enabling marginal plant to more effectively understand their costs. Generators would benefit from a more accurate BSUoS forecast, as they would be more able to reflect the BSUoS price they are exposed to in their prices.
Potential structure of incentive	Incentive based on an accuracy measure, potentially weighted to forecasts with greatest market and consumer impact. The structure would need to be sufficiently flexible to accommodate potential future changes in the structure and application of BSUoS charges.

[7] Any such change requires approval by Ofgem as to whether it better meets the applicable CUSC objectives in comparison to the status quo. We also anticipate that it could take up to 12 months to implement and would need to take effect from the start of a charging year (April).

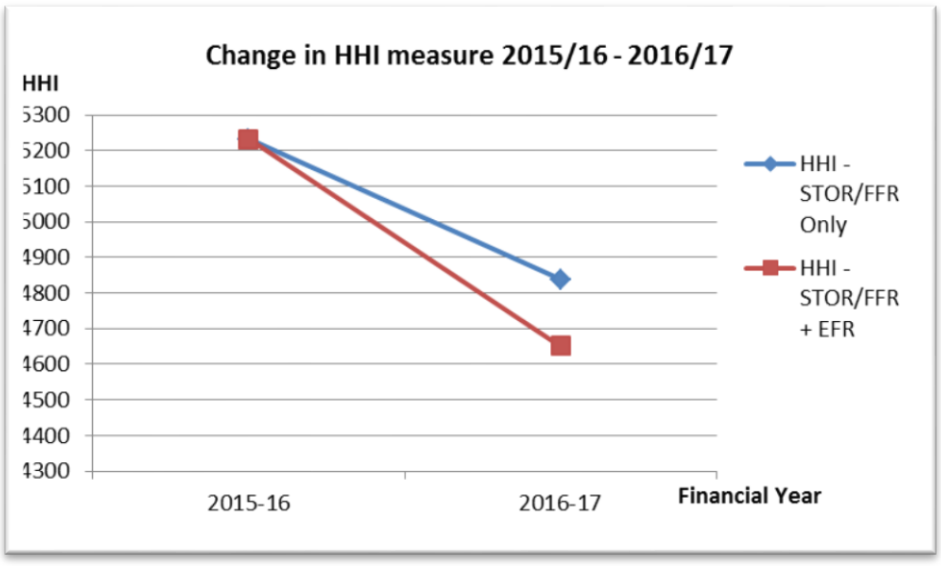
Work package	ESO Customer Service Improvements
Objective	Delivering an improved level of customer service and high quality outcomes for customers
Principle	Support market participants to make informed decisions by providing user-friendly, comprehensive, and accurate information
Rationale	The ESO has many customers to whom we directly provide services. We strive to provide great service to our customers and are continually looking for ways to improve. An incentive in this area will drive transformational improvement and place a transparent and fair monetary value on our level of service to customers. This incentive would be targeted at the services we provide that are most important to our customers, and it would drive innovation and customer service improvements in the specific areas of our role where customers would like to see step-change improvements. Examples could include improvements to the transmission connections process or progress made in transforming and simplifying our commercial products and services. After legal separation of the ESO from the transmission owner (TO) business, this incentive would be consistent with existing customer satisfaction incentives for the three onshore TOs, but with specific regard to areas which are within the control of the ESO and most relevant to our customers. There could be merit in putting the new arrangements in place before legal separation of the ESO in April 2019, for example in April 2018, so that consumers can start benefiting from the focus the new arrangements will bring as soon as possible.
Consumer Benefit	The consumer benefit of such an incentive would be derived in a similar manner to the consumer benefits derived from the existing customer satisfaction incentives. Improvements made to services which are of material interest to our customers would then allow them to add value to their own customers who are ultimately consumers. The customer satisfaction survey scores would therefore be used as a proxy for increased consumer value.
Potential structure of incentive	Incentive based on an average customer satisfaction survey score for the ESO across the survey base – there will be a benchmark score at a zero value with a plus or minus (with cap and collar) based upon customer feedback.

Work package	Innovation
Objective	To ensure that Innovation is delivered to the highest standard possible and delivers a maximum return on investment (ROI) to consumers.
Principle	Support market participants to make informed decisions by providing user-friendly, comprehensive, and accurate information
Rationale	The ESO needs to *drive overall efficiency and transparency in balancing, taking into account impacts of its actions across time horizons.* One of the areas in which the ESO can do this is through improvements in assessment and delivery of innovation projects. There are criteria in place for which projects can use the network innovation allowance (NIA); particularly the type of projects that can be approved for funding. However there is currently less accountability for how effectively this funding is being used to deliver benefits to consumers. This incentive ties the amount of NIA funding available directly to the innovation portfolio's performance; measured against a set of KPIs for delivery and amount of consumer value created. This goes beyond merely assessing the criteria for project eligibility and rewards *how* the innovation portfolio (as a whole) has delivered maximum benefits to consumers. This requires more accountability in the innovation process, including a robust methodology for assessing which projects should be approved. The ESO will need the ability to baseline consumer value cases, careful tracking of metrics to measure success rates (for project delivery, and implementation of successful outcomes), and resources to measure if this value has been realised (verifiable by an auditor). Greater efficiency in the portfolio will improve consumer return on investment. Projects which are assessed as no longer delivering sufficient value will be closed early (a fail-fast methodology), and allow funding to be re-prioritised toward projects with higher cost-benefit scores, thus making the best of the available budget. The better a portfolio delivers against key performance indicators (KPIs), the more funding will be available for future innovation. By rewarding high performance, the benefits of a successful innovation process can be compounded and more resources made available to focus on delivering the benefits for consumers. A rigorous consultation process with Ofgem and other stakeholders will ensure details of this incentive reflect a suitable balance of risk vs. reward for a successful innovation portfolio.
Consumer Benefit	Maximises the value returned to consumers from innovation funding: • More effective delivery (more consumer value realised, sooner) • More efficient use of consumer money • Greater transparency on how consumer funds are used Innovation is focused on consumer priorities, e.g. Reducing carbon on the network, lowering the cost of constraints, improving future stability and security of the network.
Potential structure of incentive	Incentive based on KPIs for project delivery and value, potential measures such as consumers' return on funding.

Work package	Innovation: Disruptive Bonus Incentive
Objective	To encourage the SO to take risks on high-reward/low-probability (disruptive) innovation projects, where step-changes in performance can be achieved.
Principle	Support market participants to make informed decisions by providing user-friendly, comprehensive, and accurate information
Rationale	The ESO needs to drive overall efficiency and transparency in balancing, taking into account impacts of its actions across time horizons. One of the areas in which the ESO can do this is through undertaking more disruptive innovation projects. When performance targets are set and rewards capped, SO incentives often don't reward 'step-changes' in improvement. Unless the business is able to justify additional risk from disruptive projects, the value to consumers will be limited to smaller, incremental benefits, distributed over an extended period. Step-change disruption is a hallmark of innovation activity where high-risk projects are able to achieve high-value benefits for consumers. By focusing 'disruptive innovation' towards outperforming the targets set in other incentives, the chances of larger, more immediate savings for consumers are improved. Recognising such an approach will help the ESO make more dramatic changes that otherwise might not reflect the wider business' risk profile. The higher risk is a consequence of lower probability of success, or unforeseen consequences to activities beyond the predicted scope. Therefore the ESO should be encouraged to pursue innovation projects that meet the agreed criteria for high-risk/high-reward, and which have a reasonable link to outperforming an incentive cap. A strict and unequivocal criteria for disruptive innovation is required (a risk/reward profile) as well as a robust assessment of the benefits case for projects. Clear alignment is needed between the innovation process and business areas where outcomes are to be implemented and realised. Accurate tracking of the value delivered will increase the business justification for disruptive innovation and improve transparency in how consumer benefits are being delivered by the ESO.
Consumer Benefit	Disruptive Innovation means distinctively different ways to work, which ultimately may be the best opportunity for strong savings for the consumer. Disruptive step-changes to ESO processes, systems or services have the potential to deliver larger, more immediate savings to consumers. This incentive will improve the viability of business cases for disruptive innovation, which will help success rates for project delivery and implementation of outcomes into business-as-usual activities, ensuring the most value from large performance improvements can be passed onto consumers.
Potential structure of incentive	Bonus reward added to existing incentive mechanism.

Work package	Balancing services cost control
Objective	To incentivise effective management of balancing costs and drive efficient and innovative approaches towards procurement and utilisation of balancing services within an increasingly challenging operating environment.
Principle	Drive overall efficiency and transparency in balancing, taking into account impacts of its actions across time horizons
Rationale	The electricity system operation role has evolved in recent years and is continuing to evolve under the FRSO programme. Despite this, a core function of the ESO continues to be the maintenance of safe operating limits on the electricity transmission network through real time balancing, procurement and utilisation of balancing services. The ESO's incentives have historically been largely focussed on this element of its role. While the ESO's wider roles now require a broader range of incentives, perhaps with proportionately less focus on real-time balancing, an incentive on real-time balancing should remain in place to ensure a sharp focus on economical and efficient balancing of the system, taking into account the impact of balancing actions across time horizons. The graph below shows the ESO's annual performance against the balancing cost forecasts set by the BSIS model since 2011/12. Where the ESO has reduced balancing costs against the forecast, money has been saved for consumers. Recent amendments to the forecast have illustrated the increased volatility and difficulty in forecasting costs under the current methodology.  The ESO has continued to develop and adapt its approaches to balancing the system in response to new challenges and opportunities. This includes new technologies and a changing technology mix, evolving geographic distributions of supply and demand, etc. While the ESO has resources in place to manage balancing costs in real time and to identify opportunities and threats on the horizon, the proposed incentive will challenge the ESO to

	continue changing and adapting its approach in order to benefit from the incentive scheme. It is recognised that 'standing still' will not be sufficient to maintain operating costs at an efficient level within this rapidly changing operating environment.
Consumer Benefit	Consumers will benefit directly from the ESO's sharpened focus on maintaining efficient balancing costs under an incentive. Every pound saved by the ESO as a result of its optimised approach will result in lower costs for consumers. While an incentive scheme will allow the ESO to capture a percentage of this benefit (with this level dependent on the scheme parameters that are applied), the remainder will result in a direct reduction in costs to consumers.
Potential structure of incentive	We have developed some potential options for a balancing cost incentive which we consider merit further development. These options fall under one of two high level designs: 1. **A simple target-based incentive**: Under this approach, a simple target for balancing costs would be identified through an Ofgem-approved methodology. Final cost performance would then be compared against this target and the ESO would share a percentage of the over- or underperformance. While this approach is conceptually similar to the current BSIS scheme, a new, simpler methodology for setting a target would improve the transparency and legitimacy of the scheme. 2. **A hybrid incentive**: Under a hybrid approach, a scheme would be partly based on an agreed target as above. However, this would be supplemented by a more 'evaluative' element of the incentive scheme which would allow for ex-post assessment of performance based on agreed up front evaluation principles and processes. This would allow for more in depth consideration of external factors and wider delivery of consumer benefit in addition to balancing cost minimisation.

Work package	Market Diversity
Objective	To drive increased diversity of participants/technologies within the Balancing Services market, by reducing and/or removing barriers to entry in the short to medium term.
Principle	Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent Promote competition in wholesale and capacity markets
Rationale	The ESO role needs to evolve in facilitating competitive markets. The ESO's knowledge of the market and system balancing means that it is well placed to understand the interactions between the different market arrangements and rules, and how we need to adapt to support effective competition, innovation and better outcomes for consumers more generally. The ESO can take a more active role in influencing the future development of these markets and ensure that the rules and process for procuring balancing services maximise competition where possible and are simple, fair and transparent. One way in which this could be done is through promoting and achieving increased diversity in balancing services markets. The graph below shows the Herfindahl-Hirschman index[8] (HHI) for participation[9] in short-term operating reserve (STOR), firm frequency response (FFR) and enhanced frequency response (EFR) markets. While the markets have become less concentrated (and therefore potentially more competitive) between 2015-16 and 2016-17, the index still implies a relatively concentrated market.  There is value in having a diverse range of market participants from both a

[8] The Herfindahl–Hirschman Index is a measure of market concentration. It is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers. The maximum index is 10,000 when a market is dominated by a single firm. The smaller the index, the less concentrated the market is.

[9] Participation measures number of parties who have been tested and have the capability to participate in the market, rather than those with contracts

	cost and security perspective. Actions taken to develop increased diversity accrue benefit to consumers over a longer timescale. Acceleration of ESO works to make market data more transparent coupled with the removal or reduction of barriers to entry could drive market diversity and the resulting consumer benefits. This focuses on participation of providers in service provision rather than actual procurement to ensure that procurement remains technology neutral. If diversity is not valued or pursued: • The market may not transform within a short timescale. • Market inefficiency may increase as the number of traditional providers/technologies decrease and the services may become less relevant to system needs. • Speed at which transparency of information is delivered may lag the needs of would-be new market entrants. • Consumer benefits would not be fully realised.
Consumer Benefit	Consumers benefit from diverse, thriving, competitive markets. The consumer could potentially benefit from an estimated cost saving of a small percentage in balancing spend, for example on products such as frequency response and short-term operating reserve. Savings of 3% on response and short-term operating reserve costs could equate to £6.5 million in a year. A more diverse market would produce efficiencies and deliver cost benefits to the consumer. An additional intangible consumer benefit around security is also supported by a wider diversity.
Potential structure of incentive	Target-based, using a metric of diversity (for example, Herfindahl-Hirschman index)

Work package	New Markets
Objective	To drive development of more competitive balancing services markets in the medium to longer term.
Principle	Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent. Promote competition in wholesale and capacity markets
Rationale	The ESO can take a more transformational role in shaping the future development of these markets and ensure that the rules and process for procuring balancing services maximise competition where possible and are simple, fair and transparent. One way in which this could be done is to drive the ESO to deliver a more fundamental and ambitious change programme for each balancing service product, with a goal to achieve discrete, transparent and competitive markets for each service delivering long term consumer value. Current areas perceived as barriers to competitive markets: • Each Balancing Services requirement is currently procured across multiple platforms and timeframes (balancing mechanism, trades, bilateral arrangements, optional contracts and tenders). This approach may be perceived as a blocker to transparency and fully competitive markets. • There is a bias towards low risk decisions when we have more certainty of actual requirements close to real time. • Current optimisation approach is also perceived to be “polluting” markets, for example, if we buy a service for voltage management that results in synchronising a generator, then we may also use it to provide frequency response once it is synchronised to the system. Activities to enable transformative change to markets and removal of barriers: • Greater market transparency through more clear accessible data • Standardisation of products and markets • Development of new procurement approaches • DSO coordination and whole system approach to markets • Creation of new markets (e.g. using distribution solutions to manage transmission constraints)
Consumer Benefit	Consumers benefit from diverse, thriving, competitive markets. Longer term consumer value is driven through better more efficient markets in the medium to longer term. This is a transformational change which supports the ESO leading market development. A longer (than 2021) time horizon would deliver full benefits but staged delivery would allow incremental development of the markets to work towards the final vision through the T2 period.
Potential structure of incentive	Target-based, using a metric of market diversity and concentration (for example, Hirschman-Herfindahl index or similar) and potentially a measure such as the % volume requirement procured through market. Markets potentially in scope would be Response, Reserve, Reactive Power, Black Start and Constraint Management. Specific targets would be required for each market dependent on current state of play.

Work package	Code Manager
Objective	To trial the role of code manager and to deliver strategic code priorities and cross code coordination.
Principle	Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent
Rationale	In a recent open letter[10] Ofgem stated that it saw benefits in trialling potential measures to improve code governance and the delivery of strategic change that benefits consumers. This work package could enable the ESO to support this through potentially taking on a proactive 'code manager' role that can deliver strategic code change priorities for the codes that it currently administers. The full role of the code manager (including the associated licencing and incentive regime) has not been defined by Ofgem, so work needs to be done to specify the aspects that could be covered by this new role. This will: • Deliver stronger and more focused management of industry codes to remove barriers and deliver market change more efficiently; • Help deliver Government, Ofgem and Competition and Markets Authority (CMA) objectives; and • Support the new roles we will play under the FRSO programme. The ESO is well-placed to potentially trial this new role of code manager as the only code administrator with a licence that can be strengthened in order to implement this change without primary legislation. This proposal provides an opportunity to pilot the Code Manager role and supporting incentive model in the near-term, capturing benefits early and applying the learning to the design and implementation of future code management reforms. An incentive will drive the ESO to deliver strategic changes and ensure delivery of the changes that are required to drive benefit for the consumer, as envisaged by the Ofgem consultation on these code reforms.
Consumer Benefit	The role of the code manager has been identified as a remedy to the Adverse Effects on Competition identified in the CMA published on the 17th March 2016. This new role will drive an increased pace of change in industry governance processes and therefore remove the barriers to delivery of Government and Ofgem policies, and their associated consumer benefits. With code managers given accountability for driving timely and effective change in the codes, policies benefiting consumers, such as the Targeted Charging Review (TCR), will be implemented faster and more efficiently. For example, by exploring innovative ways to facilitate greater access to code processes for all the proposal could promote code change solutions that are more representative of the industry, and enhanced market participation and competition in the energy markets leading to reduced costs for consumers.
Potential structure of incentive	Balanced scorecard approach based on elements such as customer satisfaction (survey measure) and delivery of KPIs.

10 https://www.ofgem.gov.uk/system/files/docs/2017/07/update_on_the_implementation_of_the_code_governance_remedies.pdf

Work package	European Negotiation
Objective	Represent British interests in European negotiations to seek to minimise or prevent bill increases generated by proposed changes or maximise bill savings.
Principle	Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent
Rationale	British stakeholders, customers and end consumers face a great deal of new European energy laws and regulations that may bring significant benefits in the form of lower costs. However inadequate legislation, or legislation that does not consider the specificities of the GB Energy System, also presents significant cost risks to the end consumer. National Grid is currently active in European negotiations, carrying out a market facilitation role as a 'thought leader', providing market insight and influencing the future agenda. An incentive in this area would provide National Grid with a clear mandate from the GB Energy Market to lead the debate on behalf of GB stakeholders, customers and consumers. By clearly agreeing negotiation priorities and strategy in collaboration with customers, consumer panels and Ofgem, the ESO can be accountable for consumer outcomes, demonstrate the value delivered for consumers and receive recognition for this work. This would lead to greater alignment between the ESO and consumers' interests. Customers and stakeholders tell us that we should be more proactive and use our expertise to help them navigate through complex systems or processes to achieve the right outcome. By demonstrating our ability to translate complex legislation into what GB should focus on for the sake of the consumer, we will strengthen our reputation going forward. The addition of an incentive will drive the ESO to do more than just comply with the requirement to lobby on behalf of consumers; this will fit with legal separation of National Grid's TO and SO and the FRSO programme. The SO is in an ideal position to take on this extra responsibility as it already has European Network of Transmission System Operators for electricity (ENTSOE) membership and a licence requirement to consider the impact on the GB consumer. In future, more European engagement may be required, should the outcome of the Brexit negotiations result in a diminished voice for GB in Europe, requiring greater influencing and relationship building for GB to indirectly influence on European issues.
Consumer Benefit	Our role would be to represent wider GB and in particular consumer interests in European negotiations – we would seek to minimise or prevent bill increases generated by proposed changes or maximise bill savings. The potential benefit to the consumer is considerable; all eligible issues would be prioritised by value of their potential for a positive impact or risk mitigation of negative impact on the energy cost element of the consumer's energy bill. Our intent will be to win as a minimum, a fair outcome for GB consumers as a whole, but to always strive for the most favourable outcome in terms of impact to their energy bill.
Potential structure of incentive	Ex-post reward based on delivery of defined benefits as a result of a specific negotiation outcome.

Work package	System Access
Objective	To reduce within-year outage constraint spend and stabilise the outage plan for third parties
Principle	Coordinate across system boundaries to deliver efficient network planning and development
Rationale	This incentive seeks to focus the ESO to reduce the constraint cost and volume of within-year system access outage requests, and to increase the stability of the TOs' outage plans. The ESO has an over-arching view of the GB outage plans; how the outages interact; and their impact on system operation and associated costs. An explicit incentive will shape the movement of the ESO towards a more proactive role of managing the system access plans with the TOs. The incentive will change the behaviour of SO-TO interaction through focussing attention on the stability of the year-ahead plan. The ESO will report on the volume and associated constraint cost of all within-year outage requests (including ESO generated requests), in order to create visibility into year-on-year within-year costs, to help drive the behaviour of all stakeholders to reduce this cost, for example through joint-working at Network Access Policy forums. • Cost and volume of system access change will be reduced through better year-ahead planning/placement/optimisation activity, resulting in fewer within-year outage requests. • The scheme will help to demonstrate the ESO's leadership role as we move to legal separation. • There will be increased transparency to industry through published reporting, including visibility of the ESO treating all transmission owners equally. • There will be reduced re-work in the ESO due to decreased plan-churn.
Consumer Benefit	• Saving in BSUoS costs due to reduction in the number of newly requested constraint-causing outages accepted into the plan within-year. • Stability of outage plan aids third parties and customers, eg. Generators and distribution network operators (DNOs) can operate more efficiently and effectively due to less change to their operational plans. • Scheme would demonstrate an independent, pro-active, consumer and customer focussed System Operator. • Less new outage requests would free ESO resources to focus on more value-add activity.
Potential structure of incentive	Reward based on measure of reduction in year-on-year within year suboptimal outage change (and constraint spend) as a direct result of ESO actions.

Work package	Whole System thinking
Objective	Incentivising the ESO and other parties to adopt more whole system thinking
Principle	Coordinate effectively to ensure efficient whole system operation and optimal use of resources Facilitate timely, efficient and competitive network investments
Rationale	The ESO needs to engage in more whole system thinking. There is a need for greater co-ordination across transmission and distribution systems to ensure efficient whole system operation and optimal use of resources. This is a transformational step change in the current ESO ways of working, which currently focuses on delivering an efficient GB transmission network. The ESO currently has a role in assessing the value of investment on the transmission network. By enabling more of a whole system view to be taken, a broader range of solutions will be able to be assessed in response to system issues. For example, distribution network solutions to resolve transmission operability issues. This will increase the chances of an optimal solution being chosen, leading to consumer benefits over and above those which would be delivered in the counterfactual scenario where whole system considerations are not incorporated. A strong incentive framework would drive transformational and innovative behaviour in the ESO and market participants to seek and cheaper, flexible solutions deliverable in shorter timescales. A regulatory framework to deliver whole system (transmission and distribution) solutions could be put in place. This would enable increased levels of cooperation and new approaches to be trialled compared to those within the current regulatory framework. It would build on current trial projects such as the Power Potential[11] project. This framework should be adaptable and applicable to different issues and challenges where benefits can be delivered from whole system thinking. Three areas that could be specifically incentivised are reactive power procurement, rate of change of frequency management and the Network Options Assessment process.
Consumer Benefit	There would be direct savings for consumers as a result of more efficient solutions being implemented in network management. In addition to these, there would be indirect benefits to the consumer through increased network competition, reduced costs, quicker access to the network and lower CO_2 emissions.
Potential structure of incentive	Framework to encourage participation and reward delivery of outputs, for example, aligned or shared incentive schemes across parties for specific schemes.

[11] http://nationalgridconnecting.com/power-potential-ready-make-name/

3. We welcome your views

In this document we have outlined 12 work package proposals with associated incentives that could reinforce positive outcomes for consumers against the roles and principles for the ESO that Ofgem has proposed for the 2018-21 period. We welcome the views of our customers and stakeholders on these proposals. Specifically, for each proposal:

1. Would the proposal contribute to achieving the principles?
2. Would the proposal deliver customer and consumer value?
3. Do you agree with the proposed incentive structure? Can you foresee any unintended consequences of an incentive in this area?

We would also be grateful for views on:

4. How could we ensure that a package of incentives taken from our proposals drives the desired behaviour in the ESO and delivers positive outcomes for consumers?

Please email these to box.soincentives.electricity@nationalgrid.com by 16 October.