

**Electricity System
Operator Forward
Plan 2018/19:
Delivery Schedule**



Our roles, principles and key outcomes

Here we provide a snapshot of our plan. More information can be found in the following pages and full details of the metrics can be found in the Performance Metrics Definition document.

Principle 1: Support market participants to make informed decisions by providing user-friendly, comprehensive and accurate information

- Improve confidence in our forecasts.
- Increase transparency of ESO balancing decisions.
- Develop our information portals and events.
- Efficient management of the costs of balancing the system.

Principle 2: Drive overall efficiency and transparency in balancing, taking into account impacts of ESO actions across time horizons

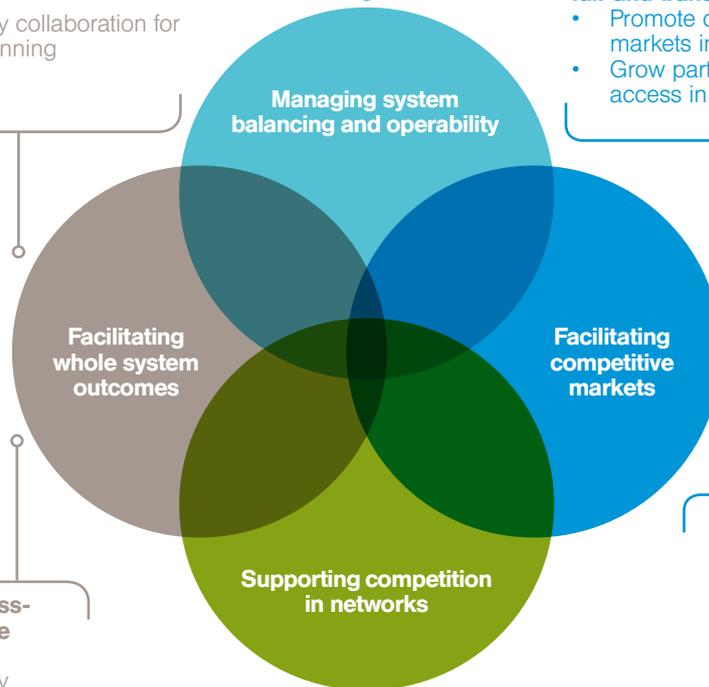
- Increase transparency of ESO balancing decisions.
- Solve operability challenges and preparing for the future.
- Develop our information events.
- Efficient management of the costs of balancing the system.

Principle 5: Coordinate across system boundaries to deliver efficient network planning and development

- Maintain and improve the quality of our insight publications.
- Improve our cross-industry collaboration for whole system network planning and development.

Principle 3: Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent

- Promote competition and develop new markets in balancing services.
- Grow participation and promote fair access in provision of balancing services.



Principle 6: Improve our cross-industry collaboration on the whole system

- Improve our cross-industry collaboration on whole system.
- Implement learning from our major innovation projects.
- Improve the service and information for new connection applications.

Principle 4: Promote competition in the wholesale and capacity markets

- Continual improvement of network charging processes.
- Facilitate the development of the code and charging framework.

Principle 7: Facilitate timely, efficient and competitive network investments

- Improve the Network Options Assessment models and methodologies to support ECIT.

70+ deliverables driving consumer value across seven principles.

See the following pages and Performance Metrics Definition document for full details.

Overarching consumer value

The complex, rapidly changing energy landscape can be enhanced by an optimally flexible electricity market and joined to a ‘Smart Power¹’ future including interconnection, storage and flexible demand to realise benefits of up to £8 billion per year from 2030.

Our Delivery Schedule sets out the work we will undertake to start to unlock this consumer benefit. It is important to understand that much of the groundwork we will cover in the next few years will come with an element of cost, but that the major benefit payback on much of this activity is not expected until after 2030. The work must be done to lay foundations for this optimised electricity supply future now, as timescales on investment, design and construction decisions can take decades to come to fruition.

The seven principles stretch across all elements of electricity system operation. As our Delivery Schedule is set out per principle there will be some overlap. When a project of work contributes significant benefit in more than one principle area, the deliverable will be repeated in each relevant section. Transparency is best served by ensuring that there is a clear line of sight between a deliverable and where the anticipated outcome is expected. Where a deliverable contributes to more than one principle, unlocked consumer value will be assessed and counted only once – either all in one principle or split in a clear way across principles. Rather than place an exact value on consumer benefit we have set out to identify the level of consumer value in bands:

Less than £15 million	Small consumer value
£15-£30 million	Medium consumer value
£30-£50 million	Large consumer value
Greater than £50 million	Very large consumer value

In the Performance Metric Definition document there are further details per principle on what delivers value, how value was estimated and the rationale behind it as of March 2018.

ESO Forward Plan: Delivery Schedule

Meet the team:

- **Fintan Slye:** Director of National Grid System Operator
- **Duncan Burt:** Director of Operations, System Operator
- **Roisin Quinn:** Head of Energy Strategy and Policy
- **Simon Johnston:** Head of Business Change
- **Mike Breslin:** Head of Operations
- **Cathy McClay:** Head of Commercial Operations, Electricity
- **Julian Leslie:** Head of Electricity Network Development
- **Richard Smith:** Head of Market Change Electricity
- **Charlotte Ramsay:** Programme Director, Future of the SO

This schedule sets out the activities that our Forward Plan will deliver in 2018/19 to meet our licence obligations, and to deliver value over and above our core role in line with the seven principles that Ofgem has defined for the ESO.

Each section sets out:

- The member of the leadership team accountable for delivery against each principle.
- A summary of our longer-term vision, potential consumer value to unlock and key baseline activities we deliver today, to meet this principle.
- Deliverables to improve on these activities to create additional value for consumers.
- The metrics we will use and the outputs that you will see delivered through the course of 2018/19.
- An assessment of the baseline stakeholder sentiment on how we are performing today, and where we want to be at the end of 2018/19.

Further detail on the performance metrics, how we have set the baseline and target performance, and the expected consumer benefits, is included in the Performance Metrics Definition document.

Running through all our ambitions and plans for next year are two major change programmes: legal separation and the Data, Risk & Compliance Programme.

By April 2019 a legally separate ESO will be in place. In the run-up to that date, elements of the new ESO model will become visible. We will deliver this major organisational change and culture shift in parallel with achieving our ambitions laid out in the Forward Plan.

We recognise the important role that our actions play in supporting confidence in the energy markets. We started our Data, Risk & Compliance Programme more than 18 months ago to ensure that we are building and maintaining a culture of efficient and effective data, risk and compliance management.

Both these initiatives contribute to creating consumer value across all seven principles. Further detail on the progress that will be made on these programmes is included in the final section of this schedule.

Principle 1: Support market participants to make informed decisions by providing user-friendly, comprehensive and accurate information.

Team members: Cathy McClay, Roisin Quinn

Long-term vision

Future consumer savings of £8 billion per year from 2030² can only be unlocked by well-informed decisions made by electricity industry parties, now and in the future. To deploy all energy resources in an optimal way to meet 2050 decarbonisation targets we will need clear, comprehensive and accurate information to make progress.

Investment decisions need robust insight, open to all, to support the important choices needed over the coming years. Improved information from the ESO will underpin this ambitious transformation.

As the system evolves towards a smarter future, the balancing market timeframe will be increasingly important. Balancing in very short timescales, with a massively increased number of parties right across the whole system, will become the norm. The industry needs continually improving information against a backdrop of a more complex and less predictable energy landscape.

Supporting the energy industry's transformation means we need to keep our analysis and publications relevant. We will do this by continuing to share our unique perspective, integrating the expertise of industry and responding to feedback.

We will harness our technical and analytical capability to use state-of-the-art models and tools. We will also provide an ongoing opportunity for stakeholders to engage with us and contribute to our analysis and recommendations, as well as transparency on our assumptions and methods.

Potential consumer value to unlock

By improving confidence in our forecasts, increasing transparency of our balancing actions and providing more comprehensive information accessible to all, we expect to potentially unlock medium consumer value in the range of £15-£30 million in the short term. In the long term, this value is a significant contributor to the optimised future benefit, releasing up to £8 billion.

Key baseline activities

To meet our aim of minimising the actions we take as System Operator, market participants are encouraged to balance their positions. We support them by providing information which helps them forecast system needs and likely market outcomes. This is currently done by:

- The publication of our requirements for balancing services together with the outcomes of the tenders for these services.
- The publication of a forecast BSUoS outturn per month.
- The publication of wind generation and demand forecasts.
- Reporting of trades to the market.
- The publication of forecasts of the carbon intensity of the electricity system.
- Running events and maintaining multiple communications channels to share this information and intelligence with market participants and stakeholders.
- Using our technical expertise, modelling and analytical capability to stimulate debate and support long-term decision making across industry, Government and the Regulator. We do this through publications such as Future Energy Scenarios, Market Outlooks, insight publications and the Electricity Capacity Report.

² 'Delivering future-proof energy infrastructure' – Report for National Infrastructure Commission by Goran Strbac, Ioannis Konstantelos, Marko Aunedi, Michael Pollitt, Richard Green February 2016 (University of Cambridge, Energy Policy Research Group & Imperial College).
<https://www.nic.org.uk/wp-content/uploads/Delivering-future-proof-energy-infrastructure-Goran-Strbac-et-al.pdf>

The table below explains how we will help to deliver value this year.

Outcome	2018/19 deliverables
Improve confidence in our forecasts	<ul style="list-style-type: none"> • The publication of new BSUoS (monthly) report including a forecast upper and lower range. • Information provision innovation – a new publication on carbon emissions from GB generation. • Publication of the Future Energy Scenarios, Summer and Winter Outlook Reports, insight and thought pieces and the Electricity Capacity Report. • Mobilisation of the Demand Forecast Modelling review.
Increase transparency of ESO balancing decisions	<ul style="list-style-type: none"> • Deliver a schedule of webinars and events relating to the Ancillary and Balancing Services Tenders.
Develop our information portals and events	<ul style="list-style-type: none"> • Successful hosting of our ‘Ops Forum’ events and expansion of our channels of information dissemination to support wider engagement of market participants and service providers. • Produce a newsletter covering updates on information, markets and ESO matters related to Balancing Services.
Efficient management of the costs of balancing the system	<ul style="list-style-type: none"> • Publication of daily and monthly summaries of balancing costs, volumes and a high-level summary of system conditions via new, more accessible channels.

Performance metrics

We will be able to demonstrate a contribution to the realisation of consumer benefit through improvements in the following metrics:

1. ‘Commercial assessment transparency’ – quality, accuracy and timeliness of the publication of tender results and assessments for Fast Reserve, Frequency Response and Short-Term Operating Reserve (STOR).
2. ‘BSUoS forecast provision’ – timeliness of the delivery of our new day-ahead half-hourly BSUoS forecast report.
3. ‘Trades data transparency’ – accuracy and timeliness of the publication of information relating to trades undertaken by the ESO in balancing and operating the system.
4. ‘Forecasting accuracy’ – accuracy of the day-ahead demand and wind forecasts.

Stakeholder sentiment

Currently: Stakeholders have told us that the ESO needs to publish more information on tenders and trades and make that information more accessible. There are lots of channels and locations of information which is confusing to navigate.

End-of-year goal: Stakeholders are telling us that they understand and buy into our vision for how we will enhance transparency and accuracy of information sharing. Stakeholders have a much better understanding of where information is available. We receive feedback that the actions we have taken within the year have made an improvement and are helping market participants to make informed decisions.

Principle 2: Drive overall efficiency and transparency in balancing, taking into account impacts of ESO actions across time horizons.

Team members: Cathy McClay, Mike Breslin, Roisin Quinn

Long-term vision

The role of the Electricity System Operator is changing rapidly as the electricity industry transitions to deliver a low-carbon energy system. As energy resources on the system change, so do the needs of the system to secure delivery of electricity across the network. These requirements can be different from one day to the next. We must match flexibility with the right systems and balancing services to meet the expectations of the consumer. We must also continue to provide a secure electricity supply across our network.

In the longer term, smart system operation – thinking across transmission and distribution boundaries – supporting the Distribution System Operator transformation will ensure that energy resources can be optimally deployed and that the ESO has the tools and the marketplaces it needs to support optimal operation of the transmission system.

In the near term, and to support this transition, we will enhance our existing IT systems and deliver new systems. This will help the integration of DER into our balancing service markets.

We will also give clear information on the changes we need to make to balancing services and codes, to deliver the flexibility that we need. We will provide an opportunity for stakeholders to engage and contribute to our recommendations.

Potential value to unlock

Through efficient management of balancing cost, taking into account impacts across all time horizons, increasing our transparency, developing our information portals and collaborating to solve future operability challenges in good time, we expect to potentially unlock very large consumer value of greater than £50 million in the short term. In the long term this area will become a major contributor to consumer value.

Key baseline activities

We operate the system in real time and run all the systems and processes to ensure that the Electricity National Control Centre (ENCC) has the tools it needs to deliver secure, economical and efficient dispatch of the system. This includes:

- Assessing the notified market information for generation and continuously optimising the generation schedules to achieve overall system and demand balance.
- Running integrated operational, commercial and network planning teams to ensure that we optimise the use of the system today. This involves analysis of the system capability requiring network re-configuration and generation adjustment to provide secure delivery of electricity to end customers.
- Assessing the impact of near real-time generation and demand changes. Adjusting our reserve holdings to compensate for forecast errors.
- Instructing Ancillary Services to ensure that we comply with our quality of supply obligations on frequency and voltage control.
- Developing an integrated view and approach to identify the challenges that the Control Centre will face, and the solutions we will use in future.
- Publication of the SO Innovation Strategy to identify our priorities for innovation through the year. This signals our response to the longer-term technical challenges in operating the system.

The table below explains how we will help to deliver value this year.

Outcome	2018/19 deliverables
Improve confidence in our forecasts	<ul style="list-style-type: none"> • Incremental improvements to our demand, wind and solar forecasts. • Consultation on innovation priorities and publication of the 2019/20 ESO Innovation Strategy.
Increase transparency of ESO balancing decisions	<ul style="list-style-type: none"> • Delivery of our schedule of webinars and events relating to the Ancillary and Balancing Services Tenders. • Publication of improved Procurement Guidelines, and report, with a framework on our current approach to the procurement of Ancillary and Balancing Services. • Promote and improve our Trades Data platform.
Develop our information portals and events	<ul style="list-style-type: none"> • Successful hosting of our 'Ops Forum' events and expansion of our channels to share information to support wider engagement of market participants and service providers. • Initiation and delivery of the SO IT Forum with terms of reference based on feedback from customers and stakeholders. Topics identified for the forum include the change roadmap, communication of project delivery and technical aspects of projects which will impact user groups.
Solve operability challenges and prepare for the future	<ul style="list-style-type: none"> • Significant upgrading of IT systems to prepare for implementation of European network codes. • Publish Operability Report on challenges, planned activity and stakeholder engagement. • Publication of the Future of ENCC Study, recommendations and scope of future work. • Embedding of enhanced inertia modelling tools and new inertia measurement capability. • Deliver new systems capability within the ENCC, specifically PAS (Platform for Ancillary Services), and progress an update of the dispatch module for our energy balancing processes.
Efficient management of the costs of balancing the system	<ul style="list-style-type: none"> • Publication of a new monthly BSUoS report. • Publication of daily and monthly summaries of balancing costs, volumes and a high-level summary of system conditions via new, more accessible channels.

Performance metrics

We will be able to demonstrate a contribution to the realisation of consumer benefit through improvements in the following metrics:

5. 'Balancing Cost Management' – efficiency of system balancing actions, measuring cost against a target for balancing spend (excluding black start).

Stakeholder sentiment

Currently: Far greater transparency is required on how and why we procure balancing services and what is driving balancing costs. Our IT systems are a blocker to change and there is poor information sharing on updates on IT programmes and how these will impact stakeholders' businesses.

End-of-year goal: Stakeholders have noted a step-change in their understanding of the decisions we take in procuring balancing services and they have a significantly better understanding of the factors that drive balancing costs. Our SO IT Forum is welcomed as a big step towards improving stakeholder understanding of changes to our IT systems and this is helping them to manage their own business systems and processes.

Principle 3: Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent.

Team member: Cathy McClay

Long-term vision

In 2017, we saw the first coal-free generation day since the Industrial Revolution. Businesses in the energy sector are changing too, with innovators and disrupters challenging all of us to think differently about how we operate. We have seen a rapid rise in battery developments, co-location of storage and renewables, increasing interest in vehicle-to-grid flexibility provided by electric vehicles and the potential for domestic-scale projects.

We work alongside these parties to embrace the potential of technological change. It allows us to work together to create and deliver a vision for the future.

We support the move towards a low-carbon grid and are working hard to overcome operational challenges that this brings. Innovation is crucial to ensuring costs to consumers do not increase.

By working to ensure that the rules and processes for procuring balancing services maximise competition and are simple and transparent, we can facilitate the entry of new business models and new technologies into the balancing and ancillary services markets. This enables the ESO to access a greater level of flexibility and ensures the whole electricity system runs in the most efficient way, benefiting consumers.

Our ambition is to support this transition and work hand in hand with the innovators so that together we can deliver a distributed, smart, flexible electricity system.

Potential value to unlock

We expect that by promoting competition and developing new markets, together with increasing participation in balancing services markets, we can potentially unlock very large consumer value of greater than £50 million in the short term. In the long term, flexible markets are one of the keys to releasing maximised value.

Key baseline activities

Today, we devise and run the processes to procure system balancing and ancillary services:

- We employ a schedule of open tenders to purchase a variety of products and services.
- We settle and report on the outturn of the balancing mechanism and ancillary services contracts.
- We support new and existing providers to help them participate in the ancillary and balancing services markets and tenders.
- We run the Power Responsive campaign to raise awareness for demand-side flexibility opportunities across the whole system.

The table below explains how we will help to deliver value this year.

Outcome	2018/19 deliverables
<p>Promote competition and develop new markets in balancing services</p>	<ul style="list-style-type: none"> • Publication of information on real-time trading activity. • Publication of updated Procurement Guidelines, a report on procurement of Ancillary and Balancing Services, and an approach for ongoing review. • Publish combined monthly balancing services summary and demand side balancing report. <p>As set out in the Products Roadmaps:</p> <ul style="list-style-type: none"> • Standardise the FFR product structure and simplify the contract. • Publish a new FFR testing and compliance policy for market participants, to streamline the process and make it more accessible. • Develop an integrated approach to buying standard and faster-acting frequency response. • Deliver new, standardised products for reserve together with simplified contracts. • Deliver a new, highly scalable and flexible dispatch solution for reserve. • Develop a weekly auction trial for response. • Publish and consult industry on exclusivity clauses to improve the ability to stack products.
<p>Grow participation and promote fair access in provision of balancing services</p>	<ul style="list-style-type: none"> • Progress Trans-European Replacement Reserve Exchange (TERRE) related developments, supporting smaller parties accessing the Balancing Mechanism. • Grow the Power Responsive campaign, including the annual conference.

Performance metrics

We will be able to demonstrate a contribution to the realisation of consumer benefit through improvements in the following metrics:

6. 'Reform of balancing services markets' – stakeholder satisfaction with delivery of rationalisation and simplification that reduce barriers to entry in balancing services markets and measuring our stakeholder engagement.
7. 'New provider entry' – stakeholder satisfaction with the ESO 'new-provider' on-boarding experience.
8. 'Market diversity' – measuring the increase in the number of tenders and bids in each balancing services market.

Stakeholder sentiment

Currently: Stakeholders welcome the direction of travel and progress in the reform of balancing services procurement to make it easier to sell services to the ESO but wonder if we have downgraded our ambition in this area. We need to ensure that stakeholders are fully involved in the process to reform balancing services procurement. Stakeholders want us to develop a better understanding of the potential services that a wider range of parties can offer.

End-of-year goal: Stakeholders have provided clear feedback that the progress and engagement on the reform of balancing services is satisfactory. Stakeholders understand the routes through which they can engage with the ESO on the potential to offer balancing services and that we are considering a full range of potential options to meet system requirements.

Principle 4: Promote competition in the wholesale and capacity markets.

Team members: Richard Smith, Cathy McClay

Long-term vision

As we transition towards a smarter, more flexible energy system, the underlying commercial frameworks need to keep pace. This will enable us to maximise the full potential that a greater diversity of technologies, market participants and business models can deliver for the consumer. We are committed to enabling this transformation. We will do this by:

- Delivering cross-industry forums, that provide a voice for all network users to engage and develop holistic whole system solutions.
- Continuing to shape the evolution of the governing codes, both as Administrator and as a party to the codes.
- Enabling customers to manage their profitability by improving the quality and timeliness of the Balancing Services Use of System (BSUoS) billing process.

To support the energy industry's transformation, and to realise the best market outcomes for the consumer, existing and new network users need to be able to understand, access and improve the current commercial frameworks.

We will therefore continue to build on our ability to lead cross-industry engagement and will expand on initiatives such as Charging Futures and Power Responsive, bringing together a range of stakeholders. These platforms will help the industry navigate through the strategic challenges that it faces, help identify market distortions, leverage whole system thinking and reduce the barriers to participating in industry change.

We will look to champion the transition from code administration towards a code manager role, where we can deliver strategic change that benefits the consumer.

Value to unlock

Facilitating the development of the codes, framework and charging processes to support the new electricity landscape and making this accessible to all industry participants, we expect to potentially unlock large value between £30 million and £50 million in the short term. In the long term driving towards an efficient framework which supports the widest potential industry where every consumer can participate is a large undertaking and is fundamental to realising those future £8 billion of savings.

Key baseline activities

We are the code administrator for a number of codes and processes that govern the electricity markets:

- We ensure that the rules of participation and the commercial arrangements for using the system are clear, fair and promote competition, specifically for the Connection and Use of System Code (CUSC), Grid Code and the SO-TO Code (STC) and, informally, for the System Quality and Security of Supply Standard (SQSS).
- We are party to several others such as the Balancing and Settlement Code (BSC) and the Distribution Connection and Use of System Agreement (DCUSA).
- We are the administrator for the BSUoS and Transmission Services Use of System Charges (TNUoS).
- We collect TNUoS charges on behalf of the Transmission Owner and offshore transmission owner companies, and distribute these funds.
- We are the EMR delivery body and we administer the running of the capacity mechanism auctions.
- We are a part of the European body for Transmission System Operators, ENTSO-E. We work with our counterparts in Europe to represent the interests of UK consumers in developing codes and frameworks that support the Internal Energy Market.
- We are the Lead Secretariat for Charging Futures, supporting Ofgem (as the Chair), to encourage as many industry partners as possible to take part in future charging and access reform.

The table below explains how we will help to deliver value this year.

Outcome	2018/19 deliverables
Continual improvement of network charging processes	<ul style="list-style-type: none"> Improved transparency and publication of charging data – Phase 1: Customer access to information. Improved transparency and publication of charging data – Phase 2: Better forecasting and outturn information and material. Deliver new, combined TNUoS and BSUoS customer seminar. Targeted interventions that enhance our customers' experience of our charging processes on the 'hot spots' they have told us matter to them. Improve TNUoS billing reconciliation, forecast and final tariff setting processes. Implement a new charging customer on-boarding process.
Facilitate the development of the code and charging framework	<ul style="list-style-type: none"> Publish an agreed code administrator strategic improvement action plan. Deliver Charging Futures Forums that are open to all network users. Deliver webinars, podcasts and plain English publications under the Charging Futures (CF) Brand. Adapt the content and format in response to the ongoing requirements and preferences of all CF members. Publish a report on Charging Futures. Identify the lessons learned from cross-industry and code engagement. Provide additional information to support the Electricity Capacity report. Update and evolve the way we analyse the energy system in response to input from BEIS's Panel of Technical Experts.

Performance metrics

We will be able to demonstrate a contribution to the realisation of consumer benefit through improvements in the following metrics:

- 'BSUoS Billing' – quality of response to customers' BSUoS queries.
- 'Code administrator stakeholder satisfaction' – in our code administrator role, through a survey of performance across CUSC, Grid Code and STC (undertaken by Ofgem).
- 'Charging Futures' – stakeholder satisfaction with our delivery of the CF facilitator role.

Stakeholder sentiment

Currently: Stakeholders have told us that our performance as a code administrator is not acceptable and that we should be much more proactive in using our role to drive industry change through the code change process. Stakeholders are pleased with our performance so far in our role as Lead Secretariat of Charging Futures.

End-of-year goal: Through the relevant surveys stakeholders tell us that our performance as a code administrator has improved significantly. Stakeholders understand our vision and level of ambition for driving wider industry change through our role. Stakeholders tell us we are adding real value to them in helping them to engage with the industry change process for network charging.

Principle 5: Coordinate across system boundaries to deliver efficient network planning and development.

Team members: Julian Leslie, Roisin Quinn

Long-term vision

The focus of system planning is to secure an efficient electricity system 10 years into the future. We do this by recommending the most economical network and operability solutions.

Efficient transmission network investment planning and development is shaped now by the data and modelling we undertake to provide future transmission system needs information for the industry.

Decentralisation of the electricity system opens up a wider range of approaches across the transmission and distribution systems to find novel solutions to current and future challenges. Meeting those challenges effectively depends on coordination and collaboration across system boundaries.

Work on our whole system approach, conceived within the NOA, will be extended by rolling out pathfinding projects across the country. The aim of these projects is to develop coordinated network and operability planning across the transmission and distribution networks. They will also develop fit-for-purpose commercial arrangements.

This should increase visibility and the optimal management of issues across the networks. It should also maximise use of existing network capacity, reduce network constraints and open up new revenue streams to distributed energy resources. At the same time, it will give network operators a wider range of resources and tools. This will ultimately reduce costs for consumers.

Enabling choices that deliver the most benefit when whole system costs are considered must be at the heart of future developments. One benefit is facilitating new connections onto the system where no capacity was previously available. We also want to improve our customers' experience of getting connected while taking a leading role in the industry transition towards whole system investment planning and development.

Potential value to unlock

Through cross-industry collaboration on efficient network planning and development, and continual improvements to our insight publications, we expect to potentially unlock large consumer value between £30 million and £50 million in the short term. In the long term, whole system sits at the heart of releasing consumer benefits.

Key baseline activities

We facilitate efficient transmission network investment planning and development by:

- Working with the DNOs to facilitate connection of new users to the distribution networks.
- Collating, managing and modelling transmission system data.
- Identifying and publishing future transmission system needs.
- Supporting efficient development and investment in the transmission network through the Electricity Ten Year Statement (ETYS) and the NOA.

The table below explains how we will help to deliver value this year.

Outcome	2018/19 deliverables
<p>Maintain and improve the quality of our insight publications</p>	<ul style="list-style-type: none"> • Publication of the Network Development Roadmap consultation and the final Roadmap. • Publish the results of two NOA Pathfinding Projects and a plan to update the NOA methodology. • Develop our analysis to evaluate non-network solutions to meet transmission system needs. • Develop new ways of working with DNOs and other solution providers to support development of the NOA methodology and analysis. <p>Upgrade and develop our network models to better reflect the whole system:</p> <ul style="list-style-type: none"> • Improve data handling and accuracy. • Support analysis of system need beyond winter peak. • Deliver our investment and planning-related outputs as part of the ENA Open Networks Project.
<p>Improve our cross-industry collaboration for whole system network planning and development</p>	<ul style="list-style-type: none"> • Collaborate with DNOs in Regional Development Programmes (RDP). The aim is to prioritise leadership attention, resource and innovation in whole system thinking in network investment and planning. This will facilitate optimised connection to and use of distribution and transmission networks. • Publication of the Regional Plan as we close out our two in-flight RDPs. • Begin two new RDPs by publishing a bespoke work plan for each region. • Implementation of new commercial contracts to allow Distributed Energy Resources (DER) to participate in provision of transmission services in our in-flight RDP areas. • Implementation of innovative connections contracts in our in-flight RDP areas.

Performance metrics

We will be able to demonstrate a contribution to the realisation of consumer benefit through improvements in the following metrics:

- 12. 'Whole system optionality' – the number of distribution-led investments and non-network solutions generated to support transmission system needs.
- 13. 'Whole system, unlocking cross-boundary solutions' – use of constrained network areas. This will allow more DER to connect to the network and provide services to the SO.

Stakeholder sentiment

Currently: Stakeholders have told us we should be doing more to identify efficient “whole system” solutions and that the ESO should work with DNOs and distribution system users to support /coordinate connections further down in the DNO network. This activity should not unfairly favour any one type of technology or solution over another but should identify solutions that deliver the best value for consumers.

End-of-year goal: Stakeholders are happy with how we have collaborated with parties in our development of processes to allow significant progress towards realising a “whole system” approach in this area. Stakeholders are happy with the role the ESO is playing to facilitate collaboration across the Transmission-Distribution boundary including our contribution to the ENA Open Networks Project. Stakeholders are satisfied that our activities in this area are creating a level playing field for different types of solution and will drive outcomes that deliver the best value for consumers.

Principle 6: Coordinate effectively to ensure efficient whole system operation and optimal use of resources.

Team members: Julian Leslie, Cathy McClay, Mike Breslin

Long-term vision

Efficient whole system operation and optimal use of resources hold the key to unlocking huge benefits for consumers in the future. We must think in new ways, work with new partners and support all types of customers.

We want to keep improving our customers' experience of gaining access to the network. This means transforming how we work with DNOs to break down barriers to whole system thinking and action in system operations.

We must lay the foundations to optimise use of existing energy resources wherever they are connected in the network, and open up new revenue streams to DER. Network operators also need access to a wider range of resources and tools.

At the same time, we recognise the technical challenges presented by operating the whole system in ways that were never anticipated when it was built. To optimise benefits to the consumer, we need to collaborate across industry to find creative solutions.

Potential value to unlock

Evolution of whole system operation and optimal use of resources begins now with finding new approaches to optimising whole system operation. By finding creative ways to collaborate and create new solutions to future operability challenges and do so with sufficient time to allow best use of whole system resources we expect to potentially unlock medium consumer value in the range of £15-£30 million in the short term. This area is one where the main consumer value will be achieved in the long term. Actions that the ESO takes with the industry now are central to the ability to unlock vast financial future savings.

Key baseline activities

We ensure efficient transmission system operation and optimal use of resources by:

- Planning and optimising outages of the transmission network to allow connections and asset maintenance.
- Six-monthly engagement with all DNOs to share the future seasonal challenges faced by the transmission system and discuss approaches to coordination and collaboration across networks to resolve these challenges.
- Developing and maintaining the TOGA model.
- Modelling and analysing the transmission system to identify future operability challenges.
- Informing market participants and our stakeholders about future operability challenges for the transmission system by developing and publishing the System Operability Framework document.
- Innovating to find cost-effective technical and commercial solutions to operability issues.
- Facilitating the connection of new users to the transmission system and managing connection contracts.

The table below explains how we will help to deliver value this year.

Outcome	2018/19 deliverables
Improve our cross-industry collaboration on whole system	Active engagement in delivering ENA Open Networks project outputs including: <ul style="list-style-type: none"> • Leading the consultation process with stakeholders on future Distribution System Operator (DSO) commercial and technical arrangements. • Providing transmission input and system operator perspective into all work.
Implement learning from our major innovation projects	<ul style="list-style-type: none"> • Implement and share learning from our major innovation project plans. These include Power Potential, Enhanced Frequency Control Capability (EFCC), our partnership with Scottish Power’s project Phoenix and our role in the new EV trial with Northern Powergrid and UKPN.
Improve the service and information for new connection applications	<ul style="list-style-type: none"> • Scoping of the new TOGA system and issuing a procurement ITT for the new system. • We aim to get 100% of our connection contracts signed first time, minimising rework and making the connections process more efficient and easier to navigate. • Implementation of new processes to ensure a minimum one-month handover for all staff in customer-facing connection roles. • Promote and seek feedback on our new Heatmap Tools. • Successful hosting of our annual customer connection seminar.

Performance metrics

We will be able to demonstrate a contribution to the realisation of consumer benefit through improvements in the following metrics:

- 14. ‘Connections agreement management’ – timeliness of updating connection contracts. As we improve, this will minimise late notice action in the balancing mechanism to facilitate network access.
- 15. ‘System access management’ – the number of within-day cancellations of system access plans.
- 16. ‘Future GB electricity system security planning’ – stakeholder engagement and satisfaction on the quality of the Operability Report covering current state, review of prior performance and future plans to address identified needs.

Stakeholder sentiment

Currently: Stakeholders don’t feel that we are providing a sufficiently clear forward view of operability challenges and balancing services needs which is a barrier to their own business planning. The ESO should be playing a greater role in defining the role of the DSO.

End-of-year goal: Stakeholders tell us that the balancing services roadmaps and the new Operability Report have improved their understanding of future demand for balancing services. We acknowledge that we will never be able to completely satisfy the demand for detailed forward-looking information on this topic due to the dynamic nature of the networks and markets.

Stakeholders acknowledge the leading role we are playing in facilitating the transition to “whole system” network operation through our Regional Development Plan collaborations with DNOs and our contribution to the ENA Open Networks Project.

Principle 7: Facilitate timely, efficient and competitive network investments.

Team member: Julian Leslie

Long-term vision

We support the evolution of Ofgem's policy to develop competition to deliver onshore transmission networks. Ultimately, competition in networks will benefit consumers in the longer term.

Currently, benefit is achieved by running the NOA process, which provides visibility of new transmission network investment. The aim of the NOA, which we produce annually, is to develop a secure, coordinated and economical electricity transmission system.

There is potential for the NOA to drive greater value for consumers in the changing electricity system in the short-to-medium term. This could include expanding the NOA approach to consider more local or regional challenges. It might also mean inviting a wider range of participants to compete to meet the transmission system needs at the least cost including DNOs and market participants, storage providers and options proposed by the ESO and transmission owners.

This should result in more cost-effective options in the long term. It may lead to using market-based or distribution network solutions to reduce the costs of managing network constraints while larger network assets are built.

Potential value to unlock

Improving competition in efficient network investment by providing better engagement and facilitating more participation, we expect to potentially unlock large consumer value in the range of £30 million to £50 million in the short term. In the long term this is a great stride towards releasing future consumer value.

Key baseline activities

We facilitate efficient transmission network investment and planning, and help to identify investments suitable for competition by:

- Identifying future transmission system needs under the FES.
- Publishing the future transmission boundary requirements in the ETYS, informed by the Transmission Owners (TO).
- Delivering SO-led analysis to identify extra solutions across TO boundaries and alternatives to network investment.
- Modelling and analysis to identify the most economical and efficient solutions to meeting future transmission system needs.
- Running the NOA committee review and publication of the NOA recommendations about efficient network investment to meet identified transmission system needs.
- Identifying projects from the NOA recommendations that meet the criteria for competition.

The table below explains how we will help to deliver value this year and summarises the key deliverables across the seven principles that will be achieved in each quarter of 2018/19.

Outcome	2018/19 deliverables
<p>Improve the Network Options Assessment models and methodologies to support Extending Competition in Transmission (ECIT)</p>	<ul style="list-style-type: none"> • Publication of the NOA Report and methodology. • Publication of the 2019 NOA recommendations. • Publication of the Network Development Roadmap consultation and the final Roadmap. • Publication of the Electricity Ten Year Statement, which includes some of the methodology improvements mentioned. • Publication of the ENA Open Networks approach to whole system investment and operability options across transmission and distribution networks. • Increase the scope of the NOA methodology to include non-network solutions. • Improve and develop our modelling capability, further embedding the interconnector modelling and our analysis of offshore networks. • Progressing probabilistic year-round assessment to understand how often the network boundaries are exceeded. • Integrate changes in our models and methodology to include analysis of generator connections to the transmission network that are suitable for competition. This is in addition to the current identification of wider works projects (in expectation of the ECIT policy development to embed the potential for competition in delivery of generation connections). • Design developments to the NOA to support the introduction of competition in delivery of the onshore transmission network.

Performance metrics

We will be able to demonstrate a contribution to the realisation of consumer benefit through improvements in the following metrics:

- 17. 'NOA consumer benefit' – benefit of alternative solutions to meeting transmission system need compared to asset-based solutions. This metric drives the ESO to consider the variety of options available. This will minimise consumer spend on network reinforcement by using alternatives to traditional asset build.
- 18. 'NOA engagement' – breadth and quality of our stakeholder engagement on all aspects of the NOA process. This will demonstrate the effectiveness of our efforts to increase awareness of and engagement with the NOA process from traditional and non-traditional parties.

Stakeholder sentiment

Currently: Stakeholders are unclear as to the current status and future direction of competition in network development activities.

End-of-year goal: Stakeholders are clear that competition is being implemented in the identification of solutions to meeting transmission network requirements. Stakeholders are happy with how they have been able to participate in changes to the Network Options Assessment process and have seen significant progress towards opening markets in this area. They are satisfied that our activities in this area are creating a level playing field for different types of solution and will drive outcomes that deliver the best value for consumers.

Legal Separation of the Electricity System Operator and Transmission Owner

Team member: Charlotte Ramsay

The ESO has an important role in the transition to a more decentralised, low-carbon electricity industry model. In this Forward Plan, we show that the ESO is transforming, promoting more whole system thinking to enhance network and market access for all parties. Our customers and stakeholders need to be confident that the ESO is delivering against its new principles in a neutral way. To achieve this, we are creating a new ESO business, separate from the Electricity Transmission Owner (ETO).

Key activities

The ESO will be operating as a separate company with its own licence from 1 April 2019. Key achievements by this date will include:

- Separate governance arrangements – the ESO will have a separate Board of Directors dealing only with ESO business. The ESO Board will include three sufficiently independent directors (SIDs) from outside National Grid. One SID will chair an ESO Compliance Committee that will provide assurance that the ESO is carrying out its duties in line with compliance requirements.
- NGESO identity – National Grid will develop a distinct visual identity for the new National Grid ESO (NGESO). Customers and stakeholders will be able to recognise when they are talking to the ESO or to any other part of National Grid.
- NGESO employees and physical separation – NGESO employees will be located in a physically separate office to the rest of National Grid. ESO managers and executives will be incentivised on ESO performance only.
- Information ring-fencing – we will create a 'soft' separation of IT systems used by the ESO to make sure that the National Grid TO will have information only available to other TOs.

Benefits and outputs

Existing industry frameworks have served consumers well, however change is needed to facilitate the transition to a decentralised, decarbonised electricity system that ensures security of supply and allows competition and markets to maximise consumer value. We believe that legal separation of the ESO marks a significant milestone in the energy industry and will provide the right environment to deliver a balanced and impartial ESO that can realise real benefits for consumers.

Establishing a strong culture of compliance, data and risk management.

Team member: Simon Johnston

Data plays a critical role in our operations. It is vital to efficiency, productivity and robust decision-making. We are building the right capabilities to manage our data better. This will help us to meet the needs of our customers and regulators.

We are 18 months into a 3.5-year programme to embed the NG Group Data Management Principles and Minimum Standards. The aim is to ensure confidence in data, based on improved data quality and controls. We are strengthening data management as a core capability. This will enable our data to be used as a key strategic asset, supporting all our decisions and informing future strategy.

The new principles and standards will provide greater clarity around what is expected – by us, our customers and our stakeholders. There will be a strong focus on what we need to do to keep us safe, secure and compliant.

Key activities

- Data asset ownership – all data connected to supported IT systems will be captured in a Data Management Library and mapped across the entire SO. There will be clear data ownership, and data stewardship accountabilities and responsibilities. All such data will be classified for business criticality and confidentiality so that we can prioritise the right controls for the right data.
- Data quality and governance – data governance groups and communities of practice will drive improvements in data quality and controls using KPIs. These KPIs are designed to identify and close any gaps between current and target states. Crucially, they will enable us to maintain these high standards as an enduring culture.
- Data access, availability and security – all data owners will ensure the right data is accessible only to the right people at the right time. This includes publications for our stakeholders, customers and regulators.
- Capability development – we are rolling out a bespoke Data Management Training curriculum. We recognise that awareness and developing capability are critical in maintaining the high standards required and will be a key metric of success. To sustain progress, we are launching a data quality service to mentor and support data managers.
- External Review – we will be commissioning an external assurance audit to look at our data, compliance and process controls across the ESO. This will result in recommendations and an action plan that we will publish to our stakeholders.

Benefits and outputs

By the first quarter of this year the ESO will have attained Data Management Maturity Level 3 in a five-level maturity framework. The programme plans to reach the target of Level 5 by April 2020. This will be achieved through an integrated approach including IT, architecture, risk and compliance management improvements. There is an intermediate target of Level 4 by April 2019.

We have developed performance metrics monitoring progress towards the 41 minimum standards of the seven National Grid Data Management Principles. These will help us assess whether we have the right culture in place and how well it is maintained. Data owners and stewards whose performance drops below standards will be notified and action taken.

ESO Forward Plan: Delivery Schedule

Summary of our 2018/19 deliverables

	Q1 Apr-June	Q2 July-Sept	Q3 Oct-Dec	Q4 Jan-Mar
Principle 1	<ul style="list-style-type: none"> Webinars on AS/BS tender results. Publish Summer Outlook report. Commence new BSUoS monthly report. Publish Innovating with the SO output. Information provision innovation – publish carbon intensity. Host Ops Forum. 	<ul style="list-style-type: none"> Webinar on AS/BS tender results. Publish SO Innovation Priorities Consultation. Publish Future Energy Scenarios (FES). Publish BSUoS Monthly Report. Publish monthly summary of daily balancing costs and volume with high-level summary of system conditions. 	<ul style="list-style-type: none"> Host Ops Forum. Publish Winter Outlook report. Publish BSUoS monthly report. 	<ul style="list-style-type: none"> Schedule of AS/BS events and timetable for results for 2019/20. Host Ops Forum. Publish SO Innovation Strategy 2019/20 output. Demand forecast modelling review completed. Publish BSUoS monthly report.
Principle 2	<ul style="list-style-type: none"> Publish Innovating with the SO Output. Consultation on SO IT Forum. 	<ul style="list-style-type: none"> Future of the Electricity National Control Centre (ENCC), scoping study findings. Publish SO Innovation Priorities Consultation. 	<ul style="list-style-type: none"> Future of the ENCC, recommendation and scope of work. Publish report on operability challenges and plan. 	<ul style="list-style-type: none"> Publish SO Innovation Strategy 2019/20 output. Inertia modelling and measurement upgrade. Updating the dispatch module of our energy balancing tool. Complete review of the Procurement Guidelines and report.
Principle 3	<ul style="list-style-type: none"> Trading activity to be published closer to real time. Standardise the Firm Frequency Response (FFR) product structure and simplify the contract. Publish roadmaps on the development of markets for voltage, constraints and black start. 	<ul style="list-style-type: none"> Publish a new FFR testing and compliance policy. Deliver new, standardised products and simplified contracts for reserve. Deliver a new, highly scalable and flexible dispatch solution for reserve (PAS). Publish and consult on exclusivity clauses. 	<ul style="list-style-type: none"> Publish combined monthly balancing services summary and demand side balancing report. Develop an integrated approach to buying standard and faster-acting frequency response. Develop a weekly auction trial for response. Grow Power Responsive including annual conference. 	<ul style="list-style-type: none"> Facilitated entry of early adopters into BM (Project TERRE – ahead of full delivery by 2020).
Principle 4	<ul style="list-style-type: none"> Improved transparency and publication of charging data – Phase 1: Customer access to information. Deliver webinars, podcasts and publications under Charging Futures. Deliver Charging Futures Forum. Supply additional information to support Electricity Capacity report. 	<ul style="list-style-type: none"> Publication of an agreed code administrator strategic improvement action plan. Deliver webinars, podcasts and publications under Charging Futures. Deliver Charging Futures Forum. Publish Electricity Capacity Report. 	<ul style="list-style-type: none"> Improved transparency and publication of charging data – Phase 2: Better forecasting and outturn information and material. Deliver new, combined TNUoS and BSUoS customer seminars. Deliver webinars, podcasts and publications under Charging Futures. Deliver Charging Futures Forum. 	<ul style="list-style-type: none"> Implementation of a new charging customer on-boarding process. Deliver webinars, podcasts and publications under Charging Futures. Deliver Charging Futures Forum.

Continued on next page

ESO Forward Plan: Delivery Schedule (continued)

	Q1 Apr-June	Q2 July-Sept	Q3 Oct-Dec	Q4 Jan-Mar
Principle 5	<ul style="list-style-type: none"> Publish the Network Development Roadmap consultation and final Roadmap. WPD Regional Development Programme learnings. 	<ul style="list-style-type: none"> Regional Plan published for our two in-flight RDPs. Launch of two new RDPs with associated work plans. 	<ul style="list-style-type: none"> Conclusions of High Volts Phase 1 Pathfinding project. First iteration of analysis of system need beyond winter peak. RDP commercial arrangements established for DER participation in in-flight areas. 	<ul style="list-style-type: none"> Develop new ways of working with DNOs and other solution providers to support development of the NOA methodology and analysis. Develop our analysis to support evaluation of non-network solutions to meet transmission system needs. Commercial solutions identified in regional development programmes (RDP) included within NOA report.
Principle 6		<ul style="list-style-type: none"> Open Networks consultation on future worlds. Active engagement in the delivery of ENA Open Networks project. 	<ul style="list-style-type: none"> Conclusion of Open Networks 2018 programme. Active engagement in the delivery of ENA Open Networks project. Innovative connections contracts available in our in-flight RDP areas. Transmission Owner Generation Availability (TOGA) output specification. Delivery of our investment and planning related outputs as part of the ENA Open Networks Project. Publish report on operability challenges and plan. 	<ul style="list-style-type: none"> Launch of Open Networks 2019 programme. TOGA Procurement Event.
Principle 7	<ul style="list-style-type: none"> Publish NOA 2019 methodology. Publish Network Development Roadmap consultation and the final Roadmap. Incorporate interconnector methodology within NOA Report. 		<ul style="list-style-type: none"> Publish Electricity Ten Year Statement, to include probabilistic thermal assessment. Publish the ENA Open Networks approach to whole system investment and operability options across transmission and distribution networks. 	<ul style="list-style-type: none"> Publication of the 2019 NOA recommendations. Publication of the 2019 NOA Report. Commercial non-network solutions within the NOA Report.

