

May 2020

Forward Plan 2019-21

End of Year Performance Report

Welcome

Welcome to our End of Year incentives report for 2019-20.

Foreword



Firstly, I recognise the significant impact that COVID-19 has had on all of society, and that the whole energy industry currently finds itself operating in a different environment than would have been anticipated only a few months ago. At this difficult time, as ESO we are prioritising system security and reliability, and the wellbeing of our employees.

Nevertheless, I think it is important to recognise what we have delivered during 2019-20, and I am proud of the work the teams have done: in particular their response to COVID-19 in the final weeks of March where difficult decisions had to be rapidly made.

We were all reminded of the importance of safe, reliable energy when approximately one million customers lost power as a result of a series of rare and unprecedented events on the electricity system on 9 August 2019. We are aware of the disruption this caused to homes, businesses and rail services. We have therefore worked with our stakeholders to thoroughly investigate the events, and progressed the resulting set of actions which were identified by the Energy Emergencies Executive Committee. I am pleased that we have now successfully completed the actions assigned to us by the E3C and Ofgem.

During the 2019-20 year, we have worked collaboratively with our stakeholders to deliver significant benefit for consumers, and taken significant steps along the path to net zero. This year, we have delivered approximately £50m of savings for today's consumers, as well as releasing around 11,000,000 MWh of renewable energy.

None of this would have been possible without the contributions of our stakeholders, whose input shapes our activities. We recognise that there are areas where there is room for improvement, and we are listening to your feedback and doing our best to act on it. Please keep talking and helping us to see your perspective.

The end of 2019-20 marks the first anniversary of the ESO becoming a legally separate business within the National Grid PLC family. We hope you have recognised the changes this has brought to our business, allowing us to take on new roles and become a more independent voice within industry.

This report contains both an Executive Summary, which provides an overview of the year, and detailed Evidence Chapters¹ which provide a more complete picture of the work we have done. I hope you find it interesting and informative.

Fintan Slye
Director, Electricity System Operator

1. <https://www.nationalgrideso.com/document/168786/download>

The ESO Incentive Scheme

The End of Year Performance Report sets out the ESO's performance against the 2019-21 Forward Plan¹ over the past year.

We have structured the evidence chapters of this report according to the three role areas set out by Ofgem for the 2019-20 year:

- Role 1 Managing system balance and operability
- Role 2 Facilitating competitive markets
- Roles 3&4 Facilitating whole system outcomes and supporting competition in networks

As set out in Ofgem's Electricity System Operator Reporting and Incentive Arrangements (ESORI) guidance document², the Performance Panel will use five key inputs to evaluate the ESO's performance for each role.

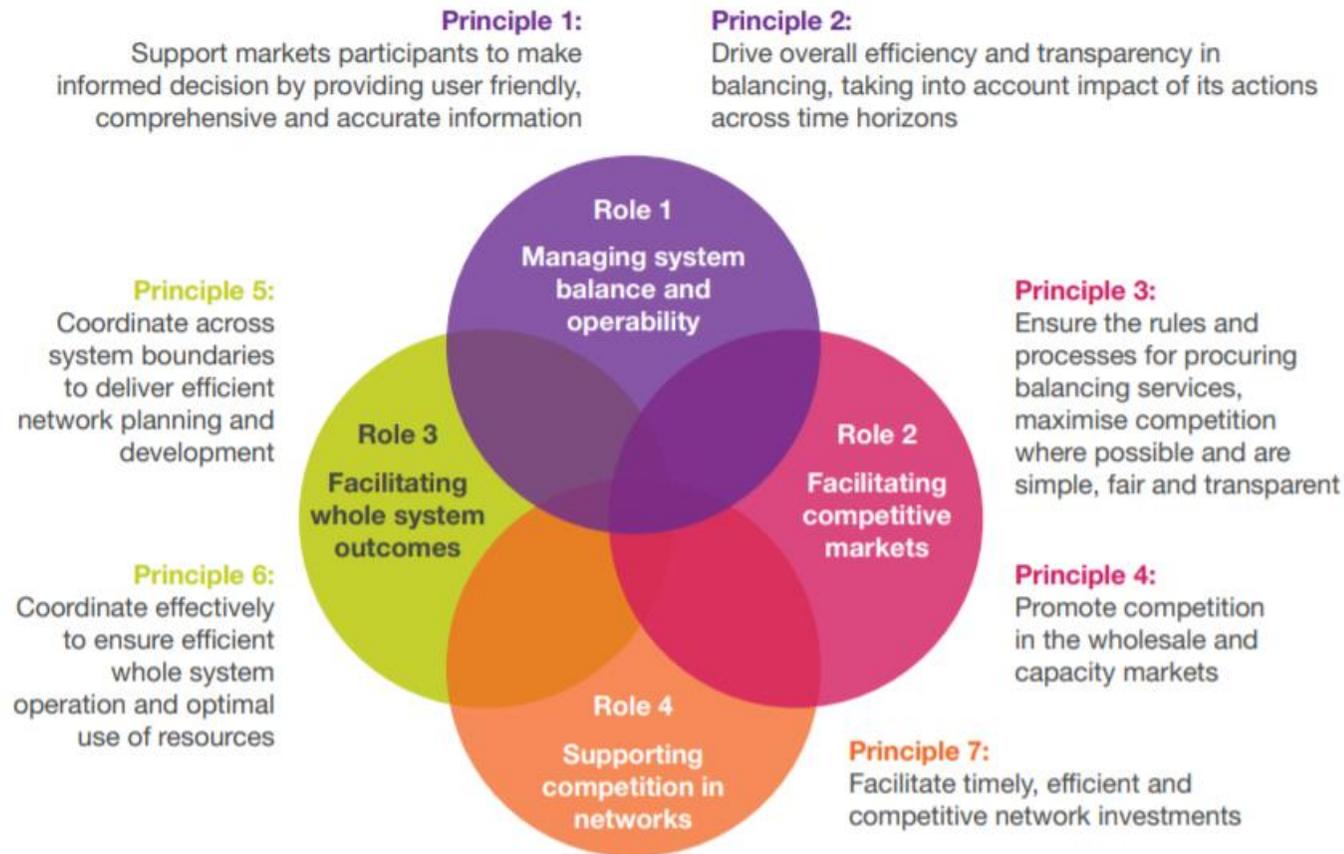
We have therefore sub-divided each role chapter to present our performance according to each of the following five categories:

- Evidence of delivered benefits
- Evidence of future benefits / progress against longer term initiatives
- Plan delivery
- Stakeholder views
- Outturn performance metrics and justifications

If you are not familiar with the ESO incentive scheme and Forward Plan, we recommend starting with the "Plan Delivery" sections which give an overview of the projects which have been delivered.

For each role area, the Performance Panel will assign the ESO a score on a scale of 1 to 5. Each role will then be assigned an incentive reward or penalty within the range of ±£10m. The total incentive reward available to the ESO for 2019-20 therefore falls within the range of ±£30m.

1. <https://www.nationalgrideso.com/document/140736/download>
 2. https://www.ofgem.gov.uk/system/files/docs/2019/03/esori_guidance_document_2019-20.pdf





Our ESO Mission

Our Mission is to enable the transformation to a sustainable energy system and ensure the delivery of reliable, affordable energy for all consumers.

Success in 2025 looks like:

- An electricity system that can operate carbon free
- A whole system strategy that supports net zero by 2050
- Competition everywhere
- The ESO is a trusted partner

More about our ambitions



An electricity system that can operate carbon free

What is it?

When the market can economically and efficiently dispatch generation to meet all GB demand for energy with zero carbon solutions, then ESO will be able to operate this carbon free system safely and securely. In order to facilitate this, by 2025 we will have introduced new tools and technologies into the market to manage real-time challenges such as thermal constraints, voltage and inertia.

We consider this ambition to be fundamental to support achieving the legislated net zero emissions target and therefore a crucial contribution to consumer-led action on climate change.

What progress have we made?

- We awarded the world's first contracts, totalling £328m, to providers of inertia services as part of Stability Pathfinder phase 1, securing 12.5GVAs of inertia until 31 March 2026.
- We successfully awarded a contract for a static reactive power service to manage voltage levels in the Mersey region. This is the first time that we have sought reactive power support from embedded providers as well as transmission

connected plant.

- Our Constraint Management pathfinder Request for Information (RFI) attracted 21 responses with 77 technical solutions proposed. We are aiming to promote network competition and procure a long-term product to alleviate network constraints, by focusing on a wider pool of solutions to reduce constraint costs.
- We have made good progress on Windows 1 and 2 of the Accelerated Loss of Mains Change Programme, with a cumulative total of over 3,000 applications approved, for a capacity of over 6,000MW.
- We published our Operability Strategy Report, explaining the future challenges we face in maintaining an operable electricity system, and how we are addressing them
- As part of our response and reserve roadmap, we are reforming the design of these services to ensure that they are capable of supporting the operation of the electricity system carbon-free by 2025



A whole system strategy that supports net zero by 2050

What is it?

Achieving the legislated UK net zero emissions target by 2050 is a huge challenge for all of society. We will play our role in this journey through co-ordination and co-optimisation across the whole energy system.

The ESO will support government and industry by examining whole system operability and interactions across networked energy systems, and working with stakeholders to develop a shared pathway forward.

What progress have we made?

- We published the first whole energy system net zero analysis in our Future Energy Scenarios after the new emissions target was legislated
- We worked with commercial Electric Vehicle (EV) organisations to recommend policy and market changes to enable EVs to support the decarbonisation of both transport and power generation
- We held a four month series of stakeholder engagement to understand the role of bioenergy and the interdependencies across the energy sector and other areas of the economy
- We piloted the FES: Bridging the Gap programme and

report, which worked with stakeholders to tackle some of the biggest areas of uncertainty in the pathway to net zero. This work built consensus and recommended rapid actions for policy, industry, and the ESO to meet the UK's 2050 net zero target.

- We presented dual fuel guidance on clean heat to BEIS in to support their Heat Policy Roadmap (expected later in 2020), advising on key issues for system operation in different clean heat pathways.
- Closer ways of working have been established with Distribution Network Owners (DNOs) including the design of co-ordinated Distributed Energy Resource (DER) visibility and control infrastructure in Scotland and on the South Coast.
- We have continued to be actively involved with the ENA Open Networks project including leading their cross-sector work through the Whole Energy System workstream.
- We have extended our Regional Development Programmes (RDPs) to other regions including working with Electricity North West and a second RDP with WPD in the Midlands.

More about our ambitions

continued



Competition everywhere

What is it?

Efficient well-functioning markets are essential if we are to operate a carbon free system by 2025 and unlock the full consumer benefits of flexibility. The Competition Everywhere ambition describes the approach we will take to creating markets which facilitate carbon free operation.

We have a vital role in delivering this complex task by working with a wide range of stakeholders to develop competitively procured balancing services. We also seek competitive network and non-network solutions to a range of system challenges, ensure our codes and charging arrangements are fit for the future, and promote competition in wholesale and capacity markets.

What progress have we made?

- We have developed a new market mechanism to competitively procure Black Start services, delivering two tenders during 2019-20. For the first time, we have invited renewable generation to tender to provide restoration services.
- We went live with Phases 1 and 2 of the frequency response auction trial, enhancing our understanding of how procurement of services closer to real time can realise significant benefits for system operation, market participants, and GB energy consumers.
- We responded to the BEIS/Ofgem consultation on

reforming the energy industry codes, emphasising that market arrangements and regulatory frameworks should facilitate the energy transformation.

- We continue to progress our plans for the reform of our frequency response and reserve services, including publishing our new roadmap for Frequency Response and Reserve
- In 2019-20 we have continued to improve access to the Balancing Mechanism, ensuring that it is open to all technologies and facilitating increased competition in the Balancing Mechanism market, 24% of all new units registered are new aggregated Balancing Mechanism units and Virtual lead Parties (VLP). 1.85GW of new registered capacity has been registered from 42 new aggregated Balancing Mechanism units, and in April 2020 we saw the first VLP go-live in the Balancing Mechanism, with several parties currently progressing through the application process.
- We are delivering the Targeted Charging Review, fostering competition by addressing inefficiencies in network charging
- We have worked with stakeholders to produce an Early Competition Plan, bringing competition to network development where it can benefit consumers



The Electricity System Operator is a trusted partner

What is it?

The ESO is at the centre of the energy transition. In order to successfully enable all the changes needed over coming years, we will work collaboratively across the industry, and seek to build trust with our customers and stakeholders. We are therefore focussing on building strong, cooperative relationships; being reliable in our approach, credible in our expertise, and demonstrating our impartial position, in order to ensure that we are a Trusted Partner to others in the industry.

What progress have we made?

- We have increased transparency around our activities, introducing the Forward Plan tracker to report progress against our deliverables on a monthly basis, and publishing more operational data to inform stakeholders about the actions we have taken to balance the system.
- We have been asked to take on new roles within the industry, such as Early Competition, showing that we are trusted by Ofgem and BEIS.
- We rolled out the ESO customer strategy and started to deliver against it. This strategy has seen us implementing a revised governance and performance monitoring structure; introducing new segmentation and insights processes; developing a customer digital

roadmap; reviewing our customer capability and culture; introducing toolkits and guidance to help our people to deliver differently for our customers and stakeholders; and improving our communications.

- We have revisited our approach to external engagement, as measured through the improved insights and feedback programme. This approach to engagement and gathering feedback was tested with our Electricity RIIO-2 Stakeholder Group (ERSG), who were broadly supportive; they also provided an invaluable role in testing and refining our approach.
- We have refreshed our website to make it easier for stakeholders to find the information they need. This has led to a 31% page view improvement, meaning more people are finding us through search engines, and a 14% bounce rate reduction from the homepage, meaning that people are finding our site more useful and not leaving straight away.
- We were an integral member of the EV Energy Task Force which published its recommendations to government and industry in January. Ourselves and National Grid were the only businesses on the Steerco alongside Government and Trade bodies.

ESO milestones

2019-20

April

May

June

July

August

September

October

November

December

January

February

March

Role 1

Hosted the Electricity Transmission Operational Forum

Published Energy Forecasting Strategic Roadmap

Set up portal to receive applications for Loss of Mains Change Programme

Hosted the Electricity Transmission Operational Forum

ESO Data Portal Beta version went live

Started to publish monthly Forward Plan tracker spreadsheet

COVID-19 pandemic changes demand patterns and ways of working

Power outage affecting approximately 1 million customers

Role 2

ESO becomes legally separate from NGET

ESO-led Balancing Services Charges Task Force published its Final Report

Hosted the Charging Futures forum

Delivered first phase of weekly frequency response auction trial

Guidance published for prospective new BM participants

Frequency Response auction trial phase 2 went live

Response and Reserve Roadmap launched

Code Administration website refresh

Hosted the Balancing and Charging Forum

A wider range of technologies and providers can now access the Balancing Mechanism

Roles 3 & 4

NOA Methodology and Interconnectors workshops

Published an RFI for phase 1 for Stability Pathfinder

Webinars for NOA and Pathfinders

Published a tender for a nine-year reactive power service contract in the Mersey region

Published annual Network Options Assessment (NOA) and Network Development Roadmap

Published annual Electricity Ten Year Statement (ETYS)

Published RFI for Constraint Management Pathfinder

Early Competition phase 1 update published

ESO significant milestones for 2019-20

ESO significant milestones for 2019-20

Spotlight: challenges during 2019-20

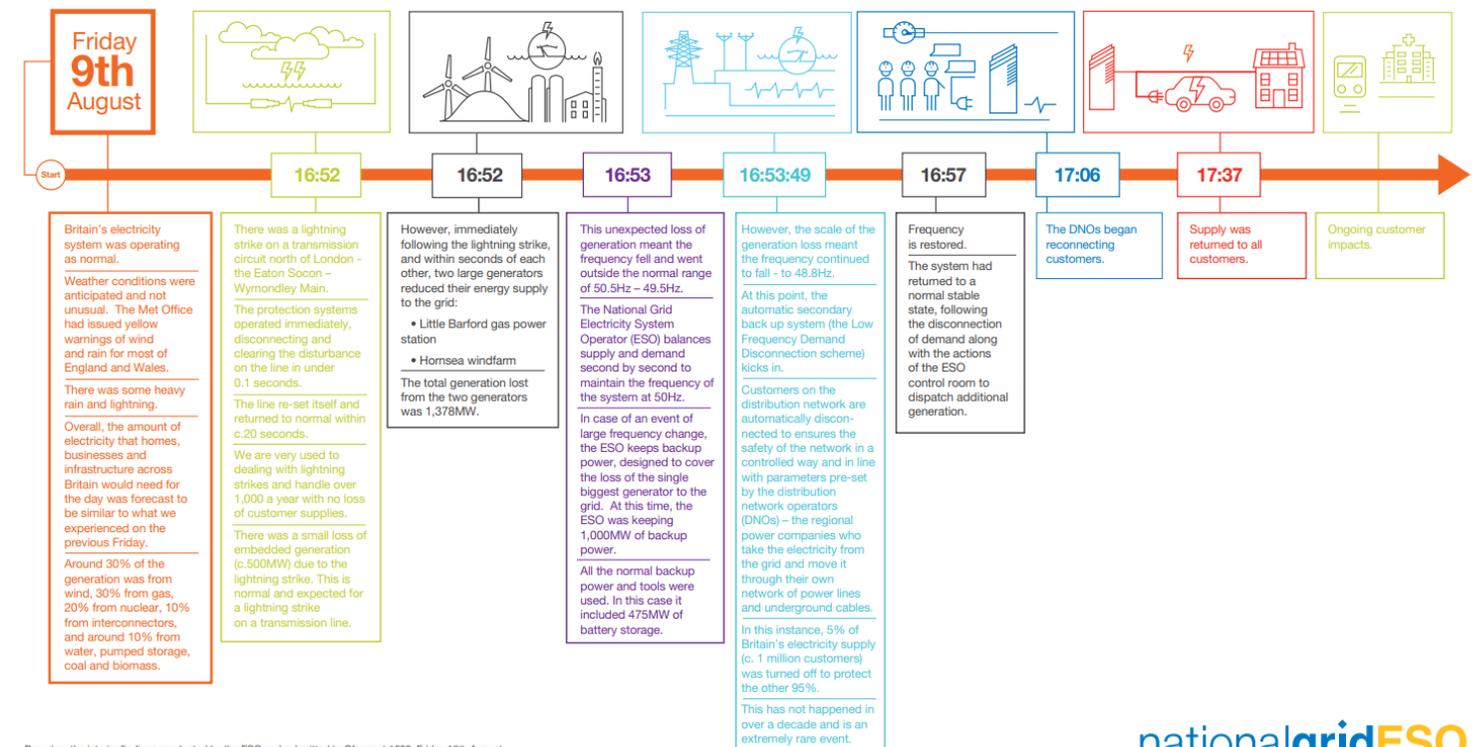


Power outage of 9 August

- At 4:52pm on 9 August 2019 approximately 1 million customers lost power as a result of a series of events on the electricity system. These events caused significant disruption to many people in their homes and businesses, and to commuters on a Friday evening with some rail services in and around London being particularly badly affected due to the protection systems on some trains not operating as expected.
- On 6 September 2019, the ESO published a technical report¹ on the events of 9 August 2019. This was the result of comprehensive internal analysis, together with input and analysis from key stakeholders such as NGET, Orsted, RWE and Govia Thameslink Railway. This report was well received by stakeholders, and has formed the basis of wider reviews by the industry.
- This report describes the sequence of events, starting with a lightning strike occurring on a transmission circuit at 4:52pm. The subsequent circuit trip and resultant loss of generation led to instability in the system frequency, leading to further operational challenges which were managed by the Electricity National Control Centre (ENCC). From 45 minutes after the lightning strike, we began instructing the Distribution Network Owners to reenergise their networks.
- We identified a number of areas where lessons can be learned, such as reviewing communication processes and protocols, and the processes associated with the Low Frequency Demand Disconnection (LFDD) scheme.
- We also identified some areas where a wider review of policy, processes or procedures may be appropriate, such as a review of the security standards, assessing whether it would be appropriate to establish standards for critical infrastructure and services setting out the range of events and conditions on the electricity system that their internal systems should be designed to cater for, and a review of the timescales for delivery of the Accelerated Loss of Mains Change Programme.

- Ofgem² and the Energy Emergencies Executive Committee³ (E3C) also investigated the events and produced reports. Following close co-ordination with E3C and Ofgem, a number of actions were assigned to the industry, including to the ESO. All of the immediate actions assigned to the ESO by E3C and Ofgem have now been successfully completed and closed. Over the coming 18 months, we will report to BEIS and Ofgem on the ongoing implementation of the plans that we set out as part of these actions.
- The Ofgem report stated that “The ESO performed well in restoring the system given the amount of generation that was lost.”

The sequence of events of Friday 9th August 2019



- <https://www.nationalgrideso.com/document/152346/download>
- https://www.ofgem.gov.uk/system/files/docs/2020/01/9_august_2019_power_outage_report.pdf
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/855767/e3c-gb-power-disruption-9-august-2019-final-report.pdf

Spotlight: challenges during 2019-20

continued



COVID-19 Pandemic

- The COVID-19 pandemic has presented an unprecedented challenge for businesses and organisations across the country, and indeed around the world. At the ESO we too are adapting to the demands the COVID-19 crisis has imposed on all of us, and for us this has meant moving resources to support key areas that are critical to our core mission of keeping our workforce safe, and keeping the lights on – all in a way that meets our licence conditions and is as economical as possible to keep bills as low as we can. The main implications of the COVID-19 pandemic for the ESO are:
 - Risk of higher than usual absenteeism among critical control room staff, and restricted working arrangements resulting in less flexibility for trialling projects under development. This has meant restricting access to critical Control Room sites, minimising travel between sites, and segregating Control Room authorised staff from other employees.
 - Changes to the external operating environment due to unprecedented low demand: as shown in the chart, we have seen a significant change to daily patterns of energy usage.
 - Changes to industry working practices and limited access to operational sites as result of lockdown.
- The ESO's key priorities are:
 - Keep our people safe and protect their wellbeing** – making sure we have enough staff to carry out critical functions
 - Keep the lights on** – including coping with periods of low demand due the current season and UK lockdown
- The ESO has developed a prioritisation framework to guide how we adapt our business, which we have discussed with Ofgem and BEIS:
 - Keep our people safe
 - Keep the lights on
 - Financial management
 - Licence obligations
 - Manage and meet expectations
 - RIIO-2 enablement

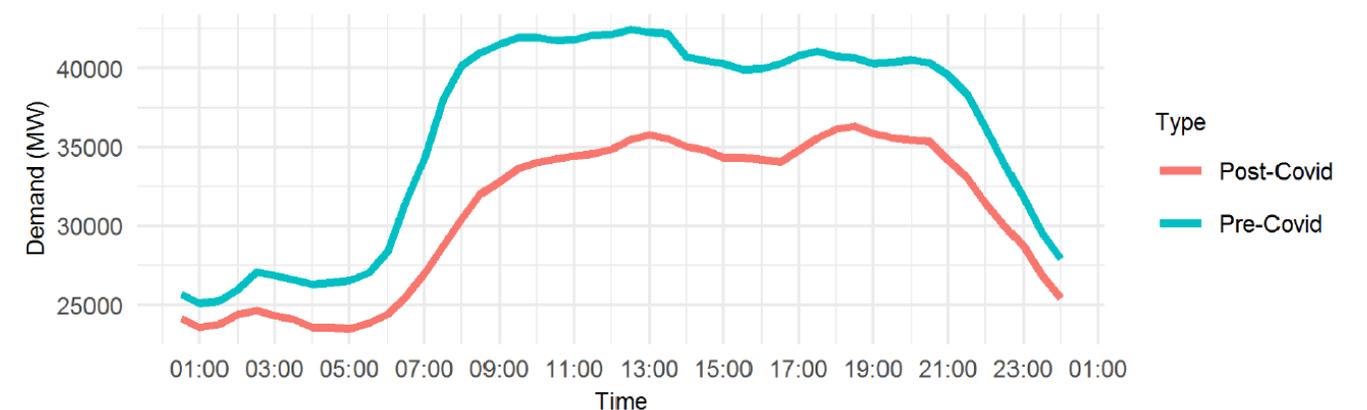
This has resulted in the ESO making decisions to move resources to the highest priority areas. We also recognise that our stakeholders' priorities will have changed as a result of COVID-19. As always, we are keen to continue the dialogue with our stakeholders, to ensure that we are meeting your needs. We have therefore introduced a weekly control room webinar with the industry to maintain engagement on the evolving COVID-19 situation, and to provide assurance to the market.

As we stated in our 2020-21 Forward Plan publication¹, we recognise that our set of commitments will evolve on an ongoing basis as manage through the impact of COVID-19 and work in a new way. We shared our latest position on COVID-19 impacts on our website² and at a webinar on 29 April and will use our existing reporting processes to communicate the latest position to stakeholders.



COVID-19 Pandemic

Outturn and estimated pre-Covid demand on Monday 30 Mar 2020



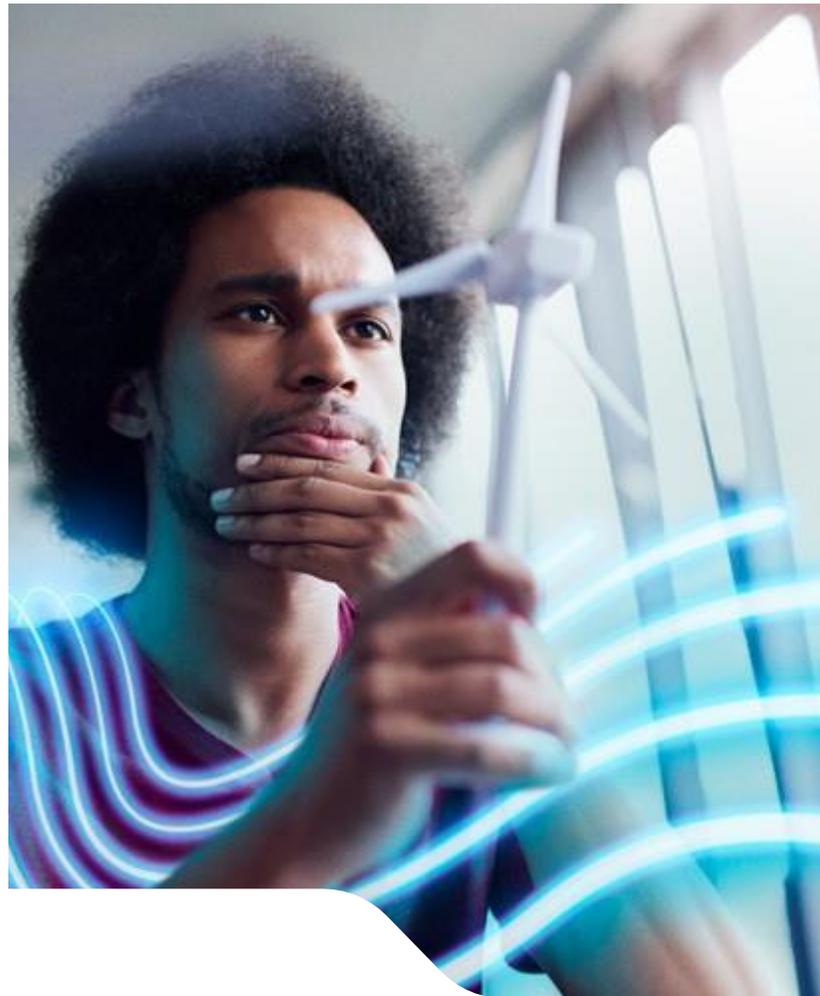
1. <https://www.nationalgrideso.com/document/166441/download>

2. <https://www.nationalgrideso.com/document/168216/download> and <https://www.nationalgrideso.com/keeping-lights-throughout-coronavirus>

Constantly adapting to a changing energy landscape

We are constantly adapting to a changing energy landscape with new ways of working.

Constantly adapting to a changing energy landscape



Constantly adapting to a changing energy landscape



We look to markets as well as networks to resolve system issues

- Our Pathfinder projects have given stakeholders the opportunity to propose options to resolve operability issues such as stability, voltage and thermal constraints. Thermal constraints are also minimised by careful optimisation of the outage plan, saving money for today's consumers and releasing significant renewable generation capacity
- We have progressed our product roadmap for Reactive implementation, setting out our intention to create a new market
- We published our industry update on the future of frequency response, bringing together our latest work on the reform of frequency response markets



Cross functional working across different timescales

- We manage stability issues in real time by taking actions in the Balancing Mechanism, and in the longer term we progress projects such as the Loss of Mains Protection changes and the Stability Pathfinder
- We use our experience of real-time system balancing to influence the future development of response and reserve products
- Thermal constraint issues can be managed by Balancing Mechanism actions in real time, and in the longer term by way of the Constraint Management Pathfinder, and the recommendations we make in the Network Options Assessment
- We learn about our stakeholders' issues and ensure that our data and insights publications provide them with the information they need



Our plans are shaped by input from our stakeholders

- We carry out extensive consultation when producing documents such as the Future Energy Scenarios, Network Options Assessment methodology and Early Competition Plan
- We listen to stakeholders' feedback about our code administration processes and actively seek to improve
- We provide open and accessible data requested by stakeholders on the ESO Data Portal
- When developing the Forward Plan, we seek feedback on our draft Forward Plan, via a consultation and stakeholder event, and take this into account when producing our final Forward Plan



We use our expertise to play a trusted role in the industry

- We lead the transformation of industry frameworks to enable the markets of the future, including leading groups such as the Balancing Services Charges Task Force and publishing thought pieces on topics such as the Energy Codes Review
- Our insights documents allow stakeholders to plan for the future
- We are increasing the transparency of the actions we take in real time, hosting regular visits to the ENCC and publishing an extensive set of information on the Data Portal
- We have been asked to take on new roles within the industry, such as Early Competition and the coordination of offshore connections, showing that we are trusted by Ofgem and BEIS

How have the ESO's activities during 2019-20 benefitted consumers?

Over the course of 2019-20, the ESO has progressed a wide range of activities which have added significant value for current and future consumers. This year, we have delivered approximately £50m of savings for today's consumers, as well as releasing around 11,000,000 MWh of renewable energy.



Lower bills than would otherwise be the case

Our Network Options Assessment process allows us to optimise between balancing and network costs, recommending the optimal timing of transmission reinforcement.

We have sought to make it easier for new providers to participate in the balancing mechanism, removing barriers to entry and increasing competition, which should place downwards pressure on prices. We have also introduced additional competition to a range of balancing services.

Closer to real time, we actively seek the lowest cost solutions whilst ensuring system security. This includes seeking to release additional capacity under outage conditions, and agreeing trades ahead of Balancing Mechanism timescales where it is efficient to do so.



Benefits for society as a whole

The ESO always seeks to promote fair outcomes for consumers, whilst facilitating progress towards the net zero target.

This can be seen in the increased transparency we have created around our operations, both in terms of data provision and stakeholder engagement.

We have also actively taken forward reforms to network charging, which result in fairer outcomes for consumers as well as facilitating the transition to a zero-carbon world.

We are constantly evolving our systems and processes to operate in a zero-carbon world, and are able to accommodate an ever-increasing proportion of renewable generation on the system.

Today's consumers have benefitted from the new tools and processes we have developed in order to minimise balancing costs spend, for example our new tool to optimise trades with interconnector counterparties (saving £22.3m), as well as our improved outage planning process which seeks to release additional capacity for our customers (saving £30m and releasing around 11,000,000 MWh of renewable energy). Consumers will also indirectly benefit from the improvements we have made to the information we provide to our stakeholders, for example via the Data Portal and improvements to the customer experience for network charging.

We have also progressed many activities which will benefit tomorrow's consumers. This includes the Loss of Mains protection work (which will save £170m per year) and Stability Pathfinder (saving £52m-£128m per year between 2021 and 2026), both of which are expected to reduce the costs of system balancing below what they would otherwise be. We are facilitating reforms which will result in a more efficient distribution of network charges (saving £3.8-5.7bn for consumers), and our Network Options Assessment will recommend the optimal path for network reinforcements, taking into account the costs of infrastructure and system balancing (with a consumer benefit of approximately £1.9bn).

For more information on these activities, please see the Consumer Benefit sections of our Evidence Chapters.

How have the ESO's activities during 2019-20 benefitted consumers?

continued



Improved safety and reliability

As the generation mix on the transmission system changes, this has brought new challenges to system operation, for example maintaining the system frequency within limits in the event of a large generation loss. This was demonstrated in the events of 9 August, and we have sought to understand the causes of these events and put in place actions to avoid a recurrence.

We are progressing several long term projects to improve system reliability, for example the Loss of Mains Protection work and Stability Pathfinder which will improve the system's ability to withstand sudden changes in generation or demand.



Reduced environmental damage

We have introduced new tools, processes and contractual arrangements to improve our ability to operate the system with a higher proportion of renewable generation, such as the Loss of Mains Protection work and the Pathfinders which seek alternatives to those services traditionally provided by conventional generation.

We have also made it easier for smaller parties (which typically include renewables) to access the Balancing Mechanism, and supported them through the process of registration and on-boarding.



Improved quality of service

We now provide our stakeholders with more information about our operations than ever before. Our Data Portal provides operational data in an accessible format within a short timescale, and we have worked to improve the accessibility of our documents (such as the Network Options Assessment) in order to ensure that our stakeholders can easily access the information they need.

We have hosted events, such as the Operational Forum and Electricity National Control Centre visits, to provide more transparency of our activities.

We engage extensively with stakeholders, actively seeking their feedback and acting on it where possible.

Role 1:

Managing System Balance & Operability

Roisin Quinn, Head of National Control

In role 1, our most visible activity is real-time system balancing. However, this is supported by a number of other activities such as energy forecasting and developing IT tools, as well as sharing information and insights with our stakeholders to enable them to make well-informed decisions.

We have achieved some great successes in role 1, such as the new ESO Data Portal, which gives our stakeholders access to an ever-increasing amount of operational data. We've upgraded our IT systems, including delivering the Ancillary Services Dispatch Platform (ASDP) and preparing for the introduction of European Network Codes. We have continued to progress the Loss of Mains Protection changes, which in due course will improve system stability and reduce certain categories of balancing services spend. We've also engaged extensively with our stakeholders to form our long-term system insights, which we have shared in publications such as the Operability Strategy Report and

the FES: Bridging the gap to Net Zero work. We have also added significant value by agreeing trades ahead of Balancing Mechanisms timescales, which has contributed to lower balancing costs than would otherwise be the case.

We have faced some challenges during 2019-20. The power outage on 9 August brought significant disruption to the UK, and we have completed a number of actions to prevent a similar situation from occurring in the future. We responded quickly to the 9 August event, producing an initial technical report within two weeks and a more detailed report within a month.



Role 1:

Managing System Balance & Operability

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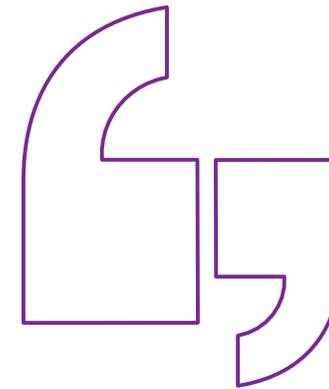
We also experienced operational challenges due to unusually high wind levels during the winter of 2019-20, which impacted on the accuracy of our energy forecasts and the level of balancing costs incurred.

Since the end of 2019-20 we, along with businesses and individuals across the country, have felt the impacts of COVID-19, not only due to social distancing but also due to the uncertainty it brings to patterns of energy usage. I'd like to recognise the efforts of the Electricity National Control Centre and teams across the ESO supporting our real time operations, who have successfully enacted a robust business continuity plan to ensure system security and the safety of our colleagues. This meant taking difficult decisions about some of our activities to ensure we protected our people, increase the pool of authorised staff for the ENCC and so continue our critical operations to keep the lights on. We anticipate record low demands this summer and have worked to understand the impact of that and ensure we have the right tools available. We also moved quickly to establish a weekly webinar to keep stakeholders informed.

During the past year, we have made good progress towards the goals for 2025 that we set out as part of our ESO mission. Projects such as the Loss of Mains Protection and improvements to our wind forecasting tools have moved us closer to being able to operate the system carbon free. Our "FES: Bridging The Gap to Net Zero" document sets out the next steps for a whole system strategy that supports net zero by 2050. We are also promoting Competition Everywhere by providing insights into our decision making, allowing stakeholders to better understand our operations. We have acted on our ambition to become a trusted partner, hosting operational forums and visits to the ENCC in order to better understand our stakeholders, and becoming increasingly transparent about the real time decisions that we take.

I look forward to leading ESO National Control to meet the challenges of system operation in 2020 and beyond.

Roisin Quinn, Head of National Control



“They listened to all of our views and the one to one engagement with them has been positive throughout the organisation”

– Future Energy Scenarios launch event attendee

Role 1: Highlights



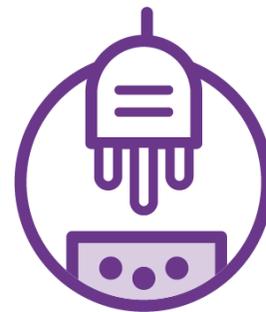
Delivered benefits in 2019-20

- The new ESO Data Portal is saving time for our customers, resulting in a saving of £600k per year, and in the future should promote a better functioning electricity market.
- Removing barriers to entry for European Interconnector Trading, saving £22.3m on balancing costs



Evidence of future benefits and long term initiatives

- We note that role 1 will mainly deliver consumer benefit within the current year, due to the nature of the activities within this role area
- We are co-ordinating changes to Loss of Mains Protection settings which will save more than £170m per year from 2022-23



Plan delivery and new ways of working

- Upgraded IT systems including Ancillary Services Dispatch Platform and preparations for European Network Codes
- New ESO data portal improved information access for stakeholders
- Published insights documents including Operability Strategy Report and FES: Bridging the Gap to Net Zero
- We have undertaken extensive optimisation of balancing costs via trading and operational decision making



Stakeholder evidence

- Engaged with 109 new organisations when developing this year's Future Energy Scenarios
- Held over 20 external engagement sessions for the Data Portal, receiving positive feedback at each one
- Stakeholder satisfaction scores for the Operational Forum improved from 5.9/10 in July to 8.5/10 in October
- Stakeholders found our monthly ENCC visits to be informative
- Weekly webinars kept the industry updated on our COVID-19 response



Outturn performance metrics and justifications

- 1: Balancing Costs: performance below benchmark
- 2: Information Provision Scorecard: performance exceeds benchmark
- 3: Energy Forecasting Accuracy: performance in line with benchmark

Role 2:

Facilitating Competitive Markets

Kayte O'Neill, Head of Markets

In role 2, we facilitate competitive markets: creating markets for balancing services, and facilitating the code changes and market reforms which will enable the energy system transition.

I'm really proud of the great work our teams have delivered during the year, progressing towards more competitive procurement of balancing services, for example widening access to the Balancing Mechanism, developing methods for competitive procurement of restoration services, and running the frequency response auction trial. We've shown real leadership in the charging reforms, leading the Balancing Services Charges Task Force and hosting the Charging Futures, Power Responsive and Balancing and Charging Forums. We have also refreshed our Code Administration website to ensure that stakeholders can easily find the information they need. I have appreciated the teams' willingness to take on board stakeholder feedback in relation to the Dynamic Containment products, increasing the level of engagement with industry groups and making changes to the product scope.

We recognise that there are areas where we need to work harder to meet the expectations of our stakeholders. The results of the CACoP survey in 2019 suggested several areas for improvement, and we have since put in place an action plan which we are actively progressing. We have also heard from stakeholders that they have been frustrated by the implications of the Clean Energy Package and what this means for balancing service products (such as Short Tern Operating Reserve (STOR) and Fast Reserve): we are currently carrying out detailed internal analysis on system changes and requirements, and will publish a detailed delivery plan in the near future. Although we are disappointed not to have delivered the Power Available work on time, we have worked with industry groups to keep stakeholders informed.



Role 2:

Facilitating Competitive Markets

continued

Facilitating Competitive Markets

Of course, we have seen the effects of COVID-19, which we appreciate will impact on both the ESO and our stakeholders, and we are keen to understand how we can best work with industry participants to operate effectively in this new environment. COVID-19 has brought a new purpose to particular areas of our work, focussing on activities which ensure security of supply over the coming months. This has meant taking difficult decisions about the priorities of our activities, to ensure that we make best use of our resources.

Notwithstanding these challenges, I feel that we have made good progress against the ambitions which we set out as part of the ESO mission. Our Reform of Balancing Services Markets metric shows the extent to which we are moving towards competition everywhere.

We are striving to improve our performance as code administrator, taking on board feedback we have received to become a trusted partner and provide a high quality service to the industry. The changes to industry frameworks that we lead and facilitate will enable the whole system strategy to net zero. We are also moving closer to carbon free operation, allowing smaller providers to access the Balancing Mechanism and making it easier for intermittent generation to participate in our markets.

I'm excited to help lead the ESO in continuing to deliver for consumers in as we move into 2020-21, moving closer to our ambition of Competition Everywhere.

Kayte O'Neill, Head of Markets



“Constant forward motion, transforming a complex system and opening markets to new capacity”

– supplier

Facilitating Competitive Markets

Role 2: Highlights



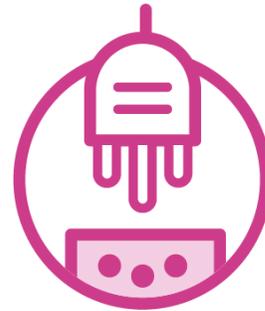
Delivered benefits in 2019-20

- We note that role 2 will mainly deliver consumer benefit in future years, due to the nature of the activities within this role area
- We are transforming the customer experience for network charging. Our customers pay around £4.5bn in Transmission charges a year, and helping them better understand the charges they face, helps them to be more effective players in the market



Evidence of future benefits and long term initiatives

- We have a key role in implementing network charging reforms, which will save £3.8-5.7 bn for consumers
- We are enabling wider access to the Balancing Mechanism, which is anticipated to bring consumer benefits of £110-500m per year from 2020-21



Plan delivery and new ways of working

- Took a leading role in charging reforms such as the Balancing Services Charges Task Force and Targeted Charging Review
- Balancing Mechanism Wider Access went live
- Delivered weekly Frequency Response auction trial
- Response and Reserve Roadmap published
- Hosted forums for Charging Futures, Power Responsive, Flexibility and Balancing and Charging, as well as Power Responsive annual event
- ESO Code Administration website refresh made information more accessible



Stakeholder evidence

- Positive stakeholder feedback from Flexibility forum and Power Responsive summer reception
- New long term reactive power service developed based on stakeholder feedback
- Collaborated with Wind Advisory Group for Power Available work
- Worked with our tenderers to improve data access, simplify tender spreadsheets and improve their procurement experience
- Our response to stakeholder feedback on Dynamic Containment work was well received by industry



Outturn performance metrics and justifications

- 4: Provider Journey Feedback: performance in line with benchmark
- 5: Reform of Balancing Services Markets: performance exceeds benchmark
- 6: Code Admin Stakeholder Satisfaction:
 - (1) performance exceeds benchmark
 - (2) performance in line with benchmark
 - (3) performance below benchmark
- 7: Charging Futures: performance exceeds benchmark
- 8: Year ahead forecast vs outturn annual BSUoS: performance in line with benchmark
- 9: Month ahead forecast vs outturn monthly BSUoS: performance exceeds benchmark

Roles 3 & 4:

Facilitating Whole System Outcomes and Supporting Competition in Networks

Julian Leslie, Head of Networks



In roles 3&4, we facilitate whole system outcomes by promoting co-ordination in network planning and development, and operations. We also support competition in networks, presenting opportunities for market players to be involved in activities which have traditionally only been carried out by networks.

During 2019-20 I have been delighted by the significant progress we have made against our pathfinder projects, which is where we seek solutions from the market for future operability issues such as Stability, Constraint Management and Voltage. It has been really positive to see so many stakeholders coming forward to participate in this. Another important milestone has been the Early Competition work, where the ESO has actively engaged with a range of interested parties and shown leadership in proposing a way forward.

We've also made improvements to our study capability, which stakeholders should recognise in the next iteration of our Electricity Ten Year Statement, and made significant revisions to the Network Options Assessment publication to make it easier for our stakeholders to access the information they need.

We have made good progress on the Generation Export Management Scheme, maximising the output of renewable generation without the need for transmission reinforcement and providing more market opportunities for customers. We have also continued to roll out the Appendix G process (relating to Appendix G of customers' Bilateral Connection Agreements), a trial we have been running to accelerate the connection of generators which are embedded within the DNO network. We recognise that many of these milestones would not have been possible without the extensive collaboration we have enjoyed with our stakeholders over the past year.

Roles 3 & 4:

Facilitating Whole System Outcomes and Supporting Competition in Networks

continued

2019-20 has not been without its challenges: the power outage on 9 August caused disruption to a large number of people. However, I'd like to recognise the efforts of my team for their thorough investigation into the event and the timely publication of their findings. We have identified and progressed follow up actions (such as working with industry on changes to the compliance process), which have contributed to a change in priorities in some areas. We have also faced several commercial and regulatory challenges as part of the Pathfinder projects due to their first-of-a kind nature, and recognise that further work will be needed to reach a sustainable set of arrangements. The Regional Development Programmes have also challenged us to develop new ways of working with our stakeholders, and new commercial arrangements.

More recently, the COVID-19 pandemic has had a significant impact on the operations of the ESO and its stakeholders, and we recognise that everyone's priorities will change as a result of COVID-19. As always, we would like to continue our conversation with stakeholders to understand their priorities and any new

challenges that they are facing, particularly if the ESO can be part of the solution. We have sought to ensure that the welfare of our colleagues and the security of the system are maintained in the coming months, and this has led to the reprioritisation of a number of our projects.

Despite the challenges we have faced this year, I feel that we have made significant progress against our ESO mission. The Pathfinders are already bringing a competitive approach to resolve system issues, and the Early Competition work will set out a workable model to bring more competition to the development of the transmission system. Our Regional Development Programmes and Whole System work are bringing us a step closer to a whole system strategy that supports net zero.

Going forward, we will build on the experience we have gained during 2019-20, and work closely with our customers and stakeholders to make the right decisions in this challenging environment.

Julian Leslie, Head of Networks



“We wanted to write to say congratulations – we think you’ve done fantastically to have 3 live pathfinder tenders and an RFI out. It must be hard work, but I hope it’s also rewarding – you’re doing an important job.”

– service provider

Roles 3 & 4:

Highlights



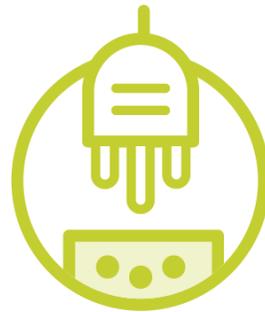
Delivered benefits in 2019-20

- We note that roles 3&4 will mainly deliver consumer benefit in future years, due to the nature of the activities within this role area
- Our new outage planning processes have saved our customers over £30m to date, releasing around 11,000,000 MWh of renewable energy



Evidence of future benefits and long term initiatives

- Stability Pathfinder phase 1 will save consumers £52m-£128m per annum between 2021 and 2026
- Our improvements to the Network Options Assessment (NOA) are estimated to deliver around £1.9m of additional value for future consumers



Plan delivery and new ways of working

- Progressed Stability, Mersey and Constraint Management pathfinders
- Began work on Early Competition
- Generation Export Management Scheme commenced in collaboration with Scottish Power Energy Networks
- Appendix G process continues to accelerate the connection of embedded generation



Stakeholder evidence

- Worked collaboratively with Distribution Network Operators (DNOs) and Transmission Owners (TOs) on Regional Development Programmes
- Led the Whole Energy System workstream as part of Open Networks
- Improved our market dispatch model based on stakeholder feedback
- Extensive stakeholder engagement as part of Pathfinder projects



Outturn performance metrics and justifications

10. Whole system unlocking cross boundary solutions: performance in line with benchmark
11. System Access Management: performance exceeds benchmark
12. Customer value opportunities: performance exceeds benchmark
13. Connections agreement management: performance exceeds benchmark
14. Right First Time connection offers: performance below benchmark
15. NOA consumer benefit: performance in line with benchmark
16. NOA Enhancing Communications: performance exceeds benchmark

Thank you for reading our End Of Year Report.
For further information, please contact:

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For further details on the ESO incentive scheme, please visit our website at <https://www.nationalgrideso.com/our-strategy/how-were-performing>
You can also find our Forward Plans at <https://www.nationalgrideso.com/our-strategy/forward-plan>