nationalgrid

ESO Forward Plan FY18/19

Quarter 1 2018

Executive Summary

The theme for this first quarter has been learning lessons. As we get to grips with the new framework, we've seen that there is still lots of scope for improvement.

We think we are currently performing at baseline and have laid the foundations for some transformative activity that is going to drive consumer value over and above our baseline work.

We're aware that we haven't always communicated these developments in the right way in the Plan, so it's been hard to evidence what we've done and demonstrate its impact in our monthly reports.

We are still working on a refresh and relaunch of the Principles – each has a different need and we're going to be making sure that the Long Term Vision we set out is well articulated with clear outcomes. For some of the principles, this is a matter of clearer articulation of a plan that is already in place. For others, we are going to be adding new deliverables and increasing our ambition.

In a bid to include more stakeholder insights in our reports, we are publishing our detailed methodology for collecting stakeholder input and feedback on our activities throughout the year and how we plan to use it. We are very interested to hear your views on this methodology and more generally on which topics you are interested in and your preferred engagement channels.

We have also been developing a methodology for estimating and evaluating the future and within year consumer benefits that our Plan is creating. This will really help us evidence that benefits are being realised as we deliver our plan. We're publishing a thought piece on how we will approach this task, and welcome views and support as we build our methodologies.

Your Feedback is Essential

We hope that you've started to see some changes. If you have or if you haven't, please do tell us what you think of our progress so far, and also, specifically on this report: Does it provide useful information? The right level of detail? Is it clear and accessible? Please provide feedback on this report or any element of the ESO Forward Plan and incentives to this email address box.soincentives.electricity@nationalgrid.com or fill in our survey here.

2018-19 ESO Incentive Recovery

In our May report we noted we issued a circular where we made an initial estimate of +£15million, which will be included in the calculation of the BSUoS charge. We want to highlight that this estimate is based on a subjective assessment by us and has not been agreed with Ofgem or stakeholders.

REPORT CONTENTS:

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

Long Term Vision and Consumer Value

For this Principle, our vision is to be a transparent ESO who provides accurate information to help market participants make investment decisions and facilitate the transition towards balancing across shorter timescales. We are committed to improving the "user experience" in everything we do.

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.[1]

Our Deliverables for Q1 2018

Outcome	2018/19 Deliverables	Documentation Link
Improve confidence in our forecasts	• Commence new BSUoS monthly report	• https://_www.nationalgrid.com/uk/electricity/market-operations-and-data/forecast-volumes-and-costs
	• Information provision innovation – publish carbon intensity	• http://carbonintensity.org.uk/
	• Publish Summer Outlook Report	• https://www.nationalgrid.com/uk/publications/summer-outlook
	• Publish Winter Review and Consultation	• https://www.nationalgrid.com/sites/default/files/documents/2018%20Winter%20Review%20and%20Consultation%20FINAL%20v2.pdf
Increase transparency of our balancing decisions	• Deliver a schedule of webinars and events relating to the Ancillary and Balancing Services (AS/BS) Tenders	• https://www.nationalgrid.com/uk/electricity/balancing-services/frequency-response-services/firm-frequency-response?assessment-process • https://www.nationalgrid.com/uk/electricity/balancing-services/reserve-services/fast-reserve?market-information
Develop our information portals and events	• Successful hosting of our Electricity Operational Forum event and expansion of our channels of information dissemination to support wider engagement of market participants and service providers	• https://www.nationalgrid.com/uk/electricity/market-operations-and-data/electricity-operational-forum

Our Key Baseline Activities

We support market participants by providing information which helps them forecast system needs and likely market outcomes. This is 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 of BSUoS outturn per month
- The publication of wind generation and demand forecasts
- Reporting of trades to the market
- Running events and maintaining multiple communication 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 decisions through publications such as Future Energy Scenarios, Market Outlooks, insight publications and the Electricity Capacity Report.

[1] See Pages 38 – 40 here for details https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

Performance this Quarter

We met our baseline expectations throughout the first quarter; we produced all deliverables intended in the plan, accelerated some that were of importance to market participants (MBSS reporting improvements). We also reprioritised some deliverables, were parallel activity in stakeholder engagement is delivering the desired outcomes via a different route, and we have learned lessons from new processes in our tender rounds that were implemented this month. The associated metrics demonstrate that we are tracking at least on target however we have been unable to address the feedback on our forecasting metrics which questioned the current level of ambition.

We made some progress with activity that has the potential to exceed our baseline. Most notably on progress towards our data portal for tailored, self-serve market information. Phase 1 was completed this quarter, with the release of a prototype platform for our BSUoS forecast data.

Lessons Learnt
We want to be open and reflective about areas where we could have done better under this Principle, why this happened and what we are going to do about it going forward.

We would have liked to consult on the revised MBSS report before the changes were made but time was short. We had been working on changes based on stakeholder feedback since last year and so we made a call to go ahead and publish without further consultation. Stakeholders had identified getting this new data as a clear priority. We have had positive feedback that MBSS now covers non BM activity and will continue to invite your views.

We are working with stakeholders across a range of channels to shape our transformation. We re-examined our newsletter proposal. A clear purpose informed by stakeholder views was lacking so we have deferred this until we have sufficient time to talk to stakeholders. In the future, we are going to plan stakeholder engagement for our key deliverables.

For the FFR tender round in June, we chose to allow providers to amend their tenders as this was the first month of the simplification of the FFR product, this lead to a delay in our processes and put the deadline at risk. Consequently, we have identified a series of improvements that have either already been implemented or will be implemented ahead of the next long term tender. We have made changes to the tender submission proforma to provide additional information for providers.

Meets Baseline Performance

We published tender results to the market to the schedule and our Monthly Balancing Services Summary (MBSS). These publications help the market to understand our requirement and utilisation of ancillary services. We improved the quality of our Monthly Balancing Services Summary (MBSS) reporting, a deliverable that we promised for Q2. We did this in response to feedback from stakeholders; they told us that they would like to see increased granularity of data, additional costs and volumes for non-BM units to make the report easier to understand. We responded positively to these requests and included this detail, restructured and carried out plain English review.

We also published daily balancing cost reports on our website to provide improved transparency and granularity of balancing costs and volumes by balancing category. We undertook our Firm Frequency Response (FFR) and Fast Reserve tenders and published results on time and right first time on our website. We ran the Short Term Operating Reserve (STOR) tender and accepted or declined tenders by 29 June in line with market schedule. We hosted webinars for FFR and FR and a webinar for STOR will be hosted in July. We continually published wind and demand forecasts. This information allows market participants to self-balance their position as much as possible. Alongside this, we delivered our regular outputs in quarter 1: Electricity Operational Forum, Summer Outlook report, and Winter Review and Consultation.

Alongside this, in June, we launched a new BSUoS Report developed through engagement with suppliers. As requested by stakeholders, the report now provides a 24-month rolling forecast, with a range based on historical forecast error. We will provide a monthly explanation for the drivers and any significant divergence between outturn and forecast, along with analysis of forecast error statistics, and volatility of the balancing cost categories. The report will be published earlier in the month than our previous outturn and forecast information, meaning customers can see the latest forecast and drivers for outturn BSUoS sooner.

Exceed Baseline Performance

Overall in Q1 some clear progress has been made towards delivering additional value. Our customers called for enhanced transparency and accessibility of balancing cost information to help them manage their businesses more efficiently. In response to this, we launched and trialled a prototype information portal with customers that includes and provides our BSUoS forecast material. In May, we completed the development of Phase 1 of this portal which will provide both BSUoS forecast and out-turn data. We also prepared the stakeholder engagement activities to provide input into Phase 2 which will focus on providing more granular balancing cost information.

In June, we held two webinars to demonstrate the new portal and forecasting material and then arranged follow up sessions with customers to collect feedback. This has been a new way of working and sharing information with market participants that allows us to reach wider and more diverse audiences. Throughout the quarter, we have also delivered webinars to explain the results of tenders for Ancillary and Balancing Services and provided a good opportunity for industry to ask questions and provide feedback. The number of attendees has increased for the FFR to 44 and we had the first FR webinar. We have had very low response numbers when we have requested feedback so we are investigating other ways of engaging with our stakeholders for future webinars. Full details of our webinars are provided in Metric 1.

We further expanded the Carbon Intensity platform, adding a new regional forecast of Carbon Intensity. We launched this in May at the House of Lords. The platform is a success and we are consistently seeing up to 500 users per day accessing the site and up to 45,000 hits per day on the platform. Users vary from individuals, apps,

charge platforms like Pod Point, heat pump providers such as Sunamp. Our delivery has been discussed by stakeholders on the international stage and has laid the foundations for our recent strides to establish us as an innovative leader in Artificial Intelligence in the energy industry. The forecasting research developed whilst creating this nationally used platform is being built into the solar and wind predictions that make up our GB Demand Forecast. The more accurate our demand forecast that is published at day ahead the better market participants can self-balance which saves the consumer money.

The half-hourly BSUoS forecasts will start from Q3, following completion of modelling and development work. Our Trades Data Transparency metric is not currently reported because the trades are not time- stamped within the portal. This is required to show that the trade publication is carried out within the one hour required in the metric. The implementation of this new functionality was tested and minor adjustments have been identified and implemented for further testing.

The detail of performance can be found here.

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

Long Term Vision and Consumer Value

For this principle, our vision is that we drive overall efficiency and transparency in balancing, taking into account impacts of its actions across time horizons.

We expect to potentially unlock very large consumer value of greater than £50 million in the short term.[2] In the long term, this area will become a major contributor to consumer value.

Our Deliverables for Q1 2018

Outcome	2018/19 Deliverables	Documentation Link
Develop our information portals and events	• Successful hosting of our Electricity Operational Forum event and expansion of our channels of information dissemination to support wider engagement of market participants and service providers	• https://www.nationalgrid.com/uk/electricity/market-operations-and-data/electricity-operational-forum

Our 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; whilst developing an integrated view and approach to identify the challenges that the Control Centre will face, and the solutions we will use in the near-future.

Performance this Quarter

We are on track to meet baseline performance, but we are operating in a challenging environment of multiple changes to our process and system. Whilst we have continued to deliver economic and efficient decision making in the control room to maintain standards in reliability and security of supply, planning and implementation of new systems and system changes remains complex. We have ensured the integration of new technologies into our suite of balancing tools and deployed new resources in to this space to manage the delivery risks we see, we must continue to monitor this area through Q2.

We have gone above baseline expectations in delivering the collaborative work on mitigating the risk from vector shift which was completed in early June, saving money for the consumer in both the short and long term.

Meets Baseline Performance

The first quarter of the year traditionally signals the start of 'outage season' when the Transmission Owners request access to the transmission system to undertake maintenance on their assets or to reinforce the network by adding new assets. We performed well during this period by facilitating over 4,700 outages on the transmission system and ensuring that the system remained resilient to potential faults whilst balancing the system economically. To do this we completed approximately 20,000 offline studies analysing the numerous generation and fault scenarios that would need to be secured.

At the Electricity Operational Forum in April, we provided our regular update on balancing costs and BSUoS forecast. We highlighted to stakeholders the potential impact that the WHVDC fault could have on future BSUoS charges. We also responded to feedback from attendees and provided query clinics where stakeholders could gain insight into the work we have been doing on Innovation, the Response and Reserve Roadmaps and the Network Options Assessments developments. Attendees were also given the opportunity to discuss any specific issues with contracts, settlements and/or trading in one-to-one sessions. We received positive feedback on the information we provided at the Forum on balancing costs but the respondee numbers were very low and we will seek to improve on this at future events. For more information please refer to the Delivering

[2] See Pages 38 – 40 here for details https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

Performance through stakeholder engagement document published alongside this report.

An issue has been raised to us by a number of market participants recently regarding Non-BM STOR impact on cash out prices. Whilst we believe these issues will be resolved with the introduction of BSC modification P354 we will explore with industry if there are any suitable interim measures that it might be appropriate to enact.

In April, we announced the IS Change Forum would be held after the Electricity Operational Forum on 4 July. This will be an important initial step in re-setting our approach to industry stakeholder engagement associated with changes to our core systems. The focus of the day will be to communicate the change landscape within the electricity industry, inform market participants about how we are setting ourselves up to deliver change, share with market participants our progress and plans on specific projects that will impact them as well as to seek feedback to ensure two way conversations on IS changes. ELEXON are set to attend the event as a key industry partner to share details of their Foundation Programme[3]. The event will be organised to run alongside the ESO Operational Forum to optimise participant's time whilst they were in London. The IS Change Forum event is open to any attendee in the morning with Operational Forum attendees free to attend after lunch. The aim is to set up the session as a relatively informal trade fair promoting individual and group conversations to cover topics of interest such as EBS.

The aim of the Electricity Balancing System (EBS) project was to provide a modern replacement of legacy balancing mechanism systems in order to optimise balancing processes. At the outset of the programme in 2010, the EBS was intended to be in place and operational by mid 2016 but the project has suffered delays. EBS is a complex IT project and NGET continues to work with the Supplier to try to overcome the challenges faced.

In parallel we have mobilised a forward looking 'Balancing Programme' to ensure we can make the appropriate changes required to meet our regulatory obligations and the needs of the fast-changing energy system.

Lessons Learnt
We want to be open and reflective about areas where we could have done better under this Principle, and what we are going to do differently going forward.

The collaborative agile approach we used to mitigate Vector Shift risk has saved money for the consumer. We will look to understand if this approach could have been developed faster and seek to take learning from this experience to accelerate other operational challenges.

Exceed Baseline Performance

Quarter 1 has delivered some solid wins for the consumer that has driven additional value. In May, the delivery of a unique collaborative commercial solution to mitigate vector shift (VS) risk was a great result. We worked with Ofgem and DNOs since May 2016 after VS was first noticed after a local demand on the transmission network had increased immediately following a fault on the transmission system. We worked to investigate the cause with Western Power Distribution (WPD) and concluded that embedded generation disconnected due to VS protection settings. We established that changing the protection may be the least cost to the consumer than other mitigation strategies. We worked with Ofgem and the three DNOs to get the right approach and then, design and implement a new process to change the protection in the at-risk areas. This work continued through the start of June. It has delivered a great commercial result through Quarter 1 starting from May 2018.This has saved us taking up to £1.5m of additional balancing actions on each sunny weekend to manage VS risk. When this process was reviewed, a few areas of improvement were identified including engaging with distribution companies earlier and providing clear proposals and recommendations of next steps to all parties. We will be using the lessons learnt from this process to improve how we work with the distribution companies and Ofgem to change the settings of all existing RoCoF relays to 1Hz/s following industry consultation in July.

The SO Innovation Strategy team attended April's Ops Forum, where we received feedback that we needed to be more visible at events. We have acted on that feedback and have since exhibited at both Utility Week Live and the FES conference, as well as attending a range of smaller, more focused events. We have also been engaging heavily around our bid for this year's Network Innovation Competition, gathering feedback on our proposed approach from DNOs, renewable and other DER developers. As part of our work to encourage parties to come to us with proposals for innovative collaboration, we published a video 'Innovate with the System Operator' describing why innovation is important to us and for delivery of consumer value and setting out how other parties can get involved to work with us. This can be found on our website here: https://www.nationalgrid.com/uk/investment-and-innovation/innovation/system-operator-innovation.

3 https://www.elexon.co.uk/documents/groups/svg/2018-meetings-svg/209-july/svg209-foundation-programme-update/

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

Long Term Vision and Consumer Value

Our vision for this Principle is to have simple, fair transparent rules for procuring balancing services to maximise competition where possible. In our Forward Plan, we described how we will use this to facilitate new business models and technologies into the market to deliver a distributed, smart, flexible electricity system.

We expect that by promoting competition and developing new markets, together with increasing participation in balancing services markets, we can potentially unlock consumer value in the short term[4]. In the long term, flexible markets are one of the keys to releasing maximised value.

Our Deliverables for Q1 2018

Outcome	2018/19 Deliverables	Documentation Link
Promote competition and develop new markets in balancing services	• Standardise the FFR product structure and simplify the contract	• https://www.nationalgrid.com/uk/electricity/balancing-services/frequency-response-services/firm-frequency-response?overview
	• Publish roadmaps on the development of markets for voltage, black start and a guidance note on thermal constraints.	• https://www.nationalgrid.com/sites/default/files/documents/National%20Grid%20SO%20Product%20Roadmap%20for%20Restoration.pdf • https://www.nationalgrid.com/sites/default/files/documents/National%20Grid%20SO%20Product%20Roadmap%20for%20Reactive%20Power.pdf

Our Key Baseline Activities:
To devise and run the processes to procure system balancing and ancillary services, we settle and report on the outturn of ancillary services contracts. We also support new and existing providers to help them participate in the ancillary and balancing services markets and tenders. We employ a schedule of open tenders to purchase a variety of products and services.

Performance this Quarter

We have achieved against our baseline expectations in the first quarter. We have started delivering on our balancing services reforms and helped on board new providers and supported new non-BM parties to participate in the markets. This increased participation should provide extra market liquidity now and in the following months. The simplification and standardisation of products and services is just one of the ways we have started to reduce barriers to entry.

We put in place foundations for strong performance to exceed expectation and bring additional consumer value in the coming quarters. We made some encouraging progress and got strong positive stakeholder response on our Product Roadmaps however must be weighed against the announcement of a delay to the auction trial.

Meets Baseline Performance

We facilitated the entry of two new Non-BM units in May, by providing on-going support to new providers, of which one entered the FR market and the other entered the FFR market. In June, 35 new units entered the first long term FFR tender under the new FFR market structure. New entrants to the market, leads to an increase in market liquidity which allows increased competition between market participants and should drive down the cost for the consumer. We provided the support for this to tight deadlines to help providers navigate updated market rules.

The impact of our balancing services reforms is also filtering into the baseline work with one new non-BM provider on-boarded to compete in the FR market for the June tender. This is the first non-BM provider to enter in 18 months, and has taken the

[4] See Pages 38 – 40 here for details https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

Lessons Learnt
We want to be open and reflective about areas where we could have done better under this Principle, why this happened and what we are going to do about it going forward.

Striking the balance between pace of delivery and providing the industry with engagement opportunities and early visibility of change will be an on-going challenge for the work in this principle.

In this quarter, we took steps to standardise the FFR market through the use of 4-hourly blocks and seasonal windows from the May tender. Stakeholders have generally been positive about these changes, although one learning point has been the need to better sign-post future changes in advance and understand impacts and interactions on existing contracts during the transition period. Going forward we have launched the Future of Balancing Services newsletter to better sign-post changes and will look to utilise our account management team to better test potential change impacts with providers prior to launch.

The re-planning of the auction trial delivery is another learning point from this quarter, earlier engagement with stakeholders and specification development would have enabled us to better manage expectations in this area. Going forward we will seek to do this, while continuing to challenge ourselves with stretching but achievable delivery timescales.

non-BM fast reserve provider total up to three. We provided guidance for how to participate in these markets and how to complete tender forms to ensure providers are supported on their new venture. In June, we launched a series called 'The Power of Frequency Response' on our YouTube channel. This has received strong engagement with over 1,000 views in the first month. The next series, on reserve products and the future of Balancing Services will be following soon.

In this quarter, we hosted our Power Responsive Annual Conference in June. This event brought together stakeholders including industrial and commercial energy users, storage developers, small-scale generators, suppliers and aggregators, finance providers, energy experts and policy makers. This provided the opportunity to facilitate discussions on the work that has been progressing on demand side flexibility and the Power Responsive programme. From 80 delegates at the first annual Power Responsive event in 2015, 350 delegates registered to attend this year. Whilst there is still work to be done, the achievement of shifting the perception of demand side flexibility from a crisis response to a business as usual proposition was noted, and was supported by the fact that continually, over the last year, more than 30% of tenders received for National Grid's balancing services have been from demand side providers. For some months, this has exceeded 50%.

In response to Stakeholder feedback that we need to provide a better forward view of all the changes that are coming into the balancing markets we published our first Future of Balancing Services newsletter in May; since publication it has been downloaded 222 times and positive feedback from stakeholders. This monthly newsletter provides updates via the Future of Balancing Services webpages to increase transparency and provide timely progress updates on our work to reform balancing markets.

Exceed Baseline Performance

On 30 May, we achieved a significant milestone of publishing the Product Roadmaps for Restoration[5] and Reactive Power[6] on the Future of balancing services website. The roadmaps follow on from last year's System Needs and Product Strategy (SNAPS) publication, and fulfil commitments made in our Forward Plan. They set out when and how we will develop the Reactive Power market and Restoration service in order to improve transparency and increase competition, whilst meeting our anticipated operational needs. The actions intend to create more liquid markets to drive value for the end consumer. Diversifying the technology mix of providers will provide the opportunity to develop alternative approaches to system operation and meet future operational needs.

Industry feedback on the Roadmaps was widely positive, with Cornwall Energy publishing: *"These are the first proposals under SNAPS since December 2017's Frequency Response and Reserve roadmap, and it is clear that NG has put its time to good use. Competitive markets open to a more diverse range of participants to provide services is the optimum route to maintaining grid stability and resilience at least-cost to the consumer."*

There has been a delay in publishing a guidance note on Thermal Constraint Management, this had been planned for issue in June but has slipped to July. While not a 'Roadmap' as such, the key transformative actions to develop these requirements are detailed and being delivered in our other Roadmaps and publications. The aim of the note is to improve the transparency of our approach to constraints and ways in which market providers may be able to get involved.
Since the publication of the System Needs and Product Strategy in 2017, we have listened to stakeholder feedback and made significant progress with our strategy and delivery of reforms to Balancing Services markets. This quarter we have delivered a simplified FFR product structure and market as part of the Response and Reserve Roadmap. This was rolled out in the May tender and has successfully reduced barriers to entry for new providers, resulting in an increase in the number of units tendering into the FFR market. We have also published an Outline Change Proposal (OCP) for simplified Response contacts, which will improve the process efficiency of tendering into the market. We are awaiting feedback from industry and will incorporate this into the new framework. In May, we also took steps to standardise the FFR market through the use of four-hourly blocks and seasonal windows from the May tender. These will improve transparency of market price and our requirement, and enhance competition. Stakeholders have generally been positive about these changes, although one learning point has been the need to

[5] https://www.nationalgrid.com/sites/default/files/documents/National%20Grid%20SO%20Product%20Roadmap%20for%20Restoration.pdf
[6] https://www.nationalgrid.com/sites/default/files/documents/National%20Grid%20SO%20Product%20Roadmap%20for%20Reactive%20Power.pdf

better sign-post future changes in advance and understand impacts and interactions on existing contracts during the transition period.

In May, we also held a number of small but well attended technical workshops to engage with interested parties at a working level to get detailed feedback on our proposals for Fast Acting Frequency Response, which we will use to support the design work. The detailed discussions between the parties on service design elements and reasoning were well received. In addition, we have also had good feedback from stakeholder meetings held on the Fast Reserve process for summer 2018 making it clear that we have targeted market participants' areas of concern.

Since the publication of the Product Roadmap for Frequency Response and Reserve we ran a procurement event to identify a preferred supplier to deliver the trial of closer to real time procurement through a weekly auction. Initial design work has been progressed with the selected company through a number of workshops, and we are now at the point of finalising contractual details which will allow us to publish the detailed description of the algorithm and platform functionality. This information was due to be published by end of June; however as a result of delays in agreeing the contract with the supplier we are anticipating this will be complete by end of July.

In the Forward Plan, the rollout date for the auction platform was given as December 2018, based on an estimate of the implementation timescales for a basic auction design. Through the workshops with the supplier, and in discussions with stakeholders at various events, the required functionality of the auction platform has evolved. This additional functionality is required to deliver the aspects our stakeholders need. We have chosen to delay and produce a platform which is fit for now and the future rather than continue with the earlier date without all the functionality desired by stakeholders. To minimise barriers to entry of new technology types, and maximise the level of competition, the auction will need to procure a number of frequency response products both separately and together, using value functions and curtailable bids. This level of functional design will require the supplier to create a 'clearing engine' using a new complex algorithm, rather than being able to use an existing algorithm and trading platform. The current estimated date of rollout has therefore shifted to June 2019; however we will be working closely with the supplier to identify areas where time can be saved through agile sprints or parallel working. This more complex functionality is necessary to ensure that the auction trial delivers the learning required to feed into future full-scale implementation of auctions in all our balancing services. It is vital that we trial new procurement routes thoroughly and in detail to maximise the learning available and ensure that the issues stakeholders have raised with our existing procurement methods are fully addressed. The re-planning of the auction trial delivery is another learning point from this quarter, earlier engagement with stakeholders and specification development would have enabled us to better manage expectations in this area. Going forward we will seek to do this, while continuing to challenge ourselves with stretching but achievable delivery timescales. As per July's Future of Balancing Services Newsletter, we will continue to use this channel to provide updates on the auction platform.

Principle 4
Promote competition in the wholesale and capacity markets

Long Term Vision and Consumer Value

We are committed to enabling the transformation towards a smarter, more flexible energy system. 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 will 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 helping industry to navigate the strategic challenges and reduce the barriers to participating.

We expect to potentially unlock large value between £30 million and £50 million in the short term[7]. 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[8].

Our 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
• 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.

Our Deliverables for Q1 2018

Outcome	2018/19 Deliverables	Documentation Link
Continual improvement of network charging processes	• Improved transparency and publication of charging data – Phase 1: Customer Access to information	• https://www.nationalgrid.com/uk/electricity/charging-and-methodology/transmission-network-use-system-tnuos-charges • Letter published explaining how incentive income will be collected through BSUoS: https://www.nationalgrid.com/sites/default/files/documents/BSUoS%20Charging%20Circular%20-%202018-19%20ESO%20Incentive%20Recovery.pdf
Facilitate the development of the code and charging framework	• Deliver Charging Futures (CF) Forums that are open to all network users	• http://www.chargingfutures.com/whats-happening/charging-futures-forum/23-may-2018-forum/
	• Deliver webinars, podcasts and publications under the CF Brand	• https://soundcloud.com/user-967817983 • http://www.chargingfutures.com/learn/webinars/ • http://www.chargingfutures.com/media/1222/cff_23_may_summary_final.pdf
We shape the outcomes of the regulatory frameworks to provide value and mitigate risk for consumers	• Deliver a stakeholder communication strategy to provide industry readiness for the implementation of EU Network Codes	• https://www.nationalgrid.com/node/118041

[7] See Pages 38 – 40 here for details https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

[8] See the National Infrastructure Commission's 'Smart Power' Report for further detail on the future £8 billion savings. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/505218/IC_Energy_Report_web.pdf

Lessons Learnt

Next month we will fully relaunch the delivery schedule for Principle 4 in response to Ofgem's Formal Opinion. We aim to take on board the feedback from Ofgem, notably around the fact that our initial version of principle 4 was tailored around our approach to Charging Futures and our Code Administrator performance activities, missing significant areas of our baseline activity, and confusing baseline and transformational outputs.

We recognise that there are many activities that we deliver within our ESO role that drive competition in wholesale and capacity markets. The new revised principle 4 has now been made broader in terms of scope to capture these key activities. We have thought hard about the role we play in shaping the debate to drive competition. Principle 4 is now more content focused and acknowledges the outcomes we drive both across GB and Europe. For example, over the remainder of this year and alongside Ofgem's Charging Futures publications and consultation we will actively engage with industry on network charging issues. In line with the letter we published in May (https://www.nationalgrid.com/sites/default/files/documents/Open%20letter_Compliance%20with%20838_2010.pdf) we consider that many charging issues can be complex and with a net impact on market participants as a whole it is important that the right choices are made to give the best overall benefits to consumers. We feel it is therefore important for NG ESO to have a clear voice on these issues to deliver changes to which promote competition and deliver consumer value.

We have also provided deliverables that demonstrate additional value over and above our baseline activities. As an example, we are leading on the implementation of the EU Network codes, specifically within the Grid Code. However, we are now showing content leadership in preparing industry readiness for some of these complicated changes by working on a suite of stakeholder-centric communication materials.

Performance this Quarter

We met our baseline performance activities over the first quarter; we recognised that we had to do more to deliver value over and above that baseline.

In response to feedback from stakeholders and Ofgem, we have been reworking and increasing our ambition in this area, and we will relaunch the plan associated with Principle 4 with a clearer description of what we deliver as baseline, and a revised set of activities that we think will add consumer value over and above this baseline in our July Report next month.

Meets Baseline Performance

In our role as Code Administrator for Grid Code and CUSC we drove forward a process which allows the Code Panels to make decisions on code modification prioritisation. This enables more efficient and targeted use of industry time to progress those modifications that are considered by Code Panels to be more important and imperative to progress on a timely basis.

In both April and June, we published our updated views of transmission charges for 18-19. The webinars on both publications were well attended and recordings are available on the website[9]. We have also written[10] to customers seeking their input on the 5-year view of how TNUoS tariffs may evolve over the next five years, which we will publish in August.

During May, we shared at the Transmission Charging Methodology Forum how charges are calculated for those seeking a transmission connection on Scottish islands. The intention is to ensure these connections are treated in the same way as an onshore connection would be.

We met with customers to discuss CUSC modifications against the backdrop of the Access and Forward Looking Charges Task Forces and the current pipeline of change. We facilitated discussions with our customers and avoided seven potential CUSC modifications with customers agreeing that significant future analytical work and industry debate is required before these modifications can be raised. Many of which would also interact with the work covered by Charging Futures and therefore would be inefficient to raise at this time.

We continue to support the work of the Access and Forward Looking Charges Task Forces in their strategic review and the Charging Delivery Body – providing input in our unique position as electricity System Operator. We also communicated with our customers our intention to ensure the interpretation of the EU cap on generation charges is actively reviewed given the Targeted Charging Review (TCR) and the Access and Forward Looking Charges Task Forces and the outcome of the CMA appeal on this topic which is of critical importance to all our customers.

We added a new deliverable to our Principle 4 Forward Plan commitments and in June, we launched our planned events schedule in relation to the Electricity European Network Codes. This is to help stakeholders to engage with industry change by providing one place to find out how they can learn about, shape and manage the European Network Code implementation in GB. These events have been designed to cut through the complexity involved with the Network codes by setting up a series of events, webinars and podcasts to provide clarity and awareness of the work being conducted across National Grid. We will be adding more educational content and adapting it to the needs of our customers and stakeholders in the electricity industry as we go.

Exceed Baseline Performance

We further developed our approach to facilitating competition in markets through targeted stakeholder engagement. In April, we contacted customers to understand their experiences of the code modification journey and had limited response from them. We believe this to be due to the sheer volume of change which is going on in industry at this time and the significant amount of engagement they must receive from us. As a result, we are taking a more personal approach to engage directly and discuss our request with them – the aim of this is to help ensure we get the stakeholder engagement we feel we need in order to deliver a step change in our code administration function, but also that our customers better understand the ask from them need not be onerous or time consuming.

[9] https://www.nationalgrid.com/uk/electricity/charging/transmission-network-use-system-tnuos-charges

[10] https://www.nationalgrid.com/sites/default/files/documents/TNUoS%20FYV%20June%202018.pdf

In May, we supported Ofgem with the delivery of the third Charging Futures Forum (CFF) where Ofgem presented an update on the TCR as well as Access and Forward Looking Charges. We have previously received feedback that we needed to help people to learn, ask and contribute in new ways. In our role as Lead Secretariat, we facilitated greater industry participation in network charging and access reform through a targeted engagement approach.

By bringing all the complex issues of charging and access together in one forum and providing more accessible materials, such as podcasts and briefings, we facilitated the participation of a wider audience in industry change processes.
There is evidence that this approach is working. For example, in May our podcast on Access and Forward Looking charges has been listened to 136 times, bringing the total number to date to 469 times. In addition, the number of parties wishing to attend the seminar has increased by 74%, to 154, since the first CFF. Furthermore, stakeholders have told us that the supporting materials, such as briefings and podcasts, allow them to come better prepared and get more out of the event.
Further detail on the metric 11 - Charging Futures can be found in the Appendix.

Some constructive feedback was received that the last forum could have been more interactive; although we did have breakout sessions to facilitate discussion there is an appetite for even more interactive sessions in the future. We also received feedback that some of the presentations could have been more engaging. We will take this feedback into account for the next forum and working with presenters to improve on this for the next forum.

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

Long Term Vision and Consumer Value

The vision for this Principle is to develop ourselves as an ESO who facilitates the move to a low-carbon grid and joins up the way we design and run the network across transmission and distribution. This will ensure decisions are made efficiently across all networks, speeding up connections by optimising the use of existing network infrastructure; and ensuring the broadest possible assessment of solutions to future transmission system needs.

Through cross-industry collaboration on efficient network planning and development, and continual improvements to our transmission network development publications, we expect to potentially unlock large consumer value between £30 million and £50 million in the short term[11]. In the long term, whole system sits at the heart of releasing consumer benefits.

Our 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.

Our Deliverables for Q1 2018

Outcome	2018/19 Deliverables	Documentation Link
Maintain and improve the quality of our insights publications	• Publish the Network Development Roadmap consultation	• https://www.nationalgrid.com/sites/default/files/documents/Network%20Development%20Roadmap%20consultation.pdf
	• Publication of the NOA Report and methodology	• https://www.nationalgrid.com/sites/default/files/documents/NOA%20methodology%20DRAFT%204.0%20201804090%20-%20for%20consultation.pdf • https://www.nationalgrid.com/sites/default/files/documents/NOA-methodology-July-2018.pdf
Improve our cross-industry collaboration for whole system network planning and development	• Publication of the Western Power Distribution (WPD) and UK Power Networks Regional Development Programme Learnings	• https://www.nationalgrid.com/sites/default/files/documents/WPD%20RDP%20South%20West%20Peninsula%20Technical%20Report_Final.pdf • https://www.nationalgrid.com/sites/default/files/documents/WPD%20RDP%20Whole%20System%20Analysis_Final.pdf • https://www.nationalgrid.com/sites/default/files/documents/WPD%20RDP%20Process%20Report_Final.pdf

[11] See Pages 38 – 40 here for details https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

Lessons Learnt
Next month we will fully relaunch the delivery schedule for Principle 5 in response to Ofgem's Formal Opinion. We aim to take on board the feedback from Ofgem which highlighted the need for further detail on Deliverables and evidence of the work we are doing to enhance collaboration.

We intend to be open and reflective about areas where we could have done better under this Principle – for example, when we started to analyse submitted distribution solutions to high-volts issues it became clear that our articulation of system needs didn't quite hit the spot, so we refined the way we articulated transmission system needs so that they were easier to understand and interpret.

Performance this Quarter

We met baseline expectations this quarter and put in place foundations for strong performance to exceed expectation and bring additional consumer value. However, we recognise that much of the transformational activity that we are undertaking in this space is not easily visible to our stakeholders, and our Forward Plan has not gone as far as it could to provide a simple, accessible window in to the work that we are doing and with who – along with the rationale, outputs and outcomes. We've had feedback that some of the things that we have produced have come as a surprise to key stakeholders in the DNO community, and that we've not given the industry sufficient visibility of our plans through Q1.

We will rectify this in Q2 with a relaunch of this Principle to provide greater clarity on baseline and transformational work, and more specific detail on deliverables that are currently described in concept.

Meets Baseline Performance

For network development during Q1, we published the revised NOA 2018/19 methodology for consultation and, following consideration of responses, created final proposed methodology for submission to Ofgem in July for approval – an important step that ensures the annual network development process remains up-to-date.

We also began the process of building the models to be used in the ETYS/NOA processes, including incorporating the latest scenario data from our Future Energy Scenarios (FES) team; and we began the process of issuing transmission boundary requirements to TOs for them to prepare options that meet future needs, when our NOA modelling starts in earnest later in the year.

Also in Q1, we continued to work with DNOs on embedding recent Statement of Works processes in our trial areas, and attended the April Transmission Charging Methodologies Forum to discuss proposals for raising the issue as a formal Connection and Use of System Code (CUSC) modification proposal. A CUSC modification (CMP298) was subsequently raised at the April CUSC Panel, where it was agreed to send the proposal to a CUSC Workgroup for progression.

Exceed Baseline Performance

In Q1, for network development, we continued to collaborate with DNOs through the Open Networks Project to develop a new whole-system approach to dealing with transmission system issues. We have established 'pathfinding projects' as a way of developing an integrated approach to tackling regional transmission network issues, seeking solutions across both transmission and distribution. Pathfinding projects are collaborative and allow us to work closely with relevant parties to understand transmission network issues, identify a range of credible non-transmission solutions to solve the transmission issue and develop our cost/benefit assessment methodology to assess those solutions against transmission solutions, so that the best one can be recommended. The ultimate aim is to enable a broader range of transmission network issues to be included as part of the NOA process.

Our pathfinding projects for 2018/19 seek to use a regional NOA concept to tackle areas of persistent high volts on the transmission network. During Q1, in conjunction with Open Networks, we have begun work to enable us to analyse distribution solutions to high-volts issues in Northern Powergrid's (NPG) North East area and Electricity North West's (ENW) Pennine area. We have made good progress in the articulation of transmission network issues and the information and data required on distribution solutions to allow them to be modelled and costed appropriately. Through this process, we realised that our articulation of system needs didn't quite hit the spot, so we have refined the way we articulate transmission system requirements so that they are clearer and enable the broadest possible range of options to be submitted for consideration. We have also developed our cost-benefit analysis approach to include a wider range of input costs. Results from this new approach to assessing a wider range of solutions to transmission network issues should be available later in the year.

In Q1, in the context of facilitating further DER connections, we concluded the design phase of our in-flight RDPs with Western Power Distribution and UK Power Networks. These RDPs have provided an environment in which we have delivered a step-change in the way we analyse Transmission and Distribution networks on a whole system basis. We have devised an enhanced approach to modelling distribution-connected demand and generation to better understand its impact on transmission in both a steady state (pre-fault) and dynamic (post-fault) sense. This has allowed us to better understand the whole-system network capability, and hence to identify actions needed to 'unlock' capacity for further DER connections in both the South-East Coast and South-West Peninsula areas of the country.

The delivery phase of our work to enable further DER connections in the WPD and UKPN regions has now commenced. The approach mirrors the transmission 'connect and manage' principles in that it provides both the technical and commercial means to manage the type of transmission issue that can arise at times of peak solar or wind output, which include the risk of circuit overloads and of dynamic voltage performance issues.

We have translated initial 'Heads of Terms' into a first draft commercial contract for a DER transmission constraint management service. We have worked hard to ensure the contract is consistent with the principles we are following to simplify our service term, and in alignment with the technical solution to deliver appropriate visibility and controllability of DER output, and visibility of potential service conflicts due to distribution network constraints.

We have progressed this commercial work in tandem with operational work to understand and mitigate the risk of conflict between the needs of the transmission network and the capabilities of the distribution networks, which is taking place within Open Networks. This work aims to test two different approaches to conflict management - one where we use signals from the DNO to form a view of the likely impacts of the distribution network on provision of transmission services from DER; and one where the DNO models in real time the impact its network will have on the effectiveness of transmission services from DER. Results from this work are expected later in the year.

We have established a web page[12] where we are publishing the learning from our RDPs – we have completed the upload of documentation for WPD and are in the process of gaining final sign-off for the equivalent for UKPN. We have identified relevant Open Networks deliverables and have been feeding in relevant learnings throughout Q1.

[12] https://www.nationalgrid.com/uk/publications/regional-development-programmes

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

Our 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.
• 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.

Lessons Learnt
Next month we will fully relaunch the delivery schedule for Principle 6 in response to Ofgem's Formal Opinion. We aim to take on board the feedback from Ofgem which highlighted the need for further detail and clarity on Deliverables and evidence of the work we are doing to enhance collaboration.

Significant work has already been done to redefine the Delivery Schedule scope for each Principle supporting the role, Facilitate Whole System Outcomes. We want to get it right and so the relaunch will be in July's Report. It will show what changes we have made to set our vision more clearly and to define the activities we need to deliver good outcomes in this area.

Long Term Vision and Consumer Value

The evolution of whole system operation and optimal use of resources begins now with finding new approaches to optimising whole system operation.

We want to be an ESO who coordinates effectively to ensure efficient whole system operation and optimal use of resources; improves our cross-industry collaboration on whole system; implement learning from our major innovation projects and improves the service and information for new connection applications.

Under this Principle we expect to potentially unlock medium consumer value in the range of £15-£30 million in the short term[13]. This area is one where the main consumer value will be achieved in the long term. Actions that we take with the industry now are central to the ability to unlock vast financial future savings.

Our Deliverables for Q1 2018

Our activities in Q1 are laying the foundations for deliverables in Q2 and Q3.

Performance this Quarter

We met baseline expectations this quarter and put in place foundations for strong performance to exceed expectation and bring additional consumer value. However, like Principle 5 we recognise that much of the transformational activity that we are undertaking in this space is not easily visible to our stakeholders, and our Forward Plan has not gone as far as it could to provide a simple, accessible window in to the work that we are doing.

In addition, we haven't brought enough visibility to the work that we do as baseline, in particular with the TOs in managing connections and access to the transmission system, which also makes it difficult to identify the impact of transformational activities as well as hard to demonstrate we are meeting baseline.

The lack of deliverables reported in this principle for Q1 makes it hard for our stakeholders to see that we have indeed set the foundations for subsequent quarters. We will rectify this in Q2 with a relaunch of this Principle to provide greater clarity on baseline and transformational work, and more specific detail on deliverables that are currently described in concept. We will also refresh the metrics that we are using to measure success in this Principle, and consider whether some of our metrics might be better indicators of success in baseline delivery.

Meets Baseline Performance

We continue to meet our commitments to engage with DNOs, stakeholders and to plan and optimise the system. Throughout the first quarter our two metrics on Connections and System Access Management for this principle have shown solid performance. Connections Agreement Management had its exceeds baseline performance level challenged by Ofgem as lacking ambition. Internal process changes have allowed us to increase the level of exceeds expectation up from 80% to 90%.

Exceed Baseline Performance

Achievement of progress which exceeds baseline expectation on whole system issues will be on a medium to longer term basis with minor milestones in the shorter term. In Q1 the ESO has made progress to this end as it engaged with DNOs on connection opportunities for those providing energy storage. We continued to try to build stronger relationships with the DNOs to allow greater collaboration. Increasing cooperation with them and using shared connection assets at the Transmission /Distribution interface can provide increased opportunities to connect generation and storage assets in certain geographies. Success would provide increased access to the network for businesses keen to get onto the system and at the same time if the right contractual agreements are in place it could provide the ESO additional options when it comes to system balancing which could drive consumer value.

The Dumfries and Galloway area is one region where the ESO has an active RDP. On 6th June, we attended a forum in Scotland which allowed Scottish Power (SP)

[13] See Pages 38 – 40 here for details https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

Transmission, SP Distribution and other interested parties to inform and discuss issues related to the region and explore potential new solutions. Progress is made as cross system collaboration is at the heart of new thinking to head off challenges around maximising potential new connections and addressing how to best manage local network congestion. New technology or more coordinated application of the existing products to solve new issues and how the industry codes and agreements come together to support the current and future challenges are not achieved quickly but progress is being made one step at a time.

A key output of the GB System Security metric will be the first ESO Six-Monthly Operability Report which is due to be published in Q3 2018/19. During Q1 2018/19 we have been further refining our processes for identifying emergent and interacting system operability challenges and coordinating our planning activity. We have developed our stakeholder engagement plan and we will be engaging with stakeholders in Q2 2018/ to seek views on the report's content. Our report will detail our plan and milestones for eliminating the operability gap in each security area. We are currently on track to deliver the Six-Monthly Operability Report on schedule.

Principle 7
Facilitate timely, efficient and competitive network investments

Long Term Vision and Consumer Value

For this Principle, our vision is to work to maximise competition in delivery of network investment and build new tools allowing the market to explore alternative solutions to meet transmission system needs.

Work that supports the outputs under this Principle will provide long term benefits in improving competition in efficient network investment by providing better engagement and facilitating more participation. Through this we expect to potentially unlock large consumer value in the range of £30 million to £50 million in the short term[14].

Our Deliverables for Q1 2018

Outcome	2018/19 Deliverables	Documentation Link
Maintain and improve the quality of our insights publications	• Publish the Network Development Roadmap consultation	• https://www.nationalgrid.com/sites/default/files/documents/Network%20Development%20Roadmap%20consultation.pdf
	• Publication of the NOA Report and methodology • Incorporate Interconnector methodology within the NOA Report	• https://www.nationalgrid.com/sites/default/files/documents/NOA%20methodology%20DRAFT%204.0%20180409%20-%20for%20consultation.pdf • https://www.nationalgrid.com/sites/default/files/documents/NOA-methodology-July-2018.pdf

Our 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 Future Energy Scenarios.
• Publishing the future transmission boundary requirements in the ETYS, informed by the Transmission Owners.
• 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.

Performance this Quarter

We have delivered against all our baseline commitments for Q1 making significant progress towards publishing our NOA methodology. Taking on-board stakeholder feedback received during the consultation, we are making significant progress with our work that will drive value over and above this baseline through our Network Development Roadmap and our pathfinding projects; we have been analysing stakeholder feedback in preparation for publishing the finalised roadmap presenting our ambition plan for how the ETYS and NOA can deliver further value.

Meets Baseline Performance

We launched our NOA methodology consultation in early April which consolidated the methodology for interconnectors into the main NOA methodology for the first time. During the consultation period, we engaged with the TOs and ran a workshop for interconnector developers. The consultation closed following a six-week period; during which we received 14 responses (eight specifically on the interconnector methodology). These can be broken down into Environment (one), Industry other than TO (two), Transmission Owners (three) and Interconnector developers and associated parties (eight). This compares to 10 responses last year of which six were specifically on the interconnector methodology.

We have continued to provide the opportunity for stakeholders to ask questions and engage on the methodology. This has been through our regular weekly teleconferences with the Transmission Owners and through a stakeholder workshop we hosted on the interconnector methodology during the consultation.

[14] See Pages 38 – 40 here for details https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

Responding to the challenge – Metric 17
When developing the NOA consumer benefit performance metric, it was clear that commercial options would be at the forefront of ESO initiated options and, from experience, we know that in order to develop commercial options a high level of certainty of the need is required. As the NOA process considers options for delivery over the next 10 – 20 years predicting what will happen in future for commercial solutions to be effective is difficult. Historical information from previous NOAs suggested a target of one successful option was appropriate for this year. Also, as the TOs become more experienced with the process it will become more challenging for the ESO to initiate further options.

Lessons Learnt
In pushing ahead with our ambitious plans under this principle we haven't always got our engagement right, particularly with the network companies. We have reflected on this and are ensuring that we are considering the right way and timing to work through the ENA Open Networks project and also where we need to get better at engaging directly with individual DNOs or TOs at the right time.

In developing our capability in this area through the high voltage pathfinding project with Northern Power Grid and Electricity North West we didn't get the way we set out the need right first time around. We therefore took the decision to revisit this aspect as it will be important for us to get right for the enduring solution, even though it slowed down progress.

Interconnector parties attended our NOA interconnector workshop on Friday 18 May in preference to providing formal written responses and provided a range of potential revisions to the methodology. To ensure that all stakeholders were provided with an opportunity to comment on some of the proposed methodology revisions, we decided to extend the consultation period and run an online survey. This was well received by the community and provided useful quantitative and qualitative data.

Since the NOA consultation closed, we have been digesting the feedback, amending the methodology where appropriate and contacting those who provided feedback. We are working towards submitting the methodology to Ofgem in early July.

Exceed Baseline Performance

At the Electricity Operational Forum in April, we unveiled plans for our Network Development Roadmap consultation, proactively engaging a new audience on what we are doing to expand our processes to consider non-asset and distribution network solutions to meet transmission network needs.

On the 3 May, we published our Network Development Roadmap Consultation, which sets out an ambitious plan for how we will develop our Electricity Ten Year Statement (ETYS) and NOA to create much more value from the way the network is planned. It proposed that we will set out the transmission network needs clearly, invite network owners and market providers across transmission and distribution to tell us how they can meet those needs, when and at what cost.

As detailed in the appendix under Metric 18 – NOA Stakeholder Engagement, there have been a number of engagement milestones and events over the first quarter of the year to help raise the awareness of and gather views on our network planning tools and the developments we are proposing to them. These include the Electricity Transmission Operational forum, Energy Networks Association (ENA) Open Networks Interconnectors workshop. We have included information on the roadmap in the Energy Insights and Power Responsive newsletters to raise awareness among a broader audience as well as the usual subscribers to the NOA.

A lot of focus has been on engaging with the network companies – Transmission Owners and Distribution Network Operators – as they will be impacted by the changes to the greatest extent in the nearer term and who we are working with through the ENA Open Networks project. We have also engaged with generators, storage providers and other energy resources through Energy UK's Flexibility working group. In addition to engaging through these groups, we have met directly with academic parties and potential participants in the extended NOA process.

We received 13 responses to the Roadmap consultation, coming from network companies (7), academics (1) and potential market participants in the extended NOA process (5). Although this isn't a high number it is twice the number we generally receive to NOA consultations if the interconnector developers are not included. Since the consultation closed in the middle of June we have been busy analysing the responses and considering how we can best address the points they raise. The responses covered a range of views, with the majority welcoming the proposals. We received some very helpful, constructive suggestions and questions for clarification on issue such as transparency, how we will compare different types of options, how we will use probabilistic analysis and what is meant by stability. There were also a number of comments on working with and through the ENA Open Networks project. We aim to address these questions in the finalised roadmap or signpost when more information will be available.

Some of the questions cover the more detailed design aspects that we aim to develop and understand better as part of the pathfinding projects detailed in Principle 5. These are key deliverables to help us and other organisations develop the capability in our modelling, processes and data exchanges to enable us to implement the stretching changes to the ETYS and NOA processes. By carrying these out over the course of this year we hope to be set up to start introducing the changes into business as usual in the 2019 ETYS and 2020 NOA, with full roll out in the 2020 ETYS and 2021 NOA.

We have also started our ETYS analysis and are beginning to see some opportunities where alternative solutions to transmission reinforcement could be used to drive further consumer benefit.

The application of probabilistic analysis to the network needs is one of the commitments set out in the forward plan to help us adapt to the changing needs of the electricity system, where needs are no longer solely driven by winter peak requirements. This should help us make a real step change in our analysis to identify the needs of the changing transmission network and give us confidence our recommendations are resulting in the optimal outcome for consumers. We will be using a probabilistic approach in support of the existing deterministic approach to

enhance our compliance with the SQSS. The SQSS requires the study of winter peak demand with an intact system and also credible conditions over the whole year. A probabilistic approach will help us enhance our analysis on the second aspect beyond our current, simpler approach to boundaries outside winter. It should help improve the value that ETYS and NOA drive for consumers by providing more informative data and therefore helping to ensure the right balance between operational and network solutions. This could mean an increase or decrease in the amount of network investment recommended, based on whichever is the better outcome for consumers.

We can also use probabilistic techniques to ensure that the right network boundaries are used to accurately represent current issues and amend the existing boundaries using a year-round representation of system conditions. These aspects will be considered for a specific region in a case study exploring the probabilistic approach, which we will publish in Q1 2019.

Appendix: Performance Metrics Performance

For full details of the performance metrics please read the Performance Metrics Definitions document:
https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf

ESO role	Principle
Managing system balancing and operability	1. Support market participants to make informed decisions by providing user-friendly, comprehensive and accurate information

Metric 1. Commercial Assessment Transparency

Metric Description

This metric measures the publication of Ancillary Services/Balancing Services (AS/BS) tender assessment decisions to a published schedule. This is for Firm Frequency Response[15] (FFR), Short Term Operating Reserve[16] (STOR), and Fast Reserve[17]. The tender assessment runs monthly for FFR and Fast Reserve, and three times a year for STOR. Fast Reserve and FFR tenders are run monthly and STOR tenders are run three times a year. Other tenders are run when required.

Performance

Month	FFR		Fast Reserve		STOR	
	On time	Right first time	On time	Right first time	On time	Right first time
April	●	●	●	●	●	●
May	●	●	●	●	●	●
June	●	●	●	●	●	●
YTD	●	●	●	●	●	●

Table 1 - Metric 1 Commercial Assessment Transparency Performance

● Published on-time ● Published right first time

● Not published on-time ● Not published right first time

Metric Ambition
We are keen to hear feedback from stakeholders on the usefulness of the data and webinars. Where possible we will act on the feedback given. We are further developing out communication channels for collecting feedback to ensure it is representative of the views held.

Supporting Information

- The Fast Reserve webinar was held on 22 June. Webex data shows that three individuals dialled in. A Sli.do survey was live during the webinar to capture feedback. Two providers accessed Sli.do. The feedback received was positive. Some suggestions for additional information in the Market Information Report were put forward that we will investigate further.

- The FFR feedback webinar was held on 23 June. Webex data shows that 44 individuals dialled in. The presentations and the Q&A sessions have since been uploaded onto the National Grid website. A Sli.do survey was live during the webinar to capture feedback. However, only two providers accessed it so no

[15] https://www.nationalgrid.com/uk/electricity/market-operations-and-data/system-balancing-reports
[16] https://www.nationalgrid.com/uk/electricity/balancing-services/reserve-services/short-term-operating-reserve-stor?market-information
[17] https://www.nationalgrid.com/uk/electricity/balancing-services/reserve-services/fast-reserve?market-information

meaningful feedback could be gathered. We are investigating other ways of engaging with our stakeholders for future webinars.

- The schedule of webinars, dial in details and access codes are published on National Grid's website.

- A Sli.do survey was live during both webinars to capture feedback.

Fast Reserve

We received 15 tenders for Fast Reserve in the June tender round. The assessment took place according to the agreed timetable and the results were made available on time and right first time. A webinar was held and feedback gathered from providers. This month we published the Market Information Report two days ahead of schedule. We have started providing greater guidance on our requirements for fast reserve as well as including additional information on the utilisation of Fast Reserve. This is in line with the feedback we have received from the market.

FFR

The FFR tender was the first long term tender to take place since National Grid introduced the standardisation changes highlighted in the Response and Reserve roadmap. Providers were able to tender in for the month ahead, quarter ahead and seasons going out to Summer 2020, with start and end times of service availability being aligned to Electricity Forward Agreement (EFA) blocks. In addition, the requirement for a tender to start in 6 months has been removed. We received 401 tenders, made up of 74 non-dynamic and 327 dynamic tenders.

A number of providers submitted tenders that contained errors. Under clause 2.3.8 of the Standard Contract Terms for FFR, National Grid can, in its sole discretion, choose to accept the tender, disqualify the tender or take any other action deemed appropriate, including requesting the provider to amend any information in the tender, other than the price. The decision was taken to use the discretion afforded us to contact providers and ask them to correct the submitted errors. This action was taken to assist providers with the transition to the new regime.

Correcting the errors in tender submissions was very time consuming, resulting in a delay to the start of the assessment process. This put an already tight deadline at risk and is not sustainable for future tender rounds. Our focus now is to look ahead to the next long term tender and the actions required to avoid this situation in the future. Consequently, National Grid has identified a series of improvements that have either already been implemented or will be implemented ahead of the next long term tender. We have made changes to the tender submission proforma to provide additional information for providers. These changes went live ahead of the next tender round. Providers who submitted incorrect tenders have been contacted directly. General feedback on errors was given during the results webinar on 22 June.

Prior to the next long term tender, we will have a full review of the errors submitted to see if there is any further guidance we can give the market. Our intention is to take some time in the next webinars to walk providers through the tender submission spreadsheet.

The FFR results were published on time and right first time. One of the amended tenders was assessed as beneficial and was accepted.

STOR

The STOR assessment took place during the month of June. We received 365 tenders from 57 different companies. This was an increase of 65 tenders on the same period last year, and an increase of 145 tenders on the same period in 2016. Results were published on Friday 29 June in line with the schedule published on the National Grid website. The results were published right first time. A webinar is planned for 25 July where an overview of the results will be shared with interested participants. The market information report is due to be published in August ahead of the opening of TR36.

Metric 2. BSUoS Forecast Provision

Metric Description

We will develop a new methodology for a half-hourly total BSUoS cost forecast. The forecast will be published on the National Grid website. The measure will count the number of forecasts published during the agreed reporting period. In addition, we will publish a document describing at high level the main methodology that the

forecasting process uses. The measure is the daily delivery, Monday to Friday, of a day ahead half-hourly BSUoS cost forecast by 08:00, and on Friday by 17:00 a half-hourly forecast for the coming Sunday and Monday. Performance will be measured from Q3 2018/19, following deployment and testing of the new BSUoS forecasting system in Q1/Q2 2018/19.

Performance

We will start measuring the delivery of the daily BSUoS forecast in Q3. The Modelling and Insight team are developing a more granular day ahead forecast, planned to complete by the end of Q2.

This is a new activity for the ESO providing to market participants our view of costs at day ahead. For this a new methodology, models and processes will need to be produced. Once this information is provided to the markets, we anticipate that this will affect some market participants' behaviour and when this is coupled with other unforeseeable system conditions will lead to a change in the cost from the forecast.

The half hourly BSUoS forecast that we will deliver later this year will provide our best possible forecast of the cost of energy and system balancing actions, reflecting all of the available knowledge that we have in regards to expected transmission constraints for the relevant time-frame. Whilst we have previously published BSUoS forecasts on a monthly and annual granularity, the methodologies that have been previously employed to produce these are not transferrable to a half hourly level forecast. The main challenge is how any forecast accommodates the natural volatility in some of half hourly costs in respect to both energy and system balancing actions, the effect of which is normally smoothed out in a monthly or annual forecast.

Therefore, we will employ a variety of methodologies to forecast the different cost elements including time-series approaches for more stable cost elements or deterministic approaches where the relationship between actions and outturn costs can be directly modelled. However, it is important to note that the accuracy of the forecast we produce is subject to a number of dynamic and highly variable impacts including weather conditions (driven by the arrival of weather fronts), prices submitted into the balancing mechanism, as well as random events such as large plant losses which then require additional actions to be taken. The intent of the forecast is to indicate the profile of daily costs and our expectation of where significant variation will occur in respect to the time of day. We will also provide some supporting commentary as to where and why a significant driver of costs is expected to emerge.

The intention for this year is to start to produce the forecast and publish this to the markets and then to collate data and identify drivers of change in the BSUoS outturn from the published forecasts. This is because there are many reasons for the outturn to be different from the forecast that are not within the ESO's control including;

- Outturn costs in any half hour settlement period can vary significantly as a result of random events e.g. plant breakdown or weather events
- A key driver of costs are the prices submitted by market participants for balancing services that can be changed on a dynamic (one hour ahead) basis
- The lack of a comparable benchmark in respect to BSUoS cost forecasting
- The BSUoS forecast is intended to provide insight and contextual information for market participants to help guide and inform their decision making. It is the expectation of the ESO that market participants could respond to or change behaviours as a result of the publication of a BSUoS forecast that would make the design of any credible performance metric extremely difficult
- Outturn costs used to calculate the accuracy of the forecast will not be available until BSUoS charges are calculated after the end of the financial year. Until then only estimates will be available

Metric 3. Trades Data Transparency

Metric Description

We have invested in a new platform which will allow trades information to be published within one hour of it being available. The aim is to carry out seven-days-a-week publication of trades information within the targeted frequency of one hour. The target is to publish 80-90% of all trades data within one hour of capture in the first year of deploying this new system.

Metric Ambition
We are keen to hear from stakeholders about the usefulness of the data provided. For each of the trades published a flag is already used to identify whether the action is for system or energy reasons (SO flag = T is for system). We are looking into ways we can share more information on the trades we take within the legal restriction that apply to us on publishing information.

Performance
We have been working through a test plan with our provider during Q1 and are making progress. We have rectified early issues found during the testing and have carried out a trial run, this contained a small number of trades requiring further analysis. A follow-up on these trades is currently in progress with the aim of identifying further improvements to the process and systems. We foresee that minor adjustments will be implemented throughout July and that there will be data available to start reporting in August

Supporting information
- The trades web portal is active and can be accessed here: https://trades.nationalgrid.co.uk/ this allows increased frequency of publication to trades to within an hour of a trade being enacted.
- We are now developing a solution which will add a time stamp to the trade so allowing us to measure the elapsed time following the trade to its publication.
- This solution has been trialled and tested during Q1.

Metric 4. Forecasting Accuracy

Metric Ambition
This metric is challenging because to achieve our monthly targets we need to ensure that at least circa 50% of our forecasts have the error improved by 5% compared with the last three years against a background of significantly increasing PV on the system. In 2018/19 we expect to have more than 2.5GW of additional embedded generation connecting to the grid. This makes the system more difficult to manage and forecast compared to last year and certainly compared to 3 years ago. By saying that more than half of our forecasts will be on average 5% more accurate of our last three-year performance, we are saying that regardless of the added embedded generation we will keep improving our forecasts.

We are continuing to produce the same 2DA and 7DA forecasts published previously but as these are exposed to externalities which we cannot control we do not believe that a metric here is appropriate. However, all model improvements planned for DA will also be applied to the 2DA and 7DA forecast models which should benefit these forecasts.

Metric Description
The day ahead (DA) Demand forecast accuracy will be calculated daily for the following forecasting points to align to market electricity trading blocks: overnight minimum, daytime peak, daytime minimum and evening peak. The performance of each forecasting point will be measured by comparing the forecast error (MW) to pre-defined targets (MW) for the four forecasting points.

The day ahead BMU wind forecast accuracy will be calculated for each settlement period (half hour) and will be based on: first run settlement metering data (in MW) and half hour BMU wind forecasts (in MW) excluding Bid Offer Acceptance (BOA). The incentive performance will be measured half-hourly by comparing percentage mean absolute error to pre-defined seasonal targets percentage.

Performance
This metric will cover the accuracy of our published DA Demand and Balancing Mechanism Unit (BMU) wind generation forecasts. To access the data that sits behind these metrics please click here.

Demand Forecast
In June 2018, the Energy Forecasting Team (EFT) achieved a day-ahead (DA) demand forecast performance above our baseline expectation. To achieve this, the EFT met demand monthly accuracy targets 57.5% of the time. Our performance for the year to date has exceeded the baseline target with 211 forecasts within the range against an exceeding expectation target of 196.

In June, the average temperatures were significantly above the seasonal norm during the day, typically 2-4°C higher, and 6°C higher in the final week of the month in the afternoon and evening. Overnight temperatures were 2°C warmer in the first half of the month, but in line with seasonal temperatures in the second half. These unseasonably high temperatures have made it difficult to forecast cooling load of air conditioning as recent years have been unseasonably cool, so there is limited recent history of this effect.

PV generation was very high but stable with less meteorological forecast error. Wind output remained low for most of the month. On the 13 and 14 June 2018, the UK was impacted by Storm Hector which was the first named summer storm in the UK.

We carried out some further process standardisation of our forecasting processes. This involved the team identifying the aspects of the process that were working well and applying to all the team involved. This helped to drive performance.

The Demand forecasting models coped well with these conditions producing good results. During the month, there were a few challenging special days for Demand Forecasting relating to 2018 FIFA World Cup tournament. This is due to large and unusual demand drops and pickups during relevant football matches that are not experienced during “normal” days.

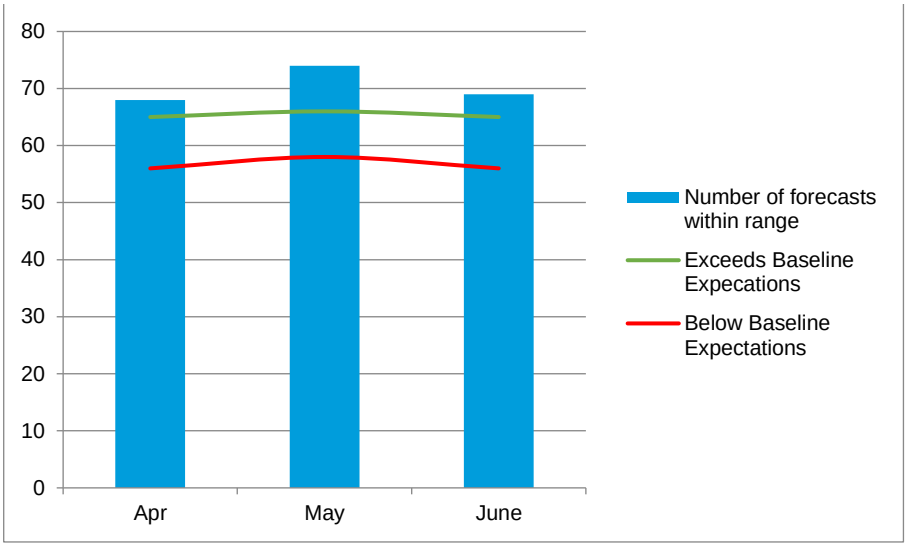


Figure 1 – Metric 4 Demand Forecast Performance

Wind Forecast

In June, the Energy Forecasting Team (EFT) achieved a DA Wind BMU performance on this metric in line with exceeds baseline expectation. To reach this outcome, the EFT delivered wind BMU monthly accuracy targets 62% of the time. Targets have been set to deliver a 5% reduction in error, on a monthly basis, against the average of the monthly performance from the last three years. For example: June's error target was created from June's performance 2015, 2016 and 2017. These were averaged and then a reduction of 5% applied. Our performance in this year to date has exceeded the baseline with 2481 forecasts within the threshold against an exceeding expectation target of 2233.

In June, a prevalence of high pressure over the UK resulted in lower wind speeds than the monthly average. Despite that our models coped well with lower than usual wind speeds. On the 13 and 14 June 2018, the UK was impacted by Storm Hector which made wind forecasting particularly challenging during those days.

Contributions to performance against this wind forecast metric was delivered by the following:

- Testing of our wind models. We are currently testing the accuracy of the new Cubic SPLINE models for BMU Wind power forecasting

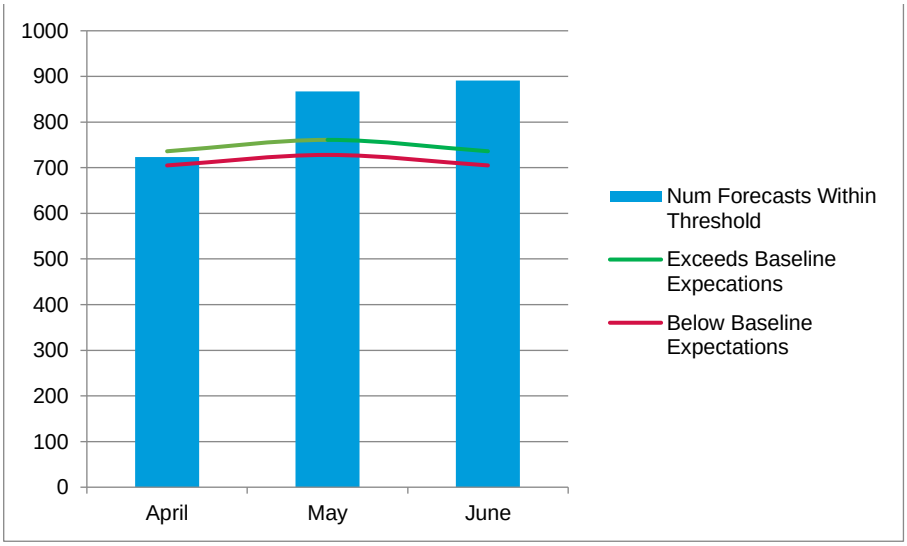


Figure 2 - Metric 4 Wind Forecast Performance

Supporting Information

Customers and Stakeholders
In June EFT met with:

- Envision, a Shanghai based company that provides wind turbines, energy management software, and energy technology services. This is in line with our effort to finding new innovative solutions to improve Wind and Solar forecasting accuracy

Innovation.

- Weather Optimisation NIA Project in progress and ready to release the first results (with Smith Institute). The objective of this project is to define the optimal weather data solution to improve energy forecasting accuracy (demand, wind and solar PV)

Special Events.

- 2018 FIFA World Cup tournament. Extensive preparation is dedicated to ensure accurate demand forecasts for every football match with particular focus on England matches. System security maintained and the forecasting error was successfully contained

ESO role	Principle
Managing system balancing and operability	2. Drive overall efficiency and transparency in balancing, taking into account impacts of the actions across time horizons

Metric Ambition
We are aiming to provide a summary of the actions taken to drive down balancing costs in the principle 2 summary and the hotspots. We will call out which of these actions we believe is baseline and what is exceeding baseline expectations. An example of this is the summary of the work on Vector Shift mentioned in detail in principle 2 in the May monthly report. Deliverables in other principles will also effect the future balancing costs, including the work carried out around Reform of Balancing Services.

The range around the benchmark has been established using analysis of the elements of balancing costs which are outside the direct control of the ESO, and which are not attributable to constraints that we expect should disappear once the Western HVDC link is fully operational - we refer to these as the residual balancing costs. The analysis shows that the 95% confidence interval for the residual balancing cost benchmark model has a range of +/-£10million. Therefore we believe that it is an appropriate range around the benchmark.

Metric 5. Balancing Cost Management

Metric Description
This metric measures the total incentivised balancing costs excluding Black Start spend compared with the benchmark. For full details of how this was calculated please see the performance metrics definition document here.

Performance
For the details of our performance please see the principle 2 summary. For monthly breakdown of costs please refer to the hotspots and the accompanying data tables.

	April	May	June	YTD	Full year
Benchmark cost (£m) [18]	56.9	68.3	90.7	215.9	843.52
Outturn cost (£m)	56.1	57.9	84.7	198.7	

Table 2 - Metric 5 Balancing Cost Management Performance

[18] Benchmark cost refers to the central benchmark number which has a +-£10million range

ESO role	Principle
Facilitating competitive markets	3. Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent

Metric Ambition
Feedback provided by Ofgem proposed that the auction trial is delivered as part of our baseline expectations. We consider that moving procurement from monthly spreadsheet-based tenders to a weekly automated auction platform is a significant shift in how we run our business. It will also have significant market benefits by reducing barriers and increasing access to our markets for intermittent generation and renewable energy sources. We note that the auction platforms being developed for balancing services in continental Europe are considerably more basic than our proposed approach, with a much-reduced functionality compared to that which we believe is essential to deliver the optimum benefit for providers. The platform will procure several different response products both independently and through a combined price stack using predetermined exchange rates and across multiple time horizons. This requires a fundamental shift in how we plan our response procurement and how we consider the interactions between multiple products and services. The learning obtained from this trial will underpin our procurement approach not just to the ESO's balancing services, but also to any future DSO/ESO markets.

Metric 6. Reform of Balancing Services Markets

Metric Description

We will publish quarterly our progress on reforming balancing service markets. Progress against the plan will be reported, supported by an explanation of the current state of the programme, and, where changes have been made, the rationale for the changes. Where deadlines have been missed or key milestones delivered early we will report the reasons for this.

Our stakeholder engagement approach for the Reform of balancing services markets is detailed in the Delivering Performance through stakeholder engagement document published alongside this report.

Performance

Table 3 - Metric 6 Progress against plan – Response and Reserve Roadmap Timeline

Q1 Deliverables	Status	Narrative
Standardise the FFR market	●	Standardised seasons and four-hourly EFA blocks were introduced for the May tender
New simplified contract	●	The simplified contract was published as part of the FFR OCP consultation in June
Publish Restoration Roadmap	●	The Restoration and Reactive Roadmaps were published in June
Publish Reactive Power Roadmap	●	The Restoration and Reactive Roadmaps were published in June
Publish Thermal Constraints Guidance Note	●	The publication of the Guidance Note was delayed until July to allow for the prioritisation of the publication and engagement on the Roadmaps
Publish detailed auction trial design	●	The publication was delayed as a result of contractual issues which have now been resolved

●	Delivered on-time	●	Not delivered on time

At the Operational Forum in April we asked the following questions with a scale of 1 to 5 where a low score reflects negative sentiment. We will use the results here to set a baseline against which we will track performance through the year.

- How satisfied are you with the pace of delivery of the developments outlined in the Product Roadmap for Response and Reserve? (3.3/5)
- How satisfied are you with the level of engagement on the developments outlined in the Product Roadmap for Response and Reserve? (3.6/5)

- How satisfied are you with the scale and speed of the SO's work to improve all our balancing services and markers? (3.3/5)
- How satisfied are you with the level of engagement on the developments outlined in the Product Roadmap for Response and Reserve? (3.4/5)

Since the publication of the System Needs and Product Strategy in 2017, we have listened to stakeholder feedback and made significant progress with our strategy and delivery of reforms to Balancing Services markets.

This quarter we have delivered the majority of the Q1 deliverables including a simplified FFR product structure and market as part of the Response and Reserve Roadmap. This was rolled out in the June tender and has successfully reduced barriers to entry for new providers, resulting in an increase in the number of units tendering into the FFR market.

We have also published an Outline Change Proposal (OCP) for simplified Response contacts, which will improve the process efficiency of tendering into the market. We are awaiting feedback from industry and will incorporate this into the new framework.

The publication of the detailed design of the auction trial has been delayed by a month as a result of contractual discussions with our preferred supplier. These discussions have been resolved, and we will be in a position to communicate to the industry on the detail of the auction trial by the end of July. It is likely that the rollout of the trial will be delayed until June 2019 as a result of the greater degree of functional complexity required to deliver the maximum benefit to participants and consumers.

The publication of our Restoration and Reactive Power Roadmaps in June marked a significant milestone in our ambition of moving more services towards competitive, market based procurement.

Industry feedback on the Roadmaps was widely positive, with Cornwall Energy publishing: "These are the first proposals under SNAPS since December 2017's Frequency Response and Reserve roadmap, and it is clear that NG has put its time to good use. Competitive markets open to a more diverse range of participants to provide services is the optimum route to maintaining grid stability and resilience at least-cost to the consumer."

Metric 7. New Provider On-boarding

Metric Description

Tracking our progress in facilitating new providers offering Balancing Services.

Metric Ambition
We are pleased with the positive feedback received from stakeholders and Ofgem regarding this initiative and will continue working collaboratively to improve the on-boarding process.

Performance

In this first quarter the focus has been on preparations to improve our on-boarding process. (Framework from October 2018 onwards).

We have begun mapping out the journey that potential counterparties go through from first showing an interest in the Balancing Services market, through to signing a framework agreement. We have contracted Engine, a consultancy helping us to work with our providers to understand this journey and then build a measurement framework that will track the success of the ESO in helping potential service providers' progress through this journey. As part of the journey work we are carrying out interviews with a range of small – large, existing and potential providers involved in the journey in order to better understand their needs, the steps they went through in the journey, any pain points and ways to improve the process. This feedback will be used to help the ESO to become a better buyer. Following the interviews, we will look for opportunities to improve the journey based on the feedback we have received. Our stakeholder engagement approach for the New Provider Onboarding is detailed in the Delivering Performance through stakeholder engagement document published alongside this report. This includes details of the questions to be used.

Metric Ambition
We agree with Ofgem's view that this metric could be influenced by factors outside of the ESO's control and we are therefore providing supporting narrative alongside the metric. This includes information on additional volume entering the market when providers increase the size of their existing units. The reason for continuing the current trend in participation, rather than achieving a higher trend is due to a number of "one offs" last year, such as the reduction in MW clip size from 10MW to 1MW, which opened the market to a great number of smaller players. The historical increase was also caused by several established aggregators beginning to operate in these markets. Going forward, new entrants are more likely to be smaller independent parties who will find the market more difficult to navigate. We will continue to monitor this metric whilst we work with stakeholders on alternative approaches for 2019/20.

Metric 8. Market Diversity

Metric Description

A measure of success of our activities demonstrated through increased liquidity in relevant markets.

Performance

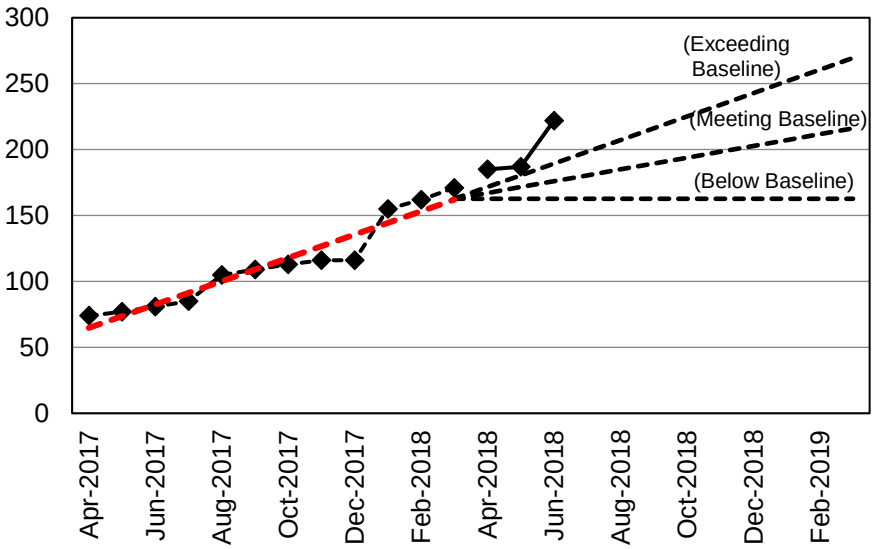


Figure 3 - Metric 8 Market Diversity

Account Managers facilitated the entry of two new Non-BM units in May, by providing on-going support to new providers, of which one entered the FR market and the other entered the FFR market. In June, 35 new units entered the first long term FFR tender under the new FFR market structure. The new FFR market structure aims to simplify the tender rules and make the market easier to interpret. The new structure was outlined in the Roadmap for Response and Reserve and the number of new units entering the market is a positive sign that the changes have attracted new providers and increased competition in the market. The June FFR tender was the first long term tender under the new structure and we expect to see prices coming down as competition in the long-term tender is increased.

In addition to the new non-BM units noted above, over 260MW of additional volume entered the market from non-BM providers that increased the size of their existing portfolios in May. This volume came mostly from aggregators adding battery storage sites to their portfolios. Not all of these new units were successful in the tender, due to the level of competition in the market.

In terms of attracting new types of providers and diversifying the market, we have had several enquiries and initial meetings with various companies and consortiums that are interested in providing frequency response and reserve capability from Electric Vehicle and Domestic DSR aggregation. The companies have all been assigned Account Managers, who are supporting them through the on-boarding process with a view to setting up Framework Agreements that will allow them to tender in to provide balancing services.

ESO role	Principle
Facilitating competitive markets	4. Promote competition in wholesale and capacity markets

Metric Ambition
We recognise that there is a requirement in CUSC that requires NG to prepare daily BSUoS bills in a timely manner; against a set of timing parameters outlined in CUSC. We publish a payment calendar on our website which is based on the CUSC requirements. However, on more than two thirds of settlement days in the year, we set a timescale that is earlier than the CUSC requires. Timings are based on preparing bills the next working day following receipt of the required input data by Elexon. It would not be possible to bill customers any sooner; the dates indicated by the CUSC would allow us to bill later in a number of cases.

We believe that our metric does drive outperformance against CUSC and is a stretching target as the baseline dates for the timeliness metric are the payment calendar that NG publishes not the minimum CUSC requirements and we set ourselves the target of 98% timeliness against this more challenging calendar.

Metric 9. BSUoS Billing

Metric Description
These metrics measure the quality of the billing process in response and resolution time of BSUoS billing queries alongside the timeliness of those bills.

Performance

Figure 4 - Metric 9 BSUoS query response time

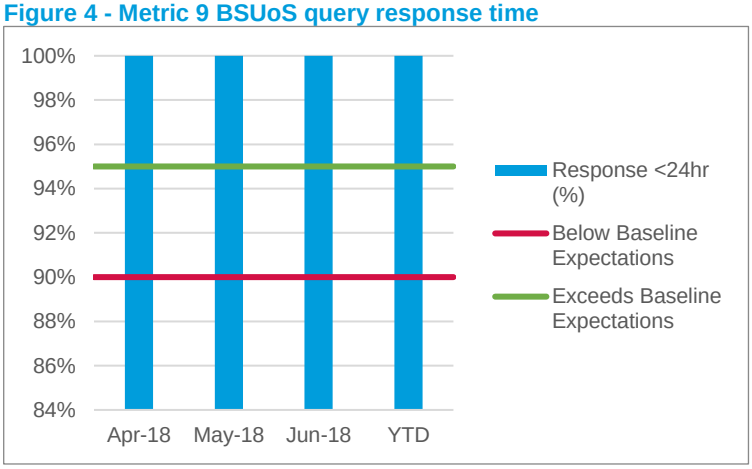


Figure 5 - Metric 9 BSUoS query resolution time

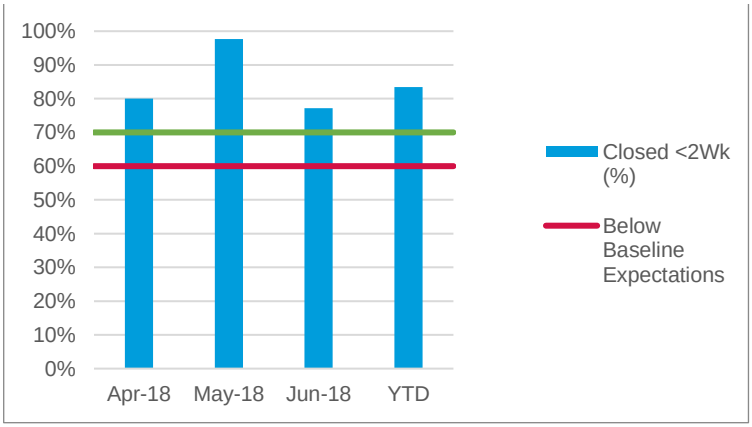
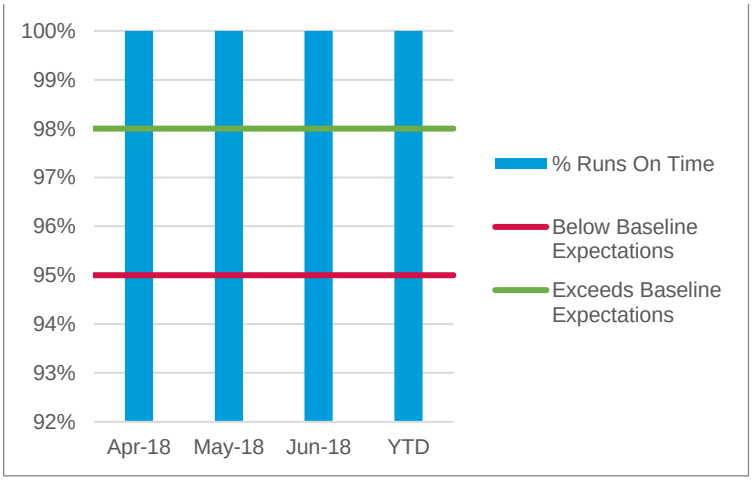


Figure 6 - Metric 9 BSUoS bills timeliness



Metric Ambition
The CUSC and the BSC both set out requirements on the ESO in relation to its role in preparing BSUoS bills. To comply with the BSC the ESO must create a Payment Calendar base on the requirements around setting the Notification Date as set out in the BSC. Our calendar that has been published has been set with the notification date earlier than specified in the BSC on 67% of days for the year. The timeliness metric here sets out our target to invoice as per the Notification Date set out in our Payment Calendar, on 98% of days unless this is not practicable due to data, system or accuracy issues. Therefore, we are measuring our 98% performance target against a benchmark that is more stringent than the code requires.

Supporting information

- No suspended billing runs in June means five sequential months of no suspended runs
- The resolution time metric is lower this month because we focussed our efforts on closing several old queries that were beyond the two-week service level agreement
- We had an influx of new queries in May and June due to planned changes to our Secure File Transfer Protocol service for BSUoS customers
- We successfully closed more queries in June (70) than ever before and currently have just three open queries, the lowest ever
- We issued a circular to BSUoS customers advising them of a new BSUoS forecast published to our website

Metric 10. Code Admin Stakeholder Survey

Metric Description

This metric measures the outcome from the CACoP survey in 2019/20 for the three codes for which the ESO is the code admin. As part of this we will publish and consult on our improvement plan.

Performance

Our main focus in this first quarter has been to develop a robust improvement plan that looks to address key areas of improvement that better facilitates a more strategic approach to administering industry code in the GB and improves transparency with our customers and stakeholders.

The pace of change across all electricity codes is relentless and this is forecast to continue for the immediate future resulting in an increase in modifications. It's essential we ensure industry change is expedited effectively and collaboratively and that key priorities are managed efficiently to deliver code change and compliance. To tackle this, we are currently undertaking a recruitment process, increasing the team by the end of October 2018.

In May 2018, internally we launched a customer journey called 'Change My Code'. We are seeking to understand the code change process from our customers' experiences in order to identify areas for improvement and best practice. We will then assess how these improvements might be achieved and develop a delivery plan accordingly. Interviews are currently underway with a number of customers and stakeholders to understand their experience and frustrations of code administration and work with them to improve the service and products we provide.

Metric 11. Charging Futures

Metric Description

Survey the full Charging Futures membership with 3 outcome-focused metrics based around the three engagement objectives for Charging Futures of:

- Learn – about electricity network charging across the whole system today, and how it could change in the future.
- Ask – regularly ask charging and regulatory experts questions related to reforms, and wider charging code change.
- Contribute – be able to contribute to reform at all stages and through a number of ways.

Performance

The first quarterly Charging Futures Forum for this financial year took place in May; it covered the:

- Targeted Charging Review
- Access and Forward Looking Task Forces
- Settlement Reform Project

The forum gave attendees the opportunity to learn, ask and contribute. Attendees learnt about recent developments of the TCR and modelling work through a presentation from Ofgem and Frontier Economics. Elexon gave attendees an opportunity to learn about the Settlement Reform Project. Task Force members and Baringa presented on the Task Forces' final report on Access Rights and Forward-looking charges and the analysis work on the case for change. As requested through

customer feedback, customers were given the opportunity to gain an understanding, and contribute their thoughts, about each of the programmes of work and how they interlink.

There has been a 74% increase in the number of organisations who want to attend the forum from 89 to 155 since November 2017, with 126 different organisations so far having attended a forum. The proportion of user types attending has also developed. Historically it has been challenging to fully engage with demand customers on developing network charging arrangements however through Charging Futures we have seen increasing interest from demand users with an increase from 5 to 13 attending the forum. The increase may be down to how Charging Futures has made the area of charging arrangements reform more accessible to users through the use of available resources, the website and the forums. It has given opportunities to learn, ask and contribute to the changes proposed.

At the forums, we have been using innovative approaches to engage and interact with attendees. We have been using interactive mobile technology to host collaborative discussions around tables and across rooms with over 80 delegates. This allows us to very effectively gain feedback, insights and questions to enable all attendees to have a voice and contribute to the direction of change.

There are also opportunities for users to ask and learn at the forum through a charging enquiries desk at the forum. A panel was also hosted at the end of the forum to give users opportunity to reflect on the day, voice their opinions and have their questions answered by experts in the room.

To support the forum, we have created podcasts for users to gain an understanding of what will be discussed at the forums, a summary of what happened at the forums and explanations of key information being published by the Task Forces to help users understand complex analysis and options. A guest speaker from Ofgem has been included on the podcasts to give a wider perspective of what they have heard and what happened at the forums.

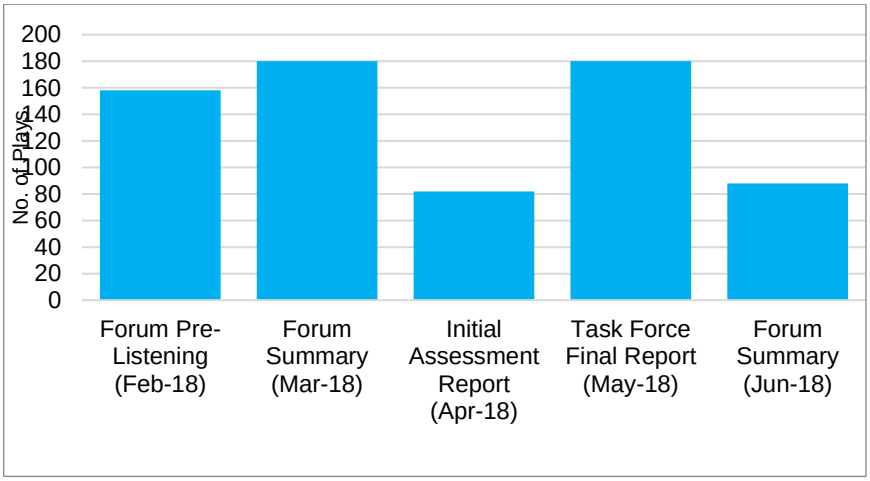


Figure 7 Number of podcast plays (as of 02/07/2018)

At the May forum, we collated feedback, using interactive technology, about the forum. An average score of 6.5 was received from 31 replies to the question - *On a scale of 1-10 (10 being highly-recommend) how much would you recommend this event to a friend or colleague?*

Through verbal communication, an interactive app and email, feedback was received about the organisation of the forum. We received feedback from multiple people that the day was well organised and well facilitated by the Lead Secretariat with highly informed presenters. Positive feedback was also given on the innovative approach of facilitating whole room discussion in the facilitated sessions to allow users to feed in their thoughts and understand what was being discussed in the room.

Constructive feedback was received that the last forum could have been more interactive; although we did have breakout sessions to facilitate discussion there is an appetite for more opportunities in the future. This is something we will be

considering for the next forum. We have also received feedback that some of the presentations could have been more engaging. Again, we will be working with presenters to improve this for future forums.

Overall, Charging Futures has received great feedback on the service it is providing:

'As someone coming new to this whole area, the Charging Futures Forum meetings and supporting materials – particularly the podcasts – have been immensely helpful in building my understanding.' - EEF Manufacturers' Association (23/05/2018).

This Feedback will be supported later this year by a survey of the full Charging Futures membership with 3 outcome focused metrics based around the three engagement objectives for Charging Futures; providing the opportunity to learn, ask and contribute.

Charging Futures Website and Communications

An informative website has been set up and maintained by the Charging Futures Lead Secretariat. This allows users to explore useful content explaining network charges and current changes being proposed. It also allows users to keep up to date with what is being discussed at the forums and Charging Delivery Body meetings so those who don't attend can keep up to date. We have seen consistent use of the website with dramatic increases in users in the weeks before and after the forums.

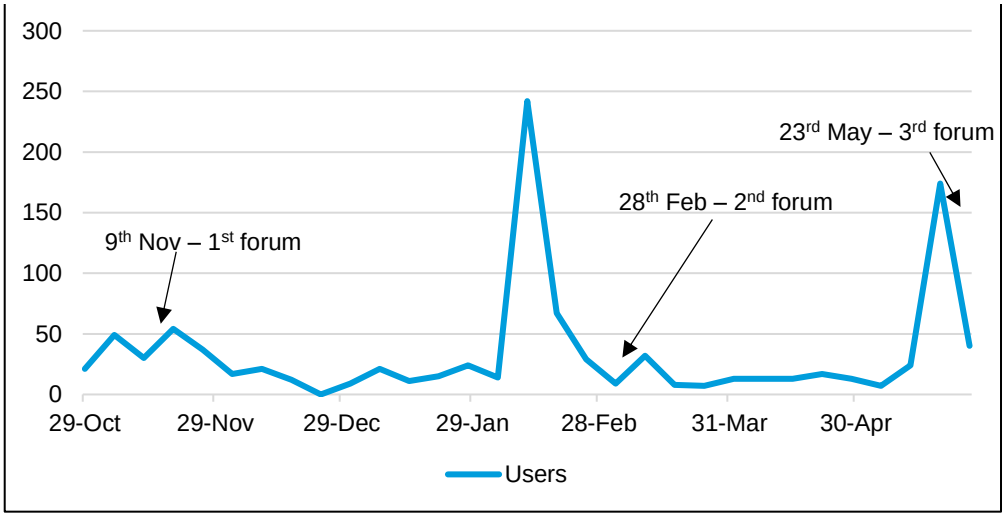


Figure 8 Number of Users on the Charging Futures Website (Chargingfutures.com)

The website is kept up to date with summary documents and FAQs and users can gain access to our webinars and podcasts. The output from the Charging Delivery Body as well as minutes and slides from the forums and Task Force meetings can be found on the website.

More resources have been created and placed on the website to support the industry, however this led to feedback from users that some of the documents were difficult to find, so we recently redesigned the website to make it easier to navigate. We send out frequent communications to our distribution list to ensure they are kept up to date with the latest publications and announcements on charging arrangements. There has been a consistently high amount of engagement from industry in Charging Futures. Since November 2017 the value that Charging Futures offers can be seen in the number of people signed up to our distribution list, which has increased from 170 to 485.

Charging Delivery Body (CDB)

The CDB takes place regularly before and after forums. It has received good feedback from its attendees about the 'smooth running of meetings' and the meeting materials. All materials are made available to all of industry by publishing on the Charging Futures website for each meeting; these include the agenda, presentation materials and meeting minutes. As part of the CDB and in response to industry requests, a charging modifications tracker has been created which gives a holistic view of all the charging mods in flight. Views have been expressed about how useful that has been for the CDB members.

ESO role	Principle
Facilitating whole system outcomes	5. Coordinate across system boundaries to deliver efficient network planning and developments

Metric 12. Whole System - Optionality

Metric Ambition
We have noted the challenge that the target of three options for this metric is not ambitious enough. This is a new area where we are developing capabilities and as such there was no historic data on which to build. The proposed target was based on several assumptions. Firstly, only credible options will be considered in this metric, which means that we are only counting the non-traditional options that have been entered into the cost-benefit analysis stage rather than considering all non-traditional options raised. Whilst the ESO together with third parties may generate a large number of non-traditional solutions, it would not be appropriate to record all of them in this metric as there is no guarantee that some of those options will benefit GB consumers, and we would also like to exclude those ones that are clearly not favourable due to viability or high capital cost from the cost-benefit analysis stage. Secondly, when deriving this metric, there was uncertainty around how third parties will respond to our request, as well as the number of areas that could potentially be identified with voltage or network issues. Using historical information from previous RDPs (only two regions were studied last year) we felt that a target of three options was appropriate for our first incentive year. It is worth noting that it is the first time that ESO has developed capability to carry out a regional NOA cost-benefit analysis process to assess non-traditional options and non-MW solutions. It is something additional to our business as usual activity, therefore it is appropriate to set the target upside only.

Metric Description

This metric is a simple count of the number of non-TO solutions to transmission system challenges submitted by non-TO parties as part of an extended NOA process, which we are developing though our pathfinding projects. The concept of Whole System Planning is to approach the technical issues as a single entity (SO, TO and DSO/DNOs) and come up with the solution that is best for the consumer (economic and efficient). The aim of the incentive metric is to act as a measure of how effective we are in encouraging non-TO parties to suggest solutions to transmission system needs. These solutions will be assessed against what is considered as more traditional transmission network solutions through a detailed cost-benefit analysis.

Performance

2018-19	Non- TO initiated options	Target
Q1	0	3
Q2		3
Q3		3
Q4		3

Table 4 - Metric 12 number of solutions from non-TO parties

Current Status: On Track
There are two ongoing projects which could potentially trigger new whole system options being proposed from non-TO parties. They are both pathfinding projects focussed on transmission high voltage issues which aim to include DNO solutions as alternatives to transmission solutions. So far, both projects are in the development stage therefore no options have been identified yet.

Currently the regional areas where voltage issues are forecast have been identified and prioritised. This includes regions in the North of England, including Yorkshire, Mersey ring and Pennine regions and South Wales. Following the identification and prioritisation of need, we commenced engagement with the DNOs, starting with the priority area in the Yorkshire and Pennine regions covering Northern Power Grid and Electricity North West's areas. The engagement has focused on raising awareness of the voltage issues in the network, reviewing modelling assumptions and gaining a better understanding on what information the DNOs would require from us in order to explore potential solutions effectively. The DNOs are currently putting together options to meet our requirements which we expect to receive in July. Whilst waiting for these solutions we are developing a framework to evaluate investments in voltage control equipment against ongoing operational costs for the cost-benefit analysis process. We will also be taking forward a high voltage pathfinding project with Western Power Distribution in South Wales and have held an initial engagement meeting with SP ManWeb about a project in their area in North West England.

The plan for the next phase of the high voltage studies is to continue engagement with the DNOs on the identified issues and development of suitable DNO solutions for cost-benefit analysis assessment.

Metric 13. Whole System – Unlocking Cross Boundary Solutions

Metric Description

This metric is an assessment of the effectiveness of the ESO's whole system actions, measured in terms of their consequences. Measure of the MW capacity of DER connections as a result of the 2017 UKPN/ESO collaboration on the South-East Coast. This will be a measure of contracted MW.

Performance

Metric Ambition
In June 2017, we completed a Regional Development Programme (RDP) with UKPN for their network on the South East coast of England. The RDP has helped to provide UKPN and their customers with better visibility of where capacity could be made available on the network. This has provided an improved understanding of the volume of Distributed Energy Resources that could be given connections in these areas and made it possible for such developers to bring their projects to market sooner than they previously thought. Prior to this work, the message given to developers was that the system was heavily constrained and access to the network in the South East was not possible until completion of major reinforcement works in 2026. Given the previous position, the expectation was that take up of capacity may be slow; however this whole system approach has created opportunities and has opened the market for products to be developed. From September 2017 to February 2018 this new process allowed an additional 123.36MW to be contracted to connect and further work during the first quarter has delivered an additional 10MW. This work started in a specific area of the network and has provided a significant impact on the network and customers, we are working with other DNOs on RDPs for their regions but we do not believe that we have a suitable baseline for this metric. However the output delivered clearly shows the value of the work in this area.

GSP	MW	Commentary on DER technology types
Bolney	82	78MW of battery storage schemes
Canterbury	0	N/A
Ninfield	51.2	All battery storage schemes
Sellinge	0	N/A
Total	133.2	

The uptake of the available megawatts has been increasing steadily through April – June 2018 with a number of new (mostly battery storage) distributed energy resources (DER) taking advantage of the available capacity, totalling approximately 130MW. This will allow earlier access of DER and offers an alternative to reinforcement of the network. This allows increased connection of distributed energy resources which supports operability and liquidity. UKPN have been actively utilising the transfer capability within Appendix G between GSPs in demand groups allowing them to offer connections where interest is higher.

Two schemes have terminated their connection capacity during this period (48.5MW) and were subject to the Wider Cancellation charge, which did not apply prior to RDP, which have subsequently been recovered via the DNO under rules of CMP223.

Discussions with Scottish DNOs regarding move to Appendix G approach continue to be challenging, however progress over RDP in South West Scotland (Dumfries and Galloway) is positive.

ESO role	Principle
Facilitating whole system outcomes	6. Coordinate effectively to ensure efficient whole system operation and optimal use of resources

Metric 14. Connections Agreement Management

Metric Ambition
During the first quarter, we have worked with the TOs and customers to develop a revised approach that improves the internal processes to complete the necessary contractual changes. These improvements have reduced the time taken for certain changes to be made and we believe we can now implement changes to connection agreements faster than the initial baseline. We accept that Ofgem believe that the ambition of this metric is too low. We have therefore increased the benchmarks to 80% of the out of date agreements updated within nine months as baseline and 90% of the out of date agreements updated within nine months to exceed baseline expectations.

Metric Description

The GB transmission system is constantly under change as TOs build new assets. We need to ensure that the relevant contracts for the affected generators are then updated to reflect this change. Some agreements permit us to curtail generation under certain circumstances at no cost but if an agreement is not up to date and the generation requires curtailment we may need to instruct this through a Bid Offer Acceptance (BOA).

Ensuring that connections agreements are up to date to reflect changes to the transmission network gives us more options to ensure the system can be run safely and securely and potentially saves BSUoS cost when we would need to pay to curtail generation.

Performance

This metric is a nine-month process so we will only report the final metric from January onwards. For the interim we will use this indicative metric to show our progression towards full delivery. This indicates the percentage of milestones completed on schedule in any given month in the process. This allows us to drive performance in this area and keep our stakeholders informed of an indication of our performance.

During June, all the milestones due were completed. There are currently seven connections agreements that require updating following notification since April 2018. Of these, three are making very good progress and are well ahead of schedule and two have been issued to the customer. Our year to date performance is 91% of milestones have been achieved.

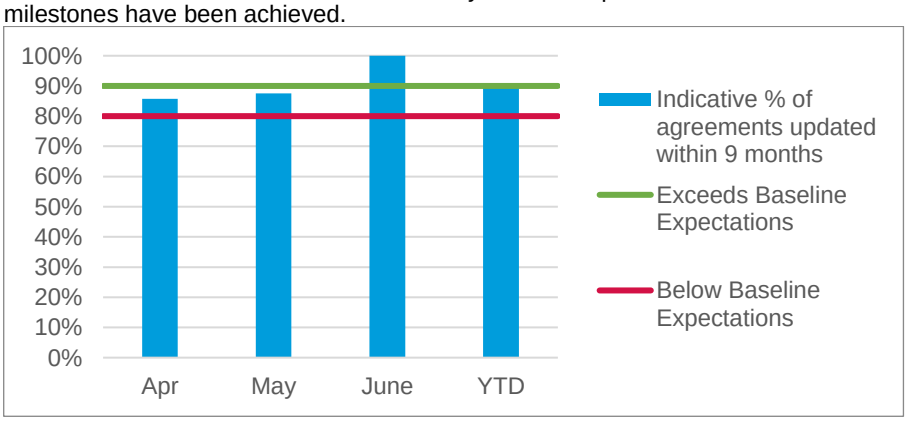


Figure 9- Metric 14 Connections Agreement Management Performance

Metric 15. System Access Management

Metric Ambition
There are legal requirements on National Grid ESO customers and stakeholders to provide outage information to the ESO in a timely manner. The Grid Code and STC set out requirements on the ESO to produce draft plans at set timescales, but allow the ESO to invoke changes right up to real-time. This is important to ensure that the ESO can maintain system security at all times but introduces a situation whereby our customers and stakeholders have no legal comeback if the ESO planning process fails and the outage is removed from the outage plan within day.

Metric Description

We, as the ESO, direct the flow of electricity over the transmission system in real time whilst the TOs own the assets through which electricity is transferred. To ensure that these assets are maintained, the TOs ask us for access to their assets. When the system access requests are formally submitted, we undertake due diligence on these requests and, if secure and economic, they are accepted into the master outage plan in the Transmission Outage Generation Availability (TOGA) database before 15:30 at DA. These outages are then reassessed in the control phase (within day) before the asset is switched out to make sure it adheres to policy[19]. When a system access request has been accepted into the plan, TOs, DNOs and generators will act on the assumption that it will go ahead. Sometimes these requests are delayed or even cancelled within day for a variety of reasons

[19] GBSQSS-GB Security and Quality of Supply Standard

Metric Ambition
The System Access Management metric is designed to incentivise the ESO to improve performance in this area and minimise impact to our customers and stakeholders. The process to facilitate each outage can typically involve input from up to 20 teams and there are more than 30,000 requests dealt with by the planning team every year. National Grid ESO Customers (DNOs, TOs, Generators and third parties) have used recent Customer Surveys to highlight short notice outage change as an issue that impacts their business processes significantly. Our Customer and Stakeholder team have recently confirmed these survey results by visiting DNOs and discussing feedback on the performance of the Network Access Planning department. Some of the impact of late changes can be:

- Resource on site being stood down
- High contractor cancellation fees
- Cancellation costs for hired equipment
- Additional resource costs in their planning teams to manage the re-placement of the outages
- A knock-on effect to other outage plans as other outages have to be rescheduled to accommodate the original outage back into the plan
- Maintenance and capital scheme delivery being delayed causing periods of unintended increased system risk and/or breach

As is demonstrated by the list above, the impact on the whole system is significant. Outages going ahead as planned are vital to minimise the risk and the cost of operating the system. The increased costs will ultimately be passed on to the consumer as higher bills. This metric has brought an ESO-wide focus to refine and realign its processes. Every change enforced by ESO within day is now being fully investigated and the results fed back into process improvements. Our customers and stakeholders have seen a more than 10% drop in late changes imposed within day by ESO in the first quarter so far, and this has a direct impact on the risk and cost of maintaining and operating the network.

from unforeseeable weather conditions to faults on the system to planning process failures. These cancellations can lead to higher network costs.

Performance

In June, we had three system access requests that were classified as fail to fly. That is those system access requests that have been cancelled or delayed by more than one hour from where they were planned or one hour after requested by the TO within the control phase that can be attributed to us. Each of these instances is internally investigated using root-cause analysis tools and learnings from these are communicated to the relevant teams using operational learning notes. These are a tool used to investigate the cause of the process failure and communicate the findings to the relevant teams.

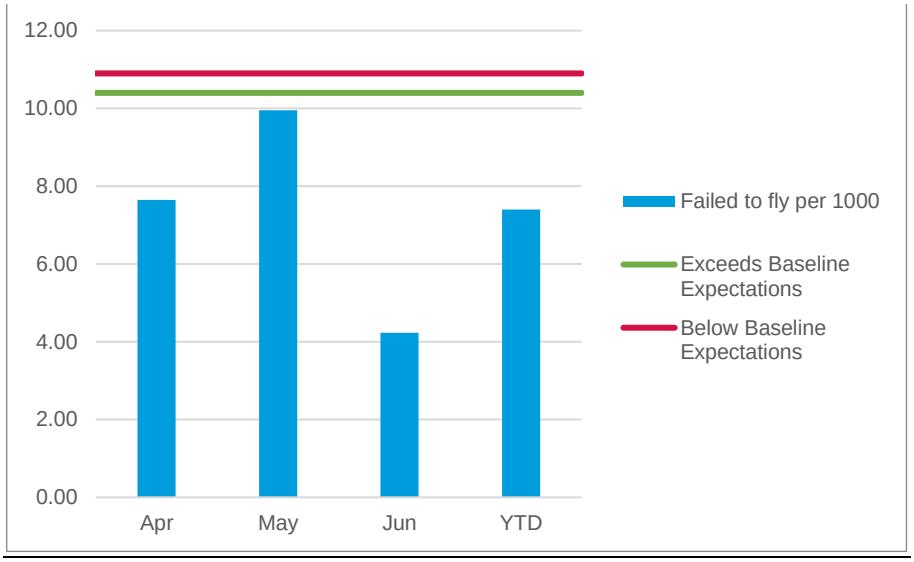


Figure 10 - Metric 15 System Access Management Performance

Metric 16. Future GB Electricity System Security Planning

Metric Description

We will measure our delivery of the Six-Monthly Operability Reports, stakeholders' engagement with them, and our delivery against plan.
Through the operability reports, the operability delivery plan will be supported by a narrative explaining the current state of the programme, and where changes have been made, the rationale for the changes. Where deadlines have been missed or key milestones delivered early we will report our reasoning for this.

Performance

The first ESO Six-Monthly Operability Report is due to be published in Q3 2018/19, as such we will be reporting on our performance against metric 16 following publication of the report.

During Q1 2018/19 we have been further refining our processes for identifying emergent and interacting system operability challenges and coordinating our planning activity. We have developed our stakeholder engagement plan and we will be engaging with stakeholders in Q2 2018/19 to seek views on the report's content. The report will detail our plan and milestones for eliminating the operability gap in each security area.

Metric Ambition
We have noted the challenge that the target of one value option for this metric is low. When deriving this performance metric, it was clear that commercial options would be at the forefront of ESO initiated options and, from experience, we know that in order to develop commercial options a high level of certainty of the need is required. As the NOA process considers options for delivery over the next 10 – 20 years predicting and guaranteeing specific needs will not change and that generators will be available for commercial solutions to be effective will prove difficult. We also want to ensure that we are capturing options that genuinely add value and therefore only options that result in the optimal path are reported. Whilst the ESO may generate numerous potential solutions, it would not be appropriate to record the quantity of these as there is no guarantee the GB consumer could benefit from them. Using historical information from previous NOAs we felt that a target of one successful option was appropriate for this year. It is also worth noting that the NOA is approaching its 4th year and the TOs are now more accustomed to the wide range of solutions that must be proposed. As the TOs become more experienced with the process it will become more challenging for the ESO to initiate further options. Due to the above, the narrative will be especially important when reporting this metric to demonstrate that the ESO is continuing to drive to find alternative options.

ESO role	Principle
Supporting competition in networks	7. Facilitate timely, efficient and competitive network investments

Metric 17. NOA Consumer Benefit

Metric Description

This metric will count how many of the reduced build options that have been submitted to the NOA process appear in the optimal path and where this is the case what their consumer value is. This will drive the ESO to propose cheaper, reduced build solutions as alternatives to those provided by the TOs for the National Network Options Assessment (NOA) to create greater value for the GB consumer.

Performance

2018-19	SO initiated options	Target	Total Consumer Value (£)
Q1	0	1	0
Q2		1	
Q3		1	
Q4		1	

Table 5 - Metric 17 SO initiated options into NOA

Current Status: On Track

At present, there is nothing significant to report for the NOA consumer value metric because the boundary capability analysis has only just commenced and hence no ESO initiated options have been proposed to date.

It is expected that at least one commercial solution to manage constraints will be proposed this year. The ESO will also be looking to ensure the most economic solutions are considered and will challenge the TOs to provide smaller incremental options to avoid over-reinforcing the network ahead of requirements.

Our main focus in this quarter has been on improving processes and capability on how to identify and initiate ESO options with the TOs. We have been actively engaging with our colleagues who will be responsible for identifying opportunities for reduced build options during their analysis. As part of these conversations we have identified a discrepancy between the definition used in this metric and the terms referred to in our licence condition C27. Whilst reduced build options are specifically referred to in the forward plan, C27 refers to alternative options that do not involve, or involve minimal, construction of new transmission capacity, commercial arrangements and possible distribution solutions. We believe that the C27 definition of alternative options is a more accurate representation and propose that these options are also included in the reporting for this metric. Furthermore, it has been identified that currently the consumer value added by ESO initiated build options is excluded from this metric. It is proposed that in these instances the value added from these options is explained qualitatively via the narrative in the quarterly report as recommending the development of an asset option is the most efficient action.

Currently we are facing challenges with this year's new Future Energy Scenarios. Three new scenarios based on different assumptions will complicate the process of

comparing results to last year. Work is ongoing in this area to help identify key themes and their potential impact on the output of the NOA and consumer value.

Metric 18. NOA Engagement

Metric Description

This updated description of the NOA engagement metric aims to meet Ofgem's concerns that they raised in their consultation response and the formal opinion.

The metric will continue to comprise of a table of the number of responses and the score, and supporting narrative. This update describes how we will survey stakeholders' opinions and is in line with the ESO Forward Plan. There are two questions, which vary slightly depending on whether our audience is more interested in the Network Development Roadmap or the NOA methodology and report:

- How satisfied are you overall with the service you have received from National Grid?
- I have been appropriately engaged by the ESO on Network Development Roadmap/NOA methodology and report

Scoring is on a scale of 1 to 10 with low scores reflecting negative sentiments.

We will use any suitable engagement channels to gather the data and so far have identified:

- CSAT/SSAT surveys
- Customer connections seminar
- Electricity Operational Forum
- Power Responsive Flexibility Forum
- Industry association meetings

As we will gather this data throughout the year, we will build a continuous picture of the quality of our engagement with stakeholders and discern any trends. We will use this information to improve our engagement with stakeholders. We will publish the scores in the quarterly return table set out below and use the Q4 figures for the year-end return. We will also include an average figure for the 12 month period. So, that stakeholders can provide any further thoughts, our survey will include a free text field that we will also use to guide how we improve engagement.

Performance

We have made a positive start in this area and also had some opportunities to better understand how we can enhance our performance against this metric over the remainder of the year. This is a new and different topic in which we are developing our way of engaging the wide range of stakeholders. We have broadened the audience awareness of the Network Options Assessment and proposed evolution through attending a number of industry events and through the publication of the Network Development Roadmap consultation, setting out our views of how we can deliver greater value for consumers through expansion of the NOA process.

There have been a number of engagement milestones and events over the first quarter of the year to help raise the awareness of and gather views on our network planning tools and the developments we are proposing to them. Discussions on the Network Development Roadmap consultation took place in a number of forums:

- The Electricity Transmission Operational Forum - Tuesday 24 April
- ENA Open Networks Project work stream 1 meeting – Tuesday 15 May plus more detailed discussions on the developments in work stream 1 product 1 meetings throughout the period
- Energy UK Flexibility working group – Thursday 17 May
- NOA for Interconnectors workshop – Friday 18 May
- As well as with a number of companies (three storage developers, one large generator) and academics (University of Strathclyde, Imperial College London) directly.

We have included information on the roadmap in the Energy Insights and Power Responsive newsletters to raise awareness among a broader audience as well as the usual subscribers to the NOA. There have also been a number of important milestones in our engagement over the period:

- NOA methodology consultation launched on Monday 9 April and closed on Monday 21 May 2018
- NOA workshop held with TOs on Tuesday 22 May
- Network Development Roadmap consultation launched on Monday 3 May and closed on Friday 15 June
- Additional questionnaire for interconnector developers circulated on Friday 15 June
- We submitted the NOA methodology to Ofgem on Monday 2 July. We put a copy of the submitted methodology on our NOA webpage on Thursday 5 July and circulated an email to parties who have registered interest in NOA

We have aimed to engage fairly widely to raise awareness of the Network Development Roadmap consultation and gather views on the proposals over this quarter. A lot of focus has been on engaging with the network companies – Transmission Owners and Distribution Network Operators – as we work with those who will be impacted by the changes to the greatest extent in the nearer term and who we are working with through the ENA Open Networks project. We have also engaged with generators, storage providers and other energy resources through Energy UK's Flexibility working group. In addition to engaging through these groups, we have met directly with academic parties and potential participants in the extended NOA process.

There were 187 unique downloads of the consultation document over May and June. We received 13 responses about the Network Development Roadmap during the consultation period from network companies, potential market participants and academics. Although this isn't a high number it is twice the number we generally receive to NOA consultations if the interconnector developers are not included. The majority were positive overall, with a couple challenging the changes as a whole. Those challenges were around whether the SO should be expanding the NOA beyond its current regulatory remit and whether the proposals change the role of the SO and TOs. Many respondents sought clarification on elements of the proposals and had helpful suggestions for improvements, which we have aimed to pick up through this finalised roadmap or will do through the pathfinding projects. There was a general push to work through ENA Open Networks but others also challenged whether the group would move at sufficient pace. More than one response also highlighted the need to ensure the focus on system security remains.

We have also engaged with a number of parties on the NOA and its methodology during this period. We have had contact with a range of stakeholders for these purposes, which include Environment stakeholders (one), energy industry other than TO (two), Transmission Owners (three) and Interconnector developers and associated parties (eight).

This feedback included the NOA including the socio-economic impact of new transmission infrastructure on local communities and non-TOs expressing their interest in being able to provide services to meet transmission system needs. The extended NOA process should accommodate them. Most engagement has been with the TOs who have been closely involved with the NOA since its start.
We have received feedback from several interconnector stakeholders that providing a formal written response to consultations can be prohibitively time consuming. We have therefore explored other options such as workshops, webinars and questionnaires to enable all stakeholders to have an opportunity to engage and provide feedback.

We haven't always got our engagement around the developments right in this area, particularly with other network companies. We have reflected on this and are focused on ensuring we work effectively through the ENA Open Networks Project. We are also considering how we can make use of direct engagement to draw on the expertise of the Transmission Owners who we already work closely with on the NOA.

The score that we've quoted for Q1 is based on a survey at the Electricity Transmission Operational Forum held in April. The number of people in the sample is low so it gives a very limited view on engagement. The score range was wide with one respondent giving one while another gave eight. We have devised a set of survey questions and will now implement them to provide our survey numbers through the year as well as for the final survey at the end of the year.

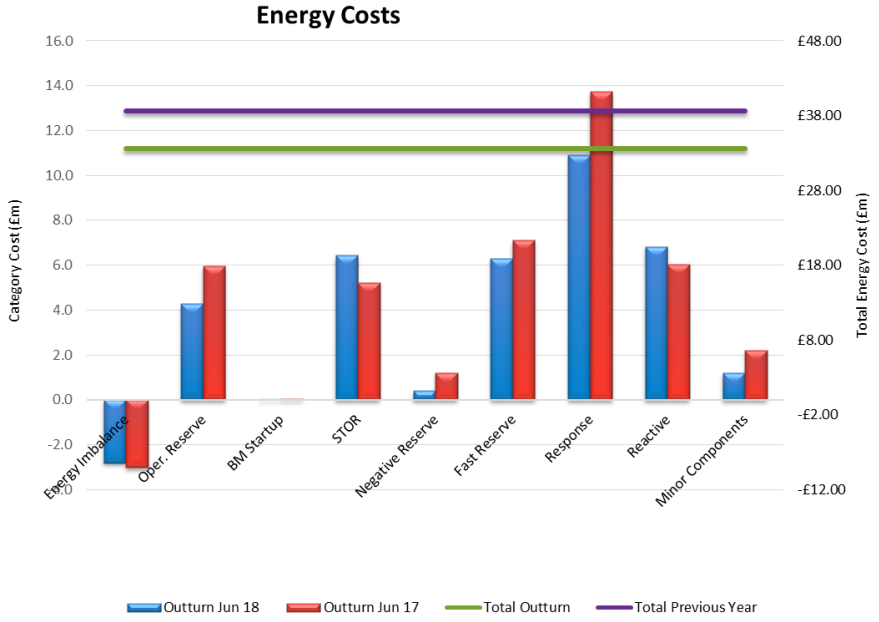
At the Energy UK Flexibility working group, we polled 15 attendees on their awareness before and after the session. The scores for their awareness rose from 4.2 to 6.5 as a result of the session which demonstrated the effectiveness of workshops as a means of raising awareness.

Hotspots

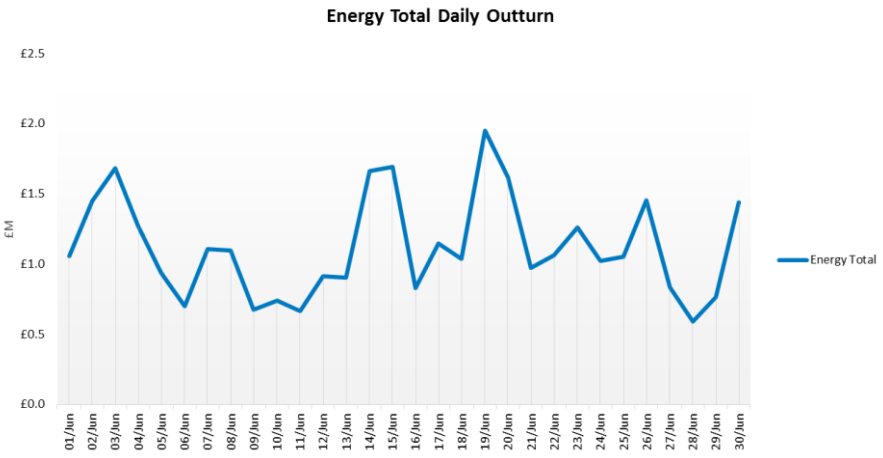
Energy Costs

Energy costs (including energy imbalance) for June 2018 out-turned at £33.59m, showing a decrease from the June 2017 outturn of £38.57m. The average daily energy spend was £1.12m.

Compared to last year, Operating Reserve costs are down ~30% which is due to both a reduction in volume and average margin price. STOR costs are up due to increased utilisation as the price remains low enough to be competitive against other marginal units, especially on non-BM STOR units. Response costs are down due to reduced BM actions for positioning; ancillary costs are down £0.5m on last year reflecting the continued value delivered through the tender rounds. The increase in Reactive costs is largely due to an increase of 19% to the Default Payment Rate.



Energy Total Daily Outturn

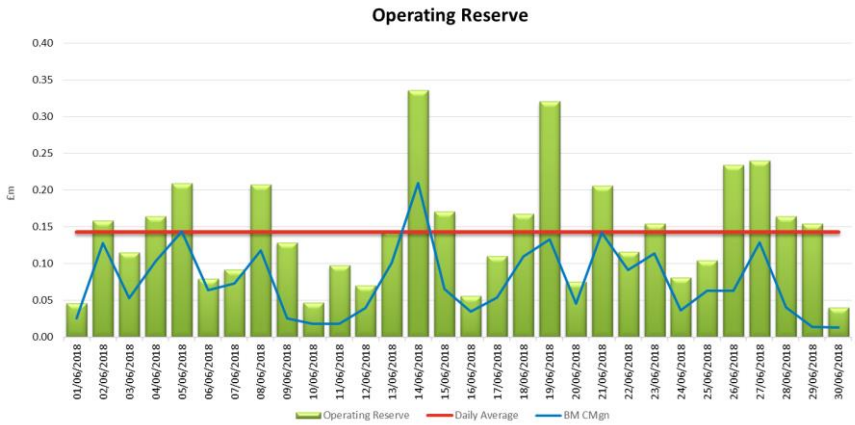


Daily Energy costs remained below or around £1.5m for most of the days in June 2018. Tuesday 19th saw the highest energy costs due to tight margins from 3pm onwards after wind generation was lower than expected (~500MW). Despite running 500MW of non-BM STOR, further marginal plant was still required with prices in excess of £60/MWh. ENCC utilised SpinGen services for approx. 8hrs to reduce spend on other BM plant. Cash out price peaked at over £120/MWh reflecting the tight margin position.

Energy Costs Breakdown

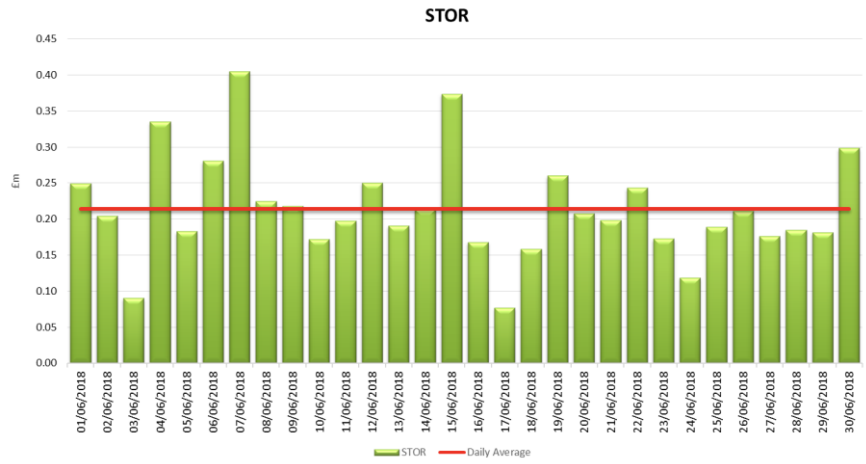
Operating Reserve

Operating Reserve out-turned at £4.3m showing a decrease from June 2017 of £6.0m. Of the total spend; £2.3m is attributed to constrained margin costs which are notionally incurred as a result of active constraints on the system preventing access to generation which is in merit. The cost of constrained margin has largely driven volatility of the daily spend, as can be seen in the below graph. High winds in Scotland and North of England during the middle of the month required significant volumes of bids on wind units, the balancing volume then delivers additional margin and consumer value against Operating Reserve.



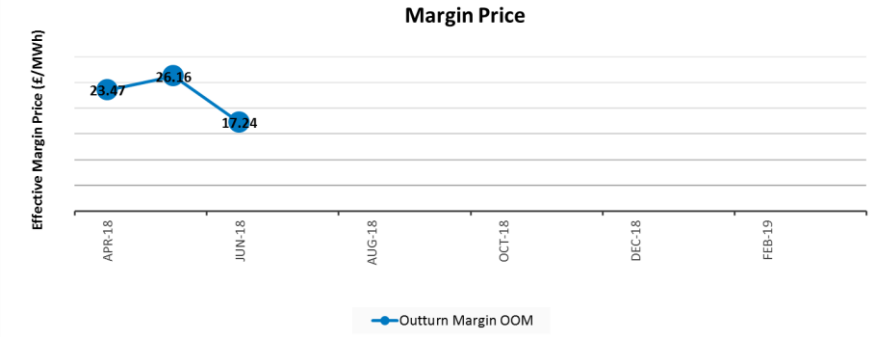
STOR

STOR cost for June 2018 was £6.4m compared to £5.2m in June 2017. The costs on 3rd and 17th are low due to zero utilisation and low availability. Availability payments during June were approx. £0.17m/day, therefore costs in excess of this represent utilisation payments. Non-BM STOR was the main contributor to utilisation payments due to its economic price. Thursday 7th June saw STOR costs at their highest for the month due to running significant volumes of STOR for lengthy periods to cover wind and solar PV generation shortfall against forecast.



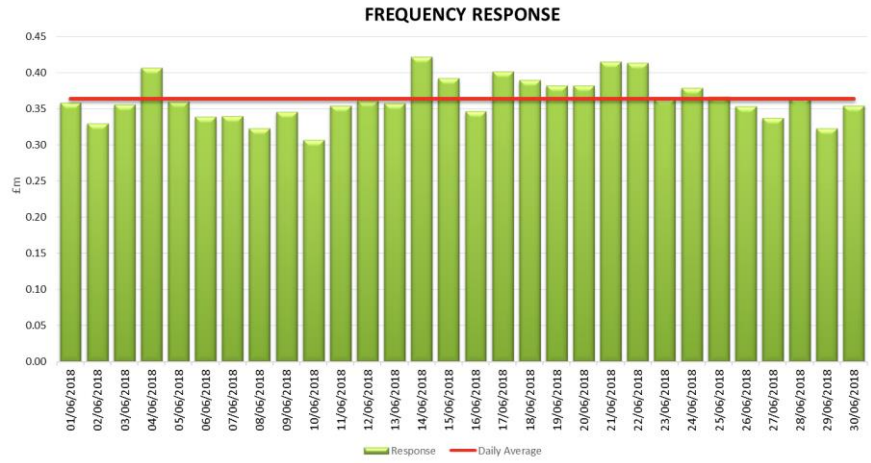
Margin Price

Average margin price in June 2018 out-turned at £17.24/MWh, a significant reduction to June 2017 (£26.18/MWh). This reduction in price contributes to the reduction in Operating Reserve costs.



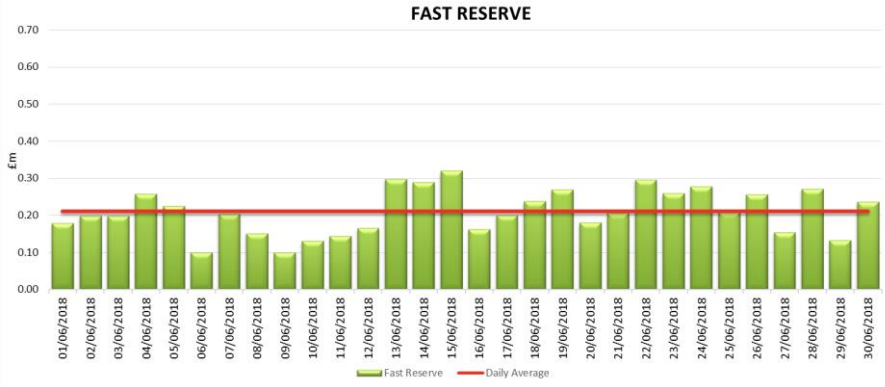
Frequency Response

Frequency response in June 2018 out-turned at £10.9m which is a near £4m decrease from last year. Response costs are largely ancillary costs (~90%) with the rest being incurred in the BM, positioning units so they can provide a response service. A large portion of the difference to last year is on positioning units in the BM (~£2m less). Since the tender rounds were changed earlier this year, a larger volume of response has been contracted which reduces the need to position units in the BM. The movement in day to day outturn reflects the level of response held in control room based on system conditions. The highest spend on the 14th was due to increased response holding for an interconnector swing in the morning, followed by wind volatility for most of the day. The control room have delivered consumer value by assessing and reducing the minimum requirement for response from 400MW to 350MW; additional response is then held above this level for specific events.



Fast Reserve

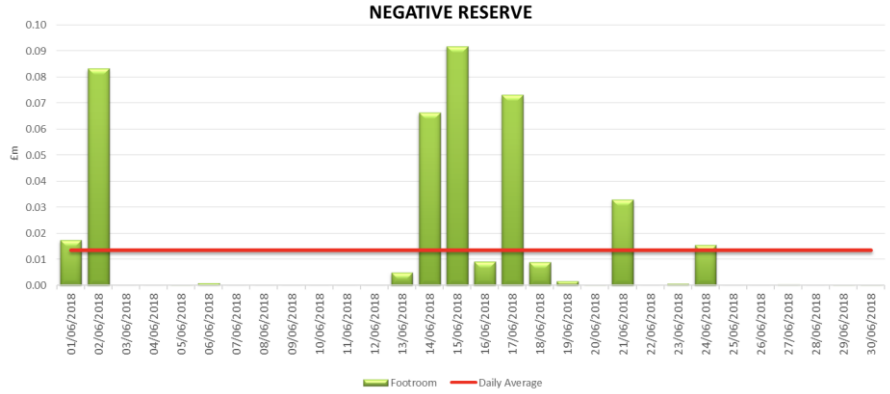
Fast reserve out-turned at £6.3m, which is a decrease of £0.8m from June 2017 costs. Throughout the month, the average daily cost was around £0.2m. Ancillary costs make up 84% of the total costs, the majority of which is incurred on the SpinGen service. Arming the service delivers consumer value over procuring reserve in the BM (Operating Reserve).



Negative Reserve

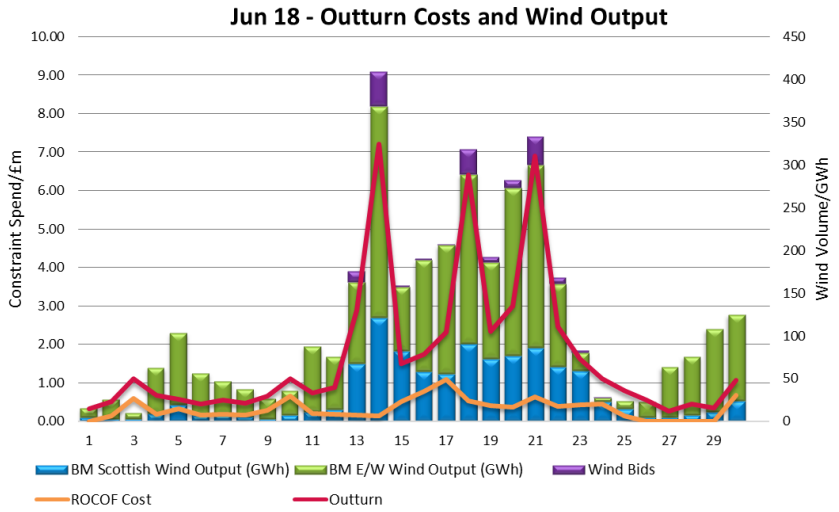
Negative Reserve out-turned at £0.4m, which is £0.8m lower than June 2017. High levels of wind generation overnight for the 14th and 15th reduced the levels of reserve provided by the market. Interconnector trades were enacted to deliver consumer

value over actions in the BM. This was also true of the morning of the 17th; trades on interconnectors for RoCoF reasons delivered consumer value against Negative Reserve. Low demand overnight for the 1st into 2nd required interconnector trades to provide additional reserve.



Constraints Costs

The total constraints cost for June 2018 was £50.8m; £14.7m for England and Wales, £9.7m for Cheviot, £5.1m for Scotland, £11.1m for Sterilised Headroom and £10.1m on RoCoF.



The graph above shows the daily outturn costs and the portion made up by RoCoF. It also shows output levels of BM wind and volume of wind bids (including trades) to indicate the extent to which wind output drives constraint costs.

Constraint costs were mostly incurred across the Scotland-England border and constraints in the North of England (~£27.3m). Significant outages in the region and unavailability of the Western HVDC cable reduced the possible power flows; this coupled with high levels of wind output in Scotland and North of England caused significant costs in resolving thermal constraints.

Despite ~40GWh of wind bids, one significant circuit was recalled back into service to help keep costs down on the 14th June, but was released again on the 15th as the wind levels dropped.

During times of low wind output in Scotland, the control room delivered consumer value against voltage spend by being able to switch out a circuit which displaces the need to buy on a generating unit. This was key to keeping costs low in the NW England region as this area accounted for 78% of voltage spend.

RoCoF

The RoCoF outturn was £10.1m, which is £3m higher than costs recorded in June 2017 and slightly higher than May 2018. RoCoF spend continues to grow as the largest loss trigger level drops with ever increasing levels of embedded generation. As the largest loss trigger drops, more generators / regions become at risk of causing a RoCoF issue in the event of an instantaneous loss of generation. We manage the risk by reducing these potential large losses to below the trigger level. This delivers consumer benefit against the alternative of buying on more generation, and ensures the Transmission system remains reliable and stable. Further

consumer value is delivered through our trading strategy which not only provides certainty to the control room, but is also economic against the BM alternative.

Voltage

These costs relate to the buying of energy, in order to access the voltage capability on the generating units. The costs for voltage are reported in the Reactive Power category.

Voltage costs in June 2018 out-turned at £2.7m to deliver 109.5 GWh of energy with voltage supporting capabilities, of which around 68% of volumes were solved with forward trading.

Last year May costs for this category were £3.6m for a related volume of 162.1GWh. NW England incurred the majority of spend (78%) to access voltage units. This was, in part, to allow for an outage to be taken in the North of England. In order to prevent costs from rising too much, a different circuit was taken out of service during periods of low Scottish wind, displacing the need for a generating unit in the region and delivering consumer value.