Electricity Operational Forum

October 2019

Host – Ben Smith

Start: 09:30am

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Electricity Operational Forum		
09:30	Welcome and Introduction	Paul Lowbridge
09:45	Balancing Services Use of System (BSUoS) update	Nigel Swan
10:20	Control Room - Difficult Day Analysis	Gavin Brown
11:00	Trading – the insider ….	Rachel Turner
11:20	Break – 20mins	
11:40	Operability / Pathfinder Update	Dave Preston
12:10	RIIO - 2	David Bowman & Joseph Donohoe
12:30	ENCC Market Information	Ronan Jamieson
12:50	Industry Updates & Questions	
13:00	Lunch / Networking / IS Stands	
14:00	Distributed Re-start	Emma Penhaligon & Anyta Dooley
14:15	GB Interconnector Capacity Restrictions & Payments	Susan Mwape
14:30	Winter Outlook	Gavin Brown
15:00	Questions / Close	

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Housekeeping and Agenda

Toilets

Fire Alarm

Breaks

Site access

WiFi

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Q&A

Please provide feedback
via slido.com
Code: #3794

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Welcome Message

Paul Lowbridge

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Balancing Service Use of System (BSUoS) Update

Nigel Swan

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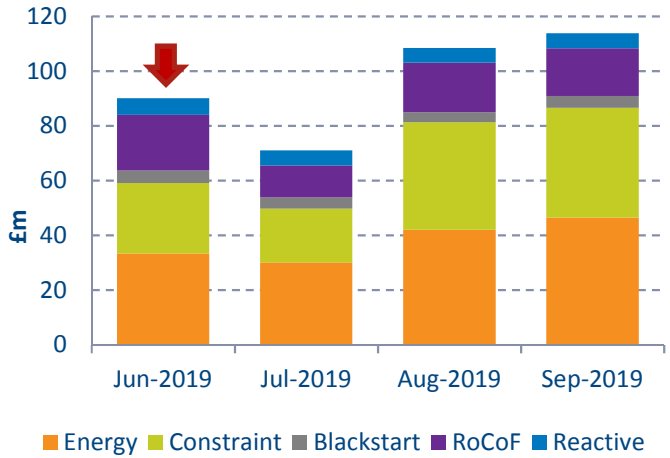
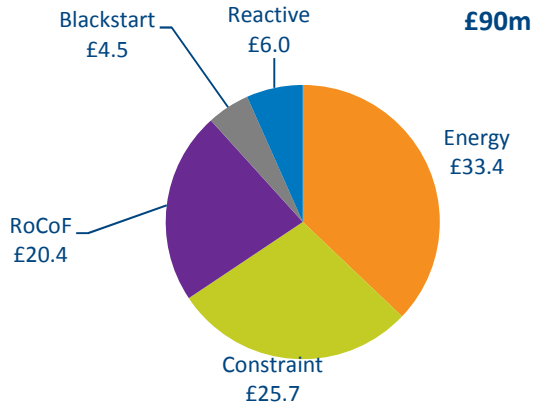
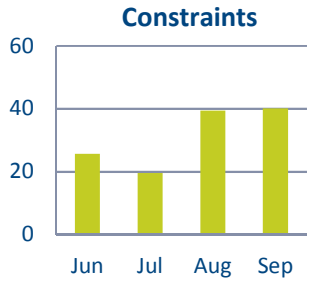
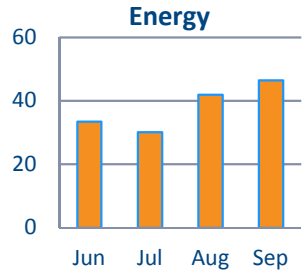
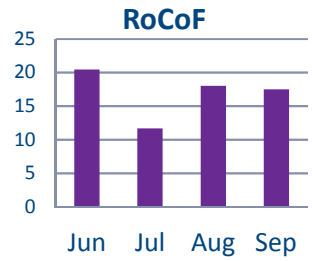
June 2019 : £3.35/MWh
Total Cost: £90m, Volume: 34.1TWh

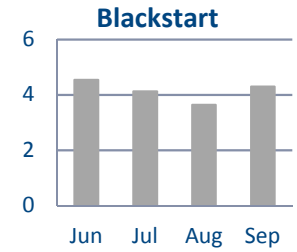


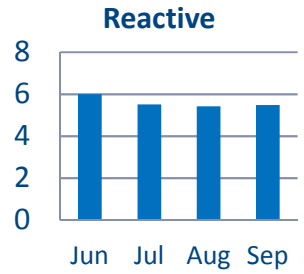












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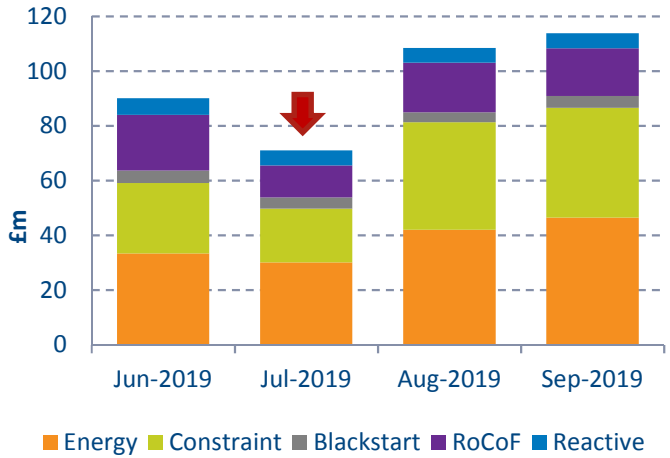
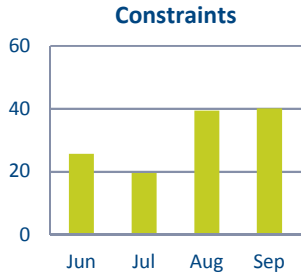
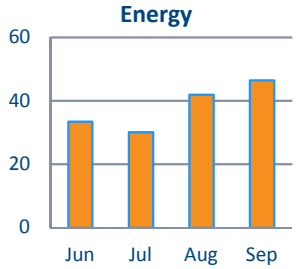
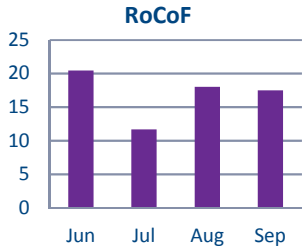
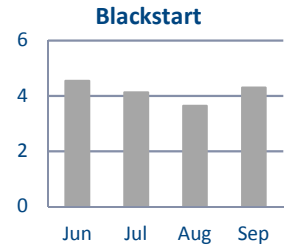
July 2019 : £2.73/MWh
Total Cost: £71m, Volume: 35.6TWh

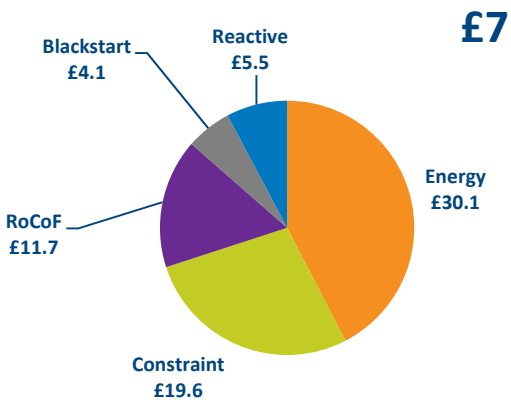


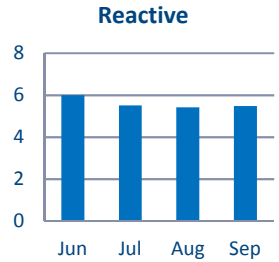












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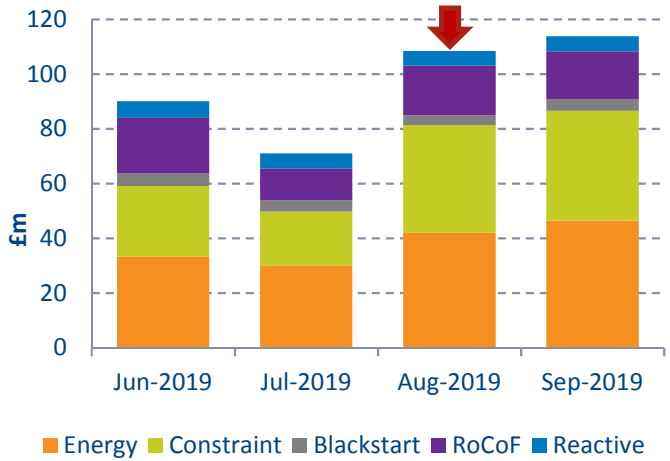
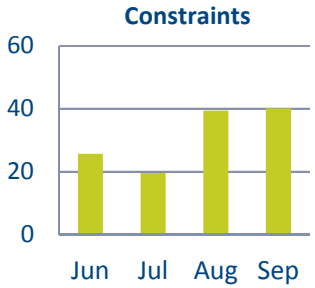
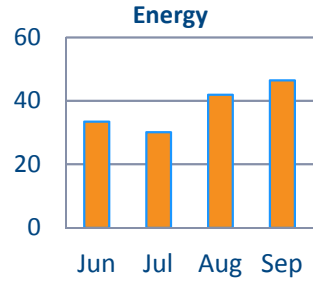
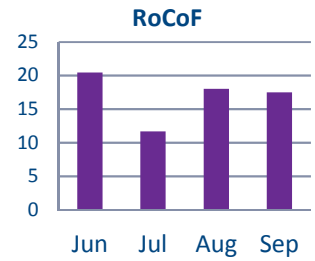
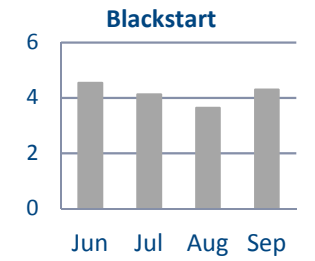
August 2019 : £3.94/MWh
Total Cost: £108.4m, Volume: 34TWh

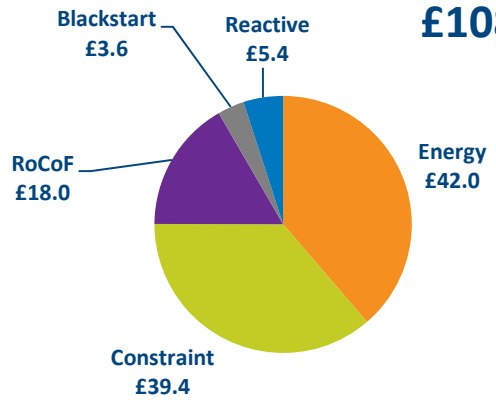




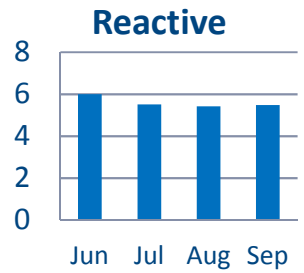








£108.4m



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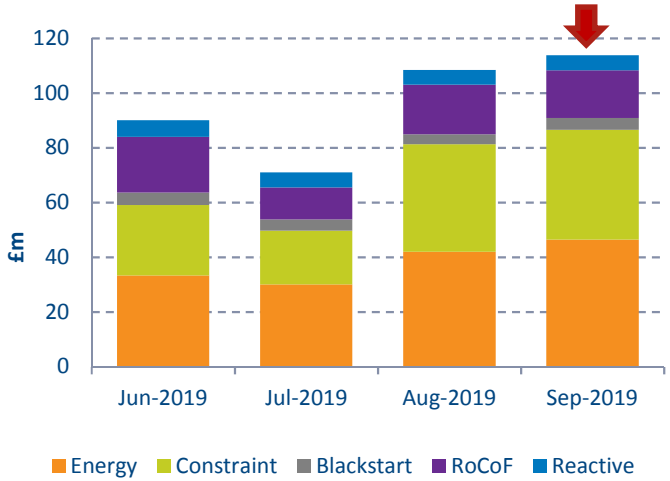
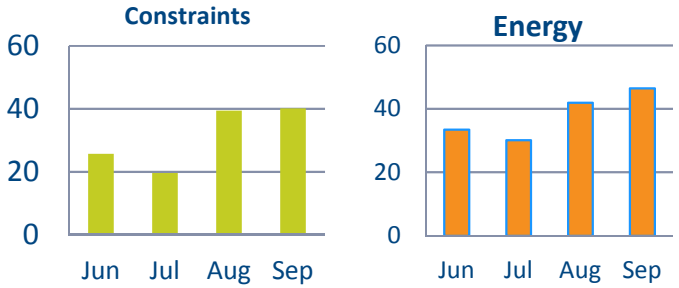
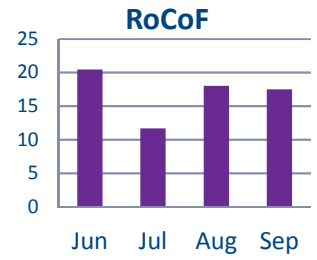
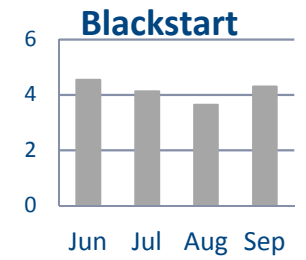
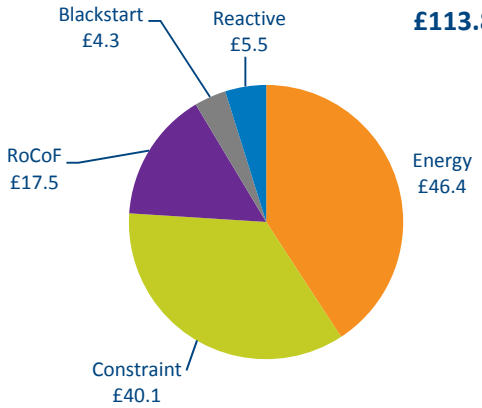
September 2019 : £3.94/MWh
Total Cost: £113.8m, Volume: 34.9TWh

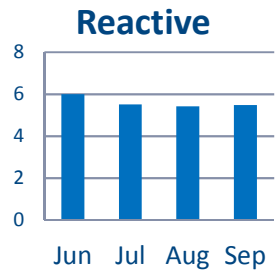




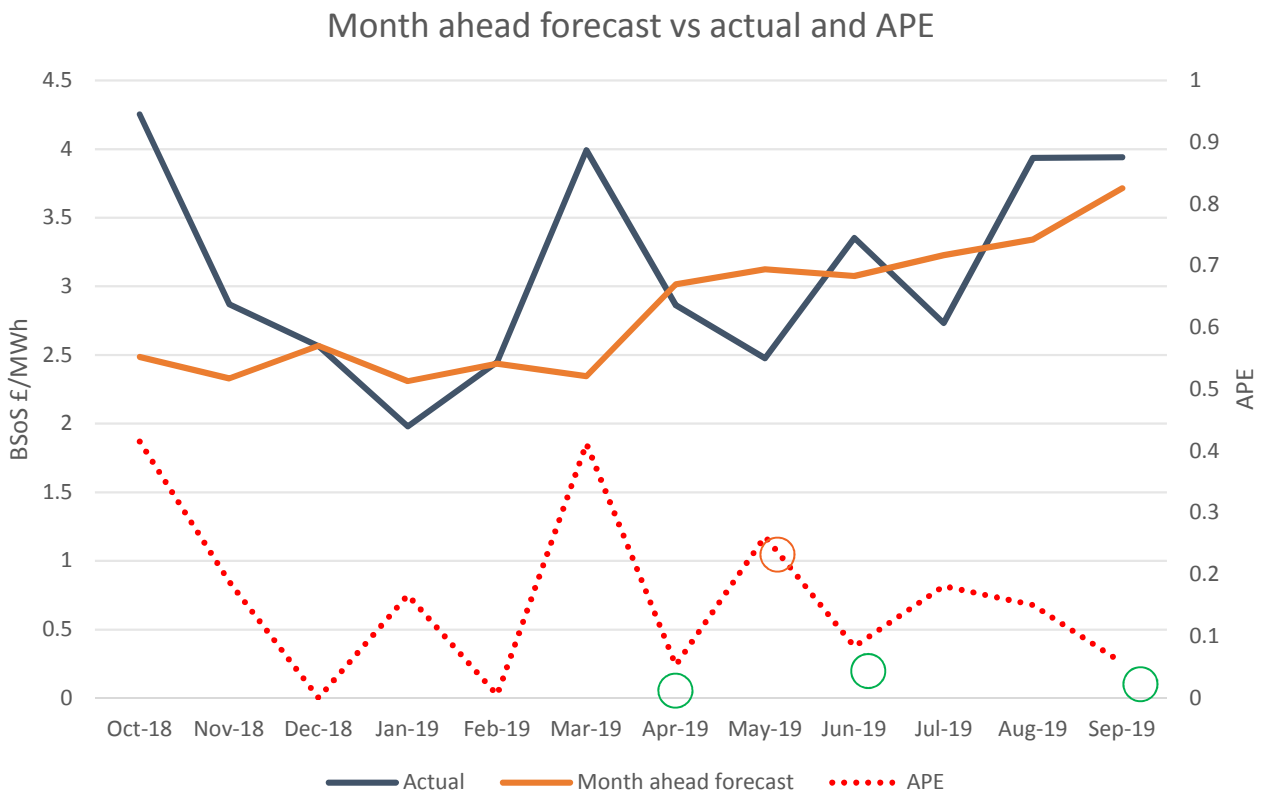








Forecast Accuracy – BSUoS Report



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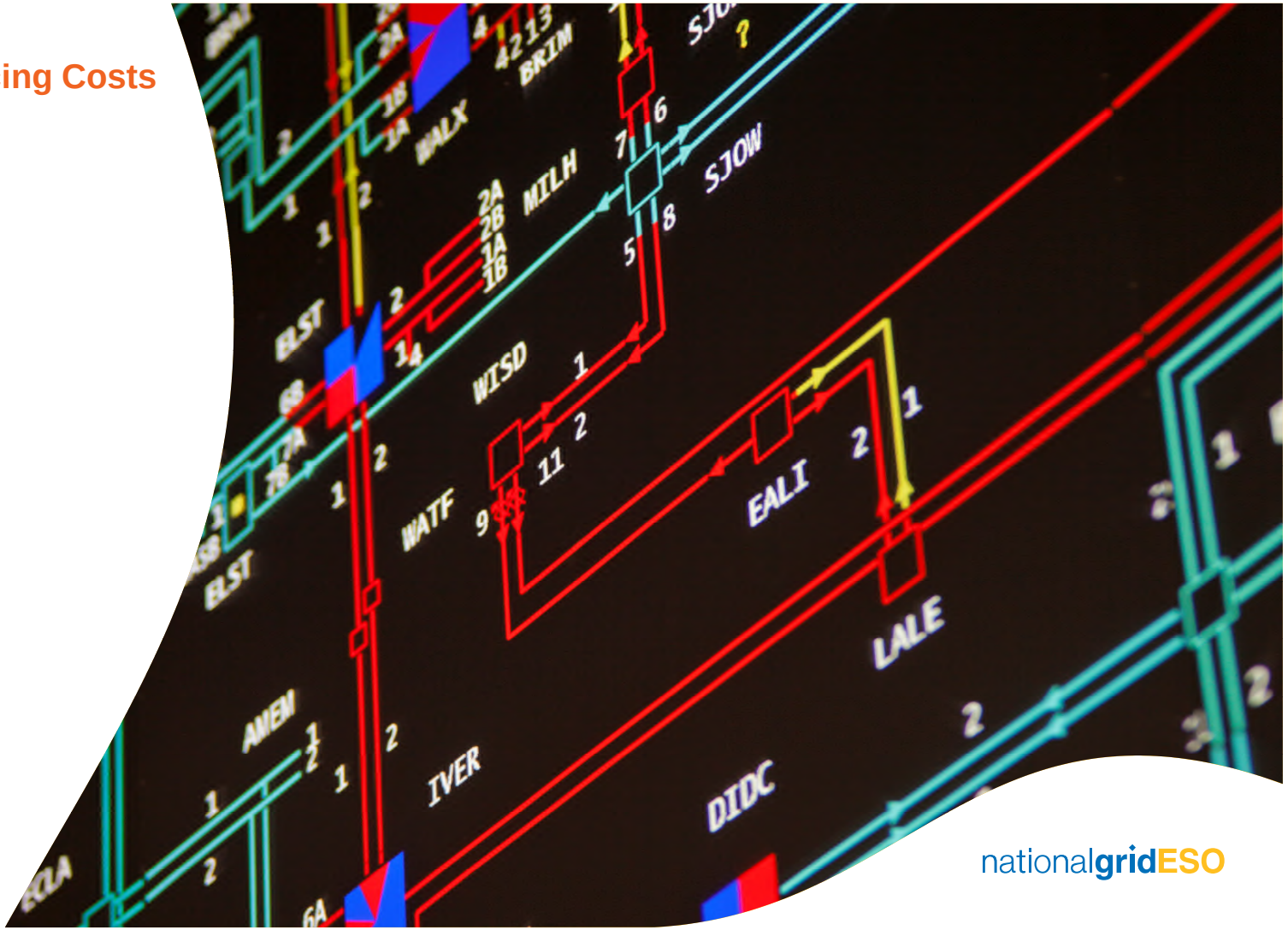
Balancing Costs



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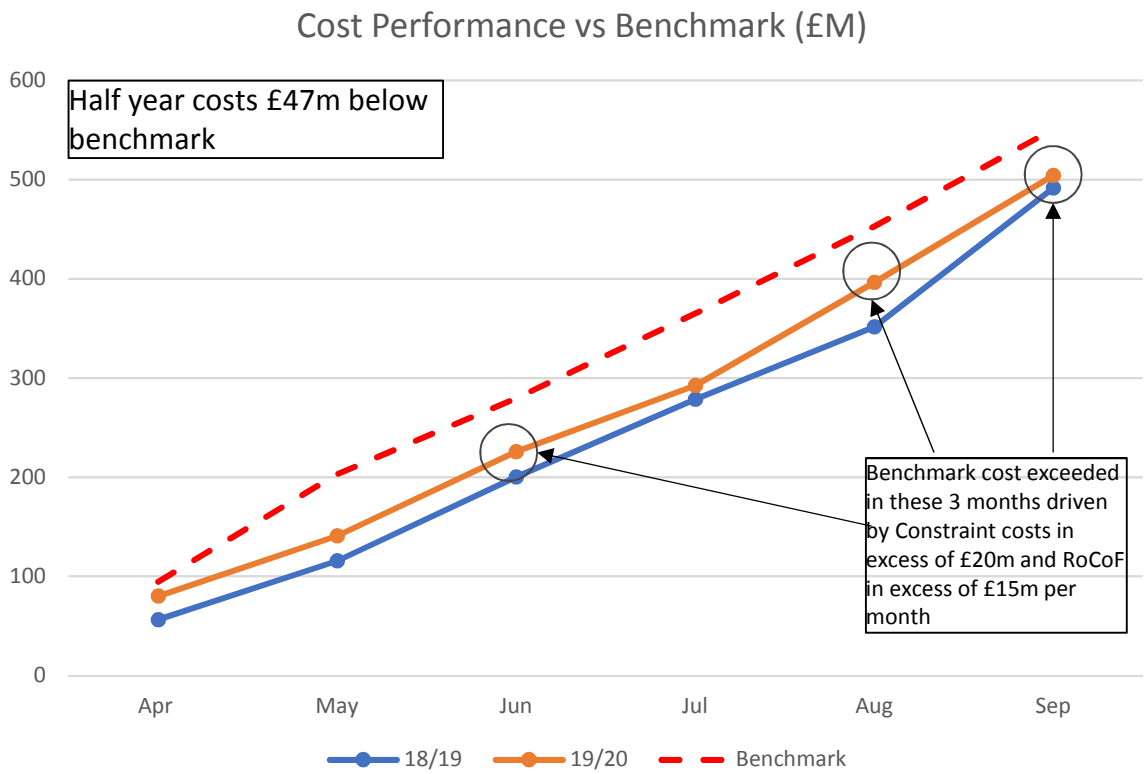
Cost performance vs benchmark



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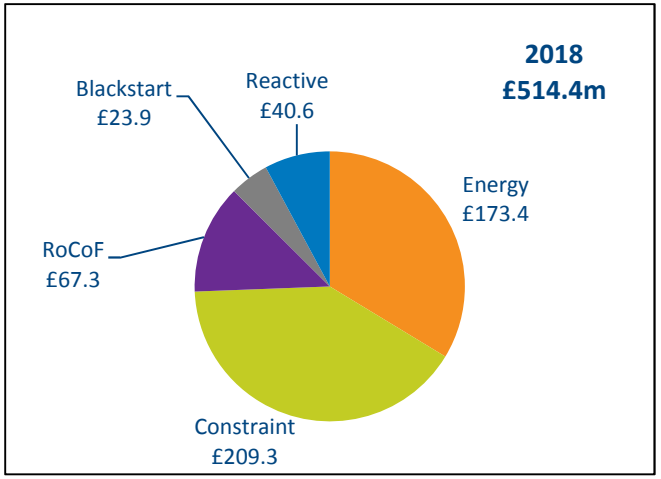
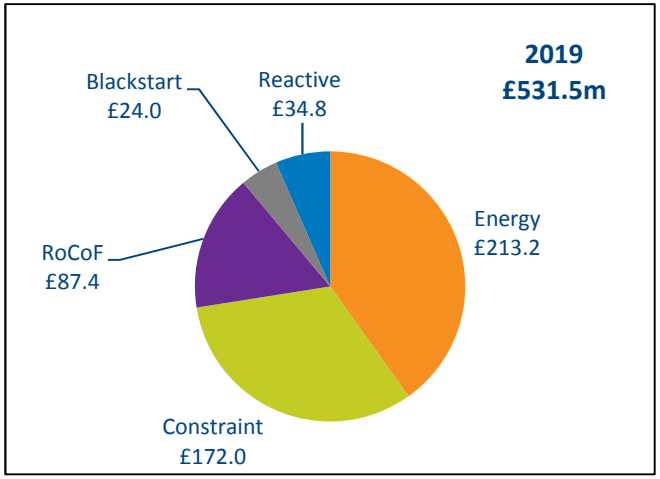
2019 April to September compared with last year





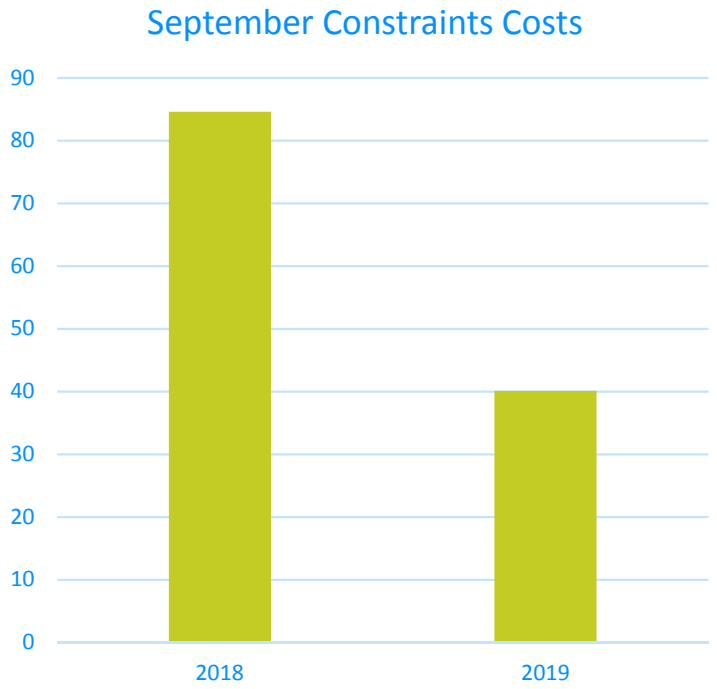
Comparing 2019 with 2018

- **£39.8m more on energy balancing, reserve and response**
- **£37.3m less on constraints**
- **£20.1m more on RoCoF**
- **£0.1m more on Blackstart**
- **£5.8m less on Reactive**

Constraints

September 2018 costs driven by:

- **Western Link HVDC unavailability**
- **High levels of Wind generation**
- **System conditions causing outages to be taken concurrently to maintain system security for October and through the winter**



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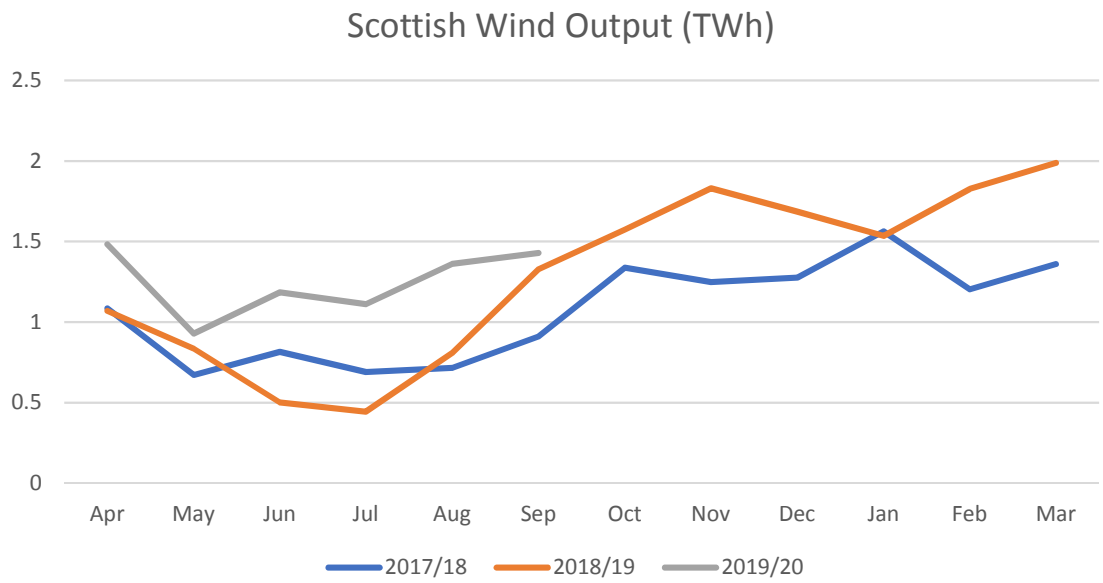
Wind volumes and constraint costs



- **Each month of 2019 higher than equivalent month in 2018**
- **HVDC availability has a massive impact during periods of high wind ie. Sept 18**

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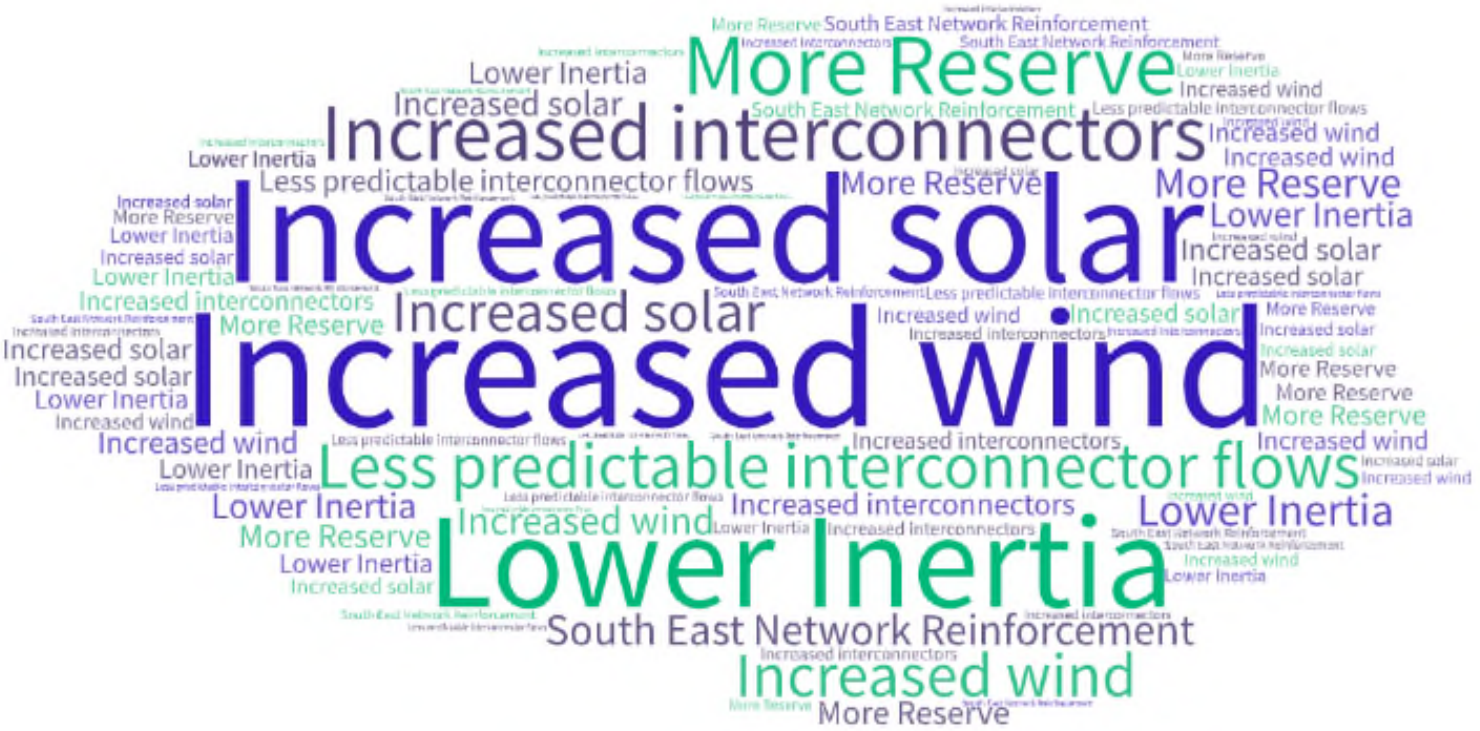
2019 Drivers of Cost



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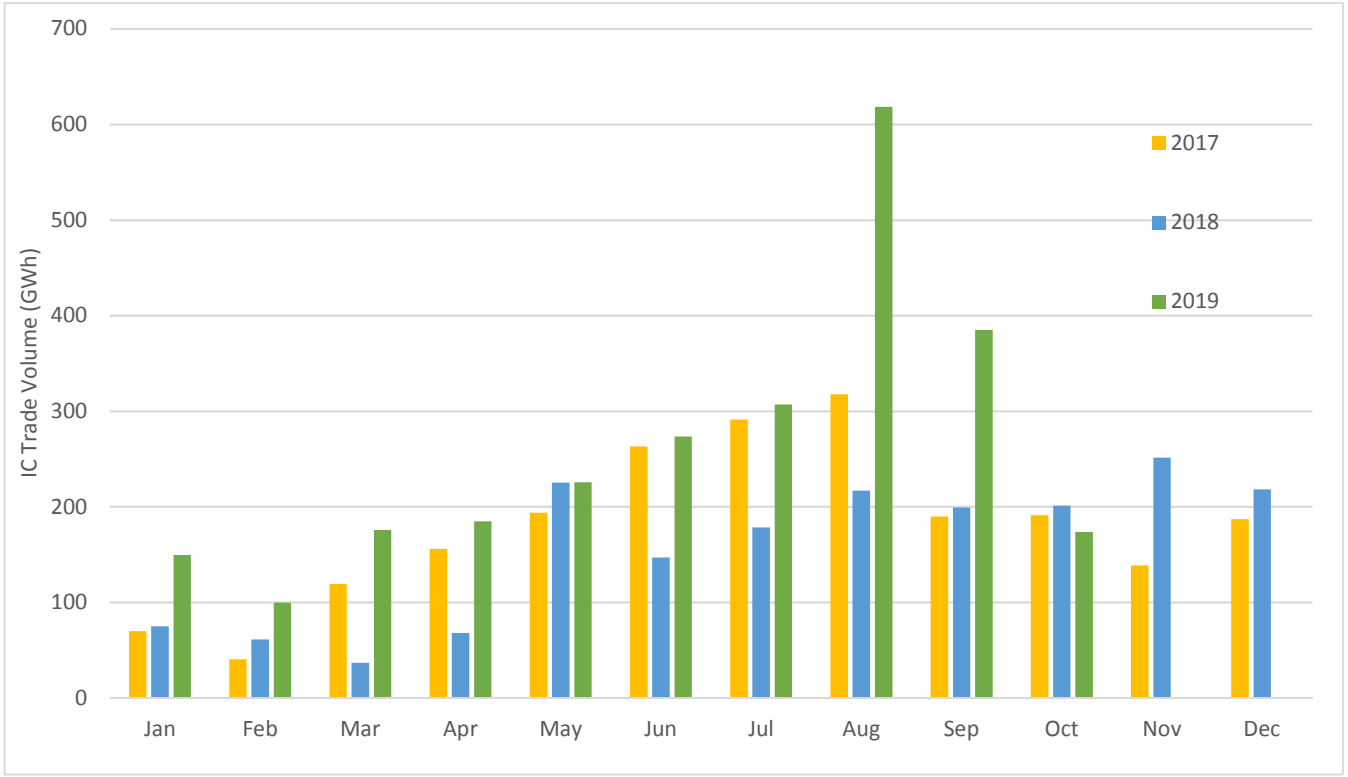
Interconnectors



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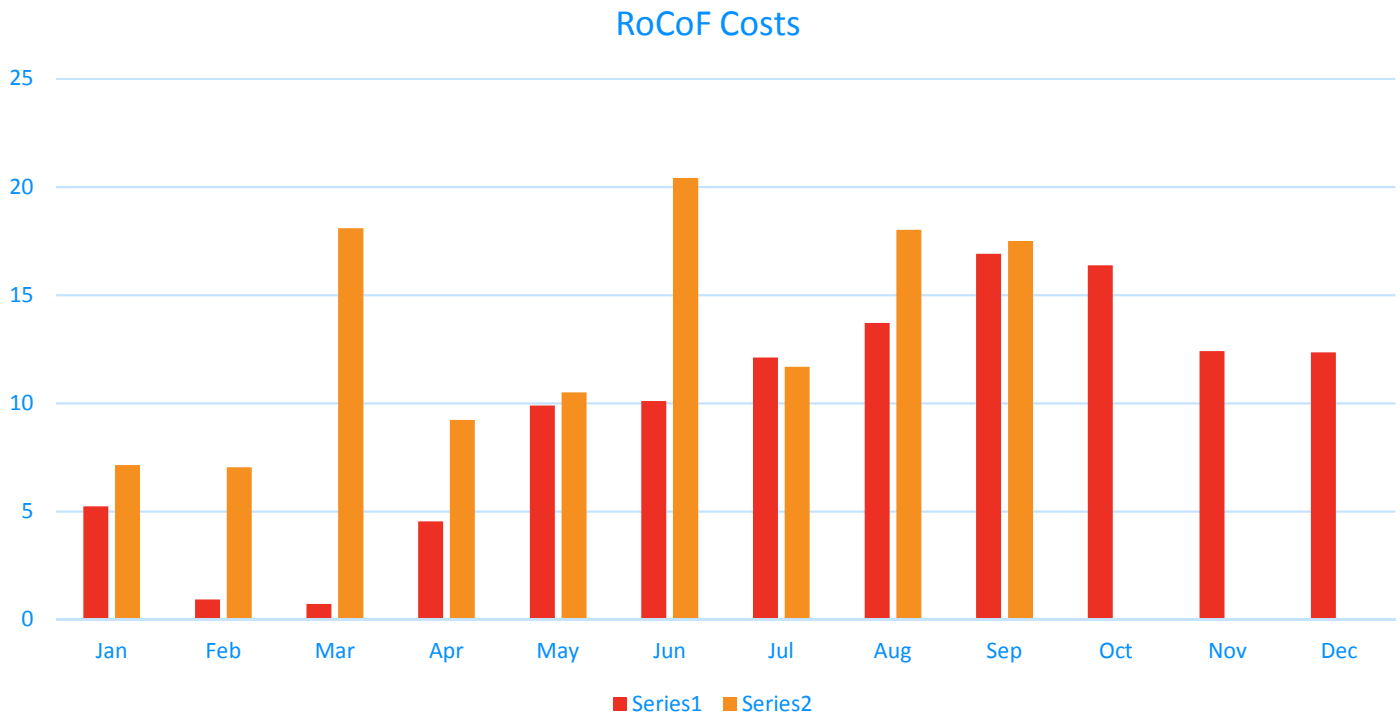
RoCoF costs



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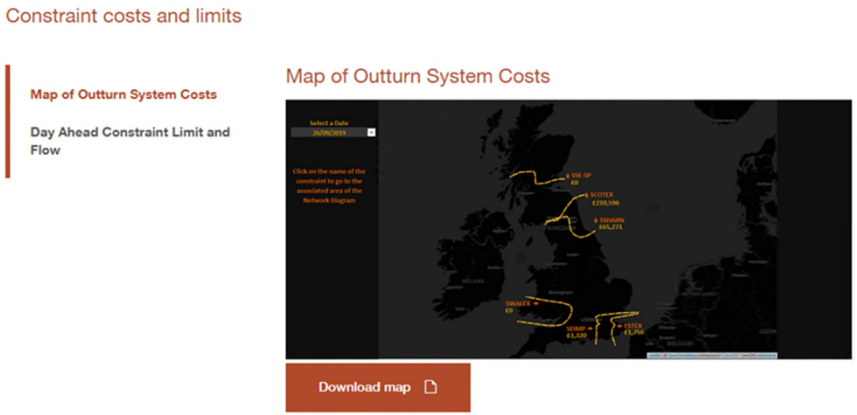
New and Future Reports

Operational Insights

- Sharing our insight on balancing actions and producing a map of outturn system costs for thermal constraint costs by region or constraint boundary.
- Publish day ahead information on constraint boundaries to share the limit and the expected flow at day ahead.

Upcoming Projects

- Sharing our insight on balancing actions and producing a map of outturn system costs for voltage constraints per region.
- New data portal:Q3 2019-20



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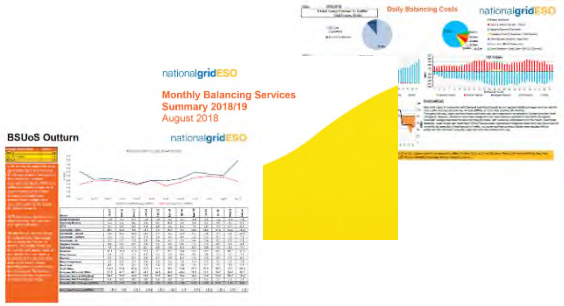
Feedback on reports

1. What reports do you look at and use to inform business decisions?
2. How understandable the content is of the reports?
3. How likely you are to recommend the reports to a friend or colleague?
4. What changes would you like to see made to our reports?

Poll questions

Go to: www.slido.com
Event code: #Charging1

Respond to the 4 questions



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Q&A

Please provide feedback
via slido.com
Code: #3794

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Control Room difficult day

Gavin Brown
National Control

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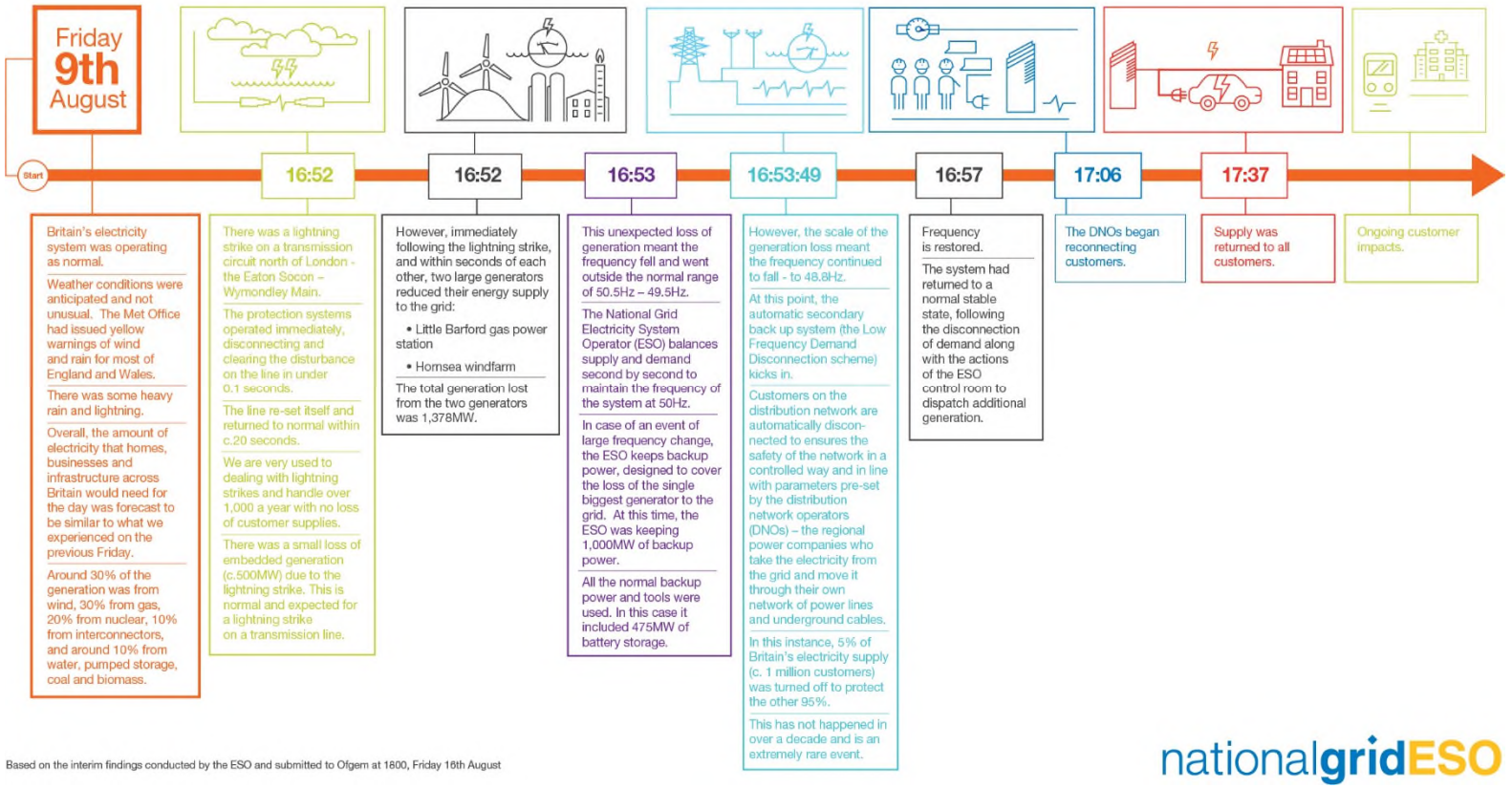
The sequence of events on Friday 9th August 2019



Based on the interim findings conducted by the ESO and submitted to Ofgem at 1600, Friday 16th August

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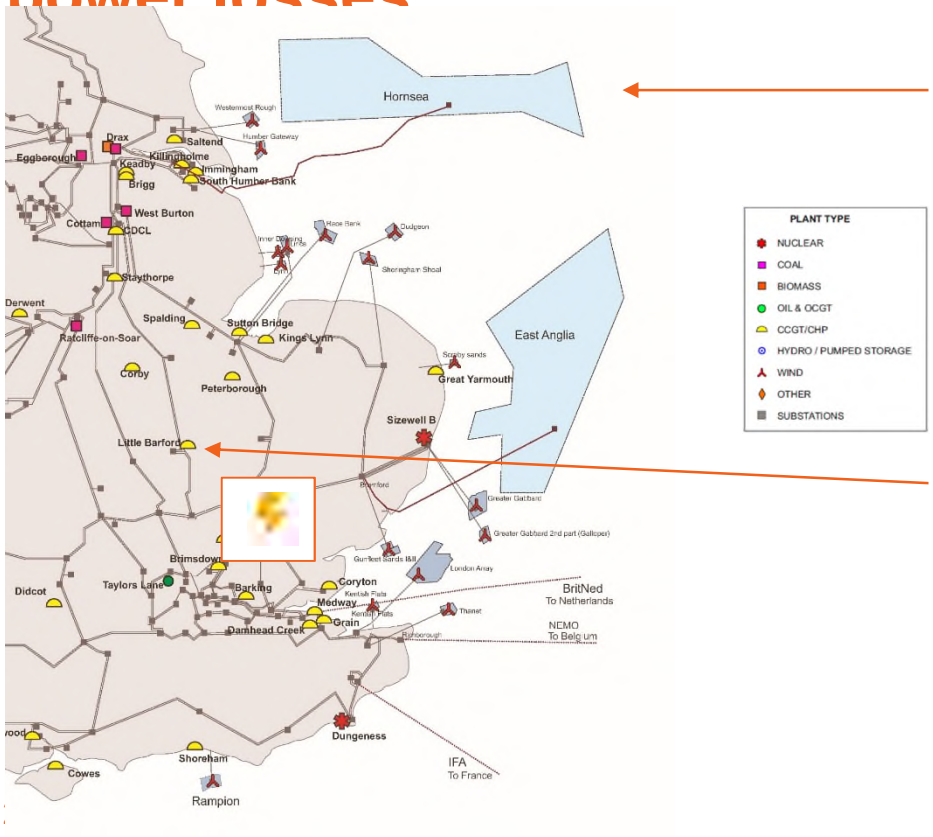
Two almost simultaneous, unexpected and independent power losses



Hornsea wind farm

Little Barford gas power station

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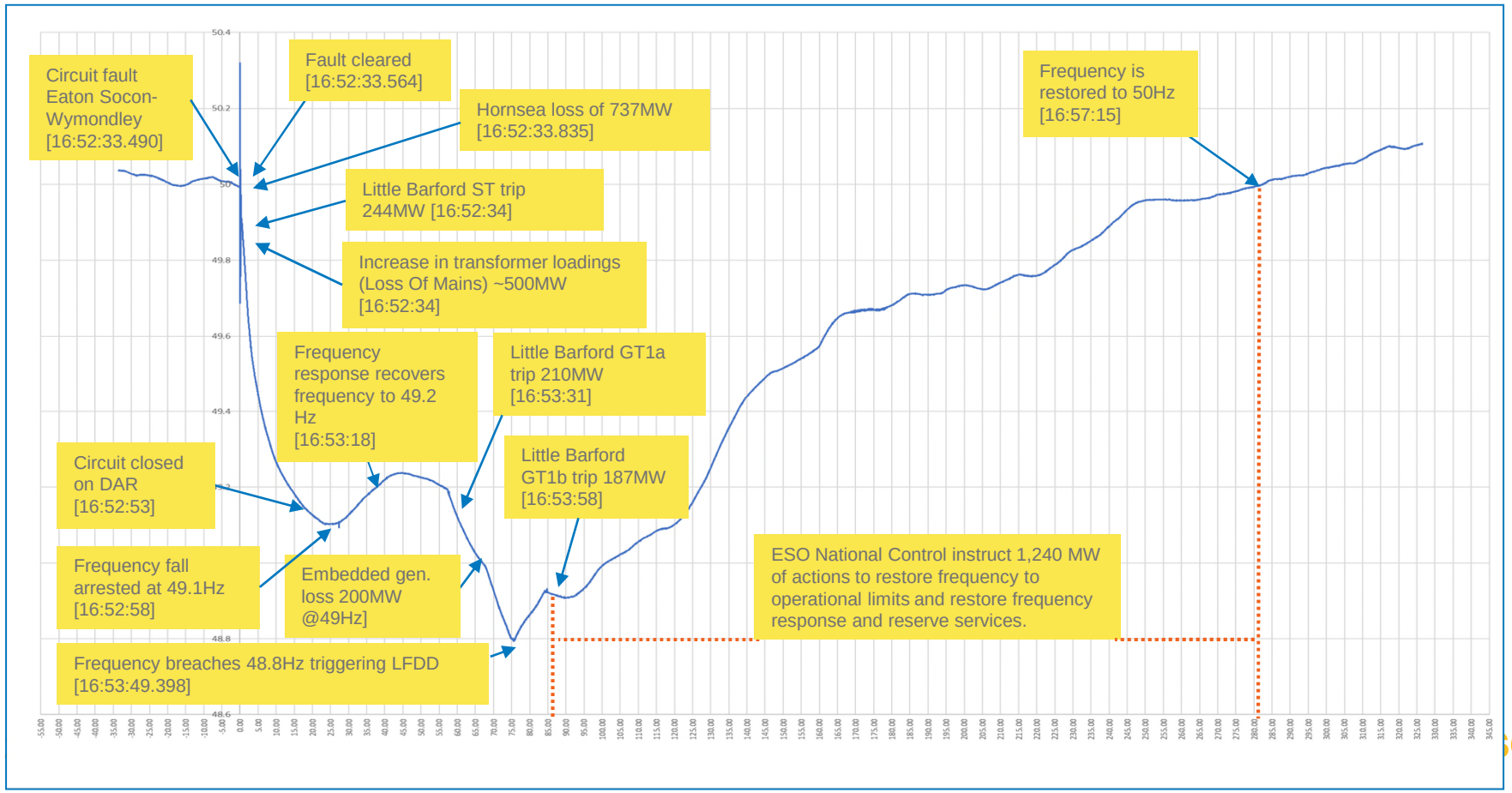
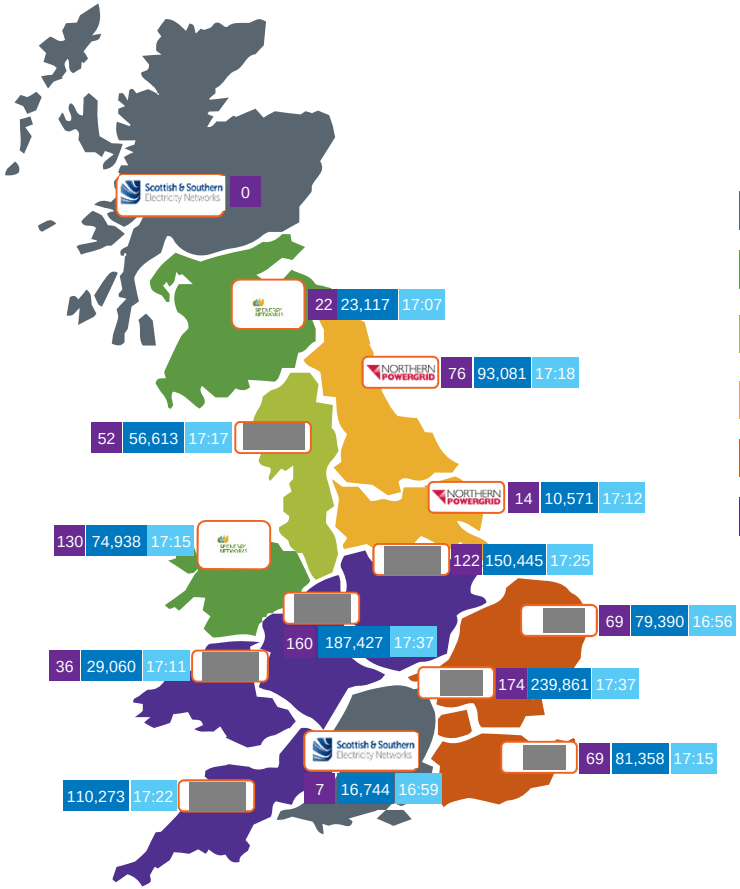
The Low Frequency Demand Disconnection in action



Demand restoration by the ESO to regional DNOs

KEY	TOTALS
MW of disconnected demand by LFDD	931
Customers affected	1,152,878
Final restoration time of demand	17:37



ELECTRICITY DISTRIBUTION NETWORKS

- Scottish & Southern Electricity Networks
- SP Energy Networks
- Electricity North West
- Northern Powergrid
- UK Power Networks
- Western Power Distribution

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Disruption continued whilst customers continued to recover their own systems

- One million electricity customers were without power for between 15 and 50 minutes.
- Major disruption to parts of the rail network, including blocked lines out of Farringdon and Kings Cross stations along with wider cancellations and significant delays impacting thousands of passengers. A major contributor to the disruption relates to a particular class of train operating in the South-East area – approximately 60 trains unexpectedly shut down when the frequency dropped below 49Hz, half of which required a visit from a technician to restart.
- Impacts to other critical facilities including Ipswich hospital (lost power due to the operation of their own protection systems) and Newcastle airport (disconnected by the Low Frequency Demand Disconnection scheme).

In summary: our findings

- At 16:52:33 on Friday 09 August 2019 there was a lightning strike on the Eaton Socon – Wymondley 400kV line. This was one of several lightning strikes that hit the transmission system on the day, but this was the only one to have a significant impact.
- The protection systems on the transmission system operated correctly to clear the lightning strike and the associated voltage disturbance was in line with what was expected.
- Two almost simultaneous unexpected power losses – at the Hornsea off-shore wind farm (737MW) and the steam turbine at the Little Barford gas-fired power station (244MW) – occurred independently of one another, but coincident with the lightning strike. As this generation would not be expected to trip off or de-load in response to a lightning strike, this represents an extremely rare and unexpected event.

In summary: our findings

- The lightning strike also initiated the operation of Vector Shift protection resulting in the tripping of approximately 150MW of embedded generation.
- These events resulted in a cumulative level of power loss greater than the level required to be secured by the Security Standards (1,000MW based on the largest infeed at the time), and as such a large frequency drop outside the normal range occurred.
- The frequency drop caused the further tripping of approximately 350MW of embedded generation on Rate of Change of Frequency (RoCoF) protection.
- Levels of embedded generation tripping due to RoCoF and vector shift were broadly in line with what was expected.
- The total loss of generation at this point was 1,481MW, nevertheless the frequency fall was arrested at 49.1Hz and began to recover as all the response and reserve available was deployed.

In summary: our findings

- However, one of the gas turbines at Little Barford then unexpectedly tripped from 210MW bringing the cumulative loss of generation to 1,691MWs. There were no further reserves left and the frequency fell to 48.8Hz.
- The LFDD scheme was correctly triggered at 48.8Hz and automatically disconnected c.1.1m customers (c. 1GW).
- The disconnection of demand, coupled with the response and reserve in place along with further dispatch of fast acting plant by ENCC, enabled the frequency return to 50Hz within 5 minutes and the system to be sufficiently stable and secure to enable ENCC to permit the re-connection of demand within 15 minutes.

In summary: our findings

- Reserve providers in aggregate delivered approximately 90% of contracted levels. While this is broadly in line with our modelling assumptions, there were variations across the portfolio and there will be specific follow-up with any provider who fell short of their contracted position.
- The DNO's quickly restored supplies within 40 minutes once the system was in a stable and secure position.
- Several critical loads were affected for a longer duration by the action of their own systems, in particularly rail services.

Working together to ensure learnings are applied across industry

- We are working with the regulator, government and other organisations to ensure there is a full understanding of the event and learnings are taken and applied across the ESO and industry
- Contribute to the wider industry review by the UK Government's Energy Emergencies Executive Committee inquiry
- Other investigations taking place e.g. in health and transport

Areas where lessons can be learned across industry

- Communication processes and protocols, in particular during the first hour, should be reviewed to support timely and effective communication in any future event;

- The list of facilities connected to the LFDD scheme should be reviewed to ensure no critical infrastructure or services are inadvertently placed at undue risk of disconnection; and

- The settings on the internal protection systems on electric trains should be reviewed to ensure they can continue to operate through ‘normal’ disturbances on the electricity system.

ESO recommended actions

- A review of the security standards (SQSS) to determine whether it would be appropriate to provide for higher levels of resilience in the electricity system. This should be done in a structured way to ensure a proper balancing of risks and costs;

- Assess whether it would be appropriate to establish standards for critical infrastructure and services (e.g. hospitals, transport, emergency services) setting out the range of events and conditions on the electricity system that their internal systems should be designed to cater for;

- A review of the timescales for delivery of the Accelerated Loss of Mains Change Programme to reduce the risk of inadvertent tripping and disconnection of embedded generation, as GB moves to ever increasing levels of embedded generation.

Overall Losses and Actions to restore Frequency

Below is the detail of the cumulative losses of infeed

Generation Unit	Infeed Loss	Cumulative Infeed Loss
Little Barford ST1C	244 MW	244 MW
Hornsea Offshore Windfarm	737 MW	981 MW
ESO Security Standards and Planning Required an infeed loss 1,000 MW loss to be covered		
Estimated, Embedded generation infeed loss due to Loss of Mains Protection	~500 MW	~1481 MW
Little Barford GT1A	210 MW	~1691 MW
Little Barford GT1B	187 MW	~1878 MW

The total loss of generation over the first minute of the event was so large that the frequency fell to 48.8Hz, triggering Low Frequency Demand Disconnection (LFDD) relays across the DNOs. These acted to disconnect 931 MW of demand from the electricity network (c. 3.2% of total demand). This loss of demand arrested the frequency fall as designed and, alongside the response (over 1000MW), reserve and rapid dispatch of additional generation (1240MW) by NGESO, recovered the system security position within 5 minutes.

Q&A

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via slido.com
Code: #3794

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Trading – the insider…..

Rachel Turner
Trading Manager

Lijia Qiu

Senior Energy Trader

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Who are we?


ESO Operations
Networks
Commercial
ENCC
Balancing & Revenue Services
Commercial Operations Strategy
Commercial Operations
EMR CM & CfD
EMR Stakeholder & Compliance
IT Business Integration
Performance Review
Energy Trading
Structuring & Optimisation
Energy Forecasting

Trading Team

Trading Manager
Rachel Turner

Senior Energy Trader
Lijia Qiu

Senior Energy Trader
James Bradley

Energy Trader
Gareth Jenkins

Energy Trader
Camille Gilsenan

Energy Trader
Aidan Wright

Energy Trader
Alex Goodey

Energy Trader
Ceirion Owain

Energy Trader
Faraz Samani

Why do we trade?

- Licence obligation to balance the system economically - benefits the end consumer
- Additional tool in ESO system balancing portfolio
- Risk mitigation – helps alleviate BM uncertainty for system planning purposes
- Gives BMUs more certainty which hopefully results in more favourable prices
- Avoid emergency actions: emergency assistance, emergency instruction, emergency demand disconnection

- Manage system constraints (RoCoF, thermal, voltage)
- Margin (upwards and downwards)
- Other (e.g. black start, response)

However:

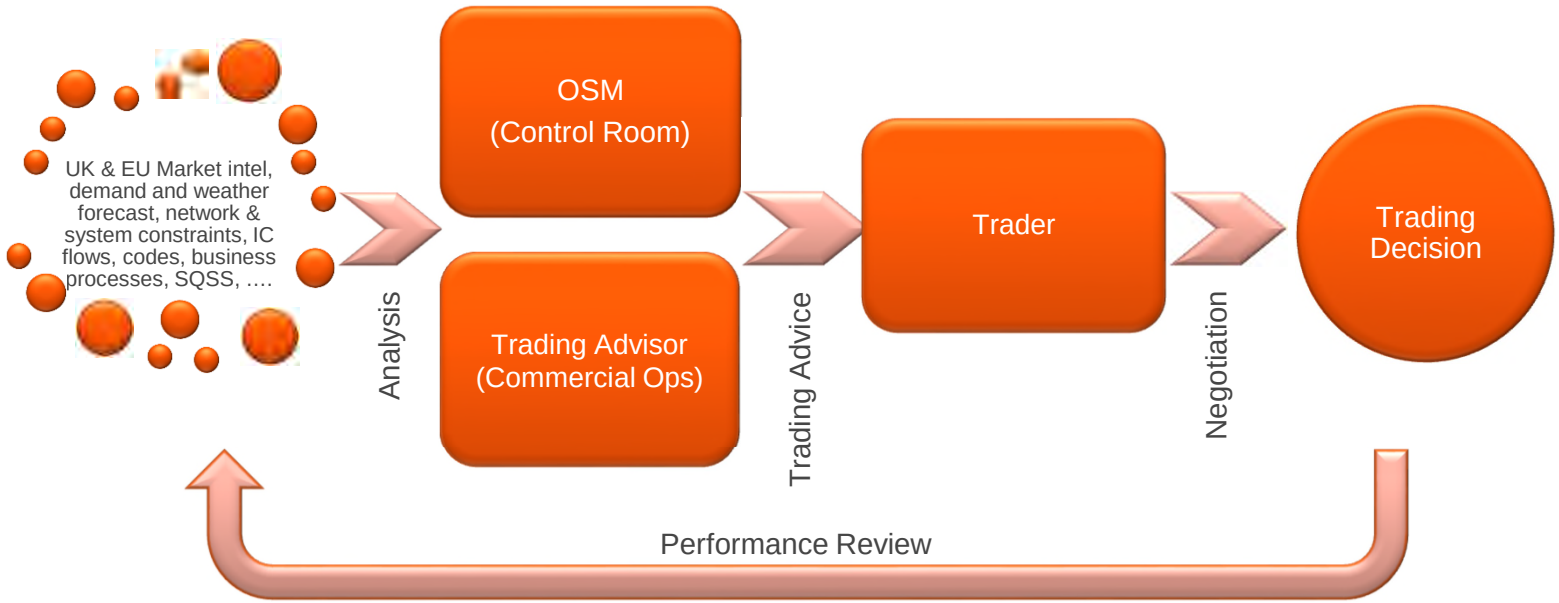
- Further out our requirements are less certain and there is the risk of over trading
- Could leave us exposed to expensive BM actions if we get it wrong
- Potentially reduces BM activities and competition

No speculative Trading! Not trading to make a profit

How do we trade?

- **Authorised to trade up to 28 days ahead, but typically focus on trading within day and day ahead**
- **Trade under GTMA (Grid Trading Master Agreement)**
  - Schedule 7A: BMU Transactions (BMU or Interconnector (IC))
  - Schedule 8: PELI Transactions (Power Exchange Linked Interconnector transactions)
- **Contract support and enactment**
  - When there is relatively firm requirement on transmission constraints and Ancillary Service contracts
    - Can be firm/optional, typically cap and/or collar
  - Support contract decision
  - Enact contracts when required
- We can also trade on Power Exchanges if required

NGESO Trading: Our Way of Working



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Typical day of trading team

08:00~09:00	Market scanning, review previous day activities and assess initial requirement for within day and day ahead
09:00~11:00	Contract enactment and publication, morning trading activities
11:00~12:00	Review day ahead PN and IC positions
12:00~12:30	Mid-day review with Control Room and NAP
14:00~16:00	Review and agree requirement for balance of the day and day ahead
16:00~18:30	Continue trading activities

18:30~08:00 D+1: Ad-hoc “out of hours” trades from control room

An example of the trading advice and transactions

Due to transmission line outage, a thermal constraint has been forecast for south east of England for the weekend:

- **Network Access Planning continuous evaluation (Y-2 to D-1)**
- **Control Room further assessment (D-1 to H-4)**

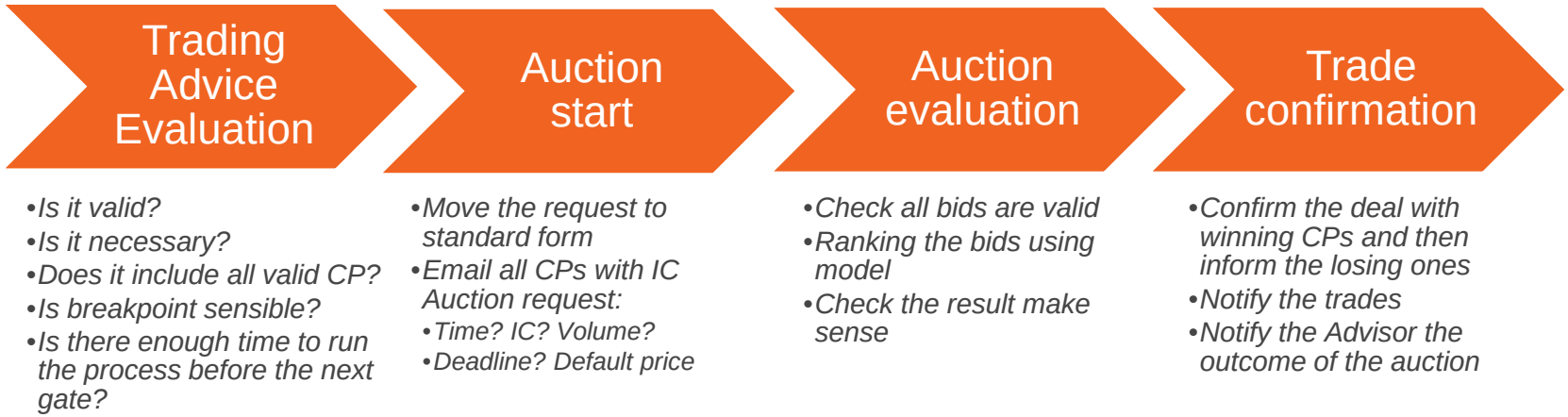
Subject: 2019-10-23 Trading Advice 01 v01

Requirement: *Sell on IFA/BN 200MW between 13:00 and 16:00*

Alternative BM actions: *Pulling back unit A 100MW at £30/MWh, unit B 100MW at £20/MWh from 13:00 to 14:00*

Breakpoint: *Reduce import on IFA or BN by 200MW; with 100MW breakpoint at £31.5/MWh and 100MW at £21/MWh*

IC Trading Process Improvement



- Standardise requirement, bid assessment, confirmation
- Communicate primarily using email (with attachments)
- Facilitate competition
- Embedded error checking
- Reduced operational risk
- Improved processing capability

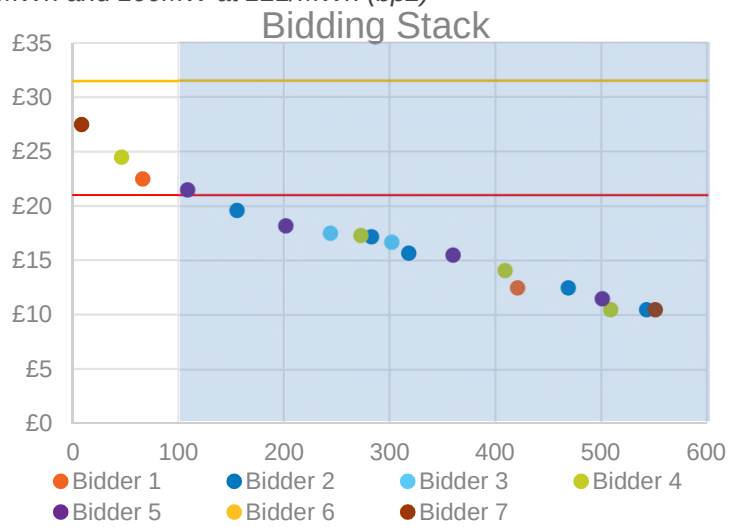
An example of the trading advice and transactions

Re: 2019-10-23 Trading Advice 01 v01

Requirement: *Sell on IFA/BN 200MW between 13:00 and 14:00*

Alternative BM actions: *Pulling back unit A 100MW at £30/MWh, unit B 100MW at £20/MWh from 13:00 to 14:00*

Breakpoint: *Reduce import on IFA or BN by 200MW; with 100MW breakpoint (bp1) at £31.5/MWh and 100MW at £21/MWh (bp2)*



Bidding Evaluation Example

Total 19 bids received from 7 bidder, total bidding volume 550MW

1. Build bidding stack in decreasing price order
2. All volume in excess of required volume removed
3. All bids above breakpoint accepted: 0 MW > bp1; 110 MW > bp2
4. But only 100MW required against BP2, therefore only 100MW taken

Requirement filled:

With 80 MW sold on BN and 20 MW on IFA, with total weighted average price of £23.3/MWh

Result:

100 MW to be flown on ICs and 100 MW to be taken on Unit A in the BM.

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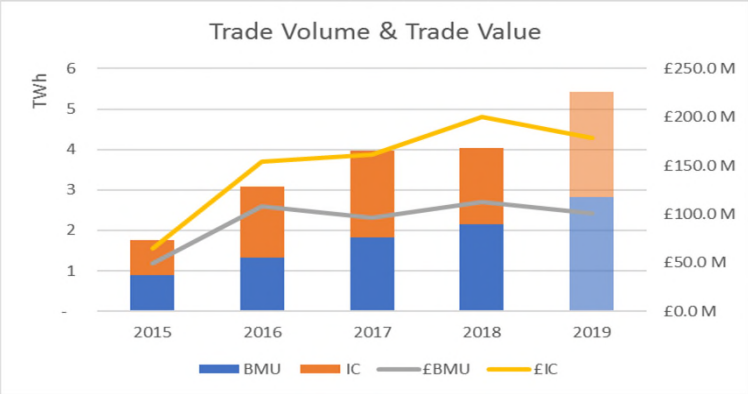
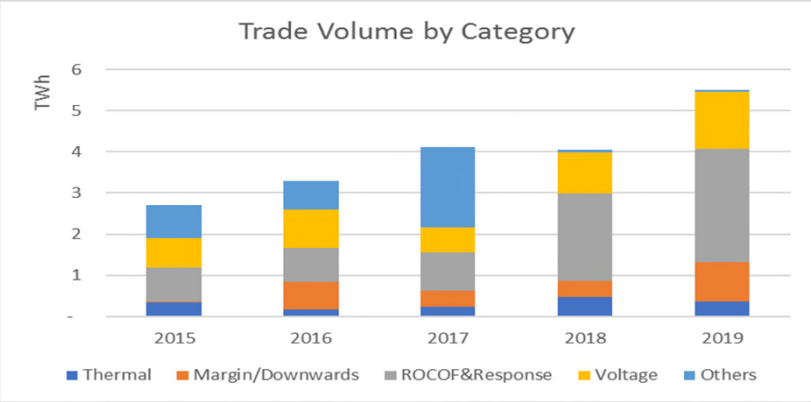
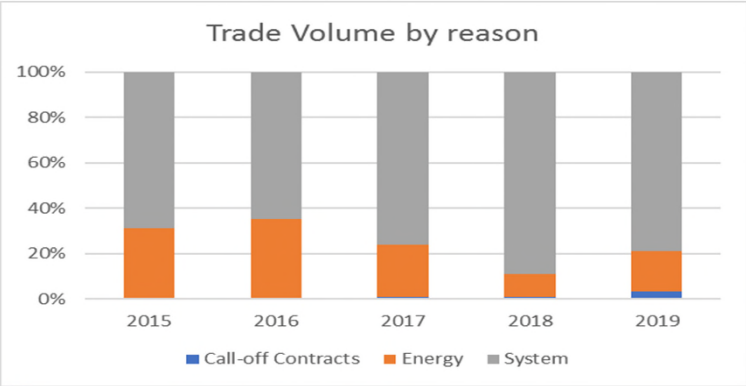
Some Trends







- **BMU trade volumes have increased year on year**
- **Following a slight reduction in IC trading volumes last year, there has been a sharp increase in 2019**
- **Less trading for thermal constraints in the last two years**
- **However, the requirement has been replaced by trading for ROCOF, margin and voltage support**

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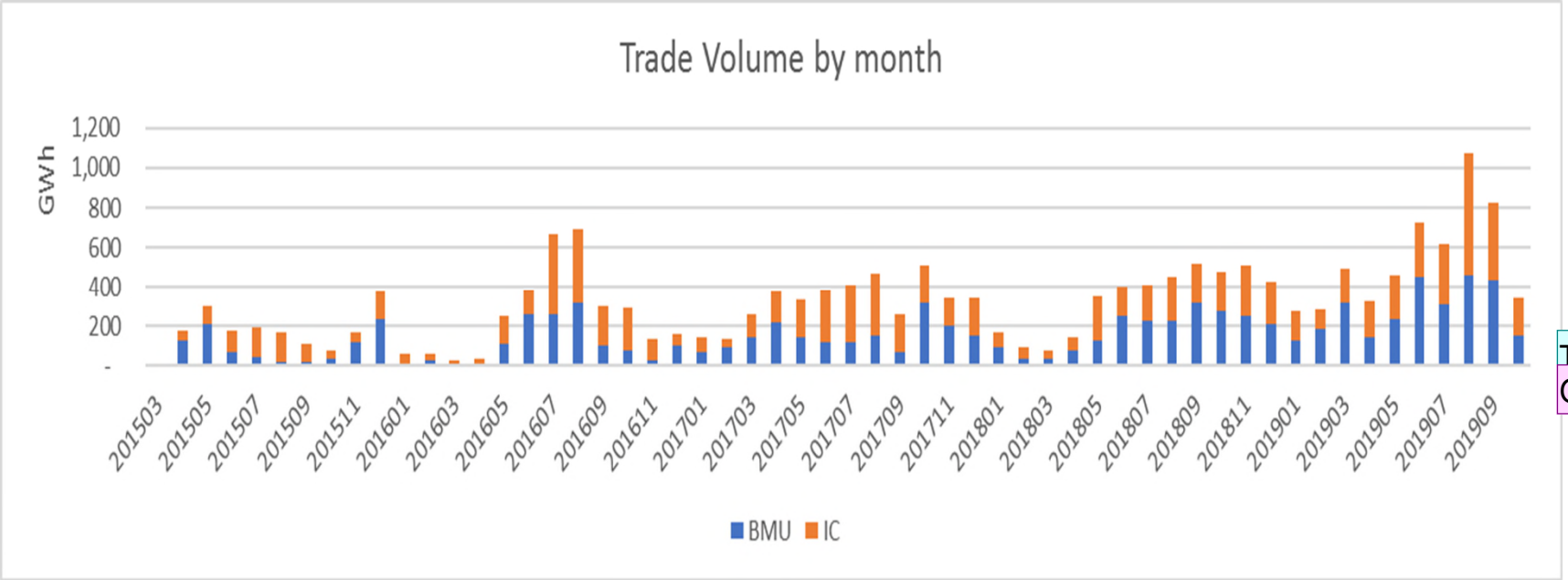
Trade Volume variation



T(R5
Q(L4

Trade volume has significant seasonal variation

Significant increase recent two years.

Trade Publication

We publish trades as soon as we can

- within 1 hour after put into our trade booking system

https://trades.nationalgrid.co.uk

can subscribe email notification

Contracts are also published

https://www.nationalgrideso.com/balancing-data/data-finder-and-explorer

Q&A

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Coffee Break

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Operability/ Pathfinder Update

David Preston
Business Lead, Strategic Projects manager

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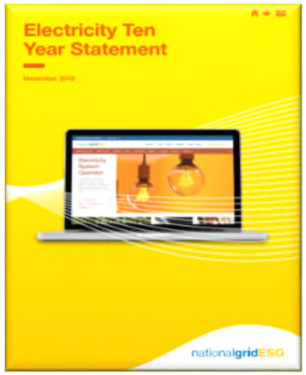
Background to NOA Pathfinders

Outline future energy scenarios (FES)

Assess system needs (ETYS)



System Operability Framework (SOF)

Identify solutions

TOs provide solutions to boundary needs

Tenders for solutions for voltage, stability, thermal and constraint solutions

Driver for NOA Pathfinders

Recommend most efficient solution (NOA)

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Voltage – update and next steps

RFI

- RFI closed in May seeking industry feedback on the potential for long term contracting opportunities for a voltage service in the Mersey area
- 17 responses received, with RFI feedback and next steps published in June
- Short term requirement identified to compliment the long term opportunity

ST Mersey

2020/21

- First time that NGESO has offered services to embedded providers in this manner. Current tender closes on 08 November for 1 year contract commencing April 2020. Contract award in January 2020
- Overnight service (23:00 to 07:00), absorption only, embedded and directly connected, ORPS utilisation
- 4 separate contract forms acknowledging BM / Non-BM participation and Firm / Non-firm availability
- Requirement measured at transmission system and will account for locational effectiveness. DNO (SPEN) will be central to assessment process and will inform power factor mode restrictions for embedded providers
- Questions and submissions to be directed to commercial.operation@nationalgrideso.com

LT Mersey

from April 2022

- Tender targeted to open on 25 November for 9 year contract opportunity from April 2022
- Availability payments only, TO asset build counter factual, Locational effectiveness and DNO interactions central to assessment process, up to -230 MVAr requirement potentially exposed to interaction with Stability
- Contracts expected to be awarded during April 2020 to facilitate build programs

Short term Mersey contract types

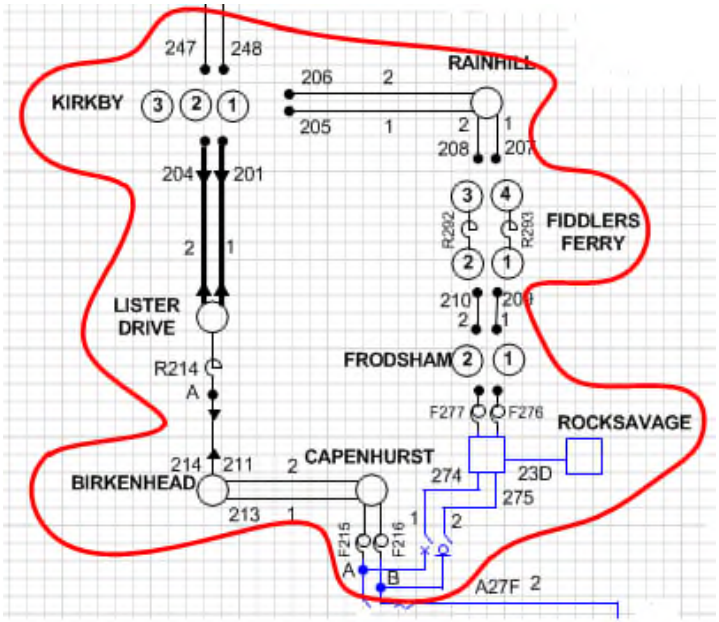
	A - BM Firm	B - BM Call-Off	C - Embedded Non-Flexible	D - Embedded Flexible
	Providers require an MSA for Reactive Power capability and are signatory to the CUSC		Providers must be connected at 132kV or below	
Transmission Connected	Transmission connected providers must be able to operate in Voltage Control mode		Cannot participate	
Distribution Connected	Cannot participate	Providers must be able to operate in Power Factor Control mode		

Short term Mersey payment structures

	A - BM Firm	B - BM Call-Off	C - Embedded Non-Flexible	D - Embedded Flexible
Aimed at:	BM providers expecting to run every night	BM providers not expecting to run every night	Embedded providers who can meet entire Service Period	Embedded providers who can't meet entire Service Period
Availability	✓ Available to deliver reactive power every service period (£/SP)	✗ Call off contract structure – no availability (£0/SP)	✓ Payment for availability if available (£/MVAr/SP)	✗ Access in real time only – no availability payment (£0/SP)
Activation	✗ Always delivering – no payment (£0/SP)	✓ Payment index linked to DA market (£/MWh)	✗ Already available – no payment (£0/SP)	✓ If instructed in real-time – paid an activation fee (£/MVAr/SP)
Utilisation	✓ All providers paid ORPS / equivalent rate (£/MVArh)			

Short term Mersey locational requirements

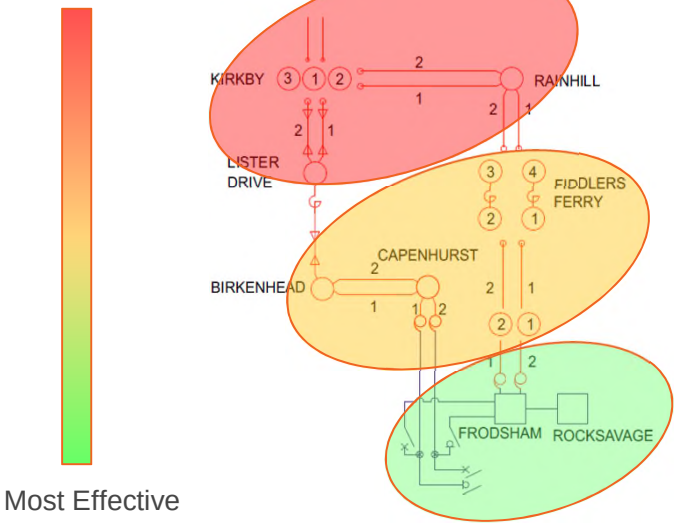
Potential Reactive Providers must be within the red boundary:



Short term Mersey locational requirements

Indicative Site Effectiveness

Least Effective



Most Effective

Typical Effectiveness at various voltage levels*

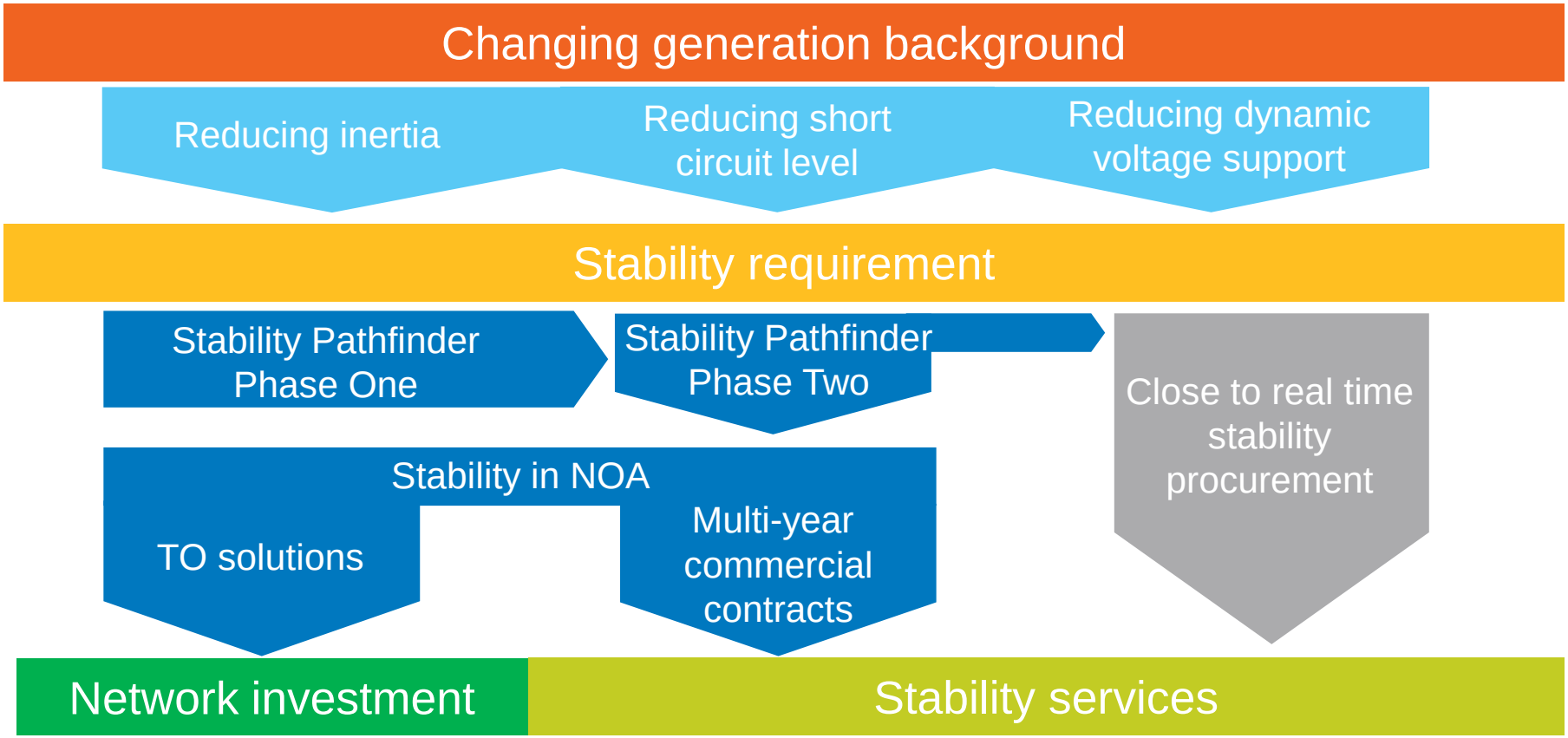
Least Effective — Most Effective

33 kV
66 kV

132 kV
275 kV
400 kV

* Actual effectiveness depends on site by site assessment

Stability procurement strategy overview



Stability – update and next steps

RFI

- RFI closed in September seeking industry feedback on any technological limitations and associated timescales of potential stability solutions
- 28 responses received, with RFI feedback and next steps published on 21 October
- Decision taken to operate across 2 phases (see Network Development Roadmap webpage – link)

Phase 1

GB from April 2020

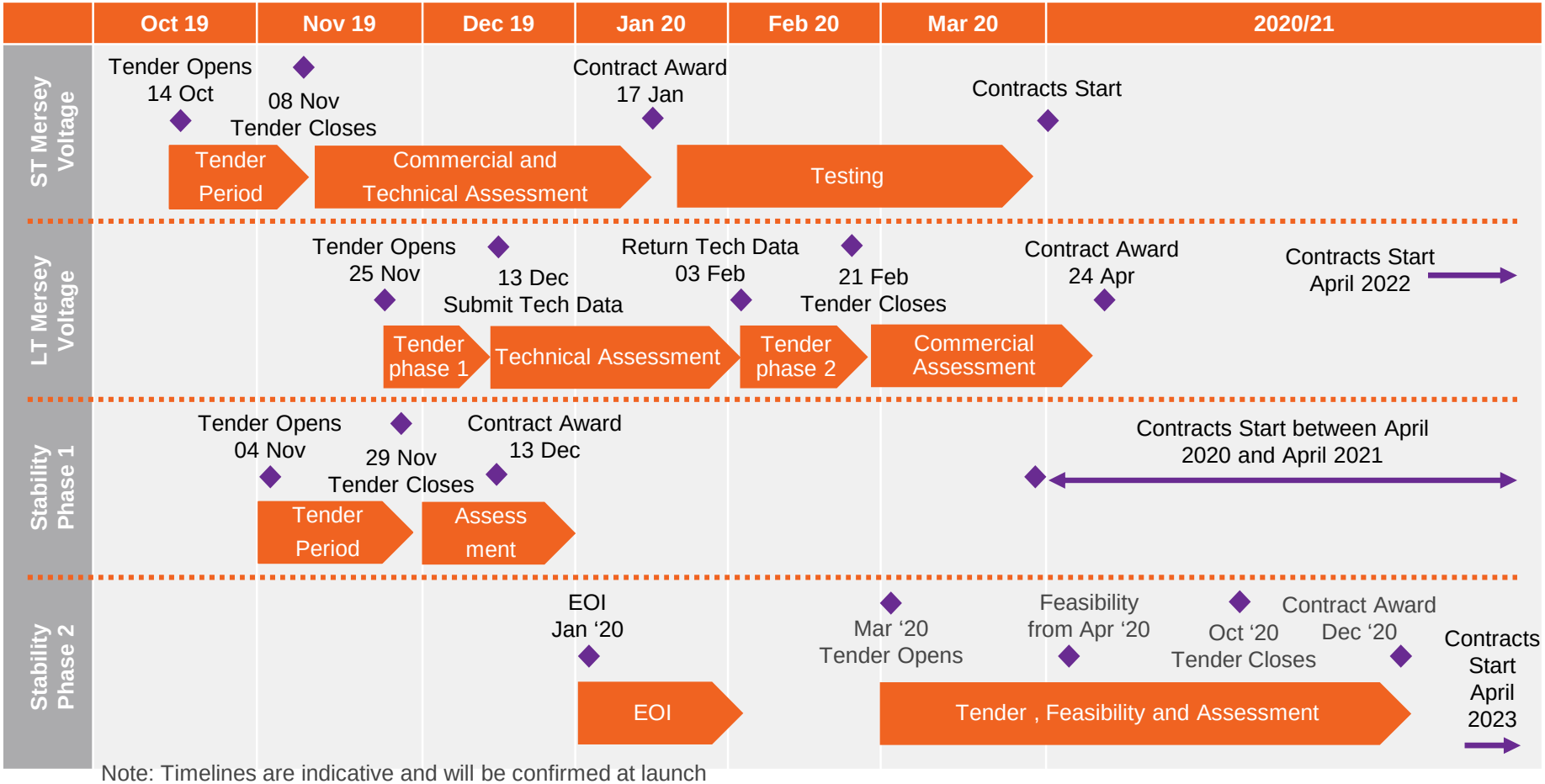
- Accelerated tender process over Q4 2019 for delivery from April 2020 for most urgent needs
- High confidence threshold for solution providers to demonstrate technological and operational readiness including synchronous compensators or synchronous generators in synchronous compensation mode
- GB wide with significant volume opportunity for 0 MW service from Grid Code compliant integrated providers
- Open to generators who wish to forgo winter availability payments in favour of generation revenue streams.
- We have already published acceptance criteria, technical specification, overview of commercial terms, assessment principles and timelines

Phase 2

Scotland from April 2023

- Expressions of interest will be sought in Q1 2020 for delivery from April 2023 across Scotland
- A feasibility study process will allow providers to demonstrate technical for new technologies and innovative solutions
- Contracts expected to be awarded before December 2020 to facilitate build programs

High level Mersey Voltage and Stability tender timelines



Note: Timelines are indicative and will be confirmed at launch

Q&A

Please provide feedback
via slido.com
Code: #3794

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Overview of our Business Plan

David Bowman and Joseph Donohoe

RIIO Team

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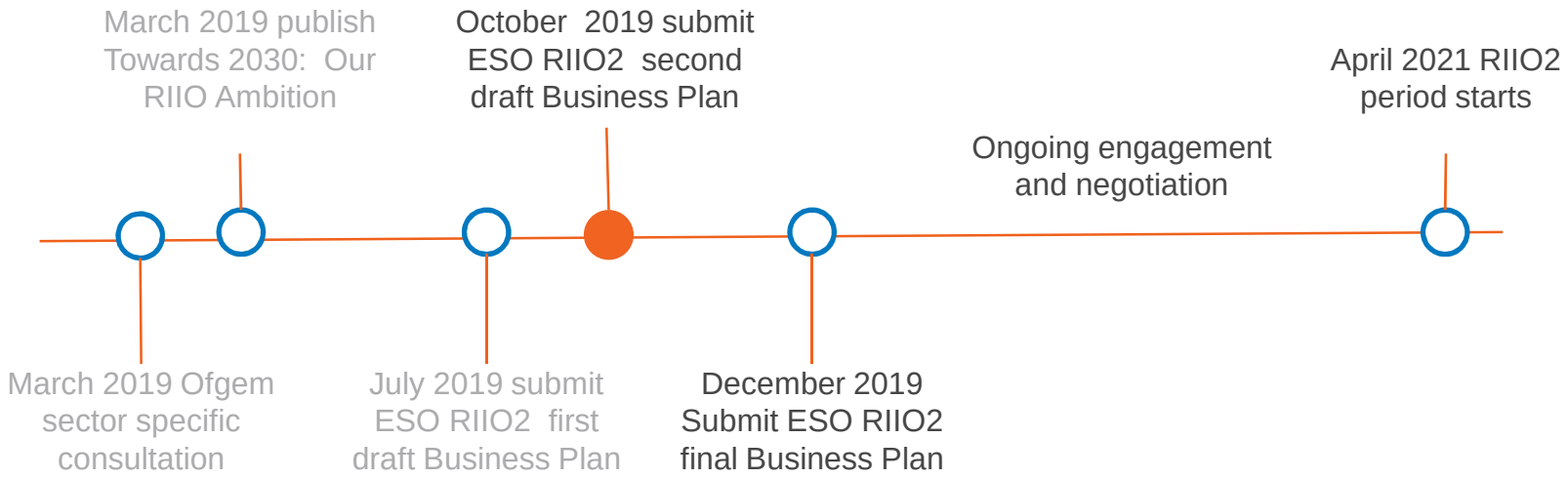
RIIO-2 Timeline



You can find our plan at: https://www.nationalgrideso.com/about-us/business-plans/riio-2-draft-business-plan

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Our business plan - overview

Part 1: Context

- Introduction and context
- Assumptions underpinning our plan
- A plan informed by our stakeholders
- Facilitating the transition to a net-zero energy system

Part 2: Our proposals

- Reliable and secure system operation, to deliver energy when consumers need it
- Transforming participation in smart and sustainable markets
- Unlocking consumer value through competition
- Driving towards a sustainable, whole energy future
- Open data

Part 3: Setting the ESO up for success

- Financing our plan
- Technology underpinning our ambition
- Innovation at all levels of the business
- People culture and capability

£250 million annual cost of the ESO.

£3 annual saving on each consumer bill in RIIO-2

£2 billion net consumer benefits in RIIO-2

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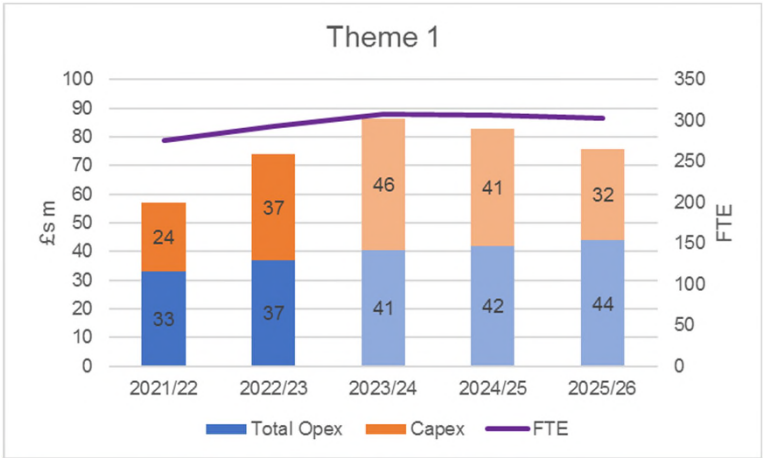
Theme 1: Ensure reliable, secure system operation to deliver electricity when consumers need it

- **transforming our control centre architecture and systems**, to be able to operate a zero carbon electricity system by 2025
- **upgrading our control centre training and simulation capabilities**, to be able to operate the system under range of scenarios, in partnership with the wider energy industry
- **evolving our restoration procedures** to ensure the reliance and reliability of the future and ensuring they meet the expectations of consumers in a highly-electrified world.



Investment £131 million - Benefit £254 million

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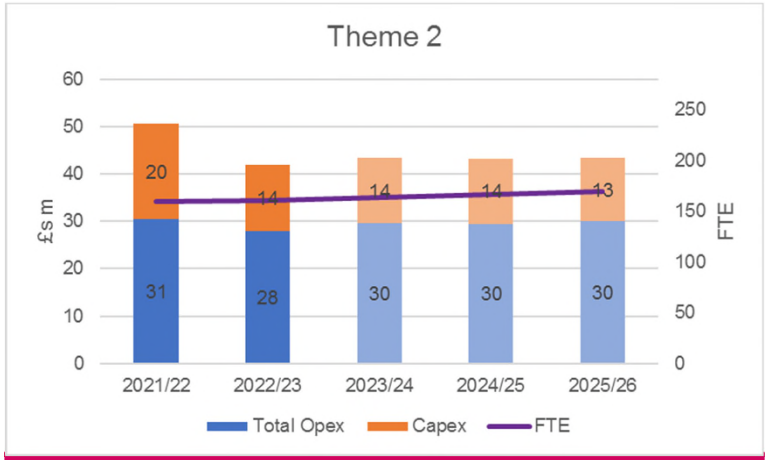
Theme 2: Transforming participation in smart and sustainable markets

- **Build the future balancing service and wholesale markets** – to attract the volume of flexibility we will need in the future, to achieve the UK's commitment to net zero emissions by 2050
- **Transform access to the Capacity Market** – to deliver security of supply with a plant mix that supports the UK's 2050 carbon target at an appropriate cost to consumers.
- **Develop codes and charging arrangements that are fit for the future** – that will facilitate the rapid change needed to deliver the low carbon energy system of the future. Code governance will be seen as an enabler of change, not a barrier



Investment £91.7 million - Benefit £411 million

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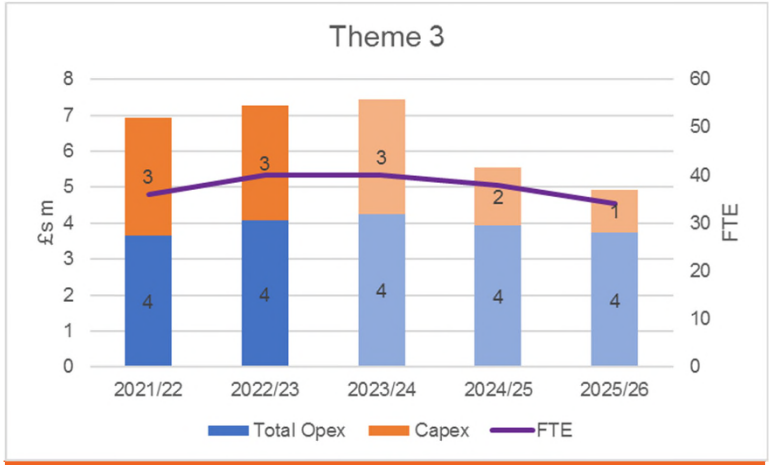
Theme 3: Unlocking consumer value through competition

- **Deliver new competitive processes -** so asset and non-asset based solutions can compete to meet future system needs.
- **Extend and enhance the Network Options Assessment (NOA) approach -** bringing the significant cost savings the NOA has already achieved for consumers to other areas, such as end of life asset replacement decisions
- **Undertake, with industry, a review of the System Quality and Security of Supply standard (SQSS) -** so system standards are appropriate for the decarbonised energy system of the future
- **Support Ofgem to develop its thinking on competitively appointed transmission owners -** bringing the benefits of competition to a wider range of consumers.



Investment £14.2 million - Benefit £663 million

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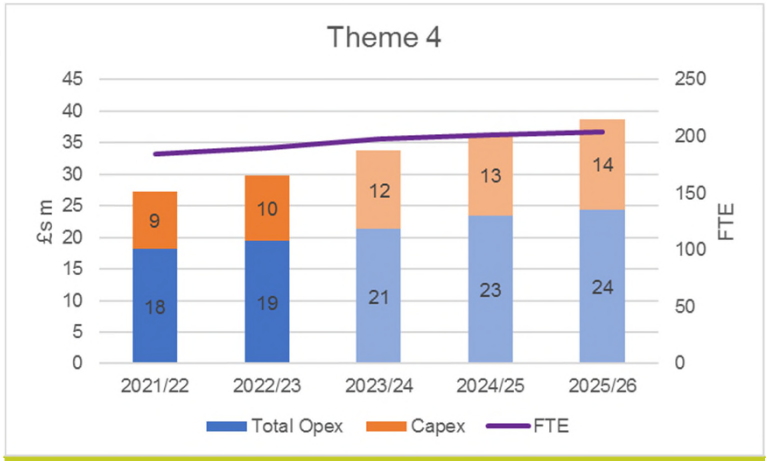
Theme 4: Driving towards a sustainable, whole-energy future

- **Leading the debate** on decarbonisation of the GB energy industry, harnessing our significant expertise to identify ways to achieve the 2050 net zero target, and policy decisions that must be made
- Working more closely with Distribution Network Operators (DNOs) and Transmission Owners (TOs) to **streamline the connection process**, so that parties can take a more efficient, whole electricity system view
- Defining innovative ways to **achieve zero-carbon, whole electricity system operability**, working with DNOs
- **Developing a whole electricity system approach** to accessing networks, therefore tackling an area of significant consumer cost.



Investment £58.9 million - Benefit £676 million

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Digitalisation and open data

- We will adopt EDTF recommendations including “presumed open”
  - Provide access to our data in machine-readable format through a data portal
  - Data sets will be prioritised based on stakeholder need and consumer value
- We will digitalise our service offering through investments that will transform the user experience of dealing with the ESO
  - Data portal, Single markets platform, Connections hub, Outage management, Digitalised Grid Code
- We will digitalise our internal processes, enhancing decision making, operational and market efficiency
  - Data platform transforming our operations and ability to implement change
  - Enhanced modelling and analysis across our activities

Q&A

Please provide feedback
via slido.com
Code: #3794

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ENCC Market Information

Ronan Jamieson
Operational Manager

nationalgridESO

Market Information – sharing and publishing

The ESO has made commitments in the Forward Plan

- **Role 1 (Managing System Balance and Operability) *"share greater information on how we balance the system and provide our operational insights"***
- **Principle 2 – Drive overall efficacy and transparency in balancing services, taking into account impacts of ESO actions across time horizons.**

Our ambition is to provide the market with more information and improve transparency concerning how the ENCC makes operational decision in the short term. Therefore, the ESO is seeking opinions, feedback and input as to how best to achieve this ambition.

Market Information – sharing and publishing

ESO publishes a lot of data/information already via BMRS

System Operating Plan (SOP) – internal ENCC document

The current SOP contains that following information

- **National 5 minute spot Demand for the CP**
- **Current Market position**
- **Contribution from Interconnectors and Wind**
- **Reserve requirements - Positive/negative**
- **Amount of STOR available (if CP within contract window)**
- **Contingency Requirement**
- **System Imbalance – Positive/Negative**

Market Information – sharing and publishing

Typical SOP

SYSTEM OPERATING PLAN Produced at 14/07/19 12:58

Final 1 Operating Plan for **3C** at **19:25** on **14/07/19** from 14/07/19 12:14 D & C

Wind forecast generated on 14/07/2019 12:32

Customer Demand Forcast (CDF)	27,425
Station Transformer (STX)	500
DSBR	0
Demand Adjustment	0
Total (SOP Demand)	**27,925**

ZONE	EMX	EOL	EMI
NO1	14,520	13,920	8,776
NW1	889	889	889
SO1	8,365	8,342	5,061
SW1	1,556	1,556	1,556
BRITNED	1,060	1,060	1,060
EWIC	-81	-81	-81
FRANCE	2,000	2,000	2,000
MOYLE	-450	-450	-450
NEMO	938	938	938

Summary

Positive Residual (EMX - (SOP Demand + Positive Reserve))	172
Imbalance (SOP Demand - EOL)	-415
Negative Residual (SOP Demand - (EMI + Negative Reserve))	5,966

Bids

Positive Reserve

Standing Reserve (< 20 mins)

Standing Reserve Requirement (SRR)	1,800
Standing Reserve Availability (SRA)	2346
Standing Reserve Shortfall (SRS)	0
Standing Reserve Excess (SRE)	546
Standing Res Wind Adj (WSRR)	0

Scheduled Reserve

Net Positive Regulating Reserve (PRG)	901
Positive Reg Res Wind Adj (WPRR)	(242)

Market Information – sharing and publishing

Therefore, some of questions that the ESO would like feedback/input on are

- **Would publishing this information be of use to the market to help understand ENCC decisions?**
- **What data does the market and system users think they need (are we publishing it already?)**
- **How does the market think by the ENCC publishing this information it will Improve their decision and benefit the end consumers?**
- **Are there any concerns about data confidential?**
- **How often and where would they want us to publish this data?**
- **What format should this data take?**

Market Information – sharing and publishing

- **Next Steps**
  - Seek feedback and suggestions from all participants
  - Conduct workshop/WebEx with participants based on feedback and suggestions
    - Publish outcome from this work
    - Final review of outcome
    - Develop delivery plan
    - Deliver
    - Continually review

- Contact details – ronan.jamieson@nationalgrideso.com

Q&A

Please provide feedback
via slido.com
Code: #3794

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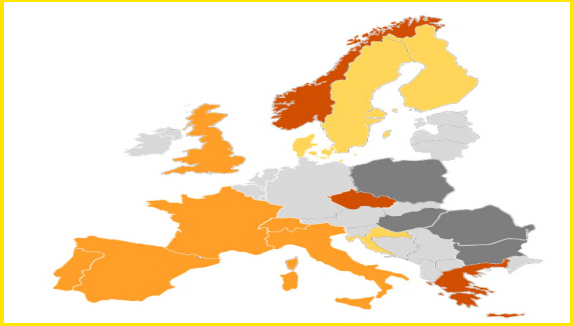
STOR Contract Change Process

Update on existing STOR OCP

Requirement to launch FR OCP



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Background

- NGESO launched a contract change process* on 1 October to incorporate:
  - relevant EU Codes,
  - introduction of the new Non-BM despatch platform; and
  - general housekeeping
- Aim was to implement all changes by 18 December 2019.
- NGESO sought exemption from A16.6 of EBGL (pre-agreement of utilisation price) which was rejected by Ofgem on 9th October.
- In their letter, Ofgem set out that we must comply with A16.6 and A34 by 31st January

* Relevant documents can be found on the STOR page of the ESO website

Next steps

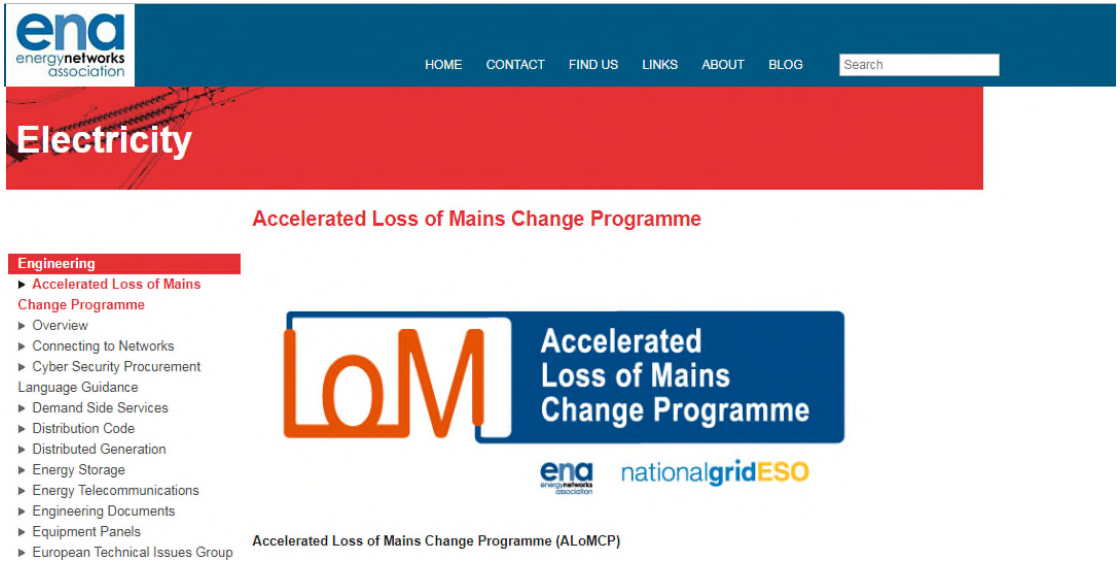
- Consultation will close at 5pm on 1st November.
  - Responses should be sent to Commercial.operation@nationalgrideso.com
  - Please note that Option 1 under Utilisation Price is no longer relevant following Ofgem's decision
- Units with existing STOR contracts, will need to submit utilisation prices in real-time
  - We will confirm with providers the exact date the change will be taking place.

- There will be no changes to the methodology for calculating BSUoS and cash-out though we recognise that there is risk of greater volatility of these costs as we set out in our exemption request

Accelerated Loss of Mains Change Programme

Portal go live

- Programme to change loss of mains protection now live
- Updated settings will reduce operational actions and cost
- The portal for applications is now open and can be accessed via the ENA website
- First application window closes 12th November 2019



http://www.energynetworks.org/electricity/engineering/accelerated-loss-of-mains-change-programme.html

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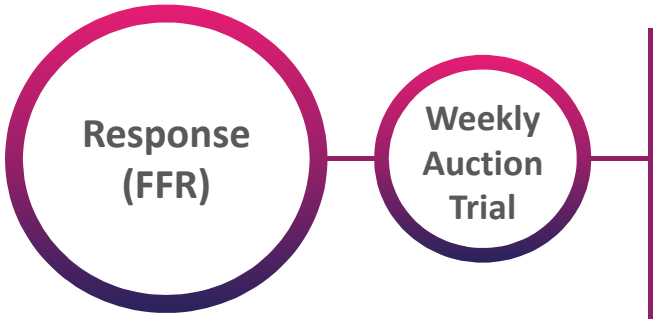
Transforming Markets



We are progressing with our Frequency Response Auction Trial to procure part of our Firm Frequency Response requirements via a weekly pay-as-clear auction.

Phase 1 Auction Trial

- Our weekly Phase 1 Frequency Response Auction Trial to procure a Low Frequency Static service has been live since 13th June 2019
- Liquidity has improved steadily since the introduction of the trial, and the cleared volumes have increased

Phase 2 Auction Trial

- We plan to launch Phase 2 next month with a new auction platform hosted and operated by our auction partners, EPEXSPOT
- Platform will go-live with a series of Mock Auctions for testing and training
- First commercial auction planned for end-November 2019

power responsive

Thank You
Lunch / Networking

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Distributed ReStart

Ops Forum
October 2019

Anyta Dooley– Project Direction Manager

Emma Penhaligon – Knowledge Dissemination Lead

In partnership with

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Animation

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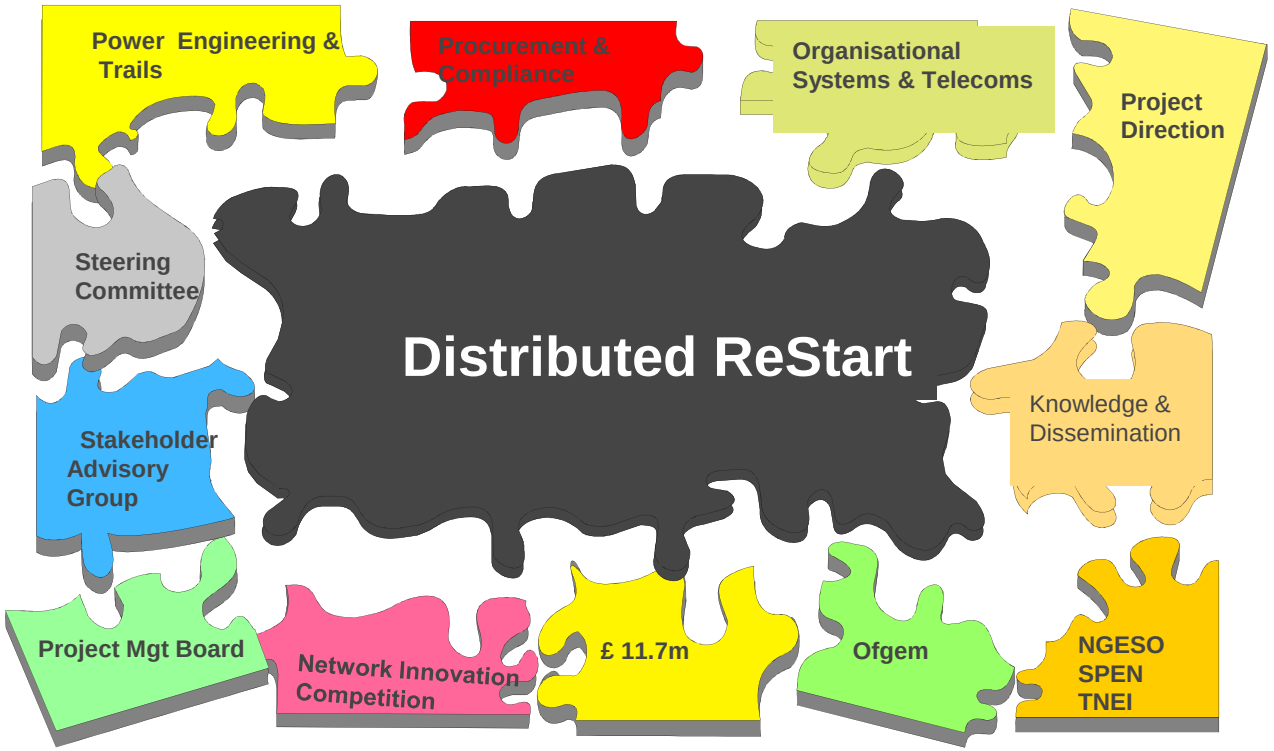
Whose involved



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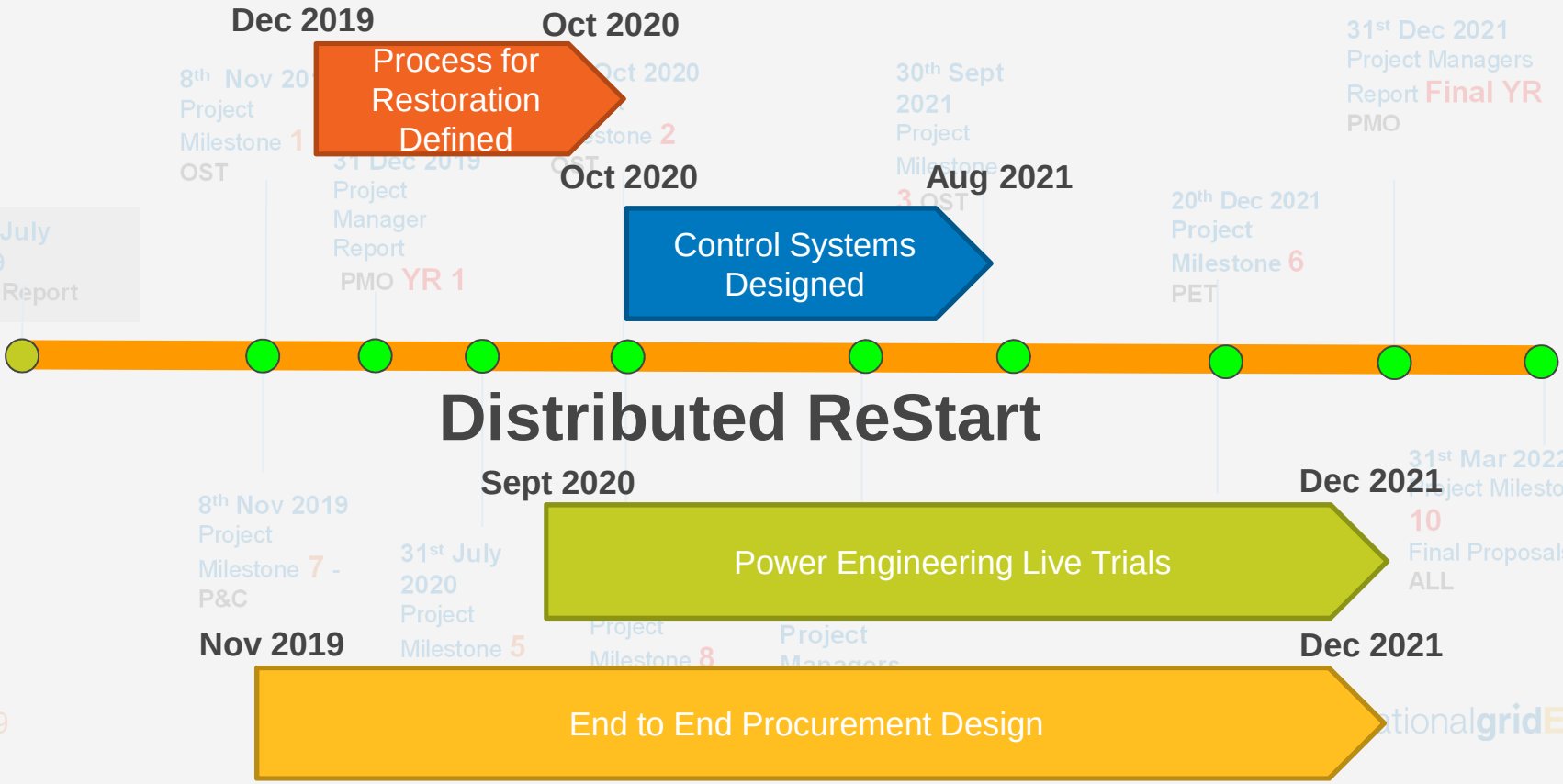
When Will We Deliver?



Look out for.....

ReStart Customer Connection Seminar	05/11/2019	Glasgow	presenting/roundtable
Procurement & Compliance – milestone report published	08/11/2019	Ofgem paper	project deliverable
Organisational Systems & Telecommunication – milestone report published	08/11/2019	Ofgem paper	project deliverable
Project Managers Annual Report – published	31/12/2019	Ofgem paper	project deliverable
ReStart Annual Conference	**30/01/2020**	**London**	**registration open**

Distributed ReStart

Keep in touch: ReStart@nationalgrideso.com

Q&A

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Code: #3794

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Interconnector capacity restrictions

Susan Mwape

EU Change Lead- Future Markets

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GB Interconnector capacity restrictions and payments

Overview:

- **CACM requires the development of regional Capacity Calculation Methodologies (CCM) which allows System Operators to reduce interconnector (IC) capacities.**
- **The Day Ahead (DA) and Intraday (ID) methodologies were approved by Regulators in 2018 while the Long Term (LT) methodology is yet to be approved.**
- **Due to the delay in the central CGM platform, implementation of the methodologies is delayed to at least Q4 2021.**

Rationale:

- **The CCM does not include payment details.**
- **The EU codes Capacity Allocation and Congestion Management (CACM) and the Forward Capacity Allocation (FCA) describes principles.**
- **Discussions with interconnectors have been guided by the following principles:**
- Polluter pays
- Single non-discriminatory GB payment
- Revenue neutral
- Maintains economic investment signals

GB Solution:

- **Under current GB mechanism, NGESO uses system trades and Intraday Transfer Limits to manage IC flows.**
- **NTC restrictions are most appropriately treated as a Balancing service and on that basis would be recovered by BSUoS.**
- **Changes to C16-related documents may be needed hence NGESO is requesting industry participation through C16 consultation.**

How to get involved

- **October consultation will be published here: https://www.nationalgrideso.com/codes/european-network-codes?meeting-docs**
- **NGESO C16 industry meeting on 5 Nov 2019**
- **Industry workshop: date TBC**
- **Email: box.europeancodes.electricity@nationalgrideso.com**

Q&A

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Winter Outlook Report 2019/20

Gavin Brown

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Key Messages

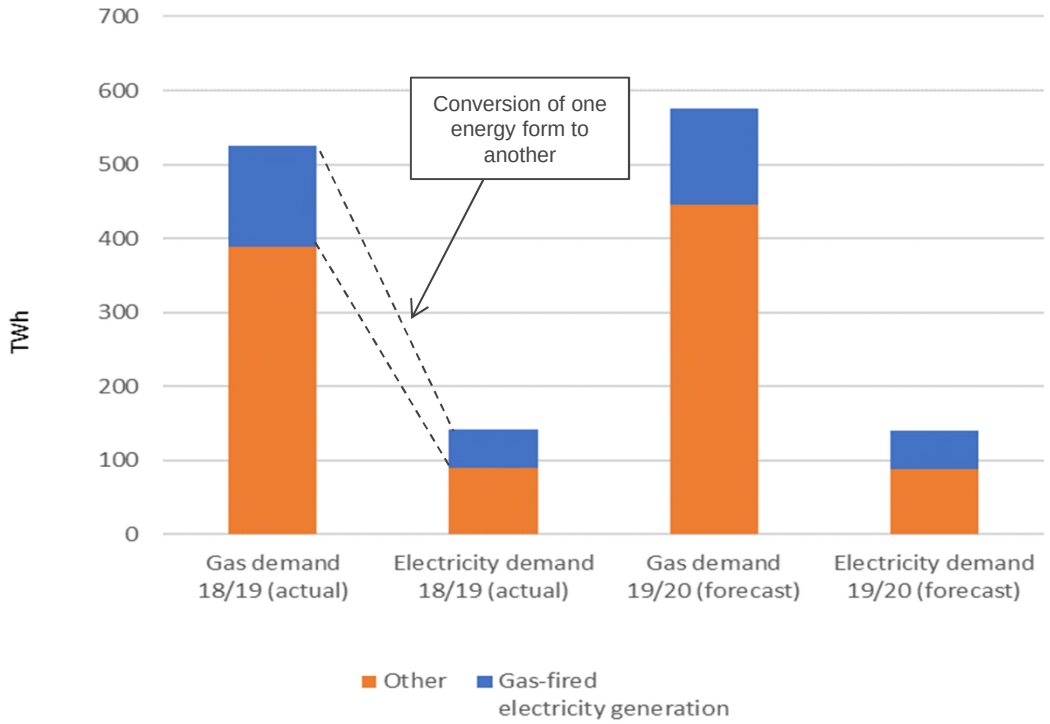
1
The margin on the electricity system is greater than last winter and well within the Reliability Standard set by the Government.

2
The gas supply margin is expected to be sufficient in all of our security of supply scenarios.

3
We anticipate no additional adequacy or operability challenges for the coming winter as a result of the UK's planned exit from the EU. We have tested our planning assumptions in a broad range of scenarios and via engagement with industry.

4
We have the tools and services we need to enable us to manage anticipated gas and electricity operability challenges across the winter period.

Whole energy system



- Viewed using the same units, it is clear to see that gas currently delivers significantly more energy than electricity.
- This energy is not all delivered to end-consumers.
- A large proportion of the overall gas demand is for the purpose of generating electricity.
- As more electricity generation comes from renewables, the more this component of gas demand becomes sensitive to weather conditions.

The UK's planned exit from the European Union

We have carried out analysis on a range of scenarios to test the risks.

Gas

- The central case is that in a no-deal situation there will be no impact on the trading arrangements for gas interconnectors.
- We have also assessed a scenario where there are no flows on the Belgium and Dutch gas interconnectors.
- In this very unlikely scenario there will still be sufficient sources of gas supplies to meet peak demand, even in a 1-in-20 day.
- There would need to be sufficient price signals in the market to attract regular LNG cargoes to the UK, an obligation that sits with the shipper community.

Electricity

- The central case is that the interconnectors continue to flow and we can continue to manage the system as at present. There will be changes to the trading arrangements for the interconnectors, but this is not envisaged to have any material implications.
- We have also assessed a scenario where there are no flows on the electricity interconnectors.
- In this very unlikely scenario there remains sufficient margin available to compensate for zero interconnector flows.
- We also have an operability strategy in place to manage this scenario and no actions in the market are currently required.

Electricity Outlook 2019/20

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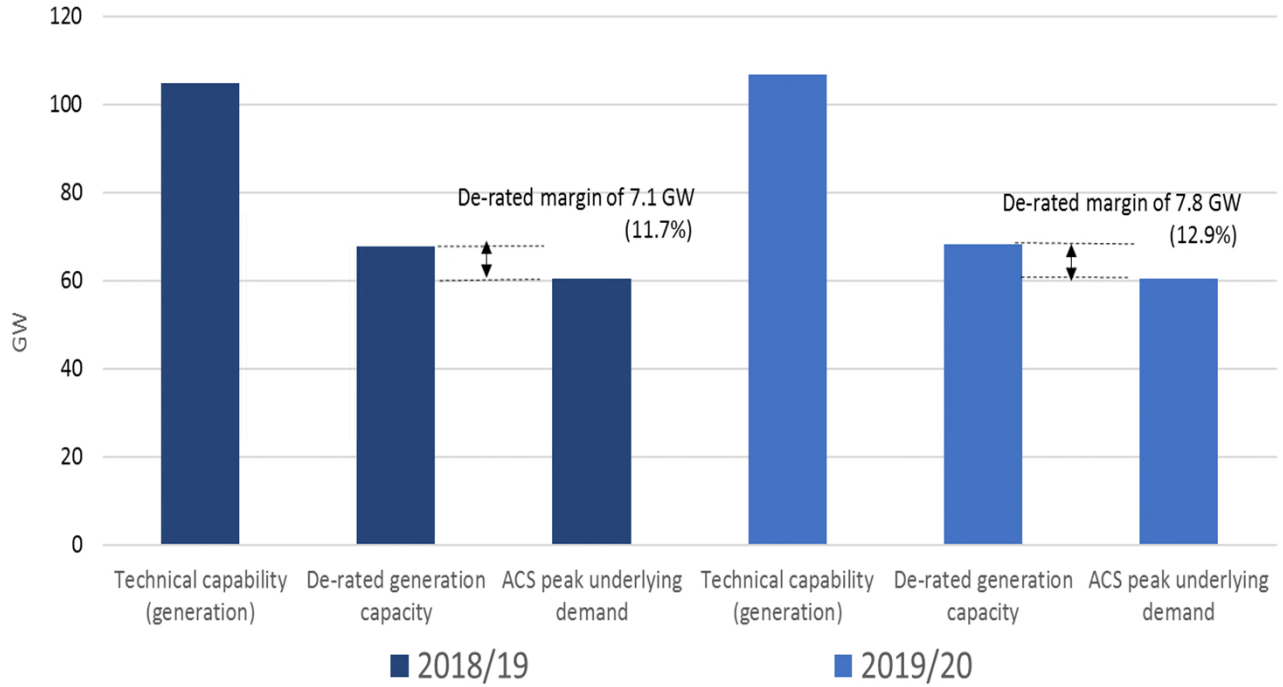
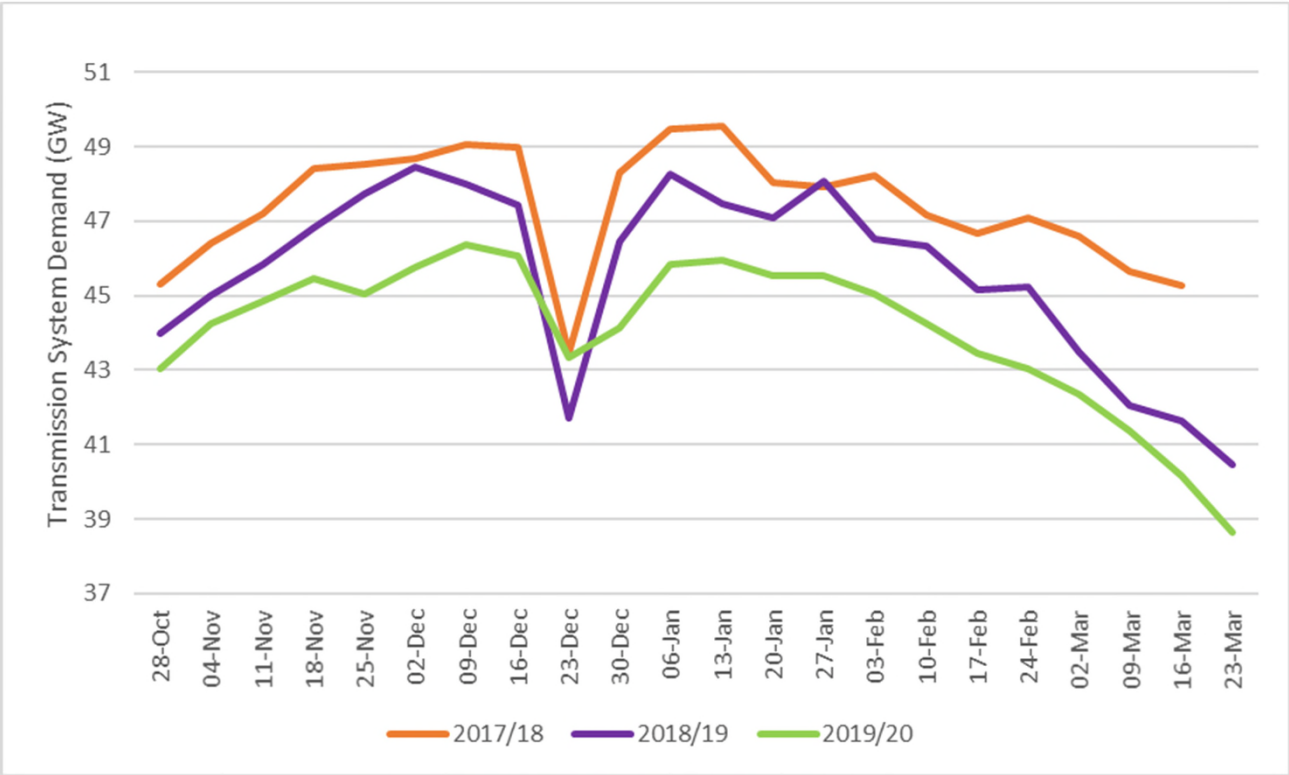
Electricity system margin



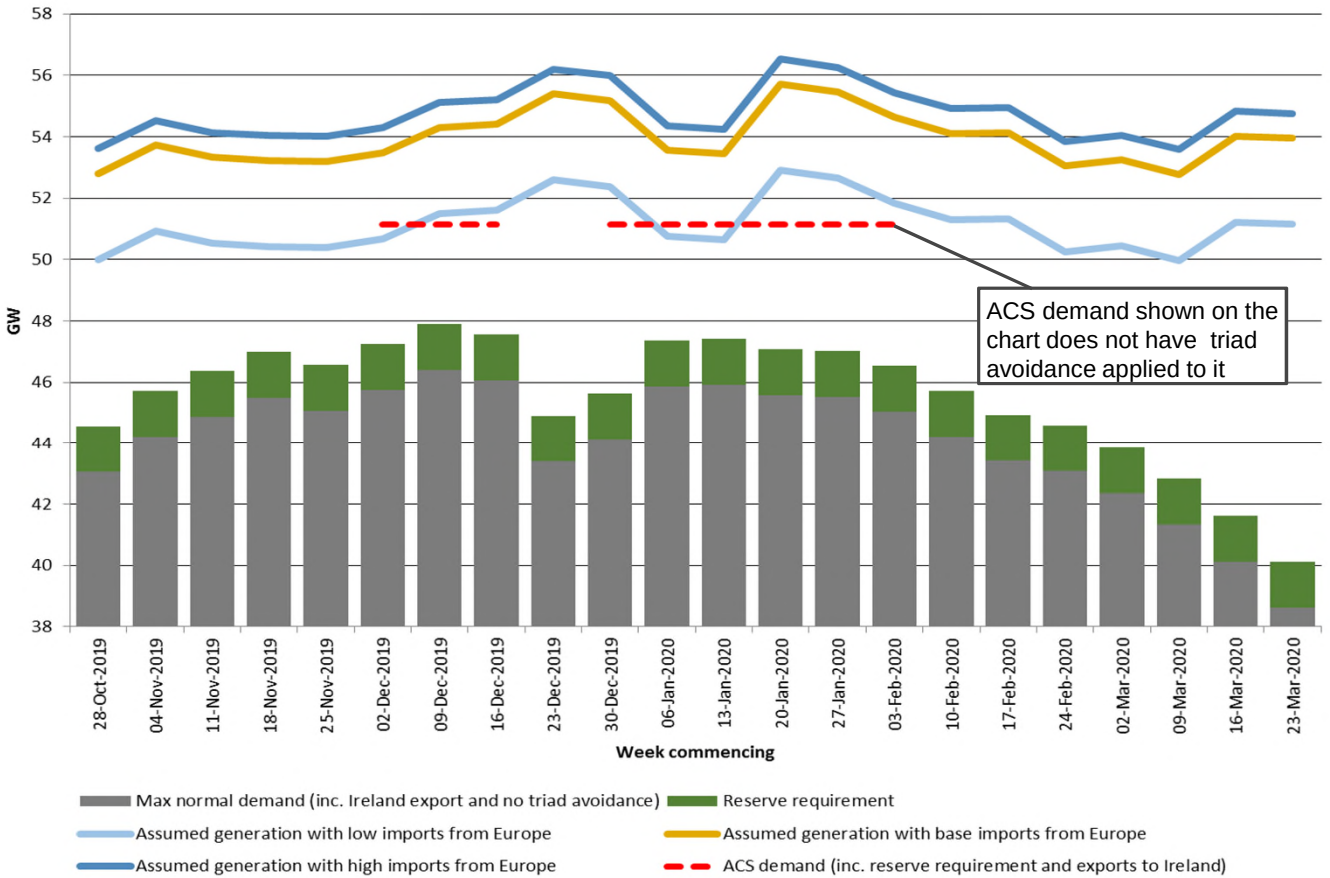
- Electricity margins are greater than last year.
- The corresponding LOLE is <0.1 hours/year.
- Max technical capability (excluding interconnector flows) is 106.7 GW, is slightly higher than last winter.

Electricity demand



- Transmission system demand continues to reduce as a result of increasing levels of embedded generation.
- Weather corrected peak transmission demand forecast is 46.4 GW.
- Weather corrected minimum demand forecast is 19.7 GW.

Electricity week-by-week view



- Operational surplus is expected to be higher than last year.
- w/c 13th January 2020 forecast to have the lowest level of operational surplus.
- Maximum Triad avoidance forecast to be 2.6 GW.

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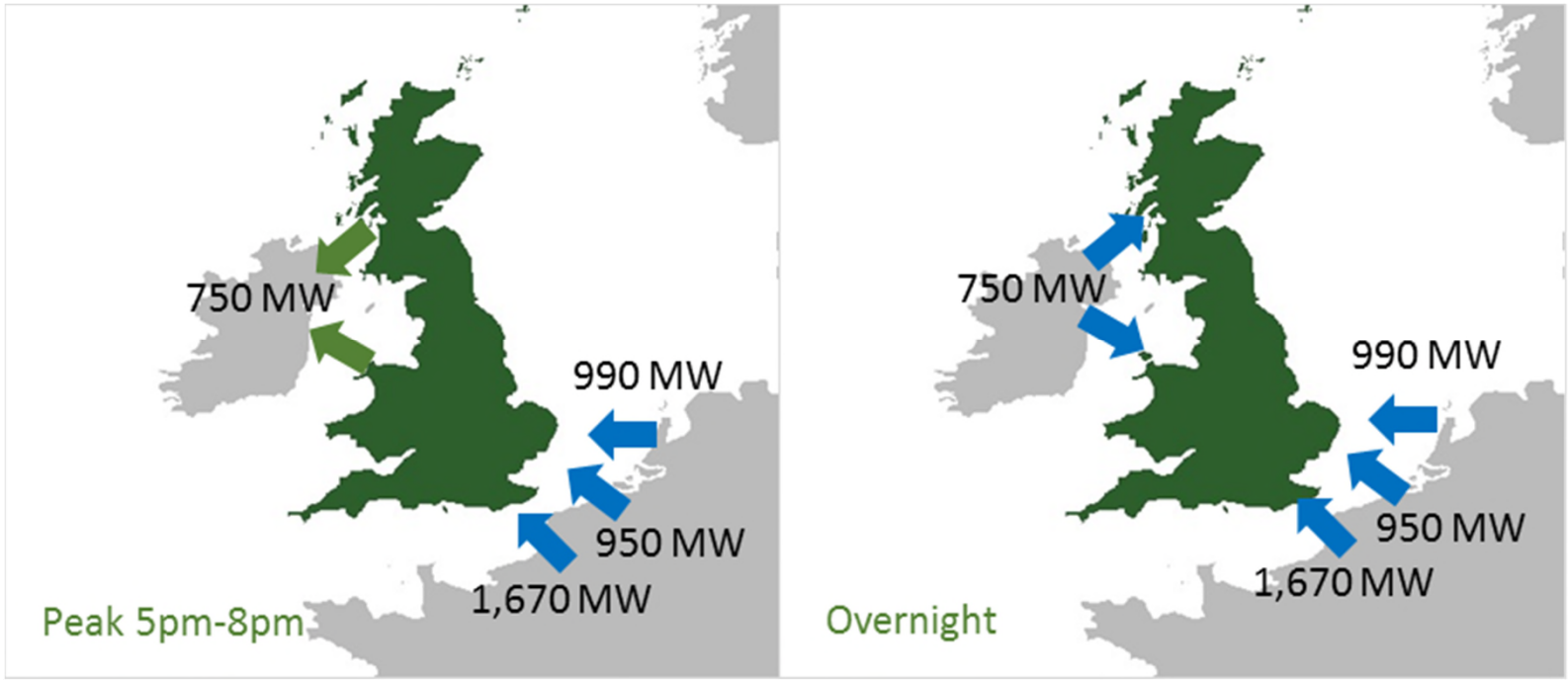
Electricity interconnectors



- Electricity forward prices are expected to remain higher in GB than continental Europe.
- European interconnectors are typically expected to import into GB at peak times.
- GB typically expected to export to Northern Ireland and Ireland at peak times.

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Q&A

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Thank You

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