

System Operability Framework Event



March 26 2018

National Grid House, Warwick





Welcome

Beth Warnock
System Performance Manager



Welcome & Housekeeping



Planned fire drill at 10am



Toilets are located in the entry corridor to the conference suite



Please keep you mobile phone on silent please



You must be escorted around the building, just ask

Agenda

- ◆ 09:00 – 09:30 Welcome and System Operability Framework introduction
- ◆ 09:30 – 10:30 National and Regional trends and insights
- ◆ 10:30 – 10:50 Break
- ◆ 10:50 – 11:10 Voltage and frequency dependency
- ◆ 11:10 – 11:45 Real time event
- ◆ 11:45 – 12:05 Future of balancing services
- ◆ 12:05 – 12:15 Plan for afternoon
- ◆ 12:15 – 13:15 Lunch
- ◆ 13:15 – 15:30 Market stalls
- ◆ 14:30 – Tea & coffee



Introduction

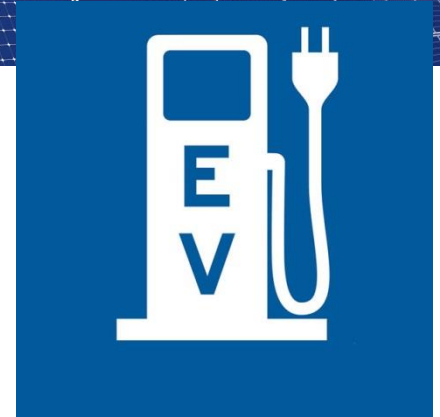
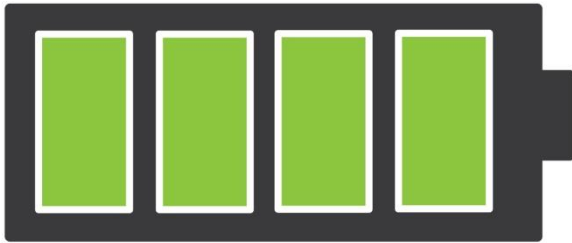
Graham Stein

Network Operability Manager

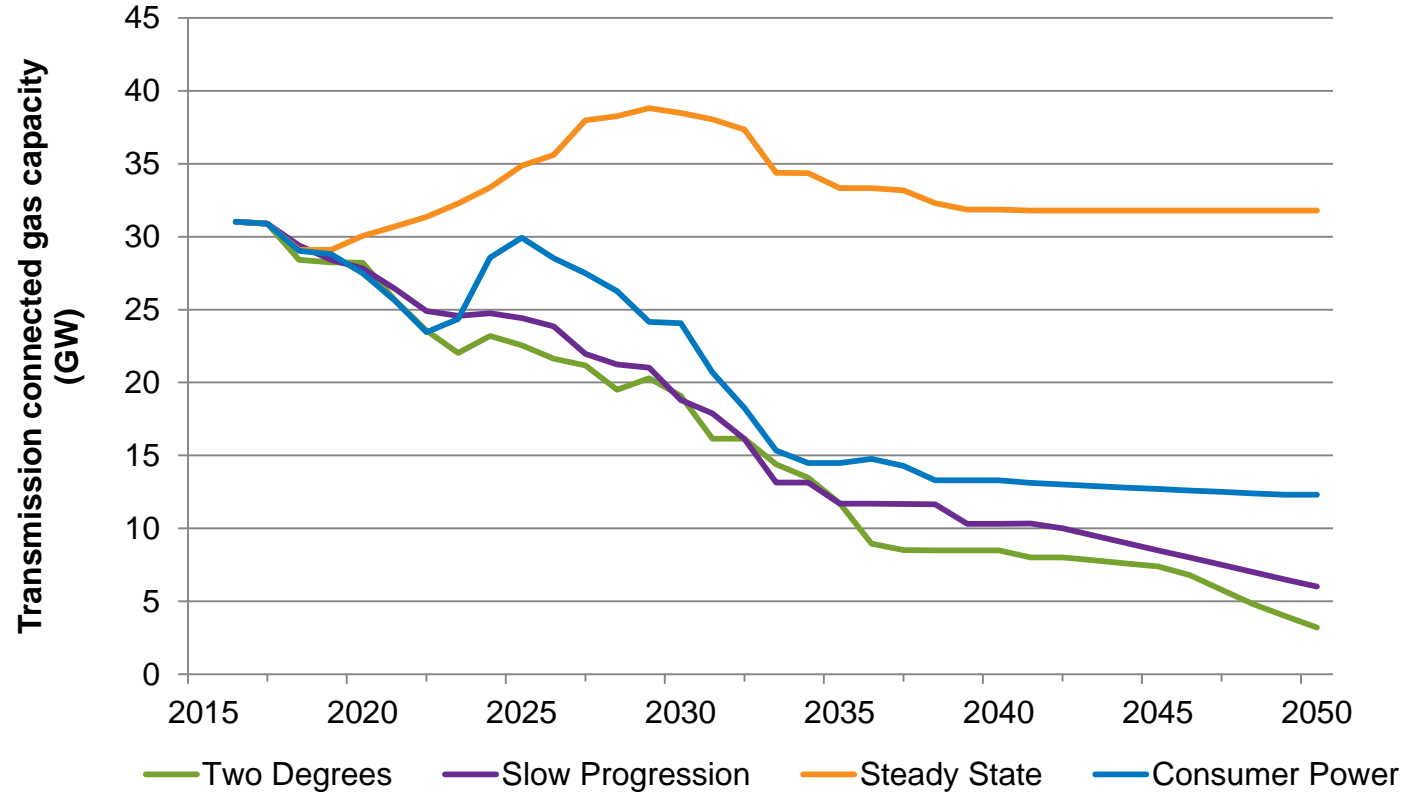


Changing Generation & Demand

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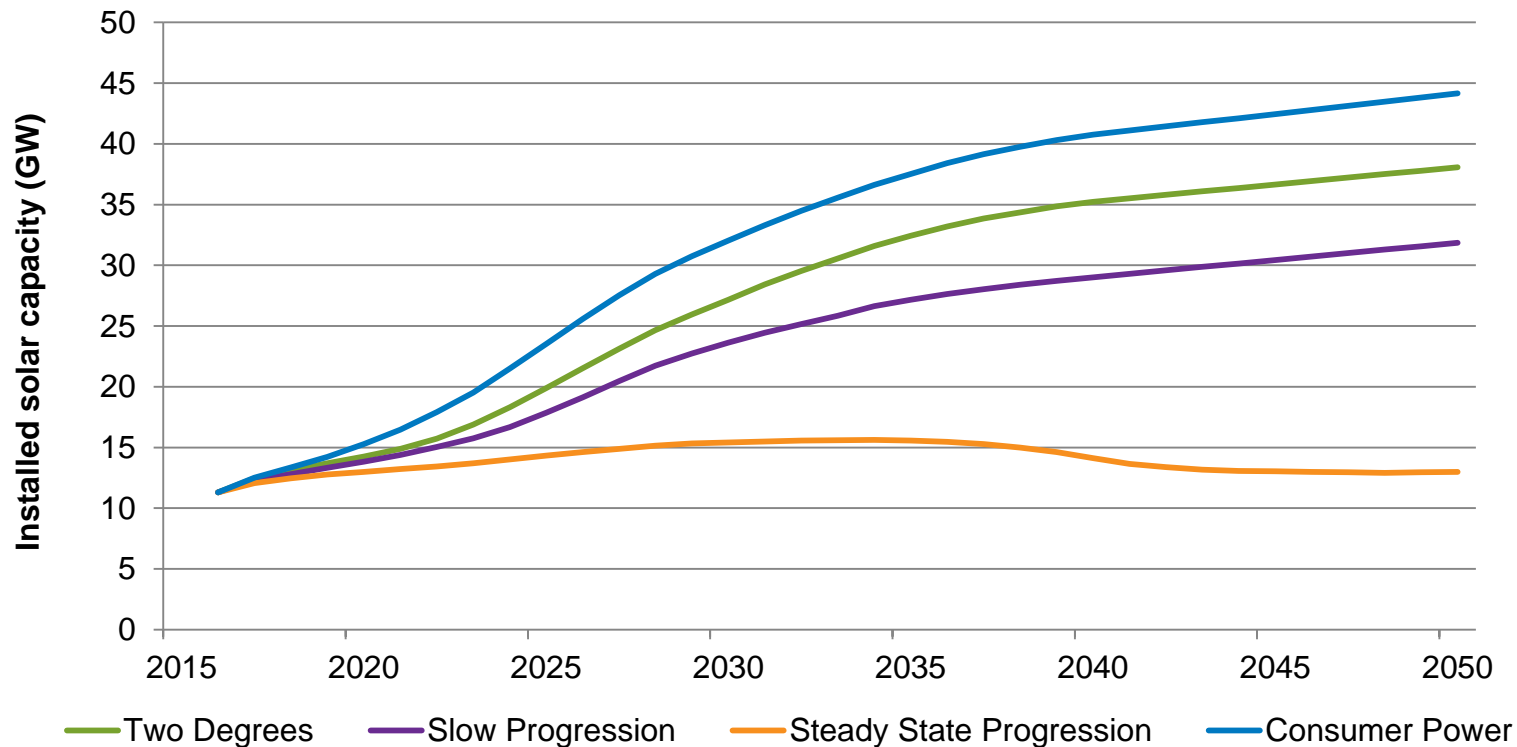


Future Energy Scenarios: Gas Generation

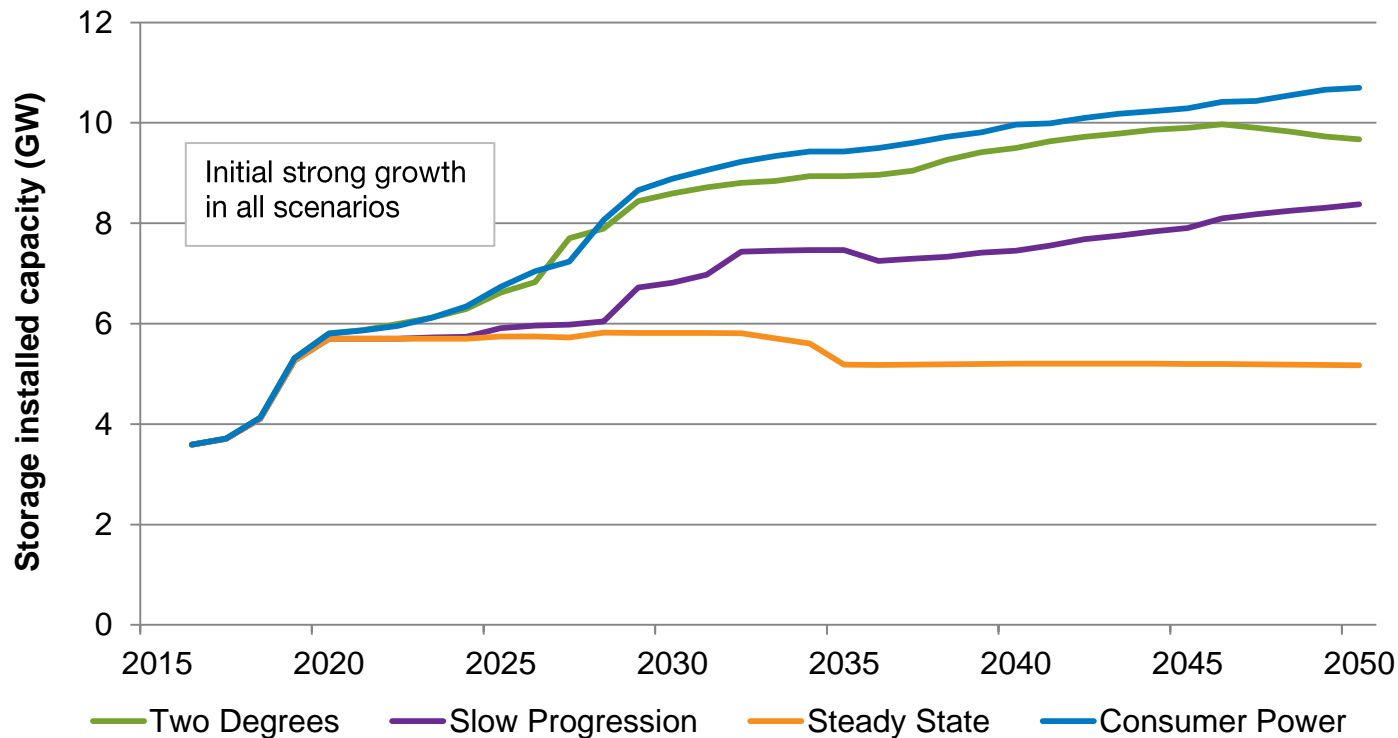


Future Energy Scenarios: Solar

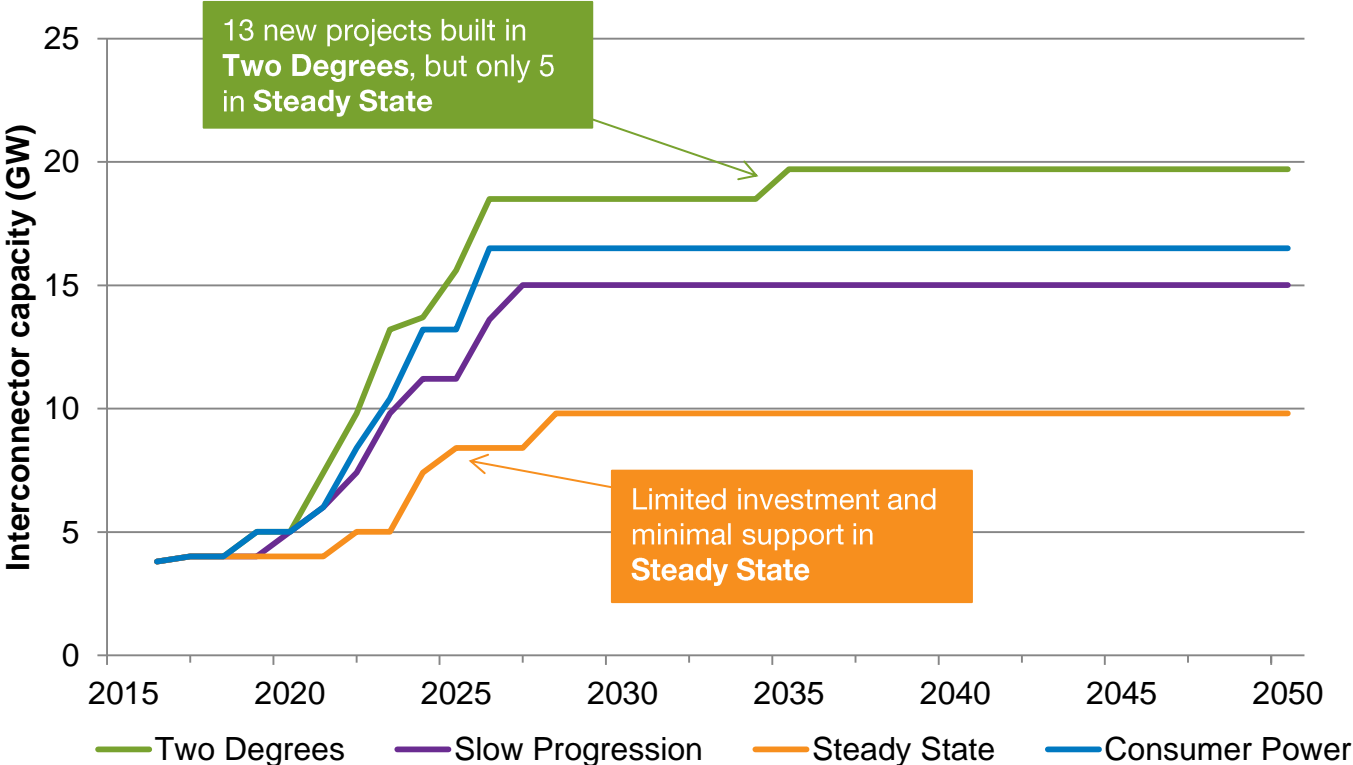
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Future Energy Scenarios: Storage



Future Energy Scenarios: Interconnectors



In 2017

Transmission System Demand

On Sat 25 Mar 2017 transmission system demand (ITSDO) in Great Britain was for the first time ever lower during the afternoon than it was overnight due to high solar PV generation.

Great Britain goes without Coal Generation for 24 hours

Friday 21st April 2017 was the first 24-hour period since the 1880s where Great Britain went without coal-fired power stations.



National Grid Control R... ✓

@NGControlRoom

Follow

[#Solar](#) has just broken another record in Great Britain, providing 8.7 GW (24.3% of demand)

5:08 am - 26 May 2017



National Grid Control Room ✓ @NGControlRoom · 25 Dec 2017

On Sunday [#wind](#) generated 35.1% of British electricity, more than gas 26.7%, nuclear 23.4%, imports 8.1%, biomass 2.4%, hydro 1.8%, storage 1.0%, coal 0.6%, solar 0.5%



National Grid Control R...

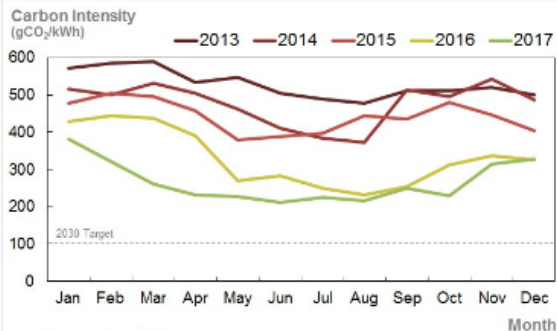
@NGControlRoom

Follow

Low-carbon generation provided 45.4% of GB electricity in 2017, with [#carbonintensity](#) dropping to record lows and nearly halving since 2013 carbonintensity.org.uk

The Decarbonisation of British Electricity

2017 was the 'greenest' year on record in Great Britain with the carbon intensity of electricity dropping to record lows.



↓ **49.7% decrease**
from 2013 to 2017

Average carbon intensity
in GB:

2017 **266** gCO₂/kWh

[nationalgrid](http://nationalgrid.com/uk/) | nationalgrid.com/uk/

Source: National Grid

5:13 am - 4 Jan 2018

In 2018, so far..



National Grid Control Room  @NGControlRoom · Feb 25

At 11:00am low-carbon sources were providing 59.8% of GB electricity (wind 21.8%, nuclear 18.8%, solar 14.7%, biomass 3.7%, hydro 0.8%), national demand 38.1 GW



National Grid Control Room  @NGControlRoom · Mar 18

Yesterday #wind generated 35.7% of British electricity, more than gas 20.3%, nuclear 17.6%, coal 12.9%, imports 6.0%, biomass 4.1%, solar 1.8%, storage 0.8%, hydro 0.6%, other 0.2%, national demand 858 GWh

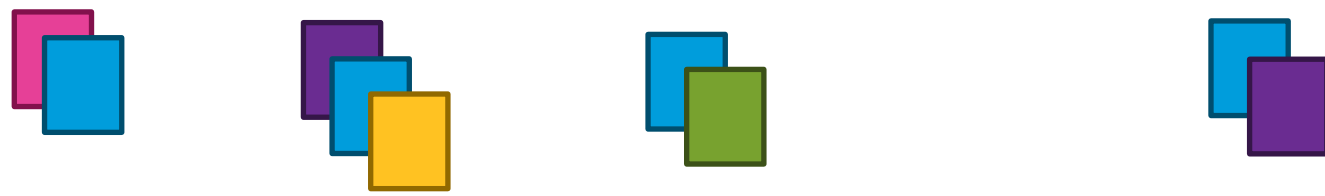
System Operability Framework has changed

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2016
and before



2017
and future



Short reports released throughout the year

● Dates are illustrative

2017 SOF Publications

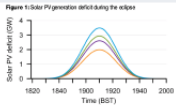
System Operability Framework

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Solar Eclipse August 2026

The UK's next significant solar eclipse will be in August 2026. By that time, we expect installed capacity of solar photovoltaic (PV) generation will be in the range of 15 GW to 26 GW, according to the 2017 Future Energy Scenarios. Despite this huge growth, the disruption of normal demand patterns and solar PV output during the eclipse will remain manageable, with careful planning and coordination between system users and operators of interconnected systems.

Executive Summary



The eclipse will occur on 15 August 2026 at about 19:10 BST (18:10 GMT/UTC). Assuming clear sky, the maximum generation deficit from solar PV could be in the range of 25.5 GW at the peak of the eclipse, see Figure 1. The reduction and recovery of solar PV generation will occur over about 80 minutes in total, at sites between 10:20MWh/site and 125MWh/site, respectively.

The balance between electricity supply and demand will be modified by factors other than the output of solar PV generation. These include changes in demand, as well as the impact of interconnector power systems, the event will remain within the capability of the system operator.

We are also able to identify some questions that will need to be addressed during the operational planning that will occur closer to the event. These include:

- How will the eclipse affect the power systems in Ireland and Continental Europe, to which GB will have an increased interconnection capacity?
- How will distributed storage assets behave during the event?
- What information about operational energy resources will the system capacity have access to during the event. These show that with sufficient

System Operability Framework

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Low Frequency Demand Disconnection

The risk that the low frequency demand disconnection scheme is not effective is increasing due to a reduction in system inertia and increased penetration of distributed generation. This report quantifies the risk increase and we recommend that the low frequency demand disconnection scheme is reviewed to allow it to continue to be effective. National Grid will continue to co-ordinate with DNOs to realise the most effective responses to these impacts on LFD effectiveness.

Executive Summary

The low frequency demand disconnection scheme (LFD) is designed to arrest frequency falls for extreme system events beyond those defined as accepted in industry standards [1][2]. The LFD scheme achieves this by ensuring demand from across the country is automatically disconnected to balance generation and stop a full system collapse. This is implemented by Distribution Network Operators (DNO) physically disconnecting demand from their network at defined low frequency levels. The report looks at how future trends on the system may impact the effectiveness of the LFD scheme.

The analysis was supported by data received by representatives from DNOs. It shows that increasing the amount of distributed generation below the relay, decreasing system inertia and inter-connection demand reduce the effectiveness of the LFD scheme. The results further show that LFD effectiveness is impacted by the output of the distributed generation behind the relay and by the number of relays that are triggered by the frequency observed. To address these issues an LFD Industry Work group has been established.

As discussed in the Future Energy Scenarios [3], and in our past SOF assessments it is expected that over the next 10 years and across all scenarios distributed generation will increase and system inertia will decrease.

We have shown that when inertia is below a threshold (of 1400GVA) the effectiveness of the LFD scheme reduces due to the interaction with rate of change of frequency (ROCOF) relays. Figure 1 shows the time that is spent below the threshold, and thus at higher risk, as increasing into the future across all scenarios.



National Grid will work with the LFD Industry Workgroup to investigate solutions to enable the LFD scheme to continue to be effective. It is recommended that the Industry Workgroup identify any short-term actions such as reallocation of different physical network areas against each LFD relay setting. We would also look to work with the LFD Industry Workgroup to consider the positioning of LFD relays for new generation connections within the distribution systems. The above changes may be most effectively made through a look change to Grid Code.

System Operability Framework

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Black Start from Distributed Sources

Traditionally Black Start has been provided from large power stations which are predicted to have a declining role in the Future Energy Scenarios. We have explored opportunities for providing Black Start from distribution connected generators and Power Islands. To realise these benefits we also identify the need for additional investment, code changes and clearer definition of roles.

Executive Summary

Black Start in the event of a power system in total loss after a complete or partial system loss of electric power. National Grid, as system operator (SO), is responsible for maintaining Black Start status and managing the process for the system. Traditionally we have achieved this by connecting predominantly with large generators connected to the high voltage transmission network. But trends in the energy market mean that the numbers of these large generators are reducing. In this report we explore alternative methods of Black Start from medium voltage distribution networks. We consider two examples of alternative methods of Black Start as shown in Figure 1:

- using smaller generators connected at distribution level
- establishing small self-contained Power Islands



We show in our analysis that one of the limitations of distribution connected generators, to provide Black Start, is the size of blocks of demand that are added to the system during restoration. By using smaller blocks of demand the pool of potential Black Start providers may increase, however the initial restoration time may also increase as a consequence. Achieving this block load change will require changes to the Distribution Network.

This report has been developed by National Grid, Northern Powergrid and SP Energy Networks in collaboration.

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SP ENERGY NETWORKS

NORTHERN POWERGRID

System Operability Framework

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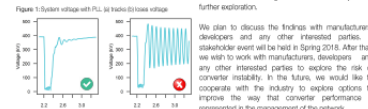
Performance of Phase-Locked Loop Based Converters

Non-synchronous generators and HVDC converters rely on phase-locked loop (PLL) converters to see and react to the electricity network status, just as motorists rely on SatNav to see the route information. We assessed the performance of phase-locked loop based converters in low system strength scenarios, as observed in our SOF, towards the end of next decade. We have found an increasing risk of converter instability. The timing and impact of this risk needs further exploration. National Grid wishes to work with manufacturers, developers and any other interested parties to further explore the risk of converter instability.

Executive Summary

The amount of renewable generation and High-Voltage Direct Current (HVDC) system in Great Britain (GB) has been increasing rapidly during the last decade. They are different to traditional electricity generators and need to be synchronised with the electricity network via power electronic converters, but as a block needs to have step with Generation Mean Time, Phase-locked loop (PLL) plays a critical role in this synchronisation. If measured the network voltage variations, which helps the converter to control its power flow to the network.

To maintain stable operation of a converter, the PLL needs to track the voltage during a network fault, as shown in Figure 1(a). If the PLL loses track of the voltage, the converter stability could be reduced, as shown in Figure 1(b). This can cause damage to network equipment and loss of the generator.



We plan to discuss the findings with manufacturers, developers and any other interested parties. A stakeholder event will be held in Spring 2018. After that, we wish to work with manufacturers, developers and any other interested parties to explore the risk of converter instability. In the future, we would like to cooperate with the industry to explore options to improve the way that converter performance is represented in the management of the network.

Product Strategy Roadmaps

System Operability Framework Analysis



Product Strategy Roadmaps

Reserve and
response

Black start

Reactive
power

Thermal
constraints

Published

Coming this year



Trends and Insights

Ben Gomersall - Power System Engineer
Yun Li - Power System Engineer



Overview

Our new data set

National trends and insights

Regional trends and insights

Q&A

Method



Future Energy
Scenarios 2017

Generator
technical and
commercial
parameters

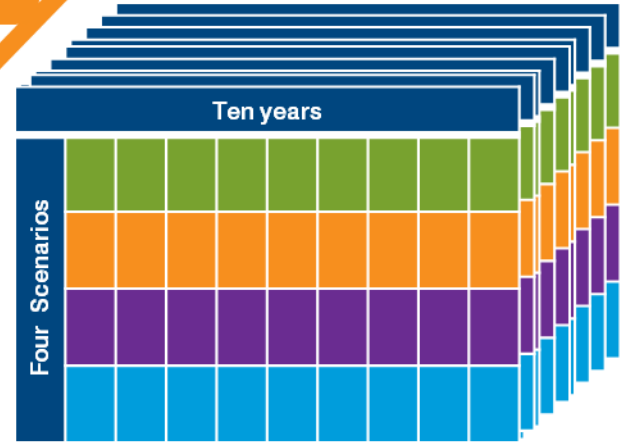
Economic
Dispatch

Generation and demand data

For every
unit and
for every
hour

Ten years

Four Scenarios



Using this data

Data treasure trove

How will the system operate over the next 10 years?

What are the challenges? When they will appear? How big they will be?

Today we have our first look

Over the next year we will dive deeper into specific issues





National Trends and Insights



Key Messages

The system is becoming less operable without intervention

We need to transform the industry's approach to operability

We will collaborate on new approaches to system operability

Flexibility

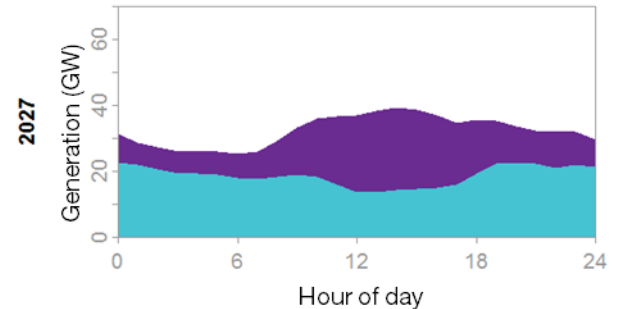
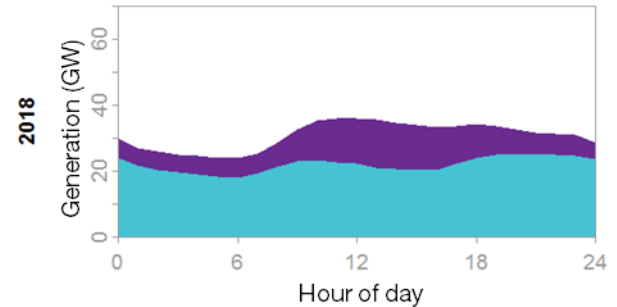
Trend: The amount of transmission generation is decreasing and the amount of distribution connect generation is increasing

Insight: Less generation and demand is visible and controllable

Actions: We need more headroom and footroom that can move fast enough

■ Transmission Generation ■ Distribution Generation

High Solar Day - Consumer Power



Wind & Solar

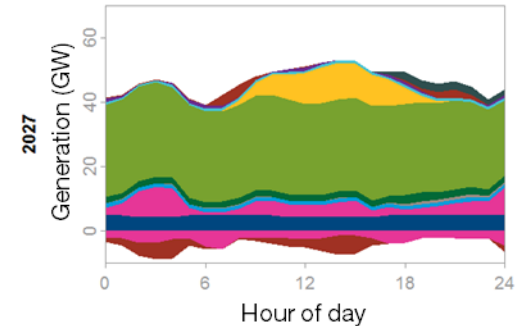
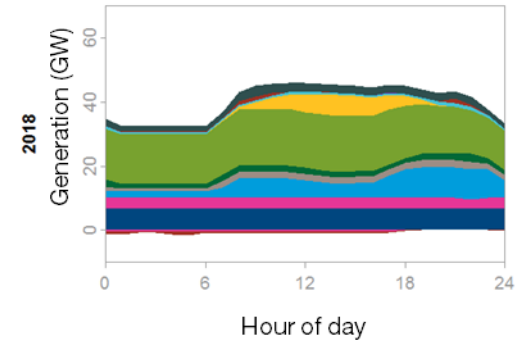
Trend: The amount of solar and wind is increasing

Insight: More generation and demand imbalances due to forecast uncertainty

Actions: We need to continue to improve our forecast methods and ensure enough flexibility

Wind
Solar

High Wind Day - Two Degrees



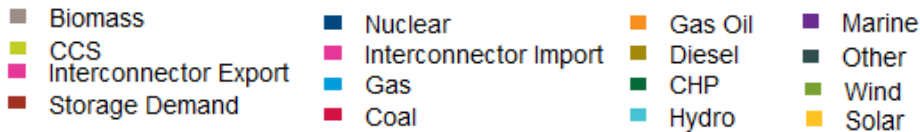
- Biomass
- Nuclear
- Gas Oil
- Marine
- CCS
- Interconnector Import
- Diesel
- Storage Generation
- Interconnector Export
- Gas
- CHP
- Other
- Storage Demand
- Coal
- Hydro

Storage

Trend: Storage in increasing

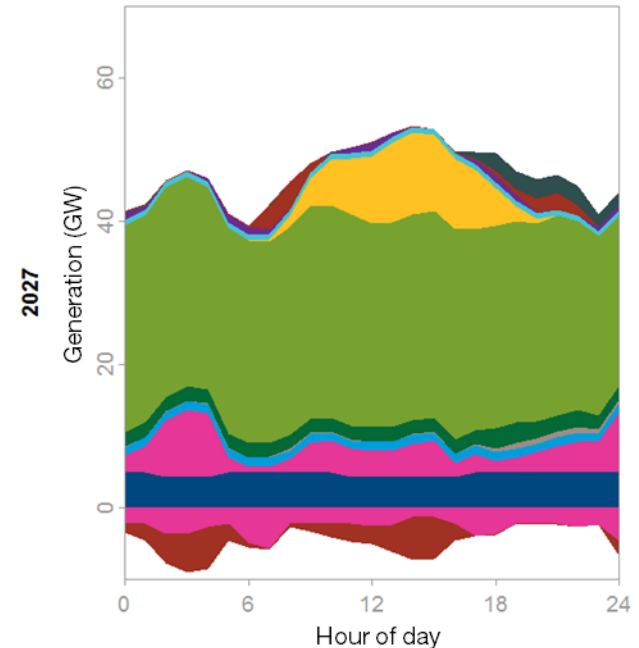
Insight: Data shows it operating beneficially but it could cause operability issues

Actions: Consider operability in market design



High Wind Day - Two Degrees

■ Storage



Synchronous Generation: Fault level

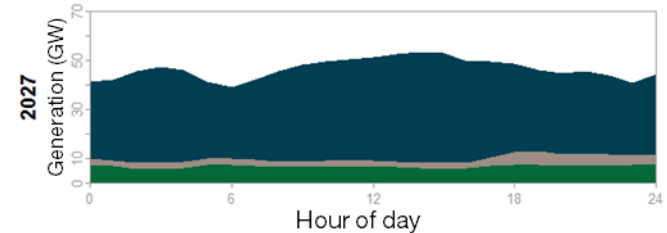
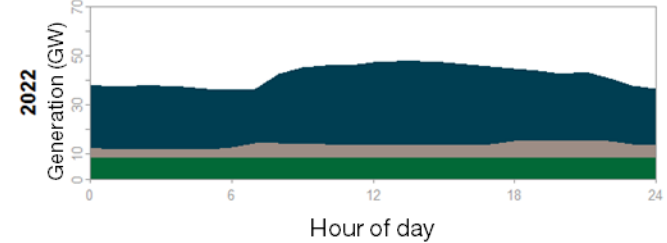
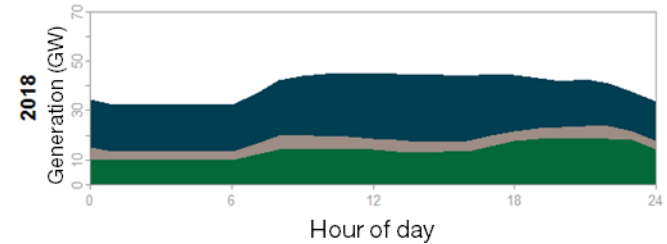
Trend: Synchronous generation is declining causing a decline in fault levels

Insight: Impacting on: Protection, Stability and Power Quality

Actions: We need a better understanding of the impact of declining fault levels

■ Transmission Synchronous ■ All Non-synchronous
■ Distribution Synchronous

High Wind - Two Degrees



Synchronous Generation: Voltage

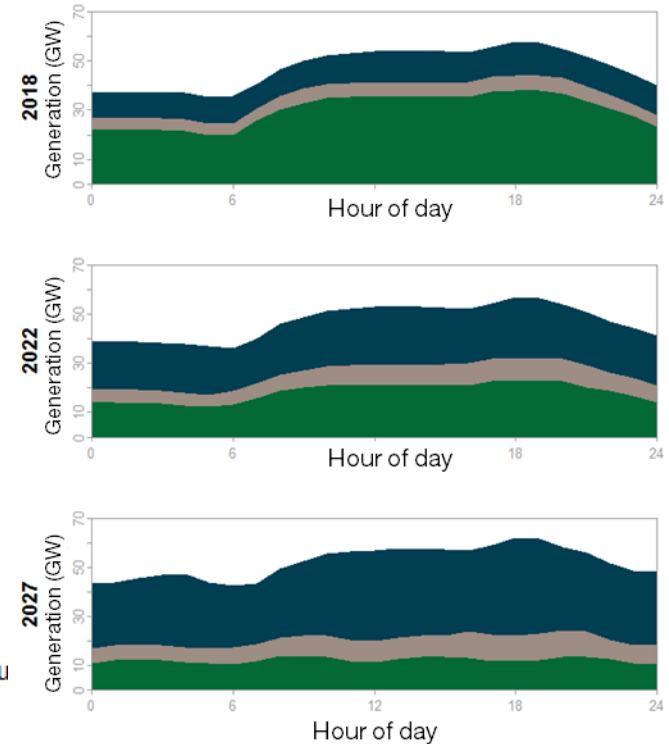
Trend: Synchronous generation is declining causing reduction in voltage support

Insight: It will be harder to keep steady state voltages and less dynamic support during a fault

Actions: Look out for the “Reactive Power Roadmap”

■ Transmission Synchronous
 ■ All Non-synchronous
 ■ Distribution Synchronous

High Demand - Two Degrees



Synchronous Generation: Inertia

Trend: Synchronous generation is declining causing reduction in inertia

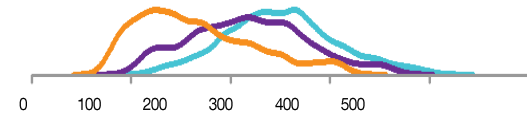
Insight: Frequency will move faster and keeping it within limits will be more difficult

Actions: See the “Product Roadmap for Frequency Response & Reserve”

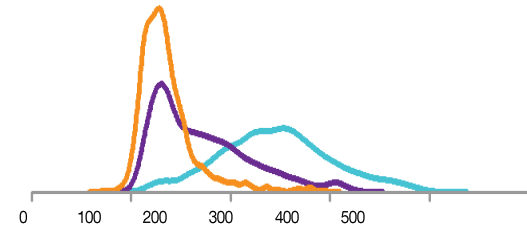
2018 2022 2027

National Inertia - Annual Distribution

Steady State



Two Degrees



Inertia (GVA.s)



Regional Trends and Insights



Key Messages

High electricity flows seen in the transmission network in all four seasons

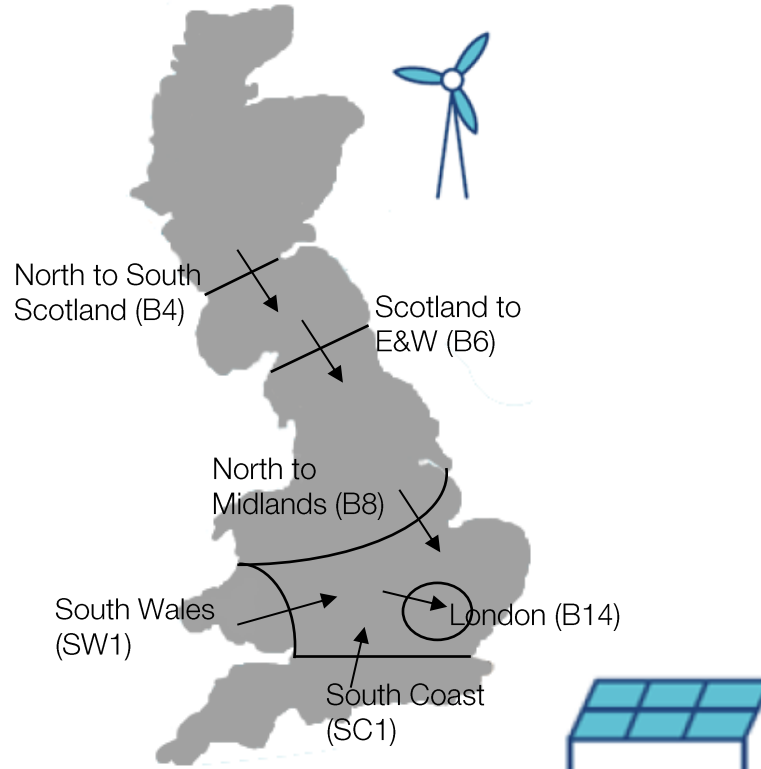
Increasing volatility of electricity flows

Low regional synchronous generation will become more frequent

More flexible resources and voltage support will be required

We will collaborate with the wider industry to understand how operability challenges affect them

Regional Power Flows

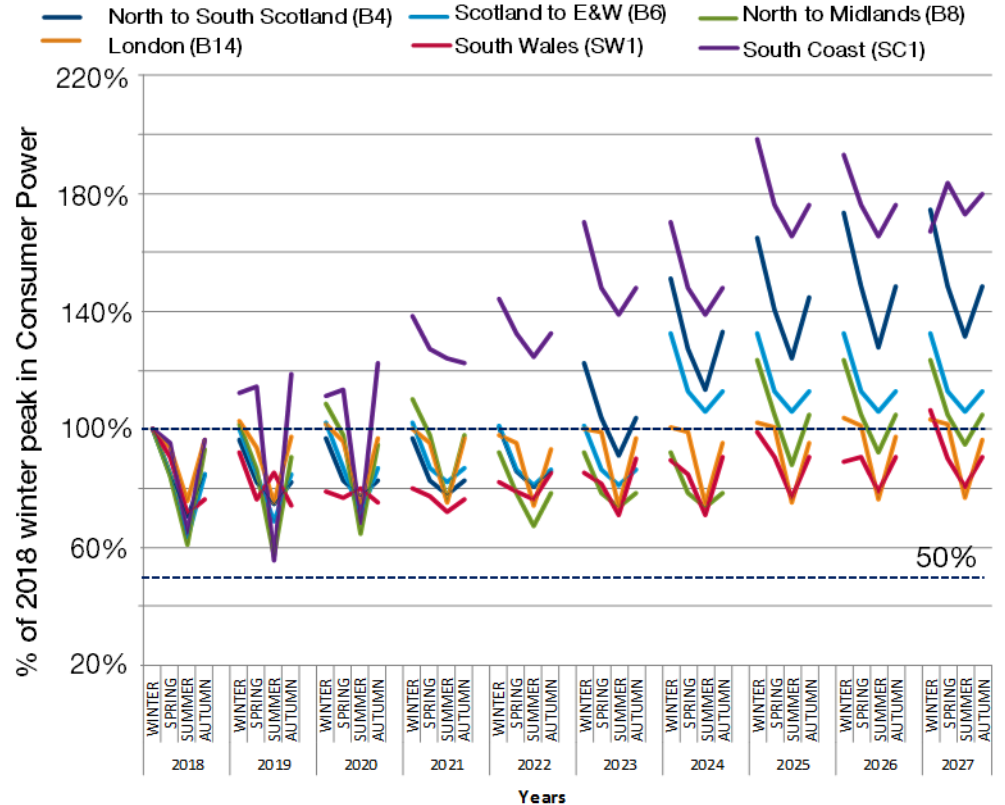


Seasonal Peak Flows

Trend: High peak flows in all seasons

Insight: Winter peak is no longer the only time the network is heavily used

Actions: Year-round analysis needs to be considered



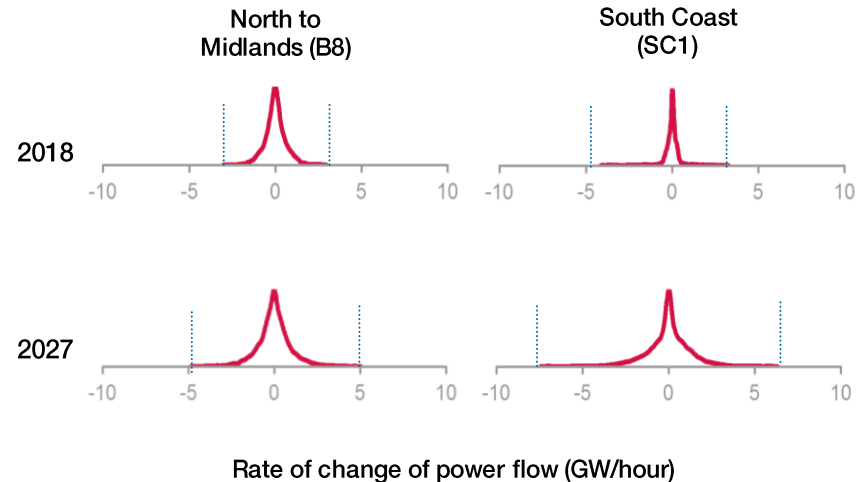
Rate of Change of Flow

Trend: Increasing volatility of power flows from one region to another

Insight: More flexible resources and voltage support are needed

Actions: Continuing to improve our forecast methods

Rate of change of flow in Consumer Power Scenario

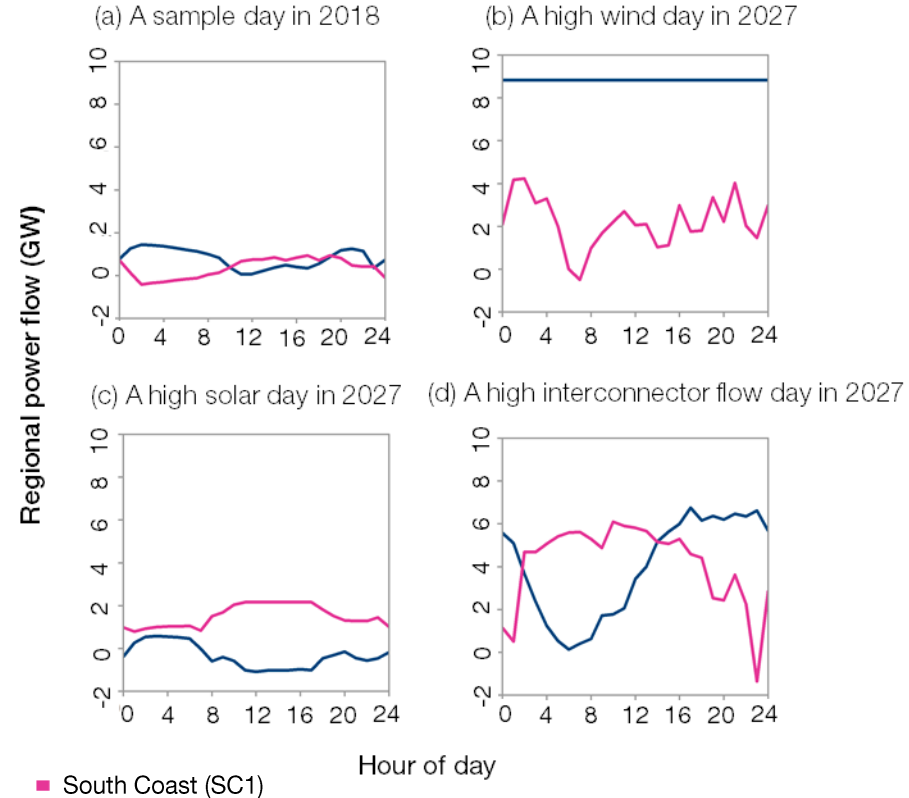


Case Studies

Trend: Wind, solar and interconnector contribute to increasing volatility

Insight: Reverse flow from south to north when there is high solar

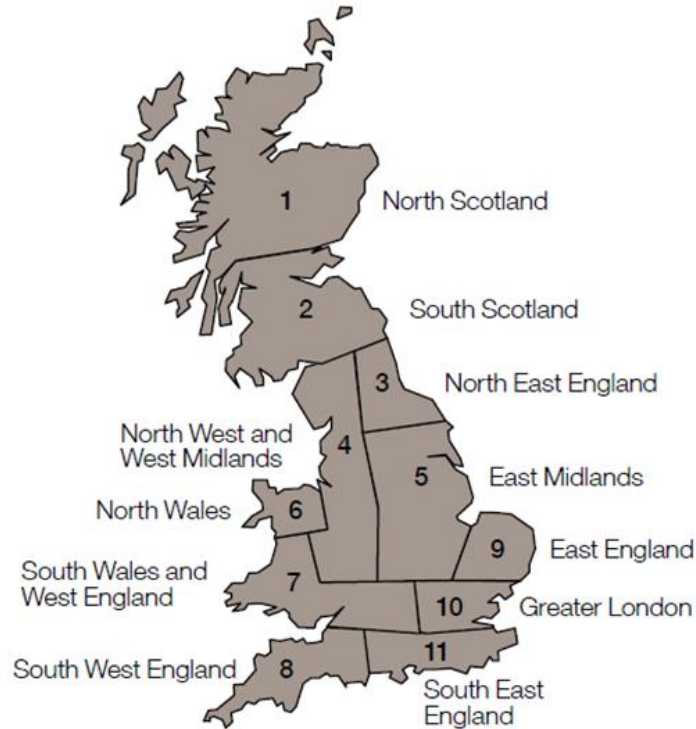
Actions: Understand the impact of Pan-European market arrangements on operability



■ Scotland to E&W (B6)

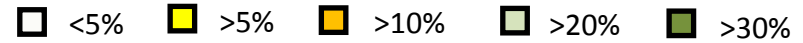
■ South Coast (SC1)

Regional Synchronous Generation



Regional Synchronous Generation

Increasing unequal distribution of synchronous generation across the GB transmission network



Steady State 2018



Steady State 2022



Steady State 2027

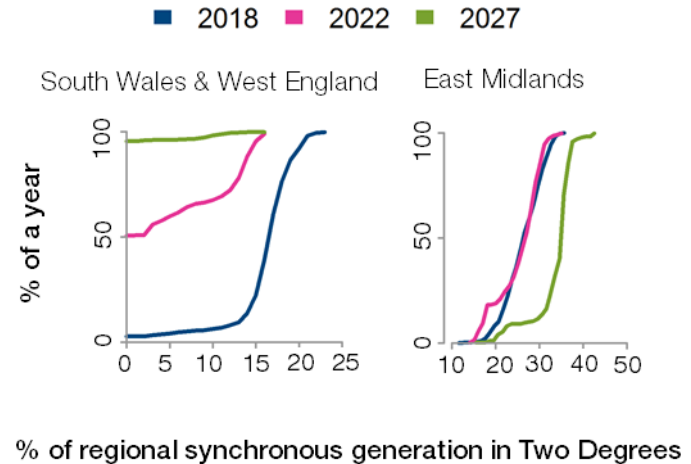


Regional Synchronous Generation

Trend: Absence of synchronous generation in some regions become frequent

Insight: These regions are vulnerable to operability challenges related to low system strength

Actions: Dynamic voltage support is needed in these regions



Key Messages

Regional

High electricity flows seen in the transmission network in all four seasons

Increasing volatility of electricity flows and frequent low regional synchronous generation

More flexible resources and voltage support will be required

We will collaborate with the wider industry to understand how these operability challenges affect their performance

National

Changing in generation mix on the system

The system is becoming less operable without intervention

Transform the industry's approach to operability

Plan for 2018

We are working on:

- Enhanced frequency control capability (EFCC) project
- Power potential project
- Phoenix project
- Virtual synchronous machine
- Reactive power roadmap

We will collaborate with:

- TOs and DNOs
- Manufacturers/developers
- Users of the network

to understand the impact of these operability challenges

Questions?

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Voltage and Frequency Dependency

Ben Marshall

Technical Specialist



Key Messages

Today we assess frequency and voltage events separately

In the future we will need to consider combined events

Combined frequency and voltage events occur today

As the levels of synchronous generation decline, this effect will increase

We will work with the energy industry to further develop our regional monitoring and modelling of these combined effects

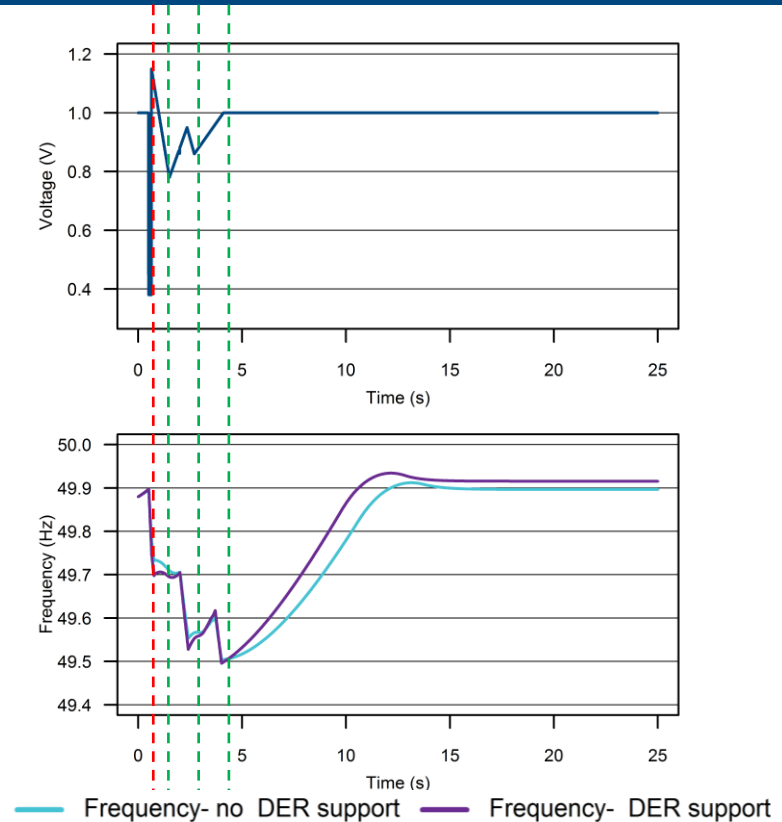
This could provide opportunities for new regional voltage support capabilities

What are frequency and voltage events?

Trend: Higher Non Synchronous Technologies (NST) and changes in demand drive an increasing voltage and frequency dependency

Insight: Regional levels of active power loss need to be limited from National level, unless additional dynamic voltage support found

Actions: We need to inform modelling and increase voltage support resources

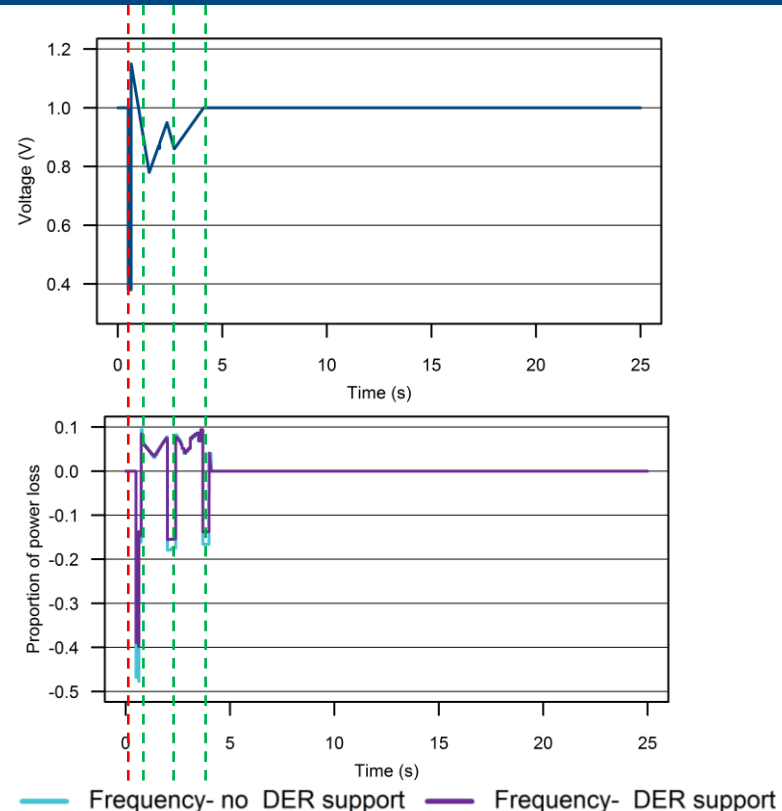


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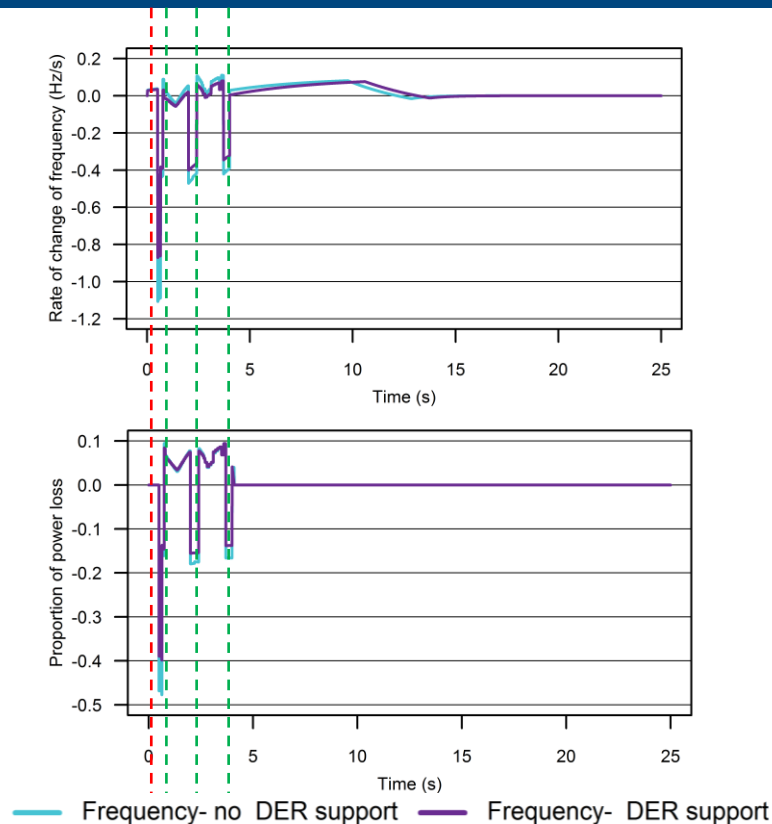


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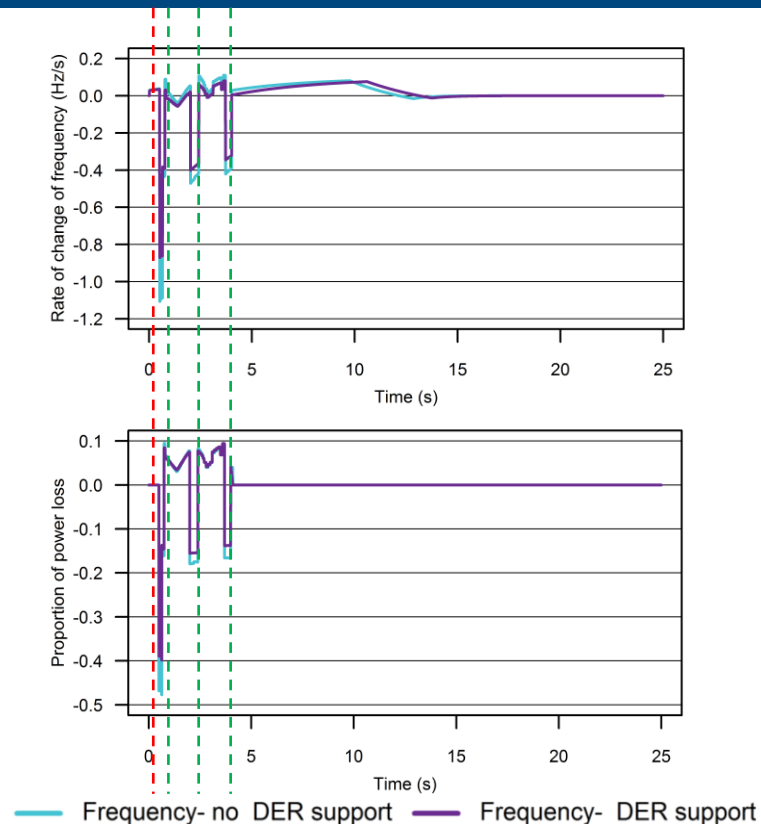


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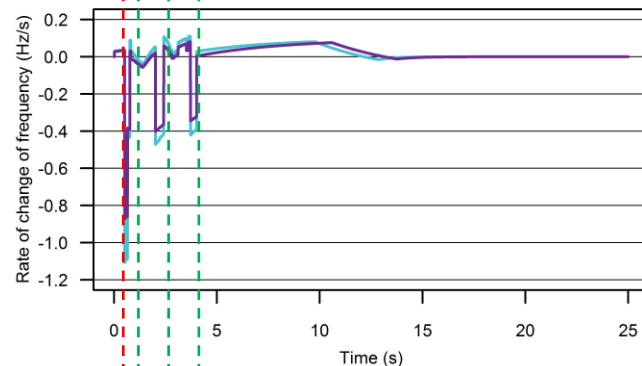


What are frequency and voltage events?

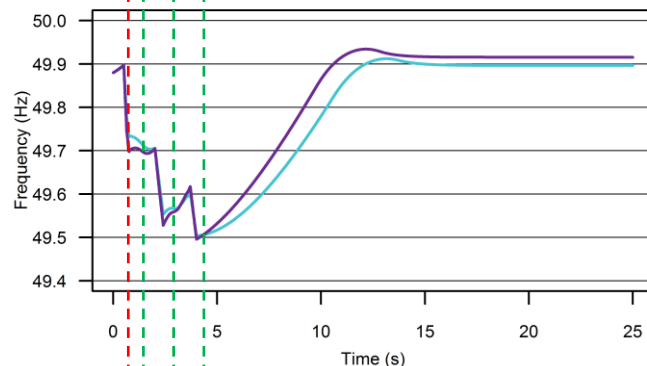
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Insight: Regional levels of active power loss need to be limited from National level, unless additional dynamic voltage support found

Actions: We need to inform modelling and increase voltage support resources



ROCof- no DER support ROCof- DER support



Frequency- no DER support Frequency- DER support

3 Case Study areas considered

Area 1:

High Non- Synchronous Technology (NST) growth, mainly in distribution system

Area 2:

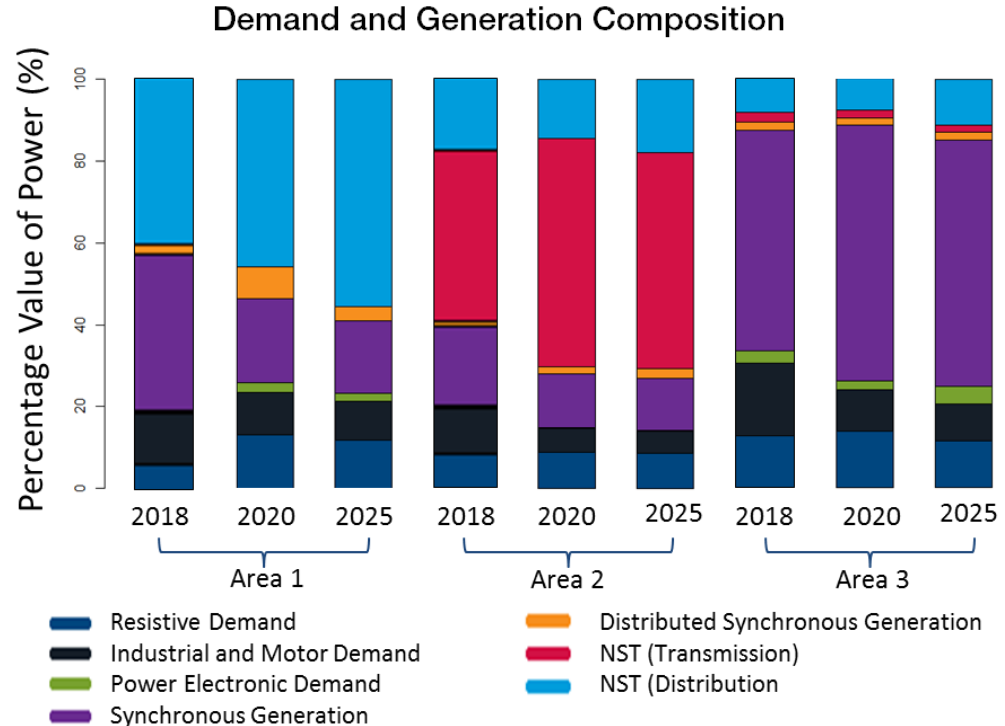
NST growth greater in transmission system

Area 3:

NST growth balanced by continued synchronous generation developments

Different demand and generation compositions

Different Voltage and Frequency behaviours

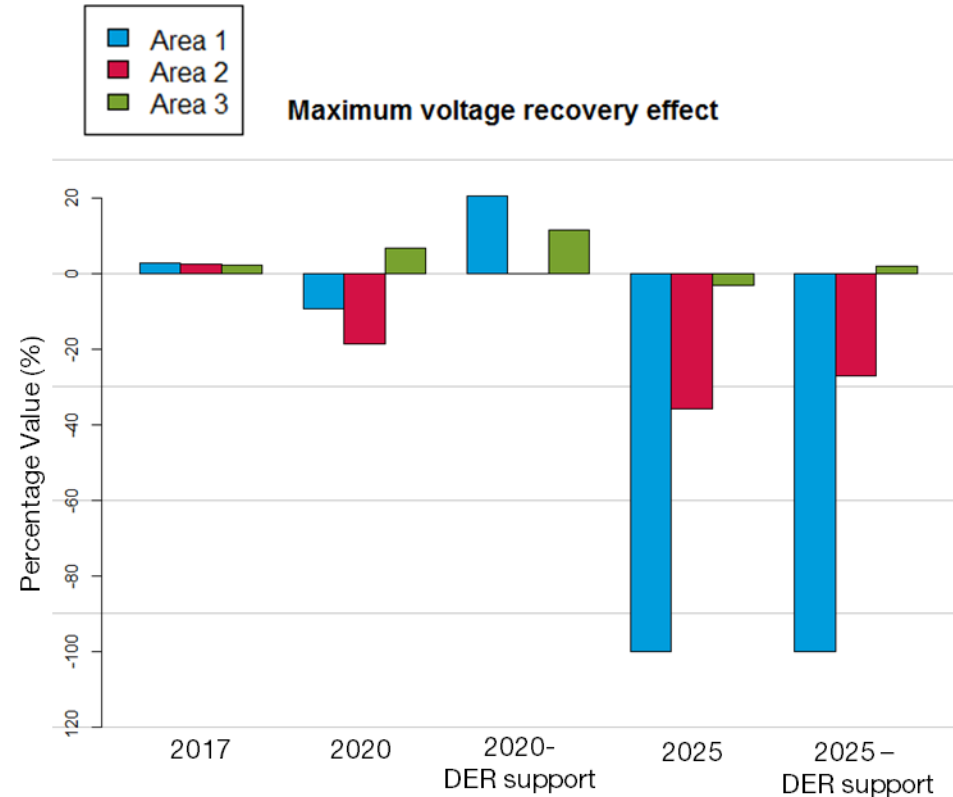


Results

Trend: from a small positive effect today, combined frequency and voltage effects drive a range of larger future regional frequency containment considerations.

Insight: Higher NST penetrations and greater voltage sensitivity in load lead to slower, more oscillatory, voltage recovery. This leads to varied impact on frequency containment by area

Actions: To collaborate across the industry to further develop regional frequency and voltage-sensitive modelling

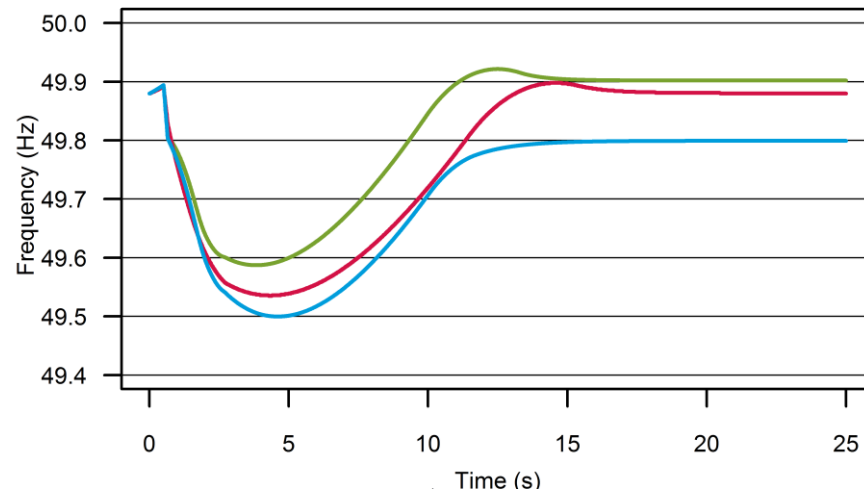


Actions to mitigate: DER support?

Trend: Distributed Energy Resources (DER) are increasing

Insight: DER support can mitigate combined frequency and voltage effects as DER grows over time

Actions: We need to continue to engage across the industry to deploy and specify the capabilities of DER most effectively



- Frequency-With DER support
- Frequency-Baseline
- Frequency-With Der support allowing for larger loss

Next steps

We have provided an example of how Trends and Insights inform further operability assessment

We intend to publish further information on our findings within our Assessment Report, in Spring 2018

We will explore opportunities for industry collaboration in advancing understanding and response to this operability area

Where does this effect come from?

Why does it change?

How does it change?

Key Messages

Today we assess frequency and voltage events separately

In the future we will need to consider combined events

Combined frequency and voltage events occur today

As the levels of synchronous generation decline, this effect will increase

We will work with the energy industry to further develop our regional monitoring and modelling of these combined effects

This could provide opportunities for new regional voltage support capabilities

Questions?

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Trading Trends & Real Time Example

Paul Rowe-Jones
Energy Trader



Contents

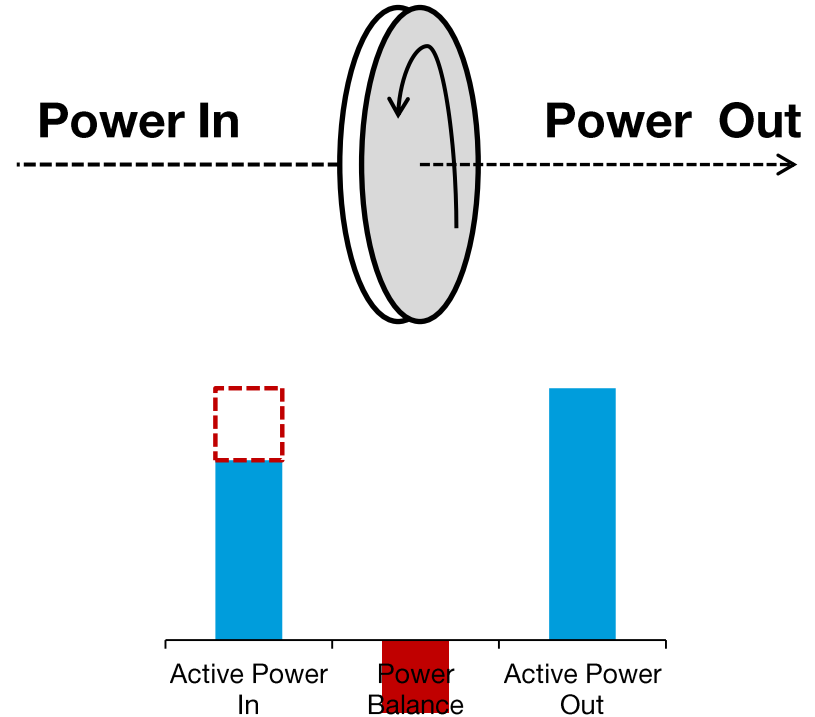
- ◆ Overview of the actions SO must take to ensure grid security
- ◆ Review of 2017 SO trading trends
- ◆ Where are we going?

System Needs



Frequency and Rate of Change of Frequency (RoCoF)

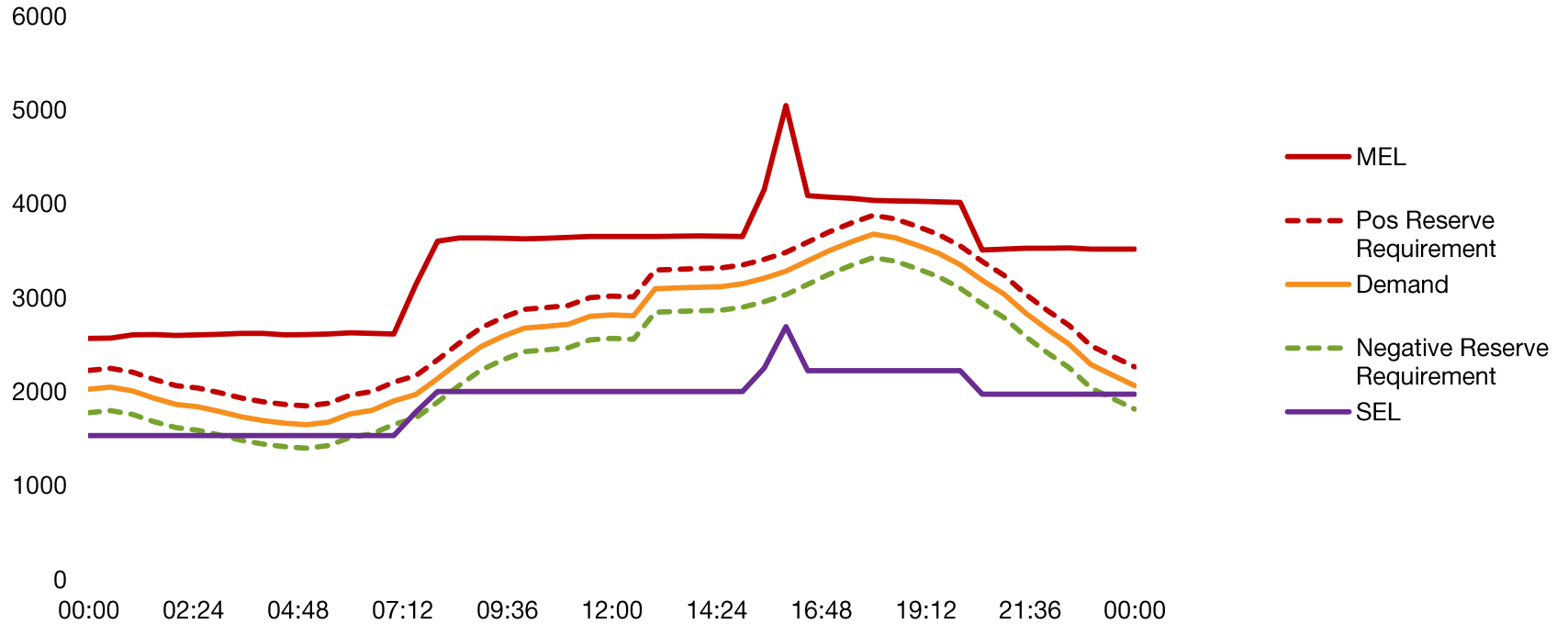
- ◆ The SO must manage the Network to keep frequency within statutory limits
- ◆ For a 'Normal' loss: 50 ± 0.5 Hz
- ◆ A significant volume of embedded generation uses protection which will disconnect the generator if $\text{RoCoF} > 0.125$ Hz/s
- ◆ The consequent generation loss can amplify the initial loss, leading to a greater frequency deviation
- ◆ The SO must manage Largest Losses, Inertia and Response Holding



Reserves

- ◆ Market imbalance and unexpected losses of Generation/Demand must be replaced in real time
- ◆ The SO must ensure that sufficient ‘flexibility’ is available to manage imbalance and credible losses
 - ◆ Upwards Reserve (‘margin’) is the ability to increase the output of generators in short timescales
 - ◆ Downwards Reserve (‘footroom’) is the ability to decrease that output

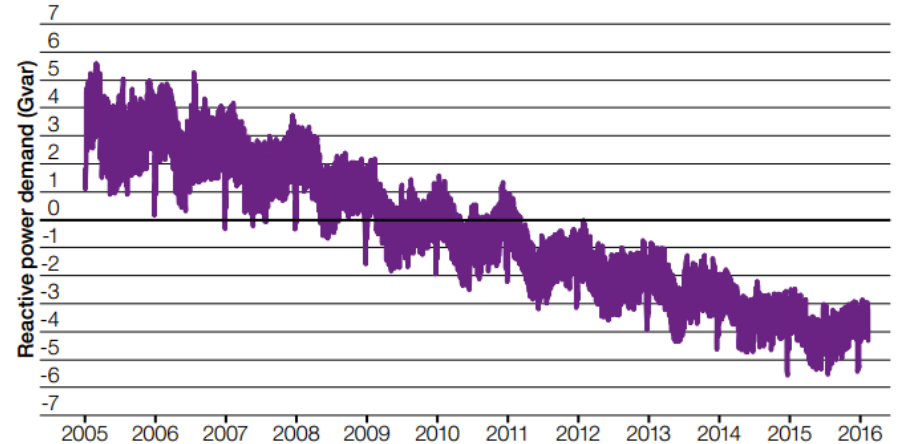
Reserve Model



Voltage

- ◆ The SO must keep within:
 - ◆ Steady State Limits
 - ◆ Step Change limits
- ◆ Load is becoming more capacitive
- ◆ This is leading to high volts and increasing the need for MVar absorption
- ◆ Voltage Requirements are locational
- ◆ After 'Transmission' options have been used, a minimum voltage generation requirement remains

Daily minimum reactive power demand from (2005–2016)



Interactions

- ◆ The SO must meet each of these requirements simultaneously and at all times
- ◆ However, actions taken to resolve one constraint may exacerbate another
- ◆ These interactions are particularly acute at low demand

Interactions

	Downward Reserve	Positive Reserve	Response Availability/Requirement	RoCoF	Voltage
Desynch Machine	Improves	Worsens	Worsens	Worsens	Worsens
Synch Machine	Worsens	Improves	Improves	Improves	Improves
Reduce Storage / IC/ DER Imports	Improves	Worsens	Improves (if IC is LL)	Improves (if IC is LL)	-
Increase Storage / IC/ DER imports	Worsens	Improves	Worsens (if IC is LL)	Worsens (if IC is LL)	-
Position Plant for Response	Worsens	Worsens	Improves	-	-

RoCoF:
Rate of Change of Frequency

IC:
Interconnector

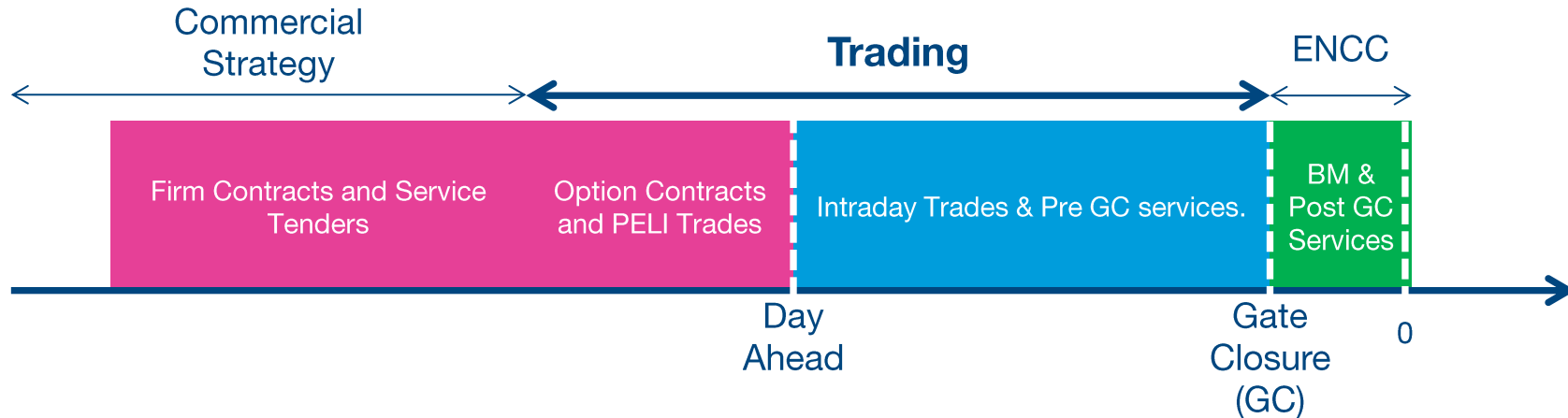
LL:
Largest Loss

Review of 2017 Trading Activity

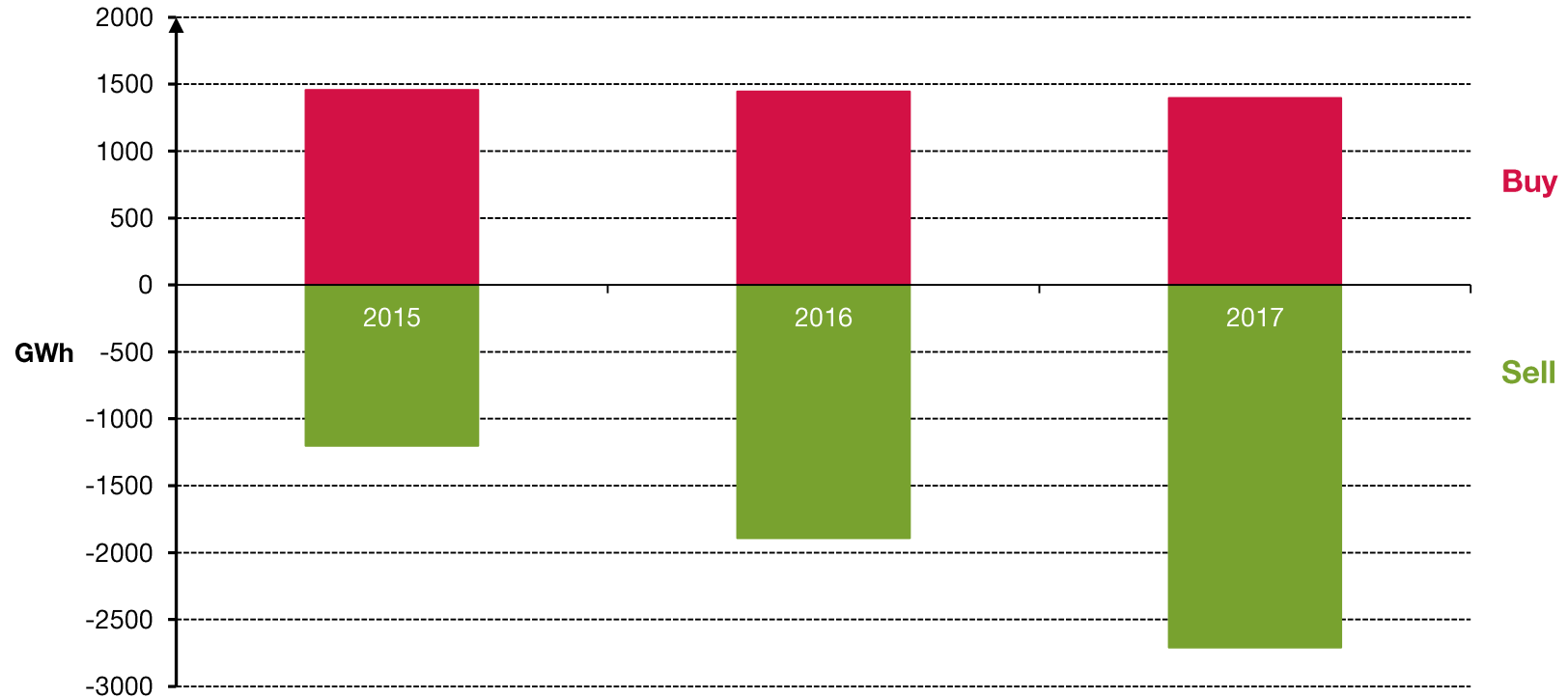


Role of the Trading Team

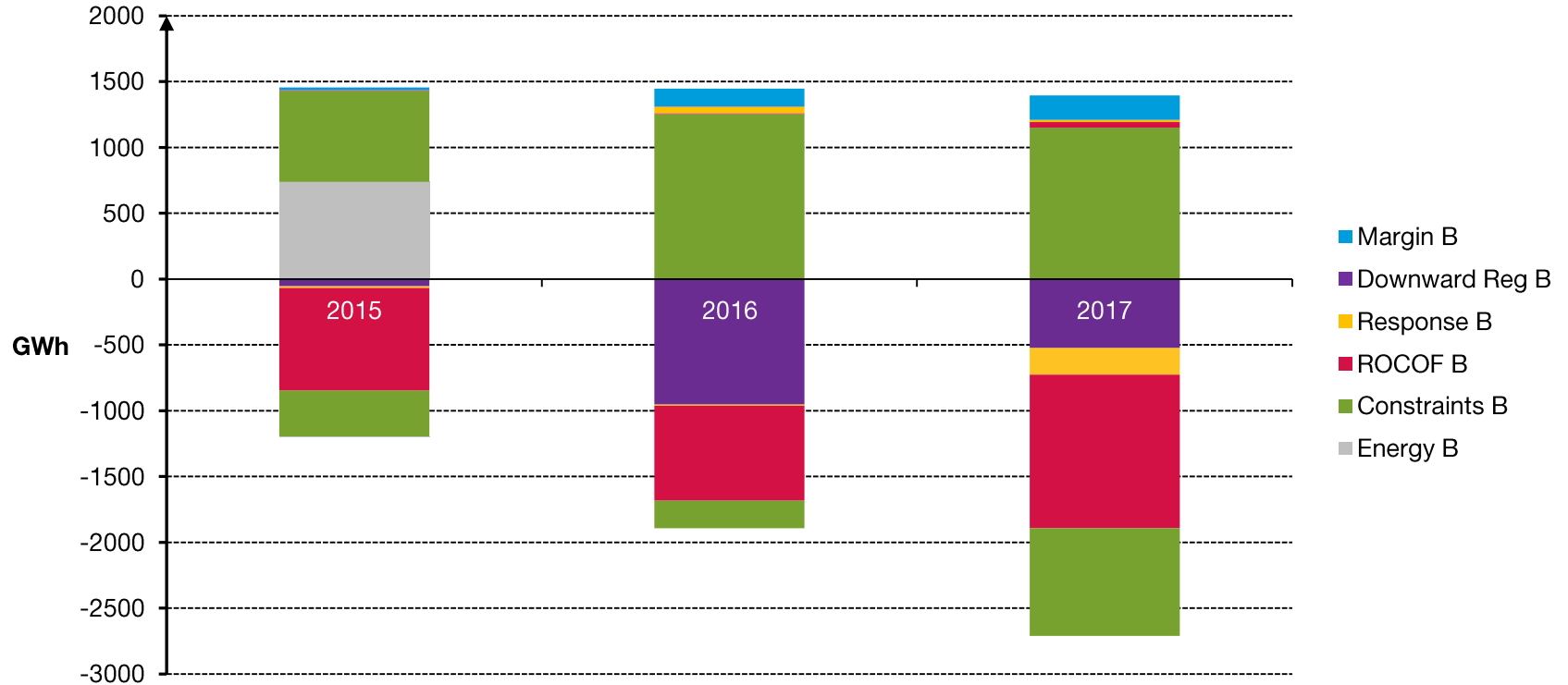
- ◆ The trading aim to take actions via forward trades where more economic than post gate closure alternatives
- ◆ Tenders are cast as wide as possible to fill a system need
- ◆ Trades are conditional on delivery on a particular unit



Volumes



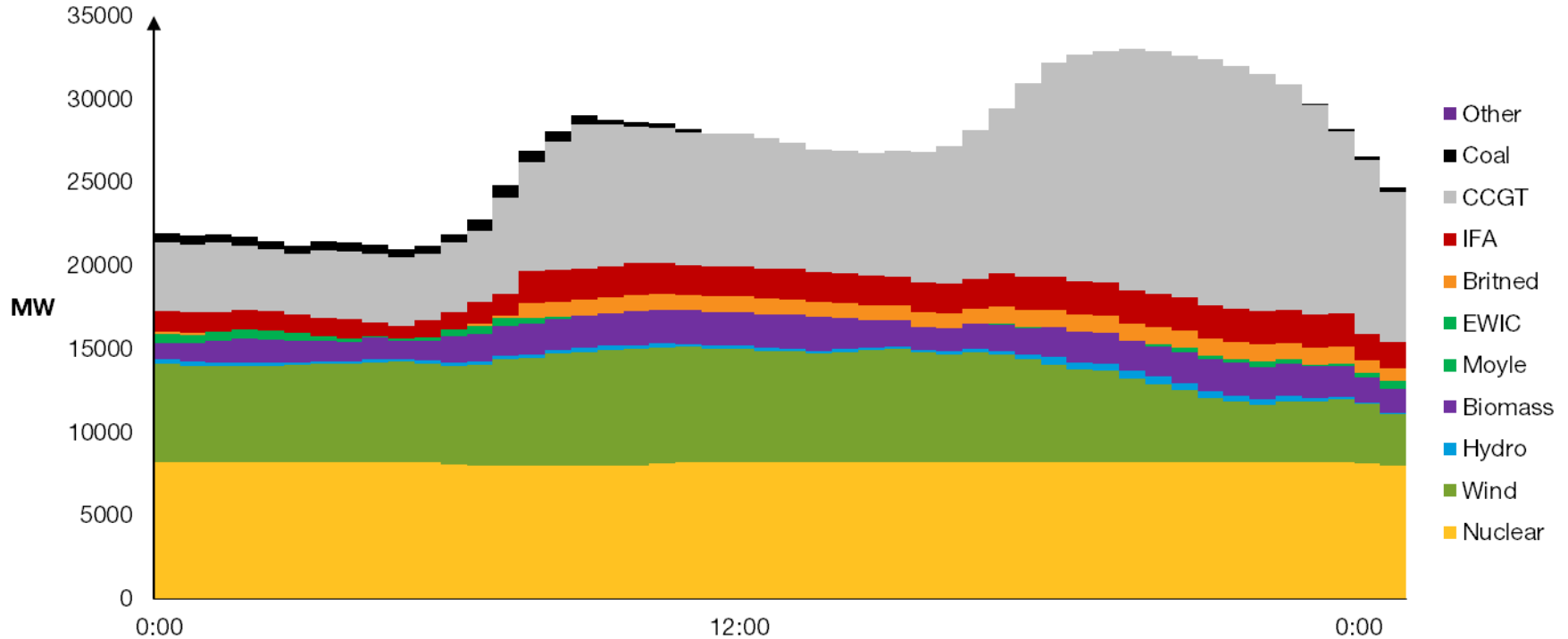
Reasons



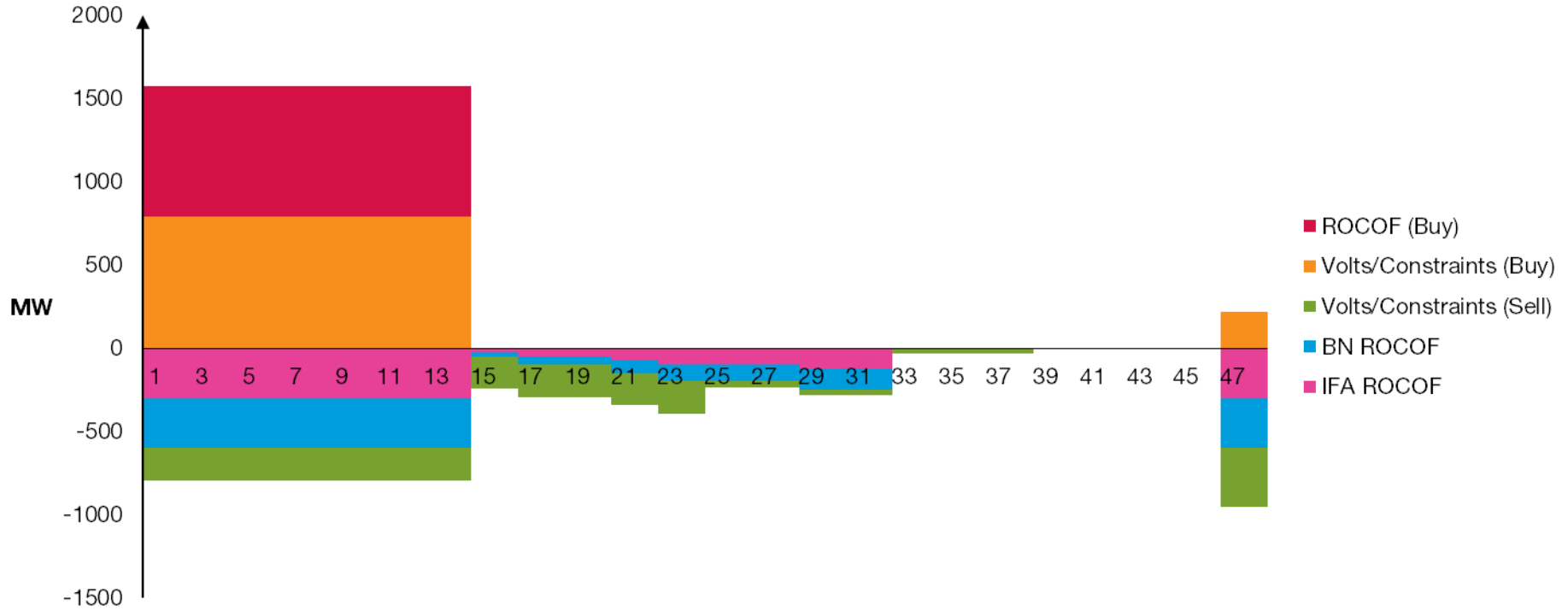
ROCOF by Month



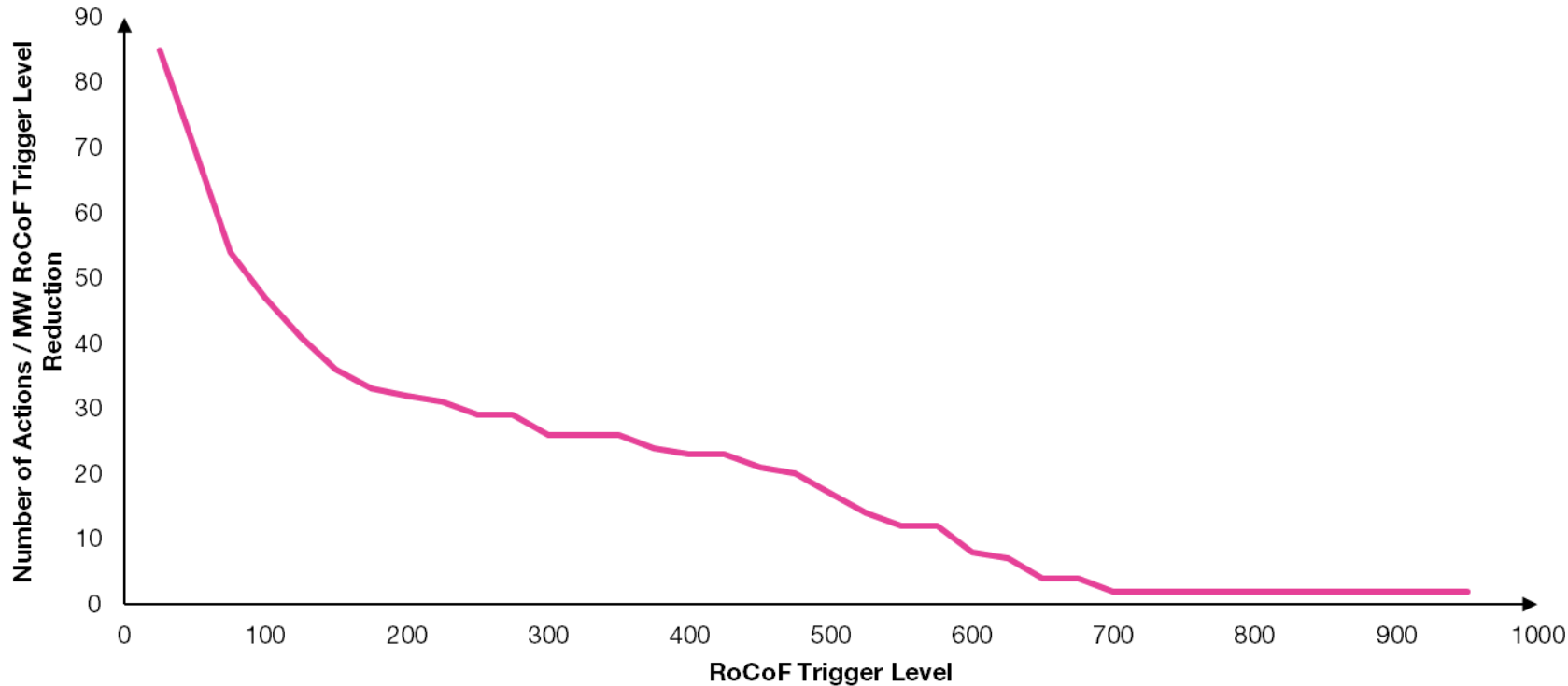
7th June 2017



7th June 2017



7th June 2017



Where next?

- ◆ With decreasing transmission system demand we expect system inertia to continue to fall
- ◆ This will mean more periods where the SO takes actions to manage largest losses
- ◆ Reducing largest losses is only viable up to a point – after which inertia must be increased by synchronising machines
- ◆ The interaction between reserve requirements and response holding becomes more onerous at low inertia
- ◆ This should drive the need for new sources of reserve

<https://www.nationalgrid.com/uk/electricity/balancing-services/future-balancing-services>

Questions?

nationalgrid



Future of Balancing Services Product Roadmap: Response & Reserve



Adam Sims
SO Flexibility Manager



Content

Principles

Frequency Response

Reserve



Principles – Summary of Consultation



Majority of market participants prefer a standardised approach to the specification of product



A mix of both short-term markets and the periodic longer-term contracts was favoured by 62% of respondents



68.4% of respondents were positive or very positive about trialling alternative procurement approaches



Other themes from consultation include transparency of SO's day-to-day activities and reducing barriers to entry

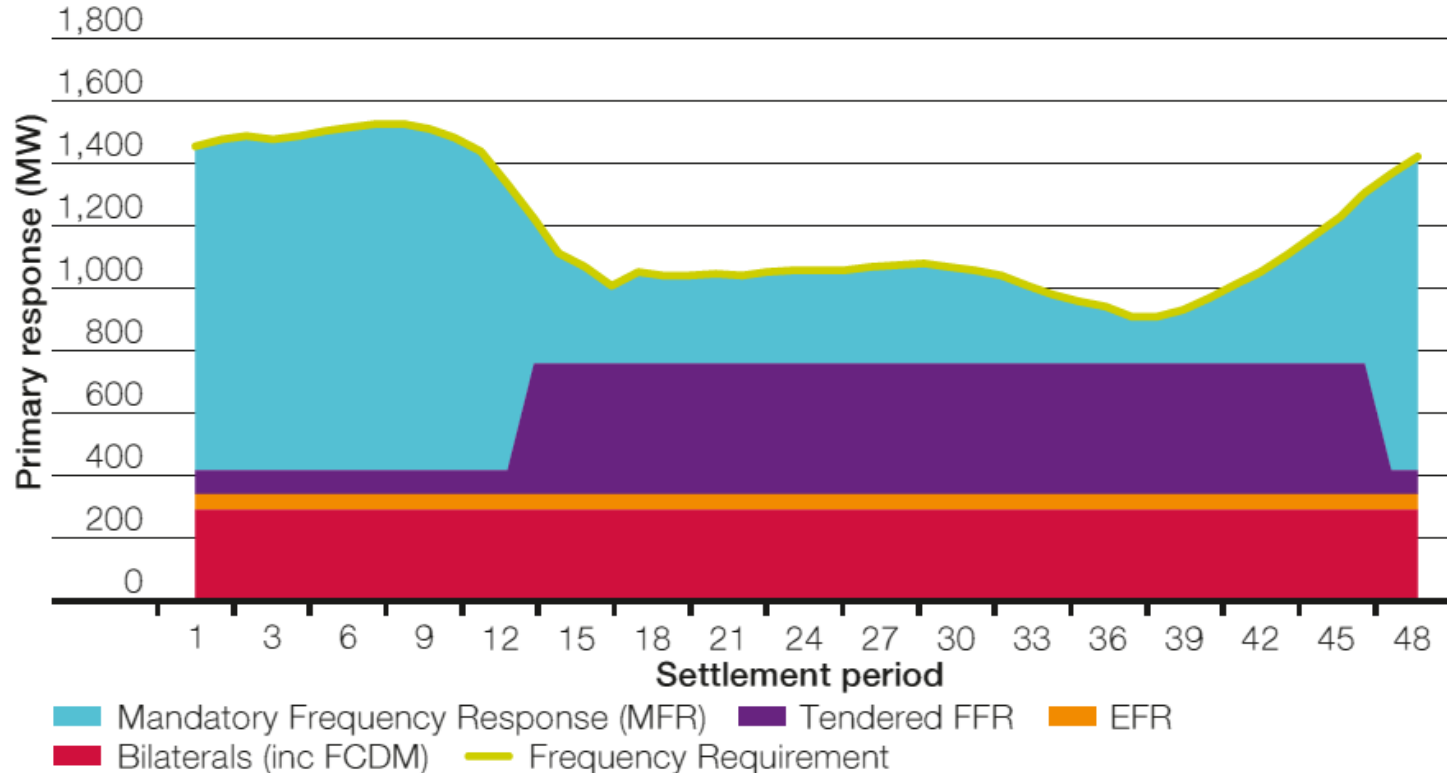
Principles

Our procurement decisions will be transparent and our methodology and needs will be clear to the market ahead of time

The design of our products, the way we procure, and the contractual arrangements will increase competition in provision of services to the SO

Our products will be designed to balance both operational requirements and the technical ability of provider assets while maintaining system security

Frequency Response - Today



Frequency Response - Roadmap

2017

Q4

Rationalisation of response products

2018

Q1

Short-term actions to improve existing Firm Frequency Response (FFR) market

Standardised FFR market

Deliver new proposed simplified contract

Publish detailed design of auction trial

Q2

Q3

Testing and compliance/ performance monitoring policy published

Publish and consult industry on revised exclusivity clauses (builds on ENA work)

Q4

Start of auction trial

Procurement of faster-acting response

Auctions trial running

2019

H1

H2

Decision on wider use of auctions in Frequency Response market

Frequency Response - Simplification

Illustration 1

Jan to March – When tendering between January and March, you can tender for the front month +

Q1

Summer 18

Winter 18

Summer 19

Winter 19

Summer 20

Illustration 2

April to June – when tendering within Q1, i.e. April to June, then, you can tender for the front month +

Q2

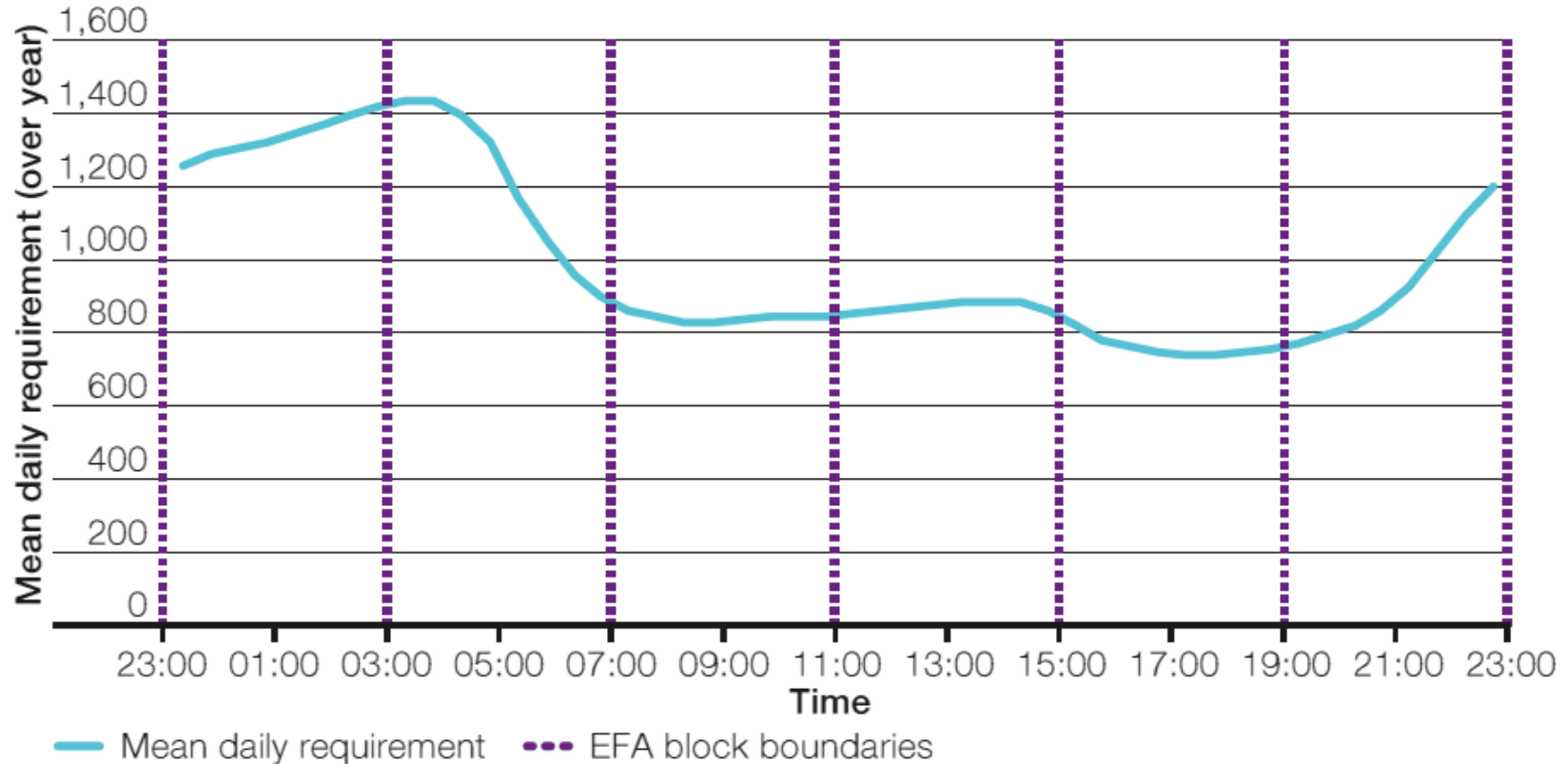
Winter 18

Summer 19

Winter 19

Summer 20

Frequency Response - Simplification

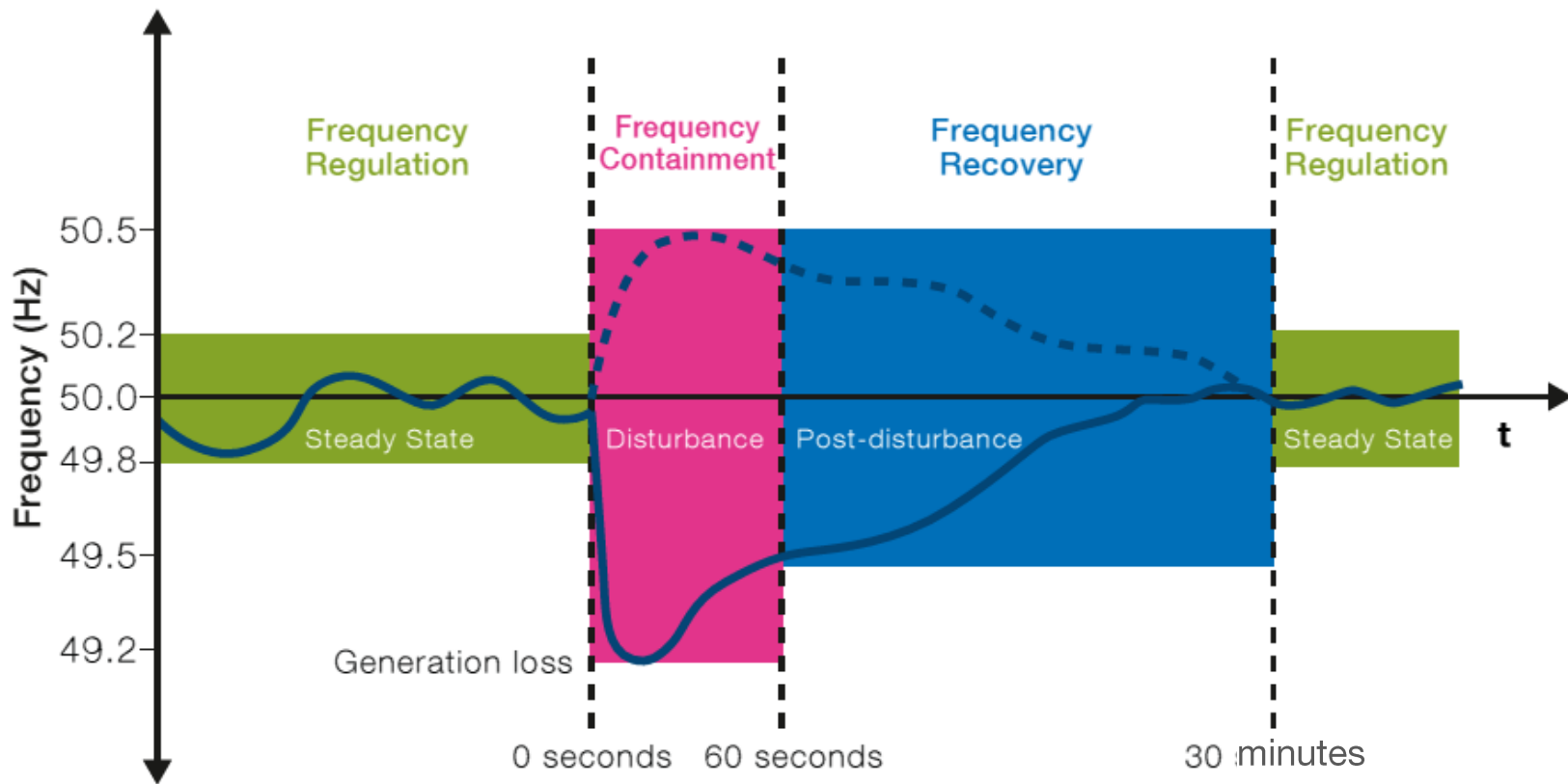


Frequency Response - Improvement

- ◆ Trial of closer to real time procurement
 - ◆ Weekly cleared price auction
 - ◆ 12 month trial starting end of 2018

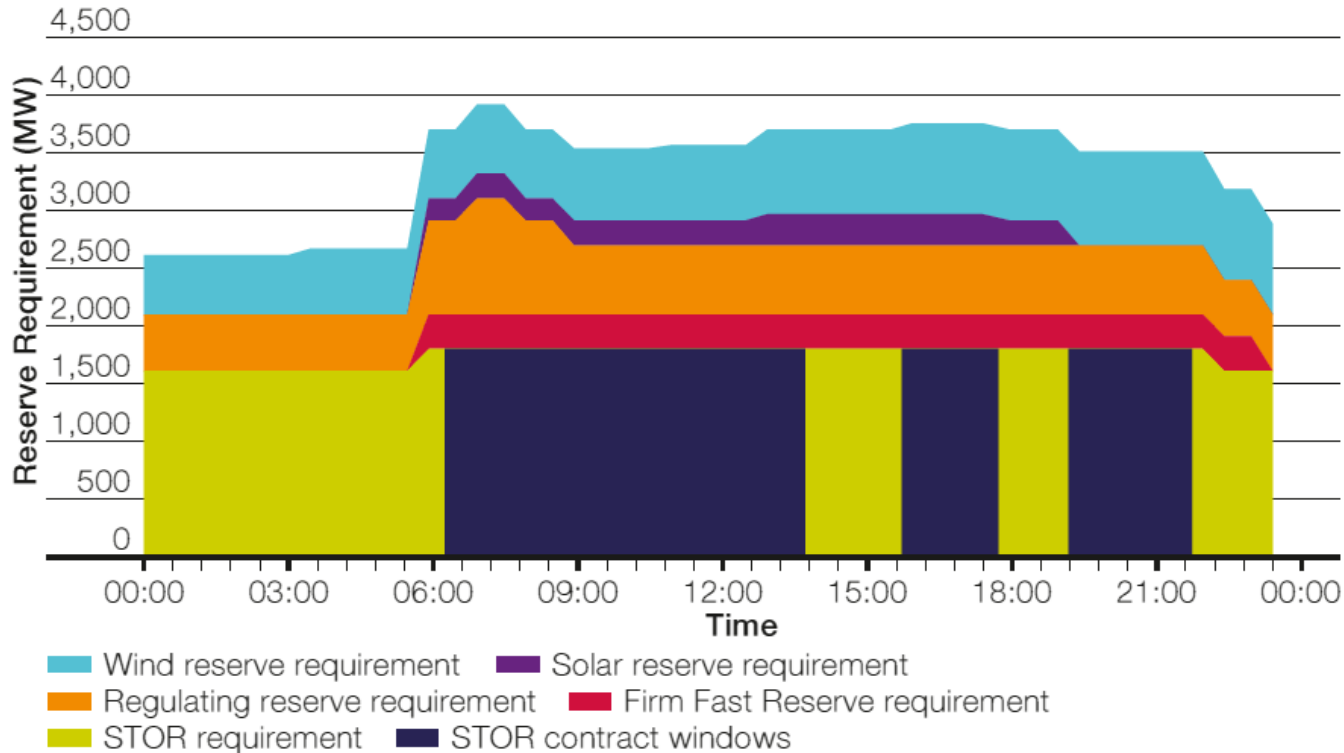
- ◆ Benefits
 - ◆ Industry: more flexible, transparent, simpler
 - ◆ SO: more competitive, automated

Frequency Response – Fast Response

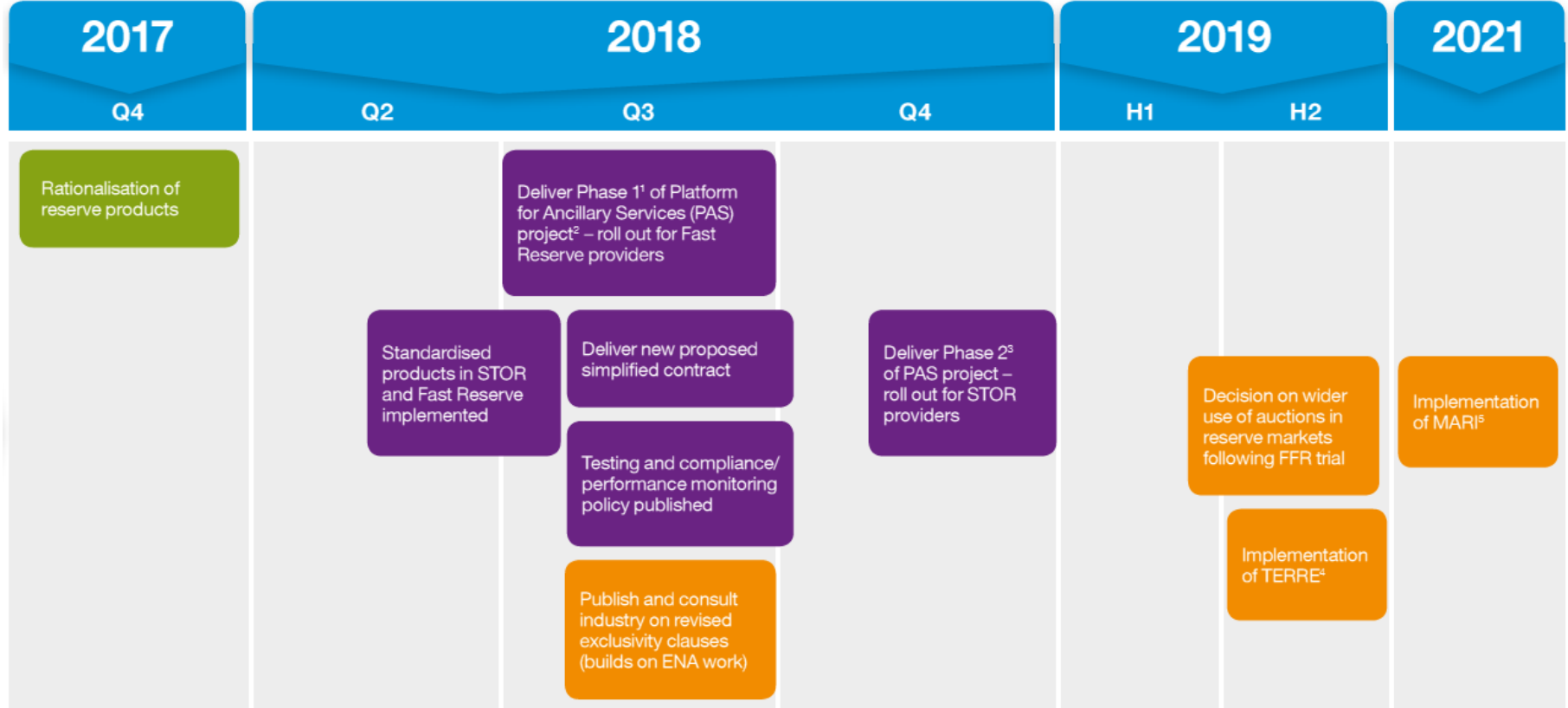


Reserve - Today

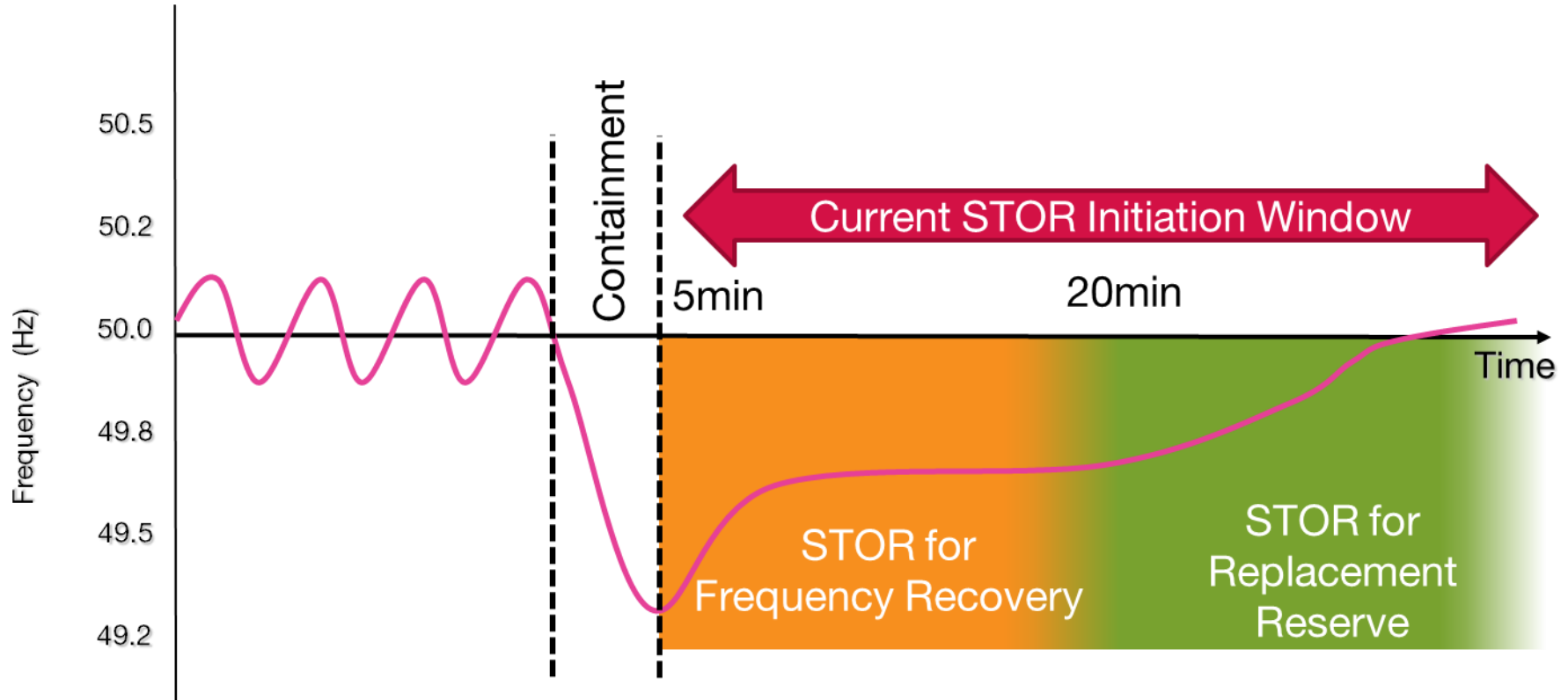
Illustration of typical Operating Reserve Requirement components



Reserve - Roadmap

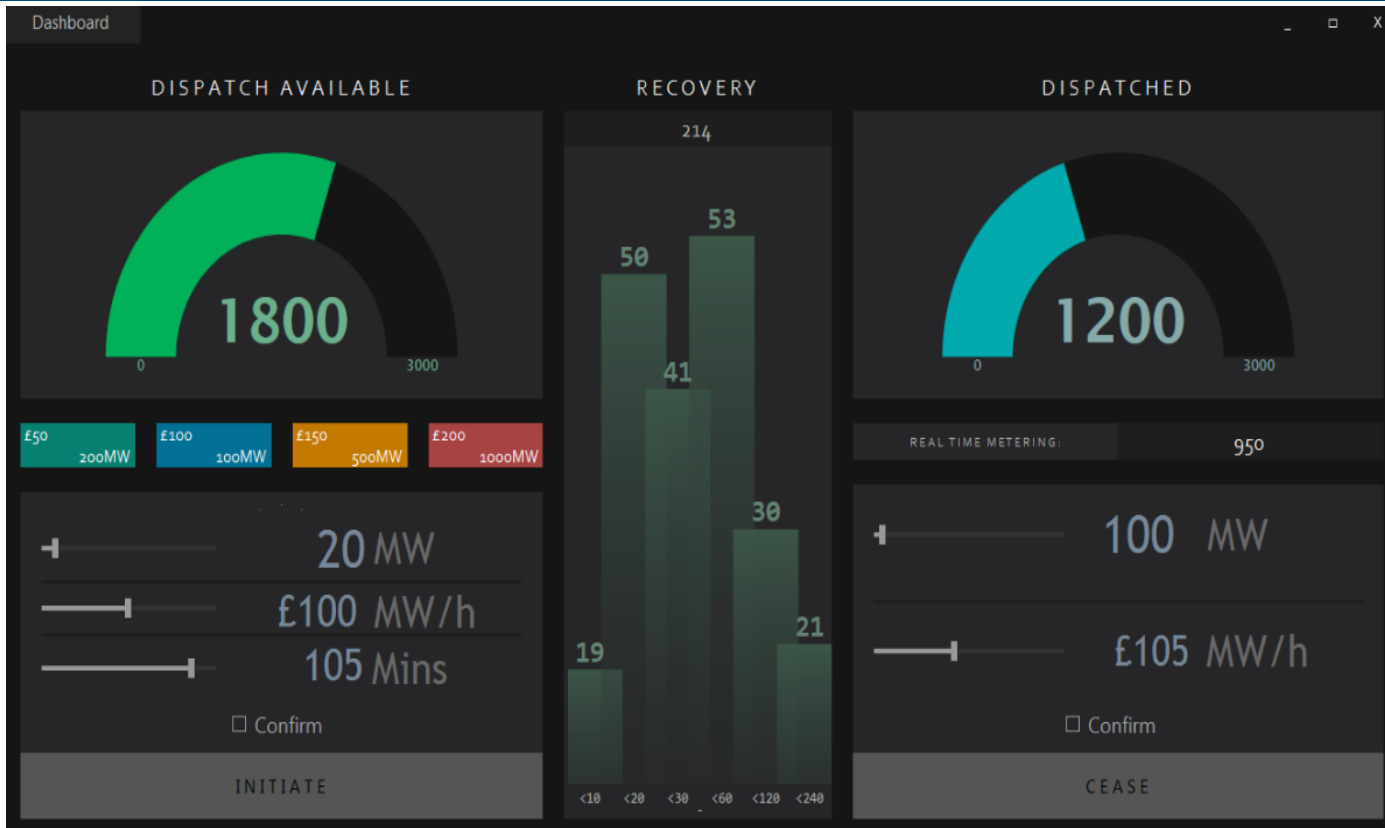


Reserve - Simplification

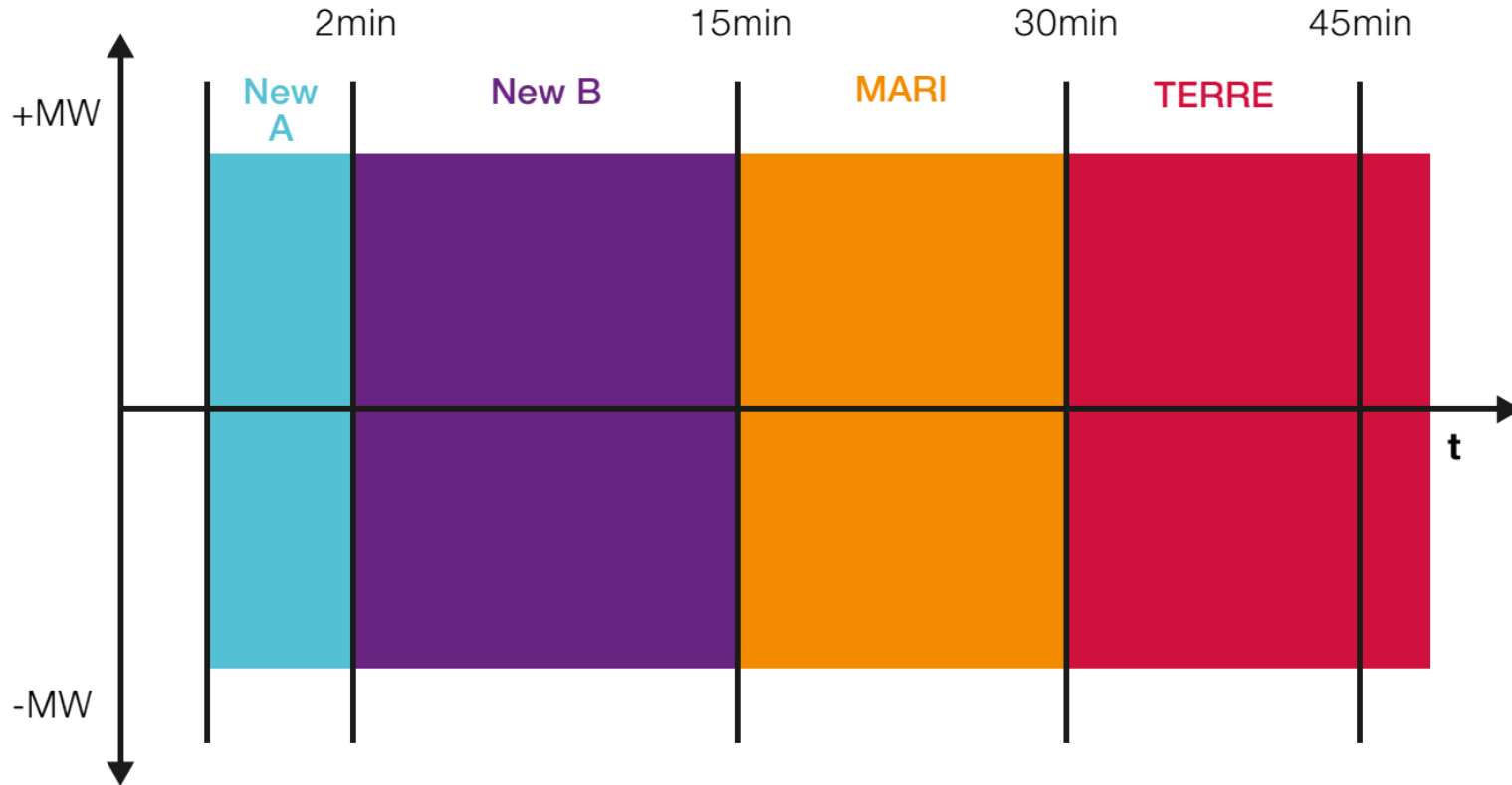


Reserve – Platform for Ancillary Services

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Reserve – Standard Products



Questions?

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Plan for Afternoon



Stall 1: SOF publications

Come and talk to us about SOF publications. You can find out more about our past and current assessments. You can also speak to Gas Future Operability Planning team to understand what interaction we expect between future gas & electricity operability.

Stall 2: Phase locked-loop controllers (PLL)

Come and talk to us about our recent assessment of phase locked-loop controllers. You can view our PSCAD model, learn more about our plan and how you can get involved.

Stall 3: Find out about SO innovation

Come and talk to us about the system operator's innovation strategy and projects.

Stall 7: Future of balancing services

Come and talk to us about our future services roadmaps.

Stall 4: Ongoing codes developments

Come and talk to us about latest work on industry codes.

Stall 6: Fault levels

Come and talk to us about the impact of declining fault levels on the whole system. Learn more about our plan to investigate the impact on network owners and users of the transmission system. Find out how you can get involved.

Stall 5: Your views on SOF

Come and tell us about how can we help you get more out of SOF?
Give us feedback on what you find useful in SOF?
Tell us about what we operability issues we should be looking at?