Balancing Service Use of System (BSUoS) Update

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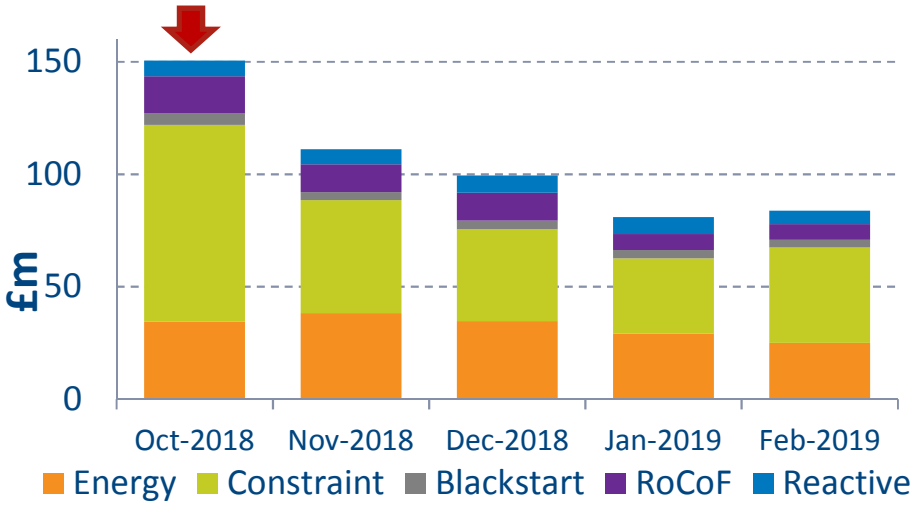
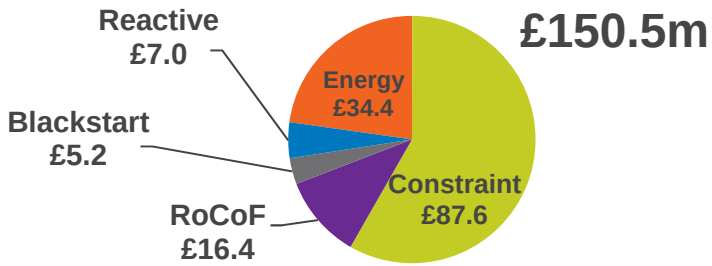
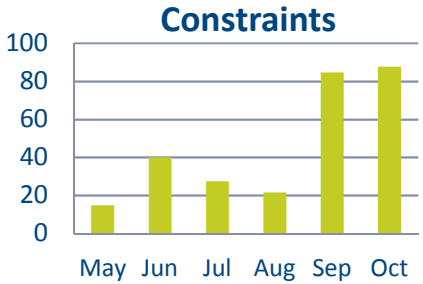
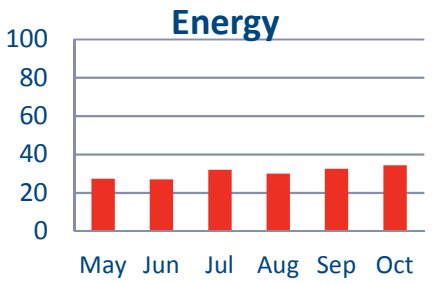
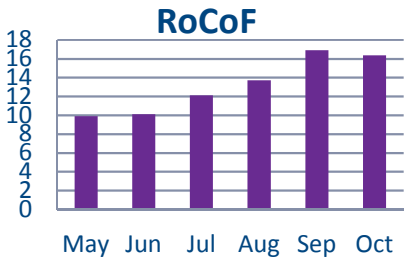
October 2018 : £4.25/MWh
Total Cost: £150.4m, Volume: 36.5TWh

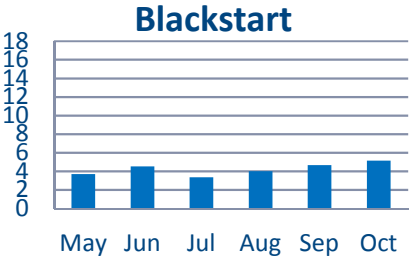


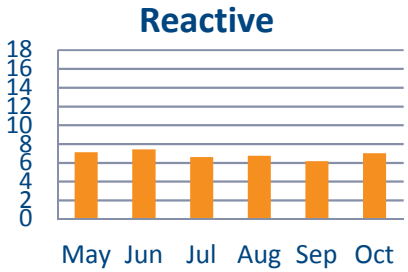












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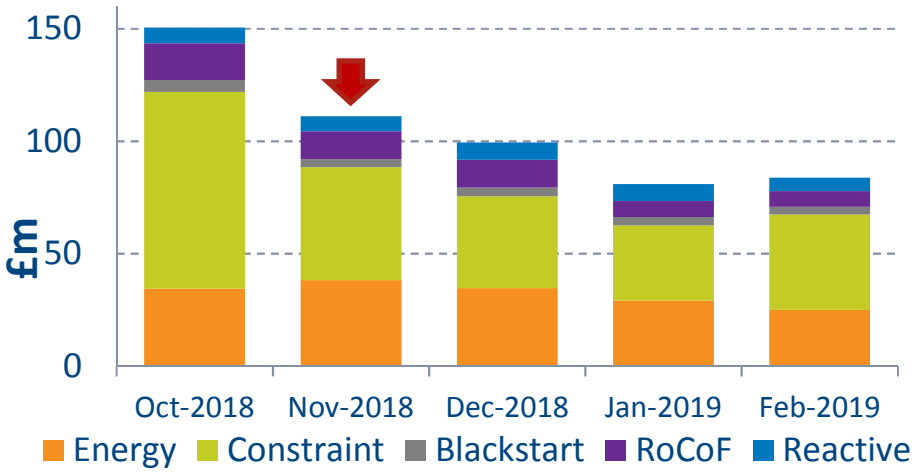
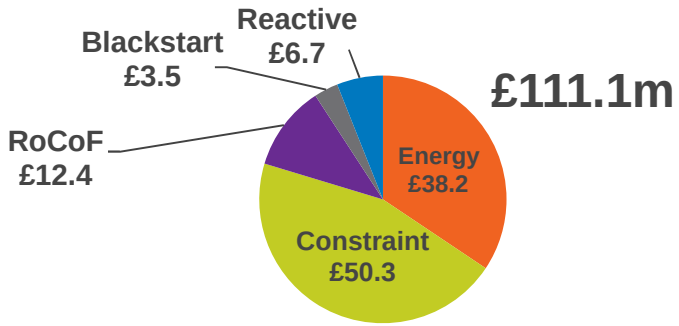
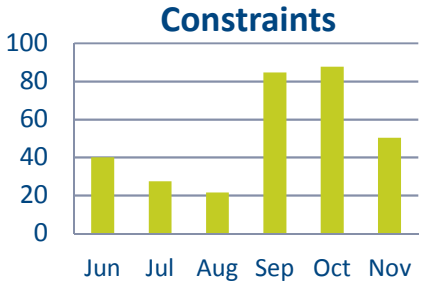
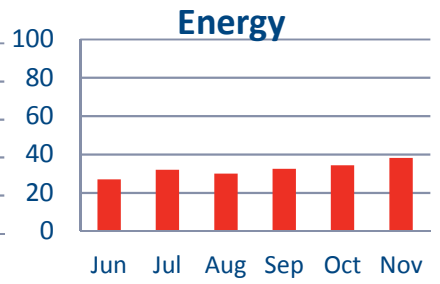
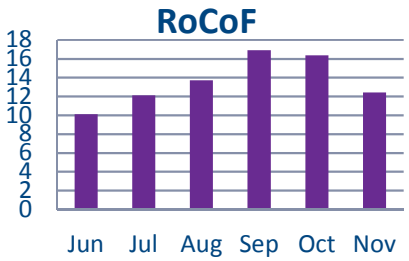
November 2018 : £2.86/MWh
Total Cost: £111.1, Volume: 44.7TWh

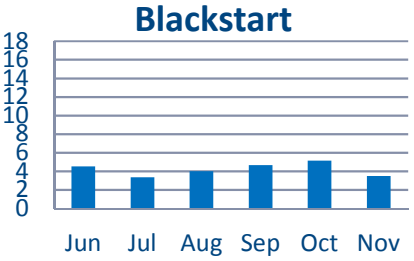


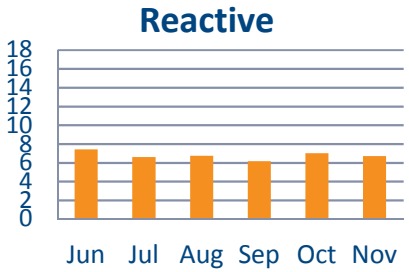












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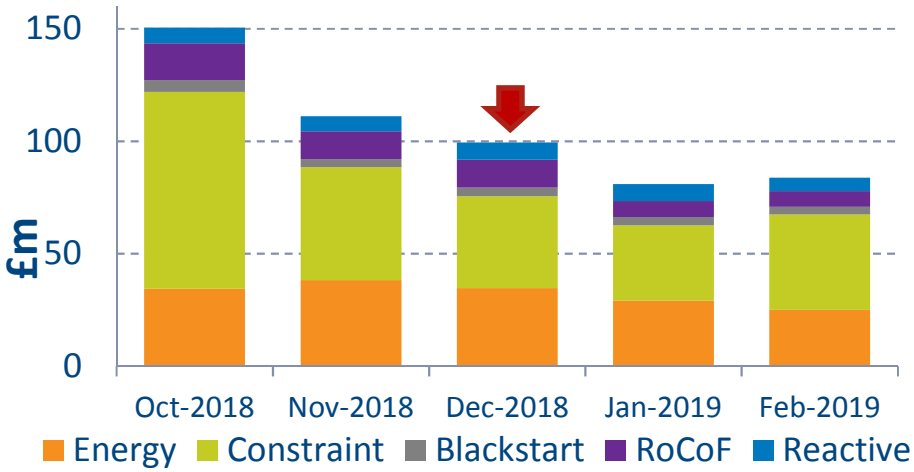
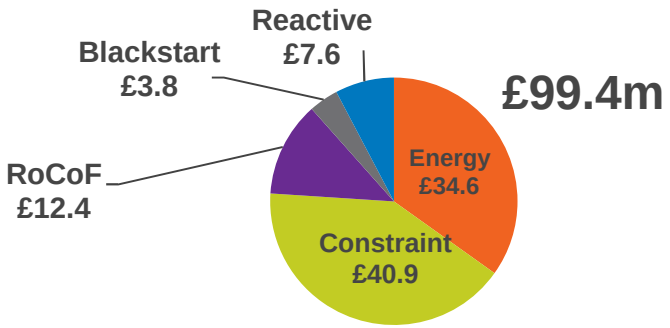
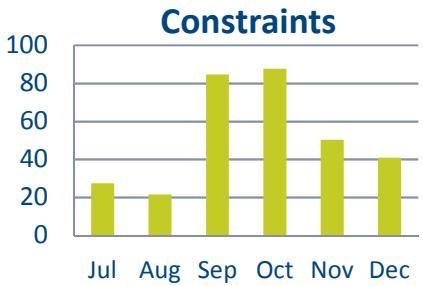
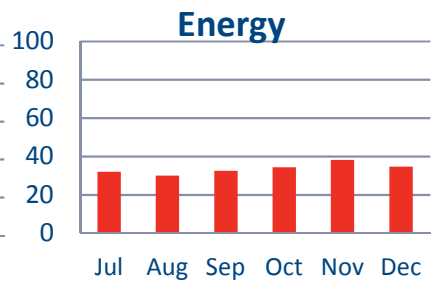
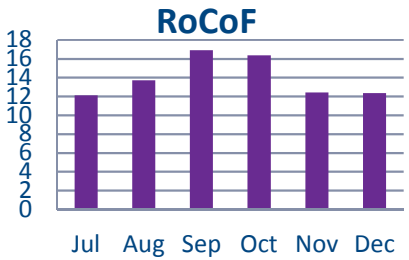
December 2018 : £2.55/MWh
Total Cost: £99.4m, Volume: 45.7TWh

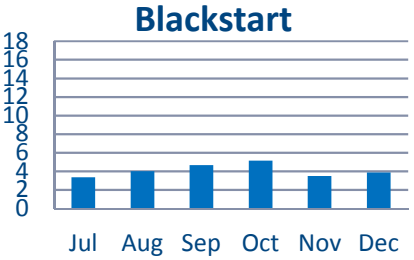


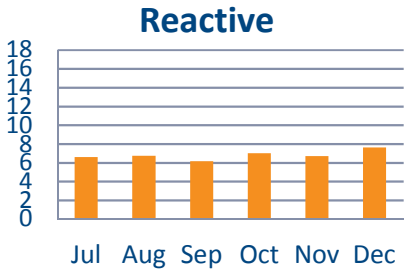












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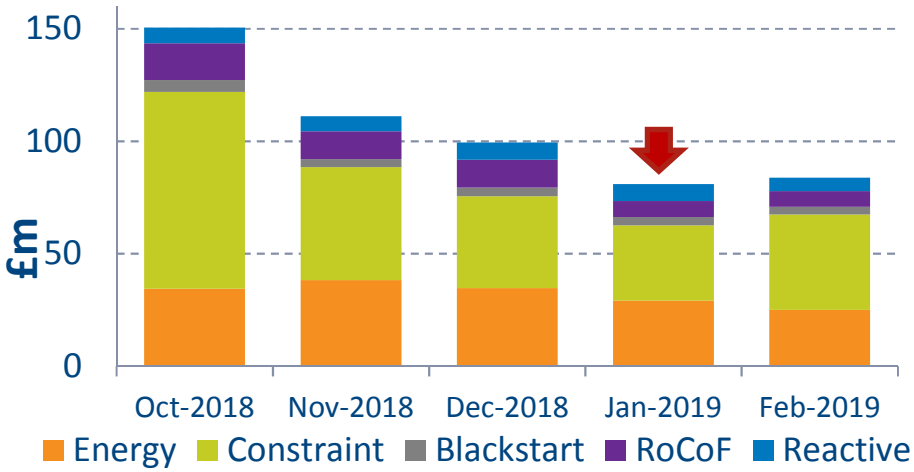
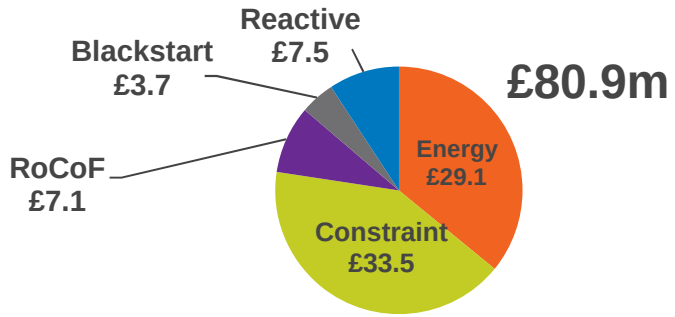
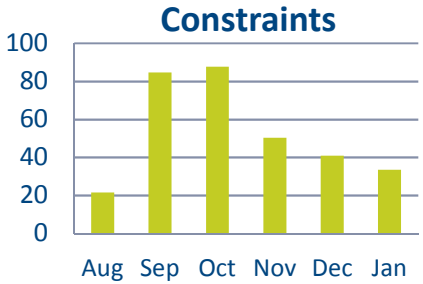
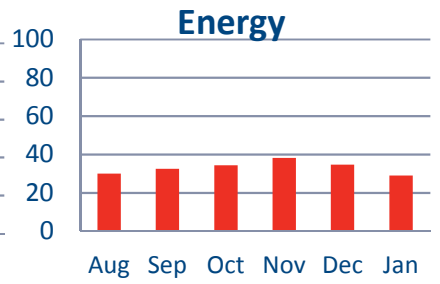
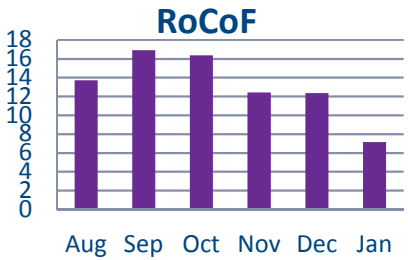
January 2019 : £1.96/MWh
Total Cost: £80.6m, Volume: 50.0TWh

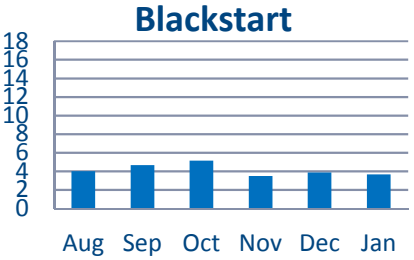


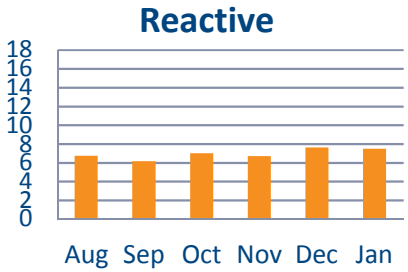












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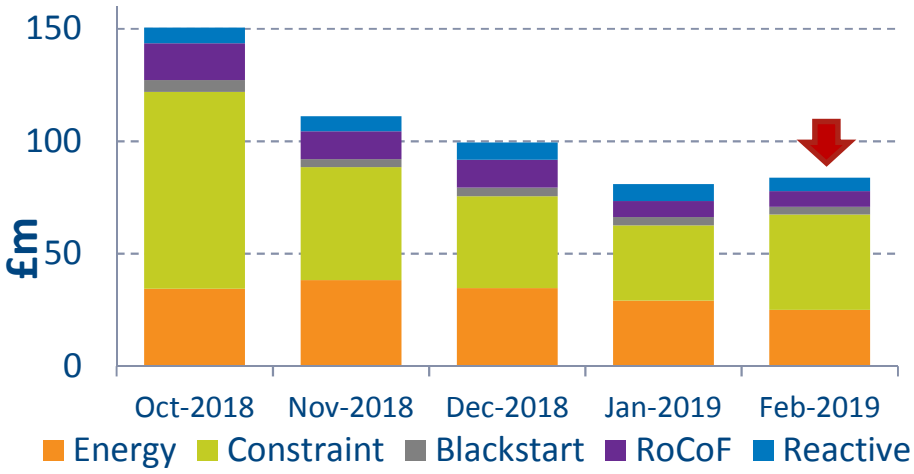
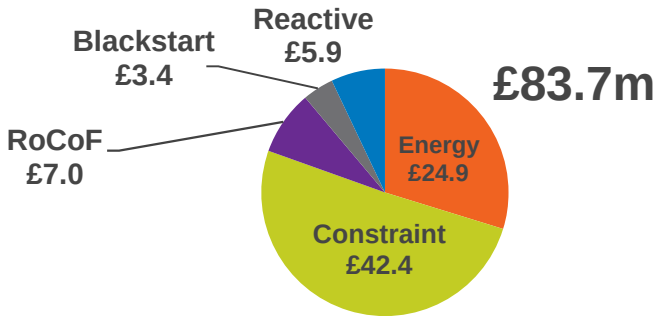
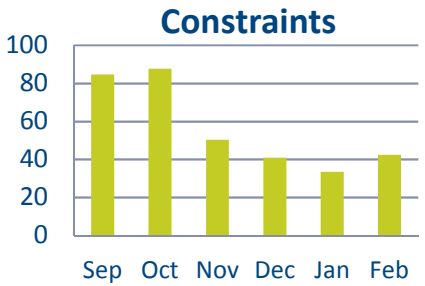
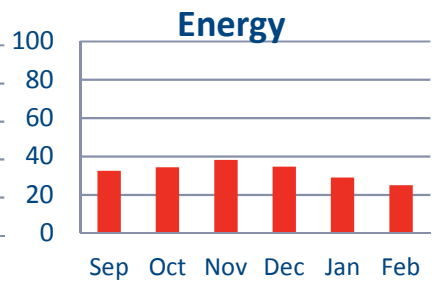
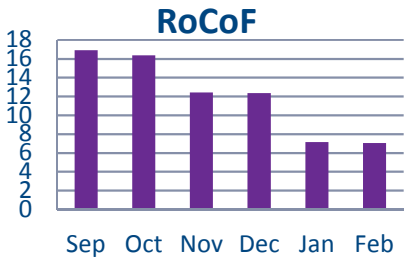
February 2019 : £2.45/MWh
Total Cost: £83.7m, Volume: 40.6TWh

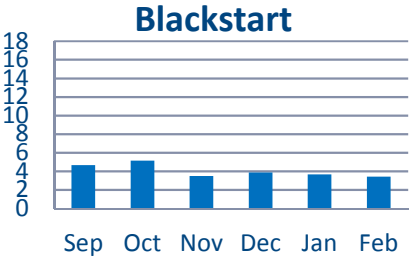


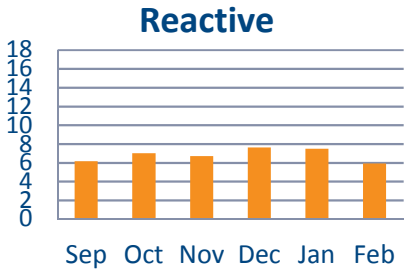












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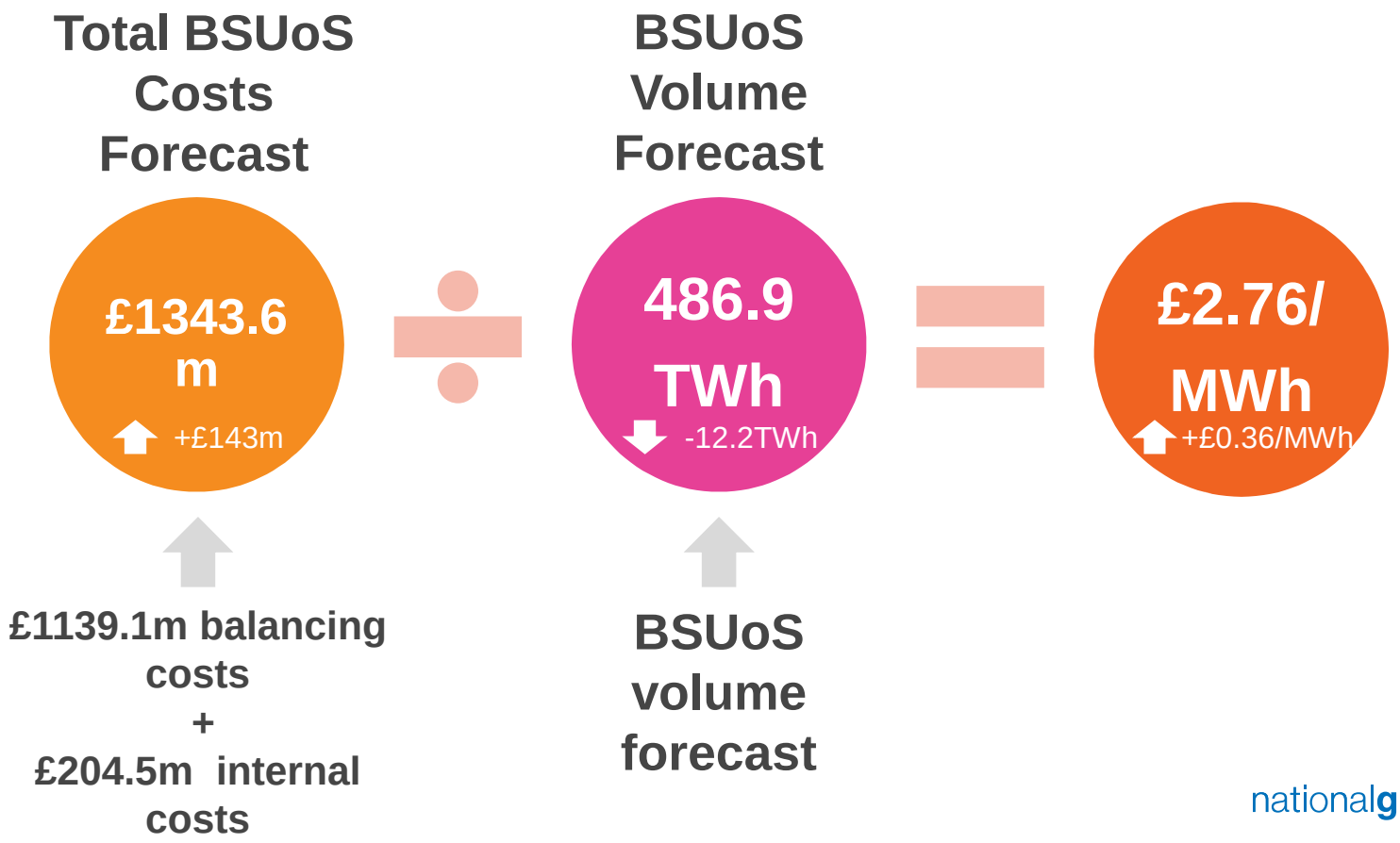
BSUoS 18/19 Forecast



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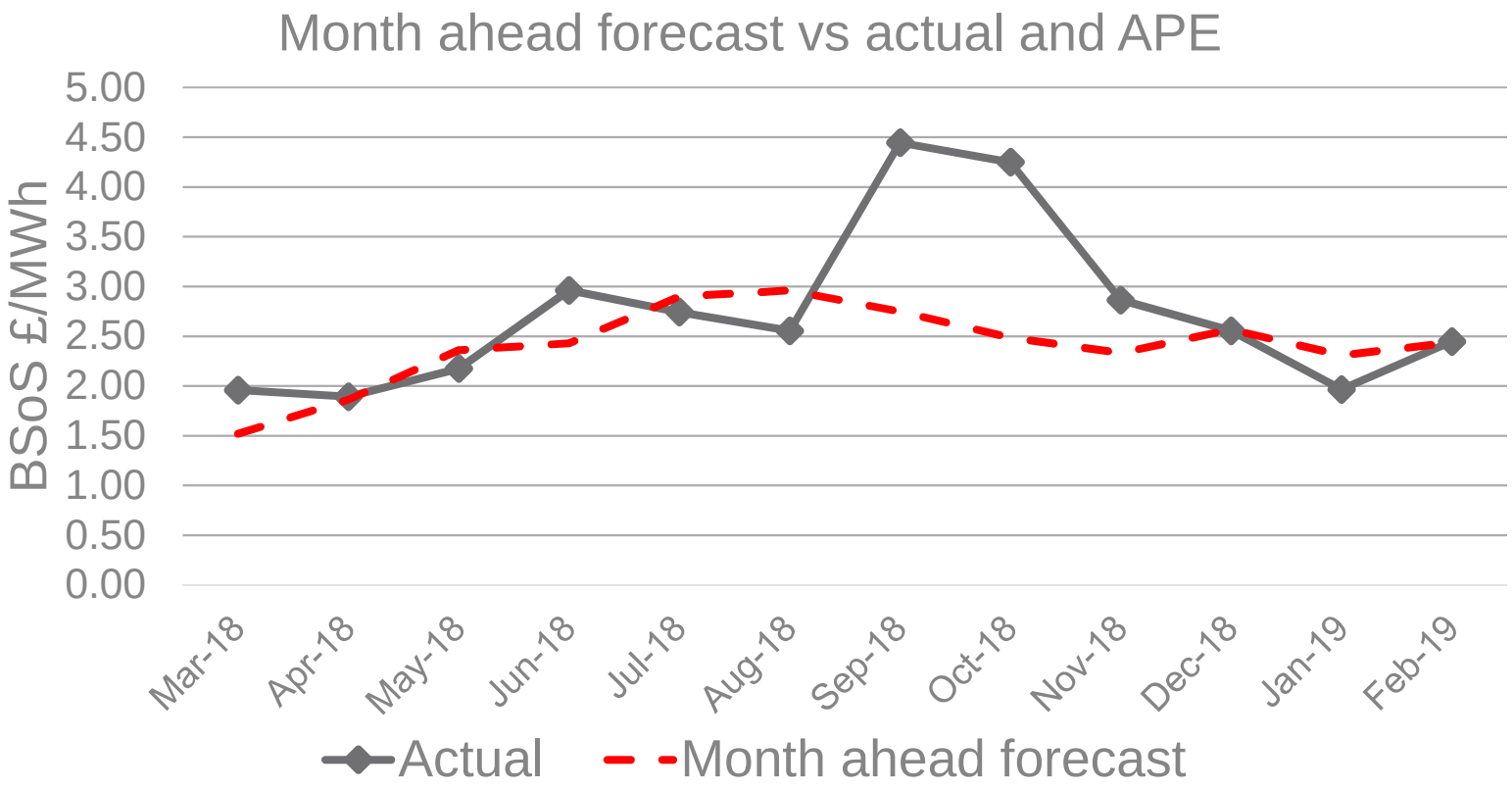
Forecast Accuracy – BSUoS Report



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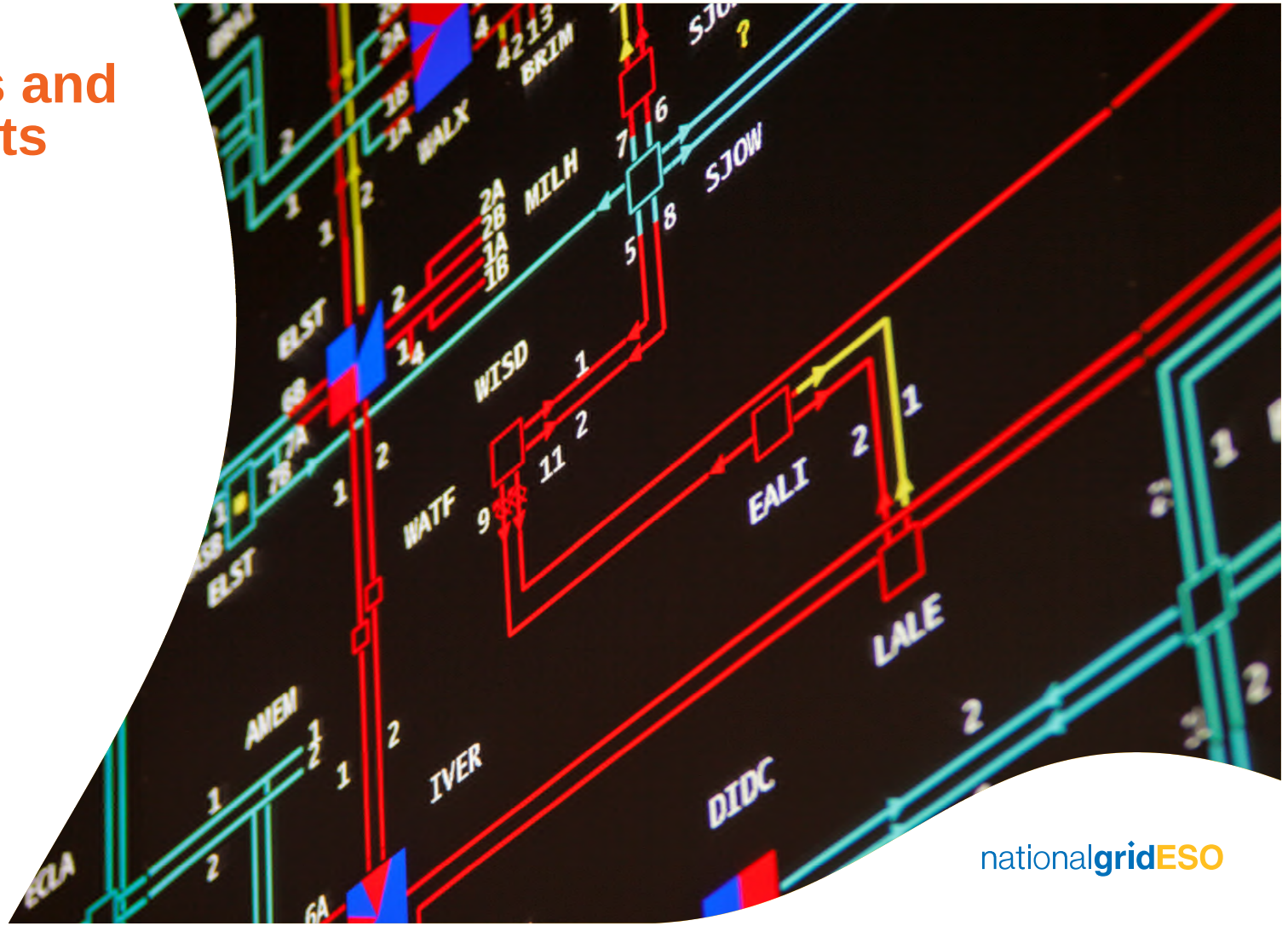
Constraints and RoCoF Costs



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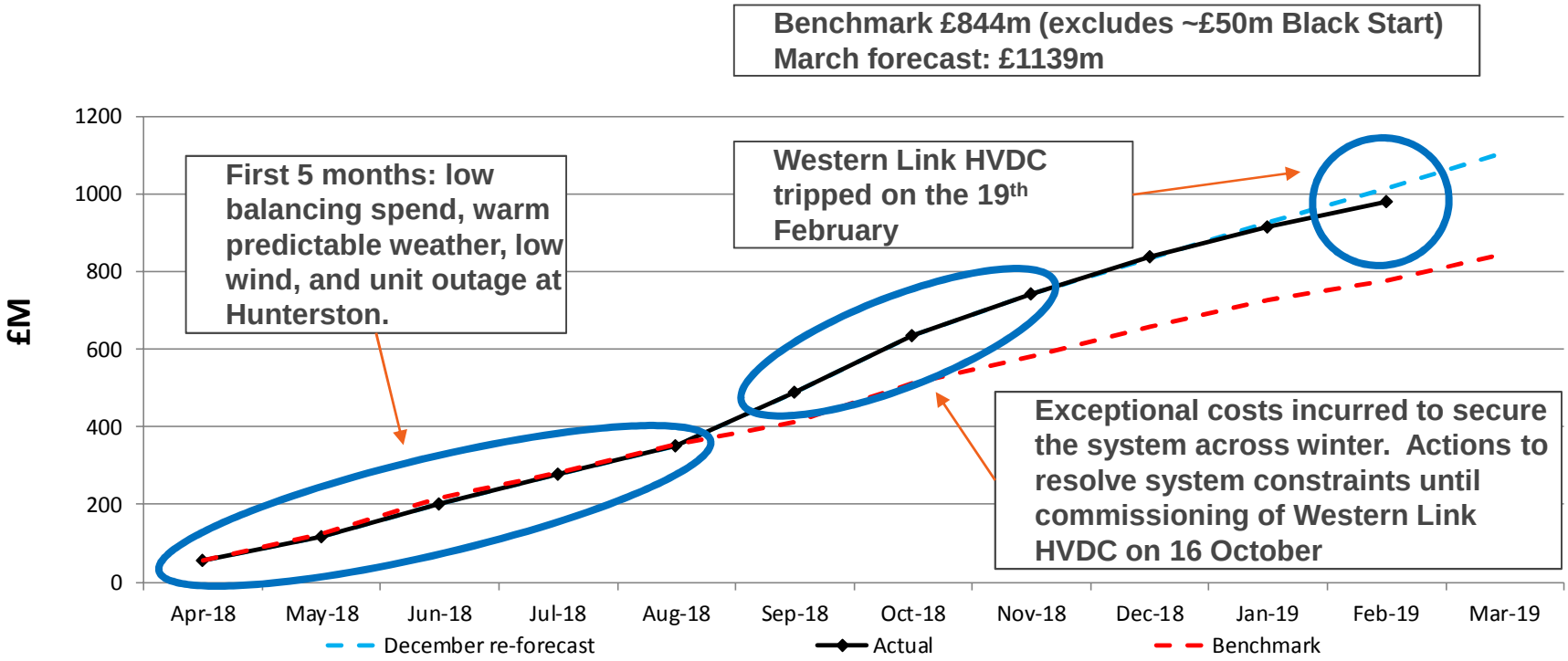
Cost performance vs benchmark



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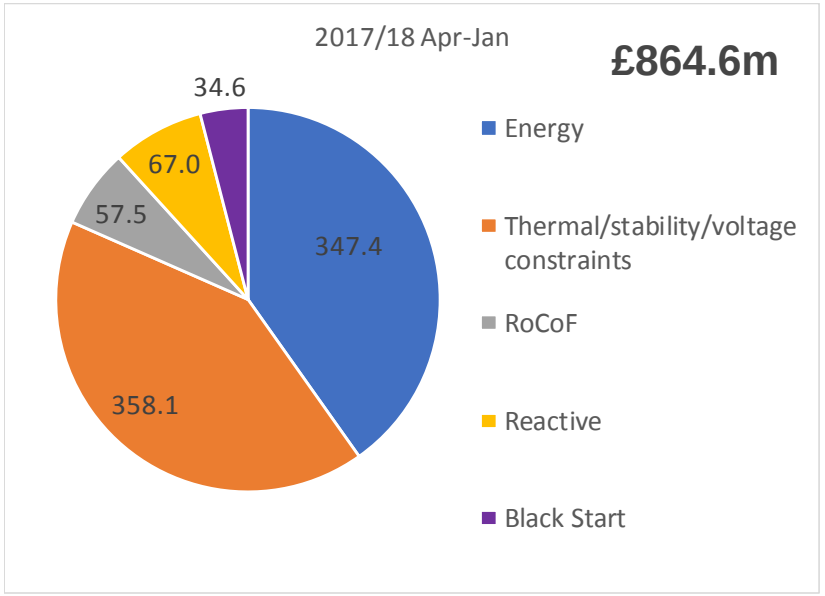
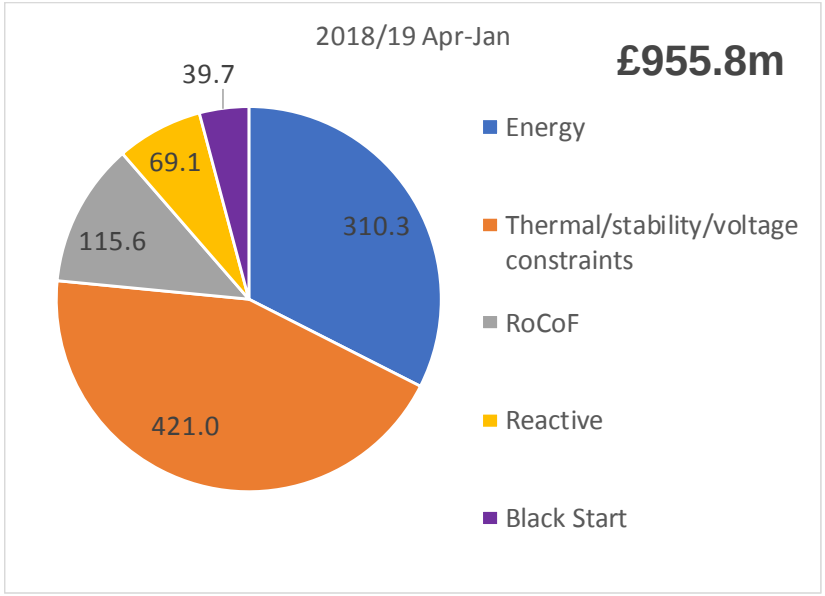
2018/19 (April to January) compared with last year





- **Comparing 2018/19 with 2017/18**
- **£37m less on energy balancing, reserve and response**
- **£63m more on constraints**
- **£58m more on RoCoF**
- **£2.2m more on reactive power**
- **£5.1m more on Blackstart**

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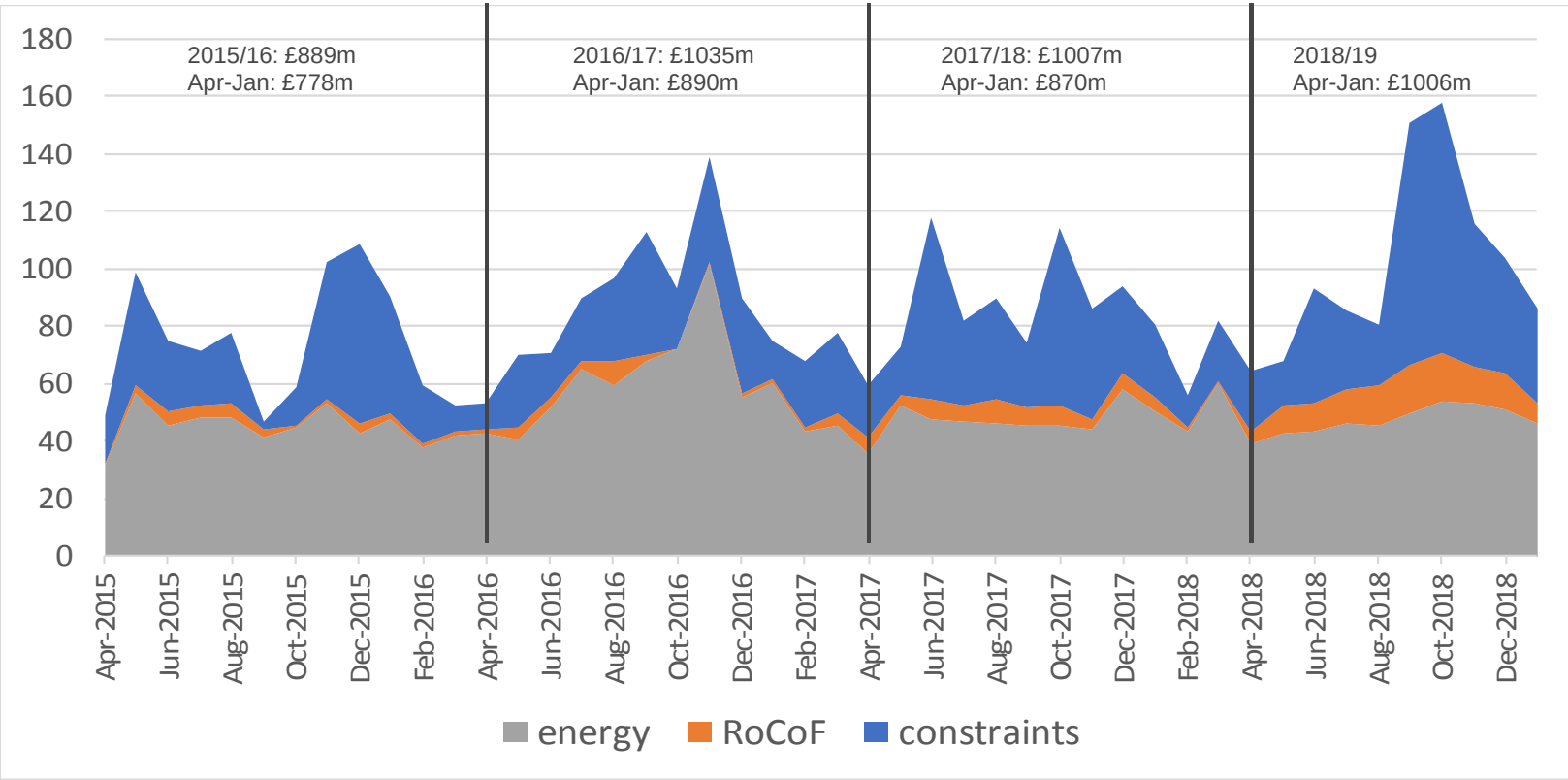
Historical balancing costs



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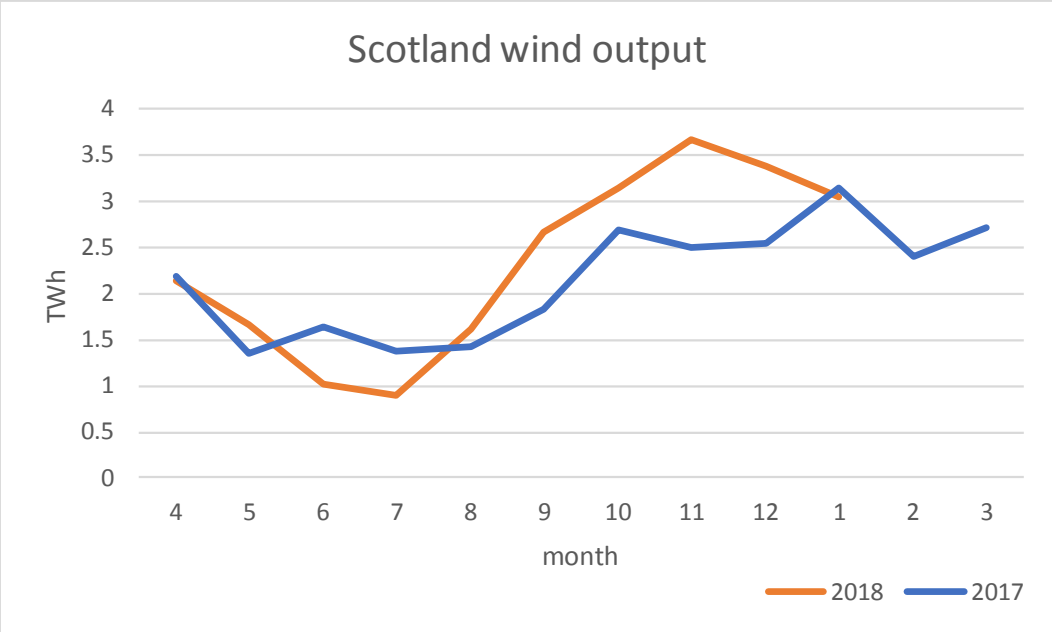
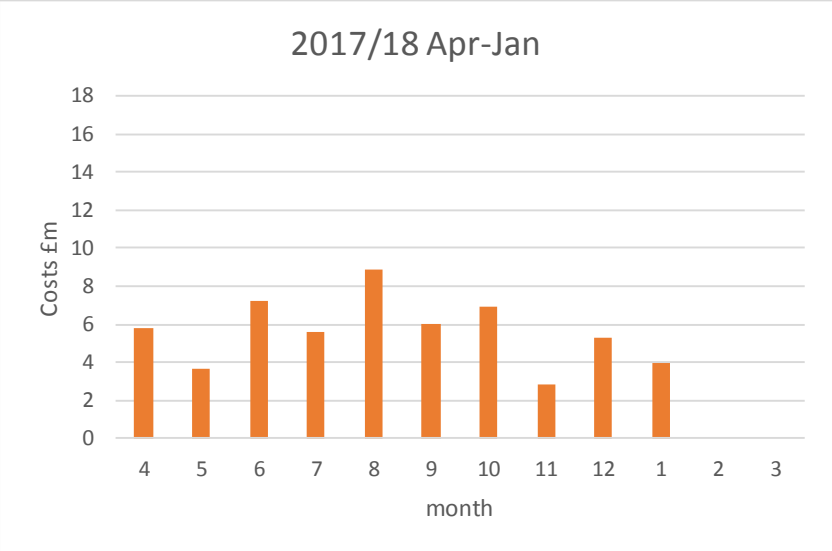
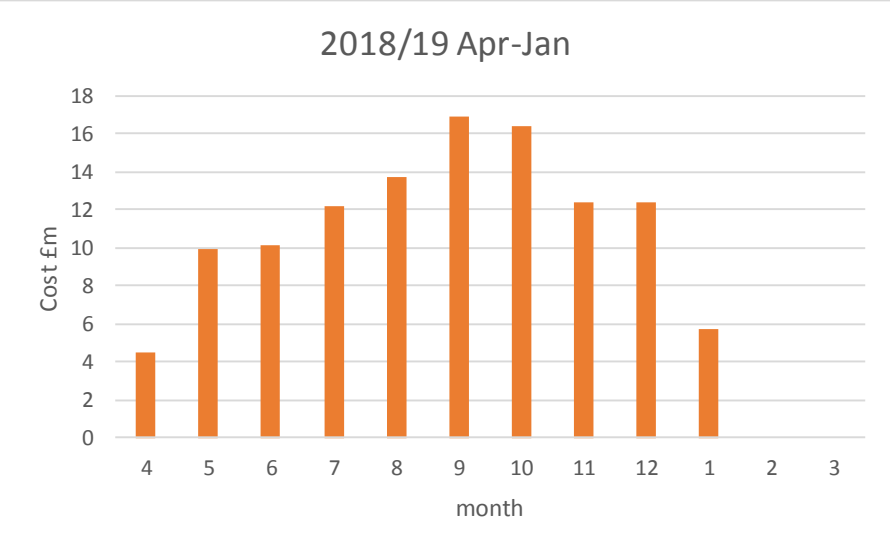
Wind volume driving constraint costs



- **Scottish wind volume April 18 to January 19 was 15.9TWh, compared with 12.7TWh for same period last year**
- **England and Wales wind volume was 25.6TWh in 2018 compared to 24.4TWh in 2017**
- **High wind volume in September coincided with accelerated actions to protect system security**
- **Commissioning of WLHVDC on 16 October eased constraint costs in second half of October and November when we had extended periods of high wind**

RoCoF costs





- **The RoCoF limit is trending down year on year, being driven mainly by higher renewable output, lower inertia contribution from conventional plant and lower transmission demand**
- **Reducing infeed losses to manage RoCoF is cost optimal and actions have continued on Interconnectors and large infeed losses.**
- **We have seen RoCoF limits as low as 670MW during periods of high wind and low synchronous generation**

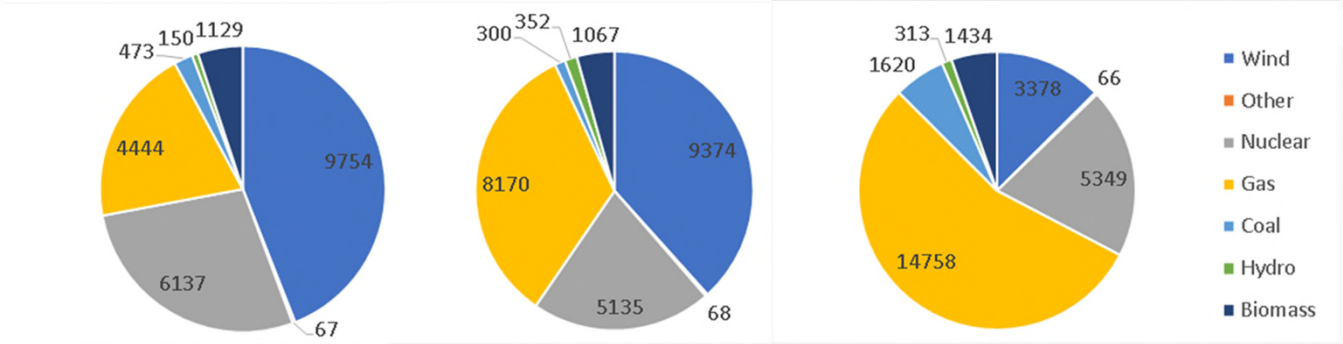
RoCoF limits

RoCoF is very dependent upon wind, day on day changes.

Saturday 12/01/19:
RoCoF limit 670MW

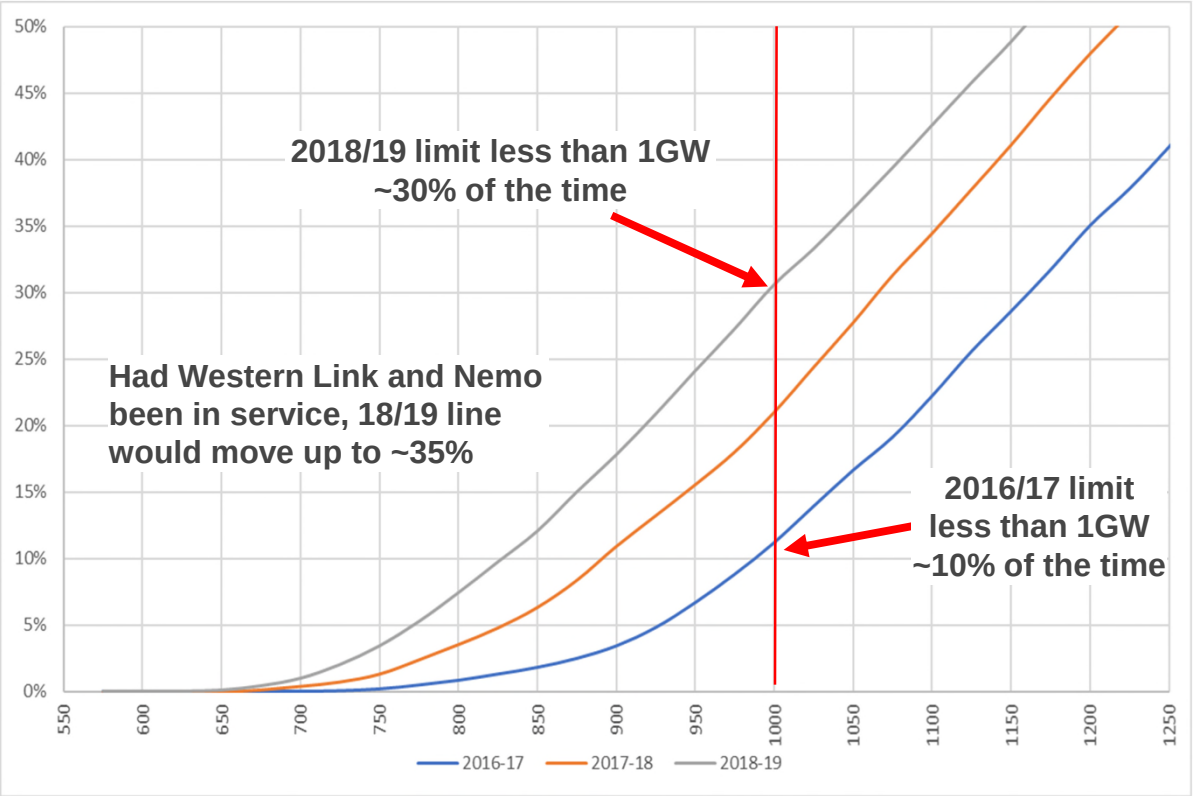
Thursday 17/01/19:
RoCoF limit 800MW

Friday 18/01/19:
RoCoF limit 1200MW



- **At 4am on the 12th, there was 11GW less synchronous generation and 6.3GW more wind, compared with the 18th.**
- **On the 12th synchronous units were brought on to increase system inertia as well as action to reduce large infeed losses.**
- **Synchronising additional machines was required to keep the RoCoF limit above the infeed of nuclear generators.**

RoCoF limit is reducing and driving infeed loss actions



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Stability Strategy

Inertia

There are four ways to manage system inertia

1. Increase system inertia by replacing self-despatched generation with ESO despatched generation with a higher inertia
2. Reduce the largest infeed loss on the system to reduce the rate of change of frequency for any loss
3. Review the consumer benefit of faults which are secured for under the SQSS
4. Introduce Stability products to manage increase inertia, fault level in-feed and reactive capability.

Option 3 is being actively reviewed to ensure the SQSS reflects consumer benefit. Option 4 is not currently available and is being developed through the stability pathfinder.

Loss of Main Protection settings result in an effective artificial level to manage the RoCoF, combined with a limited number of largest losses results in the most cost-effective method of management being reducing largest loss. It is a 1 in 20 relationship.

Once the Loss of Main Protection settings have changed, market solutions developed through the Stability Pathfinder, and the development of faster acting frequency response products, will provide stability and ensure operability to manage lower system inertia.

Balancing Services Charges Task Force

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Scope of the Task Force

- The objective of Task Force is to provide analysis to support decisions on the **future direction of balancing services charges.**
- The Task Force started in Jan 2019 and is currently mainly working on deliverable 2. It will deliver a **final report in May 2019.**

	Deliverables	Date
D1	Task Force document assessing the extent to which elements of balancing services charges **currently** provide a forward-looking signal that influences the behaviour of system users.	Feb 2019
D2	Task Force document assessing the **potential** for existing elements of balancing services charges to be charged more cost-reflectively and hence provide better forward-looking signals.	March 2019
D3	Task Force document assessing the **feasibility** of charging any identified potentially cost-reflective elements of balancing services charges on a forward-looking basis.	April 2019 (draft report)
	Based on the candidate elements of balancing services charges from the previous stage, assess the **feasibility** of charging these elements to **influence user behaviour**.	May 2019 (final report)

Task Force engagement

- **Task Force members** have a large range of experience and are representing a broad range of industry viewpoints. It is **chaired by the ESO**, which is stepping up in their role as a more independent ESO.

- The Task Force wants to work transparently and collectively. All the information regarding the Task Force (agenda, minutes, presentations, podcasts, contact details) is available and updated regularly on the **Charging Futures Website** here.

- **Wide engagement** has taken place since January (Charging Futures Forum 15th Jan) through various channels (TCMF, DCMDG, etc.). Our first formal **Webinar** took place on 7 March and is available on the Charging Futures Website here.

Deliverable 1 update – tentative conclusion

Task Force Deliverable 1 (February 2019): assessing the extent to which elements of BSUoS currently provide a forward-looking signal that influences the behaviour of system users.

The tentative conclusion of the Task Force :

- **In general, the existing elements of balancing services charges do not currently provide a forward-looking signal which influences user behaviour. This is mainly due to balancing services charges being hard to forecast, complex, increasingly volatile and other market elements taking precedence**
- **The exceptions identified being in relation to risk premia and overnight periods of high wind and low demand, neither of which are of benefit to the system or ultimately to consumers**

Deliverable 2 update - potential options

Task Force Deliverable 2 (March 2019): assessing the potential for existing elements of balancing services charges to be charged more cost-reflectively and hence provide better forward-looking signals

- At a high-level the Task Force has tentatively identified four **Potential Options** to be further explored. It is important to note that at this stage the Task Force has not assessed the feasibility of those. Example of potential limitations include double-counting, usefulness of the signal, predictability, impact on policy decision, etc.

Locational Transmission Constraints	Locational Reactive and Voltage Constraints	Response and Reserve Bands	Response and Reserve Utilisation
For example, if there are transmission constraint costs being incurred across a particular boundary then those costs could be allocated to specific parties behind the constraint.	For example, if there are voltage costs incurred due to reactive power absorption payments then those costs will be recovered from those contributing to the need for reactive power absorption.	For example, if an extra 'X' MW worth of response has been procured to protect system frequency due to the largest loss then the costs could be paid by those in the new range, or by those exacerbating the issue.	For example, a frequency service is automatically utilised for frequency support due to trip a generator, so the costs are paid for specifically by the generator which caused the issue.

If you have further views please contact ChargingFutures@nationalgrid.com.

Information is available on the website www.chargingfutures.com