Electricity Operational Forum

July 2019

Host – Ben Smith

Start: 10:00am

Electricity Operational Forum		
10:00	Welcome and Introduction	Paul Lowbridge
10:15	Balancing Services Use of System (BSUoS) update	Nigel Swan
10:50	Control Room - Difficult Day Analysis	Paul Corrie
11:20	Break	
11:45	Operability Strategy Report	Will Kirk-Wilson
12:15	Platform for Ancillary Services (PAS) Update	Matt Hopkins
12:40	Questions	
13:00	Finish – Lunch / Networking	

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Our Canadian Geese….

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Balancing Service Use of System (BSUoS) Update

Nigel Swan

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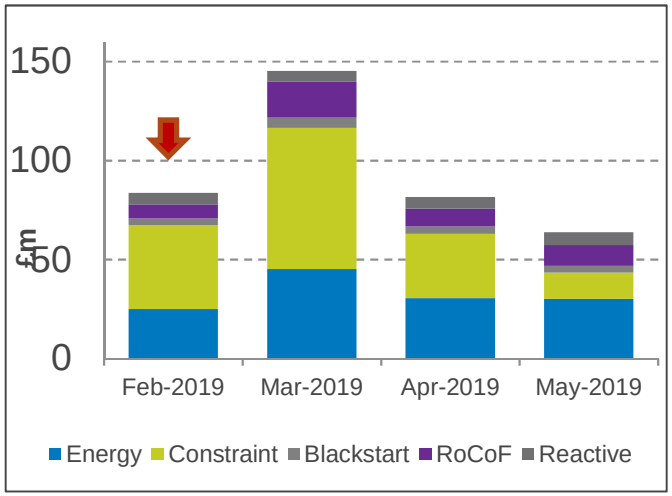
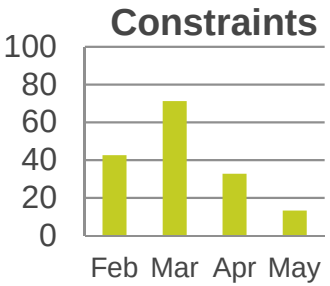
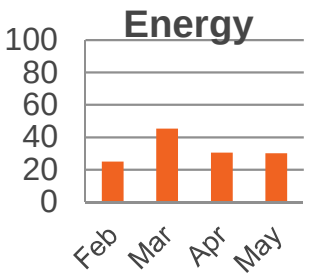
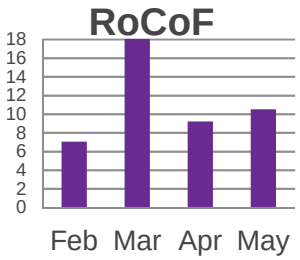
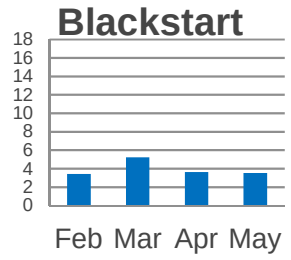
February 2019 : £2.45/MWh
Total Cost: £83.7m, Volume: 40.6TWh

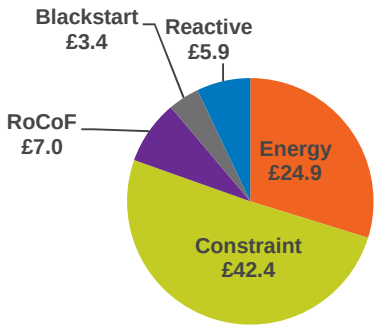












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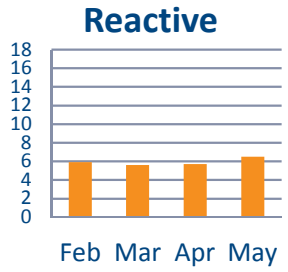

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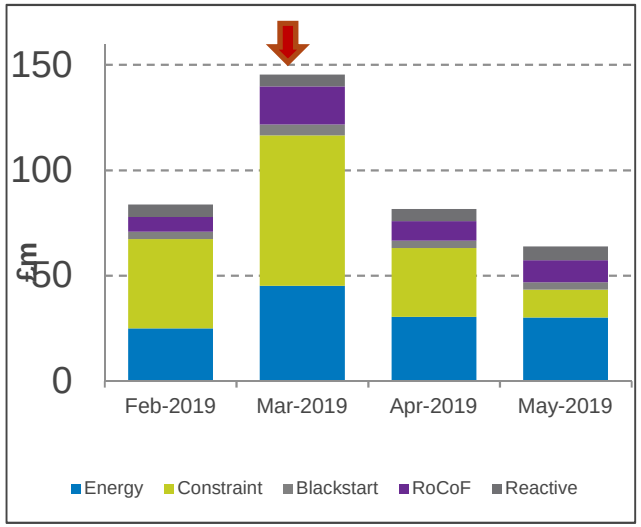

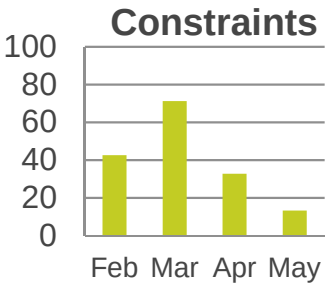

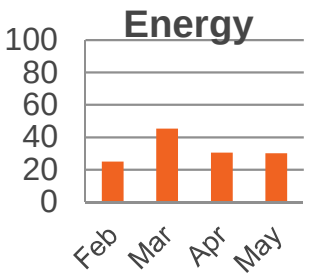

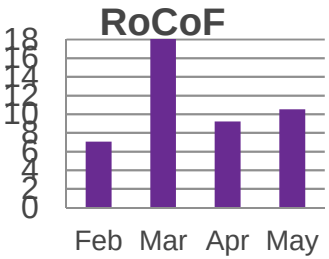

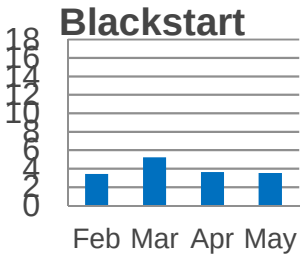

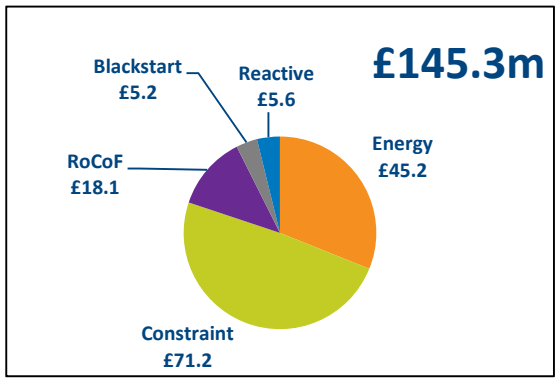

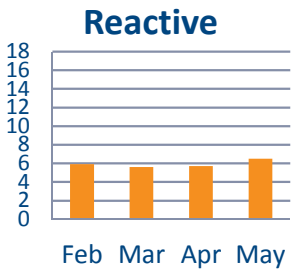

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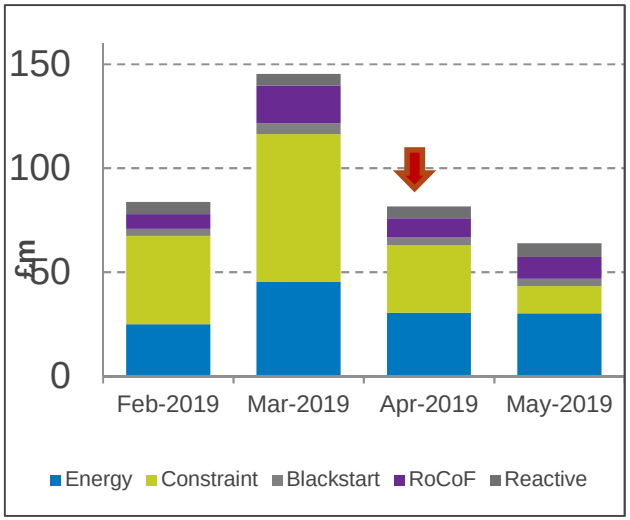

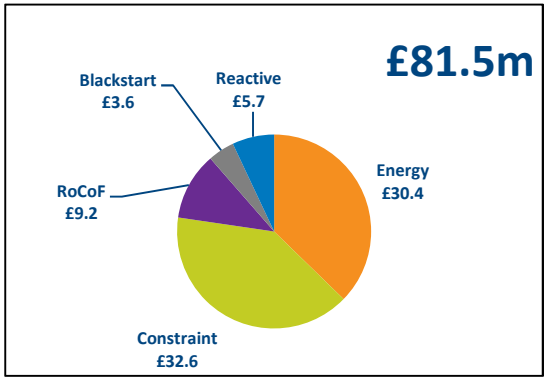

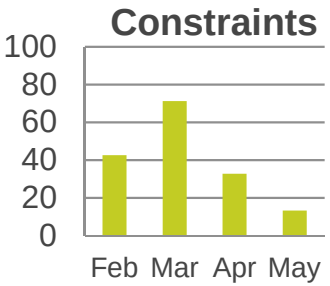

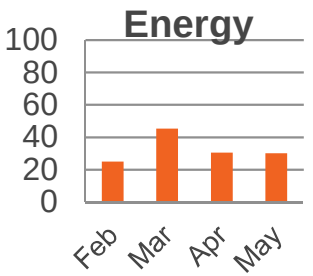

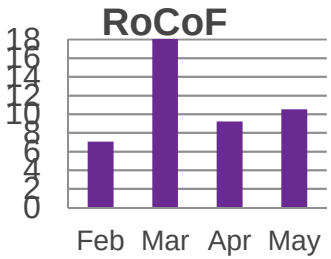

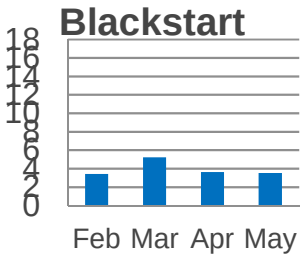

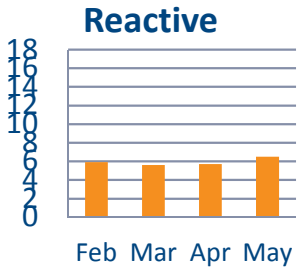

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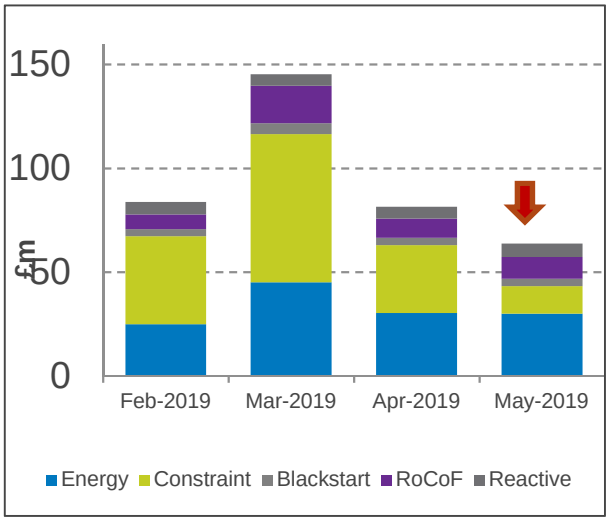
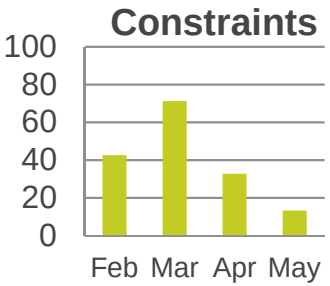
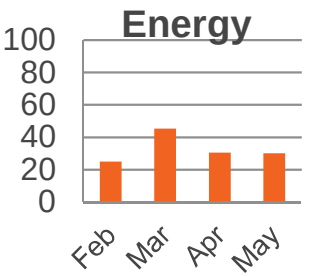
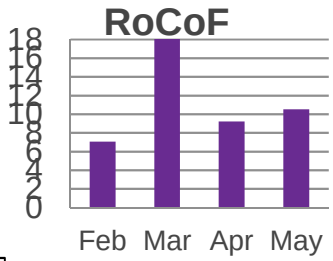
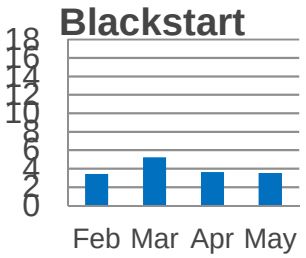
May 2019 : £2.41/MWh
Total Cost: £63.8m, Volume: 36.7TWh

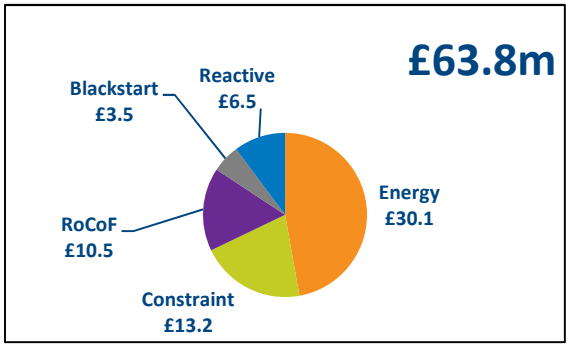


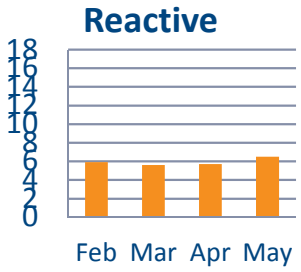












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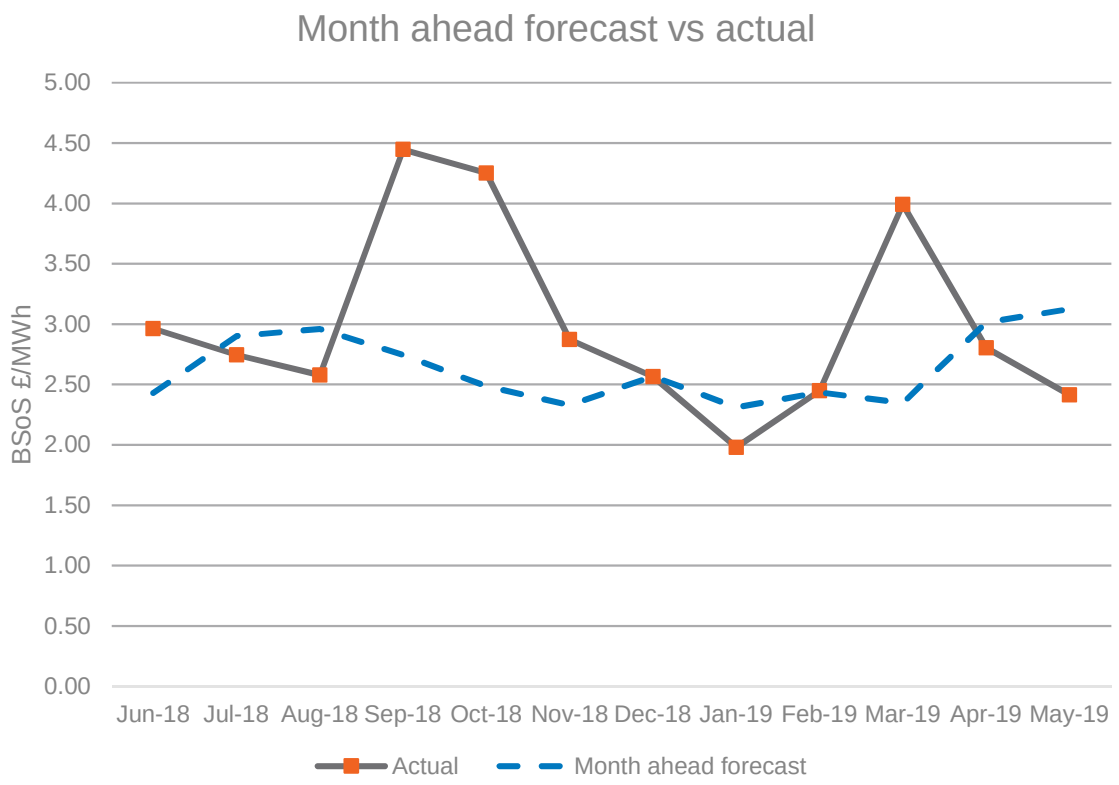
Forecast Accuracy – BSUoS Report



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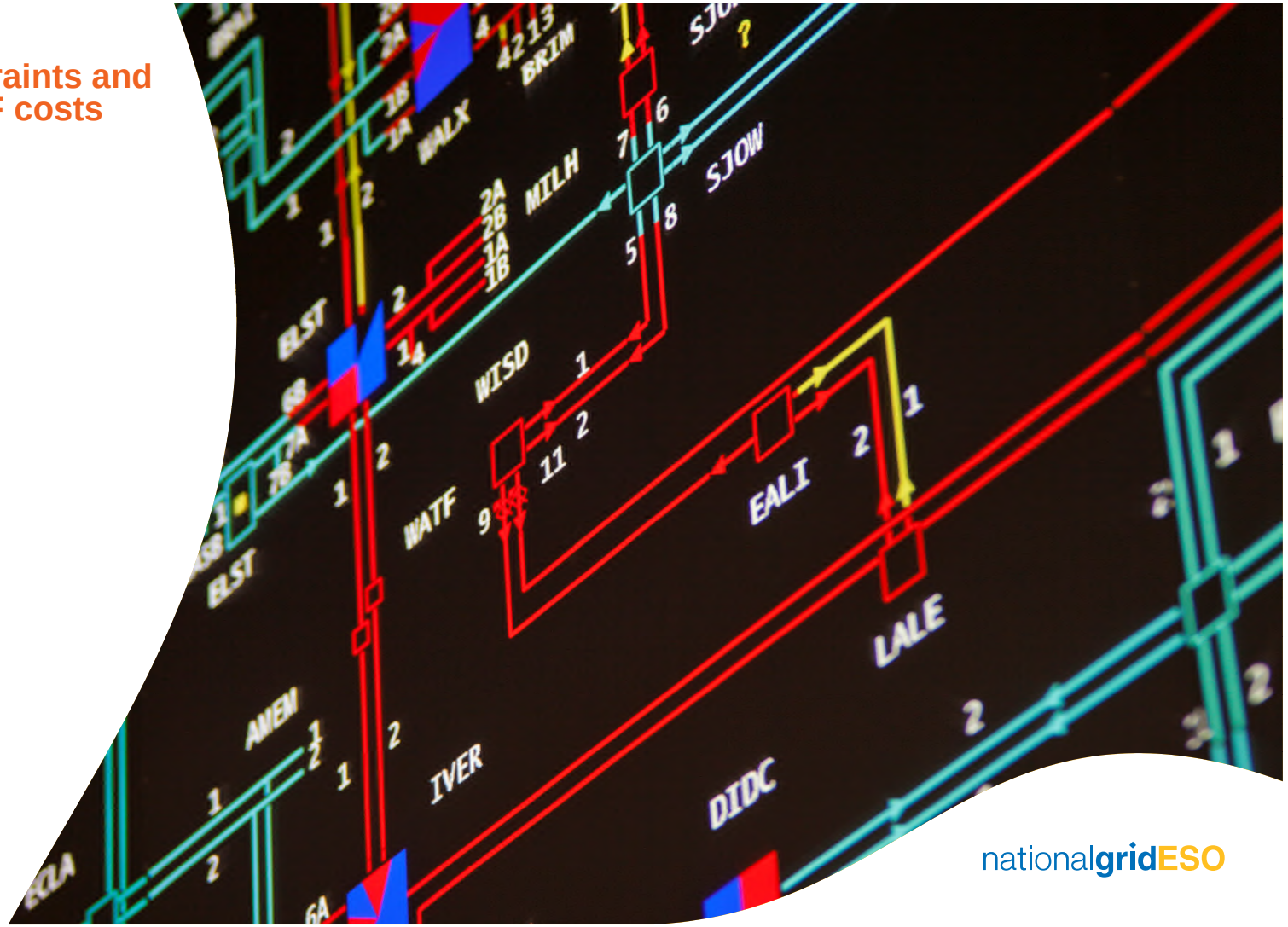
Constraints and RoCoF costs



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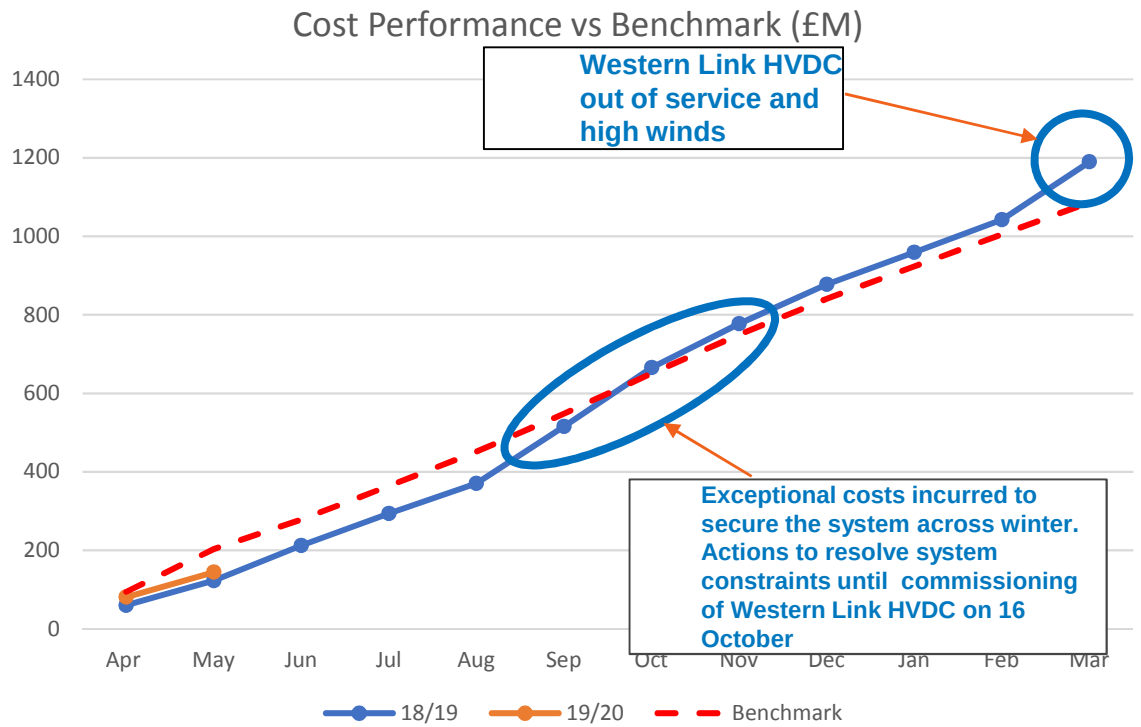
Cost performance vs benchmark



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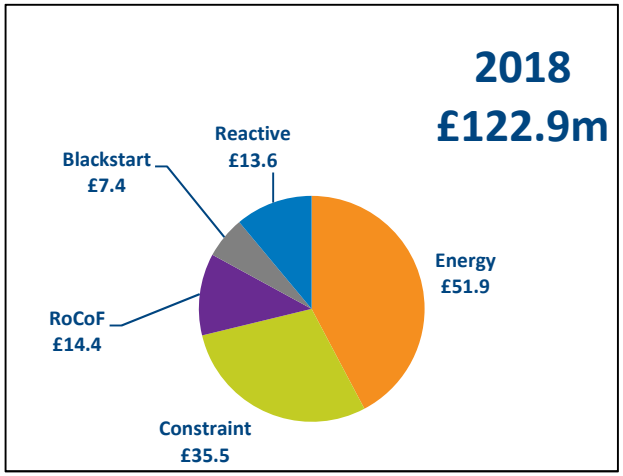
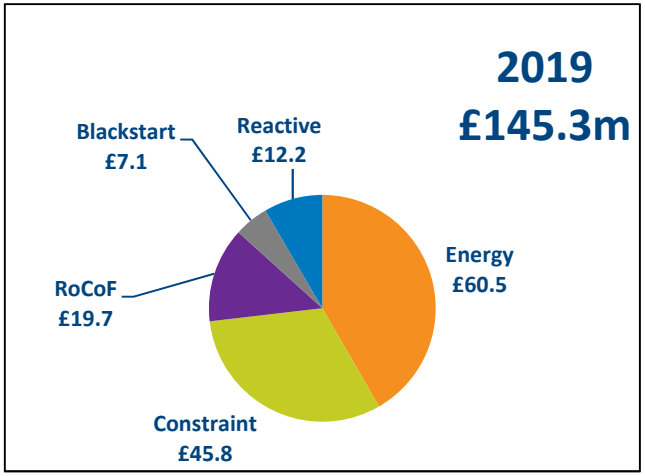
2019 April to May compared with last year

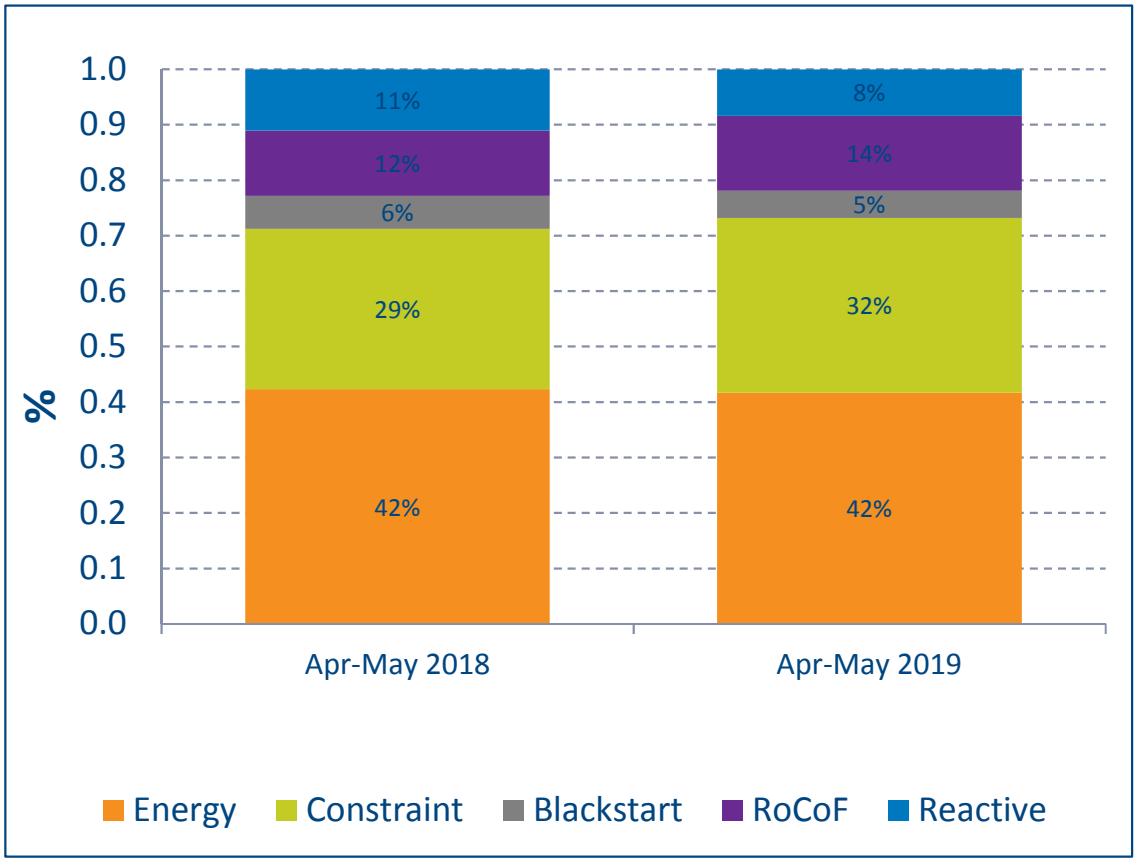




Comparing 2019 with 2018

- **£8.6m more on energy balancing, reserve and response**
- **£10.3m more on constraints**
- **£5.3m more on RoCoF**
- **£0.3m less on Blackstart**
- **£1.4m less on Reactive**

Proportional balancing costs



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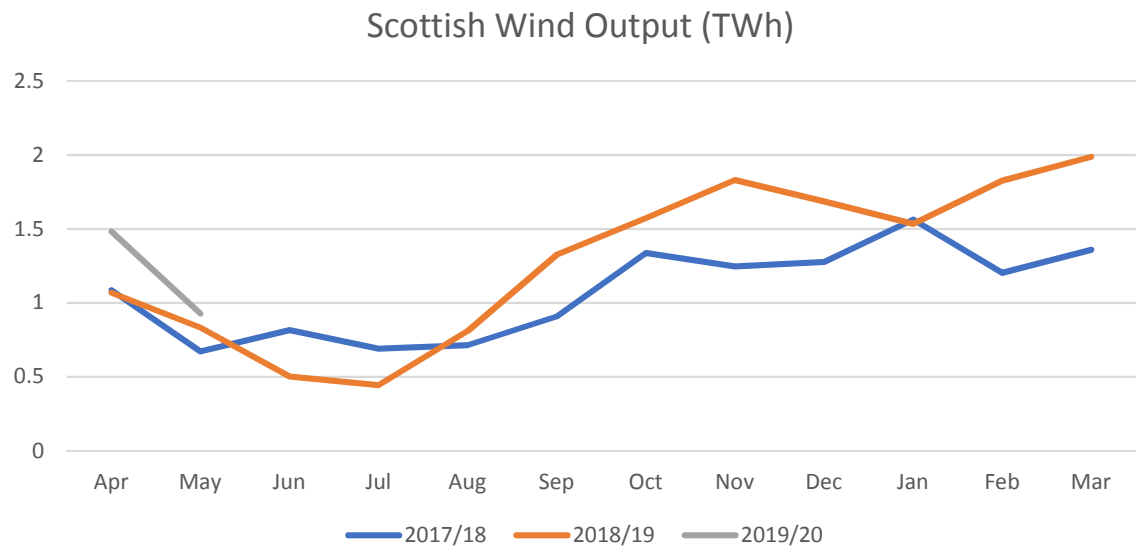
Wind volume driving constraint costs



- **Scottish wind volume increasing year on year**
- **This chart illustrates why WLHVDC unavailability had a much greater effect in September, October and March than in April and May.**

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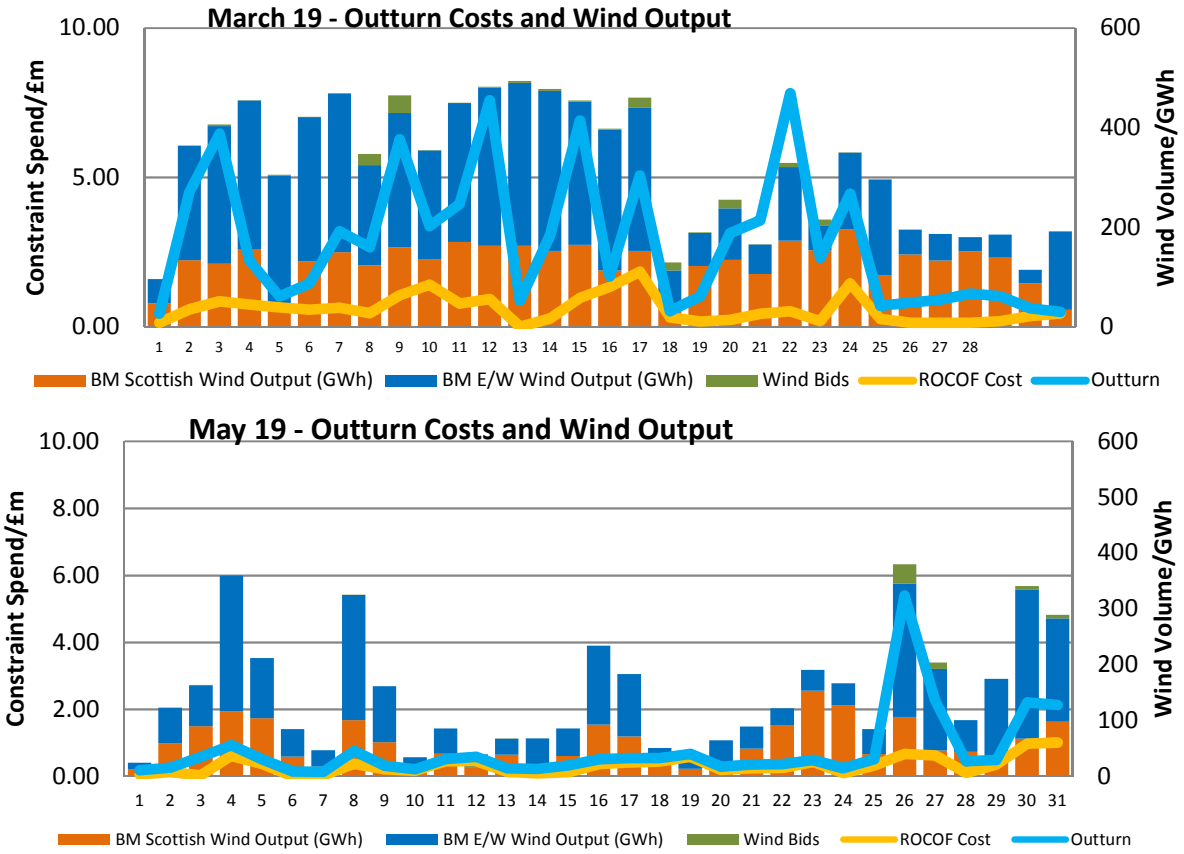
Wind volume driving constraint costs



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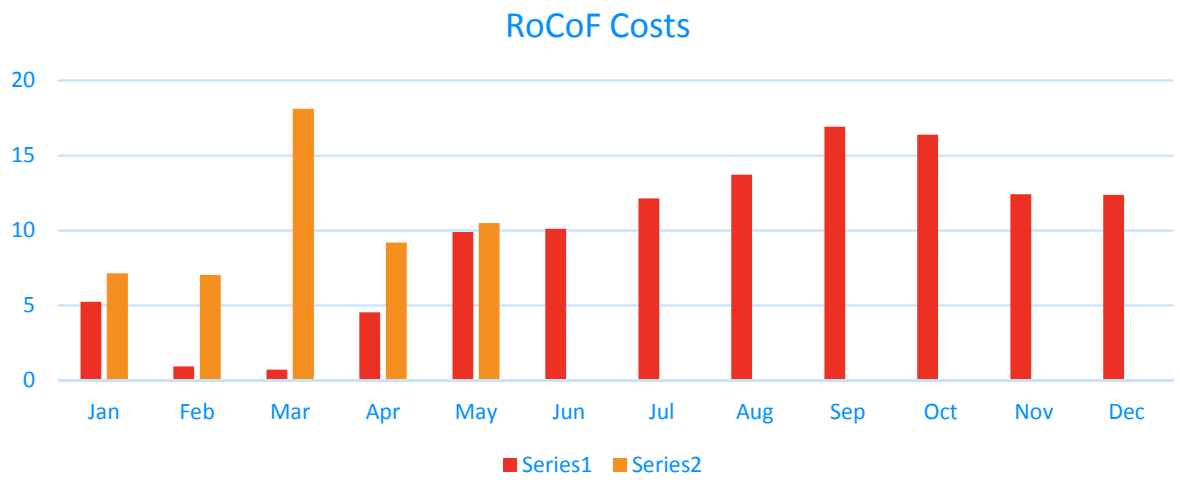
RoCoF costs



- **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**

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.

	2019/20	2020/21	2021/22	2022/23	2023/24
Estimated Balancing Costs p.a.	£130m	£150m	£150m	(£170m if LOM is not delivered)	(£190m if LOM is not delivered)
Actions	Loss of Mains Protection Changes (Power Protect)				
	Stability Pathfinder				
				‘Stability’ Markets	

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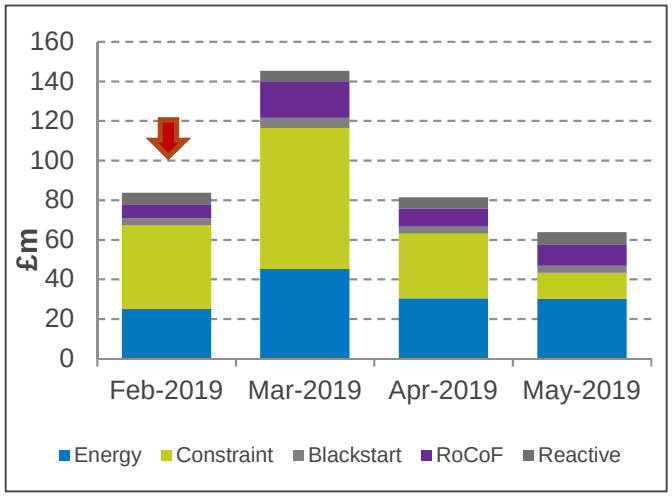

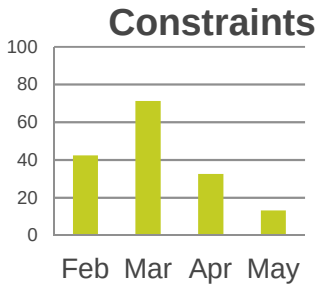

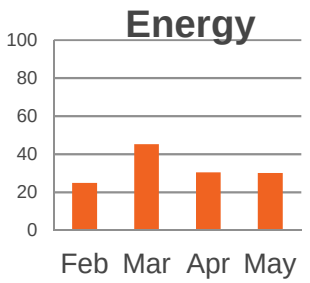

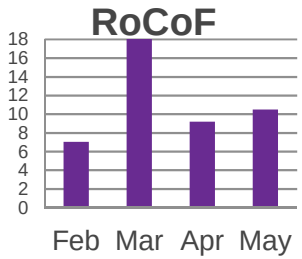

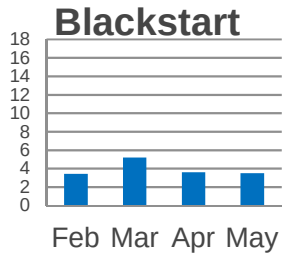

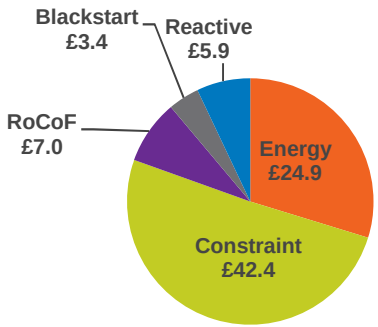

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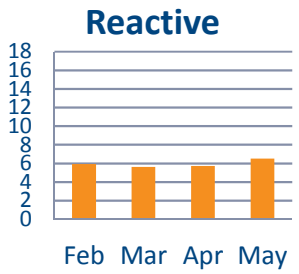

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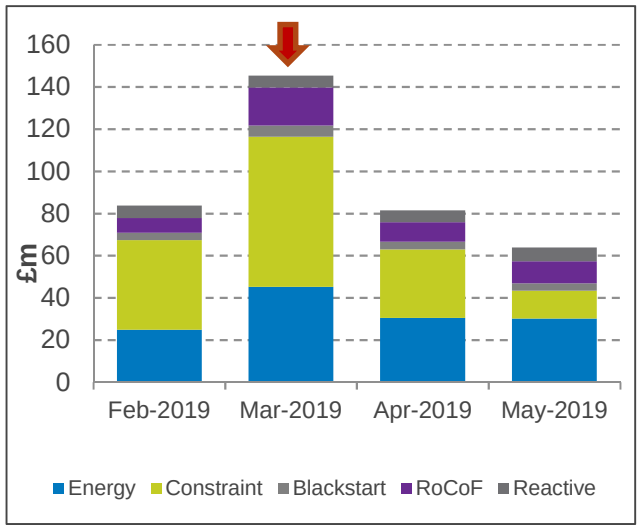

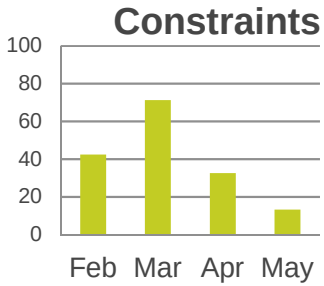

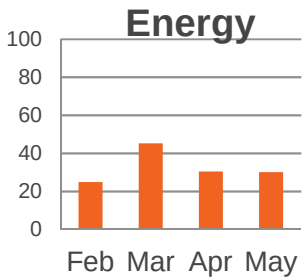

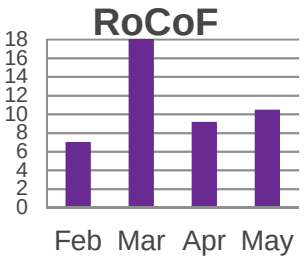

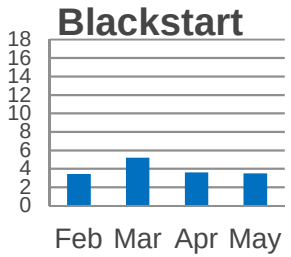

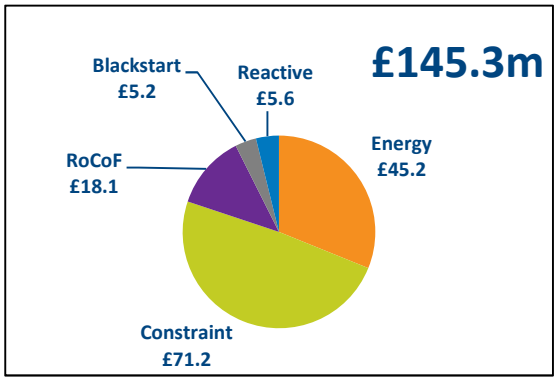

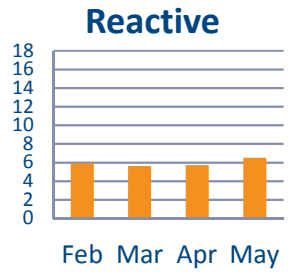

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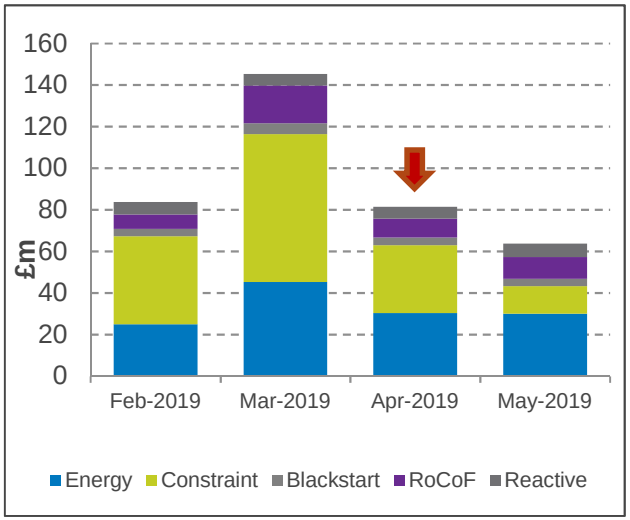

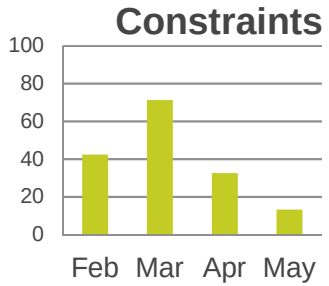

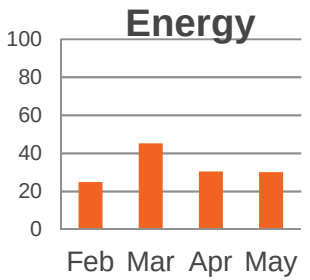

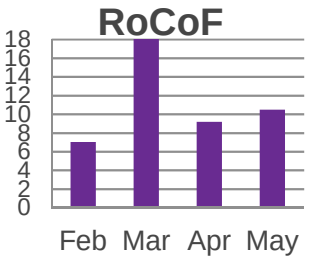

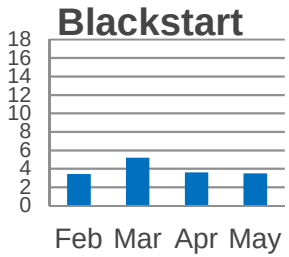

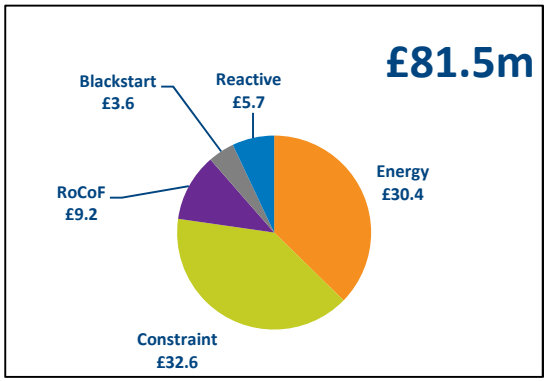

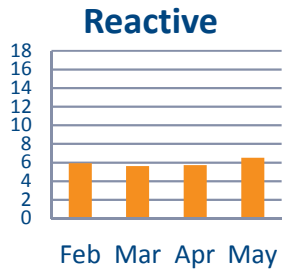

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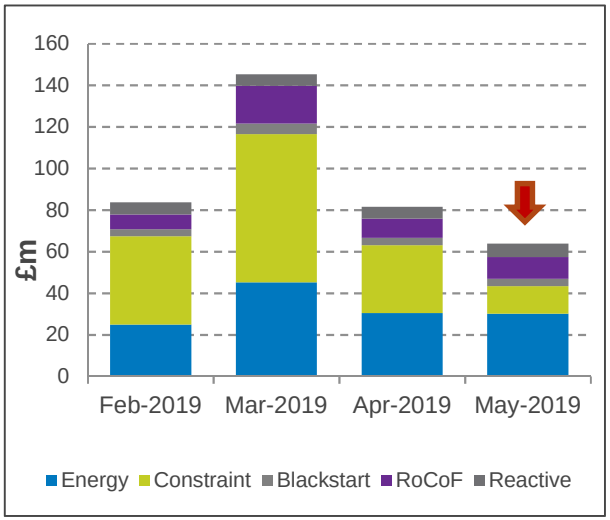
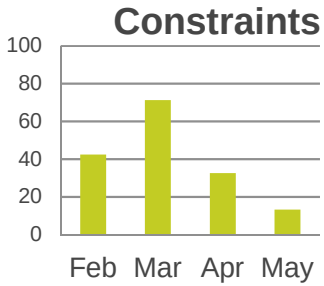
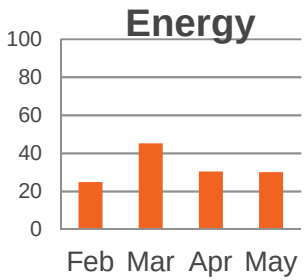
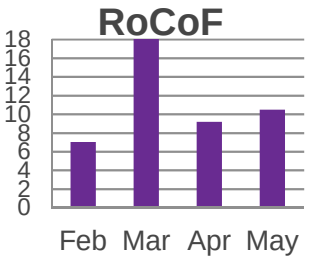
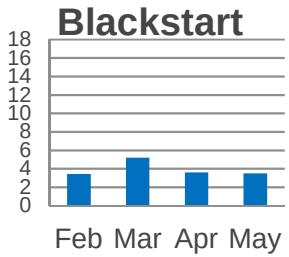
May 2019 : £2.41/MWh
Total Cost: £63.8m, Volume: 36.7TWh

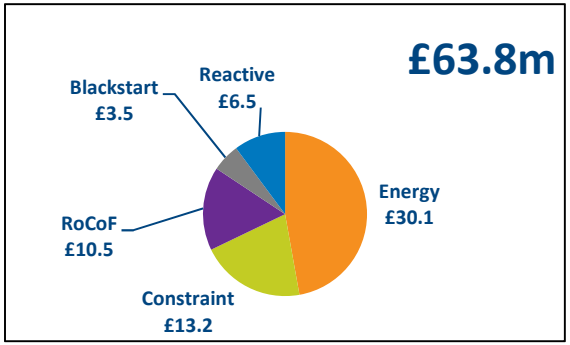


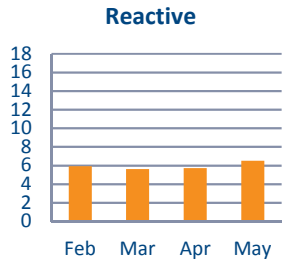












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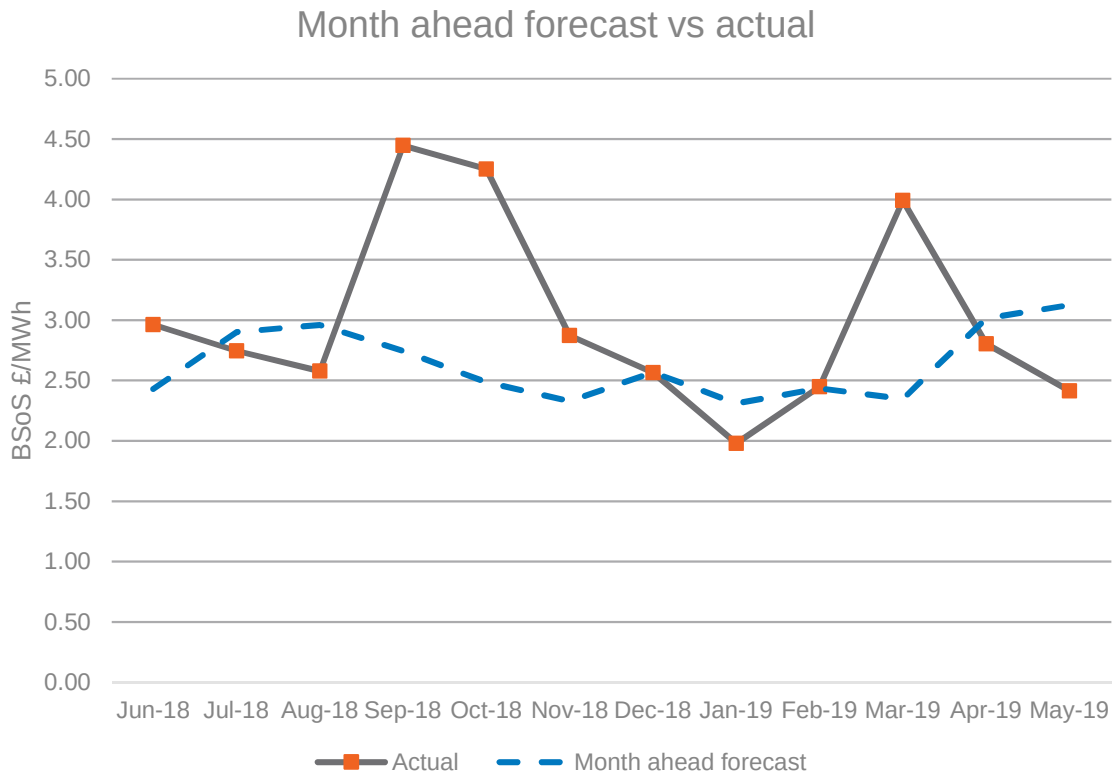
Forecast Accuracy – BSUoS Report



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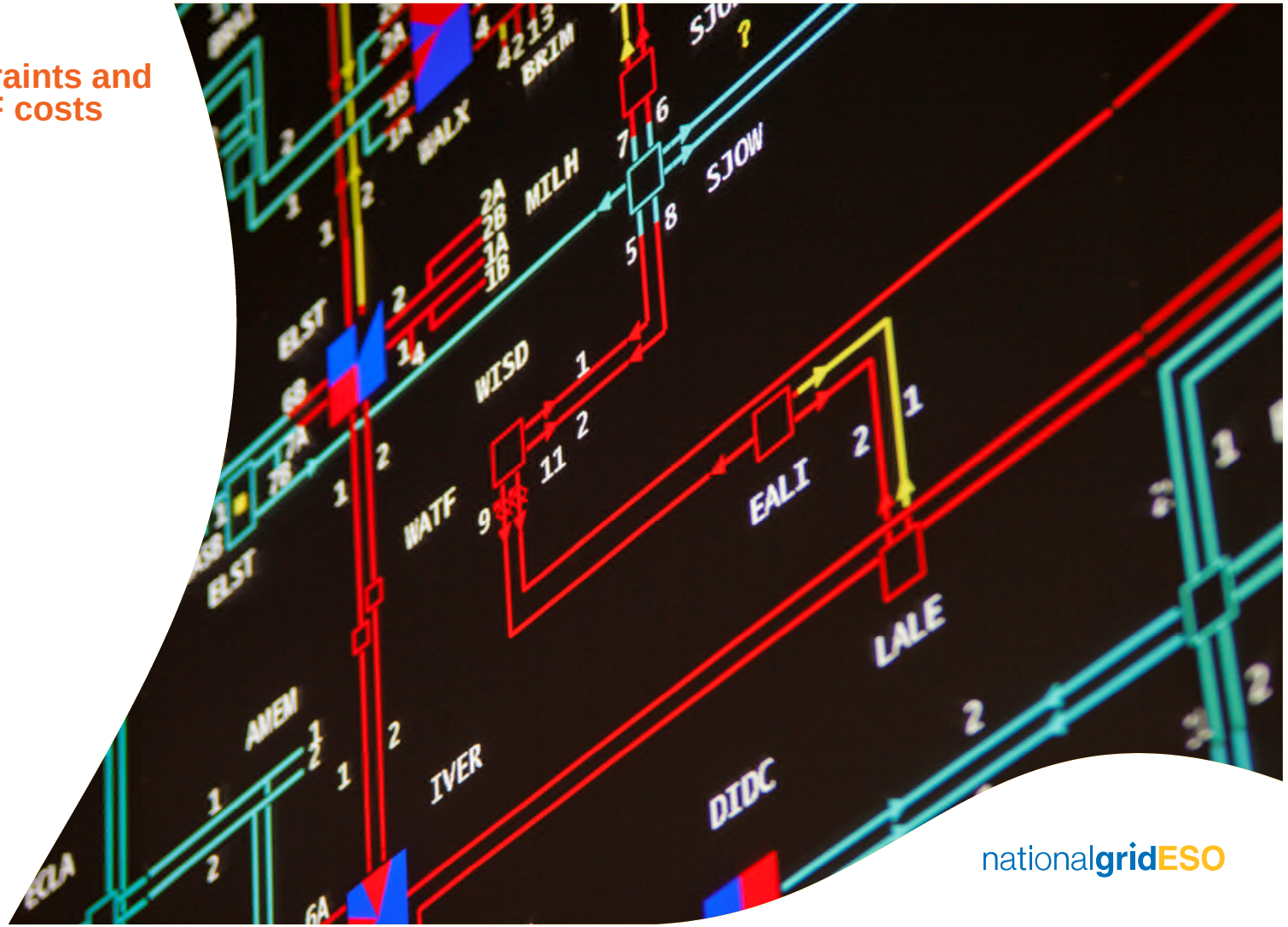
Constraints and RoCoF costs



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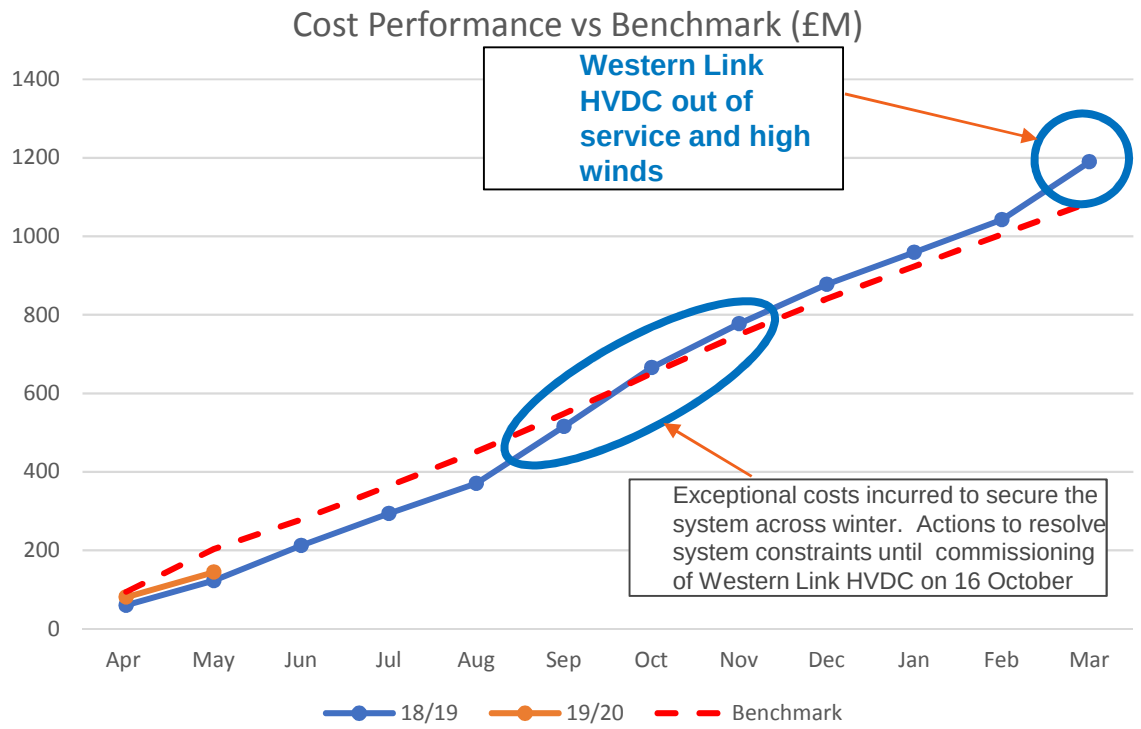
Cost performance vs benchmark



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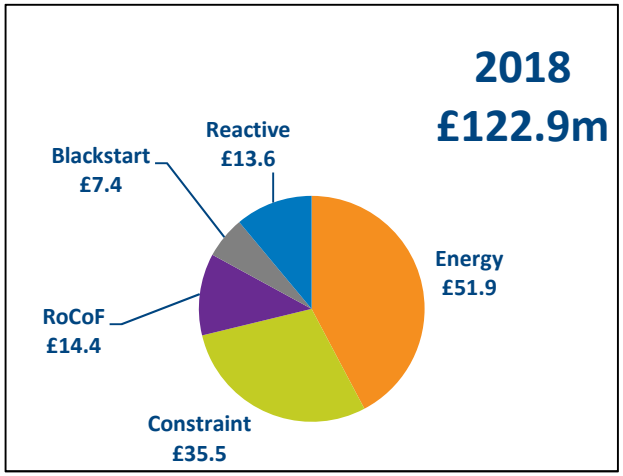
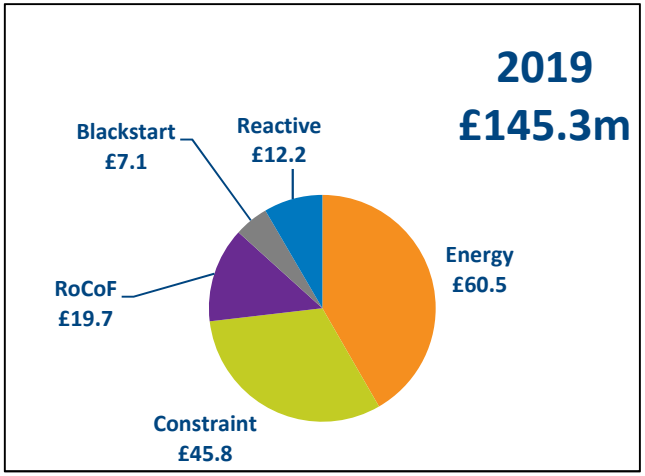
2019 April to May compared with last year

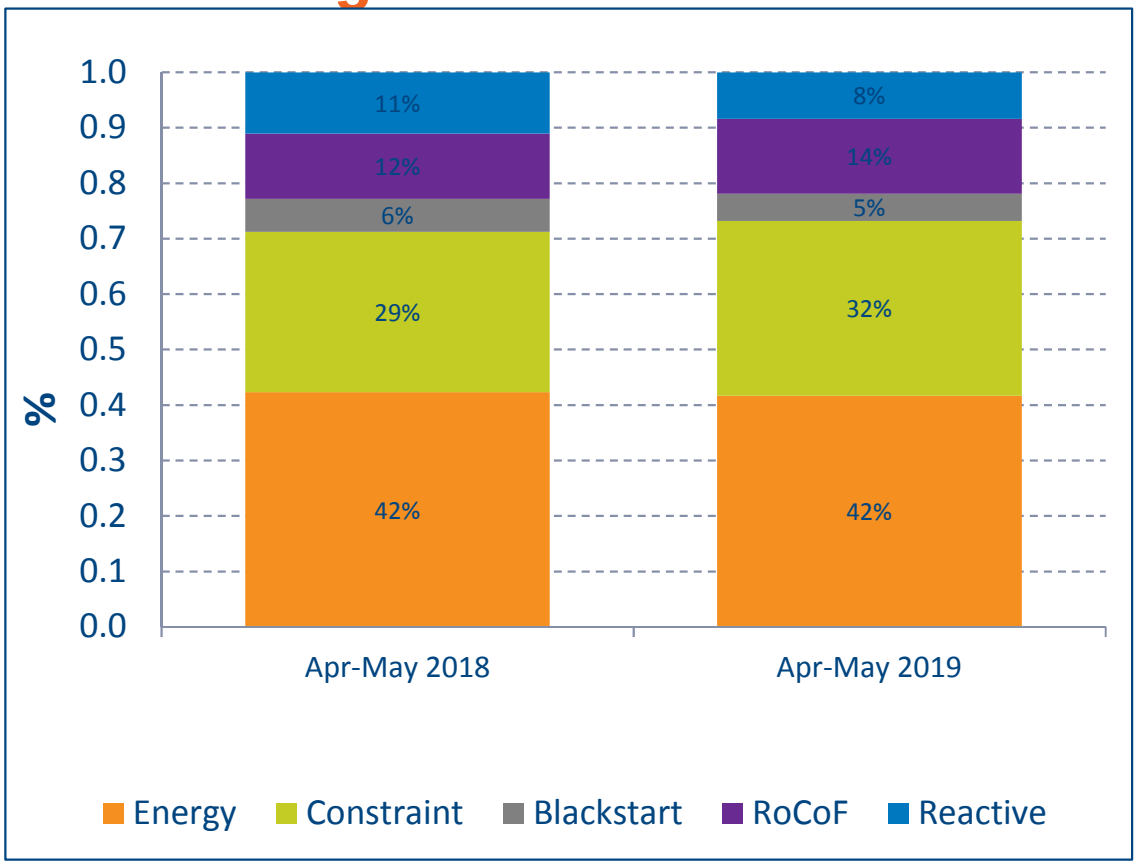




Comparing 2019 with 2018

- £8.6m more on energy balancing, reserve and response
- £10.3m more on constraints
- £5.3m more on RoCoF
- £0.3m less on Blackstart
- £1.4m less on Reactive

Proportional balancing costs



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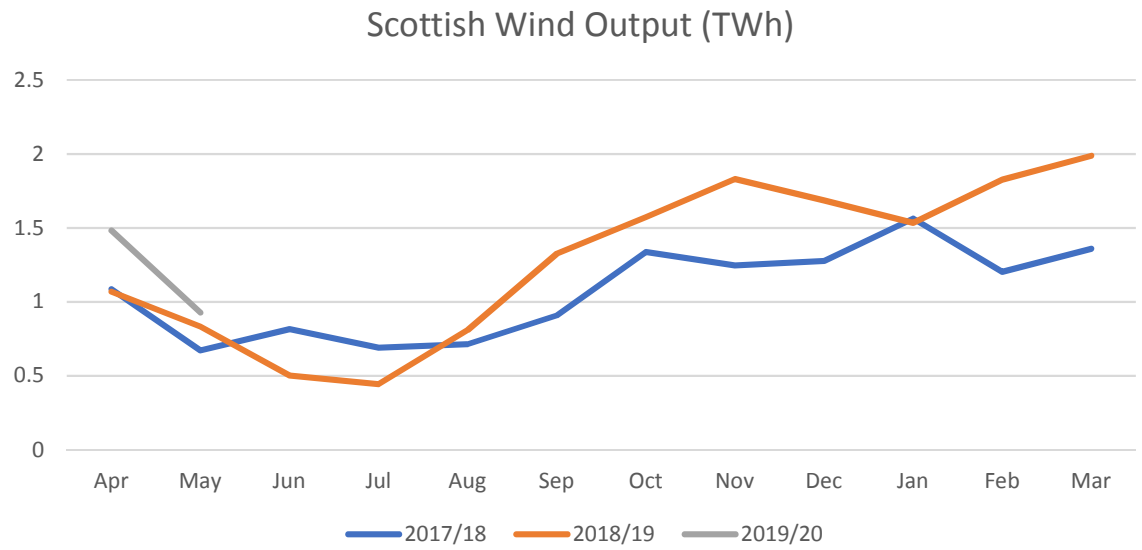
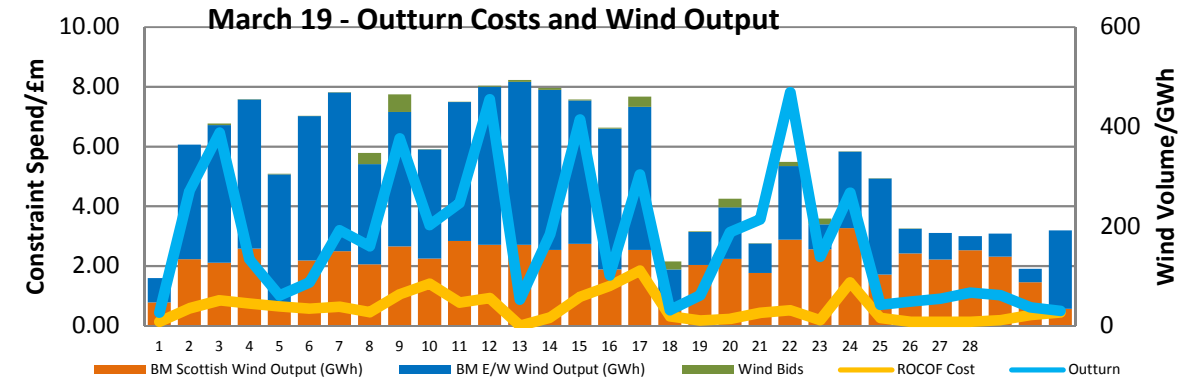
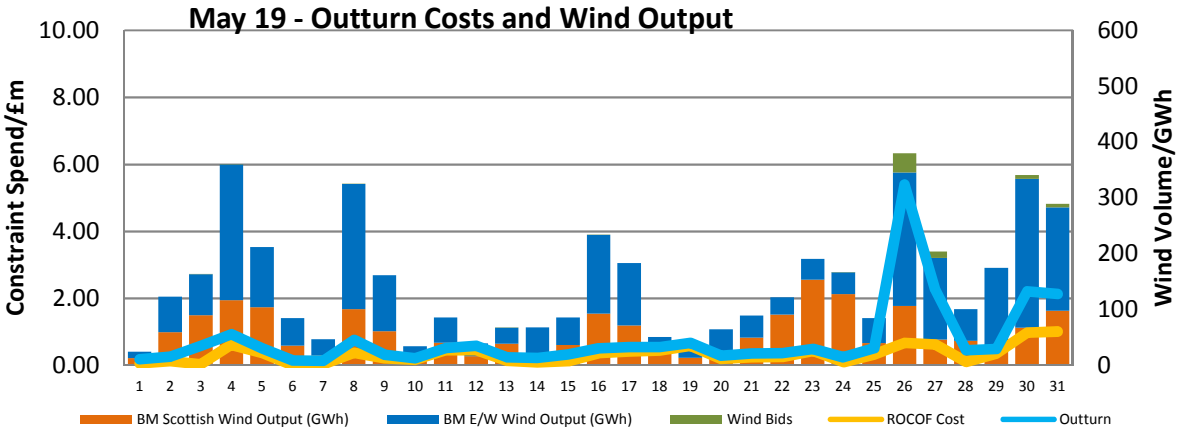
Wind volume driving constraint costs



- Scottish wind volume increasing year on year
- This chart illustrates why WLHVDC unavailability had a much greater effect in September, October and March than in April and May.

Wind volume driving constraint costs





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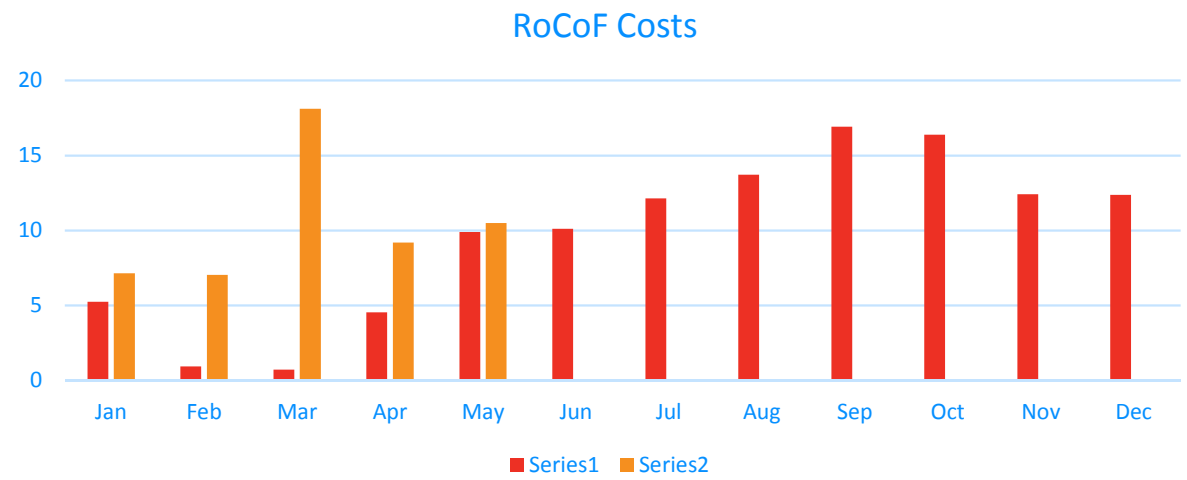
RoCoF costs



- 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

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

	2019/20	2020/21	2021/22	2022/23	2023/24
Estimated Balancing Costs p.a.	£130m	£150m	£150m	(£170m if LOM is not delivered)	(£190m if LOM is not delivered)
Actions	Loss of Mains Protection Changes (Power Protect)				
	Stability Pathfinder				
				‘Stability’ Markets	