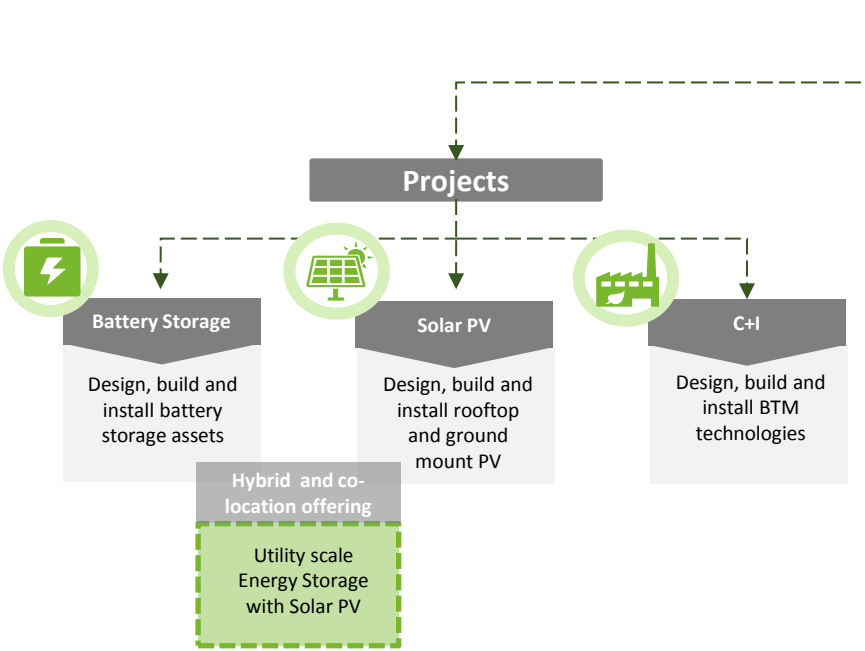
The role of storage in securing the grid

AMAZING ENERGY

Private & Confidential

Introduction



O&M – AnescoMeter	Provision of Operations and Maintenance services for renewable assets in the UK
Asset Management	Maximising returns for investors through revenue optimisation and aggregator management
Consultancy	Using our in-house expertise to offer bespoke consultancy services
ECO	Anesco's ECO team act as a managing agent to ensure energy companies are compliant with legislation

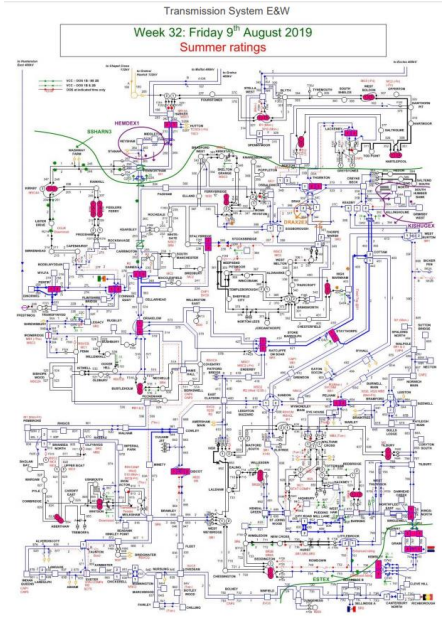
ITM – a history of firsts

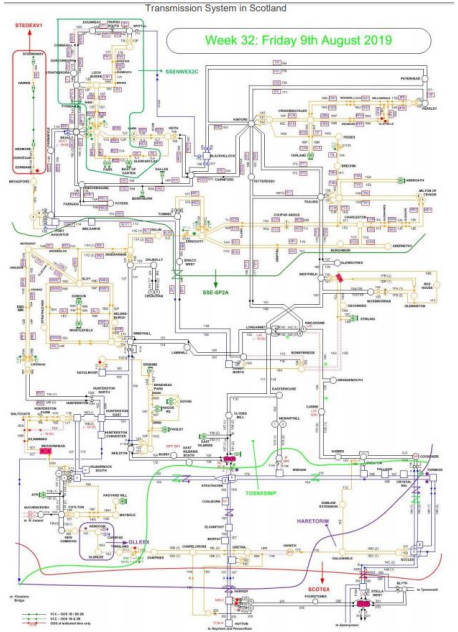
Solar	Hybrid	Battery
Designed and built the UKs first subsidy free solar farm	First company to retain ROC accreditation for solar farms that supply storage batteries directly	First grid-scale battery built in 2014
Full turn-key provider for over 500 MW of solar	First to install battery asset on existing solar PV site	Owner of 90 MW of operational sites
101 ground mount projects across the UK	20 sites co-located	First battery in the Balancing Mechanism

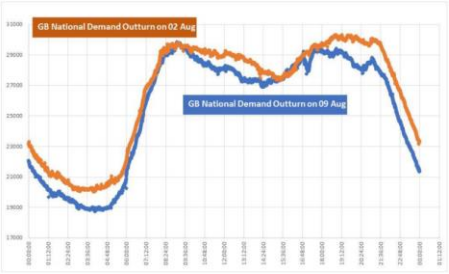
9 August 2019

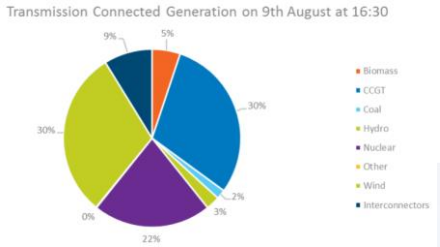
Before the event

- What was the system doing?
  - Constraints
  - Generation
  - Demand
  - Weather









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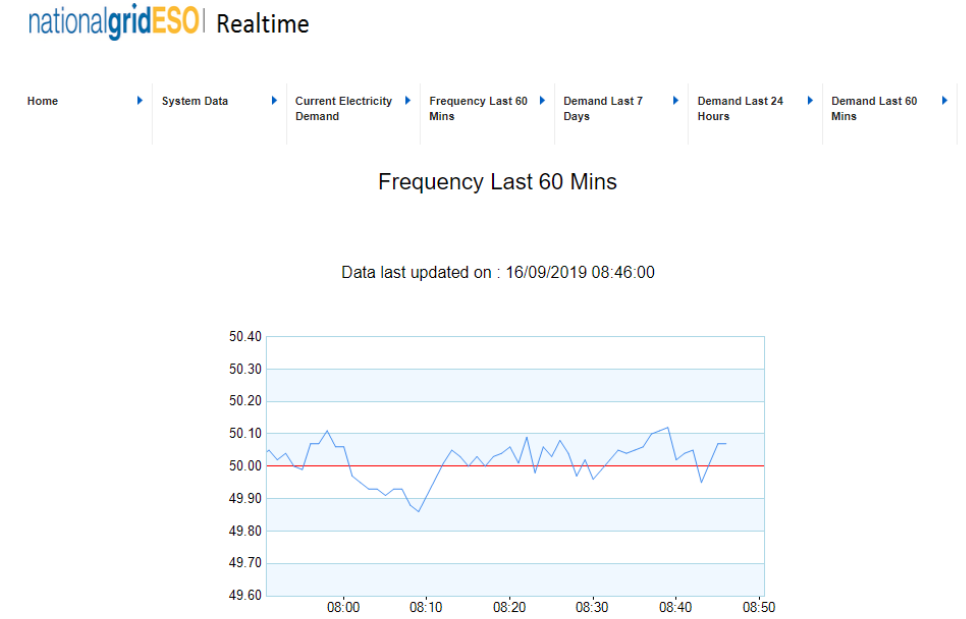
Before the event

- What were our batteries doing?
  - Dynamic Frequency Response
    - 15MW
  - Balancing Mechanism
    - 55MW
  - 20MW Testing

Side note

What is Dynamic Frequency Response?

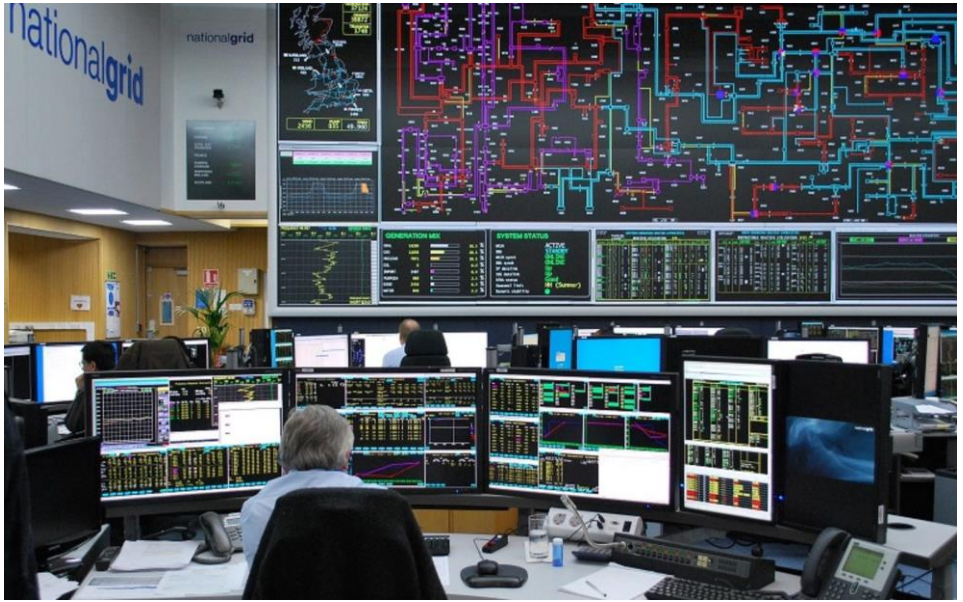
- Automatic
- Monthly tender
  - Pay as bid
- Weekly auction
  - Pay as clear
- Daily auction?



Side note

What is the Balancing Mechanism?

- ‘Flexibility market’
- Stack of ‘bids’ and ‘offers’
- Distributed Resource Desk



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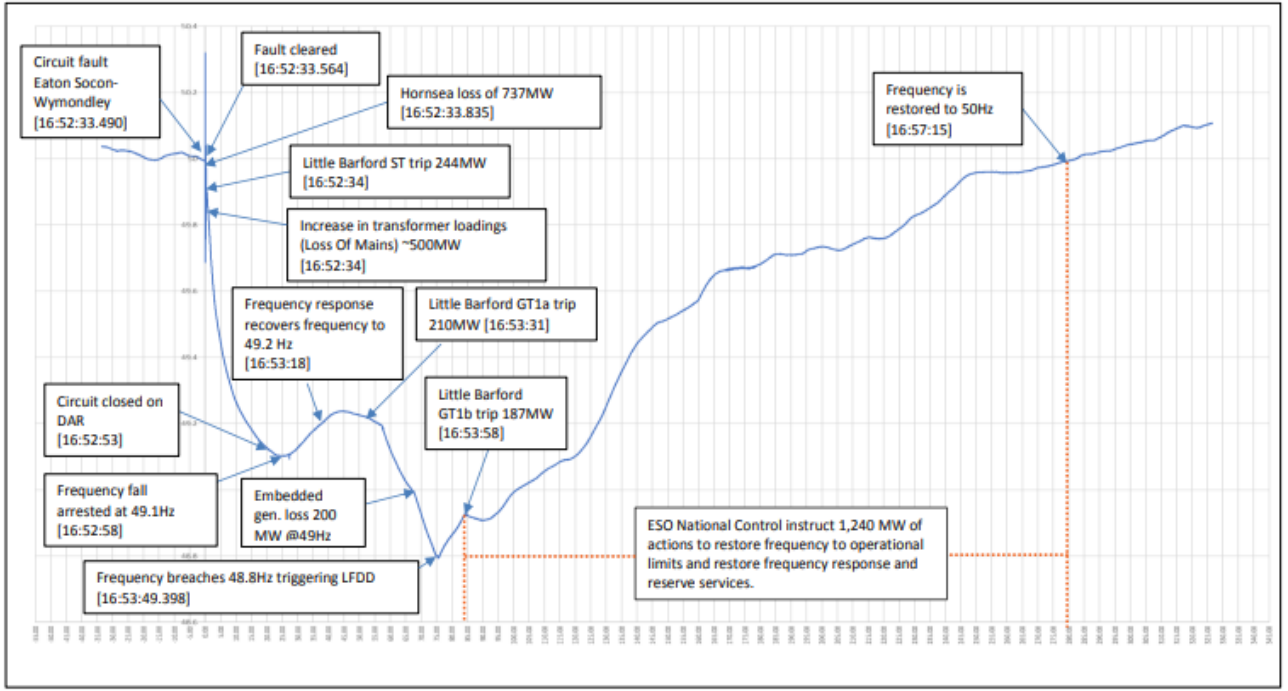
During the frequency drop

- What was the system doing
  - Loss of 981MW
  - Loss of 500MW embedded



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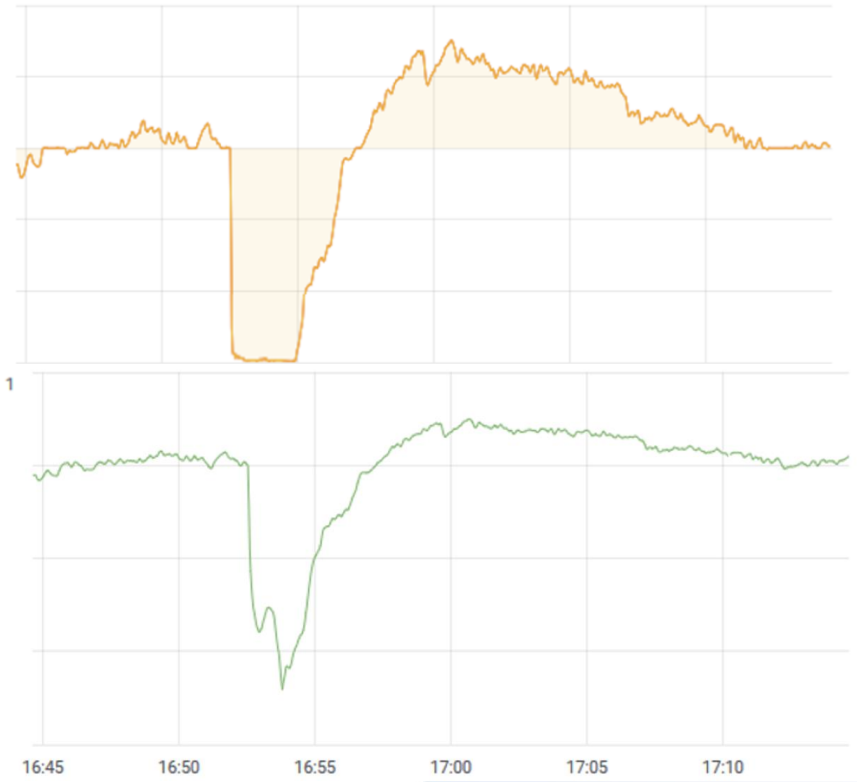
During the frequency drop

- What were our batteries of interest doing

  - Dynamic frequency Response
  - Balancing Mechanism



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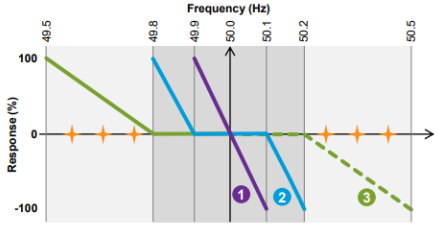
So what?

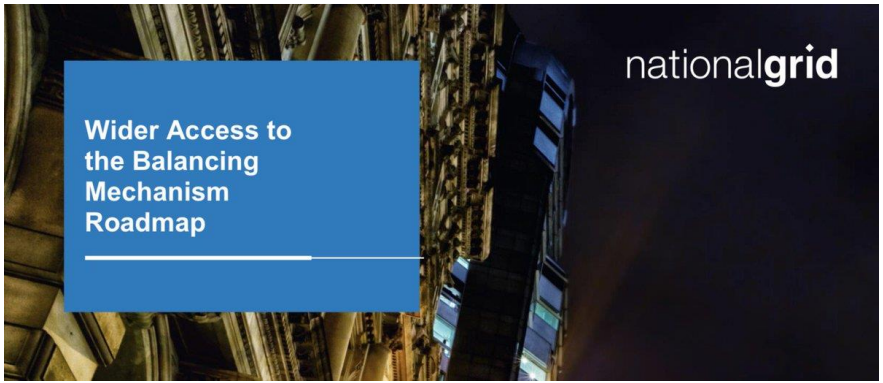
- So what for Frequency Response?
- So what for the Balancing Mechanism?

New Frequency Response Services



Services activated in Operational Limits are symmetrical:
- Dynamic Regulation
- Dynamic Balancing

Services activated in Statutory Limits are asymmetrical:
- Dynamic Containment
- Static Containment



So what for storage

So what for storage