Dynamic Containment Requirements Webinar

26th October 2021
On the webinar today from the ESO today we have:

- Paddy McNabb
- Kashia Anderson
- Abisola Dapo Akinpelu
- Andy Rice

Introductions
Agenda

Today’s webinar today will cover the following agenda items:

• Where we are
• Background of DC-LF and DC-HF
• Frequency Policy
• Requirements methodology and sensitivities
• Long-term view
• Short-term view
• Questions
Where we are
Where we are

**August response MIR:**
- Initial view of DC-LF requirements with the move from a tender to auction and EFA block procurement
- Updated to keep DC-LF requirements static for September and October during launch of DC-LF auction

**From Nov 1st:**
- ESO will begin procuring DC (HF and LF) at EFA block granularity
- As published in the September MIR for November delivery

**Market comms:**
- Publish longer-term 12 month view of DC requirements
- Publish short-term 4-day view of DC requirements
DC Response
DC is a fast-acting post-fault response service designed to:

- Stabilise frequency to within frequency limits (RoCoF = 0)
- Deliver dynamic response
- Limit response within operational limits
DC is based on the system need which is:

- Larger total losses (infeed + RoCoF, outfeed)
- Reduction in inertia
- Requires fast-acting system-responsive service
DC-LF dynamic containment diagram with deadband set at +/-0.015Hz.
Frequency Management Policy
Policy

Implementation of Phase 1 & Phase 2 of Frequency Risk and Control Report (FRCR) recommendations:

Phase 1 – COMPLETED - 25th May 2021

• removing the tighter frequency limit of 49.5Hz for smaller infeed losses
  • only applying the wider limit of 49.2Hz to all BMU-only infeed losses (back to within 49.5Hz in 60s)
  • securing BMU-only outfeed losses to 50.5Hz
• No longer taking additional bids/offers on events re-categorised as BMU+VS events
  • i.e. network faults like double circuits and single circuits

Phase 2 – COMPLETED– 7th October 2021

• allow BMU-only infeed loss risks to cause a consequential RoCoF loss, if the resulting loss can be contained to 49.2Hz and 50.5Hz
Overview of LF losses
View of infeed loss risks on the system
Overview - LF

Loss risk size (MW)

- NSL
- IFA/BP1
- IFA/BP2
- BritNed
- NEMO
- MRWD

RoCoF trigger level

Inertia level -> RoCoF trigger level
Overview - LF

Loss risk size (MW)

1260MW
1000MW
800MW

RoCoF

IFA/BP1
IFA/BP2
BritNed
NEMO
MRWD

Largest Securable Loss (1260MW to 49.2Hz)

Existing response (non-DC)

RoCoF trigger level
Overview - LF

Dynamic Containment increases the size of the Largest Securable Loss

Largest Securable Loss (inc. DC)

Largest Securable Loss (1260MW to 49.2Hz)

RoCoF trigger level

Loss risk size (MW)

- NSL: RoCoF
- IFA/BP1: RoCoF
- IFA/BP2: RoCoF
- BritNed: RoCoF
- NEMO: RoCoF
- MRWD: RoCoF

Loss risk sizes:
- 1260MW
- 1000MW
- 800MW
The size of the DC-LF requirement for a given settlement period depends on:

- **Inertia**
- **RoCoF loss**
- Size of operational loss risks
- Volume of non-DC response
- Demand
Overview of HF losses
View of *outfeed* loss risks on the system.
What outfeed loss does existing response secure?

Largest Securable Loss (560MW to 50.5Hz)

Min dynamic High = 550MW
Overview - HF

What outfeed loss does existing response secure?

Min High + EFR + Demand >= 700MW

Largest Securable Loss (560MW to 50.5Hz)

Min dynamic High = 550MW
Overview - HF

Loss risk size (MW)

-1400MW
-1000MW
-700MW

NSL IFA/BP1 IFA/BP2 BritNed NEMO

DC-HF required if large enough outfeed loss exists > **700MW**

Largest Securable Loss (560MW to 50.5Hz)

*Can be up to 1000MW at higher demand
The size of the DC-HF requirement for a given settlement period depends on:
- Size of operational loss risks
- Demand
- Inertia
- Volume of non-DC response
Requirements Calculation Methodology
(1) View of loss risks on the system day-ahead, for a chosen settlement period
(2) Will infeed loss risks cause a consequential RoCoF loss?
(3) What size of loss can I cover without DC?

*Procuring min dynamic PSH for long term DC requirements view
(4) Use DC to cover the shortfall between the largest loss and min dynamic loss.
Overview - LF

- Loss risk size (MW): 1000 MW
- Largest Securable Loss (inc. DC): 800 MW
- RoCoF trigger level: 550 MW
- Min dynamic (pre-fault): 550 MW

(5) Buy the peak MW requirement across the entire EFA block
Market Information
The short-term view of DC requirements are based on:
  • Using 2019-2021 as historic years, corrected for new connections

Using response, LoM and loss risk assumptions:
  • Procuring PSH to cover a **1260MW** loss to 49.2Hz*
  • EFR, fast and slow static included
  • Updated LoM RoCoF capacities at 0.125Hz/s and 0.200Hz/s
  • NSL limited to 700MW in both directions

Procured via DC auction on EPEX:
  • Procuring at EFA block granularity

*In coming months the ESO will transition to buying DC based on procurement of min PSH (550MW)*
DC-LF December 2021 forecast

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## DC-HF December 2021 forecast

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DC-LF
12 Month View
The long-term view of DC requirements are based on:
- Using 2019-2021 as historic years, corrected for new connections

Using response, LoM and loss risk assumptions:
- Procuring min dynamic PSH of 550MW
- EFR completing in April 2022
- No fast static from 2022, retaining slow static service
- Updated LoM RoCoF capacities at 0.125Hz/s and 0.200Hz/s
- NSL limited to 700MW in both directions till Jan 2022, then release of 200MW per month until April 2022

Procured via DC auction on EPEX:
- Procuring at EFA block granularity
DC-LF Requirements forecast - 12 Month View
DC-LF Requirements forecast - 12 Month View

April assumptions:
- NSL full 1400MW capacity
- EFR = 0MW
- PSH = 550MW
DC-LF Requirements forecast - April

Or, 100% of settlement periods have a DC-LF requirements > 300MW
DC-LF Requirements forecast - April

Or, 50% of settlement periods have a DC-LF requirements > 800MW

Median = 800MW
DC-LF Requirements forecast - April

Or, 100% of settlement periods have a DC-LF requirements < 1480MW
DC-LF Requirements forecast - EFA block
DC-LF Requirements forecast - EFA block

Min = 200MW
DC-LF Requirements forecast - EFA block

Max = 1300MW
DC-LF Requirements forecast - EFA block

Min = 30MW
DC-LF Requirements forecast - EFA block

Max = 1430MW
DC-HF
12 Month View
DC-HF Requirements forecast - 12 Month View

[Graph showing DC-HF requirement over 12 months with line graphs for each month from November to October.]
Increase in DC-HF volume requirements from Nov – Apr
Due to gradual release of NSL capacity
DC-HF Requirements forecast - 12 Month View

April assumptions:
- NSL full 1400MW capacity
- EFR = 0MW
- PSH = 550MW
DC-HF Requirements forecast - April

Min = 0MW

Min = 1190MW
DC-HF Requirements forecast - April

~45% of April DC-HF is required
4-Day view
DC-LF 4-day ahead forecast

4-day view of DC-LF:
• 4-day time series forecast
• Inertia sensitivities show impact on DC-HF requirements
DC-LF 4-day ahead forecast

EFA 4-5, 28th Oct 2021
Mean inertia = ~400MW DC-LF
DC-LF 4-day ahead forecast

EFA 4-5, 28th Oct 2021
Lower inertia = ~700MW DC-LF
DC-LF 4-day ahead forecast

EFA 4-5, 28th Oct 2021
Higher inertia = 0MW DC-LF