

ESR Operational Metering, Commissioning Assessment and Testing Guidance

Operational Metering Requirements

Frequency (Hz);
 Voltage (kV);
 Availability (Available/Unavailable);
 Active Power Output (MW);
 Reactive Power Output (MVar);
 For Contracted Top Up Plant comprising wind turbines, wind speed forecasts and observations (ms-1) and wind direction forecasts and observations (degrees); and
 For Contracted Top Up Plant comprising hydro-electric plant, the upper reservoir limits.

The Commissioning Assessment

This will aim to demonstrate that with and without external power supplies to all or part of the ESR Service Provider the restoration Auxiliary Unit(s) can be independently started and in turn allow the reliable start-up of the Main Unit(s) in the manner (including without limitation within the timescales) required by the technical parameters.

Part A – Auxiliary Unit(s) – Demonstration of Capability (where applicable)

1. 3 Consecutive starts/shutdowns
2. Start sequence initiated and interrupted before Full Speed No Load (FSNL)
3. Start sequence initiated and interrupted at FSNL
4. Start sequence initiated and allowed to complete
5. Prove that the Main Unit(s) can revert to normal operation and the Auxiliary Unit(s) removed from service.
6. Safe shutdown of the Auxiliary Unit(s) No external supplies are to be provided to the Auxiliary Unit(s) during the Commissioning Assessment and activities shall be conducted consecutively and without delay between shutdowns and restarts.

Part B – Demonstration of Electricity System Restoration Capability (where applicable)

1. Remove all external supplies from the ESR Service Provider.
2. Re-start the power generating module/facility.
3. Energise a pre-isolated bus bar at point of connection onto to the Network (example: isolated bus bar 400kV substation) by dead bar close of the relevant Circuit Breaker.
4. Energise a pre-isolated circuit of the network out of the relevant substation.
5. Synchronise to an adjacent power island.

Part C – Electricity System Restoration Telephony Systems

Check the resilience of internal communication systems across the power generating module/facility (example: radio system from the local Control Room to field staff);

Part D – Local Joint Restoration Plan –

Desktop Exercise Plan agreed between the Power Station, System Operator

Further Guidance Around Testing:

Approach followed by the ESO on Dead Line Charge (DLC) and Remote Synchronisation (RST) tests:

1. A DLC and a RST will always happen in conjunction with a ESR Capability Assessment(s);
2. A test will with a “normal” Electricity System Restoration (ESR) capability assessment: all electrical external supplies removed, and Provider expected to be ready to re-energise part of the network within 2h post blackout event;
3. DLC Test: re-energisation of part of the network, either via a soft energisation with part of the Network already pre-switched or via a step-by-step approach with one circuit breaker switched at a time.
4. RST Test: re-synchronisation of the power island created by the ESR Service Provider onto GB via a PSS, equipment similar to a Unit’s synchroniser but located at a remote substation, owned and operated by the relevant Transmission Owner (TO).

A. Timings for each test:

- ESR Capability Assessment: period of time needed by the ESR Service Provider to re-start its equipment after a blackout event and reach a position where it can re-energise (@0MW) part of a dead Network. Expected to take up to 2 hours.
- DLC Test: period of time needed to re-energise part of the Network. The moment a ESR Service Provider successfully energises a dead bar at the local Network substation is the moment ESR capability test ends and the DLC Test starts. Expected to take up to 1/2 hour.
- RST Test: once the DLC is completed, period of time needed to re-synchronise the power island created by the ESR Service Provider onto GB. Expected to take up to 1/2 hour;
- **Total time needed:** $\geq 3h$ (2h+1/2h+1/2h).

B. Comments:

- When progressing with a DLC and RST test, the ESO will typically pursue the re-energisation of the preferred restoration route agreed under the relevant Local Joint Restoration Plan (LJRP);
- Providers are expected to run on their Auxiliary Generation for the entire duration of the tests: ESR Capability Assessment, DLC and RST;
- If the Provider has multiple Units contracted for the provision of the Service but can reach the contracted figures with just one, the ESO will pursue a DLC and the RST with just one unit. All other contracted Units shall progress with a ESR capability assessment only.
- The ESO is expecting to progress with two DLC and RST tests throughout the Contract Term, always in combination/at the same time as the ESR Capability Assessment:
 - Test 1 (Commissioning Assessment): 1 or more ESR Capability Tests (depending on the number of Units contracted, and considering the comments above) + 1 DLC + 1 RST;
 - Test 2 (three years later): 1 or more ESR Capability Tests (depending on the number of Units contracted, and considering the comments above) + 1 DLC + 1 RST;

Notes:

- if you can deliver against the contracted figures with just on Unit and have multiple Units contracted for the Service you have the option to progress with the “other” related ESR Capability Assessment(s) on the same day or on different days, with the comments above in mind and following the guidance shared previously around the expected **Testing Regime***
 - Please find below a practical example for information.*
- Confirmation of time of day shall align with the expected Testing Regime. Relevant part below:

ESO’s expectations around the dates suggested by each ESR Service Provider:

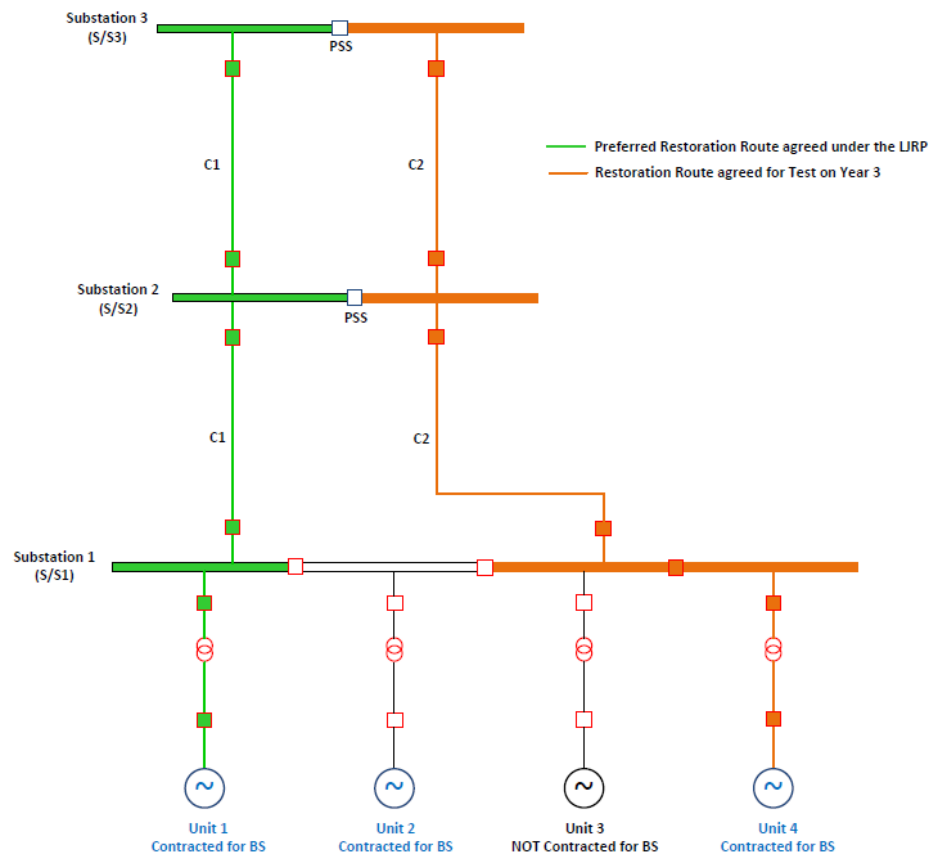
- Any day of the week/weekends;

- Test Period: ≥ 3 hours between 10:00 – 16:00 (this time period with the option of being reviewed/adjusted by the ESO and/or Provider to accommodate any potential uncertainty. If any dispute arises, 10:00 – 16:00 will withstand).

Testing Regime

- Commissioning Assessment and Capability Assessment to be progressed at a date, or dates, suggested by the Electricity System Restoration (ESR) Service Provider.
- Dates:
 - Commissioning Assessment:
 - i. To be progressed on Year 0 and ahead of the service commencement.
 - ii. ESR Service Provider to suggest/submit a minimum of 3 sets of dates to the ESO, each set consisting of 2 consecutive days (day 1/preferred, day 2/backup).
 - iii. ESO to choose one of the sets.
 - Capability Assessment on Year 3 (n) of the contract:
 - i. ESR Service Provider to suggest/submit to the ESO, between weeks 35 and 38 on Year 2 (n-1), a minimum of 3 sets of dates for the Capability Assessment to be progressed sometime within Year 3 (n).
 - ii. Each set of dates consisting of up to 7 consecutive days.
 - iii. ESO to choose one of the sets.
 - iv. At least 7 calendar days ahead of the first day of the set chosen by the ESO to progress with the ESR Capability Assessment, the ESR Service Provider to inform (firm) preferred & backup test dates (consecutive days);
 - v. If the test needs to be postponed due to any unforeseen system issue a new date shall be agreed within the 10 working days immediately after the backup test date between the ESO and the Provider.
- ESO's expectations around the dates suggested by each ESR Service Provider:
 - Any day of the week/weekends.
 - Test Period: ≥ 3 hours between 10:00 – 16:00 (this time-period with the option of being reviewed/adjusted by the ESO and/or Provider to accommodate any potential uncertainty. If any dispute arises, 10:00 – 16:00 will withstand).

EXAMPLE / Potential Testing Plan for a BS Service Provider with 4 Units, 3 of which contracted for the provision of the Service.



	TYPE OF TEST		TYPE OF TEST			TYPE OF TEST	
	BS Cap. Assess.	≤ 2h	BS Cap. Assess.	≤ 2h		BS Cap. Assess.	≤ 2h
Commissioning Assessment (Example, assuming contracted capability able to be delivered by just Unit 1)	DLC	≤ 1/2h					
	RST (@ S/S3)	≤ 1/2h					
	Test Dates / Period	01Jul, 10:00 – 13:00	01Jul, 13:00 – 16:00			04Jul, 12:30 – 15:30	

	TYPE OF TEST		TYPE OF TEST			TYPE OF TEST	
	BS Cap. Assess.	≤ 2h	BS Cap. Assess.	≤ 2h		BS Cap. Assess.	≤ 2h
Test 3 years later (Example, assuming contracted capability able to be delivered by just Unit 4)						DLC	≤ 1/2h
						RST (@ S/S2)	≤ 1/2h
	Test Dates / Period	10Jun, 10:00 – 13:00	10Jun, 13:00 – 16:00			15Jun, 12:00 – 16:00	