

Frequency Response Characteristic Calculation for All India based on NLDC SCADA Data

EVENT:

On 31th July 2023, As reported at 10:36 hrs B-ph jumper snapped at RSUPL end of 220kV Fatehgarh2-RSUPL Line, As per PMU B-N & R-N fault is observed. At the same time, drop in RE generation at RE stations connected at other ISTS pooling station in Rajasthan RE complex also occurred on LVRT. As per PMU data, total drop in RE generation was around 1620MW. Accordingly same has been considered in the FRC calculation.

| S No | Particulars | Dimension | NR | ER | WR | NER | SR |
|------|---|-----------|--------|--------|--------|--------|--------|
| 1 | Actual Net Interchange before the Event (10:36:08) | MW | 6892 | -1644 | -9322 | -266 | 4157 |
| 2 | Actual Net Interchange after the Event (10:36:48) | MW | 7891 | -1919 | -9861 | -297 | 3990 |
| 3 | Change in Net Interchange (2-1) | MW | 999 | -275 | -539 | -31.2 | -167 |
| 4 | Generation Loss (+) / Load Throw off (-) during the Event | MW | 1620 | 0 | 0 | 0 | 0 |
| 5 | Control Area Response (3 - 4) | MW | -621 | -275 | -539 | -31 | -167 |
| 6 | Frequency before the Event | HZ | 50.15 | 50.15 | 50.15 | 50.15 | 50.15 |
| 7 | Frequency after the Event | HZ | 50.04 | 50.04 | 50.04 | 50.04 | 50.04 |
| 8 | Change in Frequency (7 - 6) | HZ | -0.112 | -0.112 | -0.112 | -0.112 | -0.112 |
| 9 | Frequency Response Characteristic (5 / 8) | MW/Hz | 5545 | 2454 | 4811 | 278 | 1491 |
| 10 | Net System Demand met before the Event | MW | 68431 | 27847 | 55249 | 2523 | 51989 |
| 11 | Internal Generation before the Event (10 - 1) | MW | 61539 | 29491 | 64571 | 2789 | 47832 |
| 12 | Ideal load response assuming 4% per Hz (0.04*Row 10) | MW/Hz | 2737 | 1114 | 2210 | 101 | 2080 |
| 13 | Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11) | MW/Hz | 24616 | 11796 | 25828 | 1115 | 19133 |
| 14 | Composite ideal response (12 + 13) | MW/Hz | 27353 | 12910 | 28038 | 1216 | 21212 |
| 15 | Percentage ideal response | % | 20.3% | 19.0% | 17.2% | 22.9% | 7.0% |

(*) - Data may be constant/suspected during the event
 Note: +ve exchange=> import ; (-)ve exchange => export

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| Total Change in (MW) | 1620 |
| FRC for NEWS GRID (dp/df) MW/Hz | 14464 |
| Power Number (net change in MW/maximum change in frequency) | 9419 |

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|------------------------------------|------|-------|---------|---------|-------|-------|
| Source Wise Generation (MW) | GAS | HYDRO | NUCLEAR | Thermal | WIND | SOLAR |
| | 1754 | 27679 | 5556 | 117929 | 20510 | 33446 |