

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

EVENT:

At 20:11 Hrs on Dated 15th-May-2022, As reported at 20:11 hrs Generation loss of around 1250 MW occurred due to tripping of Units in Nathpa Jhakri, Rampur and Karcham Wangtoo Hydro generation complex of Northern Region on SPS operation and same has been considered for FRC Calculation.

| S No | Particulars | Dimension | NR | ER | WR | NER | SR |
|------|---|-----------|--------|--------|--------|--------|--------|
| 1 | Actual Net Interchange before the Event (20:11:36) | MW | 12308 | -6681 | -7550 | -437 | 2036 |
| 2 | Actual Net Interchange after the Event (20:13:08) | MW | 13329 | -6862 | -8148 | -459 | 1643 |
| 3 | Change in Net Interchange (2-1) | MW | 1021 | -181 | -598 | -22.0 | -393 |
| 4 | Generation Loss (+) / Load Throw off (-) during the Event | MW | 1250 | 0 | 0 | 0 | 0 |
| 5 | Control Area Response (3 - 4) | MW | -229 | -181 | -598 | -22 | -393 |
| 6 | Frequency before the Event | HZ | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 |
| 7 | Frequency after the Event | HZ | 49.95 | 49.95 | 49.95 | 49.95 | 49.95 |
| 8 | Change in Frequency (7 - 6) | HZ | -0.043 | -0.043 | -0.043 | -0.043 | -0.043 |
| 9 | Frequency Response Characteristic (5 / 8) | MW/Hz | 5326 | 4209 | 13907 | 512 | 9140 |
| 10 | Net System Demand met before the Event | MW | 62871 | 22527 | 55842 | 2445 | 37922 |
| 11 | Internal Generation before the Event (10 - 1) | MW | 50563 | 29208 | 63392 | 2882 | 35886 |
| 12 | Ideal load response assuming 4% per Hz (0.04*Row 10) | MW/Hz | 2515 | 901 | 2234 | 98 | 1517 |
| 13 | Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11) | MW/Hz | 20225 | 11683 | 25357 | 1153 | 14354 |
| 14 | Composite ideal response (12 + 13) | MW/Hz | 22740 | 12584 | 27590 | 1250 | 15871 |
| 15 | Percentage ideal response | % | 23.4% | 33.4% | 50.4% | 40.9% | 57.6% |

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

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| Total Change in (MW) | 1250 |
| FRC for NEWS GRID (dp/df) MW/Hz | 29070 |
| Power Number (net change in MW/maximum change in frequency) | 11062 |