

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

**EVENT:**

On 14th Jan 2023, As reported At 12:06 hrs drop in RE generation of approx.1100MW observed in Rajasthan RE complex. As per PMU at 12:06hrs R-N phase to earth fault is observed and multiple elements tipping at 220kV Heerapura(Raj) observed from SCADA data. Accordingly 1100MW has been considered in FRC Calculation.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (12:06:08)	MW	5762	-7429	-4881	43	7228
2	Actual Net Interchange after the Event (12:07:20)	MW	6415	-7755	-5388	36	6991
3	Change in Net Interchange (2-1)	MW	653	-326	-507	-7.3	-237
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	1100	0	0	0	0
5	Control Area Response (3 - 4)	MW	-447	-326	-507	-7	-237
6	Frequency before the Event	Hz	50.04	50.04	50.04	50.04	50.04
7	Frequency after the Event	Hz	50.00	50.00	50.00	50.00	50.00
8	Change in Frequency (7 - 6)	Hz	-0.033	-0.033	-0.033	-0.033	-0.033
9	Frequency Response Characteristic (5 / 8)	MW/Hz	13537	9876	15357	220	7193
10	Net System Demand met before the Event	MW	59035	19549	60592	1953	54612
11	Internal Generation before the Event (10 - 1)	MW	53274	26978	65473	1909	47384
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	2361	782	2424	78	2184
13	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11)	MW/Hz	21309	10791	26189	764	18954
14	Composite ideal response (12 + 13)	MW/Hz	23671	11573	28613	842	21138
15	Percentage ideal response	%	57.2%	85.3%	53.7%	26.1%	34.0%

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

Total Change in (MW)	1100
<b>FRC for NEWS GRID (dp/df) MW/Hz</b>	<b>33333</b>
Power Number (net change in MW/maximum change in frequency )	<b>10092</b>

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
	2200	9013	4802	137955	2522	40850