

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

EVENT: On 15th Oct 2022, As reported At 11:23 hrs 765 KV Phagi(RS)-Bhiwani(PG) Ckt-1 tripped along with 765 kV Bus-1 at Bhiwani (PG), At the same time Renewable generation reduction of around 3150 MW reported in Rajasthan Renewable generation complex of Northern Region. As per SCADA data, Solar generation reduction observed in Bhadla(PG)- 855MW, Bhadla2(PG)-359MW,Bikaner(PG)- 941MW, Fatehgarh2(PG)-1140MW, ADANI Fatehgarh Solar Park-284MW and around 150 MW in Rajasthan state solar. Accordingly for FRC Calculation figure of 3729MW has been considered.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (11:23:36)	MW	3792	-4570	123	-48	396
2	Actual Net Interchange after the Event (11:25:04)	MW	6594	-5088	-1906	-89	-329
3	Change in Net Interchange (2-1)	MW	2802	-518	-2029	-41.0	-725
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	3729	0	0	0	0
5	Control Area Response (3 - 4)	MW	-927	-518	-2029	-41	-725
6	Frequency before the Event	HZ	50.05	50.05	50.05	50.05	50.05
7	Frequency after the Event	HZ	49.76	49.76	49.76	49.76	49.76
8	Change in Frequency (7 - 6)	HZ	-0.290	-0.290	-0.290	-0.290	-0.290
9	Frequency Response Characteristic (5 / 8)	MW/Hz	3197	1786	6997	141	2500
10	Net System Demand met before the Event	MW	47793	21379	49657	2193	36159
11	Internal Generation before the Event (10 - 1)	MW	44001	25949	49534	2241	35763
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	1912	855	1986	88	1446
13	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11)	MW/Hz	17600	10380	19813	897	14305
14	Composite ideal response (12 + 13)	MW/Hz	19512	11235	21800	984	15751
15	Percentage ideal response	%	16.4%	15.9%	32.1%	14.4%	15.9%

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

Total Change in (MW)	3729
FRC for NEWS GRID (dp/df) MW/Hz	12859
Power Number (net change in MW/maximum change in frequency)	9323

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
	1470	19877	5618	97434	2482	33424