

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

EVENT:

On 01st May 2023, As reported, at 13:23 hrs, Multiple tripping of 765kV lines (765kV Fatehgarh II - Bhadla I Ckt-I, 765kV Ajmer - Bhadla II ckt-I, 765kV Ajmer - Phagi ckt-I) occurred due to operation of over voltage stage-1 protection operation in Northern region Rajasthan Renewable complex and solar generation loss of around 1130 MW observed.same has been considered in FRC Calculation.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (13:23:04)	MW	1734	-2990	-1863	292	2045
2	Actual Net Interchange after the Event (13:24:00)	MW	2229	-3075	-1826	265	1648
3	Change in Net Interchange (2-1)	MW	495	-86	37	-26.5	-398
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	1130	0	0	0	0
5	Control Area Response (3 - 4)	MW	-635	-86	37	-27	-398
6	Frequency before the Event	HZ	50.17	50.17	50.17	50.17	50.17
7	Frequency after the Event	HZ	50.11	50.11	50.11	50.11	50.11
8	Change in Frequency (7 - 6)	HZ	-0.064	-0.064	-0.064	-0.064	-0.064
9	Frequency Response Characteristic (5 / 8)	MW/Hz	9926	1338	-575	415	6211
10	Net System Demand met before the Event	MW	40568	18916	49161	2115	41299
11	Internal Generation before the Event (10 - 1)	MW	38834	21905	51024	1824	39254
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	1623	757	1966	85	1652
13	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11)	MW/Hz	15534	8762	20410	729	15702
14	Composite ideal response (12 + 13)	MW/Hz	17156	9519	22376	814	17353
15	Percentage ideal response	%	57.9%	14.1%	-2.6%	50.9%	35.8%

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

Total Change in (MW)	1130
FRC for NEWS GRID (dp/df) MW/Hz	17656
Power Number (net change in MW/maximum change in frequency)	8561

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
	2673	9061	5071	100870	2556	34715