

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

EVENT: On 17 sep 2022, At 10:14 hrs 220kV Fatehgarh2-AHEJ2L ckt tripped due to R-phase CT blast at Fatehgarh2 end. After nearly 5sec, 765kV Fatehgarh2-Bhadla ckt-2 tripped on over voltage. Voltage of 822kV observed from PMU data at Fatehgarh2 end. During the fault, approximate 2333 MW reduction of solar generation connected to Fatehgarh & Bhadla generation complex observed. In PMU data it has been observed that around 860 MW of renewable generation recovered within 30 seconds of event, accordingly for FRC Calculation 1473 has been considered while for calculation of inertial response 2333 MW has been considered.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (10:14:20)	MW	4948	-4551	-4645	-257	4185
2	Actual Net Interchange after the Event (10:15:30)	MW	6381	-4958	-5349	-294	3859
3	Change in Net Interchange (2-1)	MW	1433	-407	-704	-37.1	-326
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	1473	0	0	0	0
5	Control Area Response (3 - 4)	MW	-40	-407	-704	-37	-326
6	Frequency before the Event	Hz	50.02	50.02	50.02	50.02	50.02
7	Frequency after the Event	Hz	49.98	49.98	49.98	49.98	49.98
8	Change in Frequency (7 - 6)	Hz	-0.040	-0.040	-0.040	-0.040	-0.040
9	Frequency Response Characteristic (5 / 8)	MW/Hz	1000	10175	17592	927	8152
10	Net System Demand met before the Event	MW	55242	20985	46400	2185	47040
11	Internal Generation before the Event (10 - 1)	MW	50294	25537	51045	2442	42855
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	2210	839	1856	87	1882
13	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11)	MW/Hz	20118	10215	20418	977	17142
14	Composite ideal response (12 + 13)	MW/Hz	22327	11054	22274	1064	19024
15	Percentage ideal response	%	4.5%	92.0%	79.0%	87.1%	42.9%

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

Total Change in (MW)	1473
FRC for NEWS GRID (dp/df) MW/Hz	36825
Power Number (net change in MW/maximum change in frequency)	9113

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
		2178	30599	3829	97148	10614