

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

EVENT:

On 11 sep 2022, at 12:22 hrs 220kV Bhadla – CSP Jodhpur tripped due to phase to phase fault. During the fault, approximate 3800 MW of solar generation connected to Fatehghar & Bhadla generation complex reduced due to low bus voltage as reported by Solar Stations. During the incident, four number of 765kV lines emanating from solar complex also tripped. The loss of 3800 MW generation loss has been considered for FRC Calculation.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (12:22:08)	MW	12539	-3622	-2188	-162	-6944
2	Actual Net Interchange after the Event (12:23:08)	MW	15450	-4694	-4259	-229	-7851
3	Change in Net Interchange (2-1)	MW	2910	-1073	-2071	-67.8	-907
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	3800	0	0	0	0
5	Control Area Response (3 - 4)	MW	-890	-1073	-2071	-68	-907
6	Frequency before the Event	Hz	50.04	50.04	50.04	50.04	50.04
7	Frequency after the Event	Hz	49.74	49.74	49.74	49.74	49.74
8	Change in Frequency (7 - 6)	Hz	-0.302	-0.302	-0.302	-0.302	-0.302
9	Frequency Response Characteristic (5 / 8)	MW/Hz	2946	3552	6857	224	3005
10	Net System Demand met before the Event	MW	70482	20822	49786	2344	33185
11	Internal Generation before the Event (10 - 1)	MW	57943	24444	51974	2505	40129
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	2819	833	1991	94	1327
13	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11)	MW/Hz	23177	9778	20790	1002	16052
14	Composite ideal response (12 + 13)	MW/Hz	25996	10611	22781	1096	17379
15	Percentage ideal response	%	11.3%	33.5%	30.1%	20.5%	17.3%

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

Total Change in (MW)	3800
FRC for NEWS GRID (dp/df) MW/Hz	12583
Power Number (net change in MW/maximum change in frequency)	8768

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
	2340	28708	4725	104221	10440	28838