

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

EVENT: On 28th June 2023, As reported at 02:28 hrs 400kV Teesta -Rangpo S/C, 400kV Teesta III-Dikchu S/C and 400kV Dikchu-Rangpo S/C tripped. Fault was on 400kV Dikchu-Rangpo S/C & Teesta III -Rangpo line. 400 kV Dikchu-Teesta III tripped from Teesta III end in Back up overcurrent protection. Due to multiple tripping in Teesta generation complex, Total generation loss of 1410 MW occurred (1304 MW at Teesta III and 106 MW at Dikchu). Accordingly same has been considered in the FRC calculation.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (02:28:08)	MW	14498	-8126	-10718	460	3072
2	Actual Net Interchange after the Event (02:29:24)	MW	14351	-7212	-11207	430	2708
3	Change in Net Interchange (2-1)	MW	-147	914	-489	-29.9	-364
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	0	1410	0	0	0
5	Control Area Response (3 - 4)	MW	-147	-496	-489	-30	-364
6	Frequency before the Event	HZ	50.04	50.04	50.04	50.04	50.04
7	Frequency after the Event	HZ	49.97	49.97	49.97	49.97	49.97
8	Change in Frequency (7 - 6)	HZ	-0.068	-0.068	-0.068	-0.068	-0.068
9	Frequency Response Characteristic (5 / 8)	MW/Hz	2169	7295	7185	439	5350
10	Net System Demand met before the Event	MW	61700	21093	48130	2410	39886
11	Internal Generation before the Event (10 - 1)	MW	47202	29219	58848	1950	36815
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	2468	844	1925	96	1595
13	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 11)	MW/Hz	18881	11688	23539	780	14726
14	Composite ideal response (12 + 13)	MW/Hz	21349	12531	25464	876	16321
15	Percentage ideal response	%	10.2%	58.2%	28.2%	50.1%	32.8%

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

Total Change in (MW)	1410
FRC for NEWS GRID (dp/df) MW/Hz	20735
Power Number (net change in MW/maximum change in frequency)	11016

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
		2182	24222	4690	131529	13742