

**Frequency Response Characteristic and Performance Computation in NorthEastern Region (Based on SCADA data)**

At 13:53 Hrs of 17th June 2024, NR demand experienced a reduction in load of the order of 16.5 GW. The incident occurred immediately after tripping of both bipoles of +/-800 kV HVDC Champa (WR) - Kurukshetra (NR) which was carrying 4,500 MW from the WR to NR. After tripping of the HVDC link, low voltages were observed across the Northern region and multiple lines and generation tripping occurred.

S No	Particulars	Dimension	Assam GBPS	Agartala GBPS	Bongaigaon TPP	Palatana	Doyang HEP	Kameng HEP	Khandong HEP	Khandong Stg-2	Kopili HEP	Loktak HEP	Panyor HEP	Pare HEP	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura*	NER Region*	
1	Actual Net Interchange before the Event (13:53:12)	MW	-162	-72	-634	-416	0	-296	0	-19	-150	-106	0	0	99	905	100	67	78	108	226	-387	
2	Actual Net Interchange after the Event (13:54:08)	MW	-145	-53	-617	0	0	-296	0	-19	-102	-102	0	0	104	1024	101	71	81	114	265	265	
3	Change in Net Interchange (2 - 1)	MW	16.7	18.3	17.1	416.0	0.0	0.0	0.0	0.3	47.3	3.2	0.0	0.0	4.3	119.2	1.1	4.1	2.7	6.4	38.8	652.1	
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	0.0	0.0	0.0	416.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	416.0	
5	Control Area Response (3 - 4)	MW	16.7	18.3	17.1	0.0	0.0	0.0	0.0	0.3	47.3	3.2	0.0	0.0	4.3	119.2	1.1	4.1	2.7	6.4	38.8	236.1	
6	Frequency before the Event	Hz	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034	50.034
7	Frequency after the Event	Hz	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629	50.629
8	Change in Frequency (7 - 6)	Hz	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
9	Frequency Response Characteristic (5 / 8)	MW/Hz	28	31	29	0	0	0	0	79	5	0	0	7	200	2	7	4	11	65	397		
10	Frequency Response Obligation (FRO) of control area	MW/Hz	0	0	35	35	3	20	0	2	6	3	16	6	7	108	0	22	6	7	30	306	
11	Frequency Response Performance (FRP) (9/10)		NA	NA	0.82	0.00	No Gen	0.00	No Gen	0.28	13.59	1.98	No Gen	No Gen	0.99	1.85	NA	0.32	0.79	1.47	2.18	1.30	

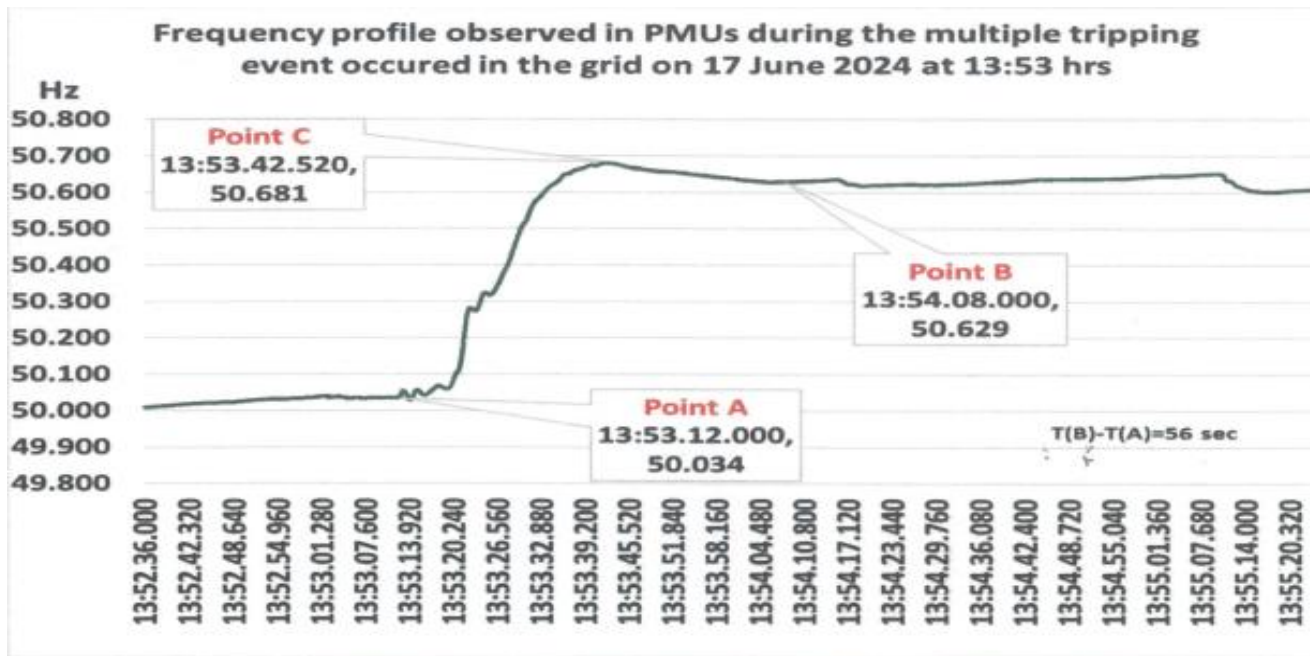


Figure 1: Multiple tripping event in the grid at 13:53 hrs of 17<sup>th</sup> June 2024