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

EVENT:	On 20th July 2023, As reported at 13:53 hrs 220kV Bus Bar protection operated at Bhadla_PG and resulting in tripping of all 220kV Circuits connected to bus bar 1-B. this resulted in generation loss of around 2542 MW in Rajasthan RE complex.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 (13:52:56)	MW	13887	-3071	-8674	331	-2395
2	Actual Net Interchange after the Event (13:53:44)	MW	15588	-3402	-9565	302	-2791
3	Change in Net Interchange (2-1)	MW	1700	-331	-891	-29.0	-396
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	2542	0	0	0	0
5	Control Area Response (3 - 4)	MW	-842	-331	-891	-29	-396
6	Frequency before the Event	HZ	50.07	50.07	50.07	50.07	50.07
7	Frequency after the Event	HZ	50.00	50.00	50.00	50.00	50.00
8	Change in Frequency (7 - 6)	HZ	-0.065	-0.065	-0.065	-0.065	-0.065
9	Frequency Response Characteristic (5 / 8)	MW/Hz	12947	5090	13700	447	6088
10	Net System Demand met before the Event	MW	74647	26571	53061	2946	42974
11	Internal Generation before the Event (10 - 1)	MW	60759	29642	61735	2615	45369
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	2986	1063	2122	118	1719
13	Ideal generator response assuming 5% droop…….40% per Hz (40% of Row 11)	MW/Hz	24304	11857	24694	1046	18148
14	Composite ideal response (12 + 13)	MW/Hz	27290	12920	26816	1164	19867
15	Percentage ideal response	%	47.4%	39.4%	51.1%	38.4%	30.6%

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

Total Change in (MW)	2542
FRC for NEWS GRID (dp/df) MW/Hz	**39108**
Power Number (net change in MW/maximum change in frequency)	**12969**

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
	3079	**23349**	**4862**	**127495**	**17510**	**26197**