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

EVENT:	On 15-Jan-24, at 14:06 hrs phase-to-phase (R-Y) fault occured on the 400 kV Bhadla (Raj)-Bikaner (Raj)-2 line due to conductor snapping between tower location no. 456-457. This fault led to reduction in active power of RE plants connected to Bhadla, Bikaner, and Fatehgarh stations. As per the SCADA data, around 1800 MW generation reduction was observed in NR solar generation.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (14:06:40)	MW	10716	-7087	-7316	-11	3601
2	Actual Net Interchange after the Event (14:07:40)	MW	12317	-7332	-8075	-16	3003
3	Change in Net Interchange (2-1)	MW	1601	-245	-759	-5	-599
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	1800	0	0	0	0
5	Control Area Response (3 - 4)	MW	-199	-245	-759	-5	-599
6	Frequency before the Event	HZ	50.06	50.06	50.06	50.06	50.06
7	Frequency after the Event	HZ	50.00	50.00	50.00	50.00	50.00
8	Change in Frequency (7 - 6)	HZ	-0.061	-0.061	-0.061	-0.061	-0.061
9	Frequency Response Characteristic (5 / 8)	MW/Hz	3271	4034	12478	82	9846
10	Net System Demand met before the Event	MW	60548	18455	64998	1637	48506
11	Internal Generation before the Event (10 - 1)	MW	49832	25542	72314	1647	44905
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	2422	738	2600	65	1940
13	Ideal generator response assuming 5% droop…….40% per Hz (40% of Row 11)	MW/Hz	19933	10217	28926	659	17962
14	Composite ideal response (12 + 13)	MW/Hz	22355	10955	31526	724	19902
15	Percentage ideal response	%	14.6%	36.8%	39.6%	11.4%	49.5%

(*) - Data may be constant/suspected during the event Note: +ve exchange=> import ; (-)ve exchange => export	# only interchange of 132kv Surjamani-comilla D/c.

Total Change in (MW)	1800
FRC for NEWS GRID (dp/df) MW/Hz	**29606**
Power Number (net change in MW/maximum change in frequency	**7547**

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
	2415	**4376**	**4683**	**139838**	**1104**	**40794**

Percentage of Non responsive generation to Primary frequency response (nuclear+ wind+ solar) as a percentage of total generation	24.11%
Percentage of non rotating generation (wind+ solar) as a percentage of total generation	21.69%