འབྲུག་གློག་མེ་ལས་འཛིན།
Bhutan Power Corporation Limited
(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)
Registered Office, Thimphu
Bhutan Power System Operator
Thimphu: Bhutan

02/BPC/BPSO/PSOD/Vol-I/20/ ૬૭૨ July 10, 2020

Chief Executive Officer,
Bhutan Electricity Authority,
Thimphu: Bhutan.

Subject: Submission of Transmission System Performance Report for the month of April to June, 2020.

Sir,

Kindly find enclosed with the transmission system performance report for the month of April to June, 2020. The report incorporate energy figure along with other Power System Parameters as per the Grid Code Regulation, 2008 Clause No: 6.14.1. Soft copy of the report is available in the BPSO website: http://bpso.bpc.bt.

Thanking you,

Yours faithfully,

(Ugyen Tshering)
Senior Manager

Copy to:
1. Director, Operation & Maintenance Department, Druk Green Power Corporation, Thimphu
2. Director, TS, BPC for kind information
3. Director, DS, BPC for kind information.

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Bhutan Power Corporation Limited

Bhutan Power System Operator

Thimphu: Bhutan

Transmission System Performance Report

Second Quarterly Report – April to June, 2020

Table of Contents

1. Introduction

The electricity transmission network in Bhutan is solely owned by Bhutan Power Corporation limited (BPC) and electricity generation is solely owned by Druk Green Power Corporation Limited (DGPC). Bhutan Power System Operator (BPSO) under BPC is responsible for safe, secure and efficient operation of Bhutan transmission network and generation.

This quarterly report is prepared in compliance to the Grid Code Regulation (GCR) 2008, clause 6.14.1, "System Operator has to submit a quarterly report covering the performance of the Transmission System to all Licensees, Authority and Ministry". This transmission performance report contains summary of growth of peak demand, performance of generating stations (power and energy generation), energy availability and requirement for the country, export and import of electricity to/ from India, frequency profile of selected substation and voltage profile of few important substations.

All the index and other calculations in this report have been executed based on the data received from substations and generating plants.

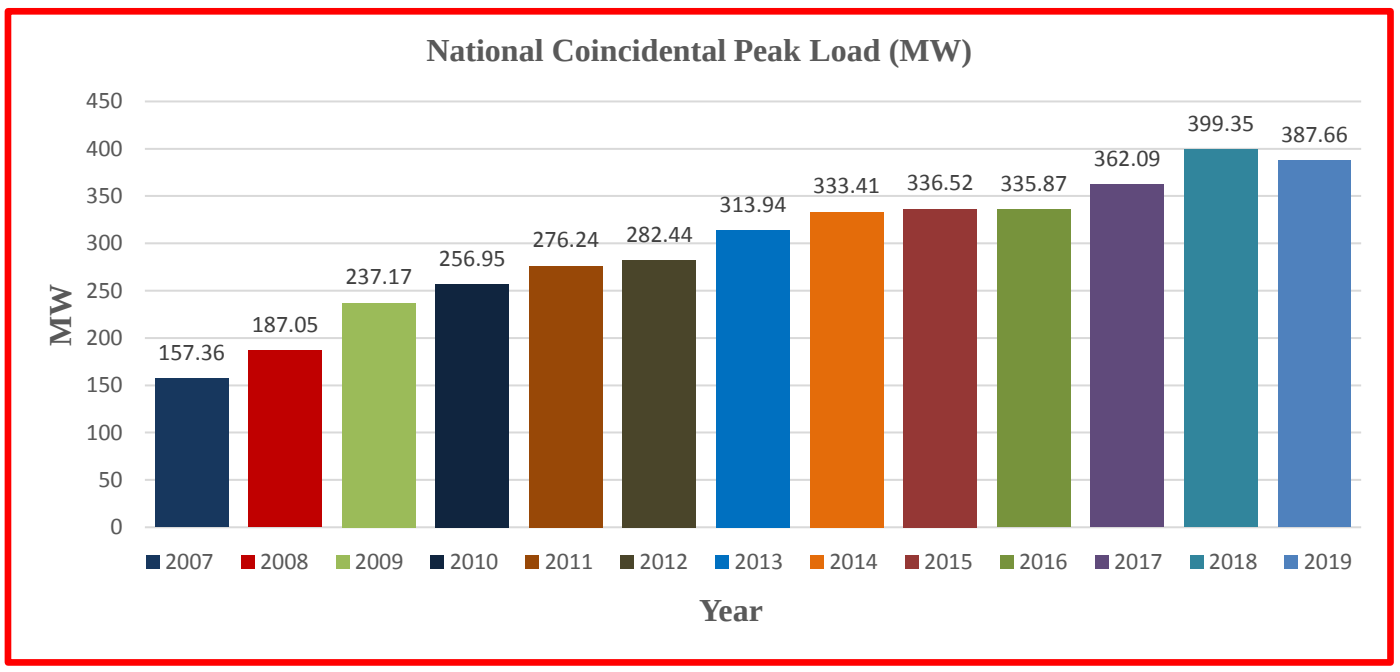
2. National Peak Demand

The national peak demand till now is recorded at **399.35MW** which was occurred on December 27, 2018 at 18:18 hours. This is calculated by summation of Feeder Loading at Plants minus Export.

Table 2.1. The National Peak Demand since 2007

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Peak Load (MW)	157.36	187.05	237.17	256.95	276.24	282.44	313.94	333.41	336.52	335.87	362.09	399.35	387.66
% Growth over previous Year	-	18.87	26.79	8.34	7.51	2.24	11.15	6.20	0.93	-0.19	7.81	10.29	-2.93

Graph 2.1. The growth in National Peak Demand since 2007



2.1. Power (MW) consumed by country

Following methods are used to calculate peak demand for the Eastern Grid, Western Grid and National demand.

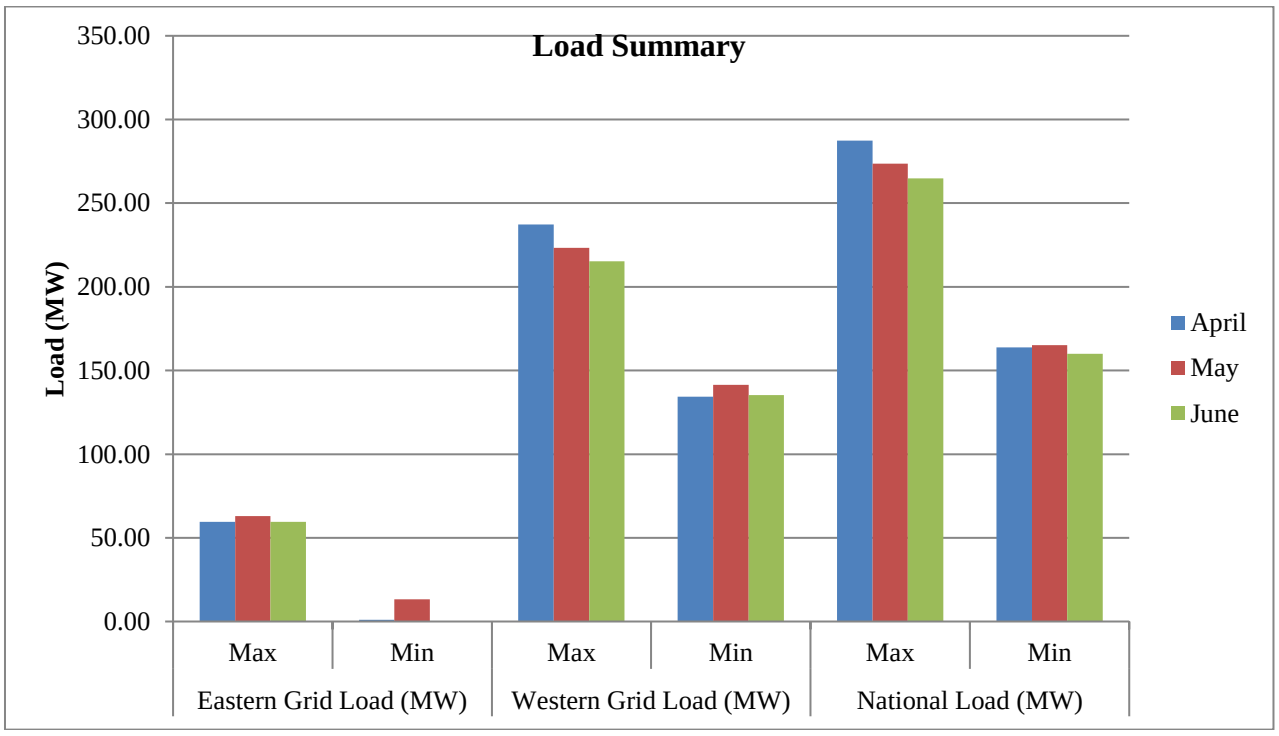
1. **National Demand** = (Sum of all total generation)-(Sum of all Export of Import)
2. **National Demand** = (Sum of all feeders loading at hydropower station) – (Sum of all Export/Import)
3. **National Demand** = (Sum of all substation loading)

For this report, the National Demand was calculated using method-3.

Table 2.1.2. Domestic demand for Eastern Grid, Western Grid and National using method- 3

Grid	Eastern Grid Load (MW)		Western Grid Load (MW)		National Load (MW)	
Month	Max	Min	Max	Min	Max	Min
April	59.53	1.11	237.33	134.32	287.28	163.88
May	63.04	18.59	223.36	141.32	273.67	165.10
June	59.58	13.55	215.24	135.33	264.73	159.88

Graph 2.1.2. Domestic demand for Eastern Grid, Western Grid and National using method- 3



The national load pattern for the month of April to June, 2020 calculated using method-3 is attached as **Annexure-II**

3. Energy Availability and Requirement for the country

3.1. Energy (MU) consumed by Country

The total energy consumed within Bhutan is computed from the total energy DGPC had sold to BPC including the royalty energy.

Table 3.1.1. Total Energy (MU) consumed

Month	Total Ex-bus (MU)	Total Export/Import (MU)	Total energy sold to BPC (MU)
April	443.06862901	272.87978242	170.18884659
May	1004.00360468	828.60874800	175.39485668
June	1449.47060733	1285.35662832	164.11397933

Graph 3.1.1. Total Energy (MU) consumed

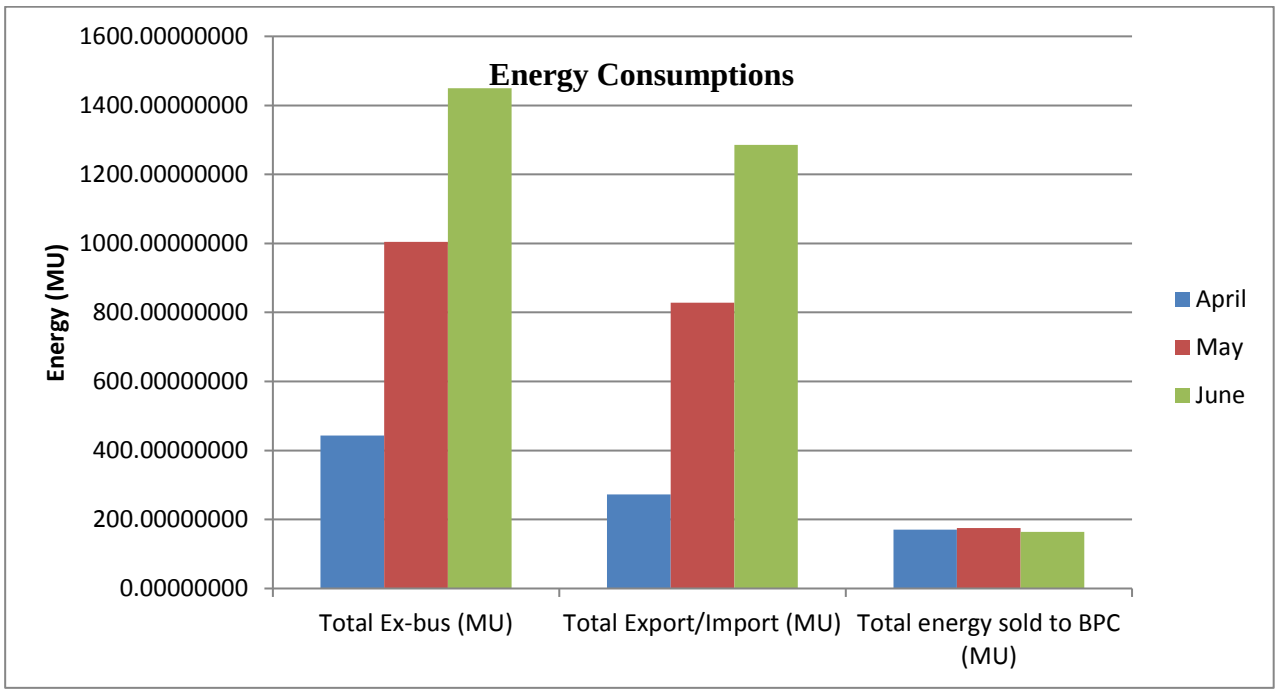
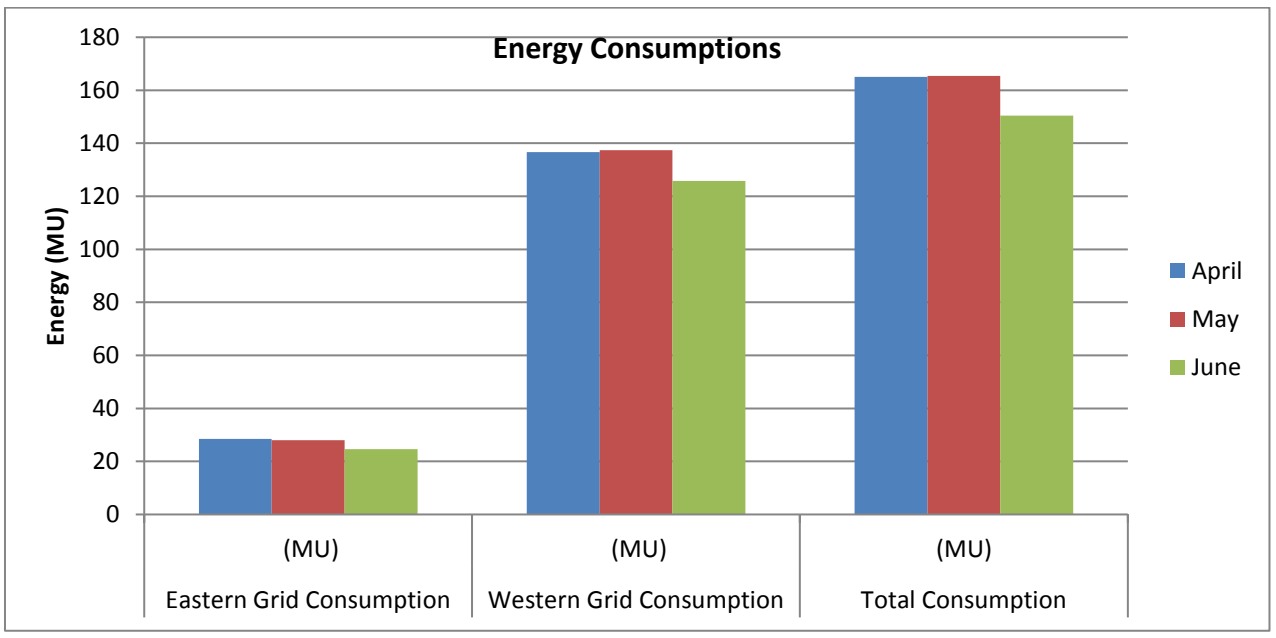


Table 3.1.2. Energy (MU) consumed

Grid	Eastern Grid Consumption	Western Grid Consumption	Total Consumption
Month	(MU)	(MU)	(MU)
April	28.4500265	136.6448945	165.094921
May	28.007881	137.3623996	165.3702806
June	24.6254595	125.795925	150.4213845

Graph 3.1.2. Energy (MU) consumed



4. Performance of generating plants

4.1. Power and Energy Generation

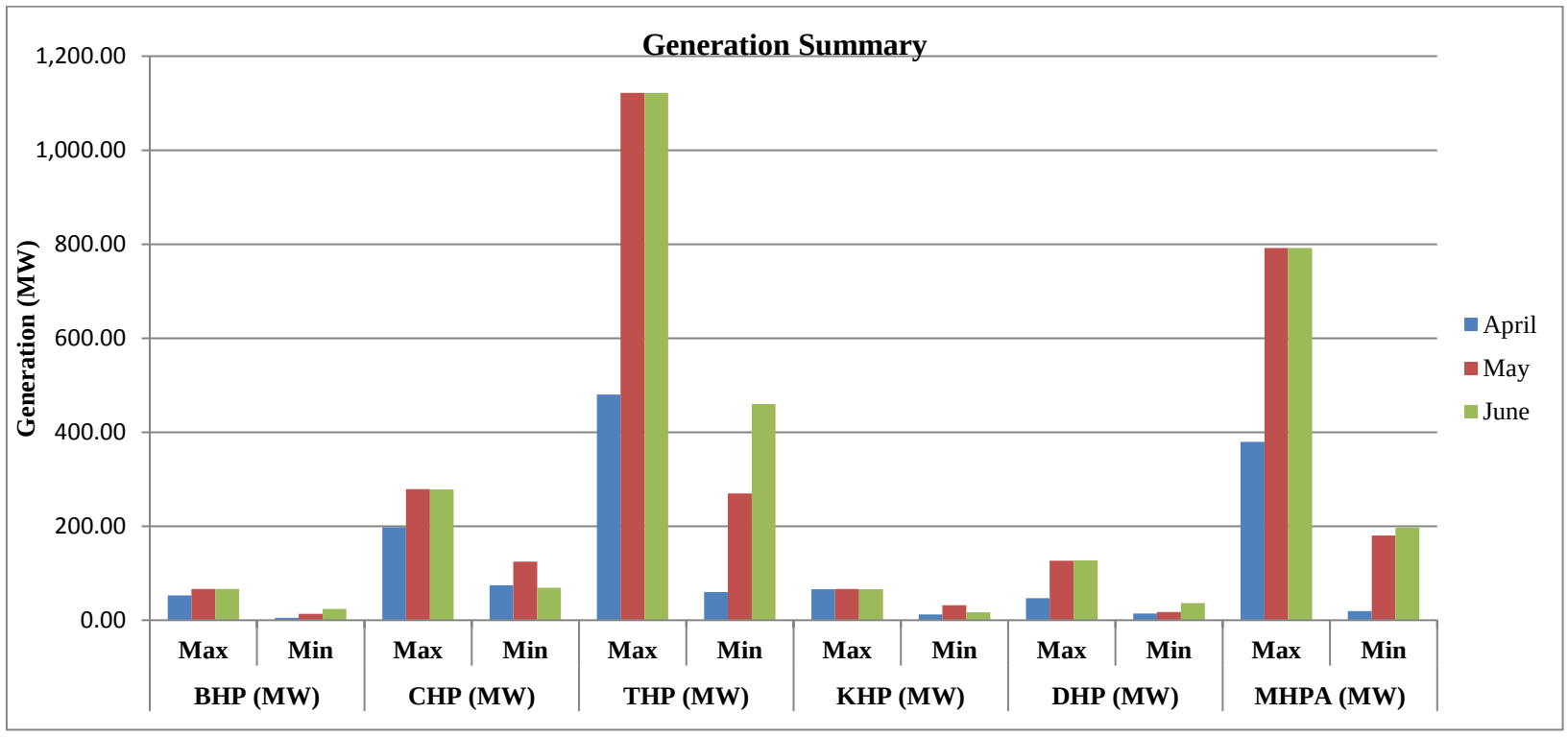
The maximum total generation for the second quarter of year 2020 was 2452.34 MW in month of May and minimum generation was 1222.88 MW in the April month.

Table: 4.1.1 Summary of maximum and minimum generation by various hydropower plant

Generation By	BHP (MW)		CHP (MW)		THP (MW)		KHP (MW)		DHP (MW)		MHPA (MW)		TOTAL (MW)	
Month	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
April	52.70	5.00	197.90	74.51	480.00	60.00	66.00	12.01	47.00	14.01	379.28	19.70	1,222.88	185.23
May	66.40	13.40	278.79	124.81	1,122.00	270.00	66.18	31.58	126.92	17.16	792.05	180.03	2,452.34	636.98
June	66.50	24.10	278.02	69.10	1,122.00	460.00	66.00	16.50	126.98	36.2	791.61	197.12	2,451.11	803.02

Source: Hydropower Plants (DGPC)

Graph: 4.1.1 Summary of maximum and minimum generation by various hydropower plant



Daily maximum, minimum and average generation by each generating plant for the month of April to June, 2020 is attached as **Annexure-I.**

4.2.Plant Capacity Factor

The capacity factor of each generating plant was calculated as below:

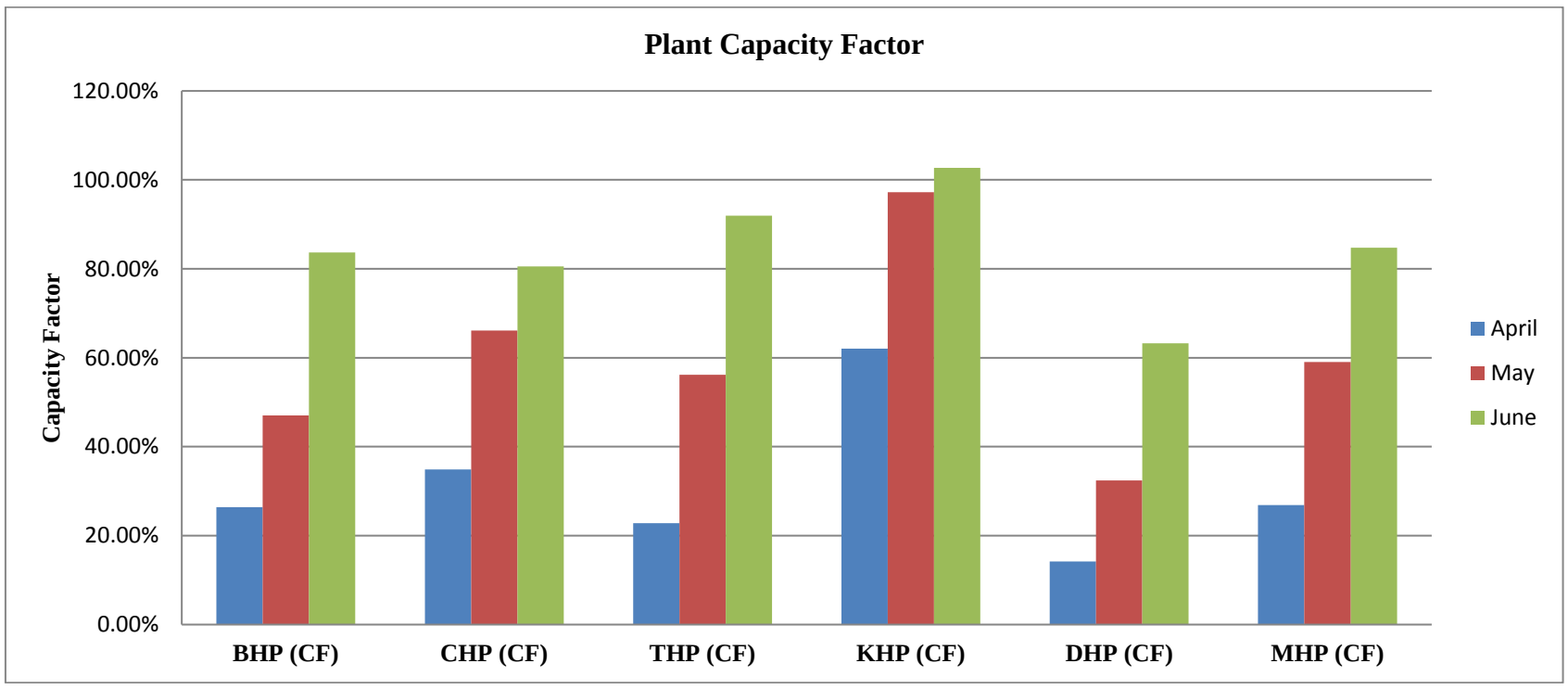
$$Capacity\ factor = \frac{Total\ energy\ plant\ has\ produce\ over\ a\ period}{Total\ energy\ plant\ would\ produce\ when\ operated\ at\ full\ capacity}$$

Table 4.2.1: Total generation and capacity factor of various hydropower plants

Month	BHP (MU)	BHP (CF)	CHP (MU)	CHP (CF)	THP (MU)	THP (CF)	KHP (MU)	KHP (CF)	DHP (MU)	DHP (CF)	MHP (MU)	MHP (CF)
April	12.17395	26.42%	84.37467	34.88%	167.533091	22.81%	26.792524	62.02%	12.85	14.17%	139.34	26.88%
May	22.38514	47.01%	165.26998	66.11%	426.31782	56.18%	43.417115	97.26%	30.358548	32.38%	316.255	59.04%
June	38.57314	83.71%	194.85251	80.54%	675.09527	91.92%	44.357304	102.68%	57.38	63.24%	439.22	84.73%

Source: TD, BPC

Graph 4.2.1: Capacity factor of various hydropower plants



5. Export and Import of Electricity

Maximum export for the second quarter of year 2020 was 1238 MW in the month of June to Binaguri substation in India. The minimum export recorded was 0.03 MW to Salakoti and Rangia substation in India during the month of April.

Table 5.1. Export of electricity to India

Export To	Binaguri (MW)		Birpara (MW)		Salakoti and Rangia (MW)	
Month	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**
April	398.00	29.00	128.00	0.04	101.04	0.03
May	1,097.00	92.00	273.55	0.33	150.44	1.24
June	1,238.00	374.00	311.08	6.00	123.20	19.55

Graph 5.1. Export of electricity to India

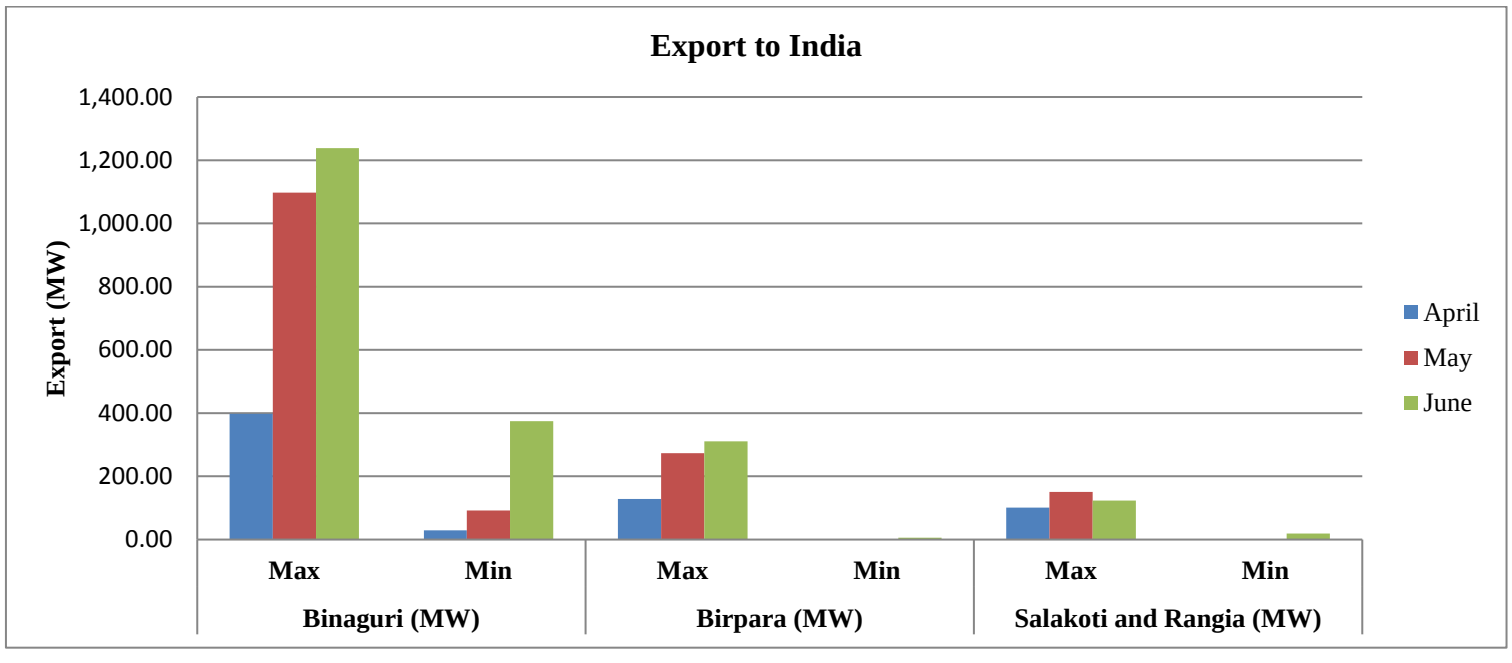


Table 5.2. Import of electricity from India.

Import From	Binaguri (MW)		Birpara (MW)		Salakoti and Rangia (MW)	
Month	Max	Min	Max	Min	Max	Min
April	0.00	0.00	73.00	0.10	46.37	0.01
May	0.00	0.00	82.18	4.30	6.74	0.50
June	0.00	0.00	0.00	0.00	0.00	0.00

6. Frequency profile

The nominal allowed frequency range shall be 50Hz ± 1% in Bhutan. The system is normally managed such that frequency is maintained within operational limit of 49.5 Hz to 50.5 Hz. However, frequency may move outside these limit under faulty condition.

As per the Grid Code 2008, clause 6.4.1 the frequency is classified into three different bands as follows:

a. Normal state
   The transmission System frequency is within the limit of 49.5Hz to 50.5Hz.
b. Alert state
   The Transmission System frequency is beyond the normal operating limit but within 49.0Hz to 50.0Hz.
c. Emergency state
   There is generation deficiency and frequency is below 49.0Hz.

The frequency at 220kV Bus at 220/66/11kV Semtokha substation in the western grid and 132kV Bus at 60MW Kurichhu Hydropower Plant in the eastern grid is considered.

6.1.Frequency for the month of April, 2020

Table 6.1.1. Bus Frequency profile of Malbasea Substation

Sl. No.	Operating State	Bus Frequency
1	Normal State	100.00%
2	Alert State	0.00%
3	Emergency State	0.00%
4	Blackout/Other	0.00%

Graph 6.1.1. Bus Frequency of Malbase Substation

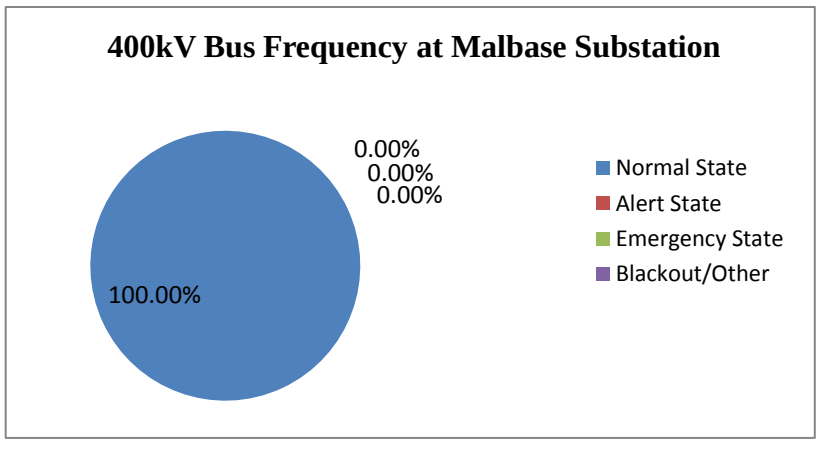
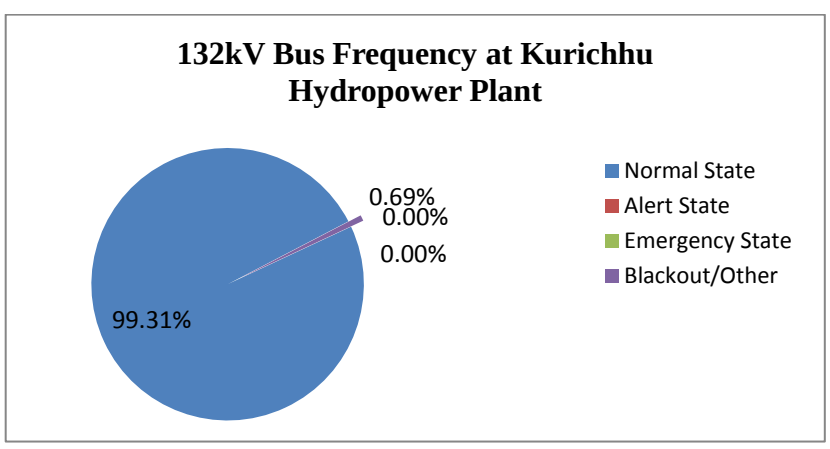


Table 6.1.2. Bus frequency of Kurichhu Hydro Power Plant

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	99.31%
2	Alert State	0.00%
3	Emergency State	0.00%
4	Blackout/Other	0.69%

Graph 6.1.2. Bus frequency of Kurichhu Hydro Power Plant



In the month of April, 2020, the Western grid has maintained the frequency within the normal operating limit of 100% and Eastern grid have managed to operate the frequency within normal operating limit of 99.3100% where 0.690 % was deviated to blackout and other.

6.2.Frequency for the month of May, 2020

Table 6.2.1. Bus frequency of Semtokha Substation

Sl. No.	Operating State	Frequency
1	Normal State	100.00%
2	Alert State	0.00%
3	Emergency State	0.00%
4	Blackout/Other	0.00%

Graph 6.2.1. Bus frequency of Semtokha Substation

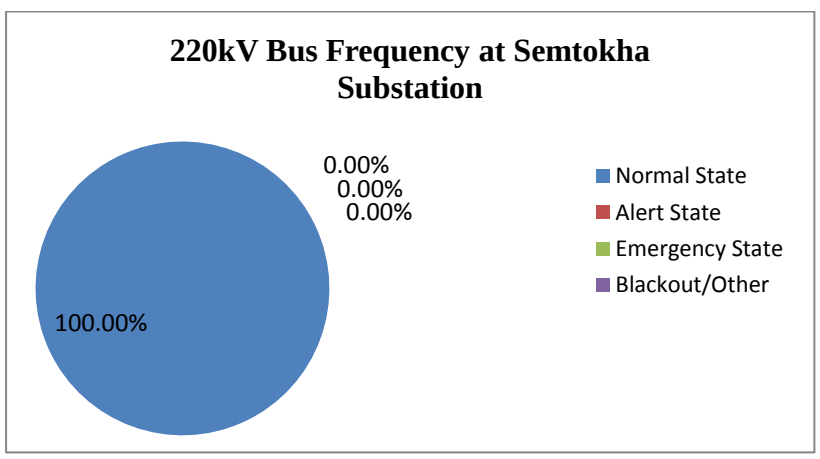
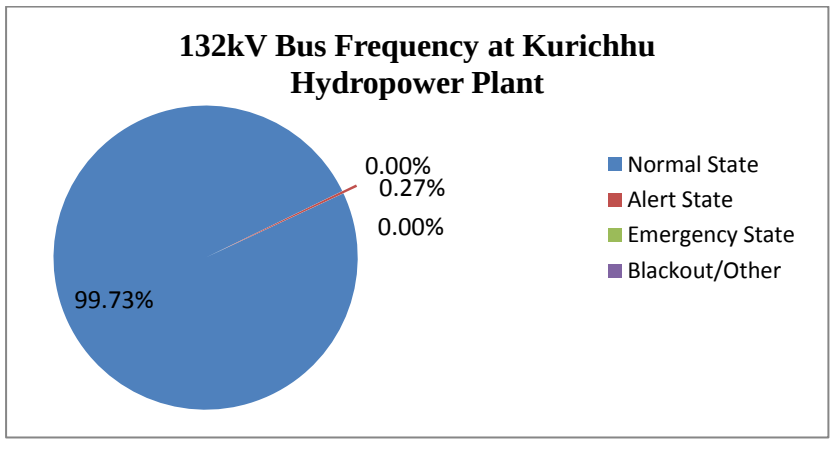


Table 6.2.2. Bus frequency of Kurichhu Hydro Power Plant

Sl. No.	Operating State	Frequency
1	Normal State	99.73%
2	Alert State	0.27%
3	Emergency State	0.00%
4	Blackout/Other	0.00%

Graph 6.2.2. Bus frequency of Kurichhu Hydro Power Plant



In the month of May, 2020, the western grid frequency was maintained at normal operating range of 100% whereas Eastern grid was maintained 99.73% in normal operating range and deviated 0.27% to alert state.

6.3.Frequency for the month of June, 2020

Table 6.3.1. Bus frequency of Semtokha Substation

Sl. No.	Operating State	Frequency
1	Normal State	96.51%
2	Alert State	0.00%
3	Emergency State	0.00%
4	Blackout/Other	3.49%

Graph 6.3.1. Bus frequency of Semtokha Substation

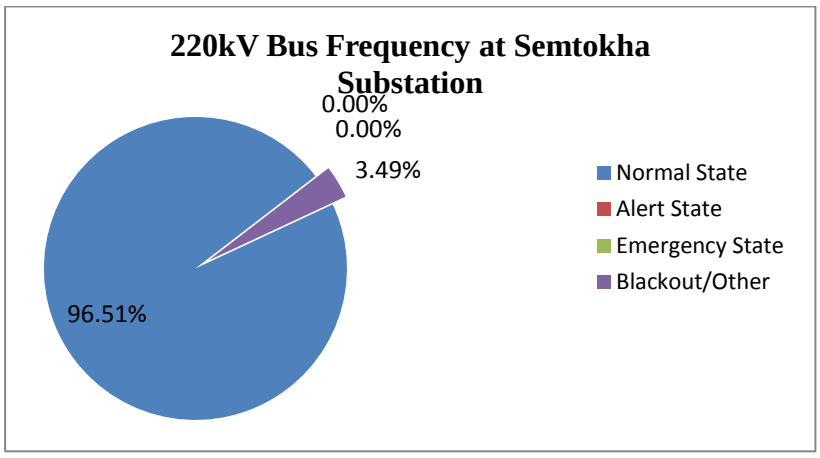
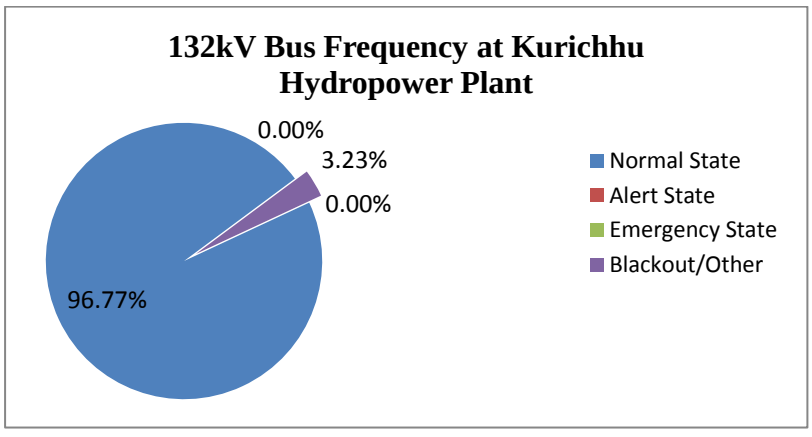


Table 6.3.2. Bus frequency of Kurichhu Hydro Power Plant

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	96.77%
2	Alert State	0.00%
3	Emergency State	0.00%
4	Blackout/Other	3.23%

Graph 6.3.2. Bus frequency of Kurichhu Hydro Power Plant



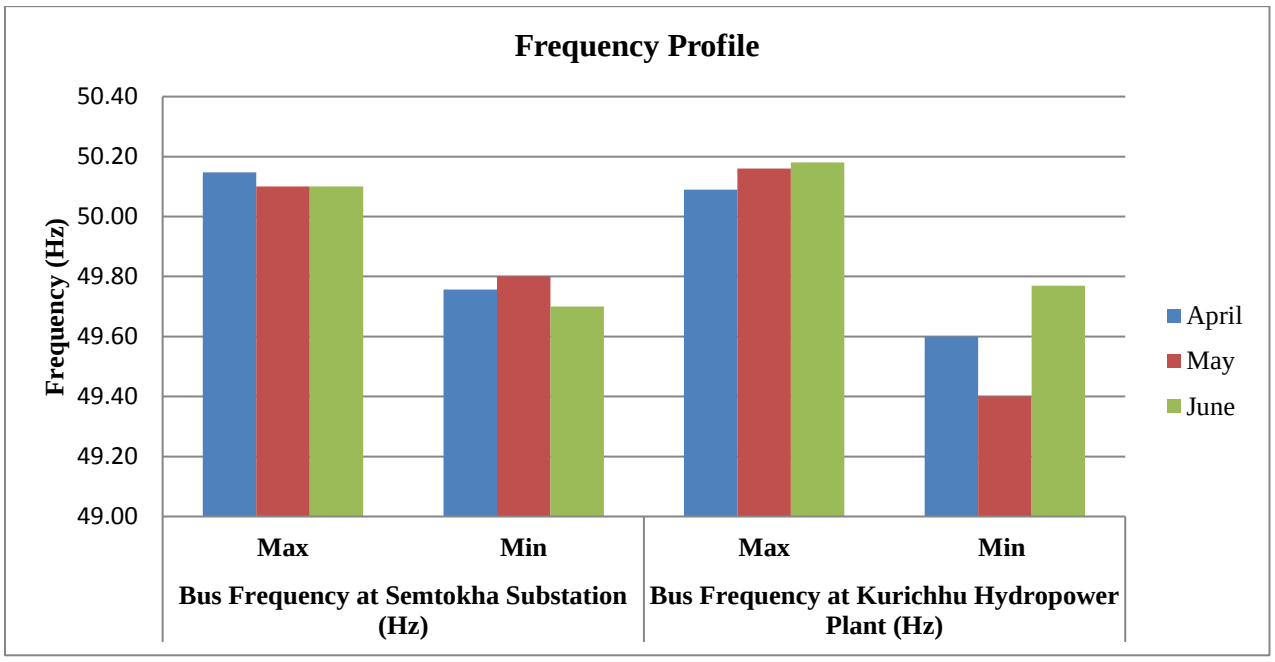
In the month of June, 2020, western gird frequency had maintained at 96.51 % within the normal operating range and deviated other to blackout/other state. The eastern also maintain almost same as western with 96.77 % within normal operating lime and deviated 3.23 % to blackout/other state.

6.4.Frequency Summary for the month of April to June, 2020

Table 6.4.1. Frequency summary for the month of April to June, 2020.

Substation/Plant	Bus Frequency at Semtokha Substation (Hz)		Bus Frequency at Kurichhu Hydropower Plant (Hz)	
Month	**Max**	**Min**	**Max**	**Min**
April	50.15	49.76	50.09	49.60
May	50.10	49.80	50.50	49.40
June	50.10	49.70	50.30	49.77

Graph 6.4.1. Frequency summary for the month of April to June, 2020



Daily maximum, minimum and average Frequency of Malbase substation in western grid and Kurichhu Hydro Power Plant in eastern grid for the month of April to June, 2020 is attached as **Annexure-III**

7. Voltage Profile of selected substation

As per the Grid Code 2008, clause 6.4.1 the voltage at all connection point is classified into three different bands as follows:

1. *Normal State*
   The voltage at all connection points are within the limits of 0.95 times and 1.05 times of the normal values

2. *Alert State*
   The voltage at all connection points are outside the normal limit but within the limits of 0.9 times and 1.1 times of the nominal values.

3. *Emergency State*
   Transmission system voltages are outside the limit of 0.9 times and 1.1 times of nominal values.

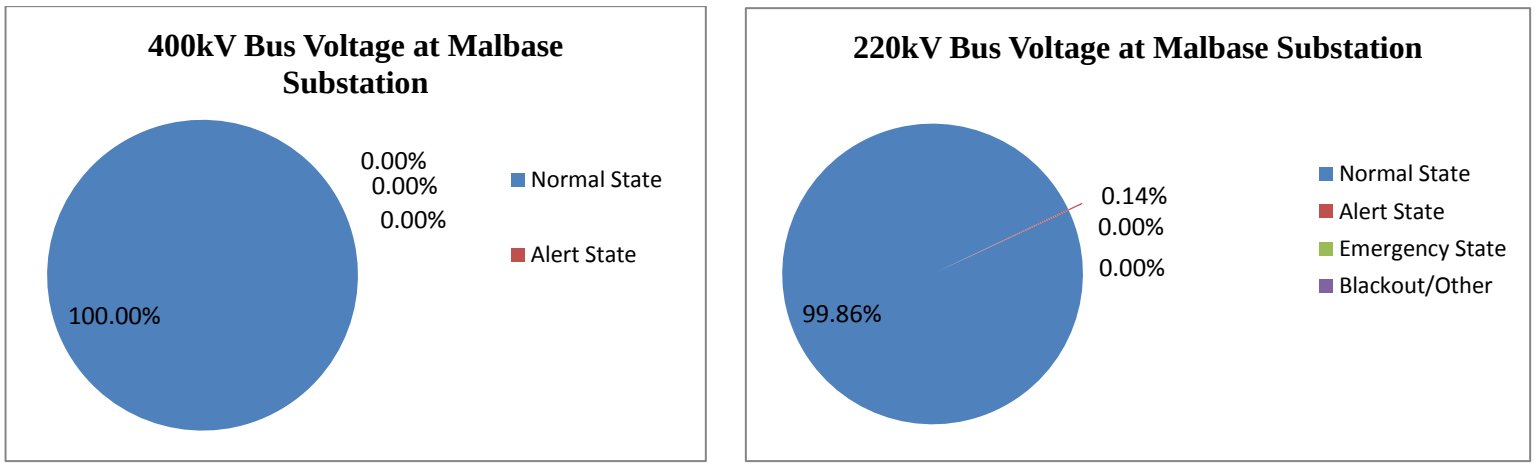
Due to the location of 400/22/66/11kV Malbase substation in western grid and 132/33/11kV Nangkhor substation in the eastern grid, the voltage profile of these substations are considered.

7.1.Voltage profile for the April, 2020

Table 7.1.1. Voltage Profile for 400/220/66kV Malbase Substation

Sl. No.	Operating State	400kV Bus Voltage	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	100.00%	99.86%	100.00%
2	Alert State	0.00%	0.14%	0.00%
3	Emergency State	0.00%	0.00%	0.00%
4	Blackout/Other	0.00%	0.00%	0.00%

Graph 7.1.1. Voltage Profile for 400/220/66kV Malbase Substation



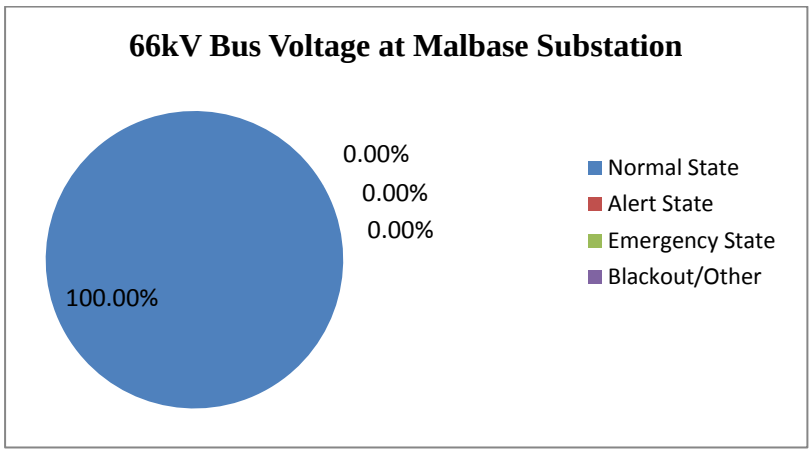
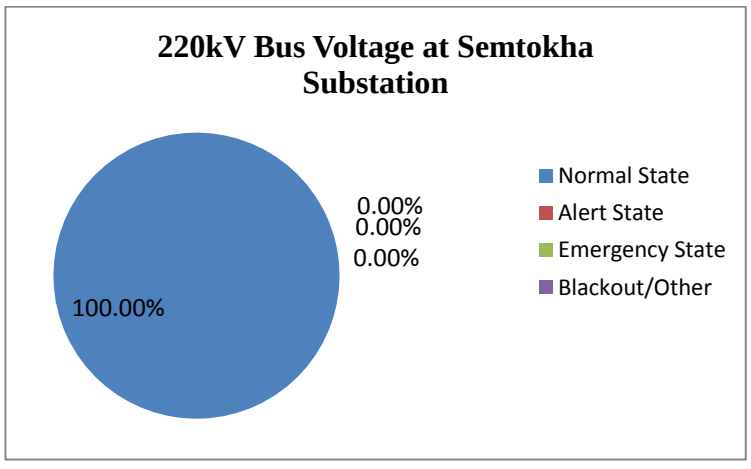


Table 7.1.2. Voltage Profile of 220/66/11kV Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	100.00%	100.00%
2	Alert State	0.00%	0.00%
3	Emergency State	0.00%	0.00%
4	Blackout/Other	0.00%	0.00%

Graph 7.1.2. Voltage Profile of 220/66/11kV Semtokha Substation



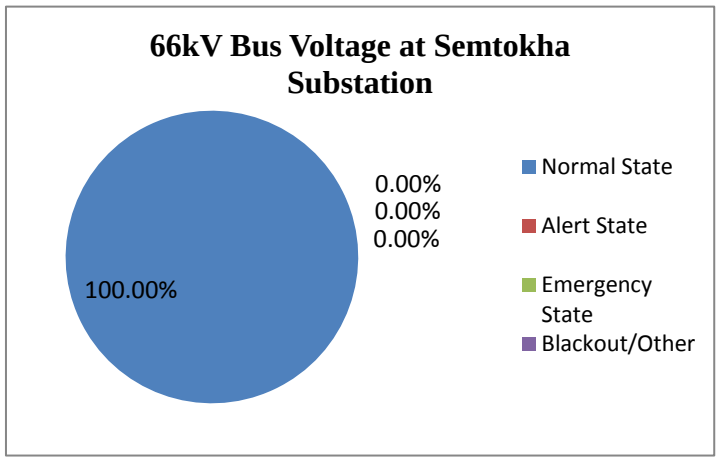
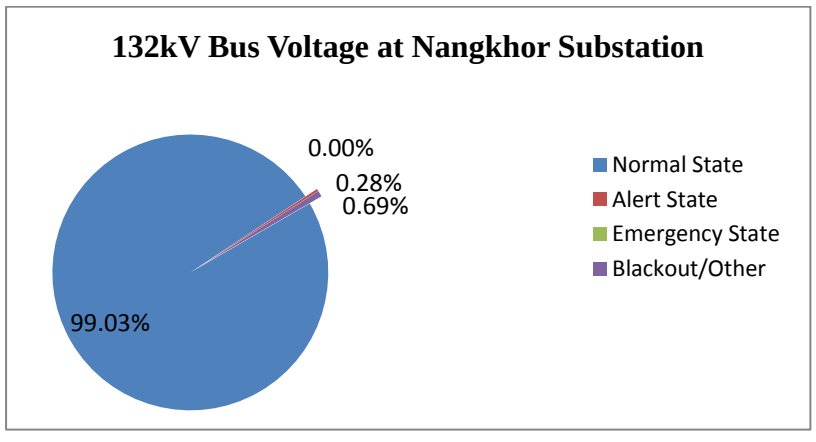


Table 7.1.3. Voltage Profile of 132/33/11kV Nangkhor Substation

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	99.03%
2	Alert State	0.28%
3	Emergency State	0.00%
4	Blackout/Other	0.69%

Graph 7.1.3. Voltage Profile of 132/33/11kV Nangkhor Substation

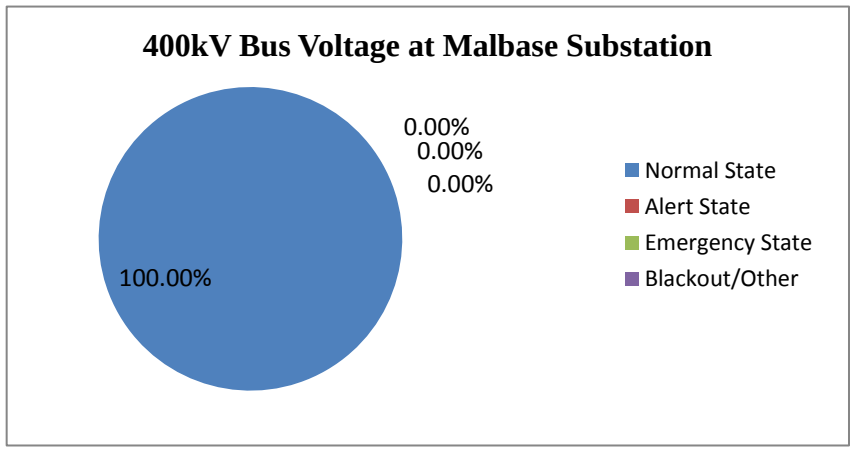


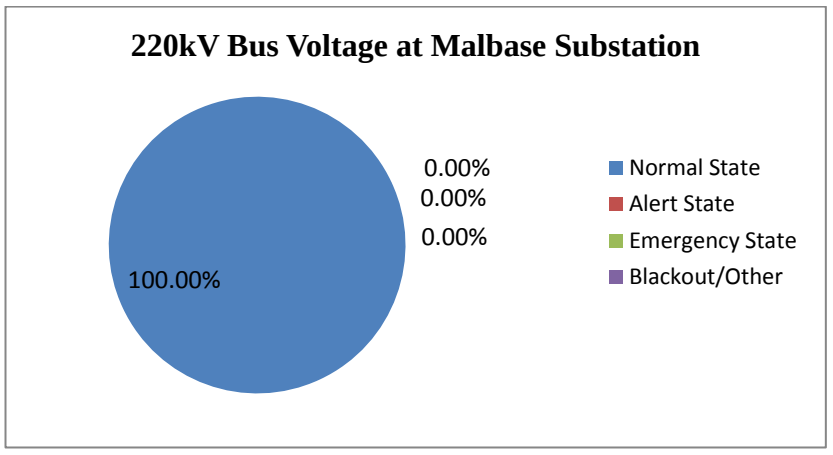
7.2.Voltage Profile for month of May, 2020

Table 7.2.1. Voltage Profile for 400/220/66kV Malbase Substation

Sl. No.	Operating State	400kV Bus Voltage	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	100.00%	100.00%	100.00%
2	Alert State	0.00%	0.00%	0.00%
3	Emergency State	0.00%	0.00%	0.00%
4	Blackout/Other	0.00%	0.00%	0.00%

Graph 7.2.1. Voltage Profile for 400/220/66kV Malbase Substation





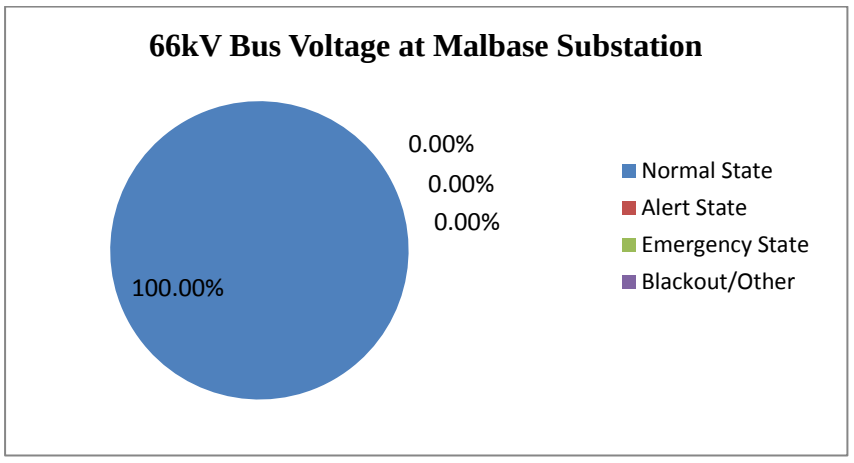
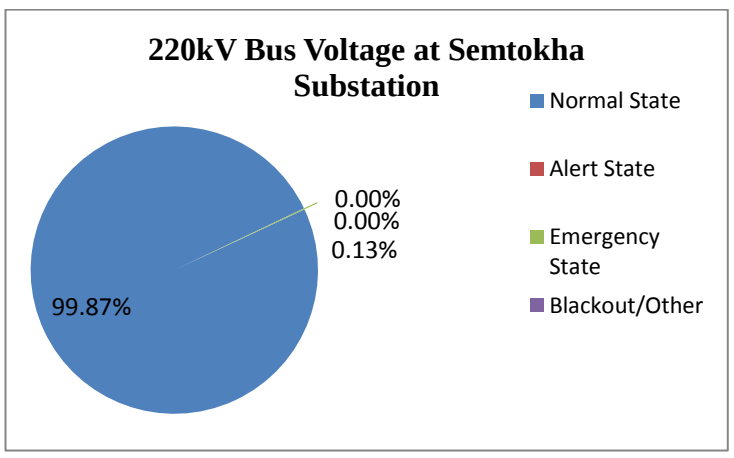


Table 7.2.2. Voltage Profile of 220/66/11kV Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	99.87%	100.00%
2	Alert State	0.00%	0.00%
3	Emergency State	0.13%	0.00%
4	Blackout/Other	0.00%	0.00%

Graph 7.2.2. Voltage Profile of 220/66/11kV Semtokha Substation



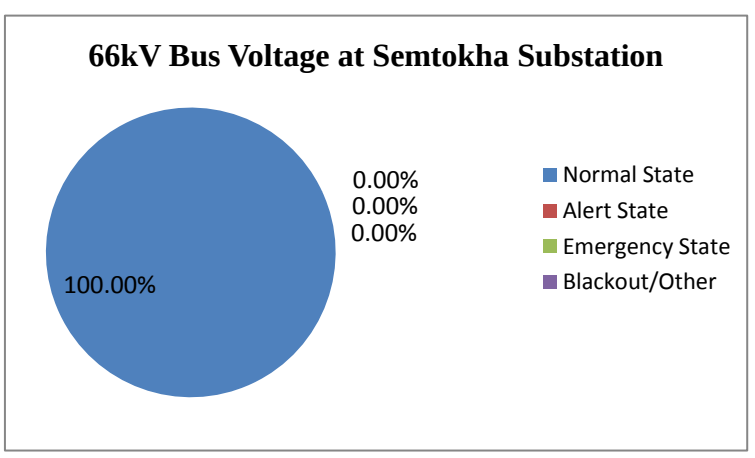
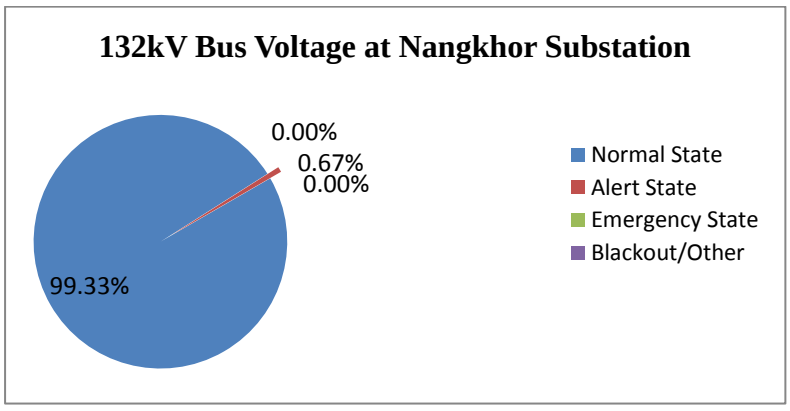


Table 7.2.3. Voltage Profile of 132/33/11kV Nangkhor Substation

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	99.33%
2	Alert State	0.67%
3	Emergency State	0.00%
4	Blackout/Other	0.00%

Graph 7.2.3. Voltage Profile of 132/33/11kV Nangkhor Substation



7.3.Voltage Profile for the month of June, 2020

Table 7.3.1. Voltage Profile for 400/220/66kV Malbase Substation

Sl. No.	Operating State	400kV Bus Voltage	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	100.00%	100.00%	99.58%
2	Alert State	0.00%	0.00%	0.00%
3	Emergency State	0.00%	0.00%	0.42%
4	Blackout/Other	0.00%	0.00%	0.00%

Graph 7.3.1. Voltage Profile for 400/220/66kV Malbase Substation

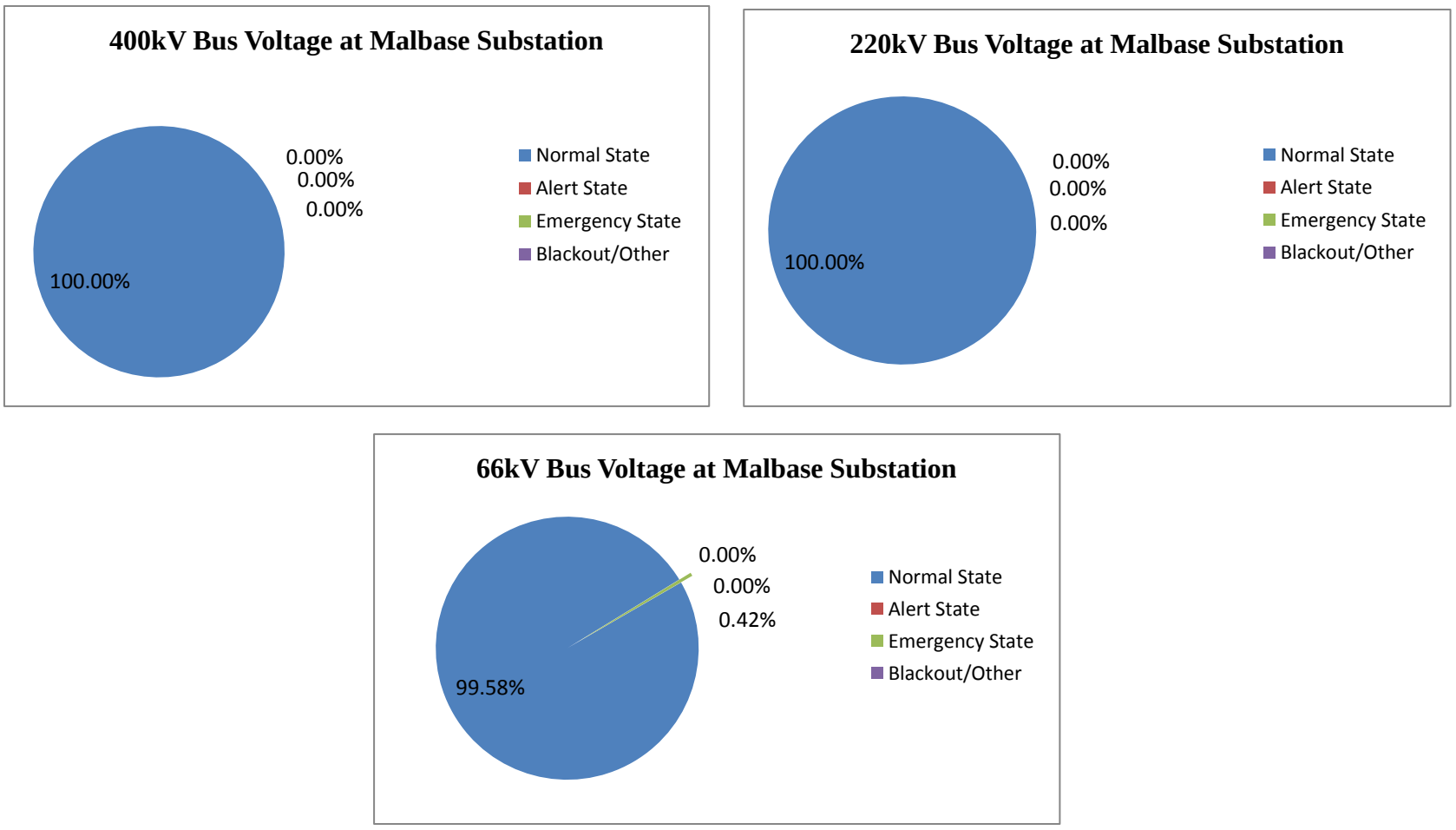


Table 7.3.2. Voltage Profile of 220/66/11kV Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	99.86%	99.86%
2	Alert State	0.00%	0.00%
3	Emergency State	0.00%	0.00%
4	Blackout/Other	0.14%	0.14%

Graph 7.3.2. Voltage Profile of 220/66/11kV Semtokha Substation

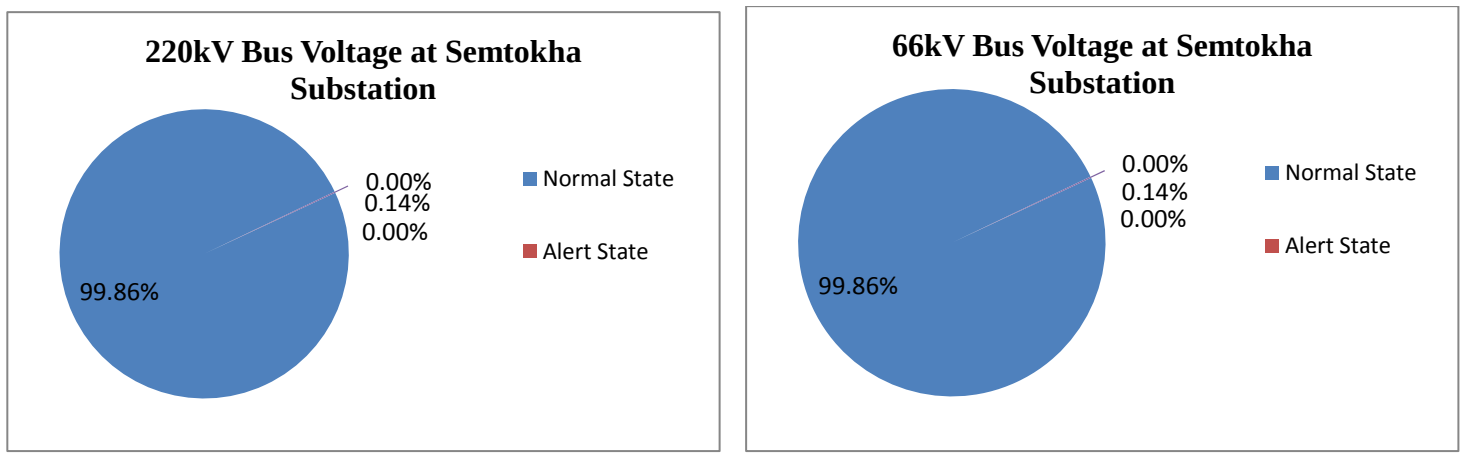
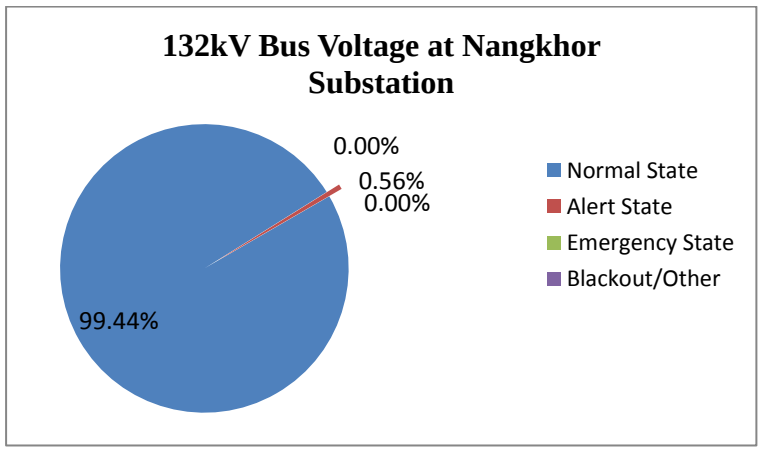


Table 7.3.3. Voltage Profile of 132/33/11kV Nangkhor Substation

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	99.44%
2	Alert State	0.56%
3	Emergency State	0.00%
4	Blackout/Other	0.00%

Graph 7.3.3. Voltage Profile of 132/33/11kV Nangkhor Substation

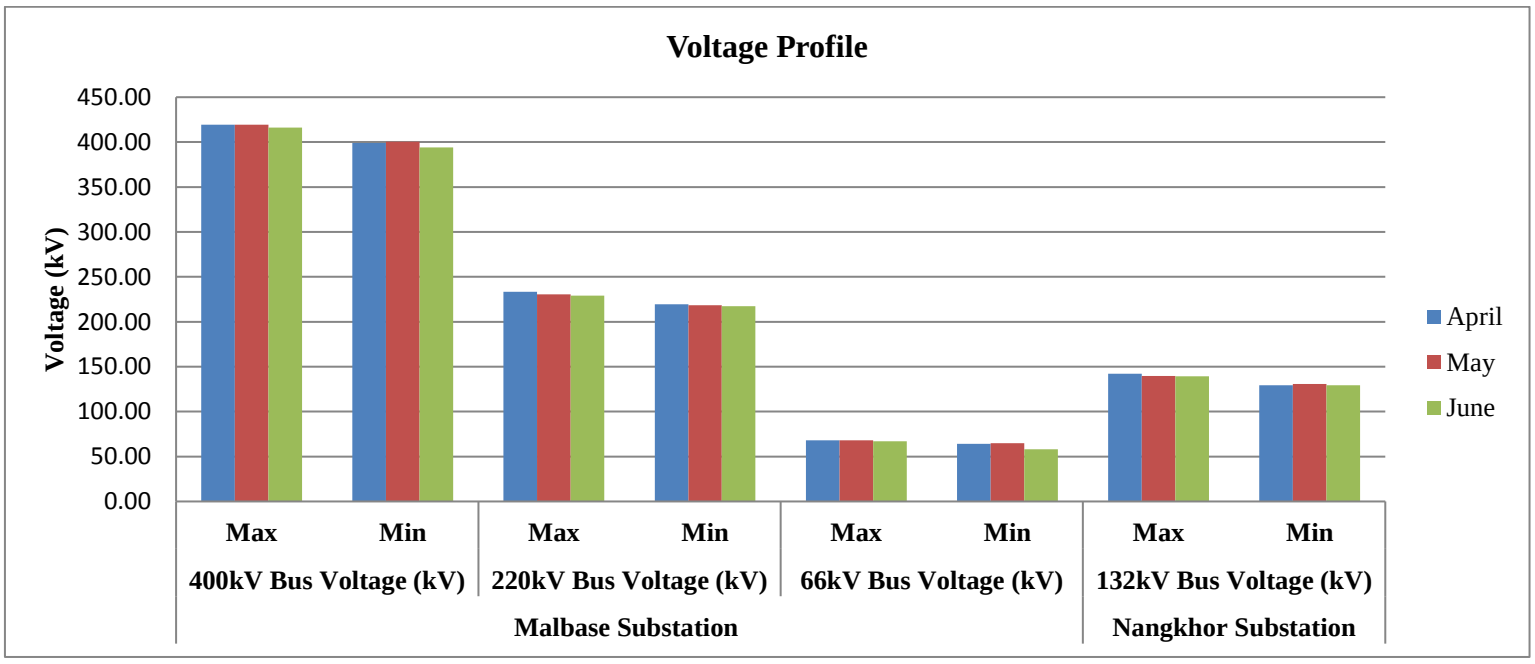


7.4.Voltage Summary for the Month of April to June, 2020

Table 7.4.1. Voltage Summary for the month of April to June, 2020

Substation	Malbase Substation						Nangkhor Substation	
Voltage Level	400kV Bus Voltage (kV)		220kV Bus Voltage (kV)		66kV Bus Voltage (kV)		132kV Bus Voltage (kV)	
Month	Max	Min	Max	Min	Max	Min	Max	Min
April	419.50	399.00	233.50	219.50	68.00	64.00	142.34	129.25
May	419.50	400.50	230.50	218.50	68.00	65.00	139.70	130.90
June	416.00	394.00	229.00	217.50	67.00	58.00	139.40	129.45

Graph 7.4.1. Voltage Summary for the month of April to June, 2020



Daily maximum, minimum and average bus voltage of Malbase substation in western grid and Nangkhor substation in eastern grid for the month of April to June, 2020 is attached as **Annexure-IV**

8. Major Outages of Feeders and Equipment

The transmission lines and equipment which were shut down for annual maintenance and hand/force trip are not considered in the report.

8.1.Major Outages in Eastern Grid

It had been observed that there was multiple tripping occurred during the second quarter of the year compare to the previous quarter. Generally, all the tripping occurred are of transient in nature or temporary fault which have been restored within few minutes. The 132kV Gelephu-Salakati feeder was out of service for more than 16 hours due to Lightning Arrester (LA) puncture/blast in B-Phase.

The feeders and equipment outages for the Eastern grid is attached as **Annexure-V**.

8.2.Major Outages in Western Grid

During the Second quarter of the year, there was no major outage occurred in western grid though there were multiple tripping happened. The 220kV Malbase-Birpara feeder was out of service for almost 7 hours.

The detail tripping report of any element is compiled and circulated to relevant stakeholder every month.

The feeders and equipment outages for the Western grid is attached as **Annexure-VI.**

9. Annexures

Annexure-I

Table: Generation of April, 2020

Apr-20	BHP (MW)			CHP (MW)			THP (MW)			KHP (MW)			DHP (MW)			MHP (MW)		
Date	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	16.70	15.10	15.73	131.10	79.50	97.20	240.00	120.00	183.75	43.74	12.01	24.97	16.85	15.45	16.07	161.27	119.79	139.60
2	16.40	13.70	15.33	130.93	88.59	104.74	260.00	170.00	193.33	45.00	15.00	32.64	17.04	15.04	16.06	170.02	124.69	0.00
3	16.20	13.00	14.40	131.09	95.73	103.50	260.00	200.00	212.50	32.09	24.05	28.26	16.36	15.06	15.73	236.10	120.25	0.00
4	14.90	13.50	14.27	131.35	79.96	92.18	260.00	120.00	184.17	30.83	14.75	25.11	15.38	14.51	14.87	145.05	19.70	0.00
5	15.60	13.40	14.21	176.48	80.77	101.64	350.00	60.00	209.17	40.50	20.20	29.09	15.56	14.05	15.02	260.07	130.04	0.00
6	14.30	13.50	13.85	123.42	79.78	91.05	240.00	120.00	168.33	30.11	15.23	22.65	15.35	14.01	14.69	189.71	134.48	0.00
7	14.20	13.60	13.97	121.85	79.67	88.18	220.00	160.00	177.50	46.10	15.30	28.17	15.27	14.53	15.09	268.78	180.16	0.00
8	14.60	13.60	14.20	129.77	76.55	86.21	230.00	150.00	176.67	28.52	16.03	26.66	15.28	14.53	14.86	260.12	104.79	0.00
9	16.60	12.20	14.54	134.06	74.51	92.71	320.00	150.00	182.50	49.50	14.31	33.85	24.19	15.02	15.81	260.04	53.07	0.00
10	19.60	13.70	15.95	150.16	102.88	122.27	320.00	220.00	258.75	58.42	24.45	32.44	24.20	16.17	19.29	209.68	132.04	0.00
11	16.90	13.50	15.21	152.44	99.63	125.17	300.00	200.00	237.08	32.50	24.62	29.76	18.20	16.15	16.80	185.92	140.09	0.00
12	15.90	13.40	14.46	149.81	101.05	116.70	320.00	200.00	237.08	43.80	28.08	32.72	17.21	14.16	15.96	180.50	140.45	0.00
13	14.80	13.50	14.19	150.79	99.40	113.32	300.00	200.00	216.67	43.98	13.10	27.38	15.96	15.15	15.36	189.19	150.28	0.00
14	16.00	13.10	14.34	164.41	97.81	121.68	280.00	200.00	240.00	40.21	28.52	32.74	15.67	14.64	15.02	198.93	142.76	0.00
15	17.30	13.20	14.92	164.85	100.57	127.04	320.00	220.00	264.17	49.50	29.68	43.73	16.35	14.65	15.01	300.26	160.17	0.00
16	17.66	13.60	15.69	142.03	94.43	109.62	270.00	180.00	219.58	49.50	20.60	41.49	16.15	14.65	15.45	200.50	160.07	0.00
17	17.70	13.00	15.40	135.73	97.48	112.97	280.00	190.00	212.08	49.50	29.05	37.06	20.20	15.93	17.37	209.82	150.26	0.00
18	16.70	13.80	15.60	154.24	96.79	115.47	300.00	180.00	213.75	56.17	32.16	43.15	22.18	14.15	15.65	299.93	189.83	0.00
19	22.70	16.20	19.70	181.71	128.68	152.87	370.00	280.00	307.92	66.00	56.21	61.79	22.19	17.16	19.18	369.18	250.24	0.00
20	20.10	15.70	17.25	181.20	137.71	154.62	370.00	240.00	312.08	66.00	50.15	61.98	23.21	18.17	19.89	379.28	200.12	0.00
21	16.30	14.90	15.44	145.72	102.33	114.80	300.00	200.00	224.58	61.06	40.84	48.84	18.16	16.13	17.09	249.77	185.43	0.00
22	16.70	15.20	15.82	149.53	108.27	117.09	300.00	220.00	233.33	64.00	34.47	45.98	23.02	16.12	18.65	199.96	165.80	0.00
23	17.30	14.80	15.48	150.17	104.21	113.91	300.00	210.00	236.25	45.68	28.21	37.02	20.21	16.15	18.74	209.81	150.54	0.00
24	21.80	5.00	16.38	138.43	103.27	110.38	280.00	210.00	224.58	66.00	30.00	43.64	20.19	16.12	17.64	260.92	170.02	0.00
25	20.70	15.60	17.42	125.67	95.00	110.60	250.00	210.00	233.33	60.88	33.00	48.33	22.18	15.15	20.17	279.93	170.07	0.00
26	17.60	15.10	16.44	140.85	89.71	103.87	270.00	200.00	213.33	48.69	30.34	36.73	17.64	16.13	17.28	230.08	155.02	0.00
27	25.30	16.90	19.10	160.06	89.01	107.56	310.00	180.00	219.17	47.67	32.20	40.79	17.50	15.16	16.79	224.23	180.14	0.00
28	25.90	18.60	21.46	183.71	97.19	149.34	380.00	180.00	298.75	66.00	38.00	49.75	25.25	17.18	20.20	369.38	210.45	0.00
29	52.70	24.60	30.24	187.26	108.91	166.74	420.00	260.00	340.83	48.01	28.15	42.26	45.00	30.00	35.40	250.07	210.08	0.00
30	47.50	23.40	31.29	197.90	144.74	177.71	480.00	290.00	350.00	61.11	40.38	47.50	47.00	25.00	33.50	259.51	130.13	0.00
31	0.00	No Generati	Error	0.00	No Generati	Error	0.00	No Generati	Error	0.00	No Generati	Error	0.00	No Generati	Error	0.00	No Generation	Error
Max	**52.70**			**197.90**			**480.00**			**66.00**			**47.00**			**379.28**		
Min		**5.00**			**74.51**			**60.00**			**12.01**			**14.01**			**19.70**	
Source: THP, CHP, BHP, KHP, MHP (DGPC)																		

Graph: Generation for the month April, 2020

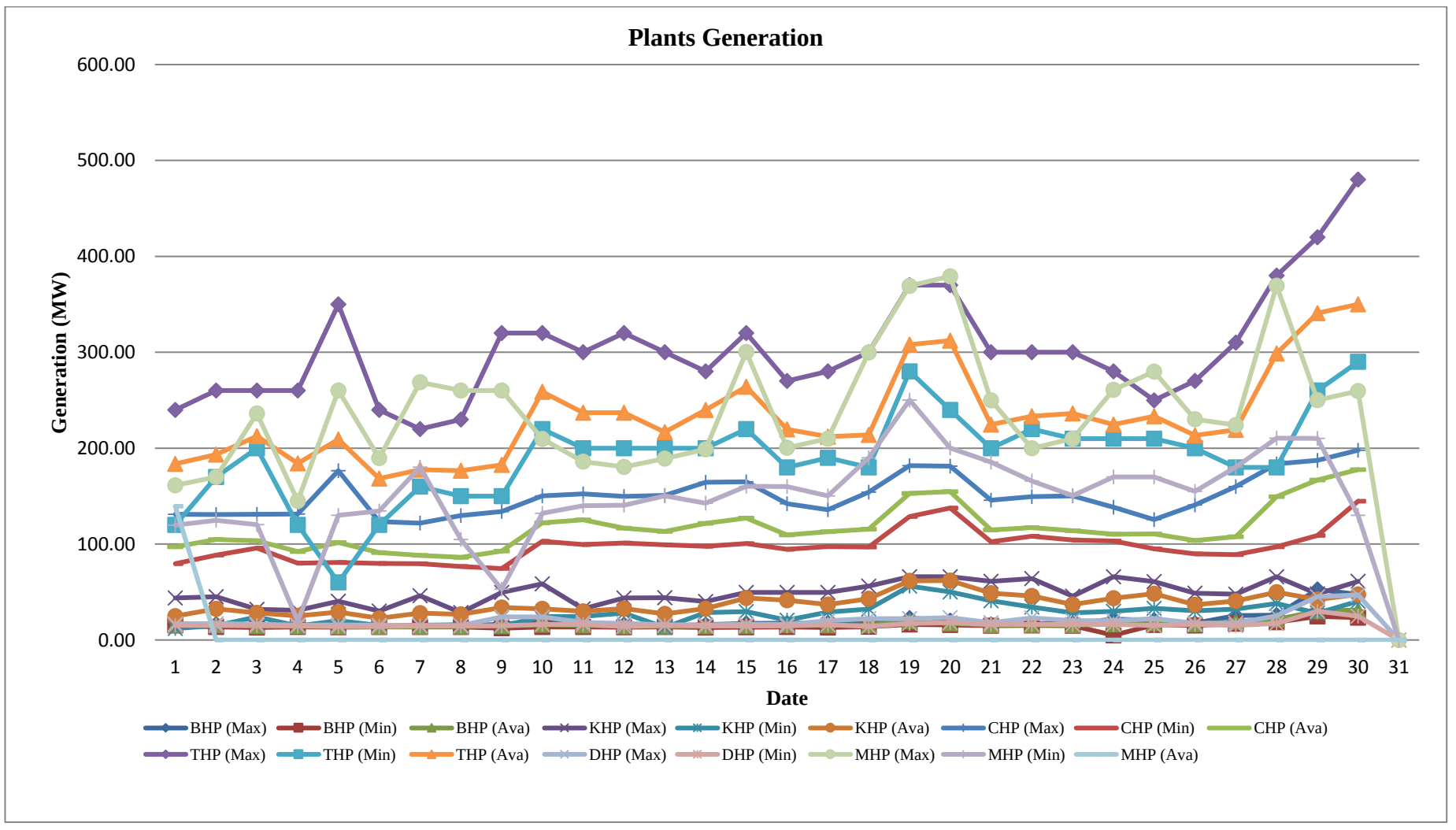


Table: Generation for the month of May, 2020

May-20	BHP (MW)			CHP (MW)			THP (MW)			KHP (MW)			DHP (MW)			MHP (MW)		
Date	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	42.40	23.20	29.68	193.34	154.39	173.51	380.00	300.00	330.83	66.00	31.58	47.17	32.00	24.00	28.13	274.73	199.46	231.19
2	38.50	23.50	29.36	268.33	179.63	203.79	450.00	370.00	400.42	66.00	33.00	60.15	32.00	23.00	24.92	299.17	210.04	0.00
3	47.60	27.60	34.91	226.21	194.66	204.79	450.00	380.00	416.25	66.00	42.11	52.98	50.33	28.26	38.59	349.59	180.36	0.00
4	43.81	26.19	30.29	256.38	196.32	217.44	550.00	380.00	451.25	66.11	48.33	59.30	37.29	26.19	29.65	478.66	196.12	0.00
5	37.13	22.12	26.80	275.01	203.38	233.15	560.00	350.00	470.00	66.18	52.88	65.10	36.17	27.19	30.91	553.28	231.68	0.00
6	24.50	20.10	21.94	234.88	188.85	212.49	470.00	350.00	421.67	66.00	62.51	65.59	33.21	25.21	29.57	518.90	260.00	0.00
7	46.20	16.00	22.24	188.84	136.85	178.09	390.00	350.00	360.83	66.00	48.32	61.26	48.41	20.20	25.72	334.07	239.87	0.00
8	32.50	19.70	23.60	189.88	175.72	181.45	350.00	350.00	350.00	66.00	49.87	62.11	48.19	23.18	33.44	460.86	279.87	0.00
9	19.60	16.30	18.19	176.79	124.81	152.46	350.00	280.00	307.50	54.06	35.08	44.15	25.22	21.15	22.96	274.99	210.45	0.00
10	18.40	16.10	17.18	172.63	145.01	156.72	350.00	300.00	306.25	48.49	37.14	43.12	21.19	18.19	20.09	269.74	215.16	0.00
11	17.00	15.70	16.23	159.31	147.70	156.71	350.00	300.00	307.08	49.32	36.07	43.74	25.00	17.70	19.11	319.61	209.64	0.00
12	16.60	15.20	15.84	161.88	147.73	152.70	310.00	300.00	305.00	45.00	36.30	39.56	18.18	17.16	17.94	210.46	194.31	0.00
13	16.80	13.40	15.62	160.09	141.61	147.68	320.00	270.00	292.08	49.50	32.03	42.80	18.70	17.16	17.90	254.73	194.71	0.00
14	22.20	14.40	15.73	202.15	146.35	152.39	380.00	300.00	303.33	48.48	32.01	41.74	18.21	17.60	17.79	365.07	204.89	0.00
15	26.80	16.01	18.60	224.26	149.78	177.13	450.00	300.00	354.58	58.35	35.98	48.21	20.19	17.66	18.43	494.70	249.49	0.00
16	22.20	14.20	17.25	237.95	177.83	216.16	560.00	360.00	472.92	66.00	45.30	63.83	28.18	18.68	23.39	618.84	360.07	0.00
17	31.60	19.20	22.99	257.40	213.47	228.35	500.00	420.00	467.08	66.00	49.50	63.87	26.17	20.15	23.78	612.36	180.03	0.00
18	19.90	17.00	18.53	275.10	211.81	237.40	530.00	420.00	469.58	66.00	66.00	66.00	26.18	22.14	24.63	590.14	334.75	0.00
19	18.20	16.00	16.73	258.66	188.03	231.26	530.00	420.00	467.50	66.00	66.00	66.00	22.17	18.17	20.33	650.69	260.79	0.00
20	63.60	14.30	22.55	251.97	193.68	211.70	520.00	370.00	435.42	66.00	65.24	65.94	25.19	19.13	21.37	624.31	209.56	0.00
21	66.10	50.40	63.11	278.72	275.24	276.64	1,122.00	420.00	1,005.88	66.00	49.50	64.37	126.92	29.17	103.28	792.05	719.25	0.00
22	66.40	30.80	64.62	278.79	274.18	276.99	1,122.00	1,122.00	1,122.00	65.51	48.15	62.21	126.76	117.62	125.94	765.31	720.10	0.00
23	66.30	66.20	66.21	277.75	275.58	276.73	1,122.00	1,122.00	1,122.00	66.00	65.02	65.68	126.79	63.32	118.19	772.16	763.51	0.00
24	66.40	45.40	55.58	277.29	275.39	276.47	1,122.00	1,122.00	1,122.00	66.00	49.50	65.31	126.81	65.41	86.79	771.93	660.15	0.00
25	43.90	38.40	40.68	277.80	275.12	276.66	1,122.00	1,122.00	1,122.00	66.00	66.00	66.00	82.43	55.39	63.09	790.33	613.57	0.00
26	37.80	33.00	35.45	277.90	274.36	276.71	1,122.00	884.00	1,065.42	66.00	66.00	66.00	87.47	54.16	61.89	756.33	500.56	0.00
27	46.30	31.10	35.20	277.95	275.40	276.29	935.00	681.00	893.17	66.00	64.84	65.66	84.42	34.22	58.52	774.96	599.51	0.00
28	37.20	30.30	32.75	277.75	276.00	276.77	831.00	590.00	740.83	66.00	65.62	65.85	90.49	27.21	44.48	629.32	300.08	0.00
29	37.30	27.80	30.23	278.09	274.44	275.98	700.00	610.00	667.50	66.00	65.03	65.77	56.24	38.23	43.75	540.07	319.99	0.00
30	34.60	27.10	30.35	276.65	275.26	276.13	710.00	570.00	657.50	66.00	66.00	66.00	50.28	30.22	43.21	510.32	419.89	0.00
31	58.50	32.10	38.90	277.36	275.18	276.51	690.00	540.00	577.08	66.00	66.00	66.00	55.29	38.42	43.01	549.07	376.39	427.95
Max	**66.40**			**278.79**			**1,122.00**			**66.18**			**126.92**			**792.05**		
Min		**13.40**			**124.81**			**270.00**			**31.58**			**17.16**			**180.03**	
Source: THP, CHP, BHP, KHP,MHP (DGPC)																		

Graph: Generation for the month of May, 2020

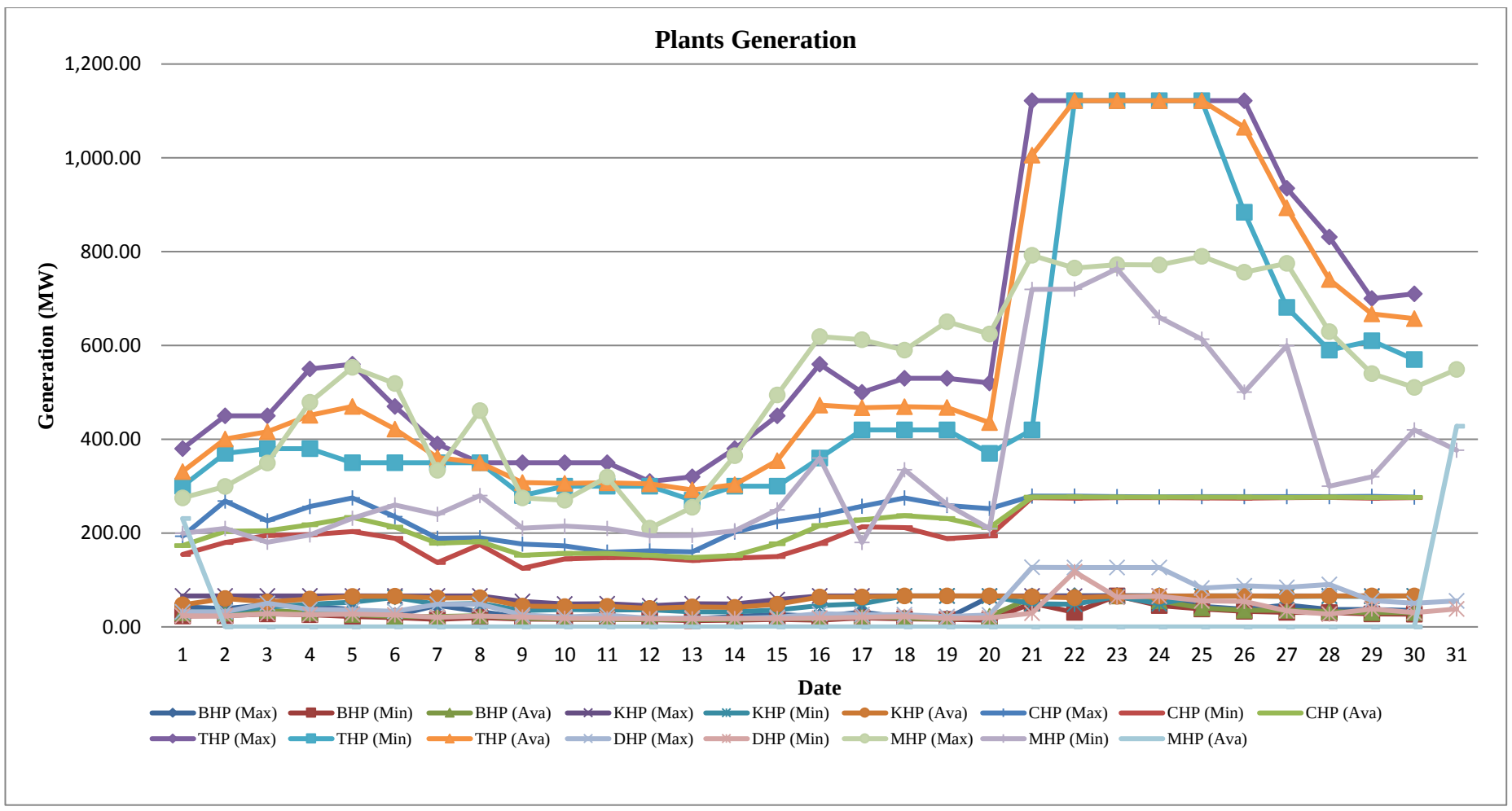


Table: Generation for the month of June, 2020

Jun-20	BHP (MW)			CHP (MW)			THP (MW)			KHP (MW)			DHP (MW)			MHP (MW)		
Date	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	63.70	34.20	46.80	277.08	275.21	276.20	760.00	570.00	631.25	66.00	65.50	65.89	56.29	40.42	49.57	790.98	514.78	623.21
2	34.10	28.50	30.68	277.31	275.04	276.31	600.00	560.00	571.67	65.79	64.75	65.32	42.27	36.21	38.40	592.93	459.09	551.49
3	28.70	25.50	27.25	277.32	275.82	276.71	690.00	560.00	630.00	66.00	16.50	59.44	48.26	36.22	40.82	584.84	474.54	516.49
4	30.10	25.60	27.25	277.32	69.10	250.32	620.00	460.00	564.58	66.00	49.50	65.31	42.29	36.20	38.38	539.18	439.81	484.73
5	37.20	26.50	33.05	277.81	275.37	276.66	700.00	620.00	655.42	66.00	66.00	66.00	70.44	36.51	54.65	593.41	390.10	570.86
6	65.40	34.80	47.47	277.34	274.45	276.50	1,122.00	660.00	852.17	66.00	66.00	66.00	95.50	50.43	64.19	593.66	592.50	593.10
7	66.10	37.90	50.26	278.02	275.28	276.44	1,122.00	700.00	1,010.83	66.00	49.50	63.94	86.49	48.44	62.67	593.51	592.66	593.09
8	62.28	31.90	37.09	277.95	275.60	276.67	840.00	670.00	763.33	66.00	65.70	65.96	48.45	40.55	44.20	593.44	592.60	593.04
9	52.20	30.70	36.70	277.63	275.57	276.51	750.00	600.00	683.75	66.00	66.00	66.00	76.46	40.17	48.39	594.14	493.92	583.86
10	37.30	28.10	30.85	277.85	275.75	276.73	790.00	590.00	706.25	66.00	66.00	66.00	48.27	38.62	44.01	593.94	575.80	592.05
11	36.20	29.20	31.66	277.83	270.00	276.61	690.00	590.00	673.33	66.00	49.50	57.75	52.66	37.73	42.56	593.61	590.87	592.41
12	66.00	31.40	40.55	277.50	275.78	276.63	774.00	561.00	679.54	49.50	49.50	49.50	67.74	38.25	48.29	593.51	395.02	583.84
13	66.20	48.10	61.33	277.31	276.17	276.95	850.00	650.00	768.33	66.00	66.00	66.00	125.66	60.69	88.43	594.28	394.33	566.98
14	66.20	49.50	62.17	277.83	275.21	276.58	1,071.00	820.00	970.75	66.00	66.00	66.00	126.88	59.26	88.17	594.56	475.90	587.56
15	66.30	62.20	65.26	277.79	183.61	253.52	1,122.00	1,020.00	1,117.75	66.00	66.00	66.00	126.88	66.49	84.90	593.19	590.28	591.88
16	66.40	65.50	66.19	277.30	274.82	276.50	1,122.00	1,122.00	1,122.00	66.00	33.00	63.40	126.89	70.44	102.85	592.52	587.28	591.73
17	66.30	54.40	59.71	277.68	275.63	276.71	1,122.00	1,122.00	1,122.00	66.00	33.00	61.21	98.59	60.43	80.21	593.17	562.17	590.74
18	66.30	65.10	66.08	277.90	275.22	276.69	1,122.00	935.00	1,114.21	66.00	66.00	66.00	126.96	105.56	125.05	593.68	395.58	582.43
19	66.20	65.80	66.08	277.85	275.87	276.85	1,122.00	1,122.00	1,122.00	66.00	66.00	66.00	126.96	63.32	116.12	593.60	591.48	592.32
20	66.20	65.40	66.00	277.90	275.52	276.74	1,122.00	1,122.00	1,122.00	66.00	65.80	65.96	126.98	101.00	111.49	592.94	359.62	503.01
21	66.30	65.80	66.09	277.40	275.76	276.76	1,122.00	1,122.00	1,122.00	66.00	33.00	63.72	116.44	90.47	103.14	594.06	591.28	592.47
22	66.30	66.10	66.25	277.46	275.23	276.41	1,122.00	1,122.00	1,122.00	66.00	66.00	66.00	124.47	81.38	96.40	594.08	592.48	593.27
23	66.50	24.10	64.15	277.52	178.00	229.57	1,122.00	1,122.00	1,122.00	66.00	66.00	66.00	118.47	87.51	101.51	593.62	197.12	560.13
24	66.50	66.30	66.43	277.84	184.25	257.63	1,122.00	1,122.00	1,122.00	66.00	65.33	65.95	112.61	82.47	92.39	672.64	592.36	596.49
25	66.50	66.10	66.33	277.42	275.43	276.88	1,122.00	1,122.00	1,122.00	63.39	28.35	43.17	116.42	79.42	91.91	791.31	332.02	708.03
26	66.40	66.20	66.32	277.98	275.21	276.56	1,122.00	1,122.00	1,122.00	66.00	16.50	53.34	126.95	63.15	107.20	791.61	271.56	726.50
27	66.50	66.20	66.33	277.46	275.46	276.65	1,122.00	1,122.00	1,122.00	66.00	49.50	57.75	126.86	102.46	116.97	790.48	558.39	756.91
28	66.40	65.10	66.18	277.18	275.37	276.23	1,122.00	1,122.00	1,122.00	66.00	66.00	66.00	126.96	63.33	120.60	755.89	753.90	754.95
29	66.50	66.20	66.32	277.35	275.78	276.74	1,122.00	1,122.00	1,122.00	66.00	66.00	66.00	126.94	63.22	115.07	781.81	659.38	757.41
30	66.40	66.20	66.32	277.41	274.85	276.65	1,122.00	1,122.00	1,122.00	66.00	66.00	66.00	114.55	83.52	101.40	758.21	755.75	757.08
31	0.00	No Generati	Error	0.00	No Generati	Error	1,122.00	1,122.00	1,122.00	0.00	No Generati	Error	0.00	No Generati	Error	0.00	No Generation	Error
Max	66.50			278.02			1,122.00			66.00			126.98			791.61		
Min		24.10			69.10			460.00			16.50			36.20			197.12	
Source: THP, CHP, BHP, KHP, MHP (DGPC)																		

Graph: Generation for the month of June, 2020

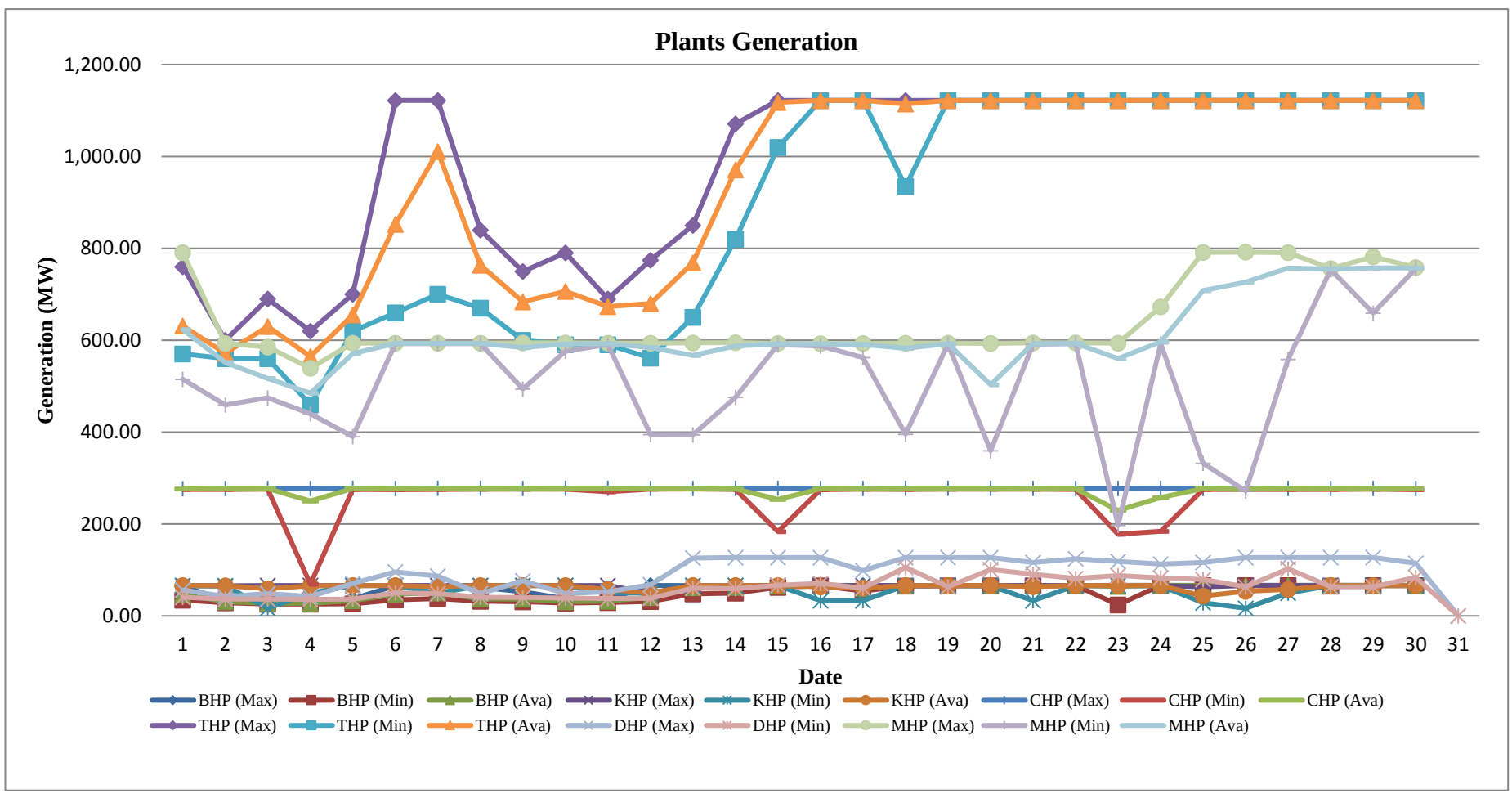


Table: National demand for April, 2020

Apr-20	Max	Min	Ava
0:00	228.20	170.60	189.86
1:00	223.67	163.88	187.75
2:00	217.22	170.51	185.17
3:00	216.51	170.20	182.82
4:00	217.37	176.13	186.84
5:00	217.84	180.32	190.47
6:00	228.21	194.72	207.19
7:00	246.49	206.58	222.64
8:00	254.74	215.11	226.07
9:00	255.30	214.13	225.62
10:00	252.70	198.33	222.42
11:00	256.34	185.93	223.53
12:00	270.14	204.51	228.54
13:00	260.73	198.96	223.11
14:00	248.19	197.28	214.02
15:00	250.38	190.47	213.13
16:00	257.76	199.99	218.00
17:00	256.55	202.65	222.30
18:00	262.17	228.42	237.06
19:00	287.28	243.79	261.99
20:00	286.67	235.86	251.19
21:00	270.03	212.10	234.63
22:00	253.95	198.40	214.14
23:00	231.93	181.84	199.65
	287.28		
		163.88	

Graph: National Demand for April, 2020

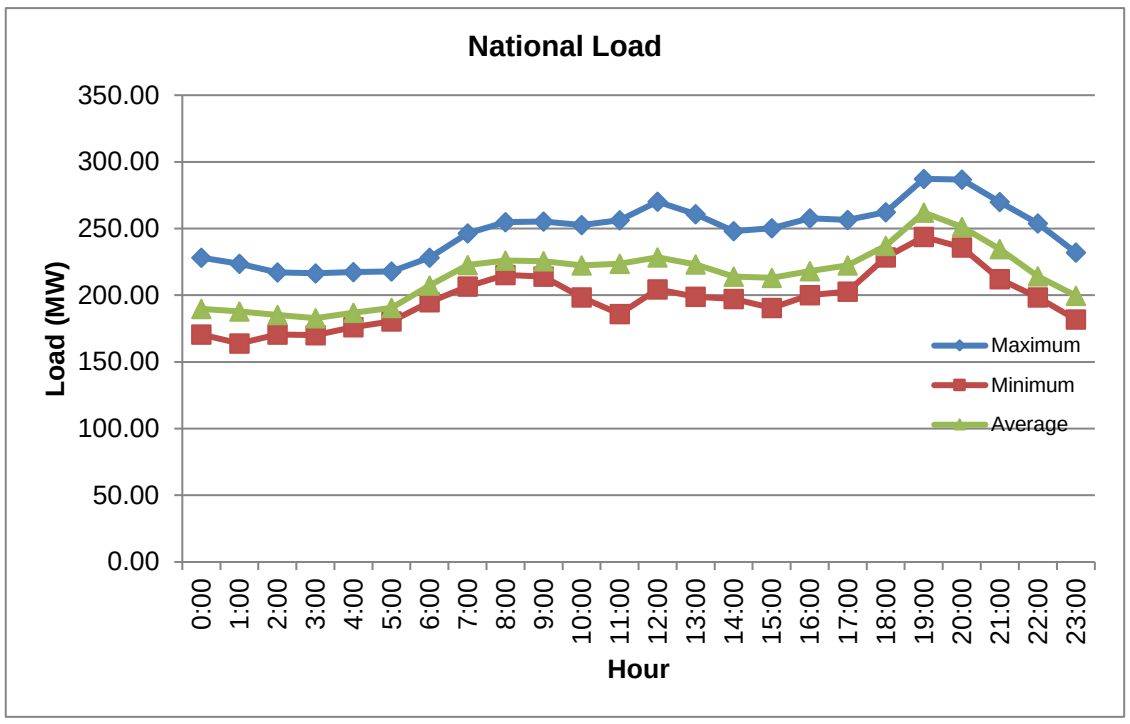
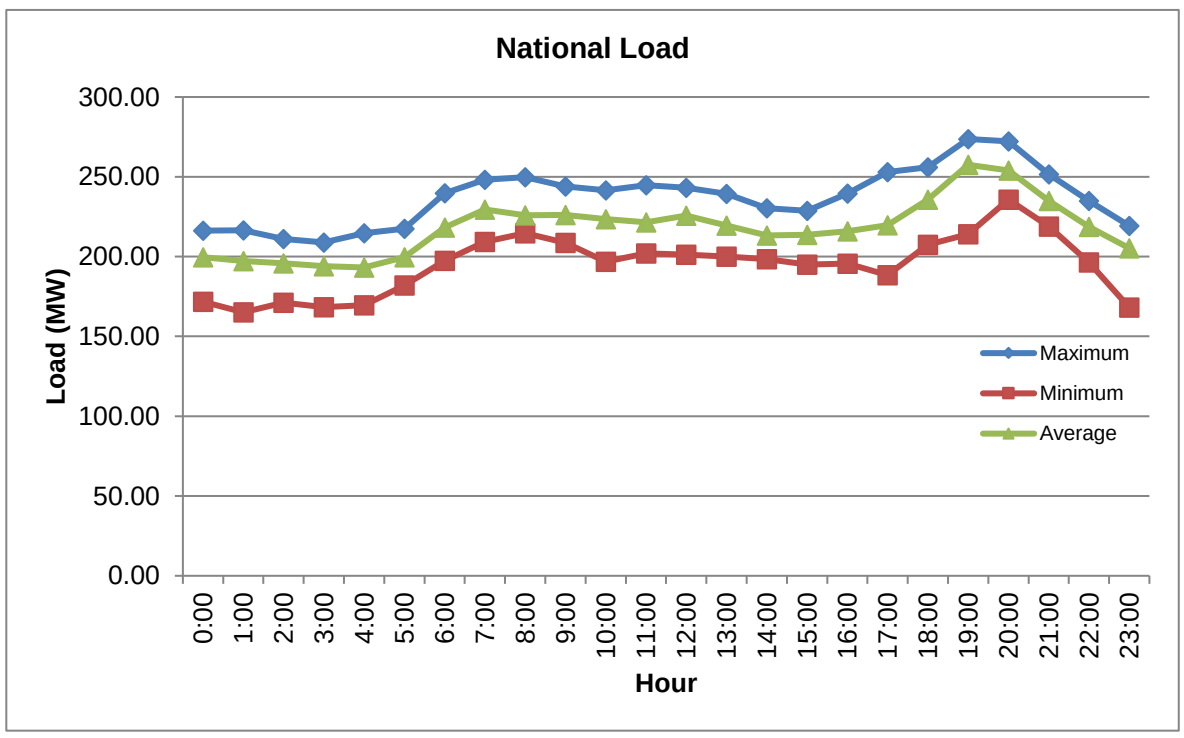


Table: National Demand for May, 2020

May-20	Max	Min	Ava
0:00	216.33	171.67	199.72
1:00	216.41	165.10	197.20
2:00	211.14	171.16	195.86
3:00	208.89	168.31	194.06
4:00	214.66	169.56	193.20
5:00	217.51	181.88	199.68
6:00	239.78	197.45	218.25
7:00	248.13	209.34	229.51
8:00	249.70	214.62	225.84
9:00	243.87	208.74	226.11
10:00	241.59	196.82	223.47
11:00	244.69	201.97	221.42
12:00	243.24	201.26	225.77
13:00	239.31	200.06	219.40
14:00	230.41	198.50	213.37
15:00	228.70	194.94	213.60
16:00	239.57	195.71	215.90
17:00	252.92	188.31	219.74
18:00	256.08	207.53	235.71
19:00	273.67	214.06	257.52
20:00	272.22	235.73	253.89
21:00	251.66	218.90	234.96
22:00	235.02	196.42	218.75
23:00	219.38	168.20	205.16
	273.67		
		165.10	

Graph: National Demand for May, 2020

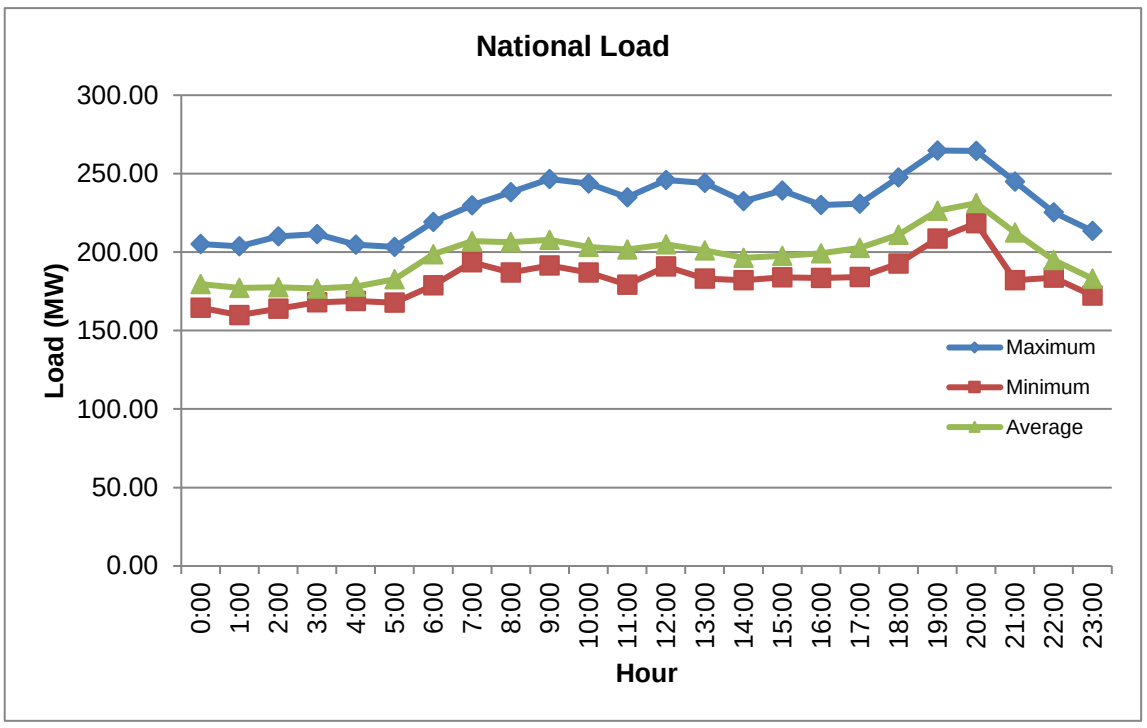


Annexure-II

Table: National Demand for June, 2020

Jun-20	Max	Min	Ava
0:00	205.21	164.52	179.57
1:00	203.65	159.88	177.11
2:00	210.02	163.88	177.61
3:00	211.56	168.08	176.86
4:00	204.80	168.79	178.04
5:00	203.31	167.80	182.76
6:00	219.14	178.82	198.67
7:00	229.80	193.58	206.93
8:00	238.10	187.04	206.37
9:00	246.53	191.54	207.77
10:00	243.61	186.97	203.30
11:00	234.93	179.30	201.66
12:00	246.03	190.86	204.91
13:00	244.13	183.02	201.10
14:00	232.38	182.16	196.35
15:00	239.23	183.93	197.62
16:00	230.01	183.54	199.17
17:00	230.94	184.17	202.65
18:00	247.56	192.63	211.07
19:00	264.73	208.52	226.38
20:00	264.43	218.44	231.16
21:00	244.89	182.06	212.50
22:00	225.28	183.64	195.03
23:00	213.48	172.22	183.11
	264.73		
		159.88	

Graph: National Demand for June, 2020



Annexure-III

Table: Daily maximum, minimum and average frequency for the month of April, 2020

Apr-20	Bus Frequency at Semtokha Substation			Bus Frequency at Kurichhu Hydropower Plant		
Date	Max	Min	Ava	Max	Min	Ava
1	50.07	49.92	49.93	50.08	49.89	49.99
2	49.95	49.95	49.95	50.07	49.97	50.03
3	49.95	49.95	49.95	50.09	49.93	50.03
4	49.95	49.95	49.95	50.08	49.87	50.01
5	50.02	49.76	49.96	50.09	49.89	50.01
6	50.01	50.01	50.01	50.09	49.94	50.02
7	50.01	50.01	50.01	50.08	49.88	50.01
8	50.01	50.01	50.01	50.09	49.94	50.02
9	50.01	50.01	50.01	50.09	49.60	49.98
10	50.01	50.01	50.01	50.09	49.89	50.01
11	50.01	50.01	50.01	50.09	49.95	50.01
12	50.01	50.01	50.01	50.09	49.92	50.02
13	50.01	50.01	50.01	50.07	49.87	49.99
14	50.01	50.01	50.01	50.09	49.79	50.01
15	50.01	50.01	50.01	50.09	49.88	50.03
16	50.10	49.82	49.99	50.08	49.86	50.01
17	50.08	49.91	50.01	50.08	49.91	49.99
18	50.14	49.78	50.01	50.08	49.97	50.01
19	50.14	49.91	50.00	50.09	49.89	50.00
20	50.09	49.88	50.01	50.09	49.96	50.03
21	50.12	49.90	50.00	50.07	49.82	49.99
22	50.10	49.87	50.01	50.08	49.88	50.00
23	50.07	49.82	49.99	50.08	49.86	50.01
24	50.08	49.79	49.98	50.08	49.79	50.00
25	50.04	49.85	49.97	50.09	49.92	50.02
26	50.07	49.84	49.97	50.09	49.93	50.01
27	50.04	49.78	49.98	50.09	49.91	50.02
28	50.15	49.78	49.96	50.07	49.92	50.01
29	50.05	49.87	49.97	50.06	49.90	50.00
30	50.08	49.86	49.98	50.08	49.91	50.01
31	0.00	Error	Error	0.00	Error	Error
Max	**50.15**			**50.09**		
Min		**49.76**			**49.60**	

Source: TD (BPC), KHP (DGPC)

Graph: Daily maximum, minimum and average frequency for the month of April, 2020

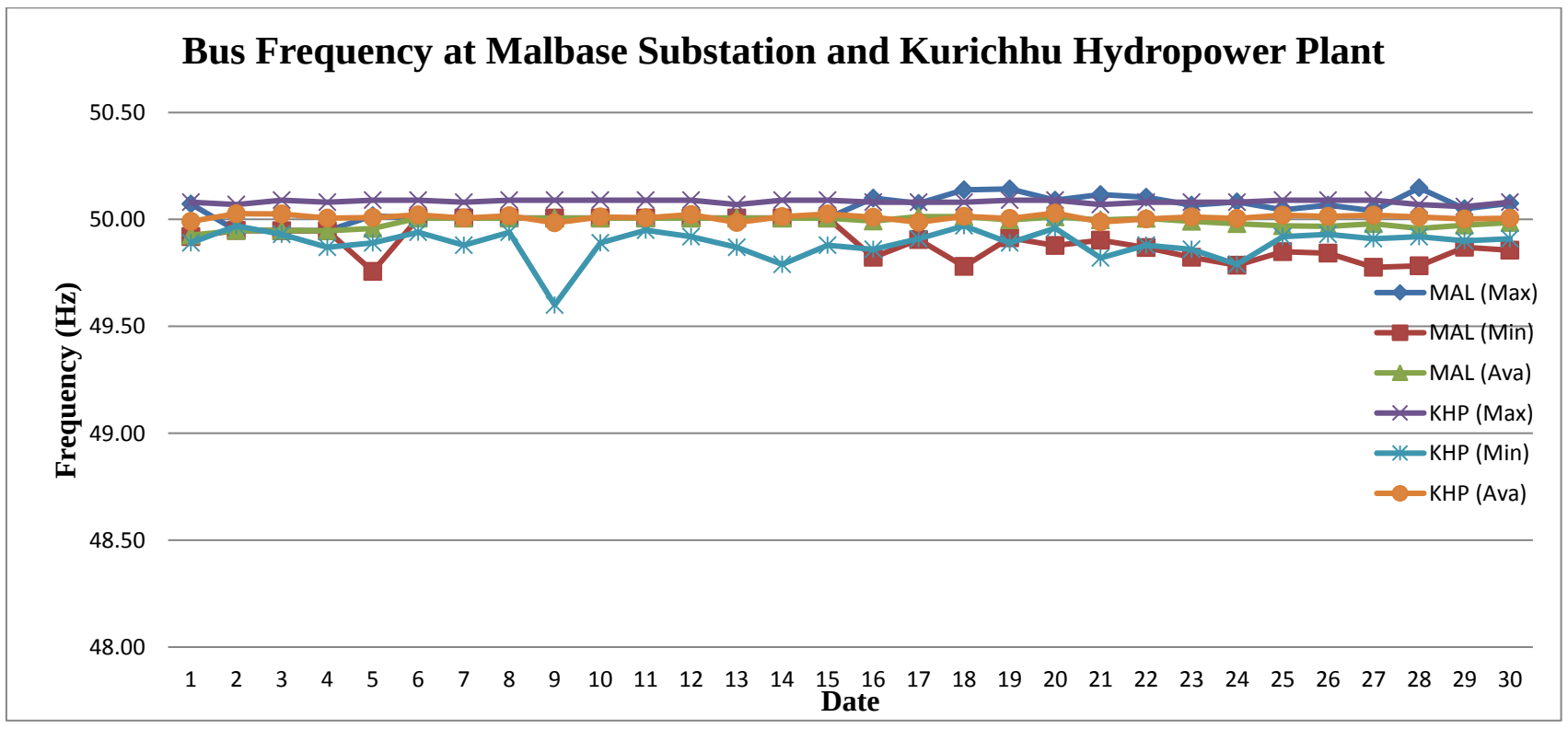


Table: Daily maximum, minimum and average frequency for the month of May, 2020

May-20	Bus Frequency at Semtokha Substation			Bus Frequency at Kurichhu Hydropower Plant		
Date	Max	Min	Ava	Max	Min	Ava
1	50.10	49.90	49.98	50.15	49.92	50.03
2	50.00	49.90	49.98	50.08	49.90	50.02
3	50.00	49.80	49.96	50.07	49.70	50.01
4	50.00	49.80	49.95	50.09	49.93	50.01
5	50.00	49.80	49.97	50.15	49.92	50.01
6	50.00	49.80	49.97	50.15	49.92	50.03
7	50.00	49.90	49.97	50.07	49.90	50.01
8	50.00	49.80	49.95	50.07	49.81	50.00
9	50.00	49.80	49.95	50.09	49.88	50.00
10	50.10	49.80	49.97	50.14	49.86	50.03
11	50.10	49.90	49.98	50.11	49.90	50.02
12	50.00	49.80	49.97	50.12	49.86	50.01
13	50.00	49.90	49.95	50.10	49.50	49.99
14	50.00	49.90	49.96	50.07	49.48	49.98
15	50.10	49.90	49.96	50.09	49.83	50.01
16	50.00	49.90	49.97	50.08	49.94	50.02
17	50.00	49.90	49.98	50.09	49.94	50.01
18	50.00	49.90	49.96	50.07	49.93	50.02
19	50.00	49.90	49.96	50.13	49.87	50.02
20	50.00	49.80	49.95	50.08	49.40	49.99
21	50.10	49.90	49.98	50.15	49.93	50.04
22	50.00	49.80	49.95	50.09	49.88	50.00
23	50.00	49.80	49.95	50.06	49.79	49.98
24	50.00	49.90	49.96	50.08	49.94	50.01
25	50.00	49.80	49.95	50.09	49.90	50.01
26	50.00	49.90	49.96	50.15	49.90	50.02
27	50.10	49.90	49.98	50.13	49.95	50.03
28	50.10	49.80	49.98	50.15	49.65	50.02
29	50.00	49.80	49.97	50.15	49.91	50.03
30	50.00	49.80	49.95	50.09	49.83	49.99
31	50.10	49.90	49.97	50.16	49.91	50.02
Max	**50.10**			**50.16**		
Min		**49.80**			**49.40**	

Source: TD (BPC), KHP (DGPC)

Graph: Daily maximum, minimum and average frequency for the month of May, 2020

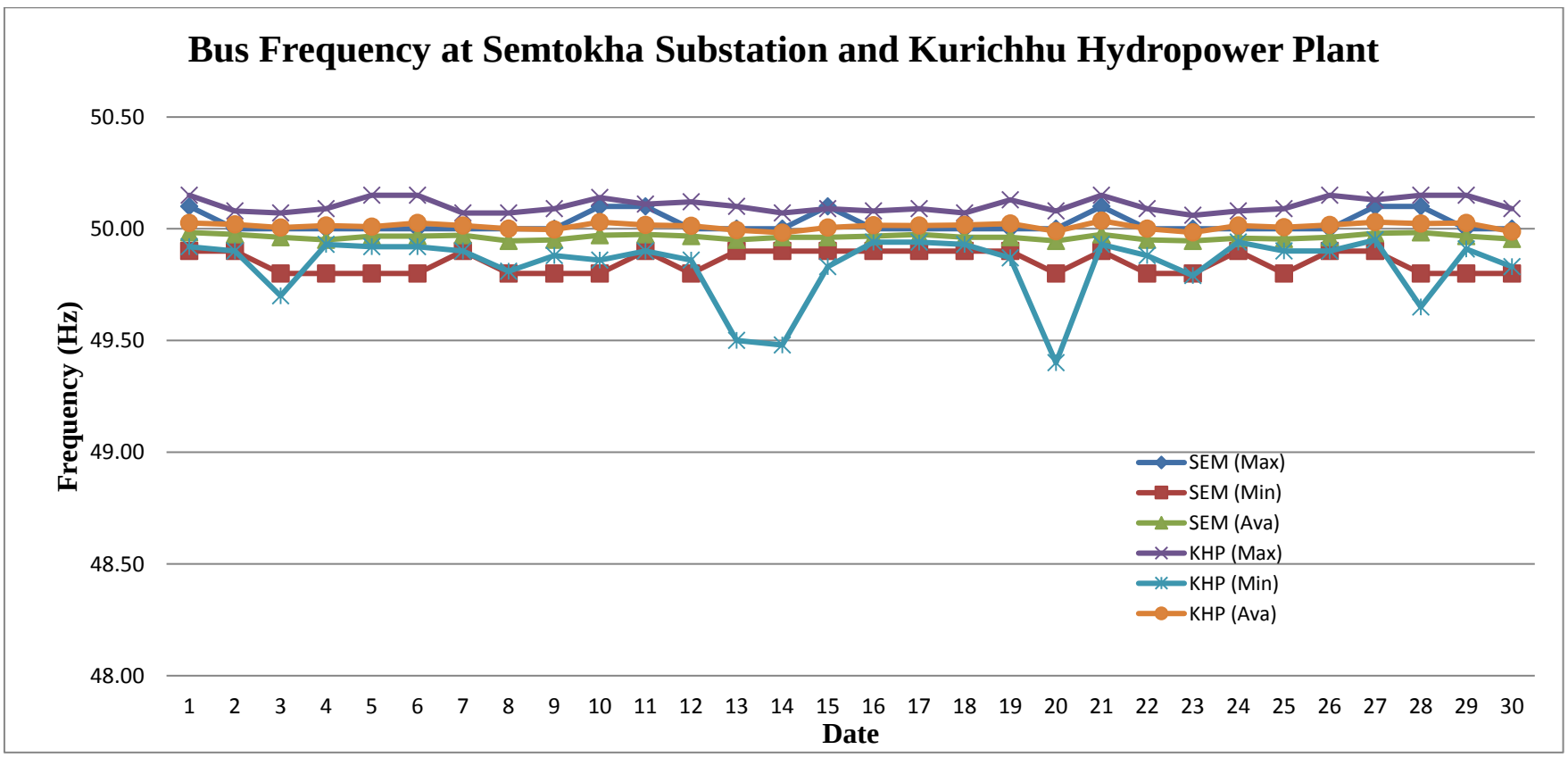
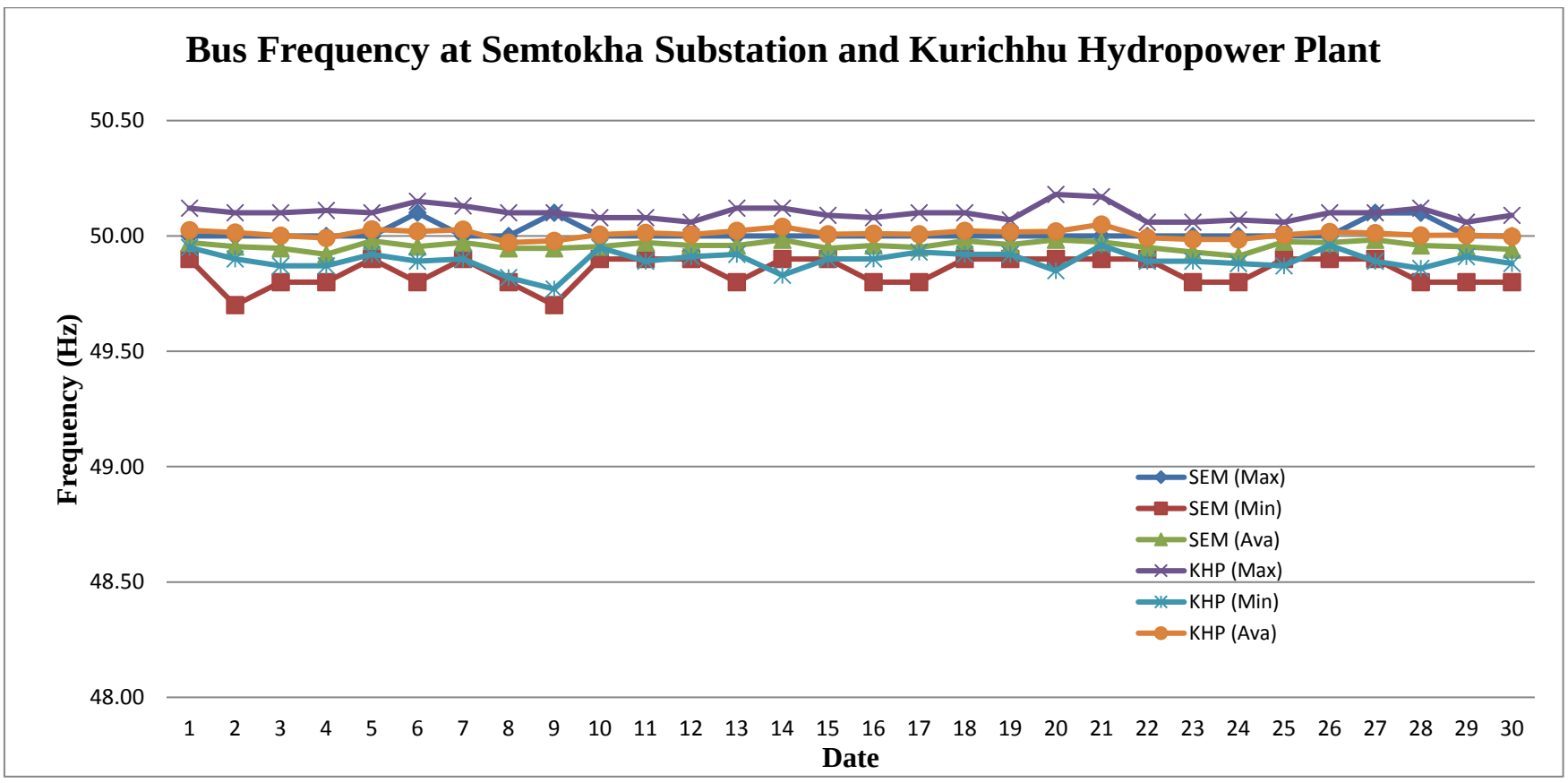


Table: Daily maximum, minimum and average frequency for the month of June, 2020

Jun-20	Bus Frequency at Semtokha Substation			Bus Frequency at Kurichhu Hydropower Plant		
Date	Max	Min	Ava	Max	Min	Ava
1	50.00	49.90	49.97	50.12	49.95	50.02
2	50.00	49.70	49.95	50.10	49.90	50.01
3	50.00	49.80	49.95	50.10	49.87	50.00
4	50.00	49.80	49.92	50.11	49.87	49.99
5	50.00	49.90	49.98	50.10	49.92	50.03
6	50.10	49.80	49.95	50.15	49.89	50.02
7	50.00	49.90	49.97	50.13	49.90	50.03
8	50.00	49.80	49.95	50.10	49.82	49.97
9	50.10	49.70	49.95	50.10	49.77	49.98
10	50.00	49.90	49.95	50.08	49.95	50.01
11	50.00	49.90	49.97	50.08	49.89	50.01
12	50.00	49.90	49.96	50.06	49.91	50.01
13	50.00	49.80	49.96	50.12	49.92	50.02
14	50.00	49.90	49.98	50.12	49.83	50.04
15	50.00	49.90	49.95	50.09	49.90	50.01
16	50.00	49.80	49.96	50.08	49.90	50.01
17	50.00	49.80	49.95	50.10	49.93	50.01
18	50.00	49.90	49.98	50.10	49.92	50.02
19	50.00	49.90	49.96	50.07	49.92	50.02
20	50.00	49.90	49.98	50.18	49.85	50.02
21	50.00	49.90	49.97	50.17	49.96	50.05
22	50.00	49.90	49.95	50.06	49.89	49.99
23	50.00	49.80	49.93	50.06	49.89	49.99
24	50.00	49.80	49.91	50.07	49.88	49.98
25	50.00	49.90	49.98	50.06	49.87	50.01
26	50.00	49.90	49.97	50.10	49.96	50.02
27	50.10	49.90	49.98	50.10	49.89	50.01
28	50.10	49.80	49.96	50.12	49.86	50.00
29	50.00	49.80	49.95	50.06	49.91	50.00
30	50.00	49.80	49.94	50.09	49.88	50.00
31	0.00	Error	Error	0.00	Error	Error
Max	**50.10**			**50.18**		
Min		**49.70**			**49.77**	

Source: TD (BPC), KHP (DGPC)

Graph: Daily maximum, minimum and average frequency for the month of June 2020



Annexure-IV

Table: Daily maximum, minimum and average Voltage for the month of April, 2020

Apr-20	Malbase Substation									Nangkhor Substation		
	400kV Bus Voltage (kV)			220kV Bus Voltage (kV)			66kV Bus Voltage (kV)			132kV Bus Voltage (kV)		
Date	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	413.50	403.00	409.58	229.00	220.50	224.79	67.00	65.00	66.08	137.70	131.50	135.24
2	412.50	401.50	409.08	227.50	222.00	225.00	67.00	65.00	66.00	138.10	132.90	135.24
3	411.00	403.50	408.29	227.00	221.50	224.92	67.00	65.00	66.13	136.52	131.53	134.68
4	412.50	404.50	409.33	227.00	222.00	224.83	67.00	65.00	66.08	136.90	131.50	134.67
5	415.50	399.50	409.50	227.50	219.50	224.83	67.00	64.00	66.25	135.73	130.70	133.81
6	416.50	409.50	413.13	229.00	223.50	226.06	67.00	65.00	66.25	137.14	131.53	134.72
7	409.50	399.00	405.71	225.50	220.00	223.17	66.00	64.00	65.04	137.70	131.50	134.91
8	409.50	401.00	405.79	225.00	220.00	223.08	66.00	64.00	65.33	137.30	132.00	134.73
9	410.50	401.00	405.54	226.00	220.00	222.85	66.00	64.00	65.13	138.10	129.25	135.72
10	409.50	400.50	406.04	233.50	220.50	223.77	67.00	65.00	65.75	137.30	132.50	134.99
11	410.50	402.50	408.08	225.50	221.50	223.94	67.00	65.00	66.04	137.50	132.70	135.69
12	417.50	404.50	413.00	229.00	220.00	225.83	68.00	65.00	66.42	138.60	132.16	136.21
13	416.50	405.50	412.71	228.00	221.00	225.46	67.00	65.00	66.29	137.90	130.70	135.23
14	414.00	407.50	411.04	227.00	220.50	224.29	67.00	65.00	66.08	137.35	132.10	134.76
15	415.00	405.50	410.94	229.00	220.00	224.75	68.00	65.00	66.17	140.00	132.50	135.39
16	415.50	404.50	411.38	228.00	223.00	225.40	67.00	66.00	66.33	135.60	131.50	134.20
17	417.00	408.50	412.58	227.50	222.50	225.13	67.00	66.00	66.33	137.77	132.30	135.45
18	415.50	407.00	410.63	228.00	221.00	224.38	68.00	65.00	66.00	138.18	132.99	135.82
19	411.50	406.50	409.29	225.50	222.00	224.13	67.00	65.00	65.71	136.10	133.20	134.64
20	415.50	406.50	411.67	228.50	222.50	225.48	67.00	65.00	66.25	136.73	132.90	135.02
21	413.50	405.00	409.81	228.00	220.50	224.19	67.00	65.00	66.04	142.34	133.20	134.96
22	413.50	407.50	411.29	227.00	222.00	225.02	67.00	65.00	66.00	137.90	132.50	134.62
23	417.50	405.50	412.42	228.00	220.50	225.92	67.00	65.00	66.00	136.50	132.50	135.03
24	417.00	406.50	413.06	228.50	221.50	225.92	67.00	65.00	66.13	138.18	132.36	135.22
25	417.50	407.50	412.33	228.50	224.00	226.06	67.00	65.00	66.25	136.30	131.90	134.65
26	419.50	410.50	415.29	230.00	226.00	227.92	67.00	65.00	66.38	136.30	132.50	134.80
27	416.50	408.50	413.44	229.00	223.00	226.35	67.00	66.00	66.25	136.90	132.57	134.91
28	414.50	409.50	411.77	227.50	222.50	225.63	67.00	66.00	66.17	136.10	132.70	134.54
29	416.50	407.00	412.63	228.00	223.50	226.56	67.00	65.00	66.13	135.90	130.91	133.75
30	413.00	405.50	410.42	226.50	221.00	225.13	67.00	66.00	66.08	136.31	131.53	134.13
31	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error
Max	**419.50**			**233.50**			**68.00**			**142.34**		
Min		**399.00**			**219.50**			**64.00**			**129.25**	

Source: TD, BPC

Graph: Daily maximum, minimum and average Voltage for the month of April, 2020

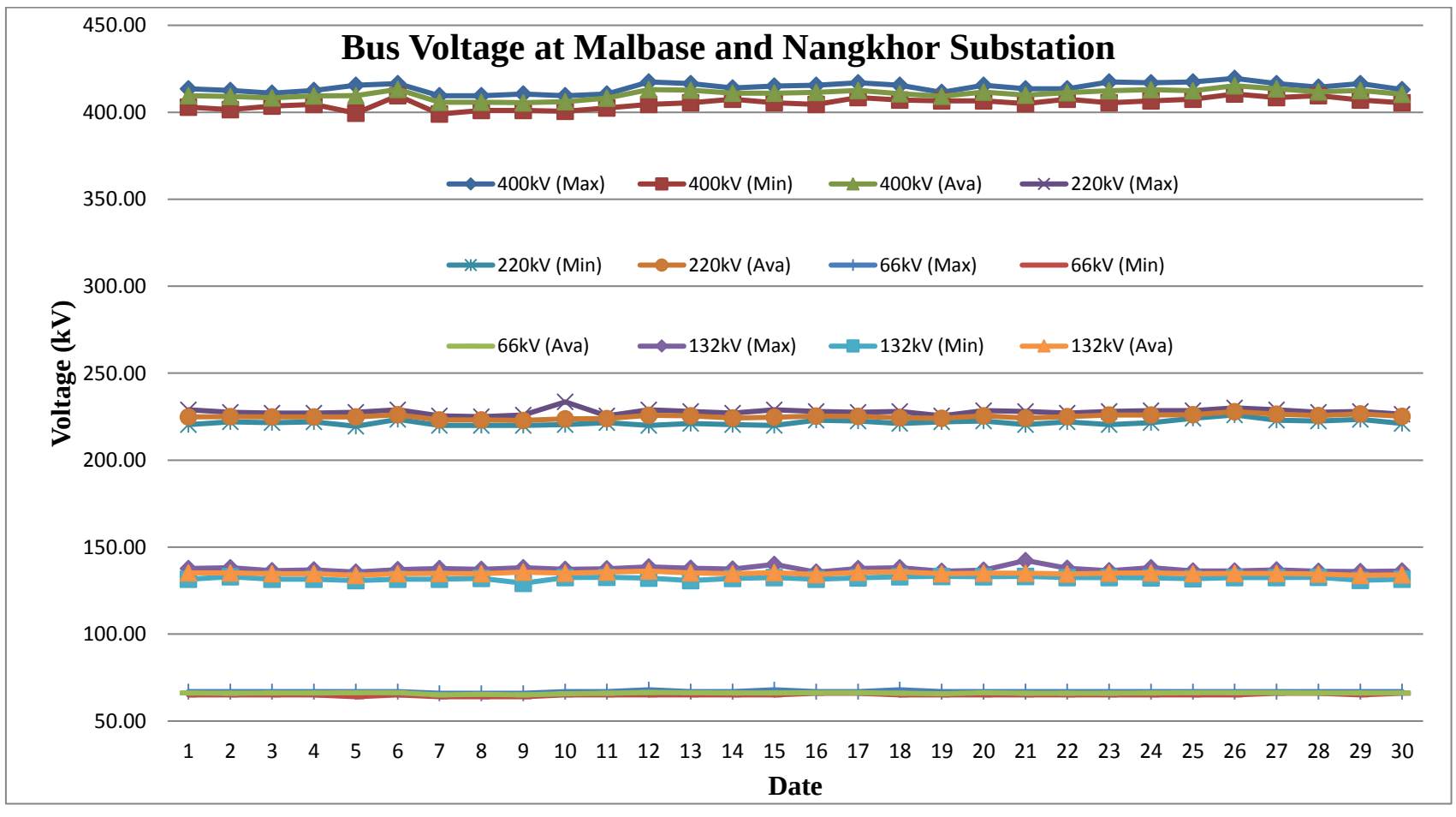


Table: Daily maximum, minimum and average Voltage for the month of May, 2020

May-20	Malbase Substation									Nangkhor Substation		
	400kV Bus Voltage (kV)			220kV Bus Voltage (kV)			66kV Bus Voltage (kV)			132kV Bus Voltage (kV)		
Date	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	415.50	408.50	411.29	227.50	224.00	225.77	66.00	65.00	65.92	136.30	131.90	134.79
2	414.50	406.50	410.85	227.00	223.00	225.33	67.00	65.00	66.17	139.70	131.30	135.10
3	415.50	406.50	411.27	226.50	222.00	224.94	66.00	65.00	65.92	137.30	132.60	135.57
4	415.50	406.50	411.04	227.00	222.00	225.17	67.00	65.00	65.83	135.90	132.16	134.13
5	412.50	406.50	409.75	227.50	223.50	225.21	67.00	65.00	65.96	135.70	132.57	134.09
6	414.50	406.00	410.13	227.50	223.50	225.58	67.00	65.00	66.00	136.10	132.36	134.35
7	415.50	407.00	412.13	228.50	223.50	226.79	67.00	66.00	66.58	138.80	131.90	134.85
8	414.50	406.00	410.79	227.00	222.00	225.23	67.00	65.00	65.96	138.60	132.00	135.12
9	415.50	408.00	412.00	228.00	223.50	225.54	67.00	65.00	66.17	137.30	131.90	134.52
10	416.50	408.50	412.29	228.50	223.00	225.65	67.00	65.00	66.38	136.70	132.57	135.24
11	416.50	401.50	411.21	228.00	219.50	225.13	67.00	66.00	66.42	136.90	132.20	134.86
12	414.50	404.00	410.23	228.50	221.50	224.67	67.00	65.00	66.21	136.31	132.78	134.72
13	415.50	409.50	412.31	228.50	223.50	225.92	67.00	66.00	66.13	137.77	134.20	135.79
14	419.50	406.50	414.10	230.50	224.00	227.44	68.00	66.00	66.83	138.65	132.70	136.15
15	417.50	403.00	410.90	229.00	220.00	224.77	67.00	65.00	66.08	137.97	132.60	135.17
16	414.50	404.00	408.94	228.00	221.00	224.54	67.00	66.00	66.25	138.90	132.99	135.52
17	411.50	405.50	408.77	227.00	223.00	225.10	67.00	65.00	66.00	137.90	131.30	135.48
18	411.50	403.00	407.17	227.00	220.00	223.46	67.00	65.00	65.75	136.20	131.95	134.13
19	409.50	400.50	406.88	226.00	218.50	223.85	66.00	65.00	65.88	135.90	130.90	133.52
20	411.50	402.00	408.71	227.00	220.50	224.73	67.00	65.00	66.00	136.50	133.40	135.05
21	410.50	405.50	407.33	225.00	222.00	224.13	66.00	65.00	65.83	137.97	134.80	136.78
22	408.50	403.50	406.27	224.00	220.00	222.81	66.00	65.00	65.25	137.90	133.82	135.82
23	406.00	401.50	403.77	223.50	219.00	221.27	66.00	65.00	65.13	136.50	133.20	134.88
24	407.50	402.50	405.38	223.50	219.50	222.21	66.00	65.00	65.58	137.10	134.44	135.71
25	410.50	403.00	406.50	226.00	221.00	223.54	67.00	65.00	65.75	137.35	134.80	136.51
26	410.00	404.50	407.50	225.50	220.00	223.13	67.00	65.00	66.00	139.01	135.20	136.91
27	413.50	405.00	410.08	227.00	220.00	224.33	67.00	66.00	66.17	138.30	133.40	136.46
28	414.50	403.50	408.52	228.00	222.00	224.27	67.00	66.00	66.38	137.10	132.57	134.81
29	412.50	400.50	407.38	227.00	220.00	223.50	67.00	65.00	66.03	136.40	131.30	134.35
30	414.50	408.00	410.52	227.50	222.50	224.56	67.00	66.00	66.33	137.14	132.99	135.01
31	418.00	405.50	412.96	228.00	222.00	225.75	67.00	66.00	66.19	137.50	133.20	135.59
Max	**419.50**			**230.50**			**68.00**			**139.70**		
Min		**400.50**			**218.50**			**65.00**			**130.90**	

Source: TD, BPC

Graph: Daily maximum, minimum and average Voltage for the month of May, 2020

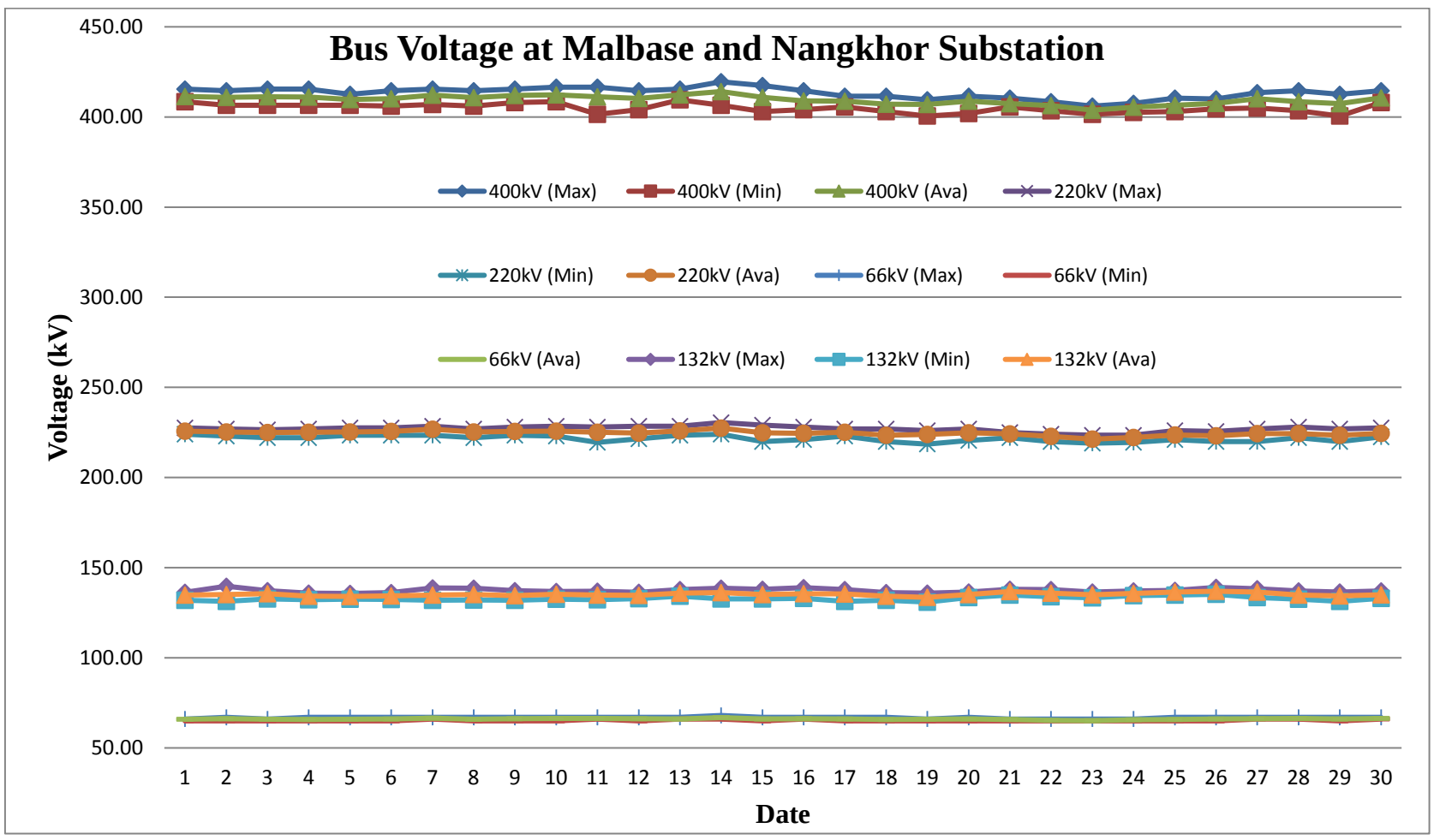
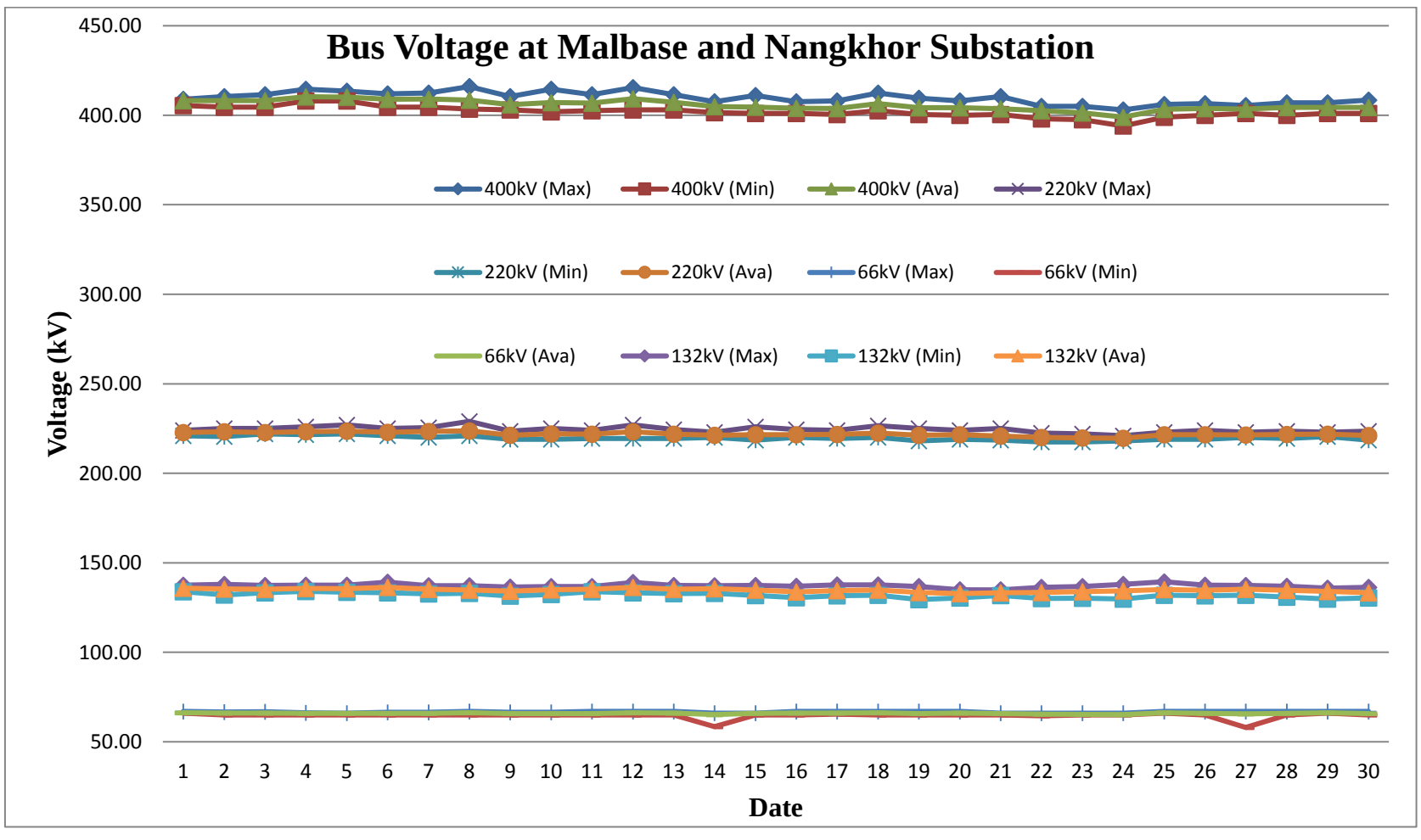


Table: Daily maximum, minimum and average Voltage for the month of June, 2020

Jun-20	Malbase Substation									Nangkhor Substation		
	400kV Bus Voltage (kV)			220kV Bus Voltage (kV)			66kV Bus Voltage (kV)			132kV Bus Voltage (kV)		
Date	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	409.00	405.50	408.17	224.00	221.00	222.75	67.00	66.00	66.25	137.56	133.82	135.85
2	410.50	404.50	408.21	225.00	220.50	223.17	66.70	65.00	66.09	137.90	132.00	135.38
3	411.50	404.50	408.21	225.00	222.00	222.71	66.80	65.00	65.98	137.30	133.19	135.29
4	414.50	408.00	410.35	226.00	221.50	223.21	66.20	65.00	65.86	137.50	134.03	135.63
5	413.50	408.00	410.17	227.00	222.00	223.60	66.00	65.00	65.92	137.50	133.61	135.48
6	412.00	404.50	408.88	225.00	221.00	222.92	66.50	65.00	65.96	139.20	133.19	136.26
7	412.50	404.50	409.04	225.50	220.00	223.31	66.50	65.00	65.90	137.14	132.70	135.26
8	416.00	403.50	408.52	229.00	221.00	223.71	67.00	65.00	66.25	137.14	132.90	134.76
9	410.50	403.00	405.96	223.50	219.00	221.21	66.50	65.00	65.69	136.50	131.50	134.18
10	414.50	402.00	407.04	225.00	219.00	221.96	66.50	65.00	65.77	136.80	132.30	134.93
11	411.50	402.50	406.75	224.00	219.50	221.92	67.00	65.00	65.71	136.73	133.82	135.18
12	415.50	403.00	409.25	227.00	219.50	223.27	67.00	65.00	66.21	139.01	133.19	136.27
13	411.50	403.00	407.25	224.50	219.50	221.92	67.00	65.00	66.06	137.30	132.78	135.16
14	407.50	401.50	404.79	223.00	220.00	221.33	66.00	58.50	65.21	137.20	132.90	135.56
15	411.00	401.00	404.58	226.00	218.50	221.63	66.00	65.00	65.83	137.30	131.70	134.71
16	407.50	401.00	403.96	224.50	220.00	221.54	67.00	65.00	66.00	136.94	130.50	133.65
17	408.00	400.50	403.83	224.00	219.50	221.75	67.00	65.50	66.00	137.70	131.53	134.52
18	412.50	402.50	406.52	226.50	220.00	222.44	67.00	65.00	66.21	137.70	131.95	134.79
19	409.50	400.50	404.25	225.00	218.00	221.25	67.00	65.00	65.75	136.70	129.45	133.48
20	408.00	400.00	404.29	224.00	219.00	221.58	67.00	65.00	66.04	135.00	130.40	132.80
21	410.50	400.50	403.63	225.00	218.50	220.83	66.00	65.00	65.71	134.86	131.70	133.33
22	405.00	398.00	402.50	222.50	217.50	219.98	66.00	64.50	65.46	136.31	130.00	133.44
23	405.00	397.50	401.42	222.00	217.50	219.77	66.00	65.00	65.29	136.73	130.20	133.84
24	403.00	394.00	398.98	221.00	218.00	219.58	66.00	65.00	65.21	137.90	129.80	134.25
25	406.00	399.00	403.33	223.00	219.00	221.63	67.00	66.00	66.23	139.40	131.95	135.12
26	406.50	400.00	403.81	224.00	219.00	221.54	67.00	65.00	65.92	137.50	131.54	134.64
27	405.50	401.00	403.48	223.00	220.00	221.48	67.00	58.00	65.54	137.30	131.95	135.21
28	407.00	400.00	404.44	223.50	219.50	221.71	67.00	65.00	65.88	136.94	130.90	134.59
29	407.00	401.00	404.33	223.00	220.50	221.88	67.00	66.00	66.17	135.90	129.80	134.02
30	408.50	401.00	404.40	223.50	218.50	221.08	67.00	65.00	65.79	136.30	130.40	133.23
31	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error
Max	**416.00**			**229.00**			**67.00**			**139.40**		
Min		**394.00**			**217.50**			**58.00**			**129.45**	

Source: TD, BPC

Graph: Daily maximum, minimum and average Voltage for the month of June, 2020



Annexure-V

Eastern Grid Outages

April, 2020

132/33/11kV, Kilikhar substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	9.04.2020	22:15	9.04.2020	22:28	13	10.73	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nill	Jigmeling	
2	9.04.2020	22:33	10.04.2020	0:05	32	10.73	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nill	Jigmeling	
3	10.04.2020	2:55	10.04.2020	3:04	9	2.88	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nill	Deothang	
4	15.04.2020	14:24	15.04.2020	15:30	6	11.70	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nill	Kurichu	

132/33/11kV, Kanglung substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	5:30	09.04.2020	5:41	0:11	-5.537	132kV Puntshothang Feeder	Phuntshothang Line	VT fuse fail		Kanglung SS	
2	09.04.2020	22:15	09.04.202	22:28	0:13	7.344	132kV Korlung Feeder		Grid fail	6 (GR A/B trip optd	Jigmeling SS	
3	09.04.2020	22:33	10.04.2020	0:05	0:32	7.344	132kV Korlung Feeder		Grid fail	6 (GR A/B trip optd	Jigmeling SS	
4	10.04.20	2:54	10.04.2020	3:01	0:07	1.498	132kV Korlung Feeder		Grid fail		Jigmeling SS	
5	15.04.2020	14:21	15.04.2020	15:29	0:08	10.8	132kV Korlung Feeder		Grid fail	6 (GR A/B trip optd	Jigmeling SS	

132/33/11kV, Nangkhor substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	01:50 hrs	09.04.2020	09:30 hrs	51	0.3	5MVA,132/33kV Transformer-I	All 33kV & 11kV feeders	NA	Ref.Protn.64R & trip relay opearted	Nangkor Substation	Tripped due to fault on Wamrong feeder. Charged in the morning hrs, no supply interrupted.
2	09.04.2020	01:50 hrs	09.04.2020	02:10 hrs	20	0.29	5MVA,132/33kV Transformer-II	All 33kV & 11kV feeders	NA	Bucholz relay 30E/F & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on Wamrong feeder
3	09.04.2020	22:16 hrs	09.04.2020	22:27 hrs	11	9.68	Grid fail	All feeders	NA	-	Jigmeling Substation	Supply failed from Jigmiling Substation.
4	09.04.2020	22:33 hrs	09.04.2020	00:05 hrs	32	-	Grid fail	All feeders	NA	-	Jigmeling Substation & Motonga Substation	Supply failed from Jigmiling Substation & Motonga Substation.Supply restored from Motonga Substation(Rangia Grid)
5	10.04.2020	02:51 hrs	10.04.2020	03:02 hrs	11	-53.28	Grid fail	All feeders	NA	-	Deothang Substation	Supply failed from Deothang Substation
6	15.04.2020	14:11 hrs	15.04.2020	15:08 hrs	57	13.96	Grid fail	All feeders	NA	Distance Relay Operated: Star Ø ABCN,Tripped phase ABC	Nangkor-Deothang line	
7	21.04.2020	14:38 hrs	21.04.2020	14:56 hrs	18	29.2	Grid fail	All feeder	NA	Distance Relay Operated: Star Ø CN,Tripped phase ABC	Nangkor-Deothang line	

132/33/11kV, Deothang substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	21:47	9.04.2020	21:55	8	-11.413	132kV Incomer fdr	Deothang to Nangkhor line	Gride fail	NA	Grid fail	
2	09.04.2020	21:47	9.04.2020	21:56	9	10.62	132kV Motanga fdr	Deothang to Motonga line	Gride fail	RYB Phase & Z1, Z2,Z3 operated. Fault Dist: 9.794km Fault Loop: L1-L2	Grid fail	
3	09.04.2020	22:15	9.04.2020	0:06	51	-11.413	132kV Incomer fdr	Deothang to Nangkhor line	Gride fail	NA	Grid fail	
4	10.04.2020	2:55	10.04.2020	3:05	10	-49.32	132kV Incomer fdr	Deothang to Nangkhor line	O/C on B&C phase	tripping relay (86) and zone 1, Zone 3 Fault Dist: 48.08km	NA	
5	15.04.2020	14:10	15.04.2020	14:11	1	-14.364	132kV Motanga fdr	Deothang to Motanga line	Overcurrent on all phase	RYB Phase & Z1, Z2,Z3 operated. Fault Dist: 9.0416km, Fault Loop: L1-L2	unknown	
6	15.04.2020	14:20	15.04.2020	14:23	3	-14.364	132kV Motanga fdr	Deothang to Motanga line	Overcurrent on all phase	RYB Phase & Z1, Z2,Z3 operated. Fault Dist: 1km, Fault Loop: L1-L2	unknown	
7	15.04.2020	14:34	15.04.2020	14:55	16	-14.364	132kV Motanga fdr	Deothang to Motanga line	Gride fail	NA	Grid fail	
8	15.04.2021	14:20	15.04.2021	14:30	10	-14.364	132kV Incomer fdr	Deothang to Nangkhor line	Tripped on Earthfault	86 relay & 50N opt.	Unknown	

220/132/33kV, Jigmeling substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

220/66/33kV, Dhajay substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No tripping												

132/66/33/11kV, Gelephu substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No tripping												

132/33/11kV, Tingtibi substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

132/33kV, Yurmoo substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

132/33/11kV, Nganglam substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	21:20	10.04.2020	21:30	10	0.183	5MVA Tr-I & II	5MVA Tr-I & II	Transient fault	86opted	5MVA Tr-I & Tr-II	
2	09.04.2020	22:15	10.04.2020	00:09	54	0.183	5MVA Tr-I & II	5MVA Tr-I & II	Transient fault	86opted	5MVA Tr-I & Tr-II	
3	09.04.2020	22:15	10.04.2020	00:33	37	-9.64	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Nangkhor & Tingtini end	
4	09.04.2020	22:15	10.04.2020	00:57	42	6.42	DCP	DCP	Hand Tripped	NA	Grid fail	
5	10.04.2020	02:55	10.04.2020	03:02	7	-18.54	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Nangkhor & Tingtini end	
6	15.04.2020	14:21	15.04.2020	15:01	40	-12.16	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Nangkhor & Tingtini end	
7	19.04.2020	20:41	19.04.2020	20:50	9	-9.35	Nganglam -Tingtibi	Nganglam -Tingtibi	Earth fault	Earth Fault & 86opted.	Nganglam-Tinigtibi	
8	21.04.2020	14:38	21.04.2020	14:56	18	-13.35	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Jigmeling & Deothang end.	
9	22.04.2020	16:33	22.04.2020	17:05	32	0.186	5MVA Tr-I & II	Nganglam SS	Tripped on Fault/tansient fault	Earth Fault & 86opted.	33kV Druk GYP fdr	

132kV, Motanga substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/10/2020	22:14 hrs	4/10/2020	00:01hrs	47 mins	16.17	Rangia fdr	Motanga-Rangia line	Trippped on fault	OV/UV	Motanga ss	
2	4/10/2020	22:14 hrs	4/10/2020	00.05hrs	51 mins	10.7	Deothang fdr	Motanga-Deothang line	Trippped on fault	OV/UV	Motanga ss	
3	4/10/2020	22:14 hrs	4/10/2020	00:34hrs	20mins	-5.81	P/thang fdr	Motanga-P/thang line	Trippped on fault	OV/UV	Motanga ss	
4	4/10/2020	2:51 hrs	4/14/2020	13:17hrs	26mins	0	P/thang fdr	Motanga-P/thang line	Trippped on fault	Zone-1 OPTD,Y-PH trip,B-PH trip,AR OPTD		
5	4/15/2020	14:32hrs	4/15/2020	14:40 hrs	8mins	7.69	Rangia fdr	Motanga-Rangia line	Trippped on fault	OV/UV	Motanga ss	
6	4/15/2020	14:32hrs	4/15/2020	14:54hrs	22mins	-12.9	Deothang fdr	Motanga-Deothang line	Trippped on fault	OV/UV	Motanga ss	
7	4/15/2020	14:32hrs	4/16/2020	14:53 hrs	17mins	-8.02	P/thang fdr	Motanga-P/thang line	Trippped on fault	OV/UV	Motanga ss	

May, 2020

132/33/11kV, Kilikhar substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

132/33/11kV, Kanglung substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	12.05.2020	13:21	12.05.2020	13;30	0:09	1.188	132kV Corlong	Kanglung Substation	Tripped on fault	OC	Kanglung Substation	

132/33/11kV, Nangkhor substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.05.2020	16:09 hrs	02.05.2020	16:33 hrs	24	0.57	Nangkor-Nganglam	Nangkor-Nganglam line	Tripped on fault	Distance Relay Operated: Star Ø CN,Tripped phase ABC : TOC start, SOTF TOR trip, Trip Z2	Nangkor-Nganglam line	
2	02.05.2020	16:18 hrs	02.05.2020	16:38 hrs	20	-1.33	Nangkor-Deothang	Nangkor-Deothang line	Tripped on fault	Distance Relay Operated: Star Ø ABCN,Tripped phase ABC : TOC start, Trip Z1, AR lockout shot>	Nangkor-Deothang line	
3	02.05.2020	16:45 hrs	02.05.2020	16:58 hrs	13	0.57	Nangkor-Nganglam	Nangkor-Nganglam line	Tripped on fault	Tripping relay 86 operated at our end.	Nangkor-Nganglam line	
4	02.05.2020	17:57 hrs	02.05.2020	18:10 hrs	13	0.72	Nangkor-Nganglam	Nangkor-Nganglam line	Tripped on fault	Tripping relay 86 operated at our end.	Nangkor-Nganglam line	
5	02.05.2020	18:13 hrs	02.05.2020	18:28 hrs	15	0.72	Main Grid fail	All feeders	NA	-	Rangia & Tintibi Substation	
6	13.05.2020	12:15 hrs	13.05.2020	12:18 hrs	3	25.7	Main Grid fail	All feeders	NA	-	Rangia & Tintibi Substation	
7	13.05.2020	12:15 hrs	13.05.2020	12:27 hrs	12	25.7	Nangkor-Deothang	All feeders	Tripped on fault	Distance Relay Operated: Star Ø AN,Tripped phase ABC : TOC start, Zone 2, AR lockout shot>	Nangkor-Deothang line	

132/33/11kV, Deothang substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.05.2020	15:58	02.05.2020	16:05	7	-34.272	132kV Nangkor Incommer	Deothang ss	Tripped on Fault	E/F	Unknown	132kV Nangkhor Incommer breaker opened at Deothang end only.
2	02.05.2020	15:58	02.05.2020	16:05	7	32.58	132kV Motanga	Motanga line	Tripped on Fault	All phase & zone 1,zone 2 operated	Motanga line	
3	02.05.2020	16:12	02.05.2020	16:24	11	0	132kV Motanga	Motanga line	Tripped on Fault	All phase & zone 1,zone 2 operated	Motanga line	
4	02.05.2020	16:12	02.05.2020	16:55	43	0	132kV Nangkor Incommer	Deothang ss	Tripped on Fault	E/F	Grid fail	
5	02.05.2020	17:18	02.05.2020	17:28	10	2.664	132kV Nangkor Incommer	Deothang ss	Tripped from Tingtibi substation	Nil	Grid fail	Supply fail from Tingtibi substation
6	02.05.2020	17:57	02.05.2020	17:59	2	-17.208	132kV Motanga	Motanga line	Tripped on Fault	All phase & zone 3 operated, Fault Dist:-1km, Fault loop:L1-L3	Motanga line	
7	07.05.2020	22:39	07.05.2020	23:08	28	32.58	132kV Motanga	Motanga line	Tripped on fault	R, Y & B phase Tripped & Zone 5 operated	Motanga line	
8	07.05.2020	22:39	07.05.2020	22:50	11	-35.208	1332kV Nangkhor Incommer	All 33kV & 11kV	Tripped on Fault	86 relay opt. & Trip zone 1, Fault Dist. = 1.899km	Deothang S/S	
9	13.05.2020	12:18	13.05.2020	12:27	9	-25.7	1332kV Nangkor Incommer	Deothang ss	Grid fail	86 Relay, and E/F - 50N Opt.	Grid fail from Tingtibi ss	Grid fail from Tingtib substation, at our end both the 132kV Nangkhor and Motanga breaker was open and as per the instruction of
10	13.05.2020	12:18	13.05.2020	12:29	11	20.66	132kV Motonga fdr	Motanga line	Grid fail	R,Y B phase, zone 1, zone 2, zone 3. Opt. Fault Dist:-1km and fault loop-L1-L2	Grid fail from Tingtibi ss	
11	13.05.2020	14:00	13.05.2020	14:02	2	-29.19	132kV Nangkor Incommer	Deothang ss	Tripped on Fault	86 Relay and E/F - 50N Opt.	Unknown	

132/33/11kV, Nganglam substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.05.2020	16:13	02.05.2020	16:35	22	3.92	Nangkhor & Tingtibi	Nganglam SS	Tripped on fault	Nill	Nangkhor/Tingtibi end	CB operated at Nangkhor and Tingtibi end respectively.
2	02.05.2020	16:46	02.05.2020	17:01	15	3.92	Nangkhor - Nganglam	Nangkhor - Nganglam	Tripped on fault	Earth Fault & 86opted.	Nanggkhor- Nganglam line	
3	02.05.2020	18:00	02.04.2020	18:15	15	3.91	Nangkhor & Tingtibi	Nganglam SS	Tripped on fault	NA	Nangkhor/Tingtibi end	CB operated at Nangkhor and Tingtibi end respectively.
4	02.05.2020	18:21	02.05.2020	18:29	8	3.91	Nangkhor - Nganglam	Nangkhor - Nganglam	Tripped on fault	Earth Fault & 86opted.	Nanggkhor- Nganglam line	
5	08.05.2020	06:35	08.05.2020	06:58	23	0.519	5MVA Tr-I	Nganglam SS	Heavy Spark on 33kV DCCL feeder	Earth Fault & 86opted.	Above DCCL Colony	There is a Heavy Sparkling at Forth Pole location above Colony. Tr-I restored after Isolating DCCL Feeder.
6	13.05.2020	02:16	13.05.2020	02:20	4	0.294	5MVA Tr-I	Nganglam SS	Tripped on fault	O/C & E/F, 8opted.	Druk GYP	Tripped due to fault in Druk GYP feeder.Feeder withstand during test charge.
7	13.05.2020	02:16	13.05.2020	02:20	7	0.126	5MVA Tr-II	Nganglam SS	Tripped on fault	O/C & E/F, 8opted.	Druk GYP	Tripped due to fault in Druk GYP feeder.
8	13.05.2020	02:17	13.05.2020	02:28	11	-13.53	Nganglam-Tingtibi	Nganglam-Tingtibi	O/C	O/C & 86opted.	Nganglam-Tingtibi	
9	13.05.2020	12:14	13.05.2020	12:16	2	-10.29	Nganglam-Tingtibi	Nganglam-Tingtibi	Over Voltage	Over Relay opted.	Nganglam-Tingtibi	
10	22.05.2020	19:02	22.05.2020	19:14	12	-20.8	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on fault	Earth Fault & 86opted.	Nganglam-Tingtibi	
11	29.05.2020	17:13	29.05.2020	17:20	7	-7.45	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on fault	Earth Fault & 86opted.	Nganglam-Tingtibi	

132kV, Motanga substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/10/2020	22:14 hrs	4/10/2020	00:01hrs	47	16.17	Rangia fdr	Motanga-Rangia line	Trippped on fault	OV/UV	Motanga ss	
2	5/2/2020	18:19 hrs	5/3/2020	13.28hrs	47	27.1	Deothang fdr	Motanga-Deothang line	Trippped on fault	OV/UV	Motanga ss	
3	5/7/2020	22:38 hrs	5/7/2020	23:06hrs	28	-32.5	Deothang fdr	Motanga-Deothang line	Trippped on fault	R,Y,B phase trip & 86A &86 B operated	Motanga ss	
4	5/7/2020	22:40 hrs	5/7/2020	22:54hrs	14	-14.34	Phuntshothang fdr	lotanga-phuntshothang lin	Trippped on fault	OV/UV	Motanga ss	
5	5/13/2020	13:57hrs	5/13/2020	14:02 hrs	5	-22.7	Deothang fdr	Motanga -Deothang Line	Trippped on fault	B phase tripped,86A &86B operated	Motanga ss	
6	5/30/2020	17:40hrs	5/30/2020	18:35hrs	5	0.06	15mva Xmer	Motanga ss	Trippped on fault	86 A operated	Motanga ss	

220/132/33kV, Jigmeling substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	07.05.2020	19:16 hrs	08.05.2020	09:11 hrs	27	141.680	440kV Alipur Line 1	Jigmeling ss and Alipurduar	Line to Earth fault	Main 1 R&Ypicked up, Z1 optd & Main 2 R&Y picked up, Z1 optd	Main 1 (dist:135.4 km). Main II(dist:135.4 km)	
2	07.05.2020	19:16 hrs	07.05.2021	20:25hrs	9	141.680	440kV Alipur Line 2	Jigmeling ss and Alipurduar	Line to Earth fault	Main 1 R&Ypicked up, Z1 optd & Main 2 R&Y picked up, Z1 optd	Main 1 (dist:132.4 km). Main II(dist:132.4 km)	
3	10.05.2020	10:04 hrs	10.05.2020	10:28 hrs	23	125.080	440kV MHEP Line 4	Jigmeling ss and MHEP	line to line faullt	Main 1 R&Ypicked up & Main 2 R&Y picked up	Main 1 (dist:58 km). Main II(dist:58 km)	
4	13.05.2020	22:00 hrs	13.05.2020	22:14 hrs	14	103.990	440kV MHEP Line 4	Jigmeling ss and MHEP	Line to Earth faullt	Main 1 Ypicked up & Main 2 RYB picked up	Main 1 (dist:58 km). Main II(dist:58 km)	
5	02.05.2020	16:31 hrs	02.05.2020	16:42 hrs	11	0.87	220kV dagapela feeder	Jigmeling ss and dagapela	Line to earth faulth	Main I R&B picked up, Z1 optd. Main II R picked up Z1 optd	main I (Dist: 25km) & Man 2(Dist: 22.76km)	
6	14.05.2020	6:39 hrs	14.05.2020	6:46 hrs	7	1.08	220kV dagapela feeder	Jigmeling ss and dagapela	Line to Line faulth	Main I Y&B picked up, Z1 and Z1B opted, Main 2 Y&B Pickup, Z1 opt.	Main I(dist:7.7 km), Main II(dist:7.9km)	
7	02.05.2020	16:13 hrs	02.05.2020	16:31 hrs	18	3.73	132kV Tintibi feeder	Jigmelingss and Tintibi	Line fault	Main I RYBpicked up, Z1 optd. Mian 2 RYB picked up Z1 optd	Main I(dist:17.3) Main II(dist:21.94)	
8	06.05.2020	13:35 hrs	06.05.2020	13:45 hrs	15	13.56	132kV Tintibi feeder	Jigmelingss and Tintibi	line to Earth faullt	Main I R phase tripped, Mian II R Phase picked up Z1 optd.	Main I(dist:30 km) Main II(dist:26.91 km)	
9	07.05.2020	20:24hrs	07.05.2022	20:31 hrs	7	7.340	13kV Tingtibi feeder	Jigmelingss and Tintibi	Line to Line fault	Main I B phase tripped, Mian II B Phase picked up Z1 optd.		

220/66/33kV, Dhajay substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/22/2020	1:15:3hrs	5/22/2020	1:42:3hrs	27	60.86	Rurichu	Dhajay Subsation	Phase fault,Main-1(IR=0.14KA,IY=1.64 KA,IB=1.5KA)	Distance relay 21.1	16.6km	
2	5/26/2020	12:10:03hrs	5/29/2020	16:03:04hrs	27	56.1	Dagachu	Dhajay Subsation	Phase to earth faul	Distance relay both 21.1 & 21.2	Main-1=19.2km and Main-2=17.23km	

132/66/33/11kV, Gelephu substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	16.05.2020	18.46hrs	17.05.2020	10.51hrs	5	2	132kV Gel-Sal	132kV Gel-Sal	Equipment Failure	General Trip, B phase trip, Zone I, Fuse fail & Dist. 37.33Km towards Salakati end	Gelephu Substation	B phase LA blast & Replaced.
2	25.05.2020	20.07hrs	25.05.2020	20.37hrs	30	26.8	132kV Gel-Sal	132kV Gel-Sal	weather condition	General Trip, B phase trip, Zone I, Fuse fail & Dist. 38.39Km towards Salakati end	Salakati line	Along with this Fdr.both 25MVA trf(HV & LV)tripped.

132/33/11kV, Tingtibi substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/2/2020	16:11 Hrs	5/2/2020	16:36Hrs	25	12.380	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Directional O/C &EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Nanglam fdr.	
2	5/2/2020	16:45 Hrs	5/2/2020	17:23Hrs	38	12.380	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Directional O/C &EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Nanglam fdr.	
3	5/2/2020	17:57 Hrs	5/2/2020	18:30Hrs	33	12.380	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Triping relay 86 & Auto reclosed lock out annunciation dispalyed.	132kV Tingtibi-Nanglam fdr.	
4	5/13/2020	02:17 Hrs	2/13/2020	02:32Hrs	15	9.930	132kV Tingtibi-Jigmeling fdr.	132kV Tingtibi-Jigmeling fdr.	Over current	Directional O/C &EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Jigmeling fdr.	
5	5/13/2020	02:17 Hrs	2/13/2020	02:26Hrs	9	14.610	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Distance relay operated :Zone-none,Fault duration:1.665ms	132kV Tingtibi-Nanglam fdr.	
6	5/13/2020	12:17 Hrs	2/13/2020	12:19Hrs	2	12.700	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Triping relay 86 & Auto reclosed lock out annunciation dispalyed.	132kV Tingtibi-Nanglam fdr.	
7	5/26/2020	16:32 Hrs	2/26/2020	16:38Hrs	6	5.000	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current/Earth fault	Directional O/C &EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Nanglam fdr.	

132/33kV, Yurmoo substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/2/2020	16:13hrs	5/2/2020	16:31hrs	18	-3.7	132kV Tingtibi I/C	Yurmoo Substation	Grid fail	Nill	Nill	
2	5/13/2020	14:17hrs	5/13/2020	14:24rs	7	-3.3	132kV Tingtibi I/C	Yurmoo Substation	Grid fail	Nill	-	

132/33kV, Dagapela substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
Nill												

June, 2020

132/33/11kV, Kilikhar substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

132/33/11kV, Kanglung substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

132/33/11kV, Nangkhor substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.06.2020	16:59	09.06.2020	17:04	0:05	0.36	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Tsebar feeder.
2	09.06.2020	16:59	09.06.2020	16:38	0:05	0.19	132/33kV 5MVA, Transformer-II	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Tsebar feeder.
3	12.06.2020	11:54	12.06.2020	11:59	0:05	0.39	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Nanung feeder.
4	12.06.2020	11:54	12.06.2020	11:59	0:05	0.21	132/33kV 5MVA, Transformer-II	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Nanung feeder.
5	13.06.2020	12:19	13.06.2020	12:24	0:05	0.43	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Wamrong feeder
6	13.06.2020	12:19	13.06.2020	12:24	0:05	0.27	132/33kV 5MVA, Transformer-II	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Wamrong feeder
7	18.06.2020	09:14 hrs	18.06.2020	14:09 hrs	0:04	54	132/33kV Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Yurung feeder. Since its spring was discharged charged after rain stopped. Supply normalized through Transformer-II
8	18.06.2020	9:14	18.06.2020	9:19	0:05	0.27	132/33kV Transformer-II	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A,51A,51C,50C & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Yurung feeder
9	26.06.2020	18:18	26.06.2020	18:21	0:03	0.47	132/33kV 5MVA, Transformer-I	-	Tripped on fault	Non directional O/C,50A,50C & tripping relay 86 operated	Nangkor Substation	Tripped due to fault on 33kV Yurung feeder

132/33/11kV, Deothang substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

132/33/11kV, Nganglam substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	03.06.2020	02:49	03.06.2020	02:59	0:10	-9.68	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Fault	E/F & 86opted.	Nganglam-Tingtibi Line	
2	03.06.2020	8:43	03.06.2020	8:56	0:13	-2.91	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Fault	E/F & 86opted.	Nganglam-Tingtibi Line	
3	23.06.2020	12:38	23.06.2020	13:03	0:25	-3.78	Nganglam-Tingtibi	Nganglam-Tingtibi	Trippd on Over Voltage	86opted	Nganglam-Tingtibi Line	

132kV, Motanga substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	13:01	11.06.2020	15:01	2:00	0.09	15MVA Transformer	15MVA Transformer	Trippped on fault	86A & 86B optd	Motanga ss	
2	11.06.2020	19:46	11.06.2020	20:50	1:04	-39.6	Deothang Feeder	Motanga-Deothang line	Hand tripped		Motanga ss	
3	19.06.2020	12:02	19.06.2020	12:25	0:23	-53.02	Rangia Feeder	Motanga -Rangia Line	Trippped on fault	86A &86B operated	Motanga ss	

220/132/33kV, Jigmeling substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	04.06.2020	1:59	04.06.2020	3:03	2:04	234.160	Interim Alipur Line-2	Interim Alipur Line-2		Main I:R trip optd.; Mian 2:R trip optd.		
2	25.06.2020	3:17	25.06.2020	4:31	1:14	379.280	Interim Alipur Line-1	Interim Alipur Line-1	Main I:R trip optd.; Mian 2:R trip optd.	Main I:Rphase trip distance at 174.7 km. Mian 2:Rphase trip at distance 174.6 km.		
3	25.06.2020	3:17	25.06.2020	10:04	6:39	378.870	Interim Alipur Line-2	Interim Alipur Line-2	Main I:R trip optd.; Mian 2:R trip optd.	Main I:R trip optd.; Mian 2:R trip optd.		
4	25.06.2020	4:32	25.06.2020	6:20	1:48	247.990	MHPA Fdr 1	MHPA fdr 1	Main I-RYB phase trip Main II RYB phase trip	Main I-RYB phase trip Main II RYB phase trip		
5	25.06.2020	4:32	25.06.2020	6:00	1:28	255.970	MHPA fdr-2	MHPA fdr-2	Main I-RYB phase trip Main II RYB phase trip	Main I-RYB phase trip Main II RYB phase trip		
6	25.06.2020	4:32	25.06.2020	7:55	3:23	255.970	MHPA fdr-3	MHPA fdr-3	Main I-RYB phase trip Main II RYB phase trip	Main I-RYB phase trip Main II RYB phase trip		
7	26.06.2020	16:10	26.06.2020	17:35	1:25	366.890	interim alipurduar ckt I	Alipurduar s/s	Rph pick up for both main 1 and 2	Rph pick up for both main 1 and 2		
8	26.06.2020	16:23	26.06.2020	18:17	1:54	386.870	interim alipurduar ckt II	Alipurduar s/s	Yphase trip on O/V (OV values 425.40)	Yphase trip for main 1 and main 2		
9	26.06.2020	16:10	26.06.2020	17:45	1:35	253.070	MHPA line 3	Mhpa and alipurduar	Genaerator got trip due to O/C at their end	DTT trip received at our end		
10	26.06.2020	16:10	26.06.2020	18:14	4:04	258.880	MHPA line 1	Mhpa and alipurduar	Genaerator got trip due to O/C at their end	DTT trip received at our end		
11	26.06.2020	16:10	26.06.2020	18:33	2:23	260.340	MHPA line 2	Mhpa and alipurduar	Genaerator got trip due to O/C at their end	DTT trip received at our end	DTT trip received at our end	
12	03.06.2020	8:43	03.06.2020	8:56	1:13	6.84	132kV Tingtibi	Tingtibi ss	Line Fauly	Main I RYBpicked up, Z3 optd. Mian 2 RYB picked up Z3 optd	Main-1 109.5km, Main-2 51.10km	
13	06.06.2020	15:52	06.06.2020	15:57	1:05	-56.92	220kV Dagapela	Jigmeling SS	Line - Earth fault	Main-1 Rphase pick up, SOTF optd,	Main-1: -253.7km	
14	06.06.2020	15:57	06.06.2021	16:20	0:23	-56.92	220kV Dagapela	Jigmeling SS	Line - Earth fault	Main-1 Rphase pick up, SOTF optd,	Main-1 8.6km	
15	19.06.2020	4:45	19.06.2020	5:01	0:16	0.79	220kV Jigmeling_Daapela	Dagapela Substation	Phase to Phase fault	Main I Ryph Z1 Trip. Mian 2 RYph Z1 Trip	Main-1: 7.6km, Main-2 6.93km	
16	21.06.2020	4:14	21.06.2020	4:23	0:09	0.71	220kV jigmeling-Dagapela	Dagapela Substation	Phase to Phase fault(L2L3)	Mian 1 YB phase trip Main 2 YBphase trip	Main-1 7.5km, Main-2 7.11km	
17	23.06.2020	11:55	23.06.2020	14:02	2:07	-59.72	220 kV Jigmeling - Tsirang fdr	Jigmelins SS	Phase to Earth fault	Main 1; Rph to Ground (distance 107.7km) Main 2: Directional EF	Main 1; Rph to Ground (distance 107.7km) Main 2: Directional EF	

220/66/33kV, Dhajay substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

132/66/33/11kV, Gelephu substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.06.2020	0:20	09.06.2020	0:42	0:22	22	132kV Gel-Sal	132kV Gel-Sal	weather condition	General Trip, B phase trip, Zone I & Dist. 38.57Km towards Salakati end	Salakati line	Along with this Fdr.both 25MVA trf I(HV & LV)tripped.
2	24.06.2020	10:55	24.06.2020	11:10	0:15	35.6	132kV Gel-Sal	132kV Gel-Sal	weather condition	General Trip, 3 phase trip, Zone I & Dist. 17.33Km towards Salakati end	Salakati line	Along with this Fdr.both 25MVA trf I(HV & LV)tripped.

132/33/11kV, Tingtibi substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	3.06.2020	2:49	3.06.2020	3:01	0:12	7.62	132kV Ting-Nanglam Fdr.	132kV Ting-Nanglam Fdr.	Over Current & Earth Fault	Directional O/C & E F Relay:O/C Trip I>2,E/F IN1>2.	132kV Ting-Nanglam Fdr.	
2	23.06.2020	12:38	23.06.2020	13:26	0:48	-7	132kV Ting-JIgmeling Fdr.	132kV Ting-Jigmeling Fdr.	Over Voltage	Distance protection relay:Over voltage Trip V>2	132kV Ting-Jigmeling Fdr.	
3	23.06.2020	12:38	23.06.2020	13:25	0:47	5.32	132kV Ting-Nanglam Fdr.	132kV Ting-Nanglam Fdr.	Over Voltage	Distance protection relay:Over voltage Trip V>2	132kV Ting-Nanglam Fdr.	

132/33kV, Yurmoo substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	3.06.2020	8:43	3.06.2020	8:56	0:13	-3.6	132kV Tingtibi I/C	Yurmoo Substation	Grid fail	Nill	Nill	

132/33kV, Dagapela substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
Nill												

Annexure-VI

Western grid Outages

April, 2020

400/220/66/11kV Malbase substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	18:45	09.04.2020	19:34	49	-68	220kV Birpara feeder	-	Tripped	B/B trip, Trip R,Y,B Phase		
2	09.04.2020	18:48	09.04.2020	19:35	47	8	220kV Samtse feeder	-	Tripped	B/B trip, Trip R,Y,B Phase, M-I Trip, Zone I trip	-	
3	09.04.2020	22:52	09.04.2020	23:15	23	23	50/63 MVA Transformer -I (210)	-	Tripped	General Trip, LBB Trip	-	
4	09.04.2020	22:52	09.04.2020	23:40	48	25	50/63 MVA Transformer -III	-	Tripped	86 operated ,	-	
5	09.04.2020	22:52	09.04.2020	22:58	6	94	200 MVA ICT Transformer	-	Tripped	86 operated ,	-	
6	15.04.2020	10:38	15.04.2020	11:07	29	23	Passakha Feeder I		Tripped	OC trip , General Trip .		
7	15.04.2020	10:39	15.04.2020	10:45	6	-	220kV Bus Coupler	-	Tripped	General trip,time overcurrent trip	-	
8	15.04.2020	10:39	15.04.2020	11:09	30	9	Passakha Feeder I		Tripped	OC trip , General Trip		
9	15.04.2020	10:38	15.04.2020	11:09	31	12	Passakha Feeder I		Tripped	OC trip , General Trip		
10	16.04.2020	18:10	16.04.2020	18:18	8	-	220kV Bus Coupler	-	Tripped	General trip		
11	16.04.2020	18:10	16.04.2020	18:27	17	-146	400kV Tala	400kV Siliguri & Tie	Tripped	General trip, Directional time overcurrent trip, IEP Directional trip,		
12	16.04.2020	18:10	16.04.2020	19:05	55	71	400kV Siliguri	400kV Tala & Tie	Tripped	OC trip , General Trip	-	
13	18.04.20	23:11	18.04.20	23:23	12	63	200MVA ICT		Tripped	86 optd.	-	
14	18.04.20	23:11	18.04.20	23:45	34	-63	220kV Birpara feeder		Tripped	86 optd. R and B phase open.		
15	21.04.20	3:14	21.04.20	3:31	17	37	400KV ICT	Malbase s/s	Tripped	Main CB optd,67 O/C optd.		
16	21.04.20	3:14	21.04.2020	10:09	55	-92	220kV Birpara feeder	Malbase s/s	Tripped	Zone1 trip,M2 protection optd.		
17	21.04.20	3:14	21.04.2020	3:39	25	-	66kV bus coupler	Malbase s/s	Tripped	IEF trip, General trip		
18	21.04.20	3:14	21.04.2020	3:40	26	23	66kV Pasakha feeder I	Malbase s/s	Tripped	IEF- 50- trip, General trip,86 Opt.,		
19	21.04.20	3:14	21.04.2020	3:41	27	23	66kV Pasakha feeder I I	Malbase s/s	Tripped	51 START,86 Optd.		
20	21.04.20	3:14	21.04.2020	3:42	28	25	66kV Pasakha feeder I V	Malbase s/s	Tripped	50-trip,50N- trip, IEF 50N trip, General trip,86 optd.		
21	23.04.202	22:25	23.04.202	22:32	7	5	220kV Samtse feeder	Malbase s/s	Tripped	M-1 trip,zone 2 trip,M1/BC trip, AR optd.		
22	23.04.202	23:15	23.04.202	23:54	39	61	400kV Siliguri feeder	Malbase s/s	Tripped	M-1 trip, ZM 1 trip, Fuse fail,		
23	15.04.2020	10:39	15.04.2020	11:07	28	-	66kV Bhutan Concast	Singyegoan(GIS)	Tripped	General trip,Overcurrent trip,		
24	18.04.2020	23:11	19.04.2020	2:54	43	1.4MW	220kV Singyegoan-Samtse feeder	Singyegoan(GIS)	Tripped	General trip,zone 1 trip, Overcurrent relay optd.	31.8km	
25	21.04.2020	3:14	21.04.2020	3:55	41	4.1MW	66kV Bhutan Concast		Tripped			

220/66/11kV Singhigaon substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Phuentsholing substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	23:10	09.04.2020	23:19	9	-4.32	66kV Chukha-Pling	66kV Chukha-Pling feeder	Tripped	Dist Protection Opt,186 & 86	Line	
2	09.04.2020	23:26	10.04.2020	1:13	50	2.18	66kV Pling-Gomtu	66kV Pling-Gomtu feeder	Earthfault		Line	
3			12.04.2020	9:47		idle	66kV Pling-Malbase	66kV Pling-Malbase				
4	14.04.2020	10:58	14.04.2020	11:09	11	-5.76	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	Dist Protection Opt,186 & 86	Line	
5	16.04.2020	18:10	16.04.2020	18:22	12	-3.54	66kV Pling-Gomtu	Black out at Pling	Tripped at our end	Dist Protection Opt,186 & 86	Line	
6	16.04.2020	18:10	16.04.2020	18:39	29	-6.87	66kV Chukha-Pling	Black out at Pling	Tripped at our end	Dist Protection Opt,186 & 86, (Fault imp-18.8	Line	
7	21.04.2020	3:15	21.04.2020	6:32	17	12.32	66kV Pling-Malbase	Black out at Pling	Tripped at Malbase end	Nill	Line	
8	21.04.2020	3:15	21.04.2020	3:29	14	-11.72	66kV Chukha-Pling	Black out at Pling	Tripped at Chukha end	Nill	Line	
9	22.04.2020	17:09	22.04.2020			5.81	66kV Pling-Malbase	66kV Pling-Malbase fdr				
10	23.04.2020	22:25	23.04.2020	22:32	7	1.32	66kV Pling-Gomtu	66kV Pling-Gomtu	Earthfault		Line	
11	25.04.2020	15:50	25.04.2020	15:58	8	idle	66kV Pling-Malbase	66kV Pling-Malbase fdr		Nill	Line	
12	27.04.2020	17:10	27.04.2020	17:26	16	-5.22	66kV Chukha-Pling	66kV Chukha-Pling	Tripped a both end	Dist Protection Opt,186 & 86. At Chukha end: Distance 15KM, General Zone 1 trip.	Line	
13	29.04.2020	14:30	29.04.2020	15:15	45	2.72	66kV Pling-Gomtu	66kV Pling-Gomtu	Earthfault		Line	

66/33/11kV Gomtu substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	18:26	09.04.2020	18:41	15	-5.51	66kV Dhamdum feeder	Nil	Grid Failed	NA	Line segment	
2	09.04.2020	23:27	09.04.2020	23:56	29	-1.09	66kV Dhamdum feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	
3	09.04.2020	23:27	10.04.2020	4:19	52	2.58	66kV P/ling feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	
4	21.04.2020	3:15	21.04.2020	3:29	14	-6.051	66kV Dhamdum feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	
5	23.04.2020	10:36	23.04.2020	10:46	10	-2.98	66kV Dhamdum feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	

220/66/33kV Dhamdum substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	9.04.2020	18:26	9.04.2020	18:41	15	5.58	Gomtu fdr.	Gomtu	Lightinig, thunder and heavy rain fall	REF615	NA	
2	16.04.2020	18:10	16.04.2020	18:23	13	-2.97	Singeygang	NA	Lightinig, thunder and heavy rain fall	REL670	NA	
3	21.04.2020	3:14	21.04.2020	3:32	18	-6.88	22kV Malbase feeder	Damdum substation	Lightinig, thunder and heavy rain fall	no operation	NA	
4	23.04.2020	22:25	23.04.2020	22:32	7	-5.07	220KV Malbase	Damdum substation	Lightinig, thunder and heavy rain fall	REL670(21M2) General trip, Zone-1,B phase fault and V.T Fuse Fault.	NA	
5	23.04.2020	22:37	23.04.2020	22:46	9	1.29	66kv Gomtu	Gomtu	Lightinig, thunder and heavy rain fall	REL 670 (21L) General trip,Zone 1 trip,R phase fault	NA	

66/33/11kV Gedu substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	12.04.2020	10:03	12.04.2020	10:19	16	0.300	66kV line	Black out	8MVA Transformer HV side isolator alignmnet problem.		Substation	
2	21.04.2020	3:15	21.04.2020	3:30	15	0.710	66kV line	Black out	Heavy lightning and thunder strom.		Line segment	
3	27.04.202	17:10	27.04.2020	17:24	14	1.950	66kV line	Black out	Heavy lightning and thunder strom.		Line segment	

66/33/11kV Lobeysa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No tripping												

220/66/11kV Semtokha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Dechenchholing substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	30.04.2020	9:49	30.04.2020	10:12	23	0.31	66KV Gasa fdr.	Gasa line	Tripped on O/C			

66/33kV Olakha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/7/2020	7:44	4/7/2020	7:47	3	4.50	66/33kV, 20MVA Transformer I	All 33kv Outgoing feeders	Tripping of 33KV outgoing VI (DPH II)	DIR. O/C & E/F PROTN. RELAY 67		
2	4/7/2020	8:03	4/7/2020	8:05	2	5.2	66/33kV, 20MVA Transformer I	All 33kV Outgoing feeders	Tripping of 33KV outgoing VI (DPH II)	DIR. O/C & E/F PROTN. RELAY 67		
3	4/18/2020	17:42	4/18/2020	17:44	2	5.6	66/33kV, 20MVA Transformer I	33kV OG VI (DPH II)	Tripping of 33KV outgoing VI (DPH II)	TRAFO DIFFL.PROTN Relay 8		

66/33/11kV Jemina substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	16:20	09.04.2020	16:25	5	-5.52	66 kV both	Black out	Non directional earth	_	Line	

66kV Chumdo switching station

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Paro substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	9/4/2020	16:21	9/4/2020	16:30	9	7.96	Chumdo-Paro Line	Paro S/S and its	Tripped from	Tripped		

May, 2020

400/220/66/11kV Malbase substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	03.05.2020	20:28	03.05.2020	20:35	7		200MVA ICT Transformer	400kV Malbase Substation	Tripped	EARTHFAULT		
2	03.05.2020	20:28	03.05.2020	20:45	17		50/63MVA Transformer III	400kV Malbase Substation	Tripped	From RET 670,OLTC BUCH TRIP,DIFF TRIP		
3	03.05.2020	20:28	03.05.2020	20:40	12		220 Singyegoan to Samtse Feeder	220 GIS Singyegoan	Tripped	REL 511,General trip,trip R,Y&B phase,distance protection optd.	Fault loop L3-N Distance=11km	
4	04.05.2020	17:10	04.05.2020	17:20	10	20	50/63MVA Transformer III	400kV Malbase Substation	Tripped	OLTC Buch Trip, Differential Trip, EXT Trip		
5	04.05.2020	17:10	04.05.2020	17:25	15	141	400kV Siliguri Feeder	400kV Malbase Substation	Tripped	Distance- Z1 trip, A/R Lockout, Zone -I Trip.	4.25km	
6	07.05.2020	17:55	07.05.2020	18:01	6		220kV Bus Coupler	400kV Malbase Substation	Tripped		-	The feeder was triped on over current on R- phase.
7	07.05.2020	17:55	07.05.2020	18:03	8	4	220kV Samtse Feeder	400kV Malbase Substation	Tripped			
8	07.05.2020	17:55	07.05.2020	18:30	35	-41	220kV Birpara Feeder	400kV Malbase Substation	Tripped	Zone 3start, B/B trip	-	
9	07.05.2020	18:18	07.05.2020	18:21	3	51	200MVA ICT Transformer	400kV Malbase Substation	Tripped	67(HV) O/C OPTD,400kV side B/U O/C & EF Protn. Trip		
10	07.05.2020	18:18	07.05.2020	18:27	9	16	50/63MVA Transformer III	400kV Malbase Substation	Tripped	Relay RET 670 008 OLTC BUCH Trip,027 Trip		
11	13.05.2020	22:13	13.05.2020	22:20	7	-76	220kV Chukha Feeder III	400kV Malbase Substation	Tripped	Zone 1 trip,AR-lockout,location =5.315km		
12	13.05.2020	22:13	13.05.2020	22:28	15	45	200MVA ICT Transformer	400kV Malbase Substation	Tripped	Main & TIE CB open, 86 optd.		
13	13.05.2020	22:13	13.05.2020	22:22	9	22	50/63MVA Transformer I(HV)	400kV Malbase Substation	Tripped	Diff trip, 86 optd.	-	
14	13.05.2020	22:13	13.05.2020	22:34	21	24	50/63MVA Transformer III(HV)	400kV Malbase Substation	Tripped	Diff trip, 86 optd. EXT. trip,OLTC Buch trip.	-	
15	13.05.2020	22:13	13.05.2020	22:34	21	24	50/63MVA Transformer III(LV)	400kV Malbase Substation	Tripped	No Data Display in the relay.		
16	13.05.2020	22:13	13.05.2020	22:22	9	22	50/63MVA Transformer I(LV)	400kV Malbase Substation	Tripped	86 opt. .		
17	15.05.2020	20:32	15.05.2020	20:45	13	86	200MVA ICT Transformer	400kV Malbase Substation	Tripped	EARTHFAULT (FWD)IDMTL I4=857.7A.		
18	15.05.2020	20:32	15.05.2020	20:54	22	-	220kV Chukha Feeder	400kV Malbase Substation.	Tripped	General trip,zone 1 trip,A/R lockout, Dist=22.51km		
19	26.05.2020	13:57	26.05.2020	14:34	37	8	220kV Samtse Feeder	400kV Malbase Substation/ Dhamdum S/S	Tripped	Main 1 trip,trip R,Y,B.,zone 1 trip, Carrier fail,m1 carrier send. L1-N,DIST=32.2km.		
20	26.05.2020	13:57	26.05.2020	14:05	8	52	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	EARTHFAULT (REV)<HSI>IDMTL I4=1995A.		
21	26.05.2020	14:02	26.05.2020	14:47	45	249	400kV Siliguri Feeder	400kV Malbase Substation.	Tripped	Zm1 & Zm 3 trip, Time Sync error, Fuse fail,main1 & 2 trip.		
22	26.05.2020	14:14	26.05.2020	14:25	11	58	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	G1 PHASE A(REV) IDMTL IA= 210.2A,		
23	29.05.2020	14:53	29.05.2020	14:59	6	58	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	G1 PHASE A(REV) IA= 230.7A		

220/66/11kV Singhigaon substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	07.05.2020	18:18	07.05.2020	18:29	11	-10	66kV Concast	GIS Singhigoan	Tripped	I1=0.07kA, I2=0.10kA. I3=0.06kV.		
2	07.05.2020	18:18	07.05.2020	18:53	35		66kV Bus Coupler	GIS Singhigoan	Tripped	I1=0.09kA, I2=0.06kA. I3=0.10kV.		
3	09.05.2020	20:28	09.05.2020	20:40	12	64	220kV Samtse Feeder	GIS Singhigoan	Tripped	I1=58.44A, I2=50.40A. I3=4439A. I4=4334A		
4	26.05.2020	13:57	26.05.2020	14:45	48	0.02	220kV Samtse feeder	GIS Singhigoan	Tripped	I1=2345A, I2=80.69kA I3=88.69 I4=2173 A		

66/33/11kV Phuentsholing substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	08.05.2020	17:32	08.05.2020	10:48	16	0.40	5MVA Transformer (66/11kV)	Not affected	Tripped	OLTC Buch Trip, 30D OLTC Buch relay optd, 86	Substation	
2	07.05.2020	18:18	07.05.2020	18:24	6	-10.18	66kV Chukha-Pling	Black out at Pling	Tripped at our end	Dist Protection Opt,186 & 86, (Fault imp-20.4, fault current 1.42A, fault angle-162 deg, fault voltage-0.688 & fault location- 42%	Line	
3	23.05.2020	19:33	23.05.2020	20:21	48	-4.03	66kV Chukha-Pling	Black out at Pling	Tripped	Dist Protection Opt,186 & 86		
4	27.05.2020	11:07	27.05.2020	11:18	11	-3.69	66kV Chukha-Pling	66kV Chukha-Pling	Tripped at both end	Dist Protection Opt,186 & 86.	Line	
5	29.05.2020	13:37	29.05.2020	13:50	13	-4.03	66kV Chukha-Pling	66kV Chukha-Pling	Tripped at both end	Dist Protection Opt,186 & 86, (Fault imp-2.19, fault current 3.56A, fault angle-47 deg, fault voltage-.165 & fault location- 11.61%	Line	
6	29.05.2020	15:46	29.05.2020	15:54	8	-3.24	66kV Chukha-Pling	66kV Chukha-Pling	Tripped at both end	Dist Protection Opt,186 & 86,	Line	

66/33/11kV Gomtu substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks

220/66/33kV Dhamdum substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	06.05.2020	17:14	06.05.2020	17:22	8	-0.074	66kV Dhamdum feeder	Nil	Supply failed from Dhamdum	NA	Dhamdum Sub Station	
2	07.05.2020	18:18	07.05.2020	18:23	5	-1.642	66kV Incomer	Whole Gomtu	Grid failed	NA	Malbase Sub Station	
3	23.05.2020	19:32	23.05.2020	19:37	5	1.23	66kV Pling feeder	Nill	Over current	IDMTL over current relay 51CX optd	Line segment	Test charged the line as [illegible]

66/33/11kV Gedu substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	27.05.2020	11:06	27.05.2020	11:16		1.070	66kV Chukha-P/ling feeder	Black out			Line segment	Restored from Chukha.
2	29.05.2020	13:36	29.05.2020	13:48	12	0.940	66kV Chukha-P/ling feeder	Black out			Line segment	Supply resumed from Phuntsholing Ss.
3	29.05.2020	15:45	29.05.2020	15:53	8	0.840	66kV Chukha-P/ling feeder	Black out			Line segment	Supply resumed from Phuntsholing Ss.

66/33/11kV Lobeysa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No tripping												

220/66/11kV Semtokha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Dechenchholing substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33kV Olakha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Jemina substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66kV Chumdo switching station

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Paro substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/11kV Haa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/5/2020	13:33	5/5/2020	14:22	48minutes	-1.71	66kV Incomer	all the feeders	Unknown	O/C	Pangbesa	
2	5/18/2020	9:15	5/18/2020	15:06	51minutes	0.75MW	5MVA Tr-I	Transformer & Incomer - I	Ten-delta test	Nil	Haa substation	

66/33kV Watsa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/5/2020	7:37hrs	4/5/2020	8:45hrs	8min	.820MW	66KV breaker	Fdr. I and II	Over Current stage 2	Over Current relay operated	8MVA transformer	
2	4/16/2020	10:20hrs	4/16/2020	10:24hrs	4min	.310MW	66KV SF6 breaker	Fdr. I and II	O/C and E/F stage 2 on RYB phase	O/C and E/F stage 2 relay operated	Fdr. I Wanakha	

66/33kV Pangesa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/5/2020	13:33hrs	5/5/2020	14:12	39	2.14	Chumdo Line In	Haa S/S & Pangbesa S/S	Dir. OC stage 2	Dir.OC relay	Pangbesa -Chumdo	

June, 2020

400/220/66/11kV Malbase substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	20:00	11.06.2020	20:10	0:10	7	220kV Samtse Feeder	400kV Malbase Substation	Tripped	Main 1 Trip, Trip RYB, 86 OPT, Fault loop=L3-N	29.5 kM	
2	11.06.2020	20:00	11.06.2020	20:18	0:18	23	50/63MVA Transformer III	400kV Malbase Substation	Tripped	From RET,DIFF TRIP ,27 Trip, 86 optd.		
3	11.06.2020	20:32	11.06.2020	20:54	0:22	7	220kV Samtse Feeder	400kV Malbase Substation	Tripped	Main 1 Trip, Zone 2 trip, M1/BC Block, AR, 86OPT		
4	11.06.2020	20:32	11.06.2020	20:51	0:19		220kV Bus Coupler	400kV Malbase Substation	Tripped	I0>Trip		
5	11.06.2020	20:55	11.06.2020	21:16	0:21	115	220kV Chukha Feeder	400kV Malbase Substation.	Tripped	Main I trip,zone 1 , Fault loop=4.9KM	4.9KM	
6	11.06.2020	20:52	11.06.2020	21:36	0:44	149	400kV Siliguri Feeder	400kV Malbase Substation.	Tripped	Zone 1 trip, Trip RYB, AR lockout shot, Flt loop=L,-N1,	8.243KM	
7	11.06.2020	20:52	11.06.2020	21:36	0:44	46	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	G1 phase A, Phase B (rev) , IB= 423.2A, Phase C (rev) Ic= 549.6 A, Earth Fault (FWD) =IDMTL, <HSI> IE= 3034A		
8	14.06.2020	7:33	14.06.2020	7:46	0:13	21	Passakha I	Passakha II,IV	Tripped	50N Trip, 86 optd.		
9	14.06.2021	7:33	14.06.2021	7:46	0:13	21	Passakha II	Passakha I,IV	Tripped	IEF 50N Trip, 86 optd.		
10	14.06.2021	7:33	14.06.2021	7:46	0:13	21	Passakha IV	Passakha I,II	Tripped	IEF 50N Trip, 86 optd.		

220/66/11kV Singhigaon substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.06.2020	3:23	24.06.2020	3:29	0:06	108	200MVA ICT Transformer	400/220/ 66 kV Malbase Substation	Tripped due to over current on R Phase and Earth fault	67/67N Operated , 86 operated. G2 Phase A (FWD) LS IDMTL IA =1505A, Phase IB =180.8A, Phase IC = 200A , Earth Fault (FWD) IDMTL IE =1441A		
2	24.06.2020	3:23	24.06.2020	3:35	0:12	7	220kV Malbase - Samtse Feeder	400/220/ 66 kV Malbase Substation	Tripped due to over current on R Phase and Earth fault	REL511: Distance trip, OC IL1=6035A<283.6deg, IL2=31.70A<121.3deg, IL3=71.23A<107deg IL4=5923<283.6deg,	4.9 KM	
3	24.06.2020	3:23	24.06.2021	3:45	0:22	23	50 MVA Transformer I	400/220/ 66 kV Malbase Substation	Tripped	RET 670:Drifferential Trip IL1=64.04A<121.15deg, IL2=72.68A<-179.53, IL3= 128.66A<122.45deg, IL4=238.89<137.04deg,		
4	24.06.2020	3:23	24.06.2021	3:45	0:22	25	50 MVA Transformer III	400/220/ 66 kV Malbase Substation	Tripped	RET 670:Drifferential Trip IL1=87.49A<127.72deg, IL2=98.98A<173.68, IL3= 157.88A<125.92deg, IL4=321<139.62deg,		
5	30.06.2020	6:30	30.06.20	13:55	0:25	0.6	20MVA transformer I	400/220/ 66 kV Malbase Substation	Tripped	IL1=0.28kA, IL2=0.11kA, IL3=7.81kA	-	
6	11.06.2020	20:00	11.06.2020	20:13	0:12	-0.2	220kV Singi- Samtse	Dhamdum Substation	Tripped	General trip, Zone 1 trip, Fault loop= L3-L I1=71.52 A<212.3deg, I2=86.14A<234.4deg I3=2364A<43.15 deg I4=2212A<42.97deg	33.7kM	
7	11.06.2020	20:35	11.06.2020	22:05	0:30	-0.2	220kV Singi- Samtse	Dhamdum Substation	Tripped	General trip, Zone 2 trip, AR blocked I1=2079A<284.1deg, I2=93.33A<96.89deg I3=94.24A<111.9 deg I4=1890A<284.2deg		
8	14.06.2020	7:33	14.06.2021	7:46	0:13	-5	66kV Bhutan Concast	Buscoupler	Tripped	Over current & earth fault, IE>> directional trip, I>>Directional trip, IEP Dreectional Trip86 optd. IL1=5.6kA IL2=0.45kA IL3=0.4kA,		

66/33/11kV Phuentsholing substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	18:33	11.06.2020	18:36	0:03	-0.70	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped at both end	Dist Protection Opt,186 & 86.	Line	
2	11.06.2020	19:44	11.06.2020	19:56	0:12	-2.43	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped at both end	Dist Protection Opt,186 & 86.	Line	
3	11.06.2020	20:27	11.06.2020	20:32	0:05	-8.65	66kV Chukha-Pling & 66kV Pling-Gomtu	66kV Chukha-Pling & 66kV Pling-Gomtu	CB got tripped at their end.	Nill	Line	
4	11.06.2020	20:50	11.06.2020	23:44	0:54	-8.65	66kV Chukha-Pling	66kV Chukha-Pling	Tripped at Chukha end	Nill	Line	
5	11.06.2020	20:50	12.06.2020	9:15	0:25	4.16	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped at both end	Dist Protection Opt,186 & 86,	Line	
6	18.06.2020	23:59	29.06.2020	20:51	0:52	idle	10MVA transformer (Areva) (66/33kV)	10MVA transformer (66/33kV)	Eathfault	51SN , 86	Substation	
7	29.06.2020	19:58	29.06.2020	20:08	0:10	-1.65	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped at both end	Dist Protection Opt,186 & 86.	Substation	

66/33/11kV Gomtu substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	18:33	11.06.2020	18:36	0:03	0.63	66kV P/ling	Nil	Over current	IDMTL O/C 51AX, 51BX & 51CX	Gomtu Sub Station	
2	11.06.2020	19:44	11.06.2020	19:56	0:12	2.04	66kV P/ling	Whole Gomtu	Earth fault	IDMTL Earth fault 57NX	Gomtu Sub Station	Grid failed
3	11.06.2020	19:45	11.06.2020	19:56	0:11	-3.646	66kV Dhamdhum	Whole Gomtu	General trip	Nil	Chukha	Grid failed
4	11.06.2020	20:28	11.06.2020	20:33	0:05	-3.711	66kV Dhamdhum & 66kV P/ling	Whole Gomtu	General trip	Nil	Malbase	Grid failed
5	11.06.2020	20:27	11.06.2020	20:32	0:05	4.03	66kV P/ling	Whole Gomtu	General trip	Nil	Malbase	Grid failed
6	11.06.2020	20:50	12.06.2020	09:15	0:25	4.03	66kV P/ling	Phuntsholing	Earth fault	IDMTL Earth fault 57NX	P/ling Sub Station	
7	18.06.2020	12:00	19.06.2020	12:12	0:12	1.39	66kV P/ling	Phuntsholing	Over current	IDMTL O/C 51CX	Gomtu Sub Station	

220/66/33kV Dhamdum substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	19:45	11.06.2020	19:56	0:11	6.51	66 kV Gomtu Feeder	N/A	N/A	REL 670:General trip ,DIR E/F trip,Yand B phase fault and REF 615(67/67N)	N/A	
2	11.06.2020	20:00	11.06.2020	20:10	0:10	-2.84	220 kV Singhigoan feeder	N/A	N/A	General trip,zone 1 trip,B PH Trip	N/A	
3	11.06.2020	20:28	11.06.2020	23:05	0:37	-2.85	220 kV Singhigoan feeder	N/A	N/A	General trip,zone 1 trip and 86A TRP RLY OPTD./86B TRP RLY OPTD.	N/A	
4	11.06.2020	20:01	11.06.2020	20:10	0:09	-9.17	220 kV Malbase feeder	N/A	N/A	General trip, Zone I , trip,Y PH Trip	N/A	
5	11.06.2020	20:28	11.06.2020	20:33	0:05	-9.17	220 kV Malbase feeder	N/A	N/A	General Zone I trip,trip,R PH Trip	N/A	
6	24.06.2020	3:23	24.06.2020	3:40	0:17	-5.01	220 kV Malbase feeder	N/A	N/A	General trip,zone II trip,R phase fault	N/A	

66/33/11kV Lobeysa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	23.06.2020	11:55	23.06.2020	12:52	0:57	12.200	66kV Basochu Incomer	All outgoing feeders	Grid fail	NA	Grid fail from Chukha end	
2	23.06.2020	11:55	23.06.2020	12:52	0:57	12.200	66kV Semtokha Incomer	All outgoing feeders	Grid fail	NA	Grid fail from Chukha end	

220/66/11kV Semtokha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	23.06.2020	11:56	23.06.2020	12:49	0:53	52.610	220kV Semtokha-Chukha	Semtokha Substation	Trip at Chukha end, Rurichu on isolation mode	Nil, no tripping at Semtokha end	Chukha end	
2	23.06.2020	11:56	23.06.2020	12:51	0:55	-72.880	220kV Semtokha-Rurichu	Semtokha Substation	Trip at Chukha end, Rurichu on isolation mode	Nil, no tripping at Semtokha end	Chukha end	

66/33/11kV Dechenchholing substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	23.06.2020	11:54	23.06.2020	12:49	0:43	-7.69	66KV Semtokha Incomer	whole substation	Supply fail from source.			

66/33kV Olakha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	21.06.2020	16:20	21.06.2020	16:22	0:02	3.40	66/33kV, 20MVA TR.I	All 33KVoutgoing feeders	O/C and E/F	TRAFO DIFFL.PROTN Relay 8	Line Segments	
2	22.06.2020	11:57	22.06.2020	11:59	0:03	3.5	66/33kV, 20MVA TR.I	All 33KVoutgoing feeders	O/C and E/F	TRAFO DIFFL.PROTN Relay 8	Line Segments	
3	22.06.2020	15:00	22.06.2020	15:02	0:02	2.8	66/33kV, 20MVA TR.I	All 33KVoutgoing feeders	O/C and E/F	TRAFO DIFFL.PROTN Relay 87	Line Segments	
4	23.06.2020	11:57	23.06.2020	12:55	0:58	-13.4	66KV Tie Line	Olakha	Blackout	Blackout	Chhukha Line	Whole Supply fail from Chukha

66/33/11kV Jemina substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66kV Chumdo switching station

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Paro substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/11kV Haa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.06.2020	15:45	24.06.2020	15:56	0:11	-0.93	66kV Incomer	all the feeders	Unknown	O/C	Pangbesa	

66/33kV Watsa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33kV Pangesa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
No Tripping												

66/33/11kV Gedu substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	19:45	11.06.2020	19:53	0:08	1.880	66kV Chukha-Phuntsholing Line	Gedu black out	Thundering /lightning		Line segment	
2	11.06.2020	20:28	11.06.2020	20:33	0:05	1.700	66kV Chukha-Phuntsholing Line	Gedu black out	Thundering /lightning		Line segment	
3	11.06.2020	20:51	11.06.2020	21:19	0:28	1.700	66kV Chukha-Phuntsholing Line	Gedu black out	Thundering /lightning		Line segment	