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**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/19/76

May 8, 2019

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

**Subject: Submission of Transmission System Performance Report for the month of January to March, 2019.**

Sir,

Kindly find enclosed with the transmission system performance report for the month of January to March, 2019. 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,

(Sherub)  
General Manager

Copy to:

1. Director, Operation & Maintenance Department, Druk Green Power Corporation, Thimphu
2. General Manager, TD, BPC for kind information
3. General Manager, DCSD, BPC for kind information.

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**Bhutan Power Corporation Limited**

**Bhutan Power System Operator**

**Thimphu: Bhutan**



**Transmission System Performance Report**

**First Quarterly Report – January to March, 2019**



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### 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.

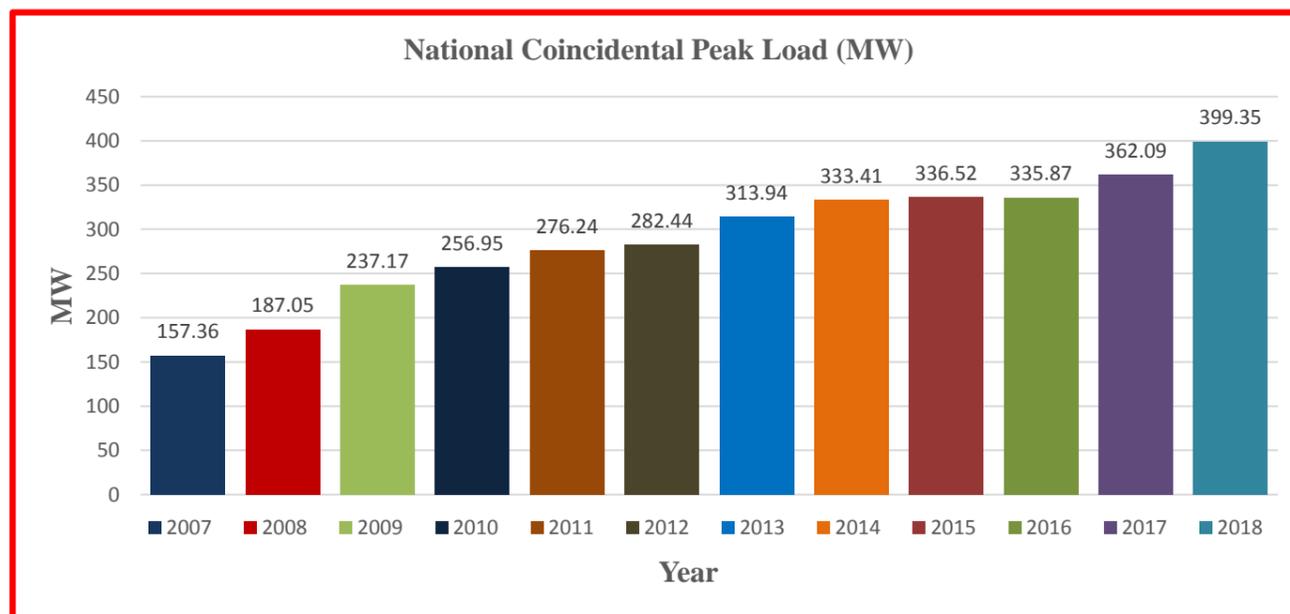
### 2. National Peak Demand

The national peak demand till now is recorded at **399.35MW** which was occurred on 27<sup>th</sup> December, 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
<b>Peak Load (MW)</b>	157.36	187.05	237.17	256.95	276.24	282.44	313.94	333.41	336.52	335.87	362.09	399.35
<b>% Growth over previous Year</b>	-	18.87	26.79	8.34	7.51	2.24	11.15	6.20	0.93	-0.19	7.81	10.29

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.

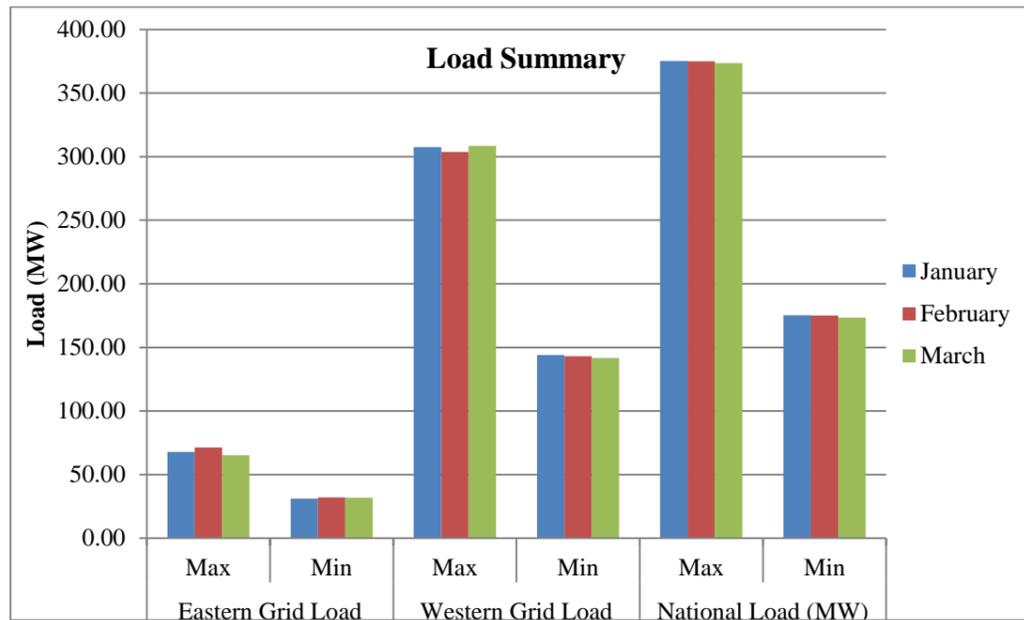
1. **National Demand** = (Sum of all total generation)-(Sum of all Export of Import)
2. **National Demand** = (Sum of all feeders loading at hydropower station) – (Sum of all Export/Import)
3. **National Demand** = (Sum of all substation loading)

For this report, the National Demand was calculated using method-2 and method-3.

Table 2.1.1. Domestic demand for Eastern Grid, Western Grid and National using method- 2

Grid	Eastern Grid Load (MW)		Western Grid Load (MW)		National Load (MW)	
	Max	Min	Max	Min	Max	Min
January	67.71	31.15	307.54	144.04	381.15	190.37
February	71.38	32.10	303.69	143.03	367.16	103.48
March	65.28	31.78	308.40	141.74	373.68	184.43

Graph 2.1.1. Domestic demand for Eastern Grid, Western Grid and National using method- 2

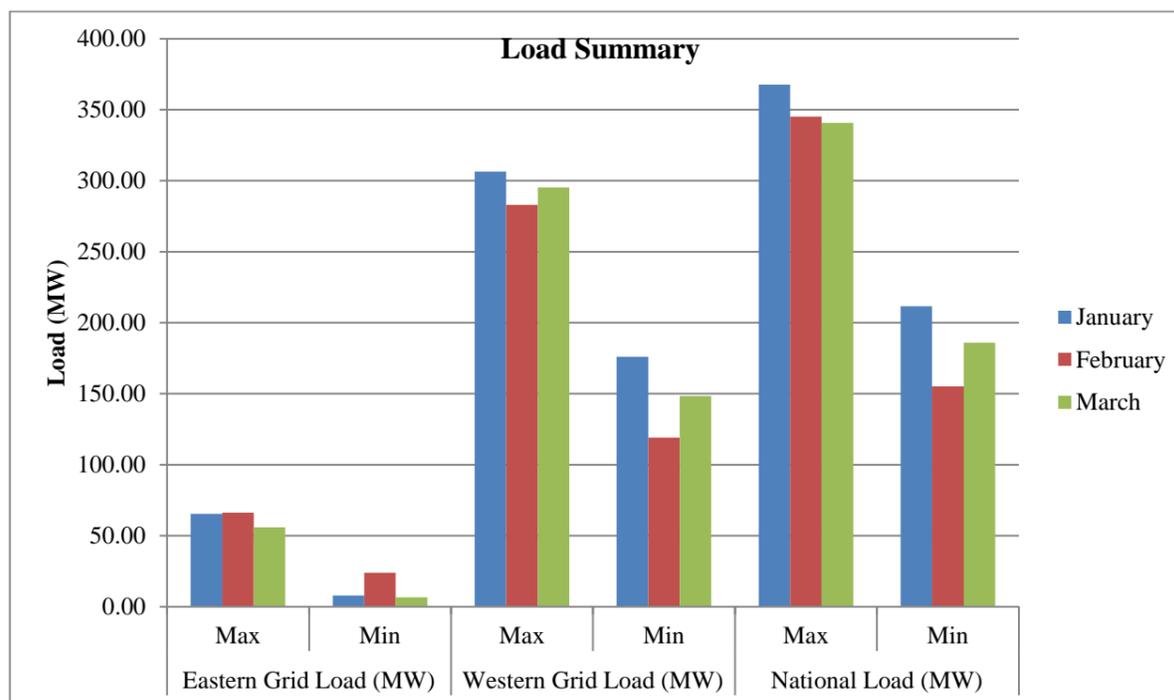


National load pattern for the month of January to March, 2019 calculated using method-2 is attached as **Annexure-II**.

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
January	65.43	7.82	306.46	176.05	367.63	211.66
February	66.15	23.86	283.06	119.04	345.13	155.12
March	55.84	6.70	295.20	148.46	340.85	185.93

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



### 3. Energy Availability and Requirement for the country

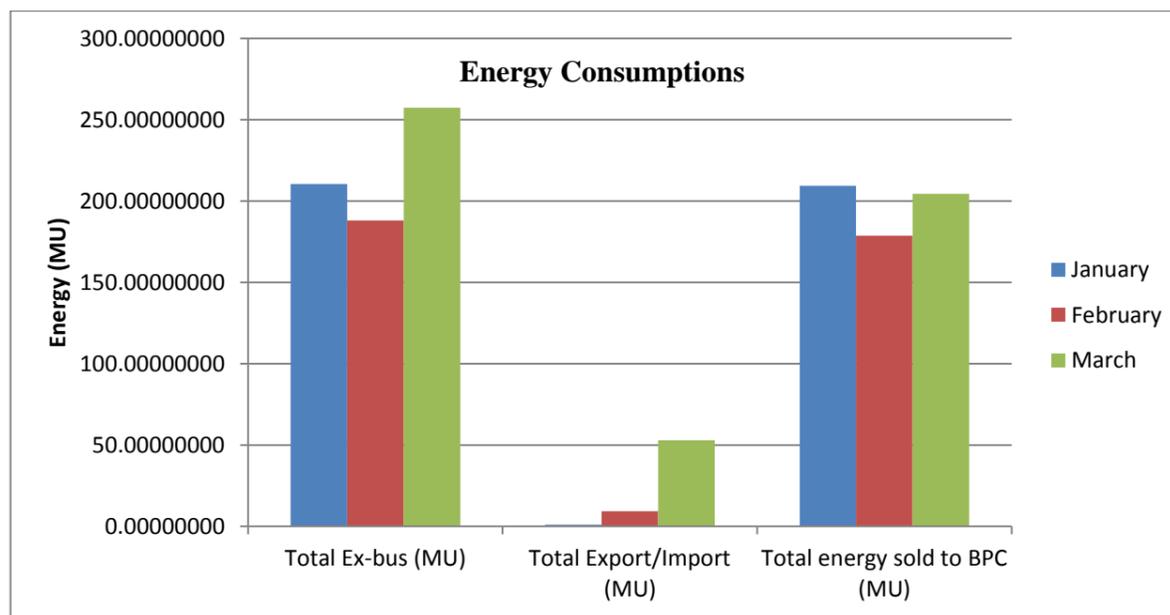
#### 3.1. Energy (MU) consumed by Country

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. Energy (MU) consumed

Month	Total Ex-bus (MU)	Total Export/Import (MU)	Total energy sold to BPC (MU)
January	210.42666300	1.05445400	209.37220900
February	187.98605400	9.36647900	178.61957500
March	257.41308300	52.91058400	204.50249900

Graph 3.1.1. Energy (MU) consumed



#### 4. Performance of generating plants

##### 4.1. Power and Energy Generation

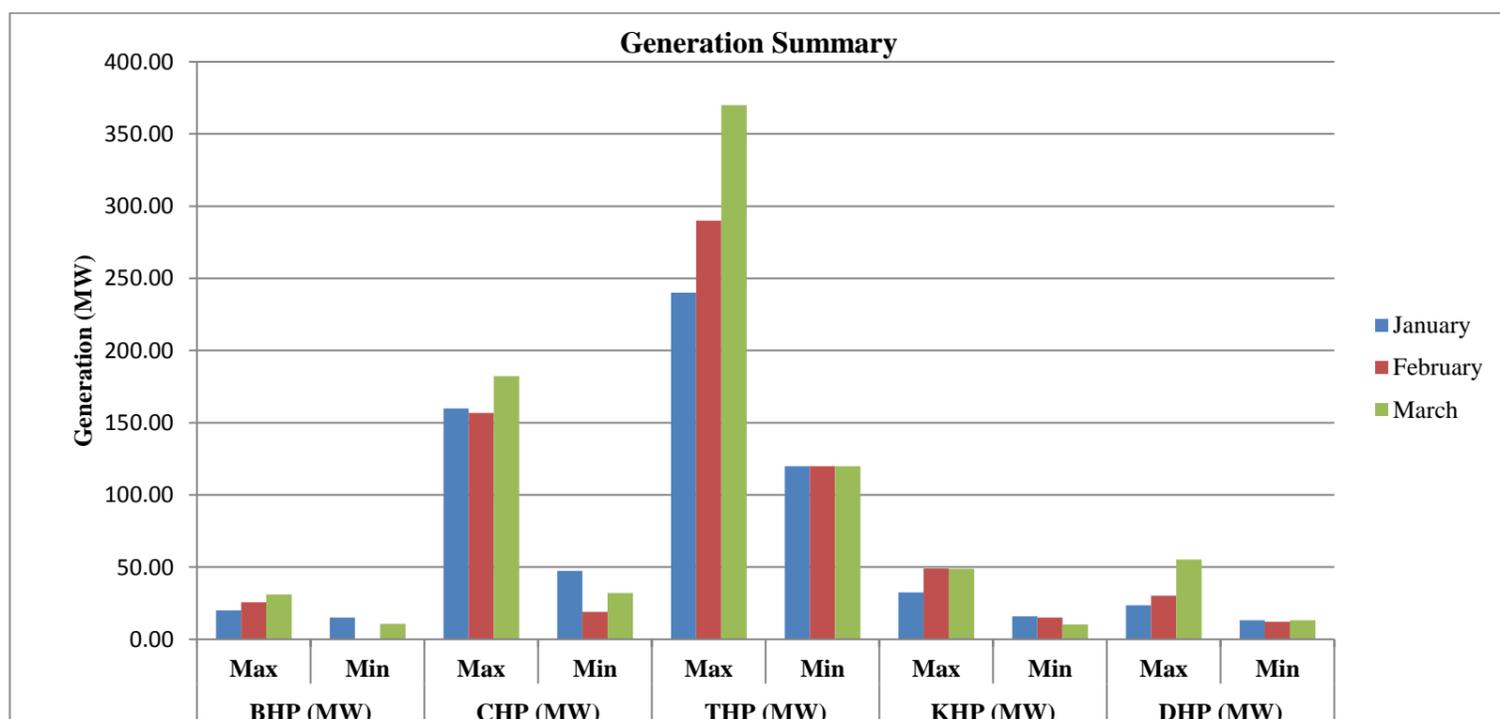
The maximum total generation for the First quarter of year 2019 was 687.37MW in month of March and minimum generation was 475.80MW in the month of January, 2019.

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)		TOTAL (MW)	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
January	20.01	15.18	159.87	47.50	240.00	120.00	32.42	16.00	23.50	13.16	475.80	211.84
February	25.74	0.05	156.79	19.10	290.00	120.00	49.01	15.00	30.27	12.27	551.81	166.42
March	31.12	10.80	182.24	31.99	370.00	120.00	48.77	10.27	55.24	13.2	687.37	186.26

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 January to March, 2019 is attached as **Annexure-I**.

**4.2.Plant Capacity Factor**

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

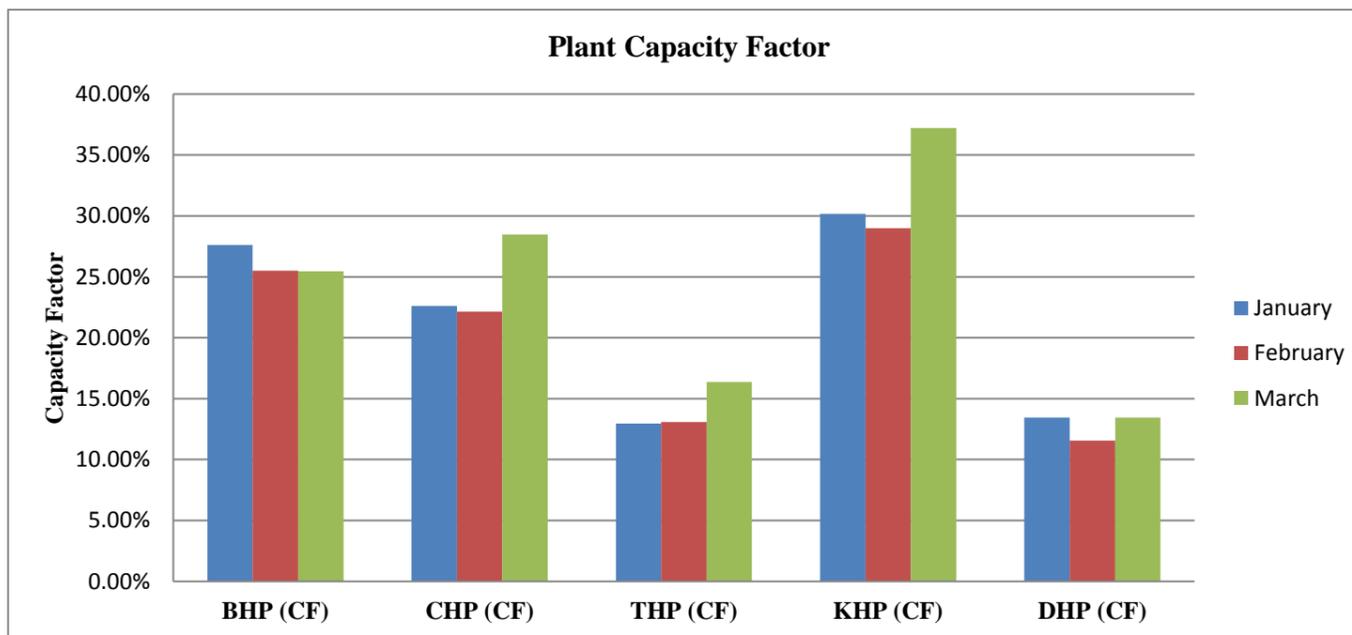
$$\text{Capacity factor} = \frac{\text{Total energy plant has produce over a period}}{\text{Total energy plant would produce when operated at full capacity}}$$

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)
January	13.14600	27.61%	56.48400	22.60%	114.733000	12.96%	13.463000	30.16%	12.598	13.44%
February	10.96500	25.50%	49.97100	22.13%	104.51600	13.07%	11.693000	29.00%	10.839	11.56%
March	12.11800	25.45%	71.18800	28.48%	144.87500	16.36%	16.619000	37.23%	12.612	13.45%

Source: TD, BPC

Graph 4.2.1: Capacity factor of various hydropower plants



**5. Export and Import of Electricity**

Maximum export for the First quarter of year 2019 was 351MW to Binaguri substation in India. The minimum export was 0.30MW to Salakoti and Rangia substation in India.

Table 5.1. Export of electricity to India

Export To	Binaguri (MW)		Birpara (MW)		Salakoti and Rangia (MW)	
	Max	Min	Max	Min	Max	Min
January	179.00	8.00	13.00	1.70	0.60	0.30
February	176.00	7.00	73.50	0.60	7.60	1.20
March	351.00	1.00	120.20	0.20	27.80	0.10

Graph 5.1. Export of electricity to India

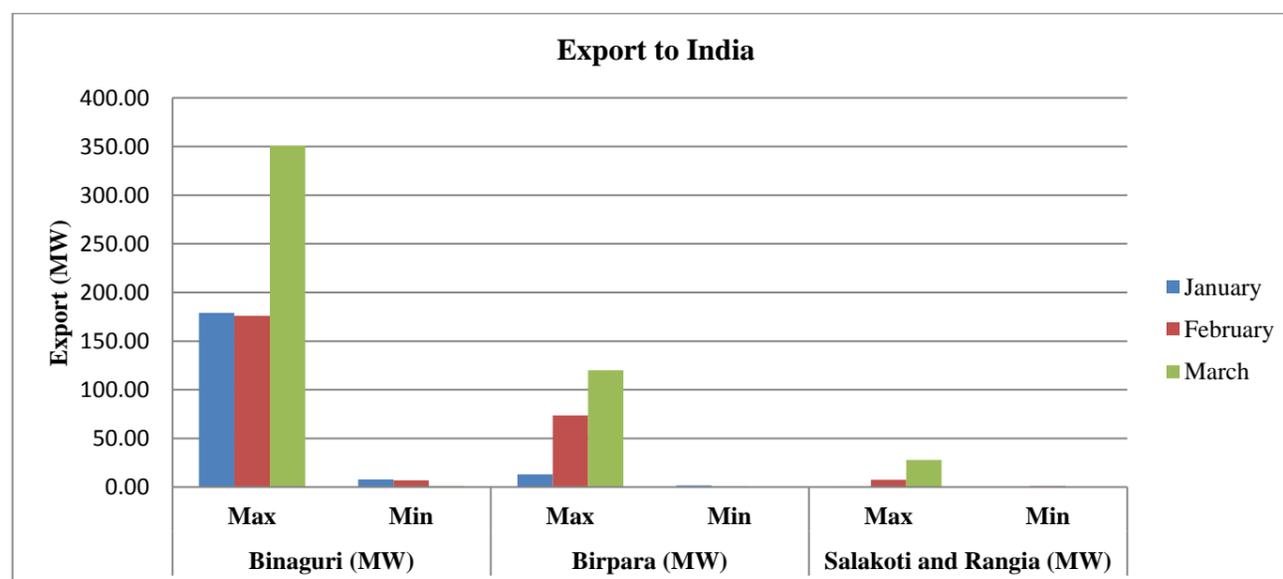
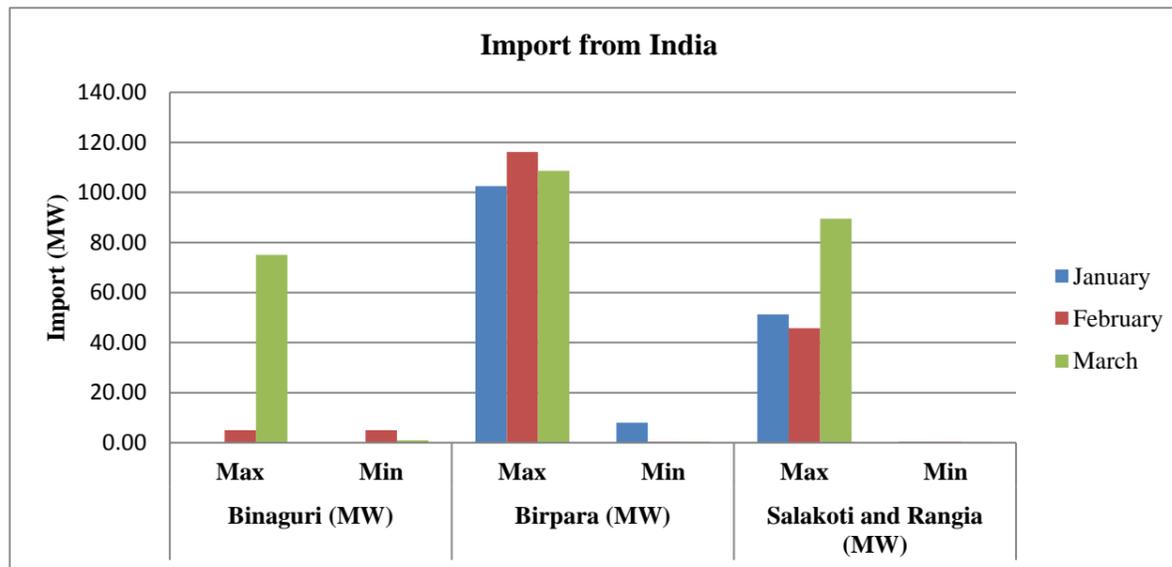


Table 5.2. Import of electricity from India.

Import From	Binaguri (MW)		Birpara (MW)		Salakoti and Rangia (MW)	
	Max	Min	Max	Min	Max	Min
January	0.00	0.00	102.50	8.00	51.30	0.30
February	5.00	5.00	116.20	0.38	45.80	0.40
March	75.00	1.00	108.60	0.30	89.50	0.20

Graph 5.2. Import of electricity from India



The maximum import of power for the First quarter of year 2019 was 116 MW from Birpara substation, India in the month of February, 2019.

**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 January, 2019**

Table 6.1.1. Bus Frequency profile of Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage
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 Semtokha Substation

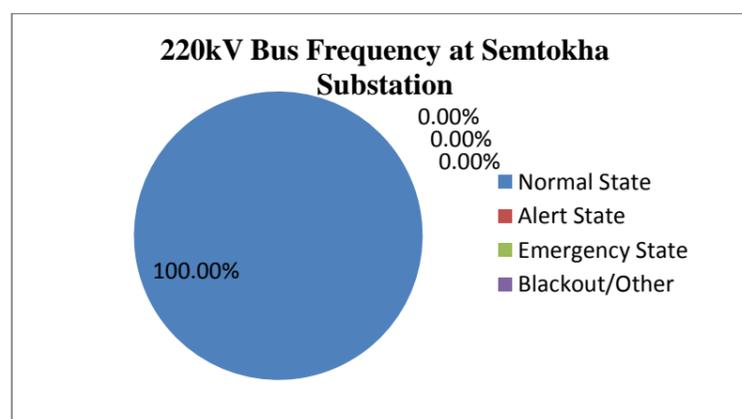
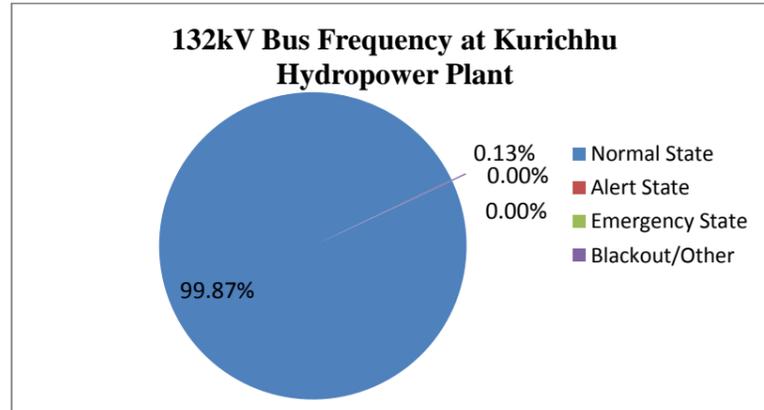


Table 6.1.2. Bus frequency of Kurichhu Hydro Power Plant

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	99.87%
2	Alert State	0.00%
3	Emergency State	0.00%
4	Blackout/Other	0.13%

Graph 6.1.2. Bus frequency of Kurichhu Hydro Power Plant



In the month of January, 2019, the Western grid was maintained within the normal operating limit of 100%. Eastern grid have operated 99.87% in operating limit and deviated 0.13% to blackout/others.

**6.2.Frequency for the month of February, 2019**

Table 6.2.1. Bus frequency of Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage
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

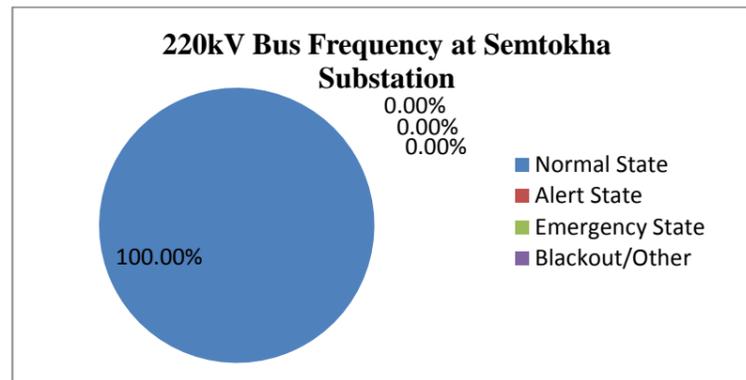
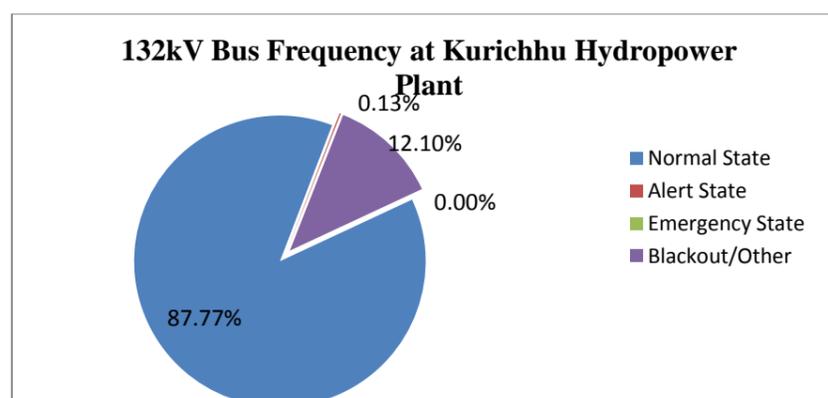


Table 6.2.2. Bus frequency of Kurichhu Hydro Power Plant

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	87.77%
2	Alert State	0.13%
3	Emergency State	0.00%
4	Blackout/Other	12.10%

Graph 6.2.2. Bus frequency of Kurichhu Hydro Power Plant



In the month of February, 2019, the Western grid frequency was maintained within the normal operating range of 100%. Eastern grid frequency was maintained within normal operating range of 87.77% and system frequency was deviated 12% to blackout/other state and 0.13% was at alert state.

**6.3.Frequency for the month of March, 2019**

Table 6.3.1. Bus frequency of Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage
1	Normal State	99.19%
2	Alert State	0.13%
3	Emergency State	0.00%
4	Blackout/Other	0.67%

Graph 6.3.1. Bus frequency of Semtokha Substation

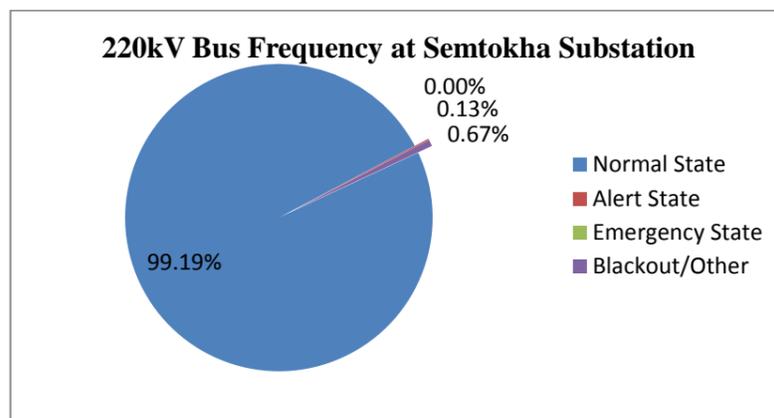
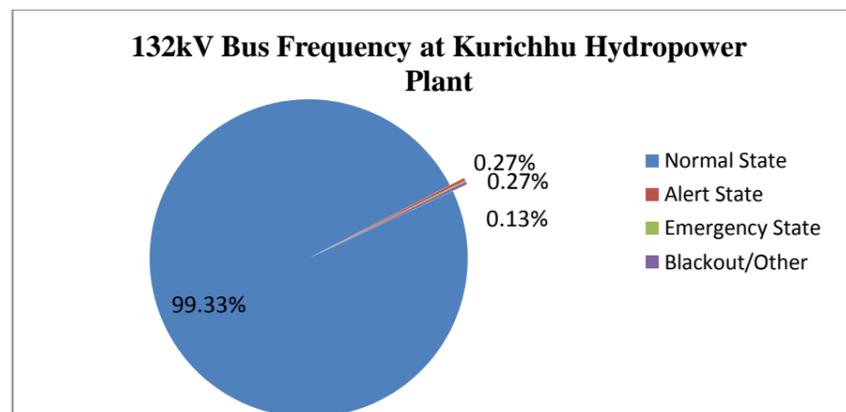


Table 6.3.2. Bus frequency of Kurichhu Hydro Power Plant

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	99.33%
2	Alert State	0.27%
3	Emergency State	0.13%
4	Blackout/Other	0.27%

Graph 6.3.2. Bus frequency of Kurichhu Hydro Power Plant



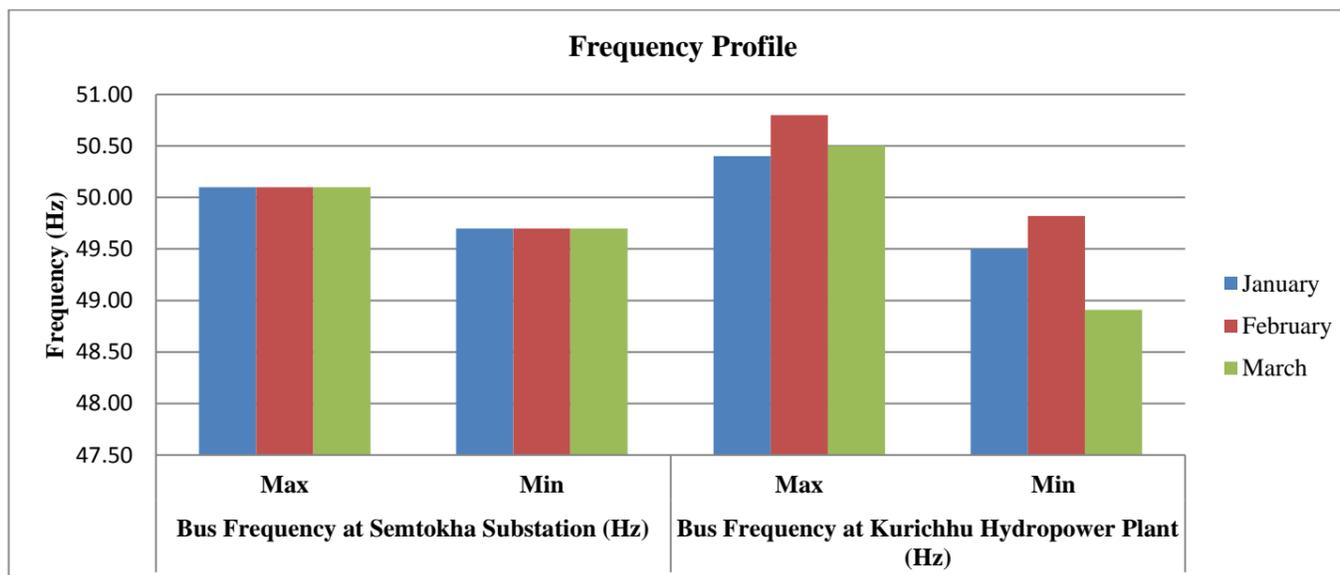
In the month of March, 2019, the Western grid frequency was maintained 99.19% within the normal operating range and deviated 0.13% to alert state and 0.67% was blackout/others. Eastern grid frequency was maintained within normal operating range of 99.33% and system frequency was deviated 0.27% to alert state and .13% was on emergency state.

**6.4.Frequency Summary for the month of January to March, 2019**

Table 6.4.1. Frequency summary for the month of January to March, 2019

Substation/Plant	Bus Frequency at Semtokha Substation (Hz)		Bus Frequency at Kurichhu Hydropower Plant (Hz)	
	Max	Min	Max	Min
January	50.10	49.70	50.40	49.50
February	50.10	49.70	50.80	49.82
March	50.10	49.70	50.50	48.91

Graph 6.4.1. Frequency summary for the month of January to March, 2019



Daily maximum, minimum and average Frequency of Semtokha substation in western grid and Kurichhu Hydro Power Plant in eastern grid for the month of January to March, 2019 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 month of January, 2019**

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

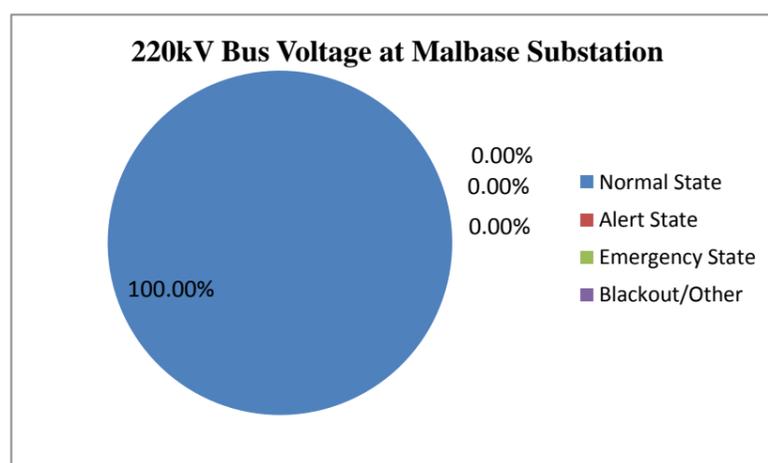
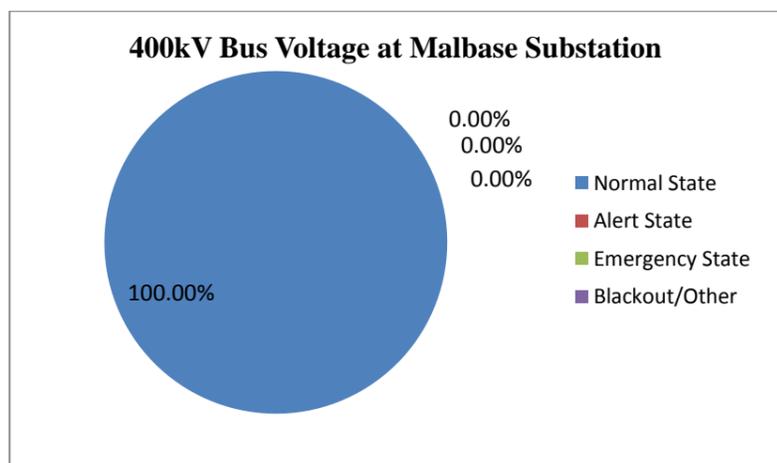


Table 7.1.2. Voltage Profile of 220/66/11kV Semtokha Substation

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

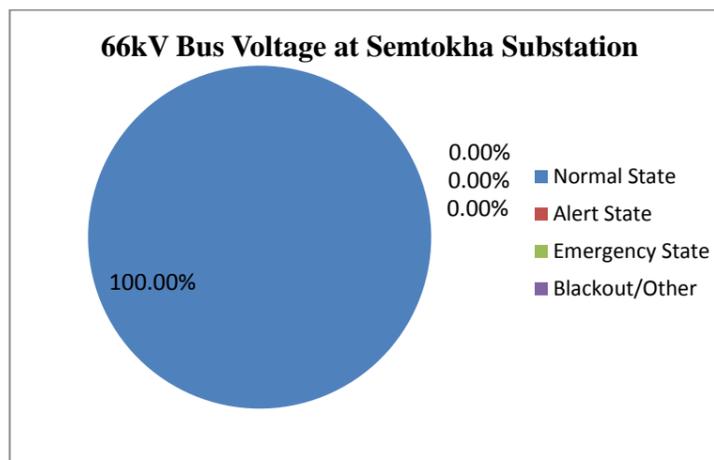
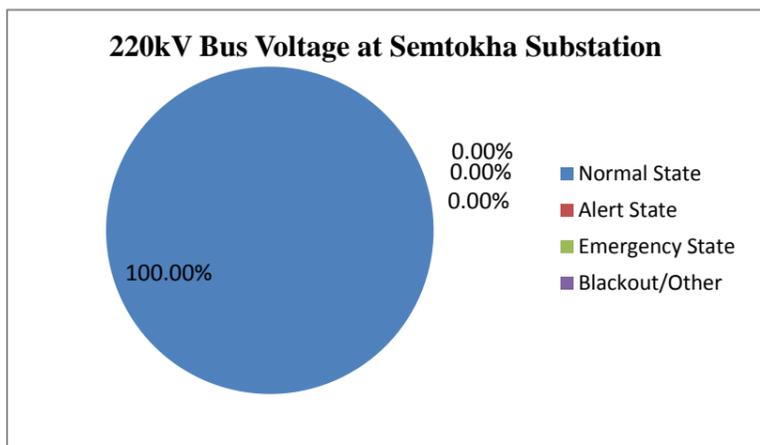
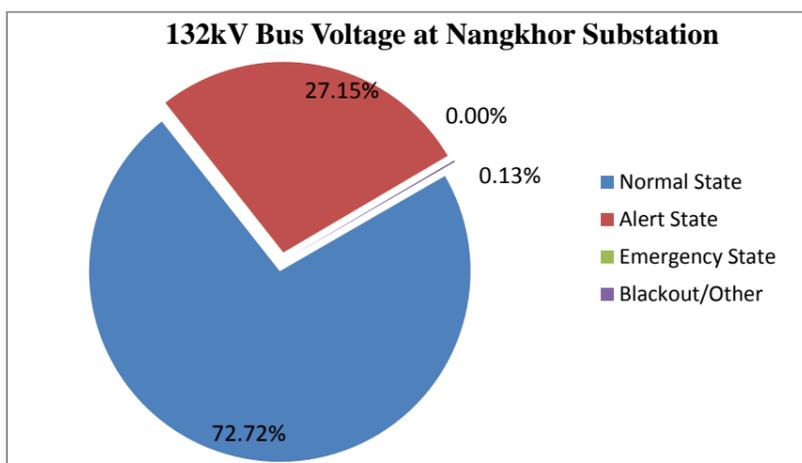


Table 7.1.3. Voltage Profile of 132/33/11kV Nangkhor Substation

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	72.72%
2	Alert State	27.15%
3	Emergency State	0.00%
4	Blackout/Other	0.13%

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



It had been observed that the eastern region is experiencing high voltage issue as clearly depicted in the above voltage profile. In order to control the issue, it is recommended to use the available voltage control measures such as reactor available at Jigmeling and KHP.

**7.2. Voltage Profile for month of February, 2019**

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	90.32%	90.32%	90.32%
2	Alert State	0.00%	0.00%	0.00%
3	Emergency State	0.00%	0.00%	0.00%
4	Blackout/Other	9.68%	9.68%	9.68%

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

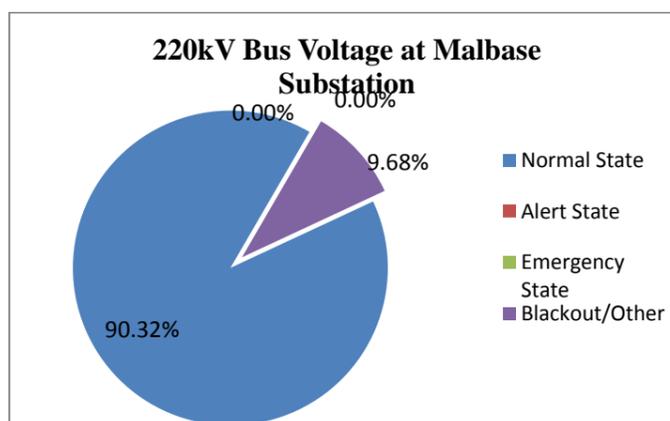
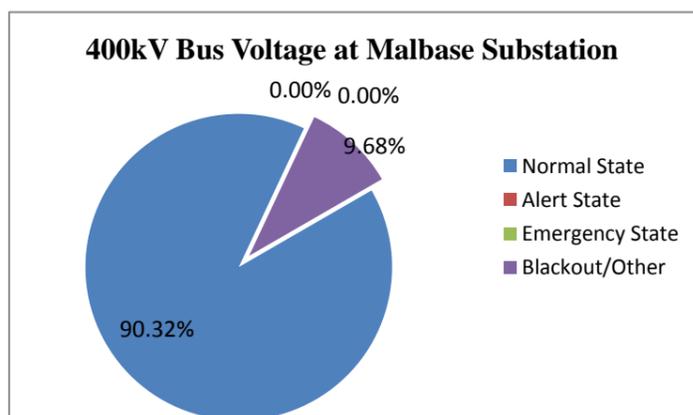


Table 7.2.2. Voltage Profile of 220/66/11kV Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	90.19%	90.32%
2	Alert State	0.00%	0.00%
3	Emergency State	0.13%	0.00%
4	Blackout/Other	9.68%	9.68%

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

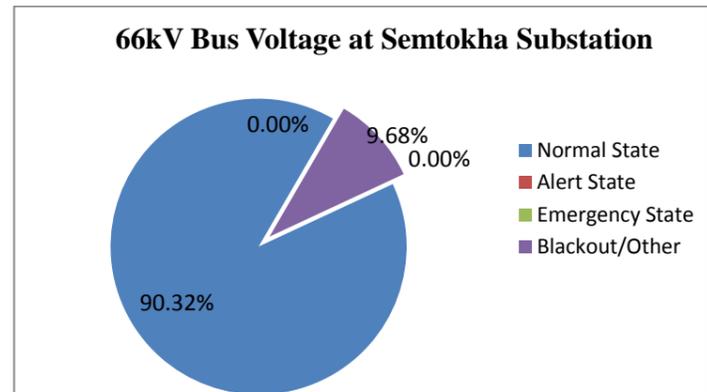
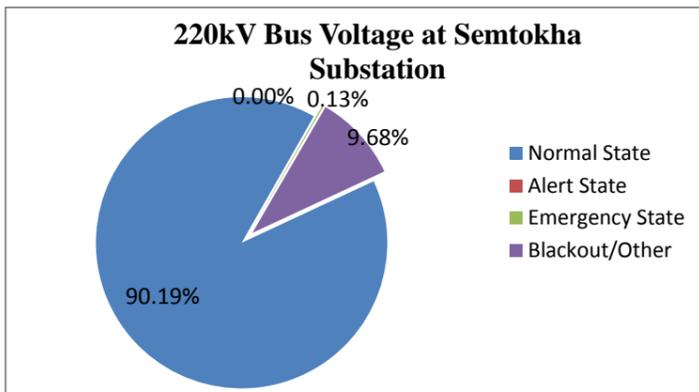
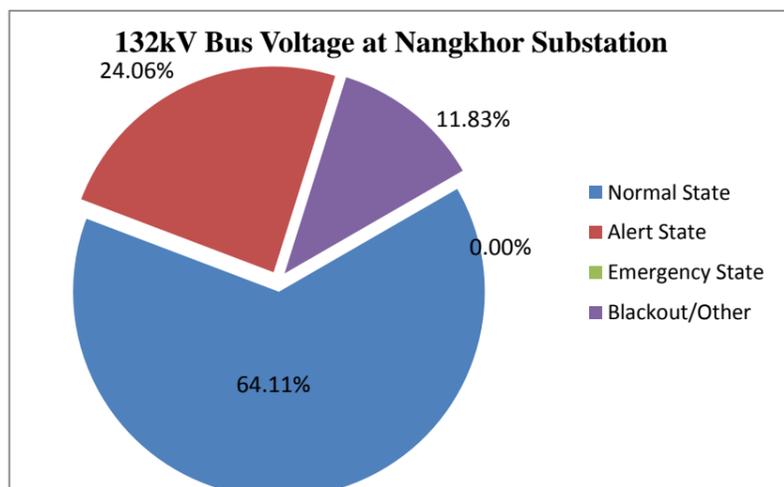


Table 7.2.3. Voltage Profile of 132/33/11kV Nangkhor Substation

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	64.11%
2	Alert State	24.06%
3	Emergency State	0.00%
4	Blackout/Other	11.83%

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



**7.3. Voltage Profile for the month of March, 2019**

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%	99.73%
2	Alert State	0.00%	0.00%	0.27%
3	Emergency State	0.00%	0.00%	0.00%
4	Blackout/Other	0.00%	0.00%	0.00%

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

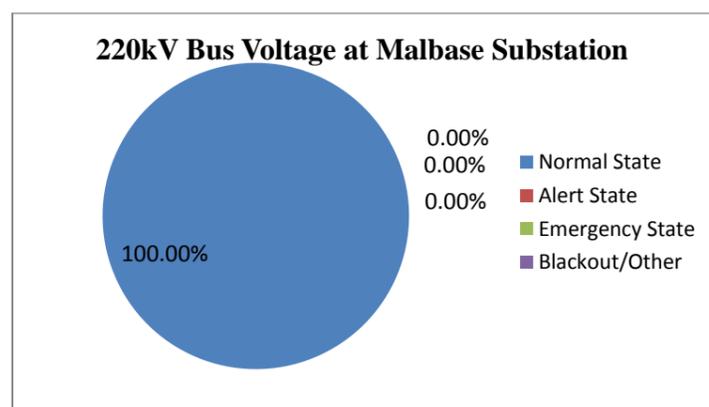
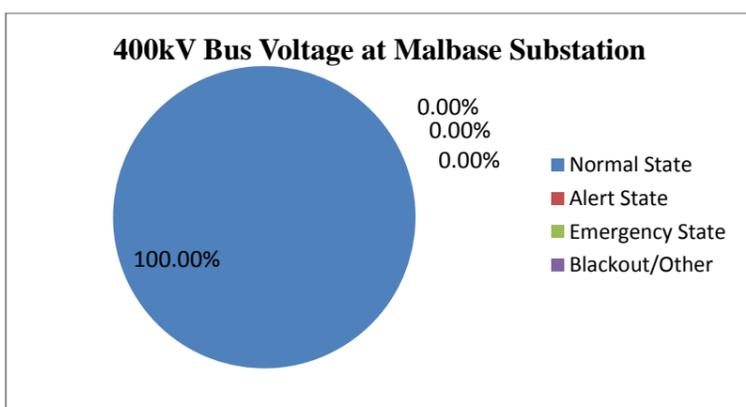


Table 7.3.2. Voltage Profile of 220/66/11kV Semtokha Substation

Sl. No.	Operating State	220kV Bus Voltage	66kV Bus Voltage
1	Normal State	99.87%	99.73%
2	Alert State	0.13%	0.27%
3	Emergency State	0.00%	0.00%
4	Blackout/Other	0.00%	0.00%

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

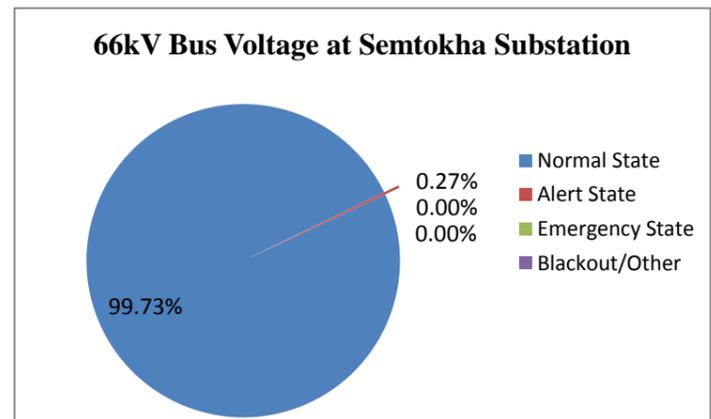
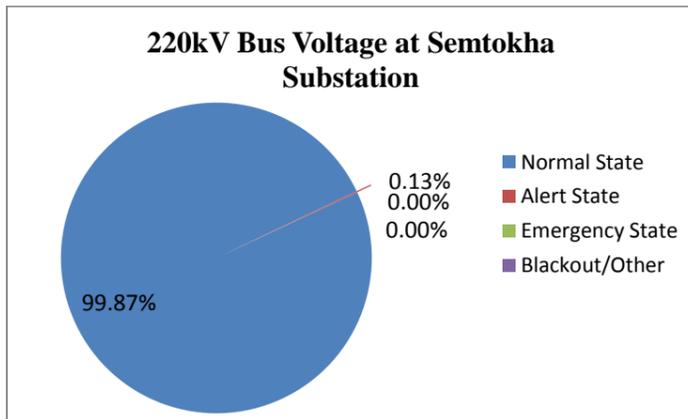
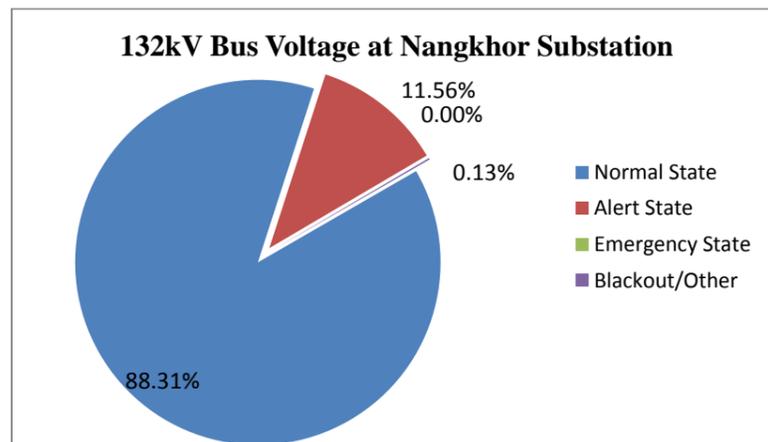


Table 7.3.3. Voltage Profile of 132/33/11kV Nangkhor Substation

Sl. No.	Operating State	132kV Bus Voltage
1	Normal State	88.31%
2	Alert State	11.56%
3	Emergency State	0.00%
4	Blackout/Other	0.13%

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

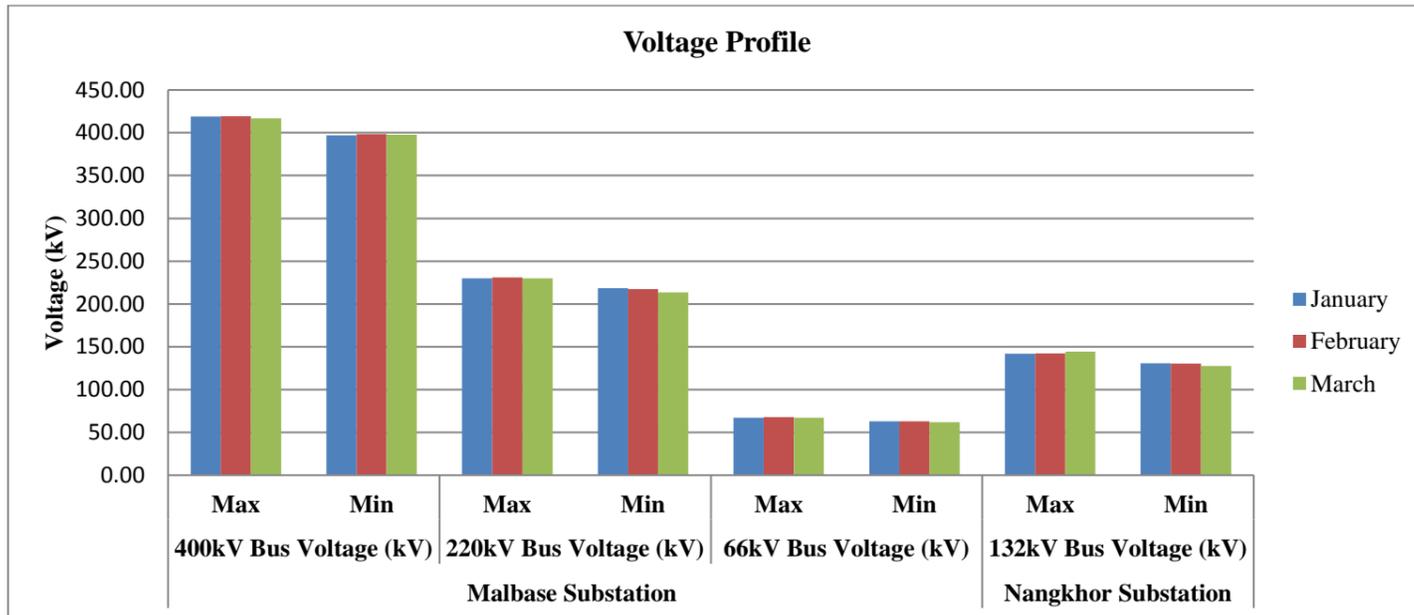


**7.4. Voltage Summary for the Month of January to March, 2019**

Table 7.4.1. Voltage Summary for the month of January to March, 2019

Substation	Malbase Substation						Nangkhor Substation	
	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
January	419.00	397.00	230.00	218.50	67.00	63.00	141.92	130.70
February	419.50	398.50	231.00	217.50	68.00	63.00	142.13	130.40
March	417.00	397.50	230.00	213.50	67.00	62.00	144.20	127.50

Graph 7.4.1. Voltage Summary for the month of January to March, 2019



Daily maximum, minimum and average bus voltage of Malbase substation in western grid and Nangkhor substation in eastern grid for the month of January to march, 2019 is attached as **Annexure-IV**

## 8. Major Outages of Feeders and Equipment

The transmission lines and equipment which was shut down for annual maintenance are not considered in the report.

### 8.1. Major Outages in Eastern Grid

During the first quarter of 2019, there was no prolong outage more than an hour in both eastern and western grid. It had been observed that almost all the fault in the transmission line recorded are of temporary fault and transient fault in nature. Therefore, it is highly recommended for auto recloser to be implement in HV transmission lines.

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

### 8.2. Major Outages in Western Grid

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



9. Annexures

Annexure-I

Table: Generation of January, 2019

Jan-19 Date	BHP (MW)			CHP (MW)			THP (MW)			KHP (MW)			DHP (MW)		
	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	19.63	18.38	19.12	108.09	62.82	80.89	240.00	140.00	160.83	20.84	16.50	20.54	19.70	16.23	18.77
2	19.49	18.40	18.94	118.30	72.39	83.47	230.00	150.00	170.42	24.76	16.50	20.18	23.50	18.22	17.23
3	19.59	18.21	19.01	106.64	73.13	82.84	220.00	140.00	157.92	21.46	16.50	19.08	19.24	18.21	18.54
4	20.01	18.50	19.23	106.23	69.56	80.02	220.00	140.00	160.83	22.51	16.50	20.17	20.25	18.23	19.25
5	20.01	18.50	19.23	110.82	70.91	79.65	210.00	140.00	162.50	24.62	16.50	20.21	21.25	15.23	18.91
6	19.40	18.31	18.85	103.02	68.25	80.63	240.00	150.00	175.00	22.91	16.27	19.65	20.26	17.22	18.54
7	19.15	17.56	18.57	105.93	71.42	81.13	220.00	140.00	156.25	22.66	16.50	19.48	19.25	17.71	18.28
8	19.02	17.96	18.40	106.76	69.62	78.13	220.00	140.00	156.67	21.05	16.50	19.05	20.22	15.17	18.03
9	19.63	17.82	18.59	109.77	69.80	80.38	220.00	140.00	157.92	20.41	16.50	18.73	18.43	17.71	18.11
10	19.67	17.88	18.83	114.12	47.50	77.76	210.00	140.00	157.08	22.12	16.50	19.07	19.22	16.63	18.49
11	19.20	18.37	18.65	105.18	70.78	80.66	210.00	140.00	160.00	21.94	16.50	19.29	19.98	17.30	18.32
12	18.82	17.92	18.38	105.79	68.89	79.65	230.00	140.00	158.75	24.26	16.50	18.61	18.42	15.95	17.90
13	19.14	17.83	18.26	104.73	68.37	76.72	210.00	140.00	157.50	20.76	16.50	18.73	18.71	17.12	18.01
14	18.36	17.50	18.01	103.99	71.18	79.58	220.00	140.00	160.00	20.89	16.50	18.91	18.28	17.54	17.84
15	18.23	17.33	17.90	159.87	69.16	80.87	220.00	140.00	160.00	20.92	16.50	18.60	17.94	16.45	17.45
16	18.01	16.76	17.56	122.45	61.41	73.74	210.00	140.00	150.00	20.61	16.50	18.28	18.65	16.19	17.09
17	17.94	16.70	17.48	104.83	63.63	77.06	200.00	140.00	151.67	20.58	16.50	17.80	17.56	16.24	17.13
18	17.71	16.85	17.28	102.24	64.23	72.52	180.00	130.00	145.83	20.84	16.50	18.14	17.32	14.32	16.76
19	17.68	16.69	17.21	100.11	63.67	74.40	190.00	120.00	146.25	20.41	16.50	17.76	16.96	16.21	16.63
20	17.77	16.92	17.28	100.50	64.01	73.00	190.00	120.00	140.42	20.51	16.50	17.81	17.26	15.23	16.60
21	17.76	16.71	17.22	100.10	63.44	71.18	190.00	130.00	145.00	20.59	16.50	17.91	18.25	14.18	16.51
22	17.76	16.71	17.22	125.53	59.68	92.05	240.00	130.00	181.67	20.55	16.00	17.79	18.27	15.23	16.57
23	17.57	15.85	16.90	81.58	55.11	61.15	180.00	120.00	130.00	32.42	16.00	18.73	17.10	15.71	16.44
24	17.38	16.66	17.00	103.89	61.28	69.06	200.00	120.00	134.17	20.86	16.50	17.78	16.75	15.72	16.40
25	17.79	16.28	17.09	109.30	64.47	76.10	200.00	120.00	137.50	20.25	16.04	17.76	16.74	16.03	16.42
26	17.45	16.86	17.15	102.41	64.26	75.85	200.00	120.00	155.00	20.61	16.00	17.82	17.27	16.03	16.54
27	17.54	16.76	17.20	104.04	70.14	78.94	200.00	130.00	157.50	20.47	16.05	17.90	16.76	13.16	16.13
28	17.36	16.46	16.82	102.03	66.83	77.24	220.00	130.00	152.50	20.44	16.03	17.88	16.74	14.71	16.14
29	17.30	16.12	16.58	110.49	65.76	89.63	220.00	150.00	183.33	20.77	16.50	17.52	16.52	14.25	16.02
30	17.23	15.18	16.27	100.72	56.59	67.06	200.00	120.00	140.42	16.50	16.02	16.39	16.93	15.20	16.21
31	17.08	15.69	16.25	111.77	60.88	75.66	220.00	120.00	145.42	20.90	16.50	17.03	16.35	14.14	15.98
Max	20.01			159.87			240.00			32.42			23.50		
Min		15.18			47.50			120.00			16.00			13.16	

Source: THP, CHP, BHP, KHP (DGPC)

Graph: Generation for the month of January, 2019

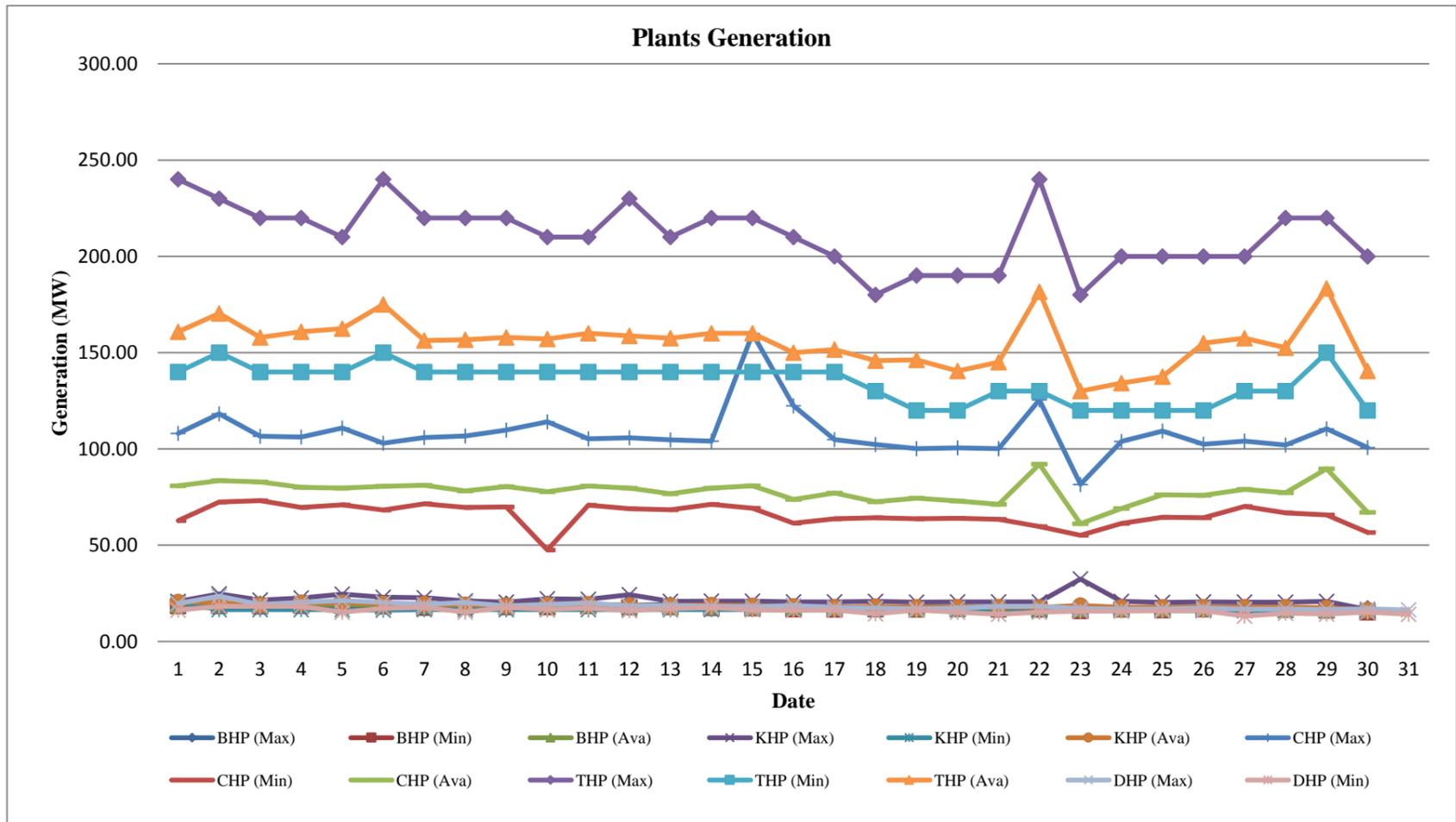




Table: Generation for the month of February, 2019

Date	BHP (MW)			CHP (MW)			THP (MW)			KHP (MW)			DHP (MW)		
	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	16.96	15.54	16.25	92.53	19.10	73.17	220.00	120.00	145.42	20.52	16.02	17.58	16.25	15.03	15.82
2	16.60	15.65	16.12	86.65	37.00	65.87	190.00	120.00	122.92	20.99	15.75	17.17	16.12	15.22	15.75
3	16.20	15.90	15.95	84.44	56.53	67.39	170.00	120.00	143.75	20.63	15.66	16.75	15.76	15.07	15.59
4	16.51	15.33	16.00	87.27	57.43	63.33	170.00	120.00	131.25	20.58	15.88	16.32	17.24	15.37	15.62
5	16.50	15.11	15.96	95.22	55.76	65.06	170.00	120.00	132.50	20.94	15.21	17.45	17.03	15.23	15.59
6	16.74	14.42	15.88	95.90	53.73	64.74	170.00	120.00	134.58	20.79	15.20	17.18	15.75	14.22	15.44
7	18.45	0.05	14.89	92.45	62.33	72.04	170.00	120.00	141.25	20.68	15.06	16.66	15.72	14.22	15.37
8	19.32	15.36	17.27	109.84	58.96	78.05	210.00	120.00	163.75	20.31	16.00	16.84	20.25	14.24	16.78
9	24.27	17.24	19.64	119.08	88.20	95.19	280.00	140.00	201.25	20.81	15.31	18.39	20.29	16.23	18.40
10	22.14	16.86	19.41	102.83	68.79	84.91	200.00	160.00	170.00	20.56	15.91	19.24	22.23	15.23	18.82
11	19.35	16.56	17.52	156.79	68.69	82.83	240.00	140.00	162.92	20.81	16.50	19.36	19.22	14.25	16.96
12	17.62	15.92	16.77	126.10	64.62	77.55	230.00	120.00	161.67	16.50	15.15	16.18	17.25	12.27	15.95
13	17.70	15.45	16.59	111.24	46.16	74.33	240.00	120.00	150.00	20.86	16.21	17.75	16.74	15.20	15.81
14	17.43	15.61	16.55	105.92	60.39	76.26	240.00	120.00	155.83	26.48	16.16	18.48	16.75	15.21	15.92
15	17.53	14.01	16.17	107.18	67.05	82.94	220.00	140.00	163.33	24.15	16.25	19.74	15.84	15.44	15.74
16	19.62	8.72	16.00	109.33	64.90	80.49	220.00	150.00	166.67	49.01	16.32	28.76	17.27	14.26	15.86
17	19.16	15.75	16.93	114.30	64.88	79.37	220.00	120.00	166.67	30.40	16.06	24.62	21.29	15.69	17.90
18	18.52	14.90	16.14	138.42	64.50	76.84	220.00	130.00	160.00	20.75	15.00	17.87	17.30	15.54	16.43
19	17.76	15.41	16.24	103.08	61.00	71.26	200.00	130.00	147.92	20.68	16.19	17.38	17.27	15.25	16.55
20	17.33	15.52	16.03	100.21	62.18	73.40	240.00	120.00	146.67	20.61	15.78	17.69	16.73	15.72	16.39
21	17.26	15.29	15.99	101.15	61.70	73.90	220.00	130.00	156.25	20.82	15.20	17.41	16.98	15.21	16.40
22	16.50	15.58	16.01	108.31	68.82	78.22	220.00	130.00	157.92	20.75	16.11	17.90	16.55	15.26	16.07
23	16.66	15.57	16.10	106.80	48.31	85.19	220.00	150.00	170.42	21.04	16.11	18.68	17.24	15.74	16.38
24	16.20	15.16	15.75	106.42	71.52	83.37	220.00	140.00	170.83	23.20	16.15	19.05	16.77	14.25	16.20
25	16.42	15.26	15.65	126.90	45.45	87.94	290.00	120.00	173.33	22.32	16.50	18.95	17.28	13.27	16.08
26	16.97	14.85	15.69	105.83	46.82	86.52	230.00	120.00	177.50	20.76	16.02	18.64	19.22	14.76	16.65
27	15.59	14.63	15.29	93.82	50.49	73.86	180.00	130.00	149.58	16.50	16.00	16.30	17.29	14.25	15.92
28	25.74	6.67	17.00	99.73	46.95	75.22	230.00	120.00	161.67	20.83	15.12	17.44	30.27	16.21	19.07
29	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error
30	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error
31	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error	0.00	No Generation	Error
Max	25.74			156.79			290.00			49.01			30.27		
Min		0.05			19.10			120.00			15.00			12.27	

Source: THP, CHP, BHP, KHP (DGPC)

Graph: Generation for the month of February, 2019

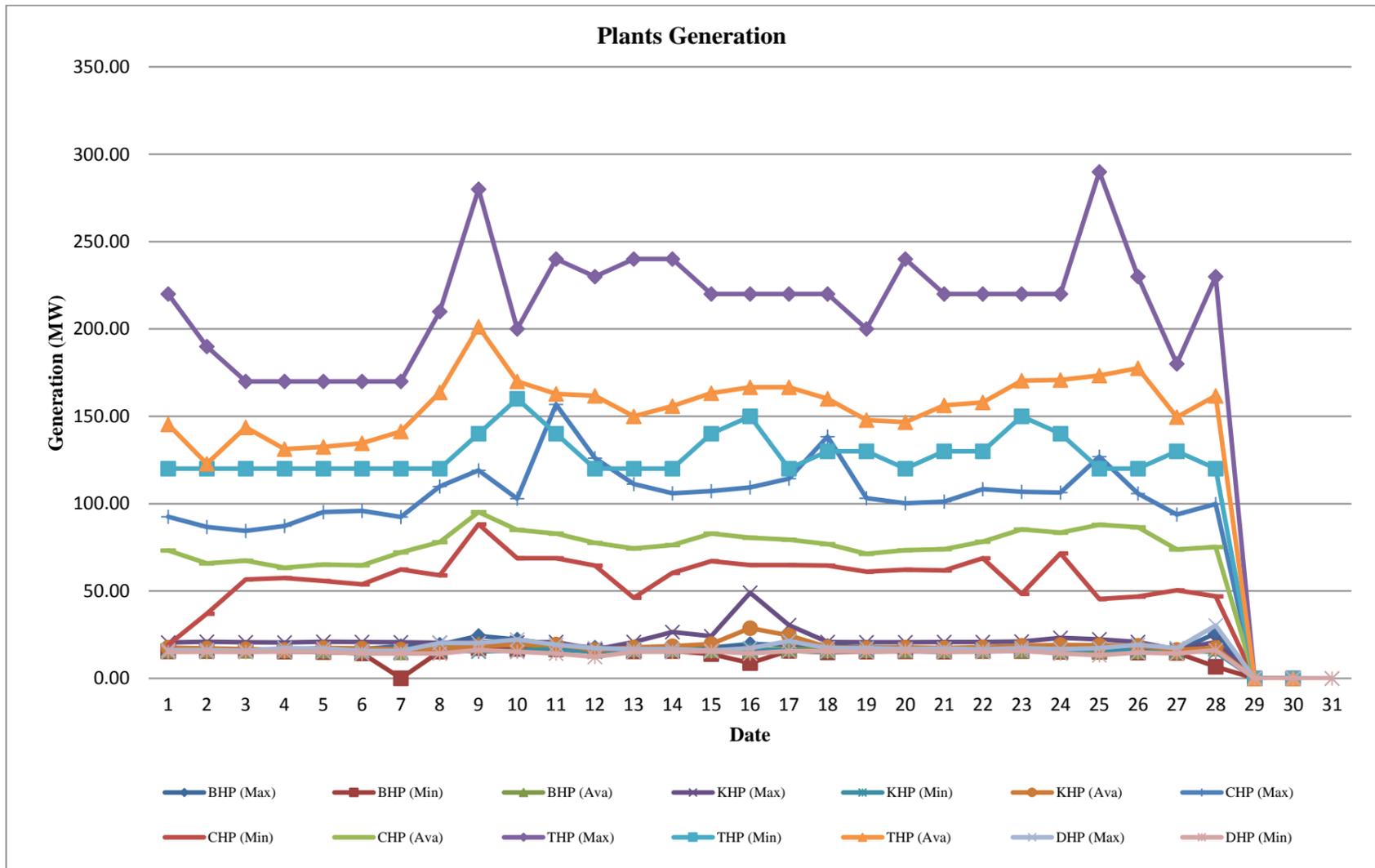




Table: Generation for the month of March, 2019

Mar-19 Date	BHP (MW)			CHP (MW)			THP (MW)			KHP (MW)			DHP (MW)		
	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	19.18	14.30	16.44	105.20	45.30	80.27	230.00	130.00	170.00	20.92	16.27	17.41	24.99	14.25	17.99
2	19.10	15.02	16.74	108.55	65.77	81.62	200.00	130.00	152.92	20.59	15.18	17.30	25.30	15.25	17.44
3	19.02	15.37	16.84	115.42	72.09	81.54	200.00	150.00	162.50	22.91	15.10	17.85	20.29	16.20	18.05
4	17.28	15.34	16.01	91.08	58.73	80.64	200.00	170.00	179.58	20.66	16.36	18.79	18.06	15.22	16.73
5	17.28	13.83	15.73	107.32	54.83	81.10	230.00	120.00	154.58	20.42	15.30	17.52	18.23	14.24	16.27
6	17.28	13.83	15.22	106.86	54.35	80.88	220.00	130.00	164.17	23.87	13.15	18.16	17.26	15.24	16.25
7	15.86	13.72	15.04	101.22	55.87	74.11	210.00	120.00	153.75	24.58	15.06	18.48	16.76	14.24	15.87
8	15.63	13.50	14.64	96.48	62.20	71.24	240.00	120.00	141.67	31.83	10.27	17.11	16.26	13.26	15.47
9	15.08	14.61	14.80	94.65	63.30	69.83	210.00	120.00	138.75	20.63	10.30	16.73	16.24	14.26	15.62
10	14.98	14.45	14.71	100.53	64.37	72.29	220.00	120.00	144.58	20.65	16.13	18.32	16.43	14.22	15.67
11	15.03	14.23	14.72	102.62	64.82	72.34	210.00	130.00	146.67	20.79	14.04	17.75	16.32	14.21	15.73
12	16.14	13.54	14.79	100.99	64.72	72.33	200.00	130.00	144.58	20.55	16.15	18.33	16.23	15.50	15.79
13	18.07	14.07	15.57	172.54	81.86	113.09	360.00	200.00	280.00	20.50	16.20	19.54	17.23	15.25	16.18
14	19.39	15.59	17.11	114.91	60.99	88.87	190.00	120.00	137.50	32.14	20.44	25.28	21.28	15.72	17.28
15	19.91	15.56	17.87	128.95	96.81	111.16	300.00	150.00	200.83	33.00	16.50	31.49	20.22	16.20	17.74
16	20.72	15.94	17.99	141.03	104.90	117.79	340.00	180.00	235.00	33.00	28.42	32.62	25.22	15.22	18.67
17	18.20	15.06	16.37	133.21	85.64	100.06	340.00	160.00	217.92	30.55	20.55	25.72	18.24	14.19	16.62
18	17.56	15.45	16.31	138.25	77.95	97.84	320.00	200.00	222.50	28.04	20.59	23.16	18.22	14.18	16.71
19	16.06	13.64	15.13	131.90	71.33	100.34	320.00	190.00	249.17	25.77	20.50	22.30	17.38	14.20	16.09
20	19.81	10.80	15.15	131.47	61.50	96.49	240.00	170.00	190.77	26.28	16.50	22.21	17.83	13.21	15.32
21	18.10	13.48	15.14	109.35	54.91	92.92	210.00	190.00	205.00	22.70	16.00	19.70	17.73	14.18	16.24
22	16.19	13.79	14.81	103.43	50.67	71.86	200.00	120.00	138.75	22.58	20.14	20.77	17.22	13.20	15.67
23	19.10	15.38	16.63	146.04	31.99	106.35	300.00	120.00	214.58	24.87	16.50	22.44	20.25	15.21	16.93
24	16.87	14.41	15.63	130.61	61.84	98.35	270.00	160.00	202.92	24.36	16.35	21.62	18.26	14.22	16.58
25	16.65	14.66	15.75	142.23	79.06	103.05	320.00	120.00	211.67	24.92	20.70	22.54	18.28	15.21	16.52
26	25.70	14.78	19.01	170.54	82.27	128.82	360.00	140.00	251.67	48.77	20.52	27.85	35.22	15.20	19.43
27	31.12	13.47	21.06	170.02	105.02	125.62	360.00	220.00	267.08	33.00	24.75	30.07	35.26	17.78	24.40
28	18.50	14.09	16.34	138.04	89.62	102.56	300.00	160.00	210.42	26.80	20.70	23.05	20.24	14.24	17.42
29	19.08	13.55	16.47	142.37	90.26	104.98	320.00	160.00	209.17	29.93	20.36	23.72	19.71	15.23	17.21
30	24.44	15.56	17.88	153.25	92.08	127.72	340.00	170.00	249.17	33.00	20.67	30.43	18.51	15.23	17.10
31	25.53	17.81	21.21	182.24	86.00	154.28	370.00	260.00	317.92	48.28	30.47	38.32	55.24	16.18	22.41
Max	31.12			182.24			370.00			48.77			55.24		
Min		10.80			31.99			120.00			10.27			13.20	

Source: THP, CHP, BHP, KHP (DGPC)

Graph: Generation for the month of March, 2019

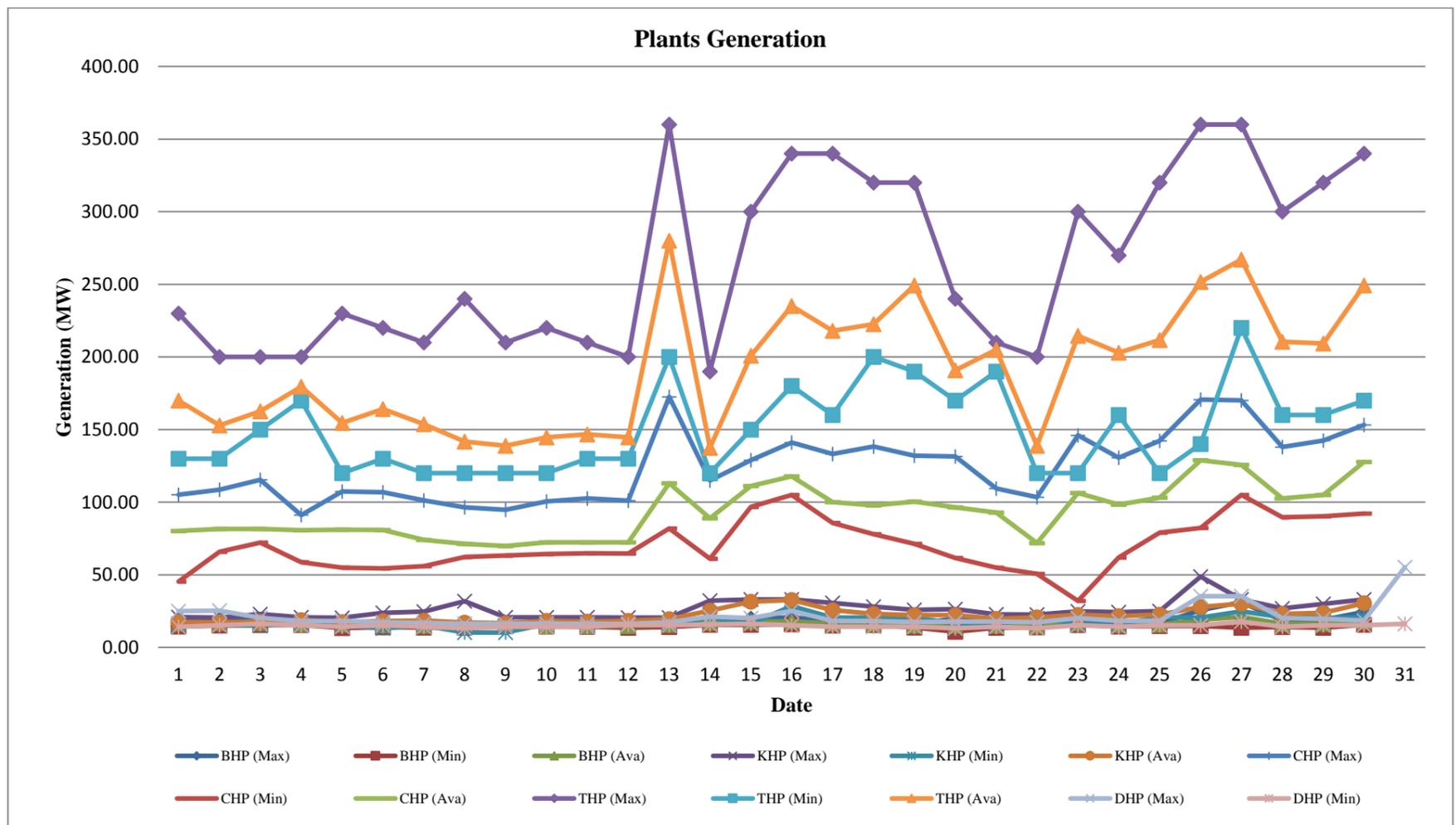




Table: National demand for January, 2019

Jan-19	Max.	Min.	Ava.
0:00	305.75	215.43	251.23
1:00	307.45	209.30	244.75
2:00	304.86	211.31	243.39
3:00	305.07	199.57	239.32
4:00	303.19	190.37	239.63
5:00	304.97	204.66	242.43
6:00	308.12	213.73	250.83
7:00	343.22	243.83	274.79
8:00	360.49	261.13	295.58
9:00	336.87	268.92	295.89
10:00	328.94	264.19	291.91
11:00	322.73	252.65	286.54
12:00	322.46	254.84	284.91
13:00	317.16	244.50	279.62
14:00	323.03	238.65	274.68
15:00	324.23	247.09	272.01
16:00	329.08	246.71	277.65
17:00	343.59	265.06	291.75
18:00	381.15	295.77	325.38
19:00	379.94	305.88	328.66
20:00	361.91	294.54	318.74
21:00	344.04	278.16	305.96
22:00	331.77	261.02	286.64
23:00	309.63	231.15	266.55
	<b>381.15</b>		
		<b>190.37</b>	

Graph: National Demand for January, 2019

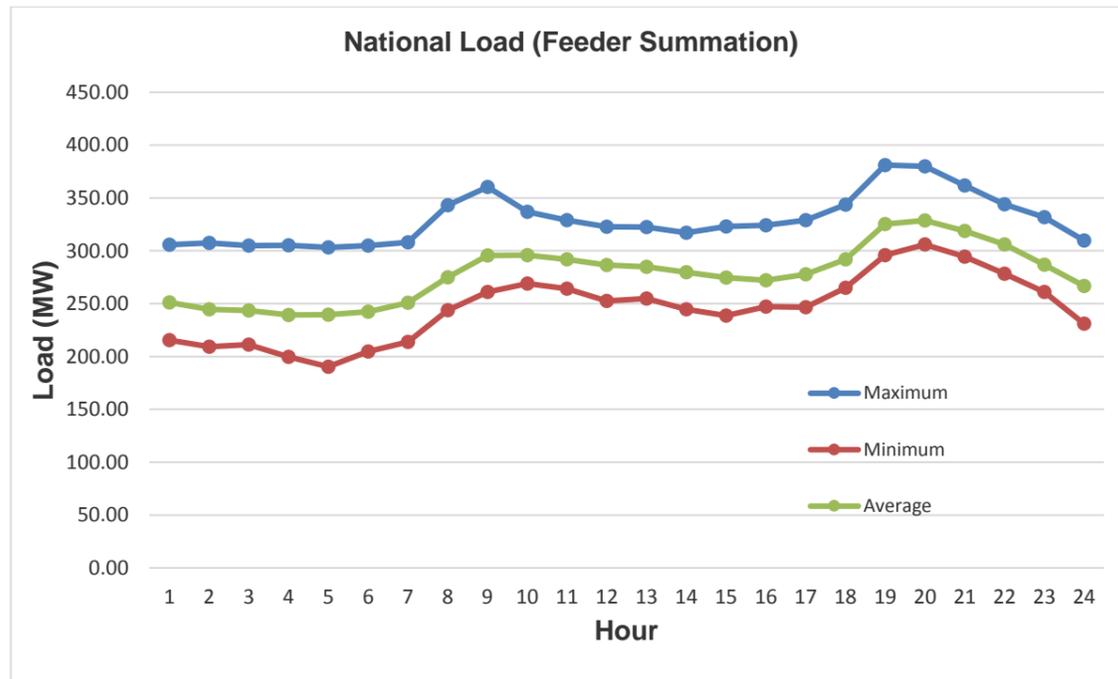


Table: National Demand for February, 2019

Feb-19	Max.	Min.	Ava.
0:00	278.21	119.91	226.29
1:00	271.20	109.68	217.78
2:00	268.05	104.59	213.52
3:00	269.44	103.48	213.16
4:00	269.29	111.30	211.96
5:00	271.38	115.31	214.43
6:00	271.46	132.08	229.52
7:00	309.15	200.88	267.48
8:00	312.98	190.95	271.98
9:00	312.16	233.26	271.73
10:00	315.34	218.71	265.61
11:00	304.83	191.46	261.22
12:00	300.91	181.29	261.45
13:00	303.25	188.66	257.50
14:00	299.38	168.32	246.57
15:00	299.38	166.64	249.80
16:00	301.30	174.80	250.02
17:00	308.16	198.59	264.25
18:00	338.59	162.80	292.47
19:00	367.16	277.11	321.69
20:00	363.70	262.32	307.20
21:00	334.19	252.51	291.36
22:00	308.64	187.84	266.17
23:00	292.26	145.42	243.03
	<b>367.16</b>		
		<b>103.48</b>	

Graph: National Demand for February, 2019

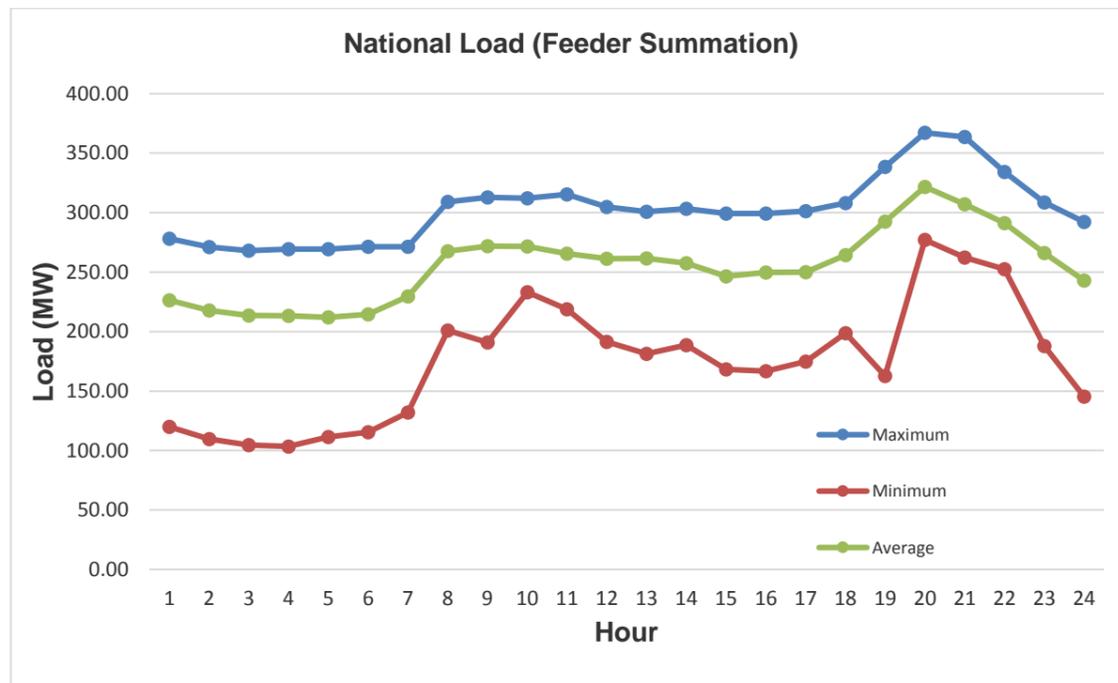
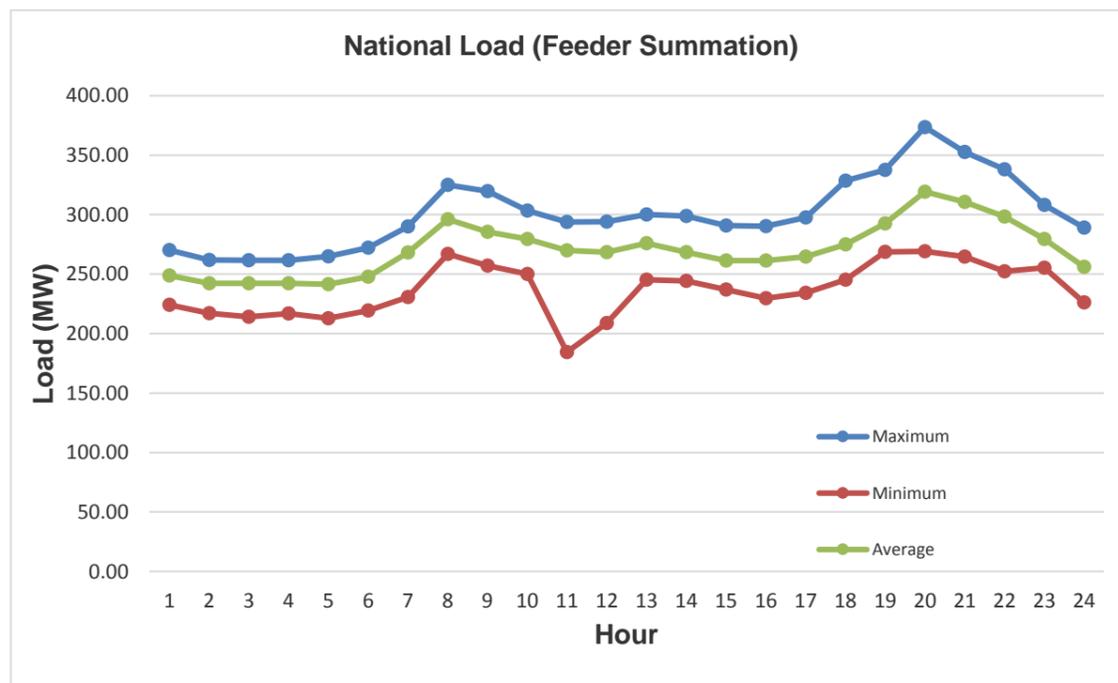




Table: National Demand for March, 2019

Mar-19	Max.	Min.	Ava.
0:00	270.30	224.08	248.69
1:00	262.02	217.14	242.39
2:00	261.72	214.05	242.21
3:00	261.60	216.86	242.39
4:00	264.84	212.95	241.47
5:00	272.29	219.34	247.84
6:00	290.16	230.64	268.09
7:00	324.91	266.98	296.06
8:00	319.69	257.04	285.49
9:00	303.32	250.10	279.50
10:00	293.93	184.43	269.87
11:00	293.97	208.90	268.54
12:00	300.11	245.29	276.04
13:00	298.97	244.38	268.47
14:00	290.91	236.97	261.44
15:00	290.36	229.58	261.28
16:00	297.61	234.32	264.60
17:00	328.48	245.20	274.85
18:00	337.59	268.77	292.53
19:00	373.68	269.13	319.27
20:00	352.63	264.58	310.58
21:00	338.16	252.26	298.33
22:00	308.06	255.38	279.41
23:00	289.02	226.25	255.99
	<b>373.68</b>		
		<b>184.43</b>	

Graph: National Demand for March, 2019



Annexure-III

Table: Daily maximum, minimum and average frequency for the month of January, 2019

Jan-19 Date	Bus Frequency at Semtokha Substation			Bus Frequency at Kurichhu Hydropower Plant		
	Max	Min	Ava	Max	Min	Ava
1	50.00	49.80	49.93	50.14	49.80	49.99
2	50.00	49.80	49.95	50.08	49.87	50.00
3	50.00	49.90	49.93	50.09	49.78	49.97
4	50.00	49.80	49.94	50.10	49.58	49.98
5	50.00	49.80	49.90	50.12	49.85	50.00
6	50.00	49.80	49.91	50.07	49.87	50.01
7	50.00	49.70	49.90	50.09	49.90	50.02
8	50.00	49.70	49.88	50.10	49.92	50.00
9	50.00	49.70	49.87	50.07	49.86	49.99
10	50.00	49.80	49.91	50.12	49.90	50.00
11	50.00	49.80	49.91	50.08	49.80	49.98
12	50.00	49.80	49.90	50.12	49.82	49.98
13	50.00	49.80	49.93	50.09	49.89	50.01
14	50.00	49.80	49.93	50.10	49.89	50.00
15	50.00	49.80	49.92	50.18	49.88	50.02
16	50.00	49.80	49.93	50.11	49.50	49.98
17	50.00	49.80	49.95	50.40	49.86	50.02
18	50.00	49.90	49.94	50.08	49.84	49.95
19	50.10	49.80	49.93	50.09	49.81	50.01
20	50.00	49.80	49.94	50.07	49.89	50.01
21	50.00	49.80	49.93	50.10	49.89	50.01
22	50.00	49.80	49.91	50.10	49.90	50.00
23	50.00	49.90	49.93	50.20	49.80	49.99
24	50.00	49.80	49.91	50.08	49.90	50.01
25	50.00	49.90	49.94	50.08	49.82	49.98
26	50.00	49.80	49.90	50.11	49.83	50.00
27	50.00	49.80	49.91	50.14	49.80	50.02
28	50.00	49.70	49.89	50.11	49.80	49.99
29	50.00	49.70	49.88	50.09	49.79	49.97
30	50.00	49.80	49.93	50.12	49.89	50.01
31	50.00	49.90	49.95	50.11	49.87	50.01

Max 50.10 50.40  
 Min 49.70 49.50

Source: TD (BPC), KHP (DGPC)

Graph: Daily maximum, minimum and average frequency for the month of January, 2019

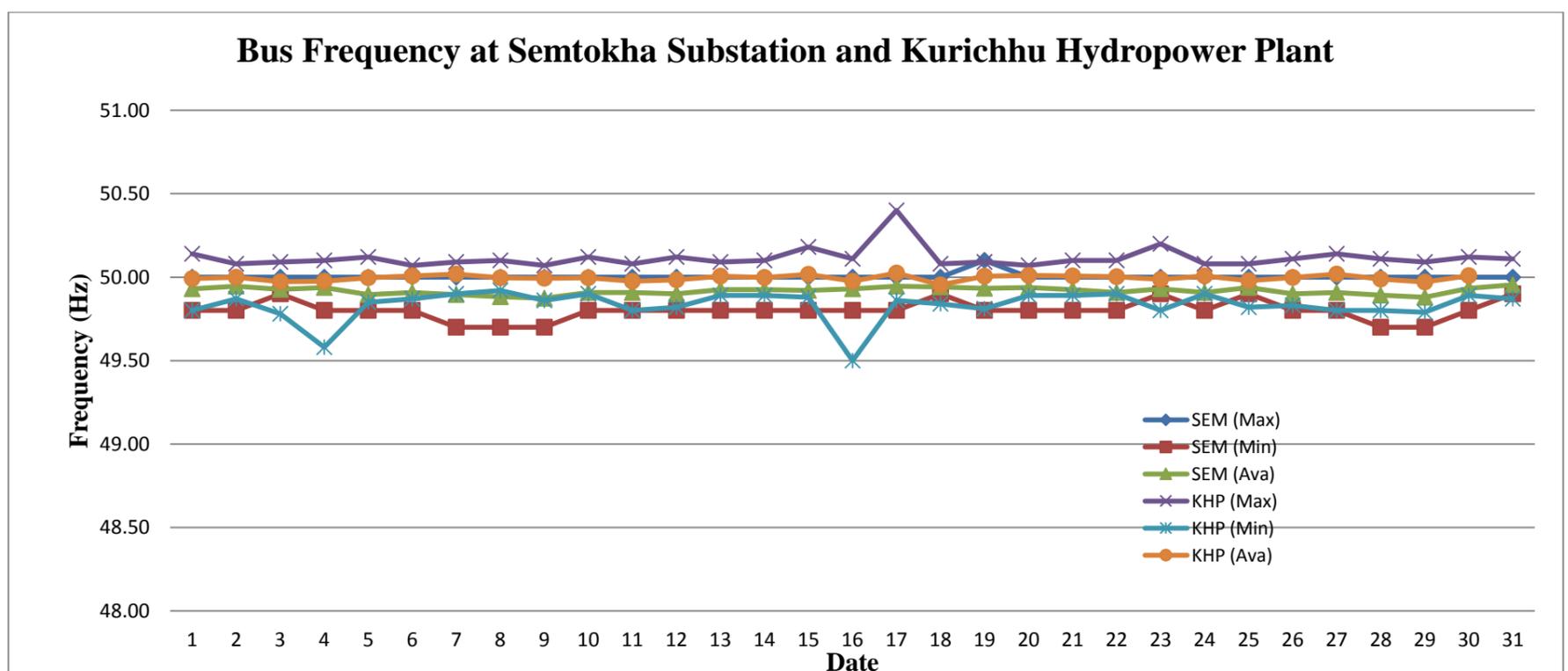




Table: Daily maximum, minimum and average frequency for the month of February, 2019

Date	Bus Frequency at Semtokha Substation			Bus Frequency at Kurichhu Hydropower Plant		
	Max	Min	Ava	Max	Min	Ava
1	50.00	49.80	49.93	50.06	49.88	49.99
2	50.00	49.80	49.95	50.11	49.87	49.99
3	50.00	49.90	49.93	50.10	49.82	49.98
4	50.00	49.80	49.94	50.14	49.92	50.01
5	50.00	49.80	49.90	50.10	49.85	50.01
6	50.00	49.80	49.91	50.07	49.89	50.00
7	50.00	49.70	49.90	50.10	49.92	50.03
8	50.00	49.70	49.88	50.11	49.86	50.03
9	50.00	49.70	49.87	50.80	49.91	50.06
10	50.00	49.80	49.91	50.10	49.95	50.04
11	50.00	49.80	49.91	50.12	49.89	50.04
12	50.00	49.80	49.90	50.07	49.92	50.00
13	50.00	49.80	49.93	50.09	49.90	50.00
14	50.00	49.80	49.93	50.09	49.90	50.00
15	50.00	49.80	49.92	50.10	49.85	50.00
16	50.00	49.80	49.93	50.09	49.88	50.02
17	50.00	49.80	49.95	50.08	49.90	50.00
18	50.00	49.90	49.94	50.12	49.88	50.01
19	50.10	49.80	49.93	50.08	49.85	50.00
20	50.00	49.80	49.94	50.15	49.89	50.02
21	50.00	49.80	49.93	50.10	49.82	49.98
22	50.00	49.80	49.91	50.10	49.85	50.00
23	50.00	49.90	49.93	50.09	49.85	50.01
24	50.00	49.80	49.91	50.14	49.88	50.01
25	50.00	49.90	49.94	50.11	49.89	50.03
26	50.00	49.80	49.90	50.12	49.88	50.02
27	50.00	49.80	49.91	50.13	49.90	50.03
28	50.00	49.70	49.89	50.11	49.96	50.03
29	50.00	49.70	49.88	0.00	Error	Error
30	50.00	49.80	49.93	0.00	Error	Error
31	50.00	49.90	49.95	0.00	Error	Error

Max 50.10 50.80  
 Min 49.70 49.82

Source: TD (BPC), KHP (DGPC)

Graph: Daily maximum, minimum and average frequency for the month of February, 2019

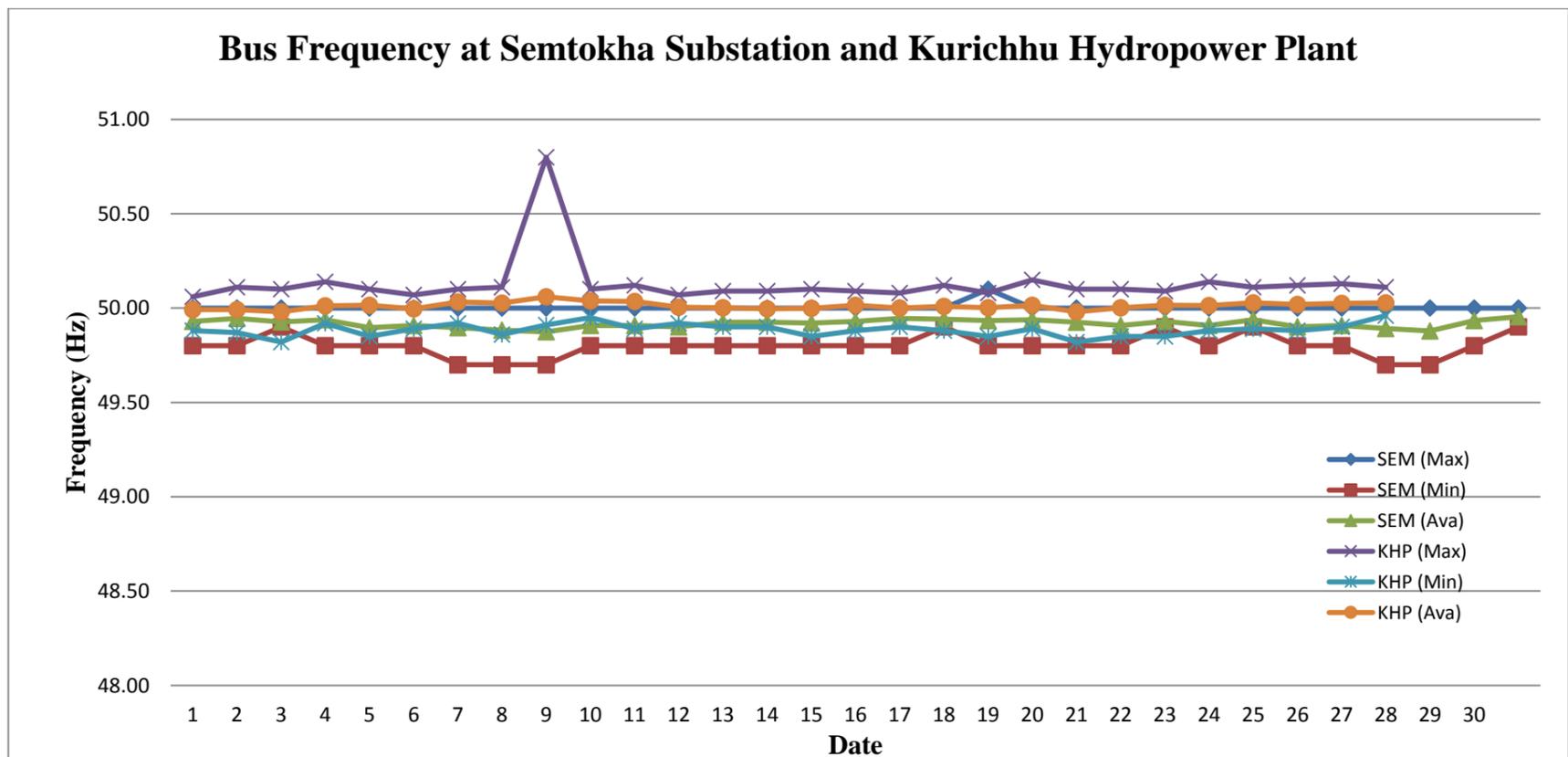


Table: Daily maximum, minimum and average frequency for the month of March, 2019

Date	Bus Frequency at Semtokha Substation			Bus Frequency at Kurichhu Hydropower Plant		
	Max	Min	Ava	Max	Min	Ava
1	50.00	49.80	49.93	50.16	49.90	50.02
2	50.00	49.80	49.95	50.40	49.93	50.03
3	50.00	49.90	49.93	50.09	49.82	50.00
4	50.00	49.80	49.94	50.11	49.82	50.00
5	50.00	49.80	49.90	50.10	49.74	49.95
6	50.00	49.80	49.91	50.13	49.87	49.98
7	50.00	49.70	49.90	50.05	49.84	49.95
8	50.00	49.70	49.88	50.08	49.89	49.99
9	50.00	49.70	49.87	50.20	48.91	49.92
10	50.00	49.80	49.91	50.08	49.91	49.99
11	50.00	49.80	49.91	50.07	49.82	49.98
12	50.00	49.80	49.90	50.10	49.90	49.98
13	50.00	49.80	49.93	50.40	49.92	50.02
14	50.00	49.80	49.93	50.09	49.90	50.01
15	50.00	49.80	49.92	50.06	49.48	50.00
16	50.00	49.80	49.93	50.09	49.90	50.02
17	50.00	49.80	49.95	50.09	49.81	50.00
18	50.00	49.90	49.94	50.11	49.88	50.02
19	50.10	49.80	49.93	50.12	49.94	50.01
20	50.00	49.80	49.94	50.14	49.96	50.02
21	50.00	49.80	49.93	50.10	49.06	49.98
22	50.00	49.80	49.91	50.12	49.89	50.03
23	50.00	49.90	49.93	50.12	49.93	50.02
24	50.00	49.80	49.91	50.10	49.90	50.03
25	50.00	49.90	49.94	50.50	49.81	50.01
26	50.00	49.80	49.90	50.10	49.90	50.01
27	50.00	49.80	49.91	50.09	49.94	50.02
28	50.00	49.70	49.89	50.06	49.80	49.97
29	50.00	49.70	49.88	50.40	49.90	50.01
30	50.00	49.80	49.93	50.15	49.90	50.01
31	50.00	49.90	49.95	50.21	49.97	50.04

Max 50.10  
 Min 49.70  
 Source: TD (BPC), KHP (DGPC)

Graph: Daily maximum, minimum and average frequency for the month of March, 2019

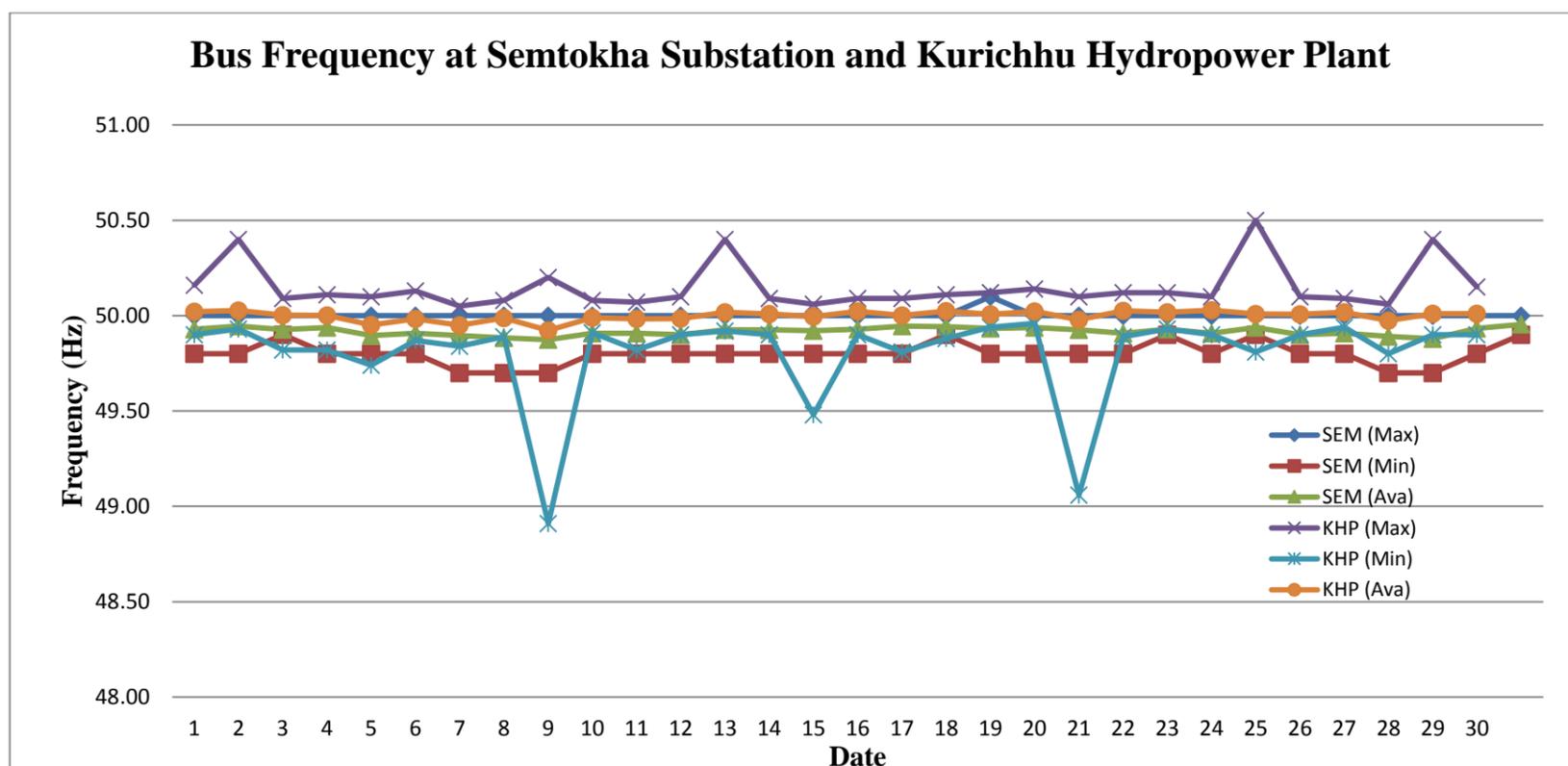




Table: Daily maximum, minimum and average Voltage for the month of January, 2019

Jan-19 Date	Malbase Substation									Nangkhor Substation		
	400kV Bus Voltage (kV)			220kV Bus Voltage (kV)			66kV Bus Voltage (kV)			132kV Bus Voltage (kV)		
	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	413.00	402.50	409.35	225.00	220.00	223.13	66.00	63.00	64.92	139.20	134.20	137.25
2	415.50	401.00	409.40	225.50	219.00	222.48	66.00	64.00	65.08	140.80	132.30	137.37
3	410.00	401.00	405.50	224.50	218.50	222.02	66.00	63.00	64.96	140.47	130.70	137.30
4	419.00	403.50	409.54	228.00	220.00	223.08	67.00	64.00	65.17	140.68	133.20	136.78
5	414.50	402.50	407.31	230.00	222.00	225.29	66.00	64.00	64.75	140.60	135.20	137.58
6	415.00	402.00	408.21	227.50	219.50	222.67	66.00	64.00	64.92	140.20	133.80	137.73
7	415.50	401.50	408.60	229.00	220.00	224.04	67.00	64.00	65.75	141.50	132.78	137.60
8	411.50	402.00	407.92	225.50	220.50	223.35	66.00	64.00	65.17	140.40	135.00	138.11
9	412.50	401.50	407.96	226.00	220.50	223.48	66.00	64.00	65.29	141.30	134.50	137.41
10	412.00	399.50	406.25	226.00	219.50	222.38	66.00	64.00	64.96	139.84	131.70	136.48
11	413.00	400.50	405.81	227.00	218.50	222.81	66.00	64.00	65.21	140.00	133.40	136.77
12	413.00	400.00	406.35	226.50	220.50	223.31	66.00	64.00	65.46	140.00	133.20	136.97
13	413.50	401.00	407.10	227.50	221.00	223.71	67.00	64.00	65.29	139.60	135.27	137.57
14	412.50	401.50	406.08	226.00	221.00	223.04	66.00	65.00	65.33	140.60	134.40	137.84
15	412.00	397.00	404.44	226.00	220.00	222.54	66.00	64.00	65.00	140.60	135.00	138.09
16	413.00	400.00	406.17	228.00	220.00	223.63	67.00	65.00	65.42	140.40	134.60	137.50
17	411.50	401.00	407.08	226.00	221.00	223.83	66.00	65.00	65.46	139.80	133.20	137.10
18	415.50	403.00	408.48	228.50	221.50	224.46	67.00	64.00	65.46	141.51	133.40	137.30
19	414.00	404.50	408.79	227.50	221.50	224.67	67.00	65.00	65.67	140.20	132.16	136.86
20	415.00	404.50	410.04	229.00	222.00	225.56	67.00	65.00	65.88	140.60	134.90	137.88
21	416.50	402.50	408.04	230.00	220.50	224.58	67.00	64.00	65.46	141.09	132.80	136.96
22	416.50	403.50	408.21	230.00	221.00	224.02	67.00	64.00	65.54	140.80	133.80	137.13
23	416.50	405.50	411.17	230.00	221.50	225.00	67.00	65.00	66.00	139.60	131.12	136.87
24	416.50	402.50	409.04	230.00	221.00	224.81	67.00	64.00	65.33	139.80	132.50	136.46
25	414.00	401.00	409.13	227.00	220.00	223.85	67.00	64.00	65.29	139.60	133.10	136.88
26	414.50	402.00	409.67	227.00	221.00	224.27	67.00	64.00	65.50	141.50	134.60	138.67
27	417.50	405.00	410.92	229.00	222.00	224.96	67.00	65.00	65.75	140.88	134.20	137.53
28	415.00	403.00	409.08	227.00	221.00	223.79	66.00	63.00	65.08	141.92	132.90	137.22
29	416.00	399.50	408.96	228.00	219.50	224.02	67.00	64.00	65.42	139.40	133.60	136.70
30	412.50	400.50	407.88	226.00	220.50	223.58	66.00	64.00	65.29	139.00	132.70	136.57
31	415.50	402.00	408.40	228.50	221.00	224.54	67.00	64.00	65.50	140.20	132.99	137.03
<b>Max</b>	<b>419.00</b>			<b>230.00</b>			<b>67.00</b>			<b>141.92</b>		
<b>Min</b>		<b>397.00</b>			<b>218.50</b>			<b>63.00</b>			<b>130.70</b>	

Source: TD, BPC

Graph: Daily maximum, minimum and average Voltage for the month of January, 2019

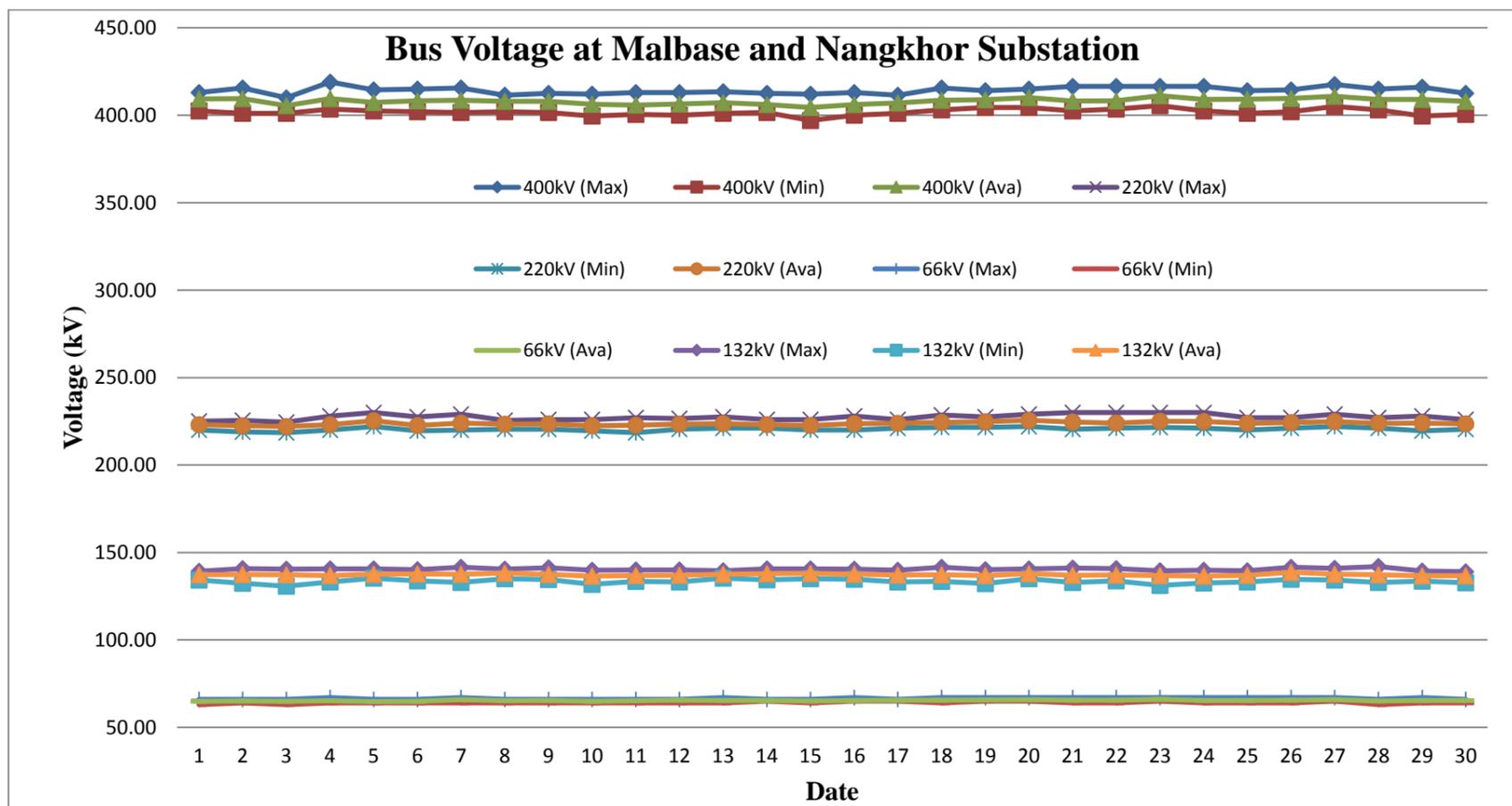




Table: Daily maximum, minimum and average Voltage for the month of February, 2019

Feb-19 Date	Malbase Substation									Nangkhor Substation		
	400kV Bus Voltage (kV)			220kV Bus Voltage (kV)			66kV Bus Voltage (kV)			132kV Bus Voltage (kV)		
	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	416.00	401.00	408.96	229.00	220.00	224.83	67.00	64.00	65.38	140.40	131.95	136.81
2	415.50	404.00	408.85	229.00	221.50	224.60	67.00	64.00	65.83	140.40	133.10	136.94
3	416.00	405.00	409.63	228.00	220.00	223.79	67.00	64.00	65.38	140.88	133.60	137.39
4	416.50	405.00	409.88	229.00	221.50	224.38	67.00	65.00	65.50	140.80	133.20	136.94
5	415.50	403.00	408.83	228.00	221.00	224.40	67.00	65.00	65.58	140.80	132.90	137.00
6	416.00	404.00	409.17	228.50	222.00	224.73	67.00	64.00	65.58	140.40	134.20	136.79
7	414.50	403.00	408.63	230.00	220.50	224.71	67.00	64.00	65.42	139.80	132.57	136.51
8	417.00	404.00	410.65	229.00	221.50	225.17	67.00	64.00	65.67	141.90	133.40	137.86
9	417.00	405.00	411.38	229.00	223.00	226.08	67.00	65.00	66.00	141.70	133.80	137.65
10	416.50	405.00	411.02	230.00	222.00	225.75	67.00	65.00	65.79	139.22	135.20	137.13
11	415.50	403.00	409.48	230.00	221.50	225.21	67.00	65.00	65.75	141.30	130.90	136.56
12	416.00	402.50	410.08	231.00	221.50	226.27	67.00	65.00	66.17	139.80	132.90	136.94
13	415.00	403.50	408.83	229.00	222.00	224.85	67.00	65.00	65.63	140.00	132.78	136.73
14	415.00	403.50	410.31	230.00	218.00	223.79	68.00	63.00	65.54	140.00	133.00	136.22
15	415.00	403.00	410.27	229.50	217.50	223.52	68.00	64.00	65.60	139.70	133.19	136.50
16	416.00	405.00	410.29	229.00	223.00	225.67	67.00	65.00	66.08	139.64	132.58	137.04
17	416.00	403.00	412.13	230.00	222.50	227.25	67.00	65.00	66.75	140.80	135.40	138.84
18	415.50	403.00	409.52	229.00	222.00	225.46	67.00	64.00	65.96	142.13	134.24	137.66
19	412.00	400.00	406.88	228.00	219.50	223.96	67.00	64.00	65.58	140.80	131.10	136.23
20	411.50	400.00	406.83	228.00	220.00	224.27	67.00	64.00	65.46	141.30	133.60	137.50
21	411.50	399.50	406.88	226.50	219.00	223.42	67.00	64.00	65.54	139.10	133.20	136.45
22	414.00	398.50	406.17	228.00	220.00	223.67	67.00	64.00	65.25	139.20	130.40	135.84
23	415.00	401.00	408.48	229.00	221.00	224.75	67.00	65.00	65.88	140.60	134.40	137.60
24	413.50	401.50	409.35	227.50	221.00	225.31	67.00	65.00	65.79	141.10	135.20	138.29
25	414.00	403.50	408.50	227.50	222.00	224.46	67.00	65.00	65.58	140.60	134.00	137.14
26	419.50	400.00	410.69	229.50	221.00	225.29	67.00	65.00	65.96	140.60	133.80	136.89
27	416.00	403.00	411.27	228.50	222.00	226.21	67.00	65.00	66.17	139.40	132.37	137.01
28	417.00	402.50	410.25	230.00	223.00	226.00	68.00	65.00	66.21	139.90	132.57	136.69
29	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error
30	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error
31	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error	0.00	Error	Error
<b>Max</b>	<b>419.50</b>			<b>231.00</b>			<b>68.00</b>			<b>142.13</b>		
<b>Min</b>		<b>398.50</b>			<b>217.50</b>			<b>63.00</b>			<b>130.40</b>	

Source: TD, BPC

Graph: Daily maximum, minimum and average Voltage for the month of February, 2019

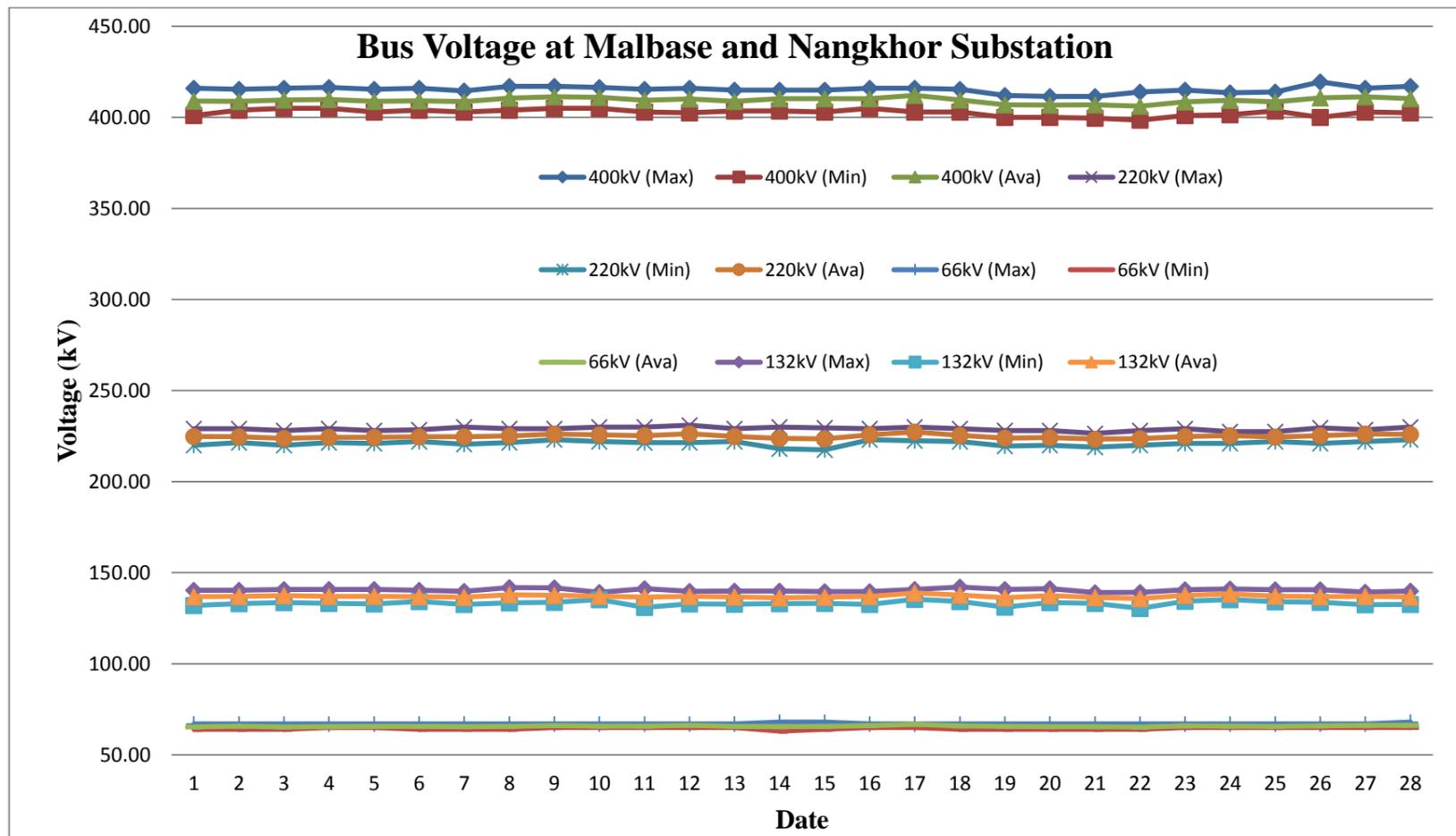


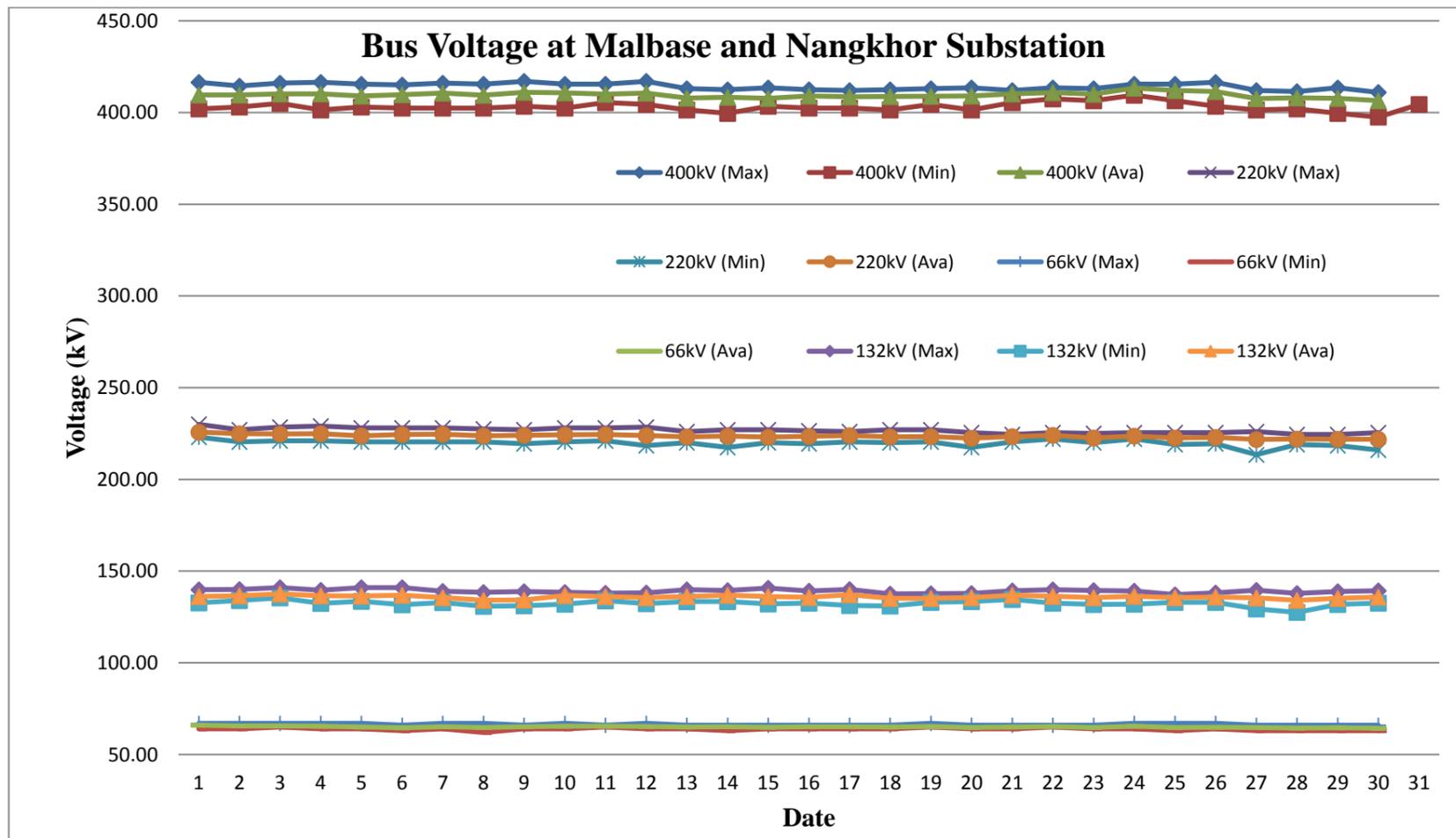


Table: Daily maximum, minimum and average Voltage for the month of March, 2019

Mar-19 Date	Malbase Substation									Nangkhor Substation		
	400kV Bus Voltage (kV)			220kV Bus Voltage (kV)			66kV Bus Voltage (kV)			132kV Bus Voltage (kV)		
	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava	Max	Min	Ava
1	416.50	402.00	409.67	230.00	223.00	225.77	67.00	64.00	65.96	139.80	132.70	136.10
2	414.50	403.00	409.67	227.00	220.50	224.92	67.00	64.00	65.58	140.05	134.00	136.55
3	416.00	405.00	410.15	228.50	221.00	224.81	67.00	65.00	65.58	141.00	135.40	137.57
4	416.50	401.50	410.17	229.00	221.00	224.83	67.00	64.00	65.46	139.60	132.37	136.62
5	415.50	403.00	409.04	228.00	220.50	223.75	67.00	64.00	64.96	141.00	133.60	136.46
6	415.00	402.50	409.81	228.00	220.50	224.46	66.00	63.00	64.63	141.00	131.70	136.82
7	416.00	402.50	410.58	228.00	220.50	224.63	67.00	64.00	65.17	139.00	132.80	135.54
8	415.50	402.50	409.46	227.50	220.50	223.79	67.00	62.00	64.75	138.39	130.90	134.08
9	417.00	403.50	410.98	227.00	219.50	224.04	66.00	64.00	65.08	138.80	131.10	134.34
10	415.50	402.50	410.69	228.00	220.50	224.27	67.00	64.00	65.38	138.40	132.00	136.65
11	415.50	405.50	410.06	228.00	221.00	224.48	66.00	65.00	65.38	138.00	133.80	136.19
12	417.00	404.50	410.63	228.50	218.50	223.96	67.00	64.00	65.29	138.10	132.20	135.54
13	413.00	401.50	407.92	226.00	220.00	223.17	66.00	64.00	65.00	139.80	133.40	136.10
14	412.50	399.50	408.31	227.00	217.50	223.67	66.00	63.00	65.21	139.40	133.40	136.90
15	413.50	403.50	407.73	227.00	220.00	223.06	66.00	64.00	64.92	140.70	132.10	136.07
16	412.50	402.50	409.04	226.50	219.50	223.44	66.00	64.00	65.08	139.20	132.50	135.72
17	412.00	402.50	408.54	226.00	220.50	223.88	66.00	64.00	65.17	140.00	131.33	137.08
18	412.50	401.50	408.71	227.00	220.00	223.19	66.00	64.00	65.00	137.50	130.91	135.08
19	413.00	404.50	408.83	227.00	220.50	223.33	67.00	65.00	65.33	137.70	132.99	135.20
20	413.50	401.50	409.04	225.50	217.50	222.50	66.00	64.00	64.75	137.90	133.40	135.53
21	412.00	405.50	410.19	224.50	220.50	223.27	66.00	64.00	65.00	139.22	134.60	136.82
22	413.50	407.50	410.90	225.50	222.00	224.00	66.00	65.00	65.29	139.84	132.50	136.28
23	413.00	406.50	410.04	225.00	220.00	222.67	66.00	64.00	64.71	139.40	131.80	135.59
24	415.50	409.50	413.35	225.50	222.00	223.60	67.00	64.00	65.46	139.20	132.00	136.24
25	415.50	406.50	412.04	225.50	219.00	222.54	67.00	63.00	64.71	137.20	133.00	135.58
26	416.50	403.50	411.46	225.50	219.50	222.88	67.00	64.00	64.92	138.10	133.00	135.91
27	412.00	401.50	407.67	226.00	213.50	221.79	66.00	63.00	64.67	139.60	129.40	135.37
28	411.50	402.00	408.02	224.50	219.00	221.98	66.00	63.00	64.50	137.90	127.50	134.07
29	413.50	399.50	407.81	224.50	218.50	221.83	66.00	63.00	64.63	138.81	131.90	135.14
30	411.00	397.50	406.50	225.50	216.00	221.83	66.00	63.00	64.33	139.22	132.50	135.90
31	411.00	404.50	408.17	225.00	221.00	223.46	66.00	64.00	65.13	144.20	135.90	138.28
<b>Max</b>	<b>417.00</b>			<b>230.00</b>			<b>67.00</b>			<b>144.20</b>		
<b>Min</b>		<b>397.50</b>			<b>213.50</b>			<b>62.00</b>			<b>127.50</b>	

Source: TD, BPC

Graph: Daily maximum, minimum and average Voltage for the month of March, 2019





## Transmission System Performance Report

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### Annexure-V

#### Eastern Grid Outages

January, 2019												
<b>132/33/11kV, Kilikhar substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	23.01.2019	14:40	23.01.2019	15:32	52	4.42	132kV Kurichu I/C	All feeders	Tripped on fault	Null	Rangia end	Main Grid failed from Rangia and same time Supply extended from Salakati Substation.
<b>132/33/11kV, Kanglung substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	23.01.2019	14:40	23.01.2019	15:32	52	2.04	132kV Incomer	All Feeders	Tripped on fault	NA	Rangia end	Gride fail from Rangia end.
<b>132/33/11kV, Nangkor substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	04.01.2019	17:20	04.01.2019	19:45	25	-1.09			NA	-	Nangkor Substation	
2	07.01.2019	9:57	07.01.2019	10:29	32	20.6	132kV Nangkor-Deothang	Nangkor-Deothang line	Low CB Sf6 Gas		Nangkor Substation	No supply interruption.
3	23.01.2019	14:45	23.01.2019	15:10	25	2.88	Main Grid	All 33& 11kV Feeders	-	-	Rangia Substation	Supply failed from Rangia Substation.
4	23.01.2019	15:11	23.01.2019	15:36	25	2.88	Main Grid	All 33& 11kV Feeders	-	-	Rangia Substation	Supply failed from Rangia Substation.
<b>132/33/11kV, Deothang substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	23.01.2019	14:40	23.01.2019	15:32	52	2.35	132kV Incommer Nangkor & Motanga feeder	All Feeders	Tripped on fault	NA	Rangia end	At our end all breaker condition was normal, as information given from Motanga substation at there end also all breaker condition was normal. Supply was extended from Salakati.
<b>132/33/11kV, Nganglam substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	23.01.2019	14:37	23.01.2019	15:32	55	5.29	132kV I/C	All feeders	Tripped on fault	Null	Rangia end	Grid fail from Rangia Substation( India)
<b>132kV, Motanga substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	1/1/2019	6:23	1/1/2019	6:46	23	-5.5	132kV Rangia fdr	Motanga ss	Tripped on fault	General trip,R-phase optd,Distance protn,	Motanga Ss	
2	23/1/2019	14:41	23/1/2019	15:05	24	-13.8	132kV Rangia fdr	Motanga ss	Tripped on fault	-	Guwahati	Rangia Substation infrom us that there was grid fail from Guwahati.
3	23/1/2019	15:07	23/1/2019	15:32	25	-13.8	132kV Rangia fdr	Motanga ss	Tripped on fault	-	Guwahati	Rangia Substation infrom us that there was grid fail from Guwahati.
4	23/1/2019	15:14	23/1/2019	17:11	57	-13.8	132kV Rangia fdr	Rangia ss	Hand trip	-	Motanga ss	



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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	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	15/1/2019	18:19	15/1/2019	21:11	52.00	0.06	220 kV Dagachu	220 kV Dagachu line	DT signal received fro Dagachu	Main II optd.	Dagachu	Direct trip signal received from dagachu whichtripped dagachu line
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	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	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	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	23/1/2019	14:41 Hrs	23/1/2019	15:31Hrs	50	5.220	132kV Tingtibi-Nanglam Fdr.	Tingtibi Substation	Supply failed from Rangai, India.	Nil	Rangai, India.	Supply extended from 132kV Tingtibi-Jigmeling feeder.
132/33kV, Yurmoo substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	23.01.2019	14:41hrs	23.01.2019	15:35hrs	56	4.50	132kV Tingtibi Line	132/33kV Yurmoo SS	Grid fail	Nil	Rangia	
February, 2019												
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	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	09.02.2019	22:44	09.02.2019	22:47	3	4.350	132kV I/C kurichu	All feeders	Tripped on fault	Nil	Kurichu	Failed from kurichu (Transient fault, relay 86 operated at KHP end.)
2	28.02.19	16:54	28.02.19	17:34	40	5.470	I/C kurichu	All feeders	Tripped on fault	OC	Kurichu end	Supply tripped from Kurichu end due to over current.
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	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	6/2/2019	14:50	6/2/2019	17:00	0:10	1.26	132/33kV Txr. II	All	NA	Differential protection relay & T-86 relay operated	kanglung substation	
2	9/2/2019	22:44	9/2/2019	22:47	0:03	1.87	132kV Incomer	All	Tripped on fault	Nil	Kurichu end	
3	28/2/2019	16:54	28/2/2019	17:34	0:40	2.68	132kV Incomer	All	NA	Over current relay operated at Kurichu end	Kurichu end	
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	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, Deothang substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	04.02.2019	20:30	04.02.2020	20:47	17	2.74	132kV Deothang-Motonga fdr	Deothang - Motonga fdr	Tripped on fault	Z1,Z3,Z2 & RYB.Phase Trip(Distance relay)	Deothang	R 183A. 69.78 deg. Y 1151.64A .173.86deg. B 1117.66A30.04deg. N 521.42A.102.53deg. Fault dist:
2	17.02.2019	11:48	17.02.2019	11:58	10	-1.87	132kV Deothang-Motonga	Deothang - Motonga fdr	Tripped on fault	Nil	Rangia End	Grid fail from Rangia end( Nangkhor incomer under shutdown) Breaker status was normal at both the end.



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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	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	12.02.2019	11:45	12.02.2019	11:52	7	2.409	132/33kV 5MVA Tr-I	All 33kV & 11kV	To replace closing coil	O/C relay opted, 86opted	Substation	Closing coil Burnt at LV side of 5MVA Tr.I while charging and load is feeded from 5MVA TR.II.( Tr.I is kept on idle charge).
2	18.02.2019	20:19	18.02.2019	20:21	2	10.89	132kV Nganglam-DCP feeder	Nganglam-DCP feeder	Tripped on fault	O/C relay opted, 86opted	DCP	Received Information from Electrical head that line tripped when they put ON Mill-2 in service.
3	26.02.2019	18:29	26.02.2019	18:30	1	1.089	132/33kV 5MVA Tr-I	All 33kV & 11kV	O/C	O/C, 50A, 86opted	33kV Druk Gyp feeder	Transformer tripped with transient fault .
132kV, Motanga substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	17.02.2019	11:44	17.02.2019	11:56	12	9.6	132kV Rangia fdr	All Feeders	Tripped on fault	Null	Rangia end	Rangia SS informed that supply failed from there end.
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	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	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	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	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	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												
March, 2019												
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	10.03.2019	13:53	10.03.2019	13:55	2	5.290	132kV Kurichu	All feeders	Tripped on fault	Null	Kurichu	Failed from kurichu (Transient fault, relay 86 operated at KHP end.)
2	15.03.2019	12:06	15.03.2019	12:34	28	4.350	132kV Kurichu	All feeders	NA	Null	Rangia end	Grid failed from Rangia
3	26.03.2019	13:25	26.03.2019	14:20	55	4.460	132kV Kurichu	All feeders	NA	Null	Rangia end	Grid failed from Rangia(supply feed from Salatati)
4	31.03.2019	0:26	31.03.2019	0:37	11	2.700	132kV Kurichu	All feeders	NA	Null	Rangia and Salkati	Grid failed from Rangia and Salakati
5	31.03.2019	1:15	31.03.2019	1:30	15	3.060	132kV Kurichu	All feeders	NA	Null	Tingtibi end	Grid failed from Tingtibi end
6	31.03.2019	12:34	31.03.2019	12:52	18	4.750	132kV Kurichu	All feeders	NA	Null	Tingtibi end	Grid failed from Tingtibi end
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	14/3/2019	2:54	14/3/2019	3:25	0:31	1.96	132kV incomer	All Feeders	Due to air pressure low	NA	Kanglung ss	132KV incomer breaker tripped due to air pressure low and supply charge through transfer bus.
2	15.03.2019	12:06	15.3.2019	12:34	28	4.350	132kV incomer	All Feeders	Tripped on fault	Null	Rangia end	Grid failed from Rangia end.
3	26/03/2019	13:27	26/03/2019	14:22	0:55	1.92	132kV incomer	All Feeders	Tripped on fault	Null	Rangia end	Grid failed from Rangia end
4	31/03.2019	0:27	31/03/2019	0:39	0:12	1.38	132kV incomer	All Feeders	Tripped on fault	Null	Rangia end	Grid failed from Rangia end
5	31/03/0219	1:16	31/03/2019	1:31	0:14	1.22	132kV incomer	All Feeders	Tripped on fault	Null	Tingtibi end	Grid failed from Tingtibi Ss.
6	31/03/2019	12:30	31/03/2019	12:54	0:24	2.27	132kV incomer	All Feeders	Tripped on fault	Null	Tingtibi end	Grid failed from Tingtibi Ss.



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132/33/11kV, Nangkorh 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	15.03.2019	12:07 hrs	15.03.2019	12:37 hrs	30	-26.67	132kV Nangkorh-kurichu	All Feeders	Tripped on fault	-	Rangia Substation	Grid failed from Rangia Substation.
2	26.03.2019	13:32 hrs	26.03.2019	14:24 hrs	52	25.66	132kV Nangkorh-kurichu	All Feeders	Tripped on fault	-	Rangia Substation	
3	31.03.2019	00:33 hrs	31.03.2019	00:40 hrs	7	25.99	Main Grid	All Feeders	NA	Tripping Relay 86 operated at our end	Tintibi Substation	
4	31.03.2019	01:10 hrs	31.03.2019	01:27 hrs	17	10.65	Main Grid	All Feeders	NA	Tripping Relay 86 operated at our end	Tintibi Substation	
5	31.03.2019	12:30 hrs	31.03.2019	12:58 hrs	28	2.52	Main Grid	All Feeders	NA		Tintibi Substation	Main Grid failed from Tintibi Substation. Distance Protection Relay operated showing fault at a distance of 11.52km towards Nganglam Zone-2, phase AB, Trip ABC, IA-533.4A, IB-389.9A, IC-145.8A, VAN-42.05kV, VBN-36.2kV, VCN-77.82kV, at our end
6	31.03.2019	12:50 hrs	31.03.2019	13:25 hrs	35	23.18	132kV Nangkor-Deothang	Nangkor-Deothang line	NA	-	Nangkor-Deothang line	Nangkor-Deothang CB opened and closed as per instruction from BPSO, Thimphu to Restored Salakati Grid from Tintibi substation

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	15.3.2019	12:07	15.3.2019	12:35	28	-26.64	132kV./C.Nangkor & Motonga	Deothang s/s	Tripped on fault	Null	Rangia end	Grid failed from Rangia substation
2	26.3.2019	13:29	26.3.2019	14:16	47	23.98	132kV Motonga	Deothang s/s	Tripped on fault	Null	Rangia end	Grid failed from Rangia substation. Charged the fdr after getting confirmation from BPSO.
3	31.3.2019	0:29	31.3.2019	0:38	9	-26.68	132kV Incomer Nangkor	Deothang s/s	Tripped on fault	Null	Tingtibi end	Grid failed from Tingtibi end
4	31.3.2019	12:23	31.3.2019	13:30	7	-23.69	132kV Incomer Nangkor	Deothang s/s	Tripped on fault	Null	Tingtibi end	Grid failed from Tingtibi end

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	16.03.2019	12:32	16.03.2019	14:43	11	20.7	132kV Tingtibi-Nganglam feeder	Tingtibi-Nganglam feeder	Earth Fault: 132kV Main Bus Y-Phase Insulator got punctured	E/F & 86opted	Tingtibi SS	Fault Value:- IA-68.76A IB-711.2A IC-34.72 Distance:- 72.99km Zone 2. Charged after replacing the insulator.
2	31.03.2019	00:27	31.03.2019	00:39	12	11.98	132kV Nganglam -Tingtibe feeder	Nganglam -Tingtibe feeder	NA	Null	Tingtibi SS	Grid failed from Tingtibi end
3	31.03.2019	12:35	31.03.2019	12:54	19	3.78	132kV Nganglam -Tingtibe feeder	Nganglam -Tingtibe feeder	NA	Null	Tingtibi SS	Grid failed from Tingtibi end

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	3/15/2019	12:07	3/15/2019	12:35	38	-24.6	132kV Rangia	All Feeders	Tripped on fault	Null	Kalipara ss india	Rangia Substation infrom that incommer failed from kalipara ss..
2	26.03.2019	13:27	26.03.2019	14:07	40	-23.9	132kV Rangia	All Feeders	Tripped on fault	Null	Rangia end	Grid failed from Rangia end
3	31.03.2019	0:27	31.03.2019	0:37	10	-25.5	132kV Deothang	All Feeders	Tripped on fault	Null	Tingtibi ss	Grid failed from Tingtibi ss.
4	31.03.2019	12:23	31.03.2019	13:32	9	-20.9	132kV Deothang	All Feeders	Tripped on fault	Null	Tingtibi ss	Grid failed from Tingtibi 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	16.03.2019	12:36	16.03.2019	12:40	4	21.470	ICT 1 & 2	Jigmeling Substation	Over current	LVSEF on both ICT	Bus Conductor snapped to Jigmeling feeder conductor at Tingtibi ss	
2	26.03.2019	12:21	26.03.2019	12:52	31	1.06	220kv Dagapela Fdr.	220kv Dagapela Fdr.	Line fault	21.1 optd. R,Y,B phase tripped. 21.2 optd, Y phase tripped	Main1. 13.4km Main2. 14.04km	
3	31.03.2019	22:57	31.03.2019	23:03	6	7.72	132 kV Tingtibi	132kVtingtibi Fdr.	Line fault	21.1, zone 1 optd. Y phase tripped. 21.2, zone 1 optd, Yphase tripped.	Main1. 17.5km Main 2 15.6 km	



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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
1	3/16/2019	12:37 Hrs	3/16/2019	16:45 Hrs	8	26.960	132kV Tingtibi-Jigmeling Fdr.	132kV Tingtibi-Jigmeling Feeder	Y phase insulator punctured for 132kV main Bus.	Distance reley and Over current reley	132kV Tingtibi - Jigmeling Feeder	
2	3/16/2019	12:37 Hrs	3/16/2019	16:45 Hrs	8	21.760	132kV Tingtibi-Nanglam Fdr.	132kV Tingtibi-Nanglam Feeder	Y phase insulator punctured for 132kV main Bus.	Distance reley and Over current reley	132kV Tingtibi - Nanglam Feeder	
3	3/31/2019	00:23 Hrs	3/31/2019	00:40 Hrs	17	10.800	132kV Tingtibi-Nanglam Fdr.	132kV Tingtibi-Nanglam Feeder	Over current	Over current reley	132kV Tingtibi - Nanglam Feeder	
4	3/31/2019	01:13 Hrs	3/31/2019	01:23 Hrs	10	7.920	132kV Tingtibi-Nanglam Fdr.	132kV Tingtibi-Nanglam Feeder	Over current	Over current reley	132kV Tingtibi - Nanglam Feeder	
5	3/31/2019	12:35 Hrs	3/31/2019	12:37 Hrs	2	5.860	132kV Tingtibi-Nanglam Fdr.	132kV Tingtibi-Nanglam Feeder	Tempoary fault	Distatnce protection relay	132kV Tingtibi - Nanglam Feeder	
6	3/31/2019	12:42Hrs	3/31/2019	12:55 Hrs	13	5.680	132kV Tingtibi-Nanglam Fdr.	132kV Tingtibi-Nanglam Feeder	Tempoary fault	Relay Operation ( Distatnce protection relay) :Start phase :ABN, Fault alarm=No.System	132kV Tingtibi - Nanglam Feeder	
7	3/31/2019	22:57 Hrs	3/31/2019	23:05 Hrs	8	7.000	132kV Tingtibi-Jigmeling Fdr.	132kV Tingtibi-Jigmeling Feeder	Tempoary fault	Distatnce protection relay	132kV Tingtibi - Jigmeling Feeder	
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	16.03.2019	12:55hrs	16.03.2019	17:40hrs	45	4.70	132kV Tingtibi I/C	132/33kV Yurmoo Ss	Main bus of Y-Phase insulator was punctured	Nil	Tingtibi Ss	Restored after completing of work at Tingtibi Side.



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Annexure-VI

Western grid Outages

January, 2019												
<b>400/220/66/11kV Malbase substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>220/66/11kV Singhigaon substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>66/33/11kV Phuentsholing substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	29.01.2019	16:51	29.01.2019	16:59	8	0.16	66kV Chukha-Pling	Nil	Temporary	86 & dist.prot	Line	
<b>66/33/11kV Gomtu substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>220/66/33kV Dhamdum substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>66/33/11kV Gedu substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	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	10.01.2019	17:50	10.01.2019	17:53	3	0.36	66/33/11kV, 5MVA transformer & 33kV Incomer II	33KV Gurung dara fdr II	Transformer got tripped due to fault on 33kV Gurungdara fdr II.	5MVA TR 2. Tripping relay 86 33kV INCOMER II 2. Tripping relay 86	1. REF relay. 1. E/F relay (INST)	Line
2	27.01.2019	5:50	27.01.2019	5:53	3	0.18	66/33/11kV, 5MVA transformer & 33kV Incomer II	33KV Gurung dara fdr II	Transformer got tripped due to fault on 33kV Gurungdara fdr II.	5MVA TR 2. Tripping relay 86 33kV INCOMER II 2. Tripping relay 86	1. REF relay. 1. E/F relay (INST)	Line
3	29.01.2019	5:40	29.01.2019	5:43	3	0.18	66/33/11kV, 5MVA transformer & 33kV Incomer II	33KV Gurung dara fdr II	Transformer got tripped due to fault on 33kV Gurungdara fdr II.	5MVA TR 2. Tripping relay 86 33kV INCOMER II 2. Tripping relay 86	1. REF relay. 1. E/F relay (INST)	Line
4	29.01.2019	16:51	29.01.2019	16:58	7	1.97	66kV Chukha-Pling feeder	Gedu substation		Nil	Chukha end	Tripped at chukha end.
5	29.01.2019	17:01	29.01.2019	17:05	4	0.19	66/33/11kV, 5MVA transformer & 33kV Incomer II	33KV Gurung dara fdr II	Transformer got tripped due to fault on 33kV Gurungdara fdr II.	5MVA TR 2. Tripping relay 86 33kV INCOMER II 2. Tripping relay 86	1. REF relay. 1. E/F relay (INST)	Line
6	29.01.2019	17:08	29.01.2019	17:10	2	0.56	8MVA Transformer	33KV Gurung dara fdr I	Transformer got tripped due to fault on 33kV Gurungdara fdr I.	1. Diff Relay (R&B) phase. 2. Tripping relay	Line	
<b>66/33/11kV Lobeysa substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>220/66/11kV Semothka substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>66/33/11kV Dechencholing substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>66/33kV Olakha substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
<b>66/33/11kV Jemina substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												



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66kV Chumdo switching station												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	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	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 Watsa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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												
February, 2019												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	16.02.2019	17:13	16.02.2019	17:18	5	-56	220kV Malbase - Birpara Feeder.	220kV Malbase - Birpara Feeder.	Tripped.	TRIP-R- PH, TRIP Y- PH, TRIP-B PH,B/B Trip.	Line	Bus coupler tripped along with Birpara feeder. Heavy rainfall with thunder and lightning at the time of tripping
2	16.02.2019	17:13	16.02.2019	17:18	5	-	220kV Bus Coupler	220kV Bus Coupler	Tripped.	-	Substation	
3	16.02.2019	17:52	16.02.2019	18:10	18	11	220kV Malbase - Santse Feeder.	220kV Malbase - Santse Feeder.	Tripped.	TRIP-R- PH, TRIP Y- PH, TRIP-B PH,B/B Trip.	Line	Heavy rainfall with thunder and lightning at the time of tripping.
9	16.02.2019	17:56	16.02.2019	17:58	2	89	200MVA ICT	200MVA ICT	Tripped.	Buchholz Alarm,67 (HV) O/C optd.	Substation	
10	27.02.2019	1:36	27.02.2019	1:45	9	68	200MVA ICT	200MVA ICT	Tripped.	Main & Tie CB open & 86 opt, 67/67N directional relay opt.	Substation	Rainfall with heavy lightning and thunder at the time of event.
11	27.02.2019	1:36	27.02.2019	1:47	11	11	220kV Malbase - Santse Feeder.	220kV Malbase - Santse Feeder.	Tripped.	86 tripped ,Main 1 tripped , R,Y,B Phase tripped , Zone 1 Tripped	Line	
12	28.02.2019	13:22	28.02.2019	13:44	22	12	220kV Malbase - Santse Feeder.	220kV Malbase - Santse Feeder.	Tripped.	86 tripped ,Main 1 tripped , R Phase tripped	Line	Light rainfall at the time of event.
15	28.02.2019	13:59	28.02.2019	14:10	11	8	400kV Malbase - Siliguri Feeder.	400kV Malbase - Siliguri Feeder.	Tripped.	Main I&II triped,main I carrier send,zone I triped.	Line	Heavy rainfall with thunder and lightning at the time of tripping.
16	28.02.2019	13:59	28.02.2019	14:04	5	101	200MVA ICT	200MVA ICT	Tripped.	Main CB & Tie CB opened,86 optd. RET 521 operated.	Substation	
220/66/11kV Singhigaon substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	16.02.2019	17:52	16.02.2019	18:50	58	5	220kV Singhi - Santse Feeder	220kV Singhi - Santse Feeder	Tripped.	Dist. Protn optd,o/c protn optd,E/f protn optd, 3phase trip relay,86 optd		Heavy rainfall with lightning and thunder at the time of tripping. Charging of line took time as operator had to go at Singhi Substation to reset the relay.
2	27.02.2019	1:36	27.02.2019	7:09	33	4.6	220kV Singhi - Santse Feeder	220kV Singhi - Santse Feeder	Tripped.	86 tripped ,Main 1 tripped , Zone 1 Tripped	Fault loop =L1-L3 , Dist = 29.9KM	Rainfall with heavy lightning and thundering at the time of tripping. Restoration of feeder took time as operator had to go at Singhi Substation to reset the relay.



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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	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	16.02.2019	12:52	16.02.2019	12:57	5	2.250	10MVA Transformer (66/33kV)				Line	10MVA transformer got tripped due to fault on 33kV feeder IV.
2	16.02.2019	17:08	16.02.2019	17:14	6	1.080	66kV Chukha-Pling	Nil		86 & dist.prot relay	Line	As per instruction from BPSO normalised the 66kV Chukha-Pling feeder.
3	16.02.2019	17:23	16.02.2019	17:25	2	2.150	10MVA Transformer (66/33kV)	All 33kV feeders			Line	10MVA transformer got tripped due to fault on 33kV feeder IV.
4	16.02.2019	17:52	16.02.2019	18:16	24	1.080	66kV Chukha-Pling	66kV Chukha-Pling		1.O/C relay 2. Dist prot 3.86	Line	As per instruction from BPSO normalised the 66kV Chukha-Pling feeder.
5	16.02.2019	17:52	16.02.2019	18:20	28	-2.540	66kV Pling-Gomtu	66kV Pling-Gomtu		1.O/C relay 2. Dist prot 3.86	Line	As per instruction from BPSO normalised the 66kV Chukha-Pling feeder.
6	23.02.2019	16:41	23.02.2019	16:51	10	-3.740	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped		Line	Tripped. Weather: Rainy. Informed to BPSO. At 16:51hrs normalised after getting charging code 1130 from BPSO.
7	29.01.2019	16:51	29.01.2019	16:59	8	0.160	66kV Chukha-Pling	Nil	Temporary	86 & dist.prot	Line	Reset the relay and after getting clearance from BPSO test charged the feeder stood normal.
66/33/11kV Gomtu substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	16.02.2019	17:52	16.02.2019	18:10	18	2.67	66kV P/ling	Gomtu substation	NA	NA	Malbase S/S	66kV Supply failed from Dhamdhum S/S and at the same time 66 kV P/ling breaker got tripped at their end.
2	23.02.2019	16:39	23.02.2019	16:48	9	3.91	66kV P/ling	Nil	IDMTL O/C	O/C 51BX ;51CX	Line segment	Test charge as per charging code 1130 given by BPSO and charge withstand.
3	28.02.2019	13:45	28.02.2019	13:51	6	-15.18	66kV Dhamdum	Nil	Yphase fault	General Trip Zone I Trip,Y phase fault	Line segment	Charged the line after receiving charging code 1143 from BPSO
220/66/33kV Dhamdum substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	16.02.2019	17:52	16.02.2019	18:10	18	-11.21	220kV Malbase feeder	Damdum Substation		There was no relay operation at our end.	Malbash substation	Supply failed from the source,ie. 220 kv Malbase substation and 220 kV singhagaon substation.
2	27.02.2019	1:36	27.02.2019	1:47	11	-11.5	220kV Malbase Incommer	NA(back feeded from 66 kV Gomtu)	B- phase fault	General trip,aone-1 trip,B-Phase fault, VT fuse fail	NA	Line test charged after getting clearance from Malbase and BPSO. The line withstood.
3	27.02.2019	1:36	27.02.2019	7:25	49	-4.49	220kV Singhagaon Incommer	NA(back feeded from 66 kV Gomtu)	R- phase fault	General trip,aone-1 trip,R-Phase fault, VT fuse fail	NA	Line was not charged because the relay at singhagaon(GIS) must be reset from Singhagaon end and the weather was not favourable. They could not go from Malbase SS as informed by the BPSO and Malbase staff.
4	28.02.2019	13:26	28.02.2019	13:28	2	-11.85	220kV Malbase incommer	R- phase fault	General trip,aone-1 trip,R-Phase fault, VT fuse fail	General trip,aone-1 trip,R-Phase fault, VT fuse fail	NA	Due to heavy lightening and thunder line got tripped
5	28.02.2019	13:44	28.02.2019	13:51	7	-11.85	66kV Gomtu fdr.	R- phase fault	General trip,aone-1 trip,R-Phase fault,	General trip,aone-1 trip,R-Phase fault, VT fuse fail	NA	Due to heavy lightening at Gomtu side .
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	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	08.02.2019	3:05	08.02.2019	7:25	20	0.36	5MVA 66/33kV transformer	33kV Gurung dara fdr II	Transformer got tripped due to fault on 33kV Gurungdara fdr II.	5MVA TR 1. REF relay. 2. Tripping relay 86 33kV INCOMER II (INST)	Line Segment	
2	08.02.2019	11:05	08.02.2019	11:55	50	0.39	5MVA 66/33kV transformer	33kV Gurung dara fdr II	Transformer got tripped due to fault on 33kV Gurungdara fdr II.	5MVA TR 1. REF relay. 2. Tripping relay 86 33kV INCOMER II 1. E/F relay (INST)	Line Segment	
3	25.02.2019	18:32	25.02.2019	19:36	4	0.02	8MVA 66/33kV transformer	33kV Gurung dara fdr I	CT punctured on R phase.	Differential relay operated on R & B phase.	Substation	
4	26.02.2019	16:25	26.02.2019	16:43	18	0.79	5MVA 66/33kV transformer	33kV Gurung dara fdr II	Transformer got tripped due to fault on 33kV Gurungdara fdr II.	5MVA TR 1. REF relay. 2. Tripping relay 86 33kV INCOMER II (INST)	Line Segment	



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66/33/11kV Lobeysa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	2/7/2019	15:53hrs	2/7/2019	16:04hrs	11	5.590	66kV Lobeysa to Basochu feeder	Lobeysa ss	Line tripped	NA	NA	Grid fail from both the end at 15:53hrs and supply resumed at 16:04hrs from both the end.
2	2/7/2019	15:53hrs	2/7/2019	16:04hrs	11	1.350	66kV Lobeysa to Sementokha feeder	Lobeysa ss	Line tripped	NA	NA	Grid fail from both the end at 15:53hrs and supply resumed at 16:04hrs from both the end.
220/66/11kV Sementokha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	2/7/2019	15:53hrs	2/7/2019	16:03hrs	11.00	-38.440	220kV Sementokha-Chukha feeder	Sementokha	Trip at Chukha end and simultaneously 220kV Rurichu got trip at Rurichu end	No tripping at Sementokha end	Chukha end	
2	2/7/2019	15:53hrs	2/7/2019	16:03hrs	11.00	-4.120	220kV Sementokha-Rurichu feeder	Sementokha	Trip at Chukha end and simultaneously 220kV Rurichu got trip at Rurichu end	No tripping at Sementokha end	Chukha end	
66/33/11kV Dechencholing substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	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	2/1/2019	3:57	2/1/2019	4:02	5	4.9	20MVA TR.I	Olakha S/S & all outgoing feeders	Tripped due to tripping of DPH II	1.TRAFO DIFFL PROT.N. Relay 87. Indication 1,3,4&5. 1.Device Trip 3.y phase Differential Trip 4.B phase differential Trip 5.Differential Trip. Dir. O/C & EF PROT.N RELAY 67. Indication1, 2&3. 1.Divice trips 2.R-phase over current pick up. 3.Y phase over current pick up. Trip relay 86.	DPH II	
2	2/1/2019	3:57	2/1/2019	4:18	3	2.2	20MVA TR.I	Olakha S/S & all outgoing feeders	Tripped due to tripping of DPH II	1.TRAFO DIFFL PROT.N. Relay 87. Indication 1,3,4&5. 1.Device Trip 3.y phase Differential Trip 4.B phase differential Trip 5.Differential Trip. Dir. O/C & EF PROT.N RELAY 67. Indication1, 2&3. 1.Divice trips 2.R-phase over current pick up. 3.Y phase over current pick up. Trip relay 86.	DPH II	
3	2/1/2019	3:57	2/1/2019	4:56	3	2.2	20MVA TR.I	Olakha S/S & all outgoing feeders	Tripped due to tripping of DPH II	1.TRAFO DIFFL PROT.N. Relay 87. Indication 1,3,4&5. 1.Device Trip 3.y phase Differential Trip 4.B phase differential Trip 5.Differential Trip. Dir. O/C & EF PROT.N RELAY 67. Indication1, 2&3. 1.Divice trips 2.R-phase over current pick up. 3.Y phase over current pick up. Trip relay 86.	DPH II	
4	2/7/2019	15:47	2/7/2019	15:58	11	5.1	66kV Olakha to Jemina Line	Olakha S/S & all outgoing feeders	220 KV Trip at Chukha	Distance Protection Relay 21. Indication:1.Device Trip 6 Distance Protection Y-B Trip. 8 Distance Protection Zone 1 Trip. Distance:7.8 Km.	Chukha	
66/33/11kV Jemina substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	28.02.2019	14:24Hrs	28.02.2019	15:40Hrs	16mins	-14.94	66KV Olakha fdr.	whole s/s	Tripped on Dist Protm & O/C	Dist Protm, 50C, 186 n 86, relay	Heavy snow fall during that time.	
Chumdo switching station												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	28.02.2019	14:25hrs	28.02.2019	14:35hrs	10min	(-)4.35MW	66kV I/C Chukha fdr	Paro, p/basa/Jemina s/s	Trip	O?C on (Y&B) ph		
66/33/11kV Paro substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	2/28/2019	14.25	2/28/2019	14.35	10	13.86	66kV Chumdo-Paro Line	66kV Paro Substation and it's outgoing feeders	Tripped from Generation Unit, Chukha	Tripped from Chukha Power House	Chukha Power House	
66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	2/18/2019	14:57	2/18/2019	15:27	30minutes	-1.69	66kV Incomer	66kV Incomer	Unknown	3phase relay optd.	Chumdo end	
66/33kV Watsa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	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	2/28/2019	14:20hrs	2/28/2019	14:31hrs	11min	.691MW	66KV Incommer fail from chukha	Feeder I and II			66KV Incommer fail from chukha	



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March, 2019												
<b>400/220/66/11kV Malbase substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (HHEMM)	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	31.03.2019	7:30	31.03.2019	7:59	29	13.597	220kV Damdum feeder	Gomtu Substation	R phase & Y phase fault	Zone I, General trip, R phase fault, Y phase fault & 86 operated	NA	66kV Dhamdhum feeder got tripped at 7:30hrs and test charged at 7:59hrs after contacting with BPSO
2	31.03.2019	8:27	31.03.2019	8:43	16	7.79	220kV Damdum feeder	Gomtu Substation	Transient fault	General trip & 86 operated	NA	66 kv Damdum feeder got tripped at 8:27hrs and charged at 8:43hrs after contacting with BPSO
3	31.03.2019	8:27	31.03.2019	8:50	23	7.18	66kV P/Ling feeder	66kV P/Ling substation	Over Current	IDMTL O/C 51 BX 51 CX	NA	66kV P/Ling feeder tripped at 8:27hrs and charged the line after receiving information from BPSO
<b>220/66/11kV Singhigaon substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (HHEMM)	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	20.03.2019	16:53	20.03.2019	17:21	28	13.7	66kV BSMPL Feeder	66kV BSMPL Feeder	Tripped	No data		11kV CB got punctured at BSMPL end
2	22.03.2019	20:26	22.03.2019	20:51	25	0.2	66kV BSMPL Feeder	66kV BSMPL Feeder	Tripped	No data		
3	23.03.2019	1:56	23.03.2019	2:52	56	12.6	66kV Concast Feeder	66kV Concast Feeder	Tripped	Directional over current		<b>Tripping occurred with the tripping of 66kV feeders of Malbase substation.</b>
4	26.03.2019	10:25	26.03.2019	10:43	18	14.1	66kV Concast Feeder	66kV Concast Feeder	Tripped	No data		Due to communication error, not able to extract the fault data from relay.
5	26.03.2019	10:25	26.03.2019	10:43	18	-	66kV Bus Coupler	66kV Bus Coupler	Tripped	No data		Due to communication error, not able to extract the fault data from relay.
6	28.03.2019	4:33	28.03.2019	5:06		16.4	66kV Concast Feeder	66kV Concast Feeder	Tripped			The feeder got tripped along with 66kV Pasakha I and bus coupler of Malbase substation.
7	31.03.2019	7:44	31.03.2019	9:06	22	4	220kV Singhigaon - Samtse Feeder.	220kV Singhigaon - Samtse Feeder.	Tripped			<b>Stormy weather at the time of event. The restoration of power took time since the relay needs to be reset manually from Singhigaon substation.</b>
<b>66/33/11kV Gomtu substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (HHEMM)	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	03.03.2019	06:46	03.03.2019	07:23	37	5.56	66kV Gomtu-P/Ling	Nil	Over Current	IDMTL O/C 51 BX 51 CX	Line segment	
2	17.03.2019	7:43	17.03.2019	7:53	10	6.08	66kV Gomtu-P/Ling	Nil	Over Current	IDMTL O/C 51 BX 51 CX	P/Ling Sub Station	
3	18.03.2019	21:11	18.03.2019	23:15	4	3.46	66kV Gomtu-P/Ling	Nil	Over Current	IDMTL O/C 51 BX 51 CX	P/Ling Sub Station	
4	20.03.2019	6:40	20.03.2019	6:54	14	4.47	66kV Gomtu-P/Ling	Nil	Over Current	IDMTL O/C 51 BX 51 CX	P/Ling Sub Station	
5	31.03.2019	7:30	31.03.2019	7:59	29	13.597	220kV Damdum feeder	Gomtu Substation	R phase & Y phase fault	Zone I, General trip, R phase fault, Y phase fault & 86 operated	NA	
6	31.03.2019	8:27	31.03.2019	8:43	16	7.79	220kV Damdum feeder	Gomtu Substation	Transient fault	General trip & 86 operated	NA	
7	31.03.2019	8:27	31.03.2019	8:50	23	7.18	66kV P/Ling feeder	66kV P/Ling substation	Over Current	IDMTL O/C 51 BX 51 CX	NA	
<b>220/66/33kV Dhamdum substation</b>												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (HHEMM)	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	31.03.2019	7:44	31.03.2019	7:48	4	-12.18	220 kV Malbase	NA	Transient Fault	Genral trip,zone-1,yph	Malbase end	
2	31.03.2019	8:02	31.03.2019	9:06	4	-4.95	220 kV Singhigoan	NA	Trip from Malbase	Genral trip,zone-1,yph	Damdum Substation	
3	31.03.2018	8:27	31.03.2019	8:42	15	14.25	66 kV Gomtu	NA	Transient Fault	General trip ,DIR.EF, Rph and Bph	Damdum Substation	
<b>66/33/11kV Gedu substation</b>												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (HHEMM)	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	07.03.2019	9:15	07.03.2019	9:26	11	2.41	66kV Chukha Pling line	Black out.	Tripped from both end		Line segment	Both the incomer tripped. Normalised at 09:26hrs.
4	23.03.2019	1:56	23.03.2019	2:23	27	1.74	66kV Chukha Pling line	Black out.	Tripped from both end		CHP	Unit tripped at CHP. Normalised at 2:23hrs.



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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 (HEMM)	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	03.03.2019	6:47	03.03.2019	7:22	35	-5.620	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	1.Dist prot 2.186 3.86	Substation	At 07:22hrs normalised the feeder after getting charging code 1154 from BPSO.
2	07.03.2019	9:16	07.03.2019	9:30	14	-4.830	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	86	Substation	Tripped at our end. Informed to BPSO as 86 relay operated at our end. Normalised the feeder after getting clearance from BPSO.
3	17.03.2019	7:42	17.03.2019	7:52	10	2.100	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	1.Dist prot 2.186 3.86	Substation	Normalised with charging code no.1191 from BPSO.
4	18.03.2019	21:11	18.03.2019	23:12	1	-3.460	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	1.Dist prot 2.186 3.86		Weather condition was heavy rainfall with lightning.
5	20.03.2019	6:38	20.03.2019	6:54	16	-3.560	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	1.186 & 86		Normalised with charging code no.1205 from BPSO.
6	23.03.2019	1:56	23.03.2019	2:12	16	-4.080	66kV Pling-Gomtu	66kV Pling-Gomtu (Pling blackout)	Tripped	1.Dist prot 2.186 3.86	Line	66kV Pling-Gomtu feeder got tripped at our end where as CB of 66kV Chukha-Pling and 66kV Pling-Malbase feeder got tripped at their end causing Phuentsholing area black out.
7	28.03.2019	4:34	28.03.2019	5:37	3	6.540	66kV Pling-Malbase	66kV Pling-Malbase	Tripped	51N ,86		At 05:37hrs normalised after getting charging code 1240 from BPSO.
8	28.03.2019	4:34	28.03.2019	5:00	26	-2.640	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	86		At 05:00hrs normalised after getting charging code 1239 from BPSO.
9	28.03.2019	4:34	28.03.2019	4:50	16	-7.180	66kV Chukha-Pling	66kV Chukha-Pling	Temporary			Tripped from Chukha end. At 04:50hrs normalised from chukha end.
10	31.03.2019	8:11	31.03.2019	8:25	14	-4.330	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	1.Dist prot (Fault imp-0.81, fault current - 14.16A, fault angle-40 deg.location- 4.7kM 2.186 3.86		At 08:25hrs normalised as per instruction from BPSO.
11	31.03.2019	8:27	31.03.2019	8:48	21	-4.330	66kV Pling-Gomtu	66kV Pling-Gomtu	Tripped	1.Dist prot (Fault imp- 1.37, fault current - 14.16A, fault angle- 54 deg location- 10kM 2.186 3.86	Line	At 08:48hrs normalised as per instruction from BPSO.
12	31.03.2019	8:40	31.03.2019	13:46	6	6.000	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	86, 186		At 13:46hrs normalised as per instruction from BPSO.



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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 Sertokha 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
1	28/3/2019	16:43	28/3/2019	16:44	1	8.8	20 MVA TR.I	Olakha S/S & all 33kV outgoing feeders	Tripped due to tripping of Chubachu Feeders	1.TRAFO DIFFL PROT.N.	33kV Chubachu Line near ESD Substation at Lungtenphu RBA	
2	28/3/2019	16:43	28/3/2019	16:44	1	8.8	20 MVA TR.II	Olakha S/S & all 33kV outgoing feeders	Tripped due to tripping of Chubachu Feeders	1.TRAFO DIFFL PROT.N.	33kV Chubachu Line near ESD Substation at Lungtenphu RBA	
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												
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
1	07.03.2019	09:15hrs	07.03.2019	09:27hrs	12min	(-)2.55MW	66kV I/C Jemina & Chukha	Paro & Pangbasa	Trip	CB open	Incomer End	
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	3/3/2019	15:35	3/3/2019	16:09	34minutes	1.737	66kV Incomer	All the feeders	Unknown	NIL	Chumdo end	
2	3/7/2019	9:15	3/7/2019	9:27	12minutes	-2.04	66kV Incomer	All the feeders	Grid fail	NIL	Chukha Power House	
3	3/7/2019	14:06	3/7/2019	15:05	59minutes	-1.96	66kV Incomer	All the feeders	Unknown	NIL	Chumdo end	
4	3/9/2019	13:40	3/9/2019	13:51	11minutes	-1.9	66kV Incomer	All the feeders	Unknown	NIL	Chumdo end	
5	3/14/2019	14:10	3/14/2019	14:39	29minutes	-1.56	66kV Incomer	All the feeders	Unknown	NIL	Chumdo end	
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	3/7/2019	9:13hrs	3/7/2019	9:24hrs	11min	.661MW	66kV Incomer fail from chukha	Feeder I and II			66KV Incomer fail from chukha	