**Bhutan Power Corporation Limited**

**Bhutan Power System Operator**

**Thimphu: Bhutan**

# Transmission System Performance Report

## First Quarterly Report – January to March, 2022

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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.

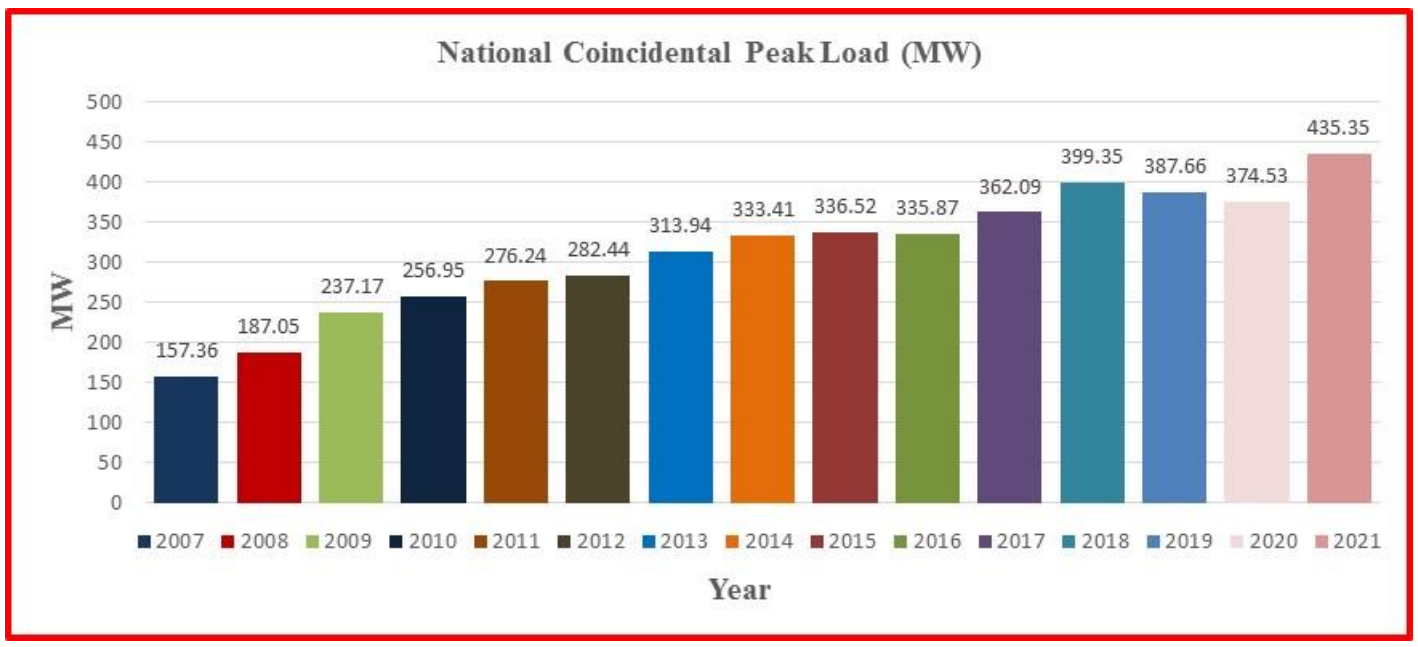
## 2. National Peak Demand

The national peak demand till now is recorded at **435.35MW** which was occurred on December 26, 2021 at 18:00 hours. This is calculated by summation of Feeder Loading at Plants minus Export.

Table 2.1. The National Peak Demand since 2007

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Peak Load (MW) | 157.36 | 187.05 | 237.17 | 256.95 | 276.24 | 282.44 | 313.94 | 333.41 | 336.52 | 335.87 | 362.09 | 399.35 | 387.66 | 374.53 | 435.35 |
| % Growth over previous Year | - | 18.87 | 26.79 | 8.34 | 7.51 | 2.24 | 11.15 | 6.20 | 0.93 | -0.19 | 7.81 | 10.29 | -2.93 | -3.39 | 16.24 |

Graph 2.1. The growth in National Peak Demand since 2007




### 2.1. Power (MW) consumed by country

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

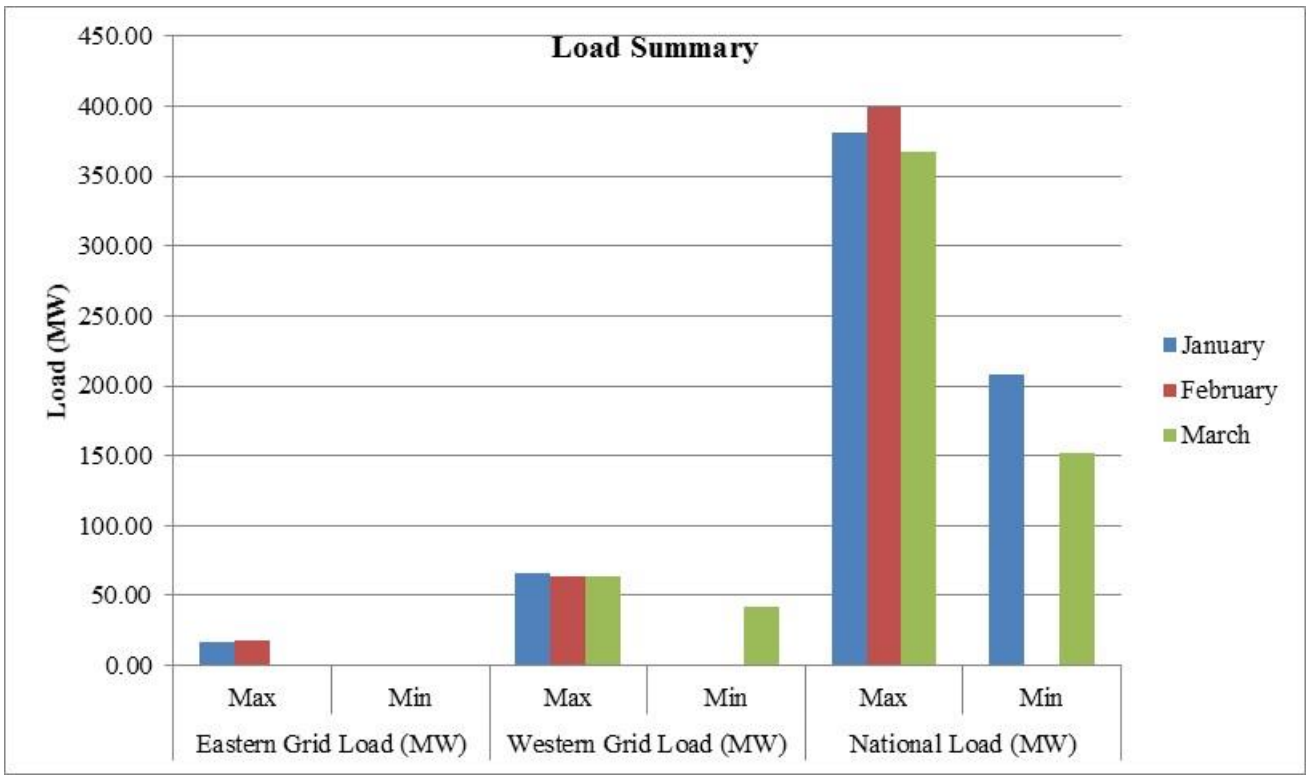
1. **National Demand** = (Sum of all total generation)-(Sum of all Export of Import)
2. **National Demand** = (Sum of all feeders loading at hydropower station) – (Sum of all Export/Import)
3. **National Demand** = (Sum of all substation loading)

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

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

| Grid | Eastern Grid Load (MW) | | Western Grid Load (MW) | | National Load (MW) | |
|---|---|---|---|---|---|---|
| Month | Max | Min | Max | Min | Max | Min |
| January | 16.70 | 1.29 | 66.18 | 1.02 | 380.90 | 208.18 |
| February | 18.01 | 0.34 | 63.97 | 0.00 | 399.67 | 0.85 |
| March | 0.00 | 0.00 | 63.28 | 41.53 | 367.10 | 151.46 |

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




The national load pattern for the month of January to March, 2021 calculated using method-3 is attached as **Annexure-II**

## 3. Energy Availability and Requirement for the country

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

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

Table 3.1.1. Total Energy (MU) consumed

| Month | Total Ex-bus (MU) | Total Export/Import (MU) | Total energy sold to BPC (MU) |
|---|---|---|---|
| January | 223.22598590 | 25.71304504 | 197.51294086 |
| February | 183.71918284 | 25.61050110 | 158.10868174 |
| March | 410.26617736 | 156.12332138 | 254.14285598 |

Graph 3.1.1. Total Energy (MU) consumed

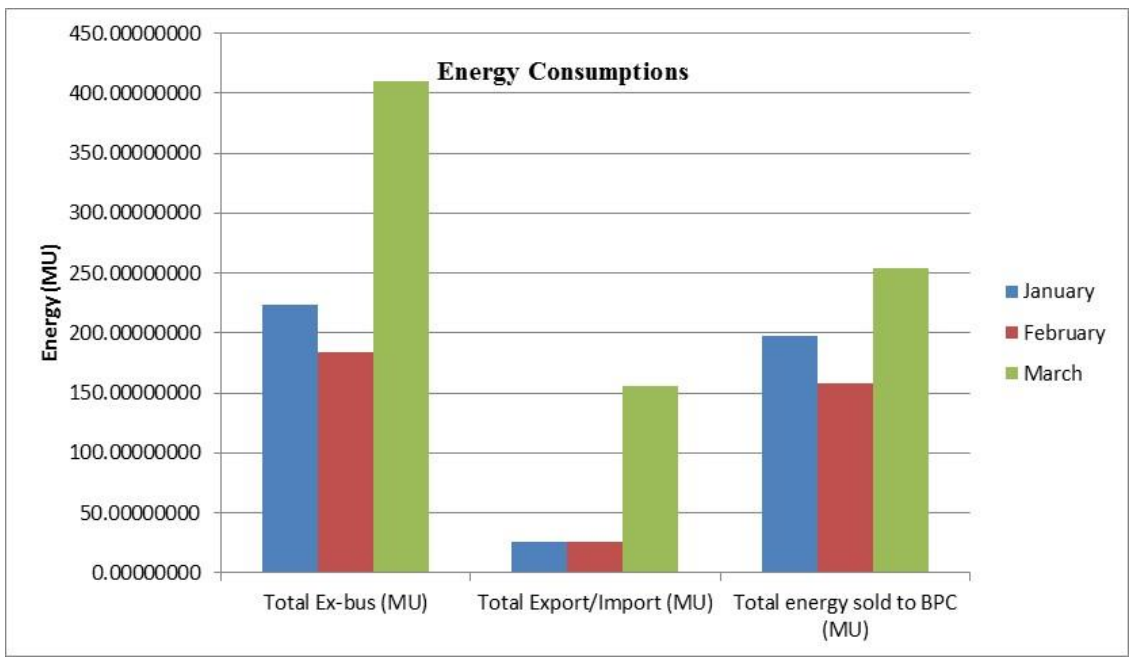
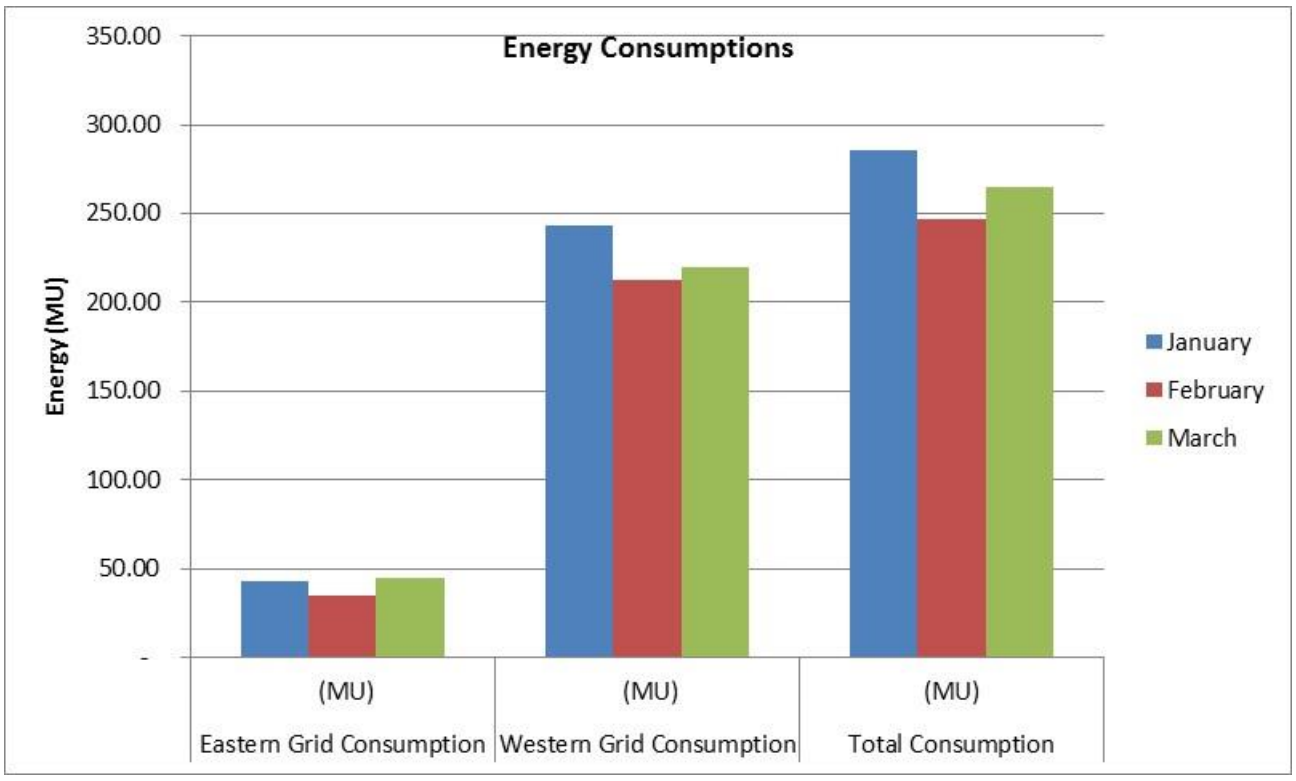



Table 3.1.2. Energy (MU) consumed

| Grid | Eastern Grid Consumption | Western Grid Consumption | Total Consumption |
|---|---|---|---|
| Month | (MU) | (MU) | (MU) |
| January | 42.76 | 243.19 | 285.9544153 |
| February | 34.91 | 212.15 | 247.0559331 |
| March | 45.03 | 220.06 | 265.0912595 |

Graph 3.1.2. Energy (MU) consumed




## 4. Performance of generating plants

### 4.1. Power and Energy Generation

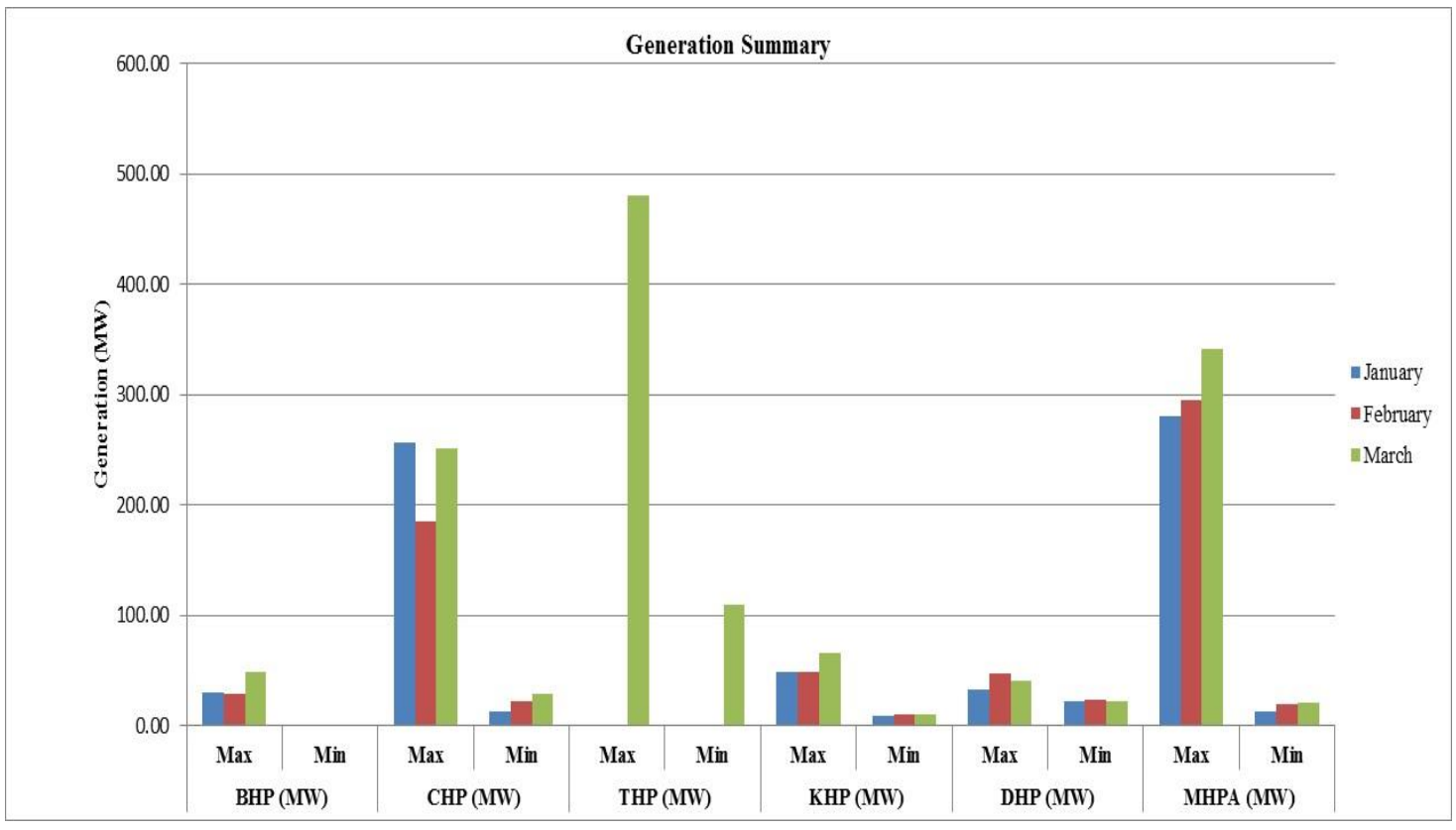
The maximum total generation for the first quarter of year 2022 was 1,226.77 MW in month of March and minimum generation was 605.29 MW in the Fevruary month.

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

| Generation By | BHP (MW) | | CHP (MW) | | THP (MW) | | KHP (MW) | | DHP (MW) | | MHPA (MW) | | TOTAL (MW) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min |
| January | 30.04 | 0.00 | 256.79 | 12.13 | 0.00 | 0.00 | 48.24 | 8.86 | 32.99 | 22.47 | 280.21 | 12.22 | 648.27 | 55.68 |
| February | 28.62 | 0.00 | 185.33 | 21.57 | 0.00 | 0.00 | 48.96 | 10.03 | 47.50 | 22.93 | 294.88 | 19.30 | 605.29 | 73.83 |
| March | 48.46 | 0.00 | 251.31 | 28.67 | 480.00 | 110.00 | 65.64 | 10.06 | 40.25 | 22.17 | 341.11 | 20.87 | 1,226.77 | 191.77 |

**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, 2022 is attached as **Annexure-I.**

### 4.2.Plant Capacity Factor

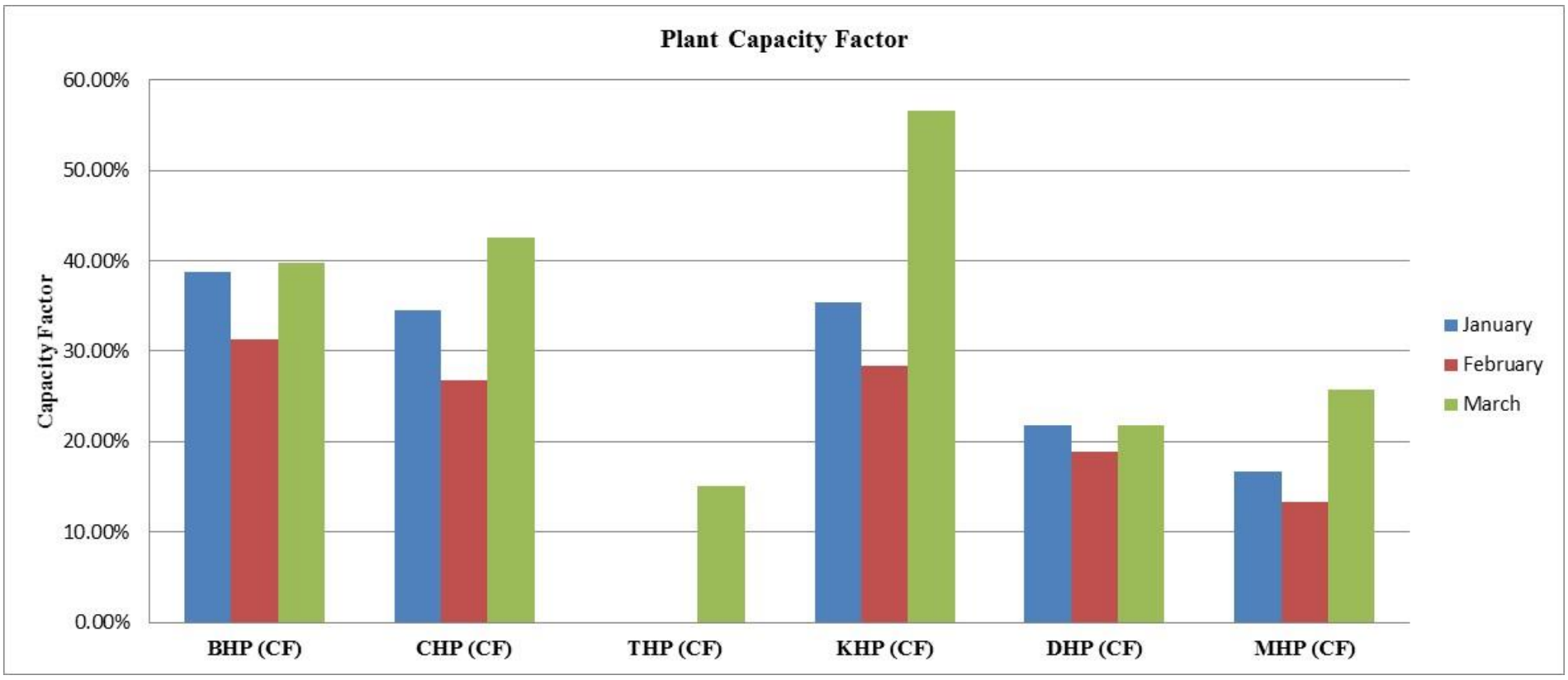
The capacity factor of each generating plant was calculated as below:

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

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

| Month | BHP (MU) | BHP (CF) | CHP (MU) | CHP (CF) | THP (MU) | THP (CF) | KHP (MU) | KHP (CF) | DHP (MU) | DHP (CF) | MHP (MU) | MHP (CF) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| January | 17.88000 | 38.80% | 83.62000 | 34.57% | 0.000000 | 0.00% | 15.320000 | 35.46% | 19.80 | 21.83% | 86.58 | 16.70% |
| February | 14.91000 | 31.31% | 67.01000 | 26.81% | 0.00000 | 0.00% | 12.680000 | 28.41% | 17.72 | 18.90% | 71.38 | 13.33% |
| March | 18.34000 | 39.80% | 102.86000 | 42.52% | 111.12000 | 15.13% | 24.480000 | 56.67% | 19.79 | 21.81% | 133.67 | 25.79% |
| 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 2022 was 217.46 MW in the month of March to Binaguri substation in India. The minimum export recorded was 0.00 MW to Birpara substation in India during the month of January and Feruary.

Table 5.1. Export of electricity to India

| Export To | Binaguri (MW) | | Birpara (MW) | | Salakoti and Rangia (MW) | |
|---|---|---|---|---|---|---|
| Month | Max | Min | Max | Min | Max | Min |
| January | 0.00 | 0.00 | 0.00 | 0.00 | 18.99 | 0.04 |
| February | 0.00 | 0.00 | 39.25 | 0.66 | 25.11 | 0.07 |
| March | 217.46 | 0.09 | 100.60 | 0.27 | 51.10 | 0.05 |

Graph 5.1. Export of electricity to India

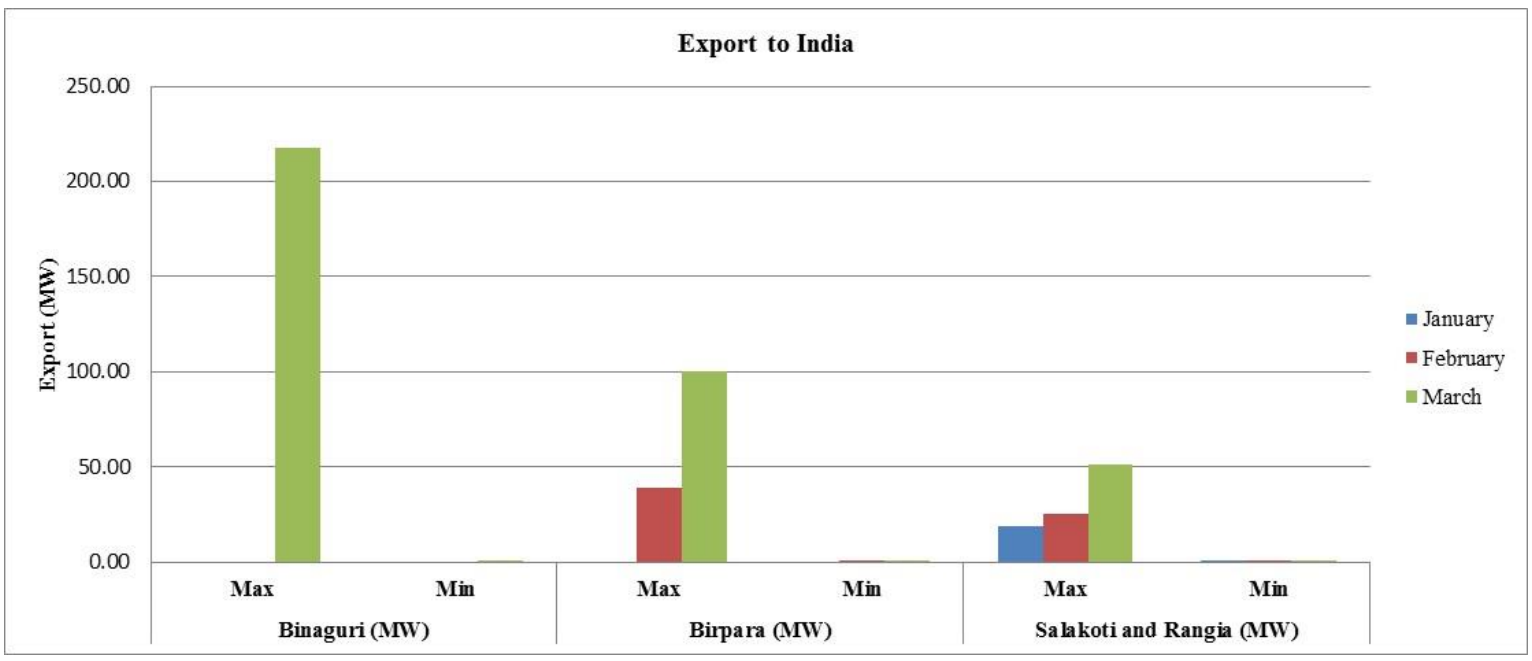
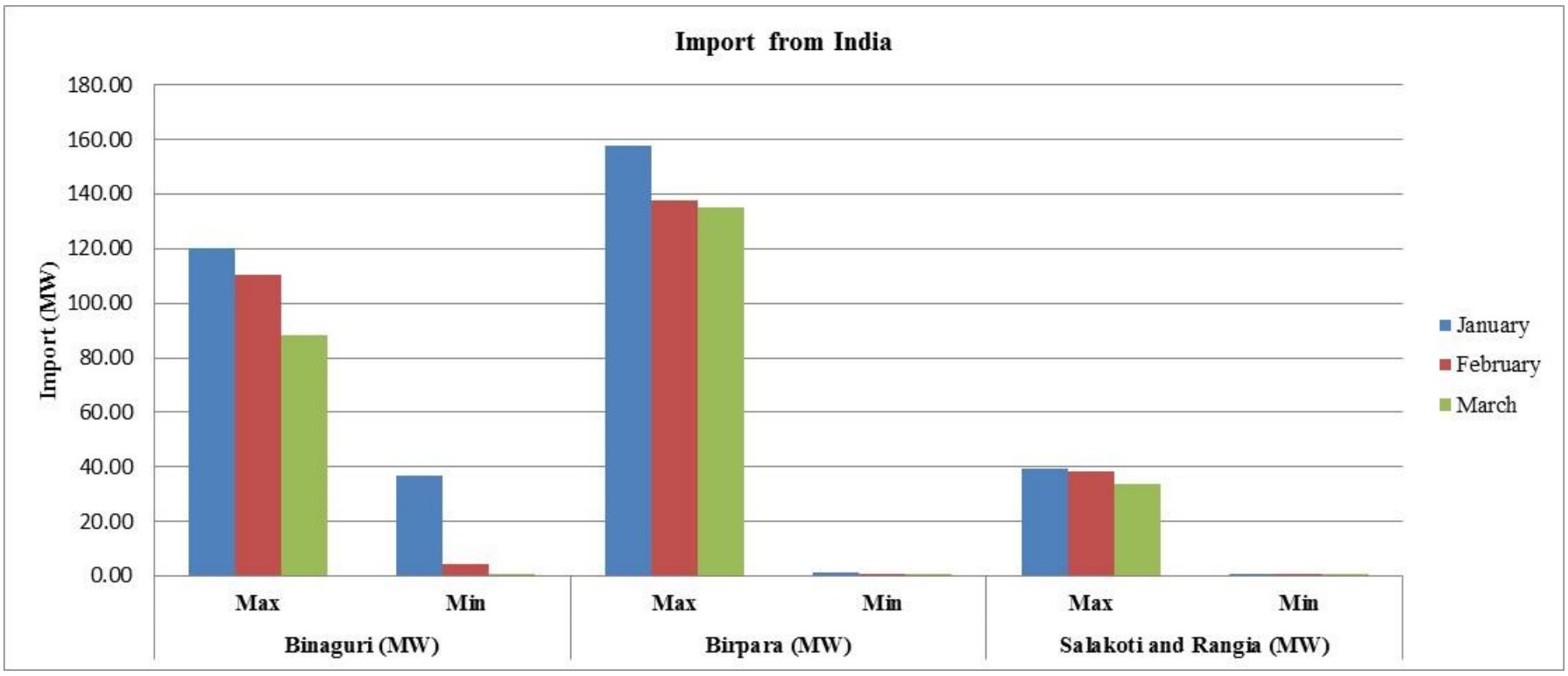


Table 5.2. Import of electricity from India.

| Import From | Binaguri (MW) | | Birpara (MW) | | Salakoti and Rangia (MW) | |
|---|---|---|---|---|---|---|
| Month | Max | Min | Max | Min | Max | Min |
| January | 120.36 | 36.73 | 157.91 | 1.44 | 39.23 | 0.05 |
| February | 110.56 | 4.36 | 137.92 | 0.46 | 38.54 | 0.29 |
| March | 88.36 | 0.09 | 135.32 | 0.05 | 33.74 | 0.11 |

Graph 5.2. Import of electricity to India




## 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, 2022

Table 6.1.1. Bus Frequency profile of Semtokha Substation

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

Graph 6.1.1. Bus Frequency of Semtokha Substation

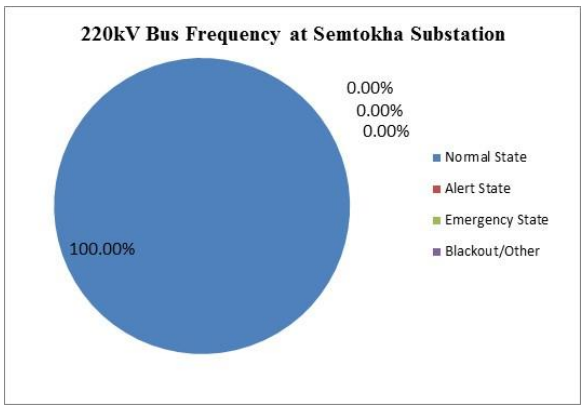
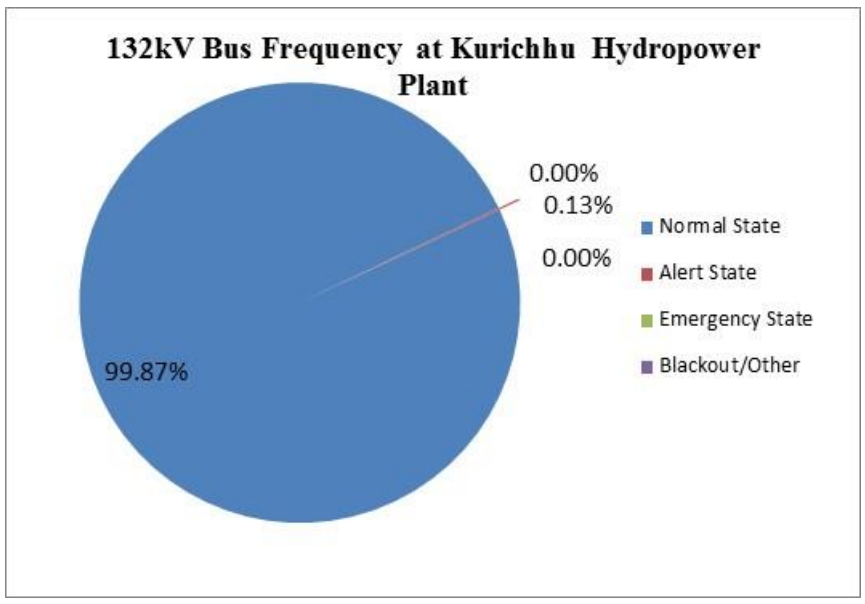


Table 6.1.2. Bus frequency of Kurichhu Hydro Power Plant

| Sl. No. | Operating State | Frequency |
|---|---|---|
| 1 | Normal State | 99.87% |
| 2 | Alert State | 0.13% |
| 3 | Emergency State | 0.00% |
| 4 | Blackout/Other | 0.00% |

Graph 6.1.2. Bus frequency of Kurichhu Hydro Power Plant




In the month of January, 2022, the Western grid was have managed to operate 100% in operating limit and Eastern grid was maintained at normal operating range of 99.87% and deviated 0.13% to Alert State.

### 6.2.Frequency for the month of February, 2022

Table 6.2.1. Bus frequency of Semtokha Substation

| Sl. No. | Operating State | Frequency |
|---|---|---|
| 1 | Normal State | 90.19% |
| 2 | Alert State | 0.00% |
| 3 | Emergency State | 0.00% |
| 4 | Blackout/Other | 9.81% |

Graph 6.2.1. Bus frequency of Semtokha Substation

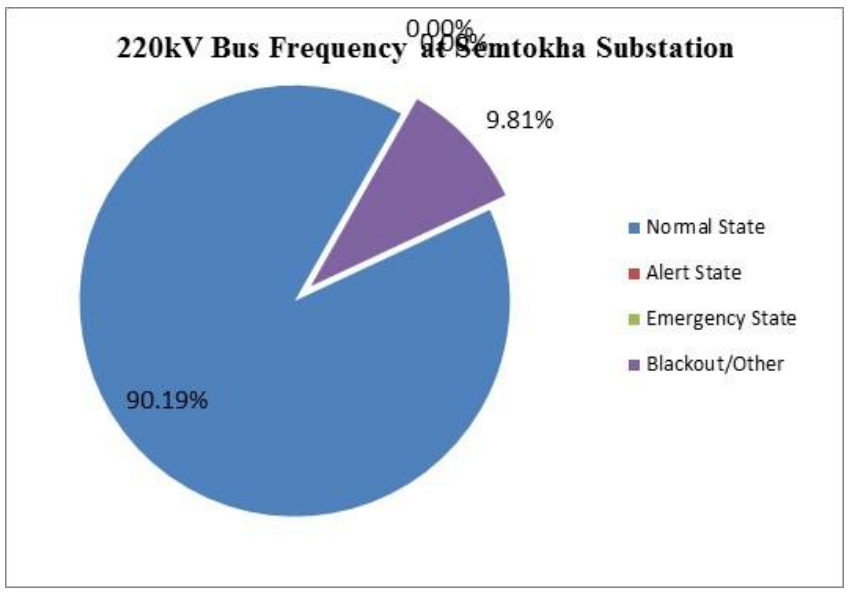
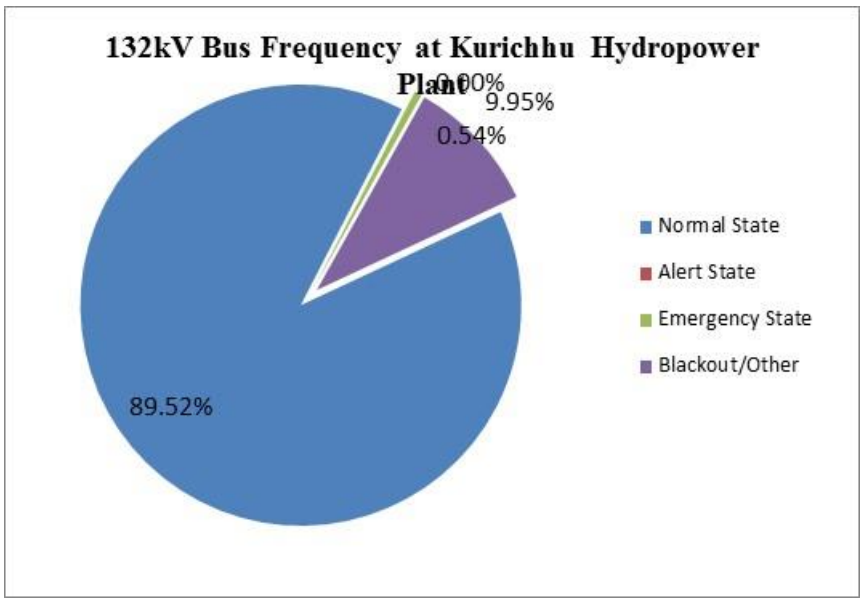



Table 6.2.2. Bus frequency of Kurichhu Hydro Power Plant

| Sl. No. | Operating State | Frequency |
|---|---|---|
| 1 | Normal State | 89.52% |
| 2 | Alert State | 0.00% |
| 3 | Emergency State | 0.54% |
| 4 | Blackout/Other | 9.95% |

Graph 6.2.2. Bus frequency of Kurichhu Hydro Power Plant




In the month of February, 2022, the western grid frequency was maintained at normal operating range of 90.19% and deviated 9.81 to blackout/others. Eastern grid was maintained 89.52% in normal operating range and deviated 0.54% to Emergency state and 9.95% to Blackout/other.

### 6.3.Frequency for the month of March, 2022

Table 6.3.1. Bus frequency of Semtokha Substation

| Sl. No. | Operating State | Frequency |
|---|---|---|
| 1 | Normal State | 99.87% |
| 2 | Alert State | 0.00% |
| 3 | Emergency State | 0.00% |
| 4 | Blackout/Other | 0.13% |

Graph 6.3.1. Bus frequency of Semtokha Substation

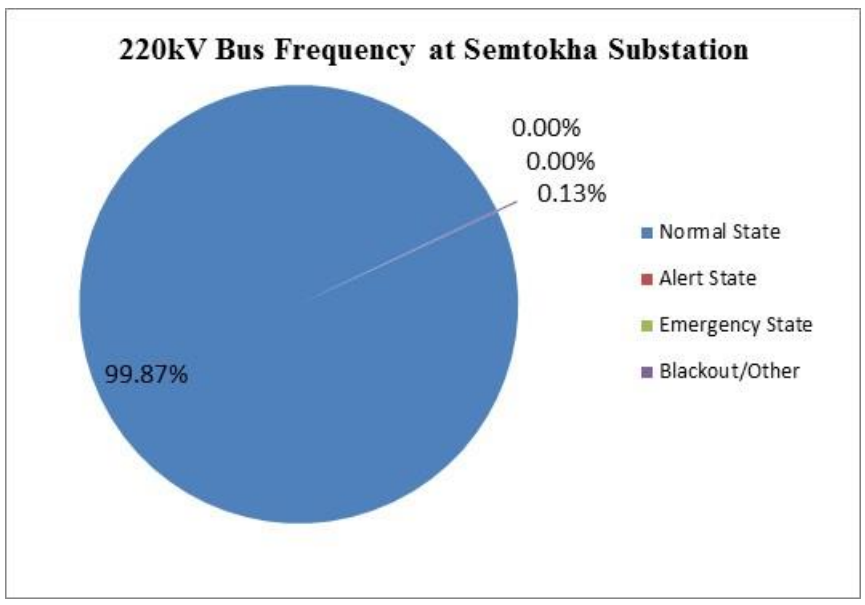
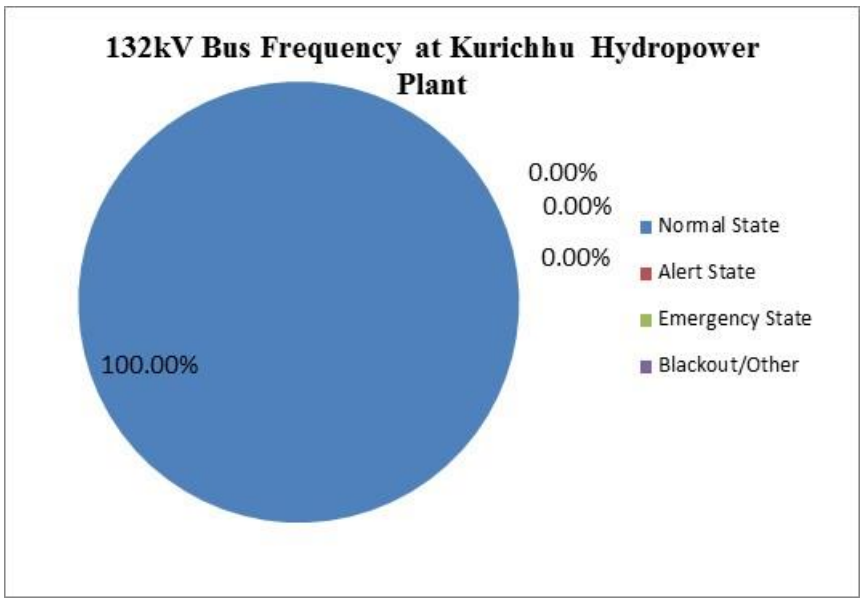



Table 6.3.2. Bus frequency of Kurichhu Hydro Power Plant

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

Graph 6.3.2. Bus frequency of Kurichhu Hydro Power Plant



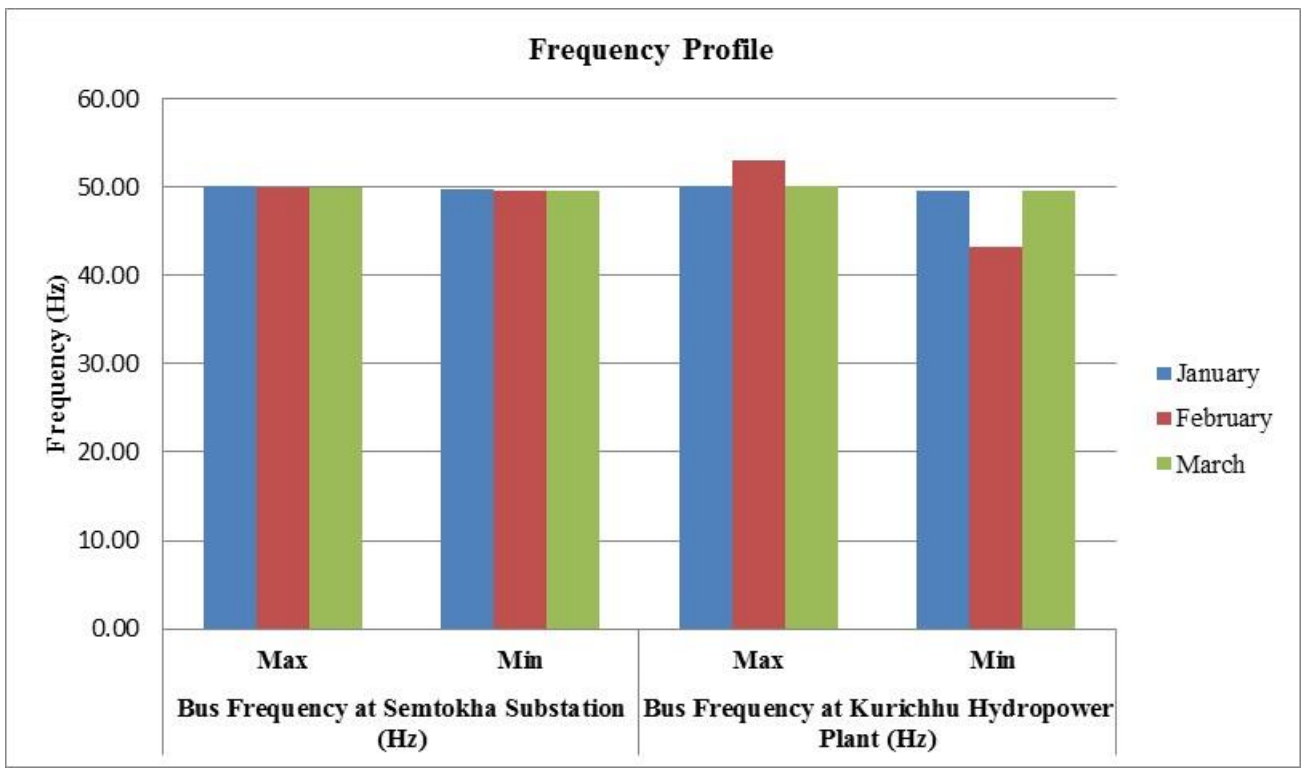

6.4.In the month of March, 2022, the western grid frequency was maintained at normal operating range of 99.87% and deviated 0.13% to Blackout/other whereas Eastern grid was maintained at normal operating range of 100%.

### 6.5.Frequency Summary for the month of January to March, 2022

Table 6.4.1. Frequency summary for the month of January to March, 2022.

| Bus Frequency at Semtokha Substation (Hz) | | Bus Frequency at Kurichhu Hydropower Plant (Hz) | |
|---|---|---|---|
| Max | Min | Max | Min |
| 50.10 | 49.70 | 50.13 | 49.49 |
| 50.00 | 49.50 | 53.10 | 43.20 |
| 50.00 | 49.50 | 50.18 | 49.64 |

Graph 6.4.1. Frequency summary for the month of January to March, 2022




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, 2022 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.*

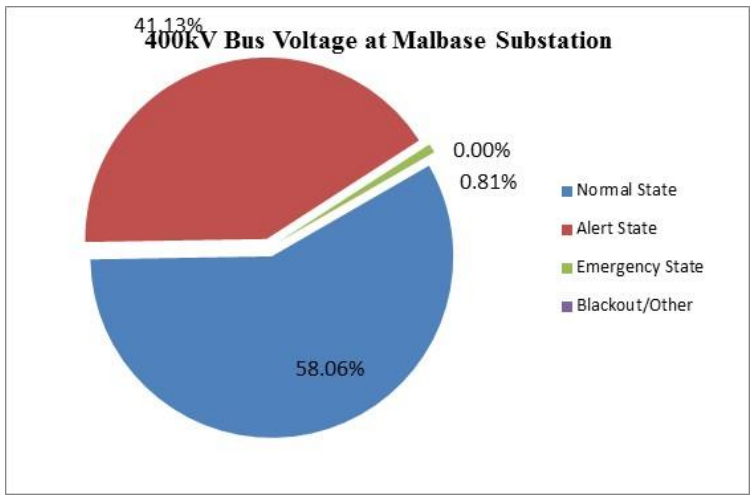
Due to the location of 400/22/66/11kV Malbase substation in western grid and 132/33/11kV Nangkhor substation in the eastern grid, the voltage profile of these substations are considered.

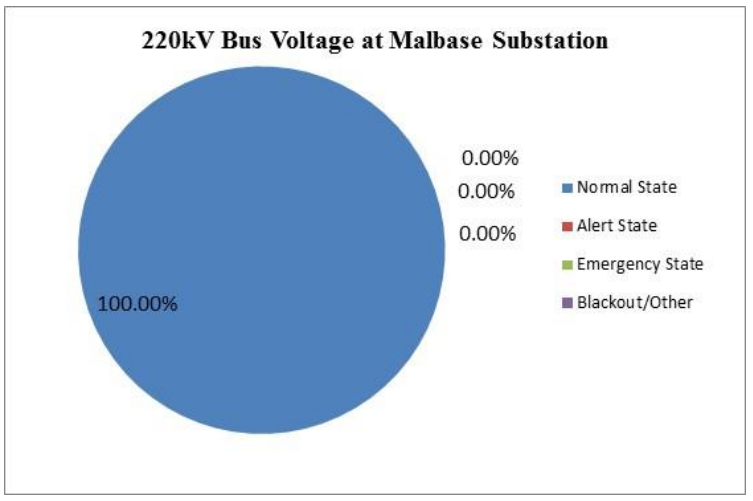
### 7.1.Voltage profile for the January, 2022

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 | 58.06% | 100.00% | 100.00% |
| 2 | Alert State | 41.13% | 0.00% | 0.00% |
| 3 | Emergency State | 0.81% | 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



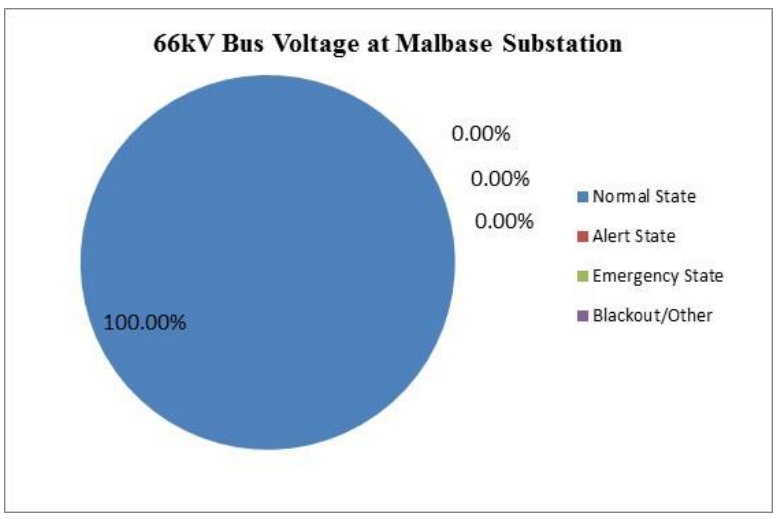
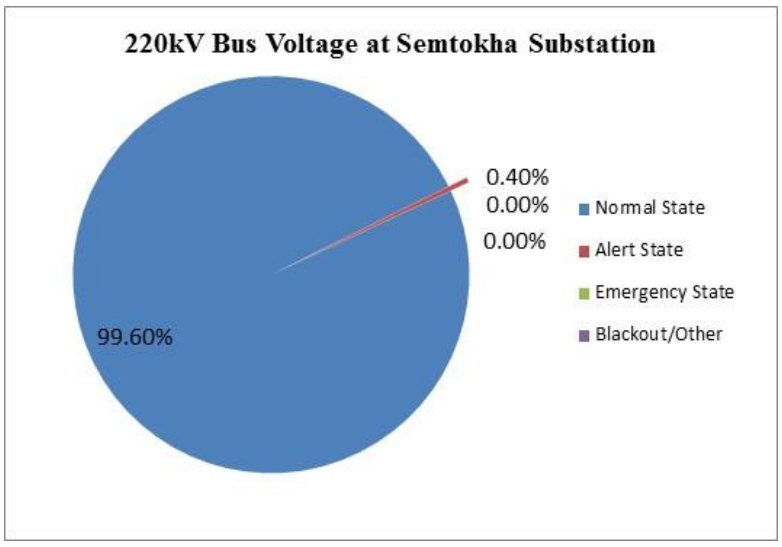




Table 7.1.2. Voltage Profile of 220/66/11kV Semtokha Substation

| Sl. No. | Operating State | 220kV Bus Voltage | 66kV Bus Voltage |
|---|---|---|---|
| 1 | Normal State | 99.60% | 97.85% |
| 2 | Alert State | 0.40% | 2.15% |
| 3 | Emergency State | 0.00% | 0.00% |
| 4 | Blackout/Other | 0.00% | 0.00% |

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



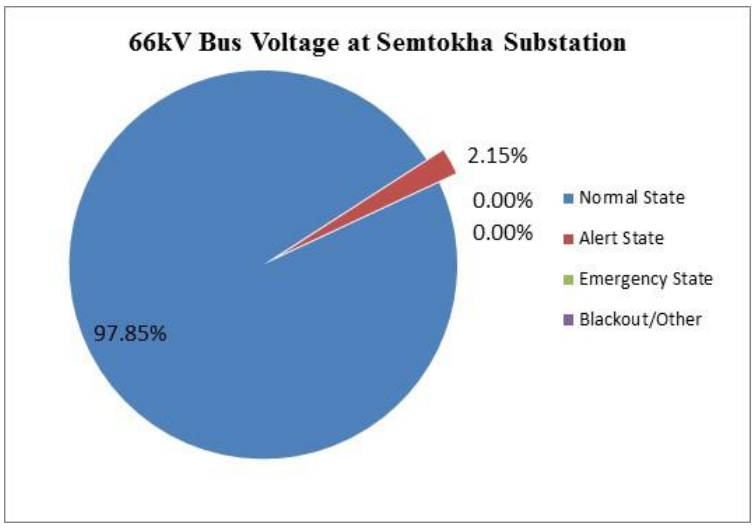
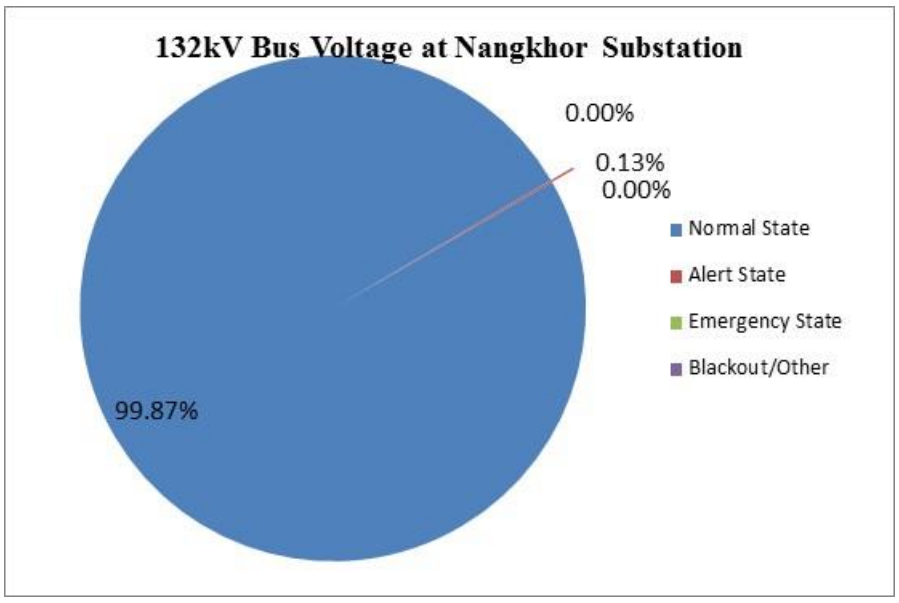




Table 7.1.3. Voltage Profile of 132/33/11kV Nangkhor Substation

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

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

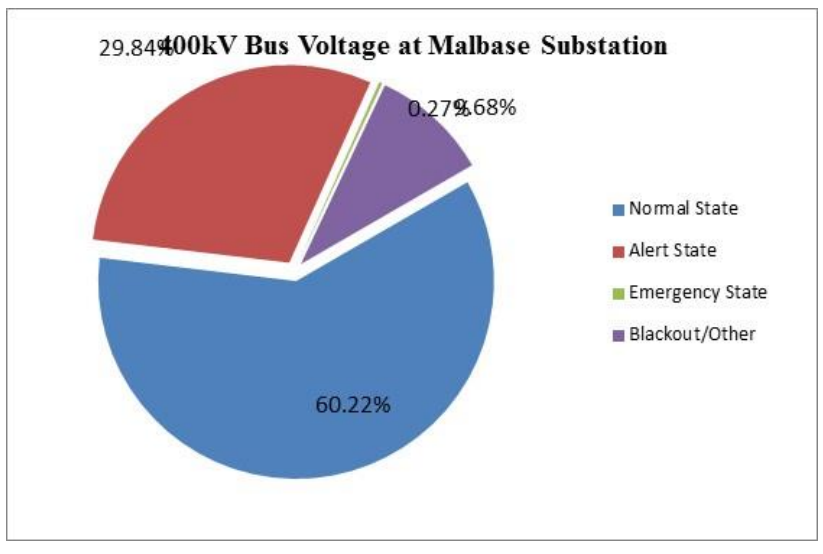


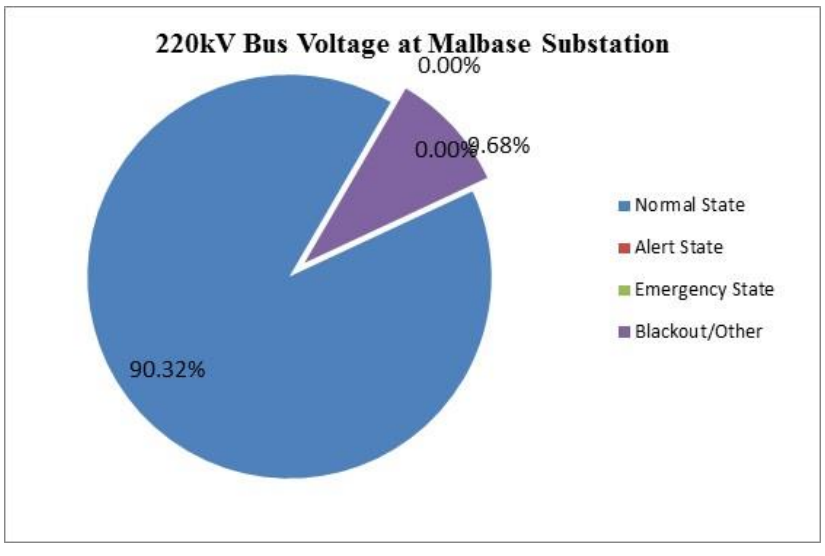

### 7.2.Voltage Profile for month of February, 2022

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 | 60.22% | 90.32% | 90.05% |
| 2 | Alert State | 29.84% | 0.00% | 0.00% |
| 3 | Emergency State | 0.27% | 0.00% | 0.27% |
| 4 | Blackout/Other | 9.68% | 9.68% | 9.68% |

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



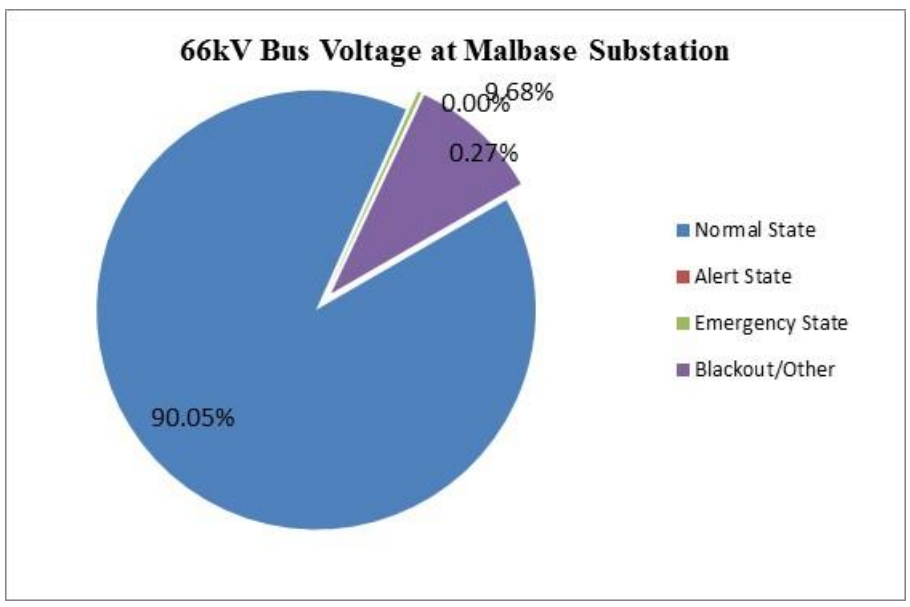
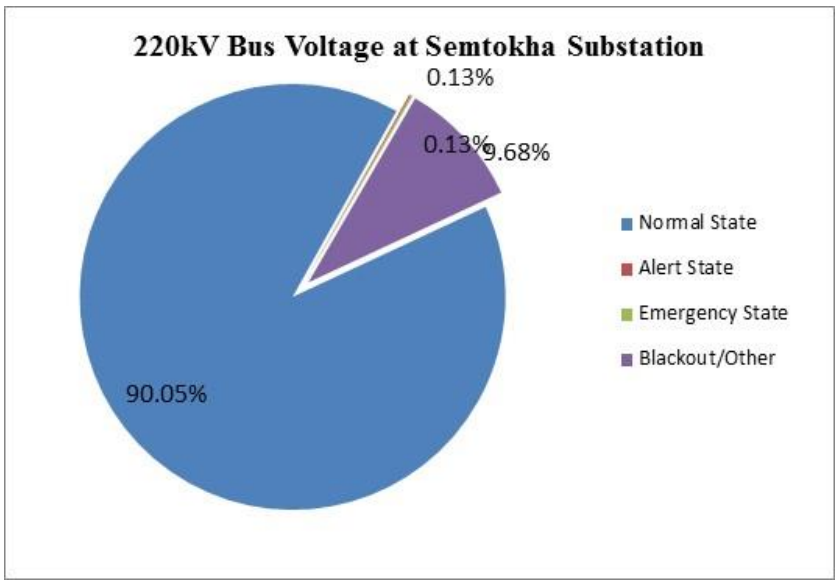



Table 7.2.2. Voltage Profile of 220/66/11kV Semtokha Substation

| Sl. No. | Operating State | 220kV Bus Voltage | 66kV Bus Voltage |
|---|---|---|---|
| 1 | Normal State | 90.05% | 99.46% |
| 2 | Alert State | 0.13% | 0.13% |
| 3 | Emergency State | 0.13% | 0.00% |
| 4 | Blackout/Other | 9.68% | 0.40% |

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



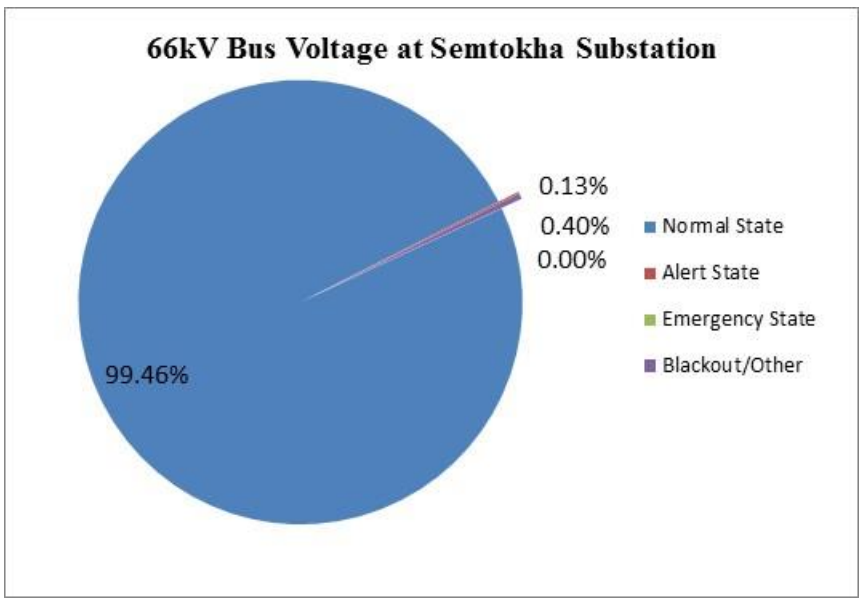
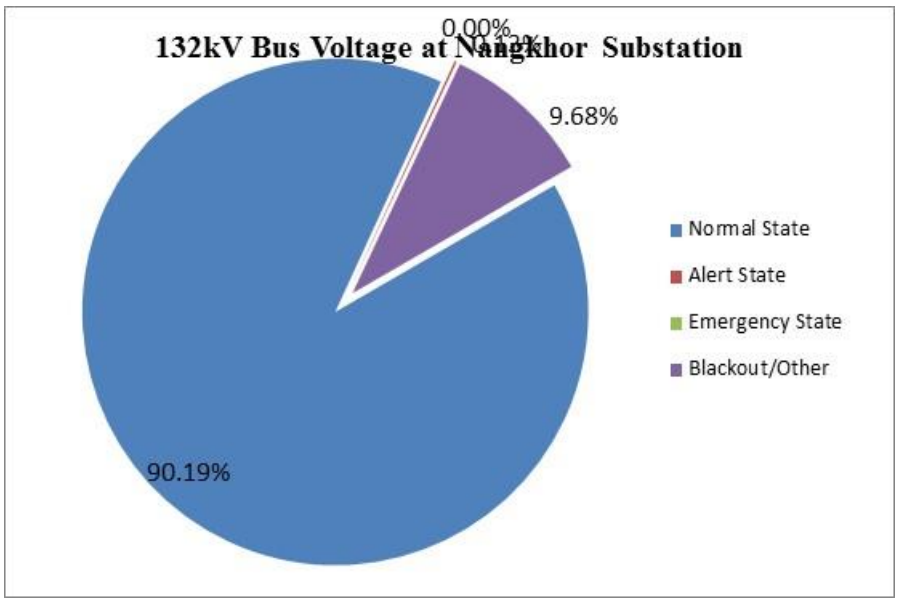




Table 7.2.3. Voltage Profile of 132/33/11kV Nangkhor Substation

| Sl. No. | Operating State | 132kV Bus Voltage |
|---|---|---|
| 1 | Normal State | 90.19% |
| 2 | Alert State | 0.13% |
| 3 | Emergency State | 0.00% |
| 4 | Blackout/Other | 9.68% |

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

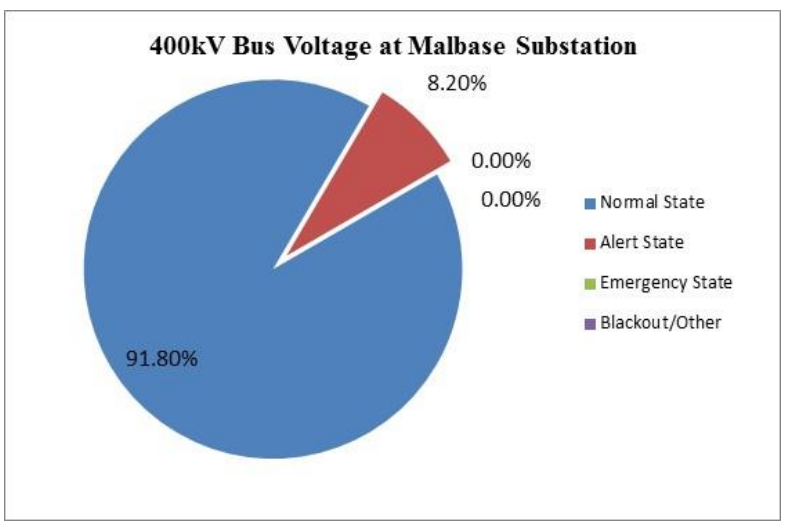


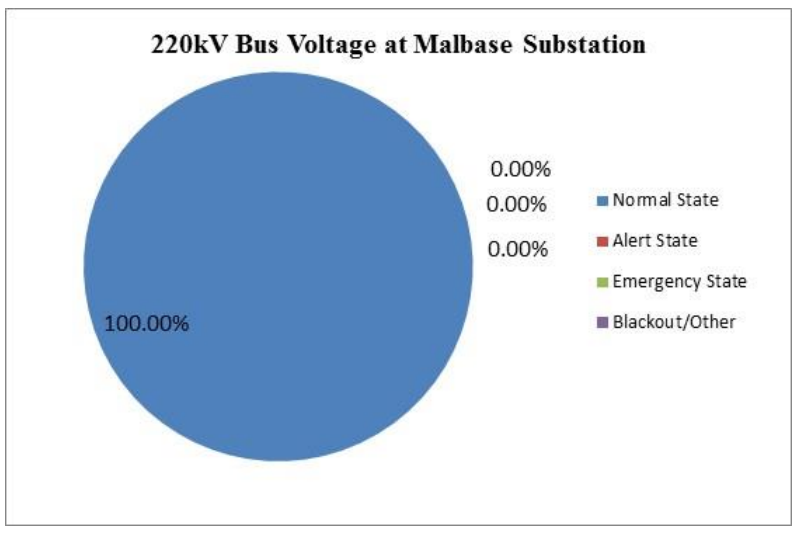

**7.3.Voltage Profile for the month of March, 2022**

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 | 91.80% | 100.00% | 99.87% |
| 2 | Alert State | 8.20% | 0.00% | 0.13% |
| 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



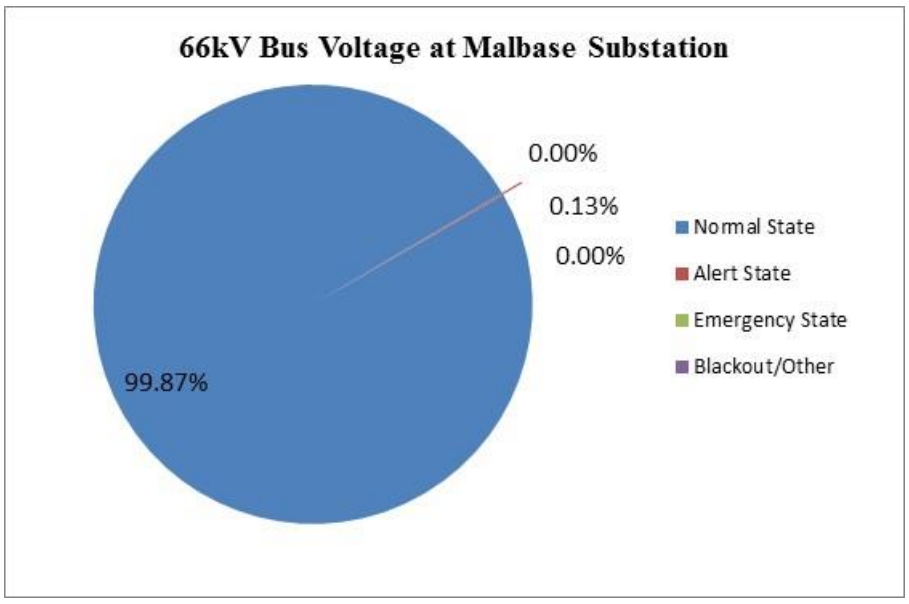
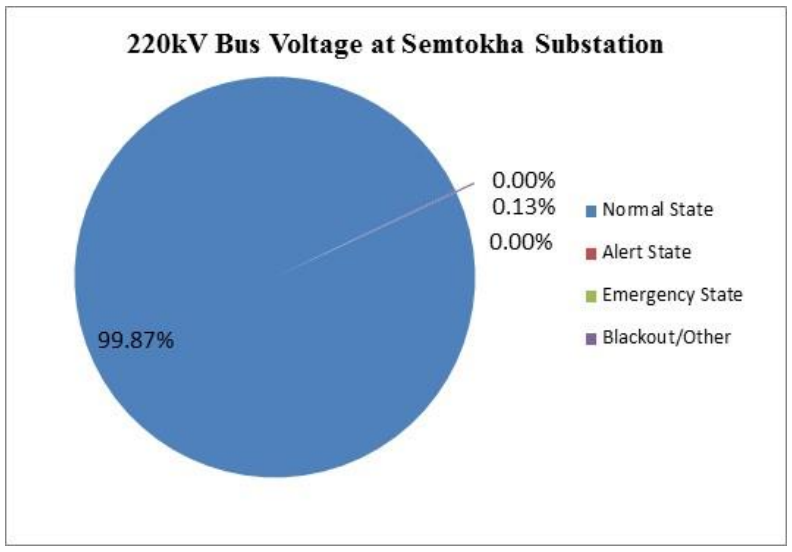




Table 7.3.2. Voltage Profile of 220/66/11kV Semtokha Substation

| Sl. No. | Operating State | 220kV Bus Voltage | 66kV Bus Voltage |
|---|---|---|---|
| 1 | Normal State | 99.87% | 99.33% |
| 2 | Alert State | 0.00% | 0.54% |
| 3 | Emergency State | 0.00% | 0.00% |
| 4 | Blackout/Other | 0.13% | 0.13% |

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



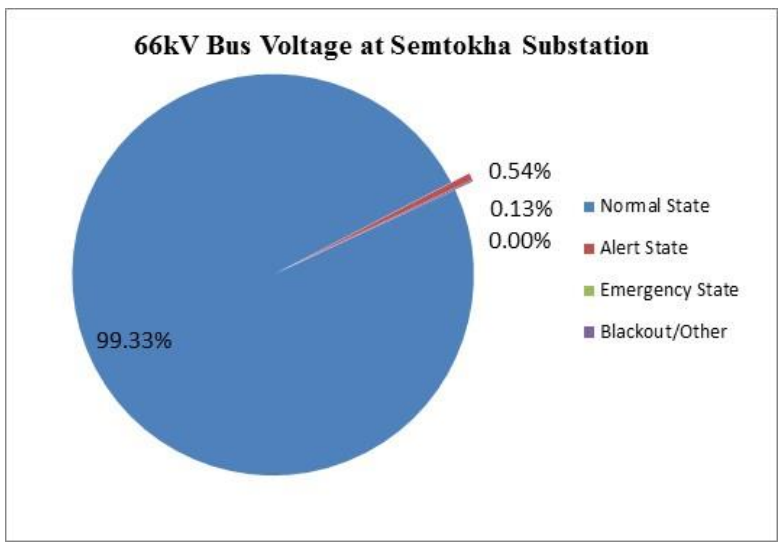
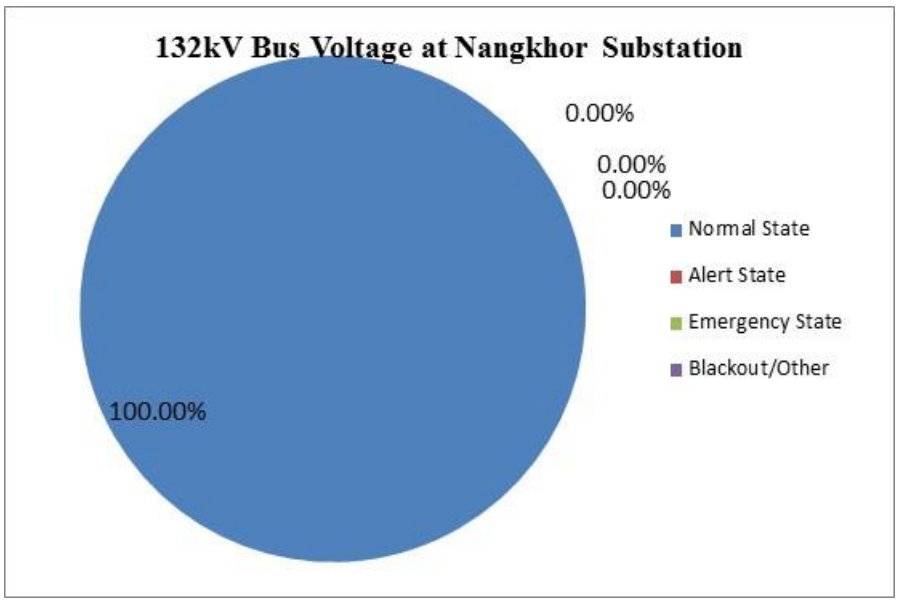




Table 7.3.3. Voltage Profile of 132/33/11kV Nangkhor Substation

| Sl. No. | Operating State | 132kV Bus Voltage |
|---|---|---|
| 1 | Normal State | 100.00% |
| 2 | Alert State | 0.00% |
| 3 | Emergency State | 0.00% |
| 4 | Blackout/Other | 0.00% |

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

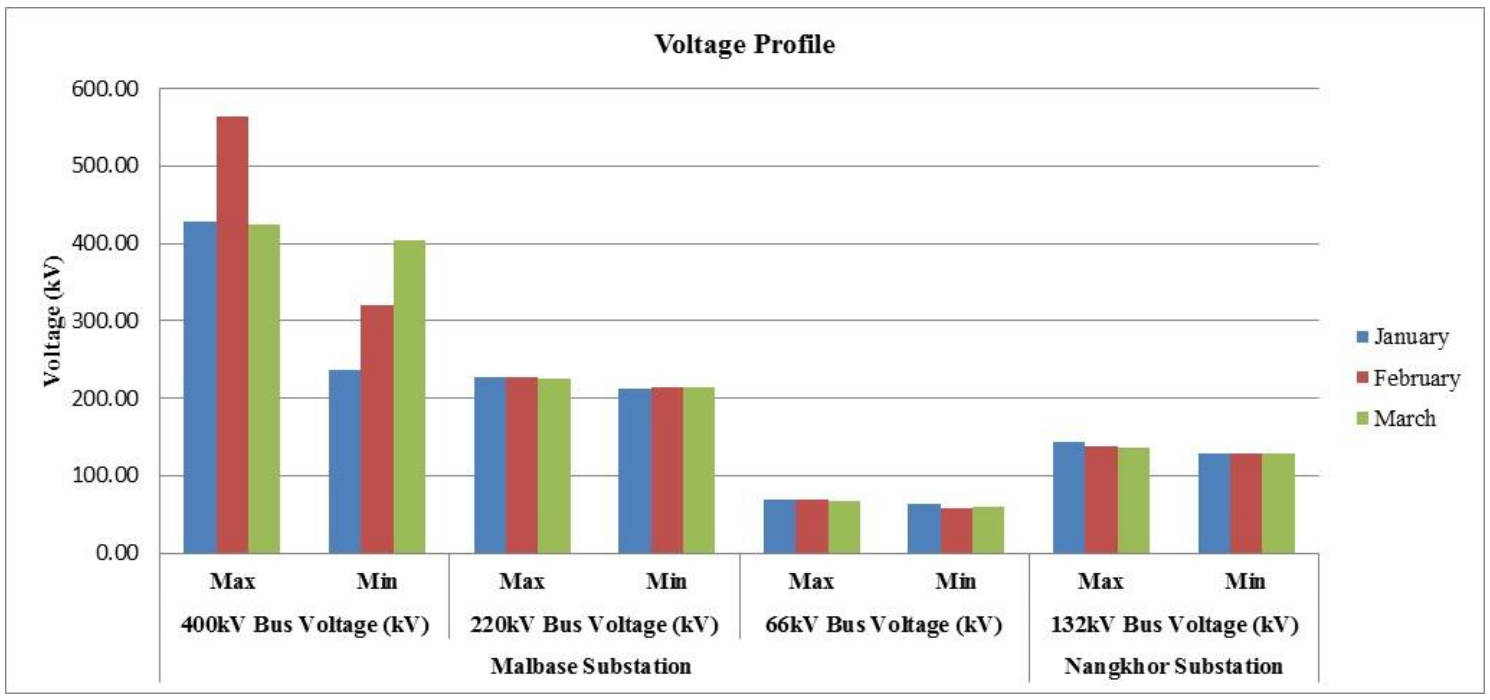



### 7.4.Voltage Summary for the Month of January to March, 2022

Table 7.4.1. Voltage Summary for the month of January to March, 2022

| Substation | Malbase Substation | | | | | | Nangkhor Substation | |
|---|---|---|---|---|---|---|---|---|
| Voltage Level | 400kV Bus Voltage (kV) | | 220kV Bus Voltage (kV) | | 66kV Bus Voltage (kV) | | 132kV Bus Voltage (kV) | |
| Month | Max | Min | Max | Min | Max | Min | Max | Min |
| January | 429.00 | 236.50 | 228.00 | 212.00 | 68.50 | 63.00 | 143.40 | 129.32 |
| February | 565.00 | 320.50 | 227.00 | 214.00 | 69.00 | 58.00 | 138.81 | 128.60 |
| March | 425.00 | 403.50 | 225.50 | 213.50 | 68.00 | 60.50 | 136.94 | 129.67 |

Graph 7.4.1. Voltage Summary for the month of January to March, 2022



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, 2022 is attached as **Annexure-IV**

## 8. Major Outages of Feeders and Equipment -to be continue

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

### 8.1.Major Outages in Eastern Grid

It had been observed that there was very few fault tripping during the first quarter of the year. Almost all the tripping occurred are of transient in nature or temporary fault which have been restored within few minutes. During the month of January, The 132/33kV Motanga Substation had a major issue as 132kV, Rangia Feeder tripped for almost 12hrs due Y-phase LA was punctured. During the month of February at 132/33/11 kV Kilikhar Station, 132kV Corlong feeder got tripped which lasted for almost 52hrs, and at Nanglam station, Nanglam-Tingtibi feeder tripped for almost 36hrs on 5th. There was no major issue during the month of March.

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

### 8.2.Major Outages in Western Grid

During the first quarter of the year, there was some outage occurred in western grid but there was not much major issue.

During the month of January one major outage took place at 220kV Semtokha Station, the outage lasted for about 25 hrs. During the month of February there was a tripping at Damji line at 66kv Decholing Station which lasted for almost 105hrs. Again during the month of March there was the same issue at Damji line at Decholing Station which lasted for almost 104hrs.

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

## 9. Annexuresn (not updated)

**Annexure-I**

Table: Generation of January, 2022

| Jan-22 | BHP (MW) | | | CHP (MW) | | | THP (MW) | | | KHP (MW) | | | DHP (MW) | | | MHP (MW) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava |
| 1 | 0.00 | 0.00 | 0.00 | 175.04 | 76.75 | 139.07 | 0.00 | No Generati | Error | 32.64 | 10.52 | 25.08 | 31.98 | 30.25 | 30.91 | 226.05 | 25.24 | 147.71 |
| 2 | 29.24 | 25.51 | 26.39 | 168.92 | 19.30 | 121.33 | 0.00 | No Generati | Error | 30.78 | 10.18 | 23.26 | 30.98 | 29.46 | 30.37 | 268.39 | 35.24 | 139.64 |
| 3 | 26.95 | 25.49 | 26.18 | 184.52 | 53.05 | 134.90 | 0.00 | No Generati | Error | 45.28 | 10.09 | 24.20 | 31.95 | 29.25 | 30.14 | 244.01 | 25.30 | 122.80 |
| 4 | 0.00 | 25.50 | 26.07 | 178.99 | 24.72 | 129.55 | 0.00 | No Generati | Error | 32.16 | 10.08 | 22.54 | 30.48 | 28.69 | 29.52 | 240.38 | 40.46 | 133.03 |
| 5 | 0.00 | 25.86 | 26.10 | 256.79 | 19.26 | 120.44 | 0.00 | No Generati | Error | 45.27 | 10.08 | 22.35 | 30.46 | 28.97 | 29.66 | 250.34 | 20.18 | 117.12 |
| 6 | 0.00 | 25.54 | 25.89 | 184.75 | 22.82 | 111.76 | 0.00 | No Generati | Error | 44.21 | 10.06 | 21.57 | 29.50 | 28.98 | 29.21 | 260.15 | 15.23 | 123.99 |
| 7 | 26.42 | 25.54 | 25.89 | 184.45 | 37.24 | 138.90 | 0.00 | No Generati | Error | 30.24 | 10.07 | 22.30 | 29.09 | 28.46 | 28.83 | 240.42 | 13.15 | 131.00 |
| 8 | 26.12 | 24.89 | 25.41 | 171.06 | 20.63 | 124.22 | 0.00 | No Generati | Error | 30.24 | 10.08 | 24.08 | 29.00 | 27.81 | 28.42 | 258.55 | 19.83 | 129.11 |
| 9 | 25.73 | 24.54 | 25.25 | 182.55 | 21.27 | 126.10 | 0.00 | No Generati | Error | 30.25 | 10.17 | 22.33 | 29.78 | 27.46 | 28.43 | 240.64 | 17.31 | 113.88 |
| 10 | 25.43 | 24.42 | 25.00 | 181.08 | 37.35 | 125.20 | 0.00 | No Generati | Error | 32.90 | 10.08 | 22.24 | 28.68 | 26.97 | 28.05 | 246.36 | 15.20 | 135.62 |
| 11 | 28.23 | 21.41 | 24.36 | 184.00 | 28.67 | 118.50 | 0.00 | No Generati | Error | 32.16 | 10.09 | 23.18 | 27.99 | 27.27 | 27.68 | 256.08 | 12.22 | 121.40 |
| 12 | 30.04 | 23.89 | 25.07 | 184.61 | 30.19 | 117.56 | 0.00 | No Generati | Error | 32.98 | 10.10 | 21.93 | 30.98 | 27.23 | 28.18 | 255.03 | 19.18 | 115.30 |
| 13 | 27.37 | 24.28 | 25.85 | 182.81 | 25.92 | 120.57 | 0.00 | No Generati | Error | 33.00 | 10.18 | 22.90 | 32.99 | 27.96 | 30.08 | 271.35 | 20.23 | 117.18 |
| 14 | 26.88 | 23.69 | 24.64 | 184.18 | 18.02 | 113.24 | 0.00 | No Generati | Error | 30.33 | 10.08 | 22.00 | 29.47 | 26.94 | 27.90 | 224.29 | 16.35 | 115.77 |
| 15 | 25.20 | 23.45 | 24.07 | 184.46 | 30.68 | 113.97 | 0.00 | No Generati | Error | 32.43 | 10.07 | 20.91 | 27.99 | 26.46 | 27.27 | 254.45 | 12.37 | 131.63 |
| 16 | 24.42 | 22.46 | 23.54 | 184.74 | 19.77 | 112.46 | 0.00 | No Generati | Error | 32.29 | 10.06 | 22.16 | 27.98 | 25.47 | 26.44 | 225.45 | 16.92 | 108.77 |
| 17 | 23.93 | 22.57 | 23.11 | 170.90 | 24.36 | 103.29 | 0.00 | No Generati | Error | 30.40 | 10.04 | 18.48 | 26.93 | 24.99 | 26.10 | 260.31 | 14.28 | 114.29 |
| 18 | 25.05 | 18.89 | 22.96 | 183.45 | 21.11 | 124.58 | 0.00 | No Generati | Error | 48.24 | 10.08 | 23.83 | 26.46 | 23.98 | 25.59 | 234.15 | 22.87 | 126.77 |
| 19 | 26.01 | 19.10 | 22.85 | 179.24 | 15.14 | 102.94 | 0.00 | No Generati | Error | 32.13 | 10.02 | 20.10 | 25.98 | 24.97 | 25.26 | 259.61 | 15.15 | 108.90 |
| 20 | 23.66 | 20.15 | 22.06 | 170.01 | 48.28 | 104.81 | 0.00 | No Generati | Error | 30.29 | 10.06 | 18.75 | 25.47 | 24.94 | 25.11 | 253.94 | 19.27 | 105.13 |
| 21 | 28.23 | 20.28 | 23.81 | 183.70 | 24.53 | 106.19 | 0.00 | No Generati | Error | 45.33 | 10.09 | 21.80 | 26.48 | 25.07 | 25.70 | 240.37 | 20.16 | 114.31 |
| 22 | 25.61 | 20.28 | 23.16 | 209.87 | 23.62 | 98.40 | 0.00 | No Generati | Error | 32.25 | 8.86 | 22.39 | 26.48 | 24.98 | 25.76 | 255.74 | 13.22 | 109.98 |
| 23 | 24.63 | 20.86 | 23.12 | 175.71 | 12.13 | 105.61 | 0.00 | No Generati | Error | 32.22 | 10.07 | 19.13 | 26.96 | 24.96 | 25.79 | 229.30 | 13.15 | 100.53 |
| 24 | 23.35 | 22.27 | 22.66 | 200.71 | 20.50 | 106.86 | 0.00 | No Generati | Error | 32.22 | 10.12 | 19.80 | 26.96 | 24.46 | 25.81 | 249.54 | 20.50 | 110.85 |
| 25 | 23.05 | 22.22 | 22.49 | 169.38 | 20.97 | 101.25 | 0.00 | No Generati | Error | 32.15 | 10.07 | 20.75 | 25.97 | 24.46 | 25.23 | 252.82 | 20.20 | 111.78 |
| 26 | 24.10 | 21.50 | 22.64 | 179.99 | 20.58 | 102.81 | 0.00 | No Generati | Error | 30.16 | 10.06 | 19.67 | 25.74 | 24.56 | 24.89 | 242.68 | 19.67 | 96.50 |
| 27 | 23.61 | 20.98 | 22.13 | 219.60 | 20.47 | 110.53 | 0.00 | No Generati | Error | 30.26 | 10.07 | 18.75 | 26.25 | 24.18 | 24.99 | 241.24 | 20.57 | 116.18 |
| 28 | 22.15 | 5.69 | 17.36 | 180.34 | 19.64 | 100.60 | 0.00 | No Generati | Error | 32.20 | 10.01 | 18.67 | 30.98 | 22.94 | 24.88 | 248.75 | 19.90 | 97.78 |
| 29 | 22.28 | 20.75 | 21.38 | 180.34 | 20.77 | 101.98 | 0.00 | No Generati | Error | 30.30 | 10.51 | 20.25 | 24.45 | 23.07 | 23.73 | 245.43 | 29.74 | 111.34 |
| 30 | 22.15 | 19.22 | 21.49 | 180.81 | 20.43 | 102.13 | 0.00 | No Generati | Error | 30.25 | 10.06 | 19.75 | 24.45 | 23.07 | 23.73 | 280.21 | 21.47 | 107.31 |
| 31 | 27.26 | 14.28 | 20.88 | 179.86 | 32.09 | 103.17 | 0.00 | No Generati | Error | 30.26 | 10.05 | 18.66 | 23.87 | 22.47 | 23.40 | 264.14 | 25.52 | 111.88 |
| **Max** | **30.04** | | | **256.79** | | | **0.00** | | | **48.24** | | | **32.99** | | | **280.21** | | |
| **Min** | | **0.00** | | | **12.13** | | | **0.00** | | | **8.86** | | | **22.47** | | | **12.22** | |
| Source: THP, CHP, BHP, KHP,MHP (DGPC) | | | | | | | | | | | | | | | | | | |

Graph: Generation for the month January, 2022

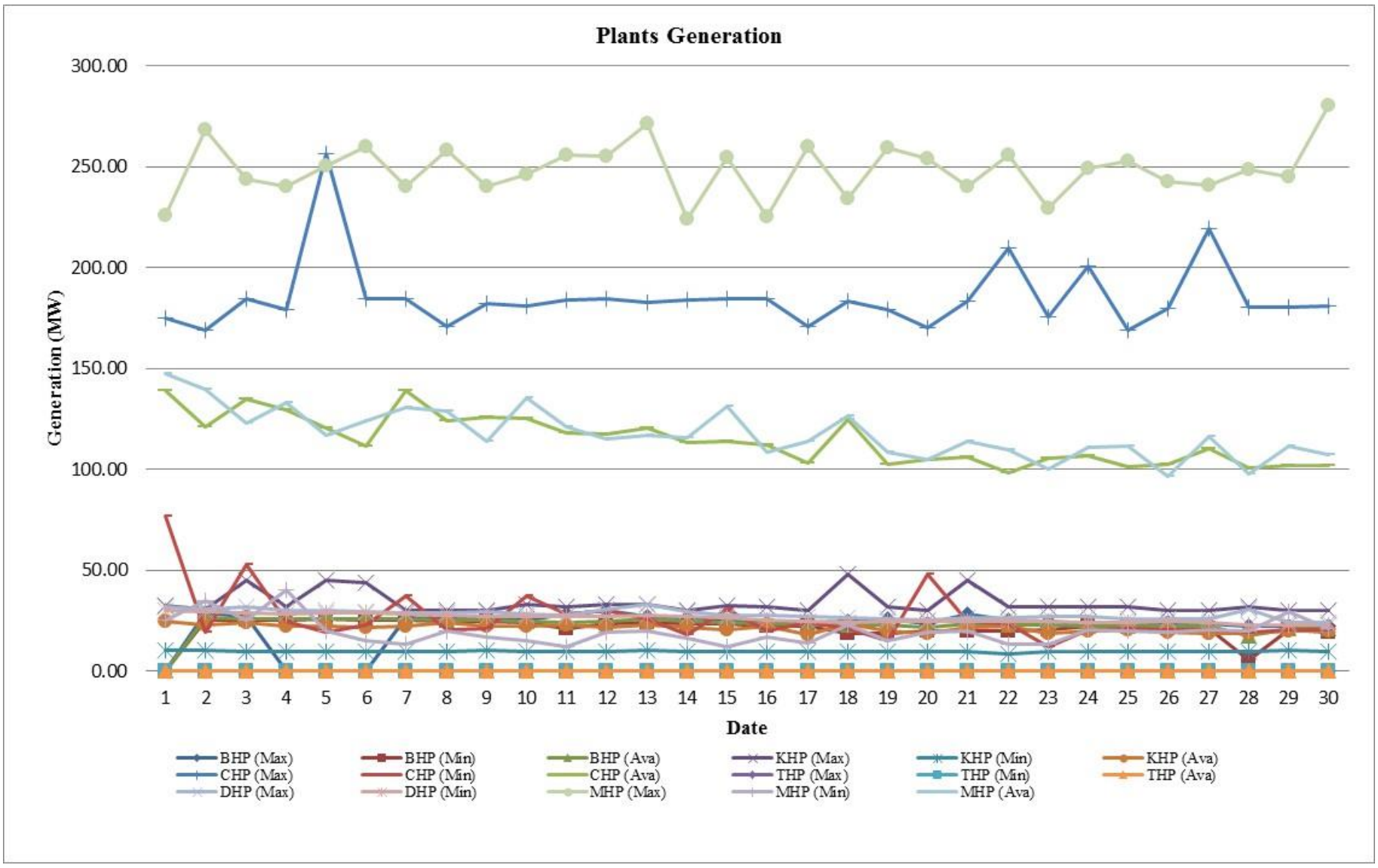



Table: Generation for the month of February, 2022

| Jan-22 | BHP (MW) | | | CHP (MW) | | | THP (MW) | | | KHP (MW) | | | DHP (MW) | | | MHP (MW) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava |
| 1 | 0.00 | 0.00 | 0.00 | 184.59 | 25.50 | 99.16 | 0.00 | No Generati | Error | 32.23 | 10.07 | 18.82 | 24.07 | 23.56 | 23.75 | 235.29 | 20.38 | 102.79 |
| 2 | 27.68 | 14.09 | 21.79 | 183.46 | 27.55 | 95.01 | 0.00 | No Generati | Error | 30.24 | 10.08 | 18.46 | 25.01 | 22.93 | 24.08 | 220.77 | 19.30 | 92.77 |
| 3 | 27.23 | 19.99 | 22.21 | 170.05 | 27.05 | 93.26 | 0.00 | No Generati | Error | 32.29 | 10.08 | 20.21 | 24.46 | 23.26 | 23.77 | 222.66 | 20.27 | 99.96 |
| 4 | 0.00 | 19.99 | 22.21 | 184.51 | 24.30 | 99.87 | 0.00 | No Generati | Error | 30.18 | 10.05 | 18.91 | 36.93 | 23.25 | 25.42 | 211.21 | 19.84 | 111.16 |
| 5 | 0.00 | 7.74 | 24.67 | 184.69 | 30.69 | 112.84 | 0.00 | No Generati | Error | 48.96 | 10.12 | 20.80 | 42.45 | 32.46 | 38.17 | 294.88 | 21.41 | 111.27 |
| 6 | 0.00 | 18.01 | 23.50 | 177.82 | 23.93 | 112.69 | 0.00 | No Generati | Error | 32.27 | 10.59 | 21.56 | 35.94 | 27.00 | 29.89 | 234.78 | 20.31 | 103.79 |
| 7 | 28.10 | 14.67 | 24.08 | 183.20 | 23.70 | 115.20 | 0.00 | No Generati | Error | 30.22 | 10.20 | 19.84 | 32.97 | 27.46 | 29.70 | 230.37 | 20.57 | 119.35 |
| 8 | 27.65 | 22.66 | 23.66 | 180.73 | 46.38 | 113.07 | 0.00 | No Generati | Error | 32.25 | 10.09 | 19.56 | 28.46 | 25.96 | 27.17 | 246.51 | 25.53 | 121.37 |
| 9 | 28.09 | 19.63 | 22.68 | 182.09 | 41.40 | 110.05 | 0.00 | No Generati | Error | 32.27 | 10.09 | 19.81 | 27.47 | 25.97 | 26.81 | 242.45 | 20.45 | 111.73 |
| 10 | 28.21 | 13.78 | 22.95 | 181.96 | 29.88 | 107.49 | 0.00 | No Generati | Error | 28.39 | 10.06 | 18.00 | 28.42 | 25.57 | 26.77 | 241.59 | 21.51 | 115.40 |
| 11 | 27.99 | 20.63 | 22.68 | 172.18 | 40.11 | 108.70 | 0.00 | No Generati | Error | 30.25 | 10.17 | 19.39 | 28.47 | 26.46 | 27.39 | 266.10 | 20.37 | 112.94 |
| 12 | 27.75 | 12.57 | 22.84 | 181.81 | 32.16 | 102.08 | 0.00 | No Generati | Error | 30.22 | 10.18 | 20.05 | 27.95 | 25.47 | 26.84 | 246.11 | 20.81 | 100.48 |
| 13 | 28.07 | 11.35 | 21.41 | 182.85 | 21.57 | 100.87 | 0.00 | No Generati | Error | 32.22 | 10.17 | 19.06 | 30.96 | 25.92 | 28.36 | 232.21 | 20.20 | 99.05 |
| 14 | 28.62 | 17.21 | 22.65 | 183.68 | 31.42 | 100.42 | 0.00 | No Generati | Error | 26.23 | 10.18 | 18.53 | 32.92 | 26.66 | 28.94 | 265.69 | 21.90 | 112.90 |
| 15 | 28.52 | 4.99 | 22.11 | 172.62 | 28.30 | 101.13 | 0.00 | No Generati | Error | 30.24 | 10.22 | 19.33 | 37.92 | 25.95 | 29.36 | 235.43 | 19.90 | 110.60 |
| 16 | 28.31 | 20.49 | 23.57 | 183.91 | 28.85 | 100.69 | 0.00 | No Generati | Error | 30.33 | 10.28 | 21.15 | 33.94 | 25.95 | 28.96 | 229.12 | 20.21 | 109.18 |
| 17 | 27.69 | 12.36 | 22.09 | 185.33 | 25.52 | 106.76 | 0.00 | No Generati | Error | 30.13 | 10.10 | 19.78 | 29.36 | 26.42 | 27.47 | 215.11 | 20.70 | 116.22 |
| 18 | 27.37 | 12.39 | 20.76 | 180.01 | 29.45 | 97.59 | 0.00 | No Generati | Error | 30.18 | 10.06 | 20.35 | 27.98 | 23.97 | 26.64 | 241.41 | 25.53 | 113.74 |
| 19 | 27.45 | 12.50 | 21.35 | 170.26 | 30.29 | 99.77 | 0.00 | No Generati | Error | 30.19 | 10.05 | 20.04 | 26.47 | 24.93 | 25.99 | 250.74 | 20.70 | 103.94 |
| 20 | 27.79 | 16.08 | 22.06 | 183.66 | 29.85 | 91.78 | 0.00 | No Generati | Error | 30.15 | 10.05 | 19.31 | 27.99 | 25.91 | 27.11 | 256.37 | 22.34 | 100.42 |
| 21 | 27.05 | 16.74 | 20.73 | 184.36 | 30.57 | 97.79 | 0.00 | No Generati | Error | 30.19 | 10.18 | 18.84 | 27.50 | 23.45 | 25.76 | 235.44 | 20.81 | 94.29 |
| 22 | 27.29 | 14.62 | 20.84 | 184.24 | 29.43 | 100.01 | 0.00 | No Generati | Error | 25.09 | 10.10 | 19.39 | 47.50 | 23.17 | 26.32 | 251.99 | 20.31 | 111.22 |
| 23 | 27.28 | 10.06 | 20.21 | 175.60 | 36.62 | 98.46 | 0.00 | No Generati | Error | 28.15 | 10.05 | 18.53 | 25.72 | 23.17 | 24.30 | 255.87 | 20.03 | 97.56 |
| 24 | 26.90 | 12.13 | 20.12 | 173.82 | 37.89 | 98.46 | 0.00 | No Generati | Error | 30.20 | 10.05 | 18.88 | 24.71 | 23.18 | 23.92 | 264.60 | 20.88 | 105.34 |
| 25 | 26.88 | 12.06 | 20.21 | 175.85 | 29.43 | 90.32 | 0.00 | No Generati | Error | 27.69 | 10.08 | 18.52 | 24.49 | 23.18 | 23.90 | 243.26 | 19.63 | 91.97 |
| 26 | 26.81 | 15.27 | 19.99 | 174.90 | 32.55 | 93.62 | 0.00 | No Generati | Error | 30.03 | 10.03 | 18.45 | 26.19 | 23.19 | 24.87 | 264.92 | 20.28 | 95.52 |
| 27 | 26.81 | 20.20 | 21.03 | 176.32 | 29.02 | 98.83 | 0.00 | No Generati | Error | 27.63 | 10.03 | 17.71 | 25.91 | 23.68 | 24.69 | 250.74 | 20.45 | 103.62 |
| 28 | 26.75 | 11.91 | 19.56 | 176.13 | 28.34 | 94.51 | 0.00 | No Generati | Error | 30.21 | 10.11 | 20.57 | 25.24 | 23.69 | 24.64 | 277.57 | 20.11 | 111.06 |
| 29 | 0.00 | No Generati | Error | 104.61 | 104.61 | 104.61 | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generati | error | 0.00 | No Generatior | 0.00 |
| 30 | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generati | error | 0.00 | No Generatior | 0.00 |
| 31 | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generati | Error | 0.00 | No Generatior | Error |
| **Max** | **28.62** | | | **185.33** | | | **0.00** | | | **48.96** | | | **47.50** | | | **294.88** | | |
| **Min** | | **0.00** | | | **21.57** | | | **0.00** | | | **10.03** | | | **22.93** | | | **19.30** | |
| Source: THP, CHP, BHP, KHP,MHP (DGPC) | | | | | | | | | | | | | | | | | | |

Graph: Generation for the month of February, 2022

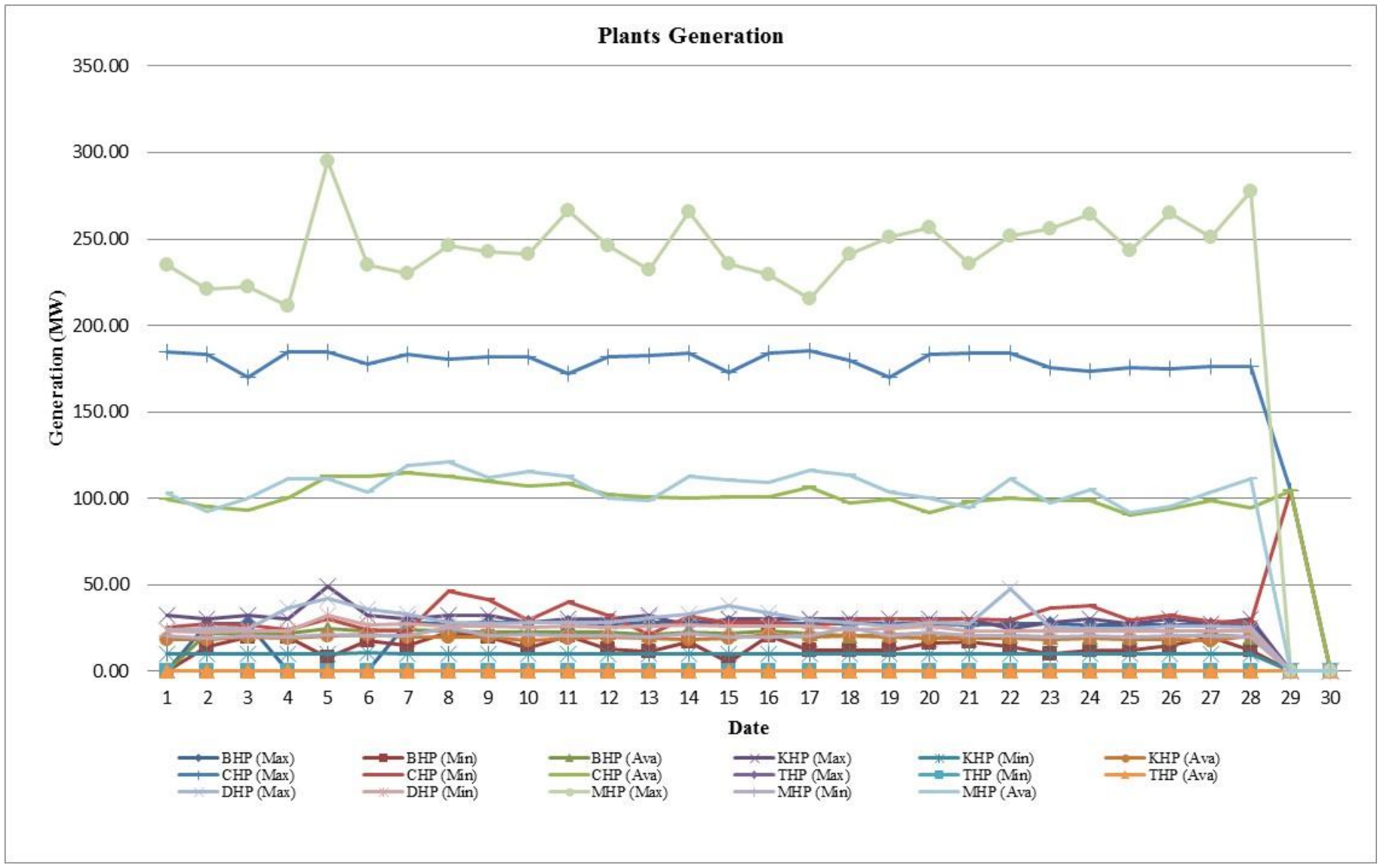



Table: Generation for the month of March, 2022

| Mar-22 | BHP (MW) | | | CHP (MW) | | | THP (MW) | | | KHP (MW) | | | DHP (MW) | | | MHP (MW) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava |
| 1 | 0.00 | 0.00 | 0.00 | 167.94 | 29.58 | 96.44 | 0.00 | No Generati | Error | 30.28 | 10.06 | 19.12 | 26.02 | 23.21 | 25.33 | 260.63 | 20.87 | 106.76 |
| 2 | 26.08 | 17.13 | 21.39 | 184.71 | 30.79 | 95.34 | 0.00 | No Generati | Error | 30.34 | 10.19 | 20.60 | 38.28 | 24.68 | 28.77 | 245.71 | 20.93 | 103.68 |
| 3 | 28.05 | 12.69 | 22.69 | 169.73 | 30.69 | 94.54 | 0.00 | No Generati | Error | 29.00 | 10.20 | 20.46 | 30.12 | 26.21 | 27.86 | 244.52 | 20.91 | 104.63 |
| 4 | 0.00 | 12.51 | 22.49 | 170.37 | 30.11 | 97.37 | 0.00 | No Generati | Error | 30.19 | 10.09 | 20.12 | 27.77 | 25.21 | 26.58 | 250.78 | 21.28 | 113.06 |
| 5 | 0.00 | 12.57 | 23.50 | 184.10 | 28.67 | 99.00 | 0.00 | No Generati | Error | 30.22 | 10.08 | 20.96 | 28.07 | 25.20 | 26.66 | 262.11 | 22.41 | 115.21 |
| 6 | 0.00 | 12.02 | 22.28 | 184.02 | 30.80 | 101.52 | 0.00 | No Generati | Error | 30.19 | 10.09 | 22.06 | 31.23 | 26.16 | 28.11 | 259.85 | 26.31 | 133.83 |
| 7 | 30.06 | 12.28 | 25.68 | 184.46 | 31.01 | 105.69 | 0.00 | No Generati | Error | 45.30 | 10.11 | 25.36 | 40.25 | 26.68 | 32.97 | 305.85 | 31.37 | 147.44 |
| 8 | 30.12 | 15.99 | 24.90 | 180.55 | 29.61 | 123.38 | 0.00 | No Generati | Error | 45.33 | 10.48 | 28.78 | 37.27 | 25.21 | 29.52 | 312.43 | 22.74 | 163.65 |
| 9 | 28.13 | 20.39 | 23.86 | 179.98 | 29.87 | 121.05 | 0.00 | No Generati | Error | 40.21 | 10.49 | 28.78 | 32.04 | 25.24 | 28.74 | 209.78 | 52.27 | 163.49 |
| 10 | 30.29 | 20.82 | 24.18 | 174.80 | 45.53 | 130.44 | 0.00 | No Generati | Error | 40.59 | 20.35 | 30.09 | 33.25 | 25.24 | 29.25 | 258.61 | 69.88 | 175.01 |
| 11 | 30.43 | 22.82 | 26.20 | 182.76 | 45.97 | 132.83 | 0.00 | No Generati | Error | 49.50 | 20.30 | 35.70 | 37.28 | 26.44 | 30.72 | 301.50 | 123.52 | 185.17 |
| 12 | 29.12 | 20.48 | 25.43 | 184.00 | 35.48 | 131.71 | 0.00 | No Generati | Error | 48.26 | 20.40 | 32.99 | 33.30 | 26.24 | 28.85 | 260.95 | 65.11 | 188.43 |
| 13 | 28.76 | 13.75 | 23.67 | 184.03 | 35.71 | 132.96 | 0.00 | No Generati | Error | 45.26 | 20.32 | 33.83 | 30.25 | 25.21 | 27.62 | 255.56 | 130.70 | 185.48 |
| 14 | 28.86 | 7.58 | 24.29 | 183.62 | 46.01 | 137.49 | 0.00 | No Generati | Error | 48.47 | 20.87 | 33.73 | 29.76 | 25.19 | 27.32 | 220.98 | 135.14 | 185.08 |
| 15 | 30.13 | 12.35 | 27.04 | 180.98 | 78.04 | 136.25 | 0.00 | No Generati | Error | 45.90 | 30.07 | 36.94 | 32.76 | 25.20 | 28.57 | 225.45 | 115.62 | 189.57 |
| 16 | 30.17 | 22.08 | 27.08 | 163.42 | 119.22 | 140.41 | 0.00 | No Generati | Error | 40.36 | 30.07 | 33.34 | 30.78 | 25.20 | 28.05 | 247.37 | 124.64 | 199.79 |
| 17 | 30.63 | 8.15 | 26.26 | 182.08 | 131.89 | 149.30 | 280.00 | 110.00 | 207.69 | 45.49 | 20.15 | 34.23 | 31.27 | 25.25 | 27.93 | 247.45 | 126.86 | 200.14 |
| 18 | 32.06 | 8.17 | 28.09 | 172.98 | 140.56 | 156.61 | 340.00 | 260.00 | 297.08 | 45.93 | 20.16 | 39.21 | 31.76 | 25.70 | 28.16 | 273.91 | 160.49 | 205.60 |
| 19 | 32.10 | 8.03 | 26.87 | 182.52 | 150.35 | 166.19 | 385.00 | 310.00 | 346.25 | 49.50 | 30.28 | 45.08 | 33.28 | 25.72 | 28.05 | 341.11 | 161.85 | 245.24 |
| 20 | 31.19 | 9.46 | 28.80 | 226.96 | 134.44 | 186.89 | 465.00 | 310.00 | 384.17 | 49.50 | 35.26 | 48.79 | 30.26 | 25.76 | 27.75 | 301.74 | 185.84 | 236.93 |
| 21 | 30.26 | 23.50 | 27.48 | 220.10 | 155.54 | 167.29 | 480.00 | 295.00 | 352.29 | 49.50 | 30.52 | 42.07 | 28.30 | 25.22 | 27.02 | 251.57 | 174.09 | 229.83 |
| 22 | 29.24 | 23.13 | 26.48 | 182.70 | 154.02 | 162.97 | 345.00 | 285.00 | 316.46 | 46.41 | 31.41 | 40.08 | 27.23 | 24.19 | 25.56 | 247.88 | 170.67 | 215.25 |
| 23 | 29.90 | 17.94 | 25.95 | 165.73 | 146.05 | 156.36 | 335.00 | 290.00 | 316.04 | 45.57 | 30.64 | 37.73 | 28.23 | 23.19 | 26.19 | 233.10 | 175.43 | 208.31 |
| 24 | 29.79 | 9.14 | 23.90 | 168.36 | 130.82 | 147.98 | 320.00 | 255.00 | 278.54 | 48.56 | 30.96 | 42.17 | 26.74 | 22.20 | 24.94 | 230.56 | 160.67 | 200.27 |
| 25 | 37.50 | 13.03 | 23.49 | 222.14 | 139.88 | 168.60 | 370.00 | 280.00 | 320.21 | 45.46 | 30.84 | 37.38 | 26.74 | 23.20 | 24.77 | 220.26 | 155.91 | 196.19 |
| 26 | 48.46 | 17.56 | 31.28 | 200.18 | 143.99 | 179.90 | 445.00 | 305.00 | 400.00 | 53.70 | 30.13 | 35.46 | 29.30 | 24.21 | 26.89 | 225.76 | 154.87 | 193.27 |
| 27 | 27.27 | 16.84 | 21.15 | 144.71 | 129.78 | 137.58 | 285.00 | 255.00 | 263.96 | 34.80 | 20.17 | 29.14 | 25.24 | 22.20 | 23.59 | 198.03 | 135.71 | 162.30 |
| 28 | 26.96 | 16.87 | 20.32 | 147.95 | 118.39 | 133.87 | 290.00 | 240.00 | 257.71 | 40.38 | 30.05 | 35.10 | 23.71 | 22.21 | 22.88 | 190.37 | 143.79 | 168.82 |
| 29 | 27.50 | 12.65 | 22.01 | 161.27 | 126.62 | 142.66 | 350.00 | 230.00 | 269.58 | 45.31 | 30.22 | 35.76 | 24.24 | 22.18 | 22.86 | 323.53 | 135.56 | 198.80 |
| 30 | 26.25 | 21.43 | 22.28 | 249.71 | 133.19 | 183.27 | 480.00 | 250.00 | 354.17 | 48.45 | 30.35 | 40.29 | 24.21 | 22.17 | 23.09 | 340.08 | 140.75 | 217.74 |
| 31 | 25.88 | 17.80 | 22.66 | 251.31 | 147.53 | 189.35 | 480.00 | 290.00 | 379.38 | 65.64 | 40.21 | 49.66 | 24.72 | 22.72 | 23.59 | 312.82 | 200.39 | 245.12 |
| **Max** | **48.46** | | | **251.31** | | | **480.00** | | | **65.64** | | | **40.25** | | | **341.11** | | |
| **Min** | | **0.00** | | | **28.67** | | | **110.00** | | | **10.06** | | | **22.17** | | | **20.87** | |
| Source: THP, CHP, BHP, KHP,MHP (DGPC) | | | | | | | | | | | | | | | | | | |

Graph: Generation for the month of March, 2022

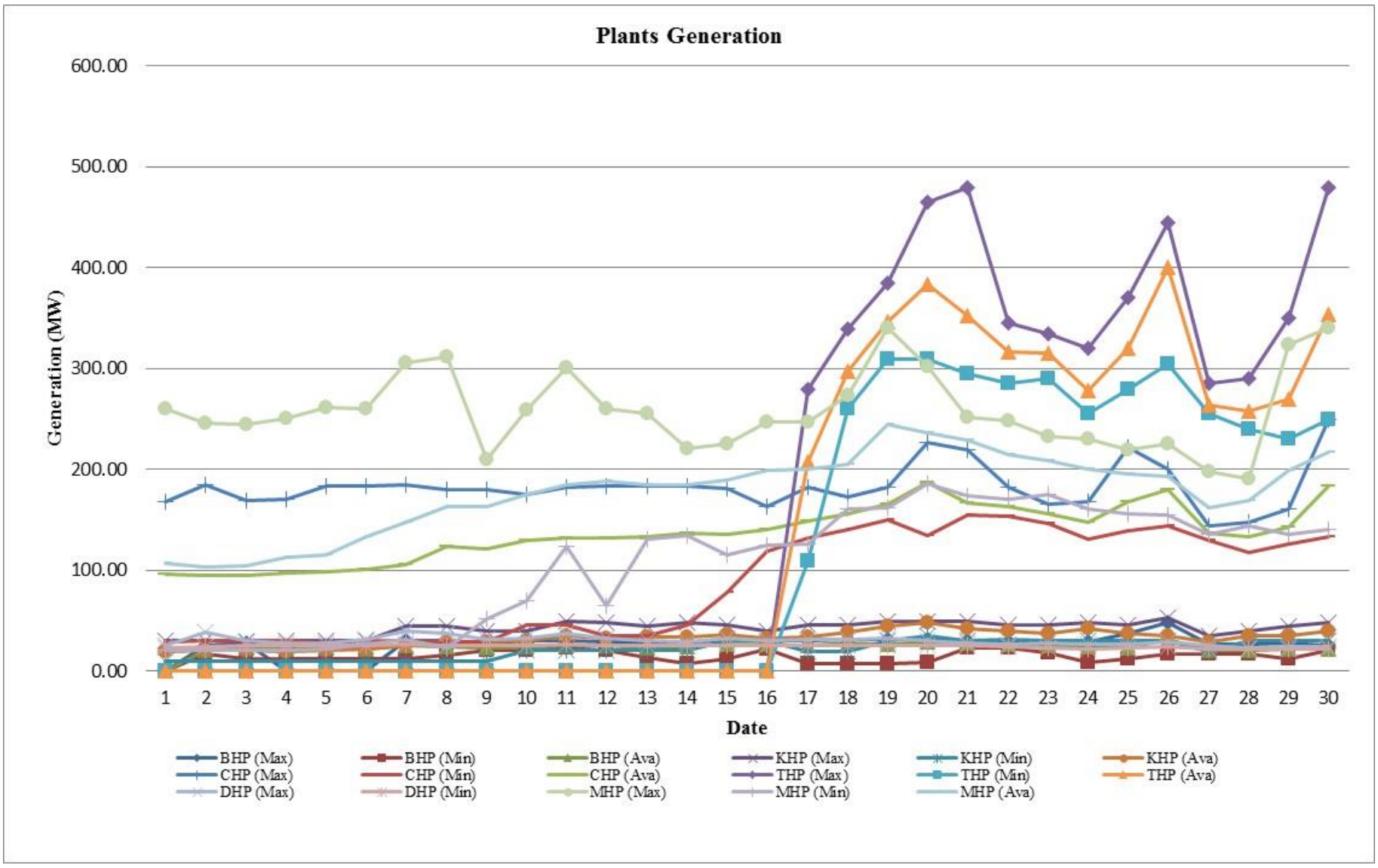



Table: National demand for January, 2022

| Jan-22 | Max | Min | Ava |
|---|---|---|---|
| 0:00 | 342.15 | 231.90 | 255.09 |
| 1:00 | 259.54 | 215.69 | 241.57 |
| 2:00 | 258.89 | 213.30 | 239.53 |
| 3:00 | 253.06 | 209.13 | 236.63 |
| 4:00 | 251.44 | 208.18 | 238.98 |
| 5:00 | 255.79 | 210.35 | 240.94 |
| 6:00 | 268.40 | 225.95 | 251.43 |
| 7:00 | 297.88 | 250.97 | 279.00 |
| 8:00 | 347.14 | 288.74 | 311.43 |
| 9:00 | 345.10 | 298.00 | 317.20 |
| 10:00 | 339.35 | 275.45 | 312.96 |
| 11:00 | 339.75 | 274.35 | 309.61 |
| 12:00 | 340.76 | 266.24 | 310.93 |
| 13:00 | 338.65 | 269.29 | 309.19 |
| 14:00 | 330.98 | 271.65 | 304.68 |
| 15:00 | 328.28 | 271.79 | 304.31 |
| 16:00 | 321.39 | 273.93 | 306.36 |
| 17:00 | 354.37 | 287.76 | 321.26 |
| 18:00 | 380.90 | 305.20 | 350.09 |
| 19:00 | 380.56 | 322.55 | 354.72 |
| 20:00 | 361.84 | 299.68 | 341.56 |
| 21:00 | 344.58 | 292.38 | 324.11 |
| 22:00 | 323.37 | 272.73 | 299.68 |
| 23:00 | 296.90 | 252.81 | 272.71 |
| | | | |
| | 380.90 | | |
| | | 208.18 | |

Graph: National Demand for January, 2022

**Annexure-II**

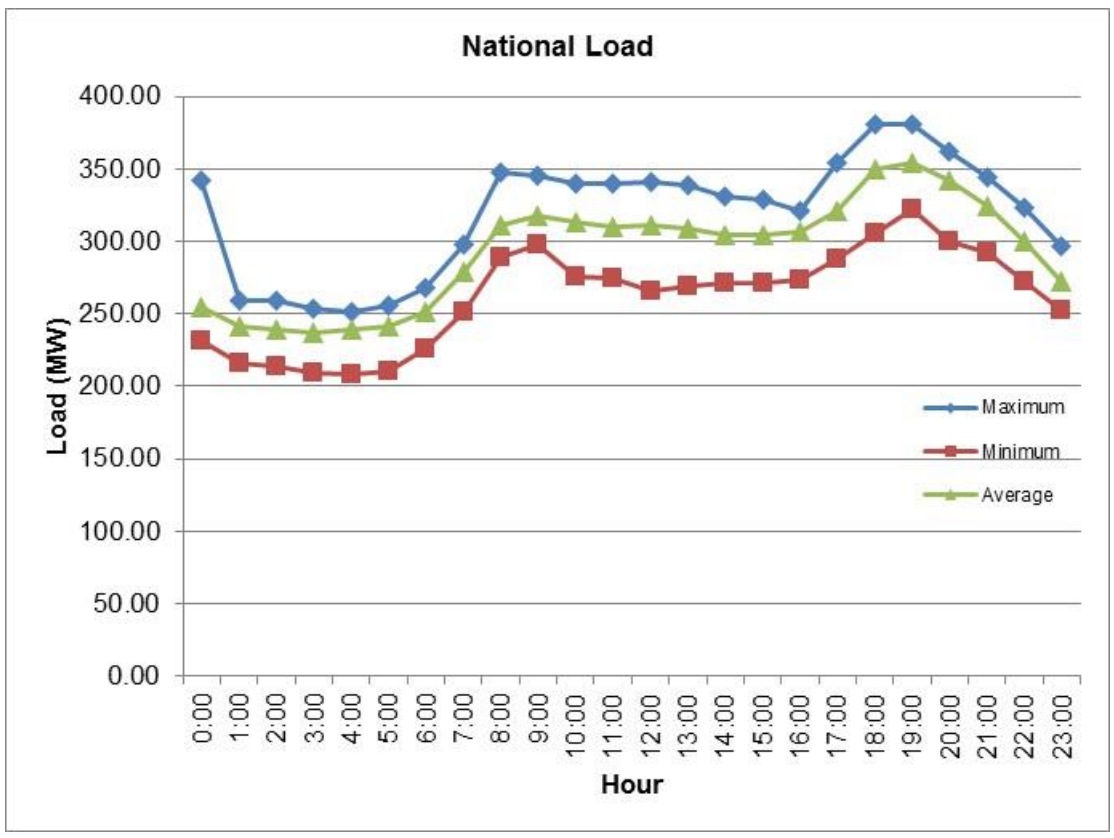


Table: National Demand for February, 2022

| Feb-22 | Max | Min | Ava |
|---|---|---|---|
| 0:00 | 358.01 | 2.75 | 222.85 |
| 1:00 | 281.76 | 12.74 | 233.26 |
| 2:00 | 278.28 | 0.93 | 229.02 |
| 3:00 | 273.68 | 0.86 | 227.18 |
| 4:00 | 269.94 | 0.85 | 224.89 |
| 5:00 | 273.07 | 0.87 | 227.71 |
| 6:00 | 277.97 | 1.01 | 234.89 |
| 7:00 | 310.75 | 1.86 | 258.14 |
| 8:00 | 347.31 | 2.56 | 286.37 |
| 9:00 | 353.14 | 2.64 | 295.93 |
| 10:00 | 354.77 | 2.46 | 292.64 |
| 11:00 | 360.02 | 2.11 | 293.16 |
| 12:00 | 366.59 | 1.97 | 298.26 |
| 13:00 | 360.86 | 1.89 | 295.61 |
| 14:00 | 351.28 | 1.84 | 289.21 |
| 15:00 | 352.28 | 1.72 | 289.33 |
| 16:00 | 351.56 | 1.97 | 287.49 |
| 17:00 | 361.24 | 2.56 | 297.61 |
| 18:00 | 385.09 | 4.10 | 323.75 |
| 19:00 | 399.67 | 3.96 | 335.90 |
| 20:00 | 385.43 | 3.32 | 321.85 |
| 21:00 | 363.10 | 2.56 | 306.90 |
| 22:00 | 331.82 | 1.92 | 282.62 |
| 23:00 | 308.41 | 1.39 | 259.62 |
| | | | |
| | 399.67 | | |
| | | 0.85 | |

Graph: National Demand for February, 2022

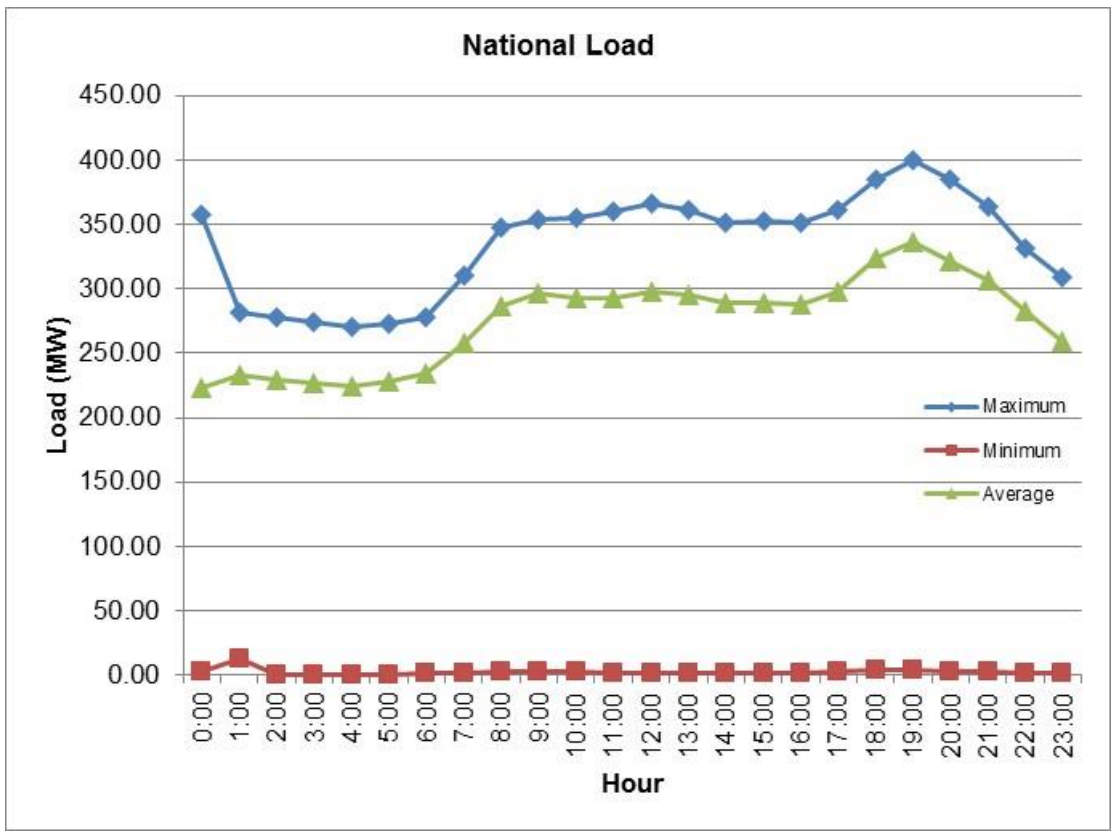
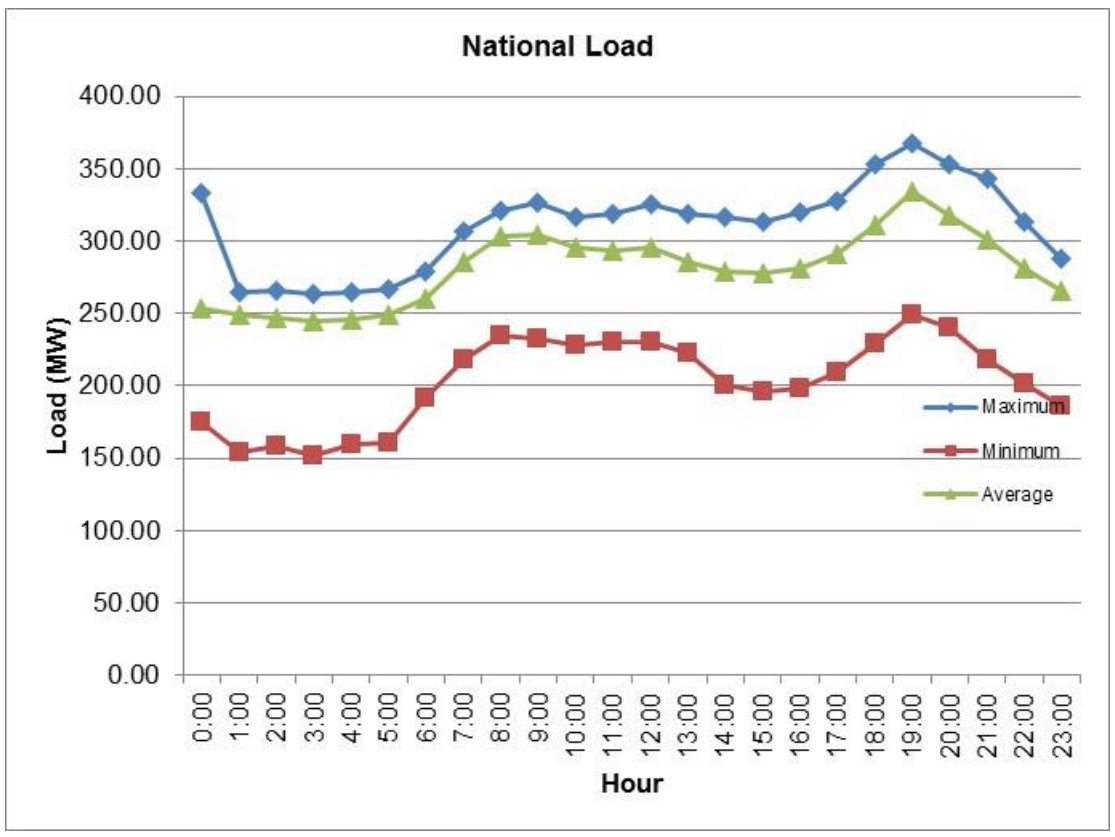



Table: National Demand for March, 2022

| Mar-22 | Max | Min | Ava |
|---|---|---|---|
| 0:00 | 332.74 | 175.63 | 254.12 |
| 1:00 | 264.52 | 154.42 | 249.33 |
| 2:00 | 265.70 | 158.26 | 247.05 |
| 3:00 | 263.89 | 151.46 | 245.22 |
| 4:00 | 264.63 | 159.24 | 245.76 |
| 5:00 | 266.40 | 161.08 | 249.11 |
| 6:00 | 278.86 | 191.91 | 260.39 |
| 7:00 | 306.65 | 218.70 | 285.47 |
| 8:00 | 320.75 | 234.42 | 303.43 |
| 9:00 | 327.13 | 232.31 | 304.27 |
| 10:00 | 317.15 | 228.57 | 295.57 |
| 11:00 | 319.10 | 230.19 | 292.96 |
| 12:00 | 325.10 | 230.01 | 296.04 |
| 13:00 | 319.13 | 222.71 | 285.62 |
| 14:00 | 317.00 | 200.52 | 279.22 |
| 15:00 | 313.09 | 196.27 | 277.75 |
| 16:00 | 319.93 | 198.27 | 281.75 |
| 17:00 | 327.66 | 209.15 | 291.36 |
| 18:00 | 353.04 | 228.79 | 311.10 |
| 19:00 | 367.10 | 249.17 | 334.22 |
| 20:00 | 353.63 | 240.88 | 318.11 |
| 21:00 | 343.18 | 218.48 | 300.88 |
| 22:00 | 313.50 | 201.80 | 281.50 |
| 23:00 | 287.98 | 186.26 | 265.42 |
| | | | |
| | 367.10 | | |
| | | 151.46 | |

Graph: National Demand for March, 2022



**Annexure-III**

Table: Daily maximum, minimum and average frequency for the month of January, 2022

| Jan-22 | Bus Frequency at Semtokha Substation | | | Bus Frequency at Kurichhu Hydropower Plant | | |
|---|---|---|---|---|---|---|
| Date | Max | Min | Ava | Max | Min | Ava |
| 1 | 50.00 | 49.80 | 49.94 | 50.11 | 49.89 | 50.02 |
| 2 | 50.00 | 49.80 | 49.95 | 50.08 | 49.92 | 50.02 |
| 3 | 50.00 | 49.80 | 49.94 | 50.08 | 49.81 | 49.99 |
| 4 | 50.00 | 49.80 | 49.93 | 50.10 | 49.79 | 50.00 |
| 5 | 50.00 | 49.70 | 49.93 | 50.06 | 49.84 | 50.00 |
| 6 | 50.00 | 49.80 | 49.95 | 50.12 | 49.87 | 50.02 |
| 7 | 50.00 | 49.70 | 49.96 | 50.11 | 49.74 | 50.01 |
| 8 | 50.10 | 49.80 | 49.97 | 50.13 | 49.94 | 50.03 |
| 9 | 50.00 | 49.90 | 49.97 | 50.08 | 49.95 | 50.02 |
| 10 | 50.10 | 49.90 | 49.95 | 50.10 | 49.94 | 50.05 |
| 11 | 50.00 | 49.90 | 49.97 | 50.10 | 49.94 | 50.02 |
| 12 | 50.10 | 49.80 | 49.98 | 50.12 | 49.93 | 50.02 |
| 13 | 50.00 | 49.90 | 49.97 | 50.09 | 49.94 | 50.02 |
| 14 | 50.10 | 49.80 | 49.93 | 50.10 | 49.87 | 50.01 |
| 15 | 50.00 | 49.80 | 49.93 | 50.11 | 49.86 | 50.02 |
| 16 | 50.00 | 49.80 | 49.94 | 50.07 | 49.49 | 49.99 |
| 17 | 50.00 | 49.90 | 49.96 | 50.08 | 49.95 | 50.02 |
| 18 | 50.00 | 49.70 | 49.93 | 50.07 | 49.85 | 50.01 |
| 19 | 50.00 | 49.80 | 49.95 | 50.09 | 49.89 | 50.00 |
| 20 | 50.00 | 49.90 | 49.95 | 50.10 | 49.93 | 50.01 |
| 21 | 50.00 | 49.80 | 49.95 | 50.11 | 49.75 | 49.99 |
| 22 | 50.00 | 49.90 | 49.97 | 50.08 | 49.89 | 50.01 |
| 23 | 50.00 | 49.90 | 49.98 | 50.09 | 49.97 | 50.02 |
| 24 | 50.00 | 49.80 | 49.97 | 50.13 | 49.88 | 50.03 |
| 25 | 50.00 | 49.90 | 49.95 | 50.10 | 49.90 | 50.03 |
| 26 | 50.00 | 49.80 | 49.93 | 50.06 | 49.87 | 50.00 |
| 27 | 50.00 | 49.90 | 49.95 | 50.09 | 49.97 | 50.03 |
| 28 | 50.00 | 49.80 | 49.93 | 50.08 | 49.84 | 50.00 |
| 29 | 50.00 | 49.80 | 49.93 | 50.09 | 49.82 | 49.99 |
| 30 | 50.00 | 49.80 | 49.96 | 50.08 | 49.92 | 50.03 |
| 31 | 50.00 | 49.90 | 49.95 | 50.07 | 49.92 | 50.02 |
| **Max** | **50.10** | | | **50.13** | | |
| **Min** | | **49.70** | | | **49.49** | |
| Source: TD (BPC), KHP (DGPC) | | | | | | |

Graph: Daily maximum, minimum and average frequency for the month of January, 2022

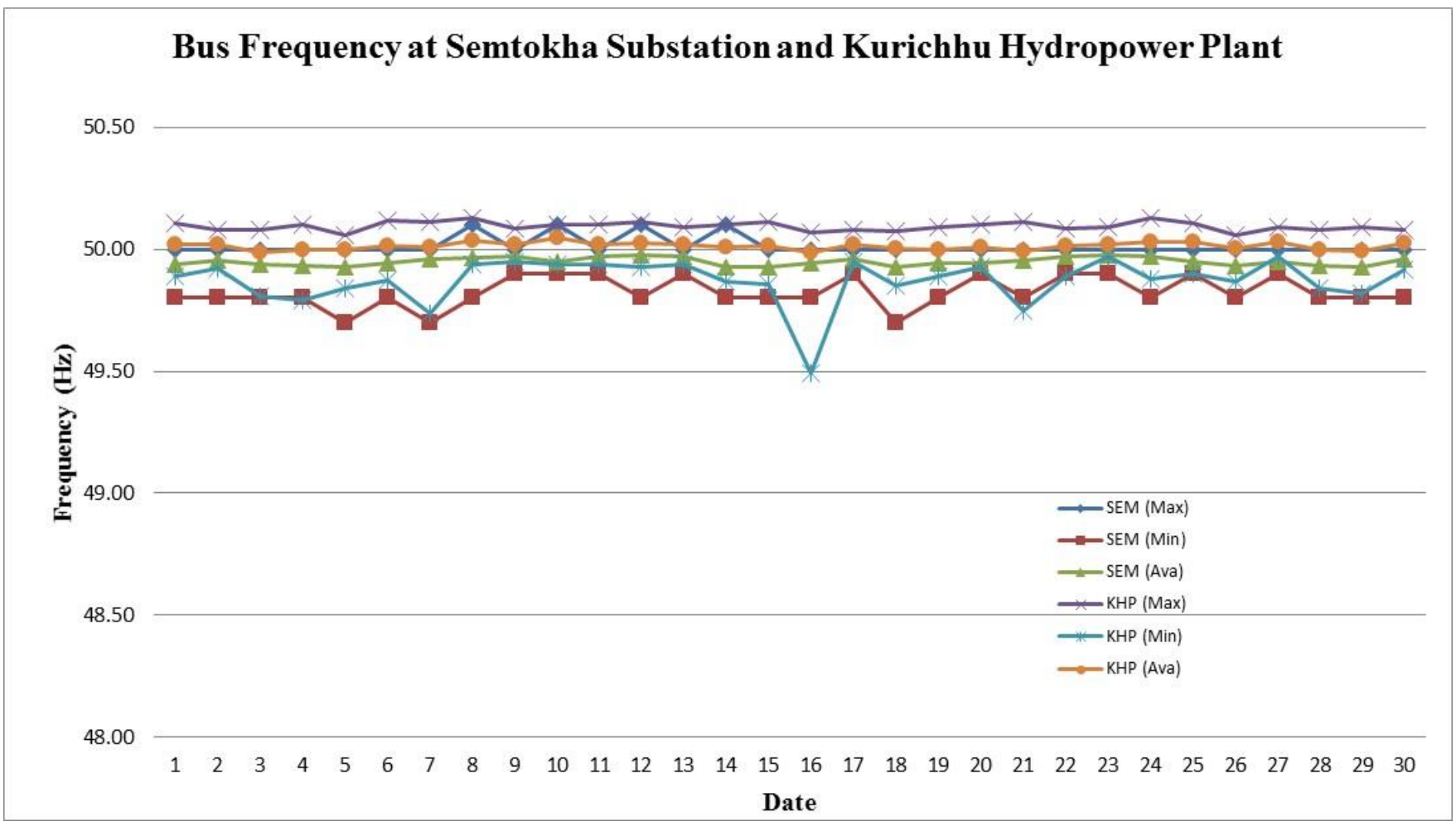


Table: Daily maximum, minimum and average frequency for the month of February, 2022

| Feb-21 | Bus Frequency at Semtokha Substation | | | Bus Frequency at Kurichhu Hydropower Plant | | |
|---|---|---|---|---|---|---|
| Date | Max | Min | Ava | Max | Min | Ava |
| 1 | 50.00 | 49.80 | 49.95 | 50.08 | 49.89 | 50.00 |
| 2 | 50.00 | 49.50 | 49.92 | 50.06 | 49.87 | 50.02 |
| 3 | 50.00 | 49.80 | 49.96 | 50.09 | 49.79 | 50.01 |
| 4 | 50.00 | 49.80 | 49.95 | 50.11 | 49.94 | 50.03 |
| 5 | 50.00 | 49.90 | 49.98 | 50.07 | 49.94 | 50.03 |
| 6 | 50.00 | 49.90 | 49.97 | 50.09 | 49.94 | 50.02 |
| 7 | 50.00 | 49.80 | 49.96 | 53.10 | 43.20 | 49.77 |
| 8 | 50.00 | 49.70 | 49.94 | 50.06 | 49.78 | 49.99 |
| 9 | 50.00 | 49.90 | 49.98 | 50.07 | 49.96 | 50.03 |
| 10 | 50.00 | 49.80 | 49.96 | 50.09 | 49.97 | 50.04 |
| 11 | 50.00 | 49.70 | 49.94 | 50.12 | 49.95 | 50.02 |
| 12 | 50.00 | 49.90 | 49.95 | 50.06 | 49.89 | 49.99 |
| 13 | 50.00 | 49.80 | 49.94 | 50.06 | 49.89 | 50.00 |
| 14 | 50.00 | 49.90 | 49.96 | 50.20 | 49.82 | 50.02 |
| 15 | 50.00 | 49.70 | 49.93 | 50.08 | 49.85 | 49.99 |
| 16 | 50.00 | 49.90 | 49.93 | 50.09 | 49.85 | 49.99 |
| 17 | 50.00 | 49.80 | 49.94 | 50.07 | 49.86 | 50.01 |
| 18 | 50.00 | 49.80 | 49.97 | 50.08 | 49.93 | 50.01 |
| 19 | 50.00 | 49.80 | 49.96 | 50.08 | 49.87 | 50.01 |
| 20 | 50.00 | 49.90 | 49.95 | 50.07 | 49.91 | 50.01 |
| 21 | 50.00 | 49.80 | 49.95 | 50.06 | 45.90 | 49.81 |
| 22 | 50.00 | 49.70 | 49.95 | 50.09 | 49.83 | 50.01 |
| 23 | 50.00 | 49.90 | 49.93 | 50.08 | 49.94 | 50.01 |
| 24 | 50.00 | 49.70 | 49.91 | 50.07 | 49.87 | 49.98 |
| 25 | 50.00 | 49.80 | 49.95 | 50.10 | 49.86 | 50.00 |
| 26 | 50.00 | 49.80 | 49.96 | 50.08 | 49.91 | 50.02 |
| 27 | 50.00 | 49.90 | 49.97 | 50.10 | 49.93 | 50.03 |
| 28 | 50.00 | 49.90 | 49.98 | 50.08 | 49.92 | 50.02 |
| 29 | 0.00 | Error | Error | 0.00 | Error | Error |
| 30 | 0.00 | Error | Error | 0.00 | Error | Error |
| 31 | 0.00 | Error | Error | 0.00 | Error | Error |
| **Max** | **50.00** | | | **53.10** | | |
| **Min** | | **49.50** | | | **43.20** | |
| Source: TD (BPC), KHP (DGPC) | | | | | | |

Graph: Daily maximum, minimum and average frequency for the month of February, 2022

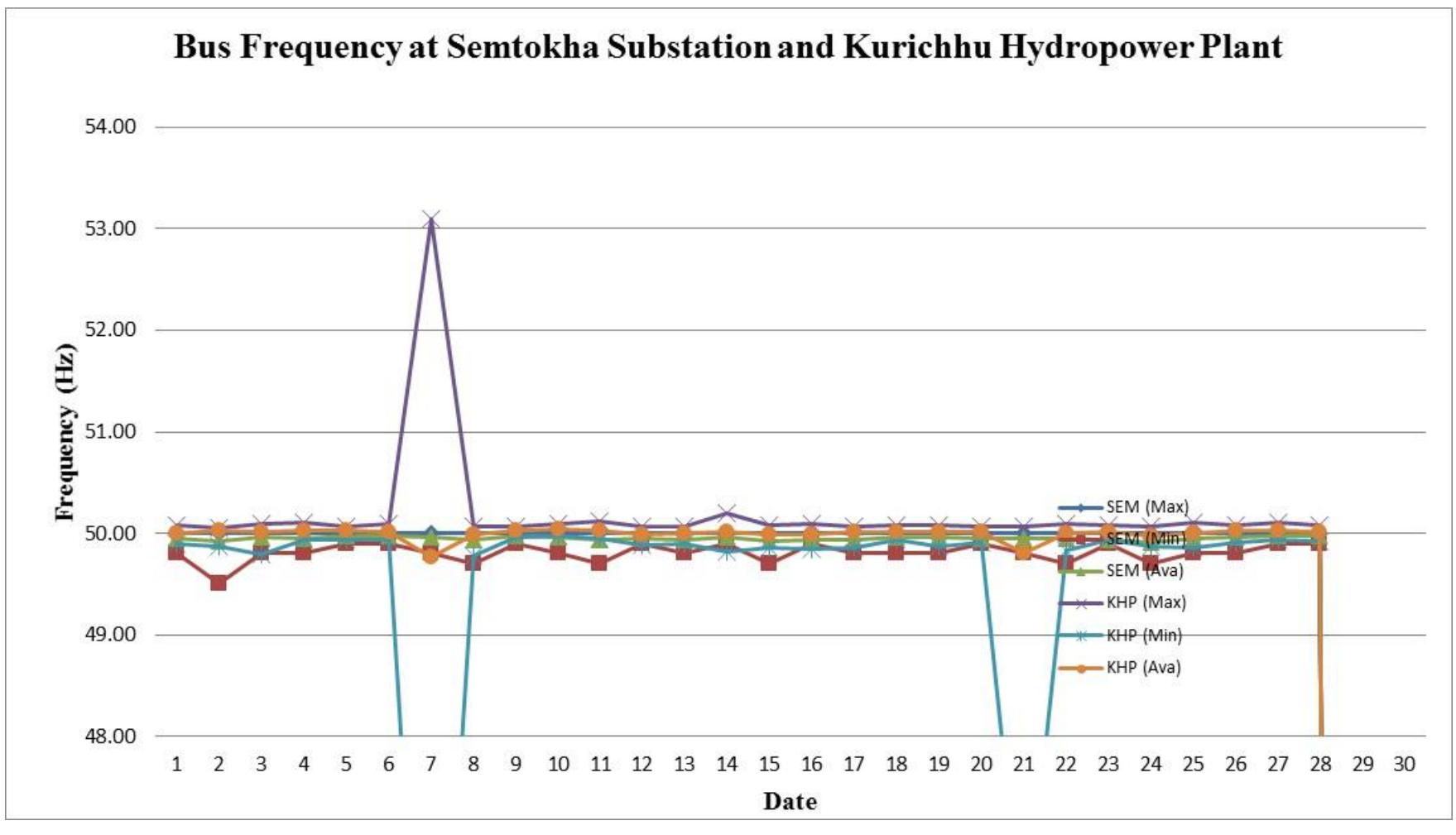
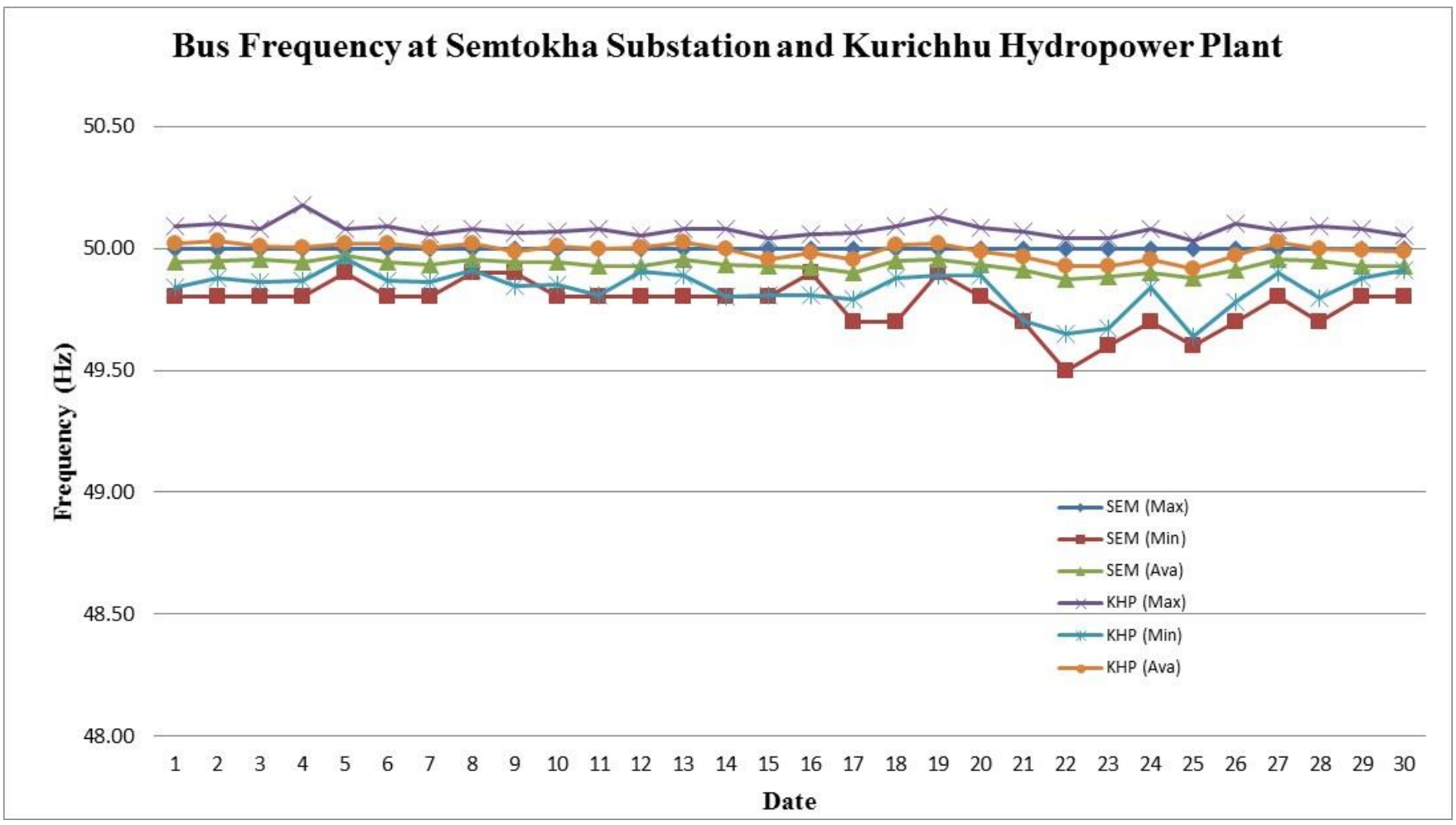


Table: Daily maximum, minimum and average frequency for the month of March, 2022

| Mar-22 | Bus Frequency at Semtokha Substation | | | Bus Frequency at Kurichhu Hydropower Plant | | |
|---|---|---|---|---|---|---|
| Date | Max | Min | Ava | Max | Min | Ava |
| 1 | 50.00 | 49.80 | 49.95 | 50.09 | 49.84 | 50.02 |
| 2 | 50.00 | 49.80 | 49.95 | 50.10 | 49.88 | 50.03 |
| 3 | 50.00 | 49.80 | 49.95 | 50.08 | 49.86 | 50.01 |
| 4 | 50.00 | 49.80 | 49.94 | 50.18 | 49.87 | 50.00 |
| 5 | 50.00 | 49.90 | 49.97 | 50.08 | 49.96 | 50.02 |
| 6 | 50.00 | 49.80 | 49.95 | 50.09 | 49.87 | 50.02 |
| 7 | 50.00 | 49.80 | 49.93 | 50.06 | 49.86 | 50.00 |
| 8 | 50.00 | 49.90 | 49.95 | 50.08 | 49.91 | 50.02 |
| 9 | 50.00 | 49.90 | 49.95 | 50.06 | 49.85 | 49.99 |
| 10 | 50.00 | 49.80 | 49.95 | 50.07 | 49.85 | 50.01 |
| 11 | 50.00 | 49.80 | 49.93 | 50.08 | 49.81 | 50.00 |
| 12 | 50.00 | 49.80 | 49.93 | 50.05 | 49.91 | 50.00 |
| 13 | 50.00 | 49.80 | 49.95 | 50.08 | 49.89 | 50.03 |
| 14 | 50.00 | 49.80 | 49.93 | 50.08 | 49.80 | 50.00 |
| 15 | 50.00 | 49.80 | 49.93 | 50.04 | 49.81 | 49.95 |
| 16 | 50.00 | 49.90 | 49.92 | 50.06 | 49.81 | 49.98 |
| 17 | 50.00 | 49.70 | 49.90 | 50.06 | 49.79 | 49.96 |
| 18 | 50.00 | 49.70 | 49.95 | 50.09 | 49.88 | 50.01 |
| 19 | 50.00 | 49.90 | 49.95 | 50.13 | 49.89 | 50.02 |
| 20 | 50.00 | 49.80 | 49.93 | 50.08 | 49.89 | 49.99 |
| 21 | 50.00 | 49.70 | 49.91 | 50.07 | 49.71 | 49.96 |
| 22 | 50.00 | 49.50 | 49.87 | 50.04 | 49.65 | 49.93 |
| 23 | 50.00 | 49.60 | 49.88 | 50.04 | 49.67 | 49.93 |
| 24 | 50.00 | 49.70 | 49.90 | 50.08 | 49.84 | 49.95 |
| 25 | 50.00 | 49.60 | 49.88 | 50.03 | 49.64 | 49.92 |
| 26 | 50.00 | 49.70 | 49.91 | 50.10 | 49.78 | 49.97 |
| 27 | 50.00 | 49.80 | 49.95 | 50.07 | 49.90 | 50.03 |
| 28 | 50.00 | 49.70 | 49.95 | 50.09 | 49.80 | 50.00 |
| 29 | 50.00 | 49.80 | 49.93 | 50.08 | 49.88 | 49.99 |
| 30 | 50.00 | 49.80 | 49.93 | 50.05 | 49.91 | 49.99 |
| 31 | 50.00 | 49.80 | 49.91 | 50.06 | 49.80 | 49.97 |
| **Max** | **50.00** | | | **50.18** | | |
| **Min** | | **49.50** | | | **49.64** | |
| Source: TD (BPC), KHP (DGPC) | | | | | | |

Graph: Daily maximum, minimum and average frequency for the month of March, 2022



**Annexure-IV**

Table: Daily maximum, minimum and average Voltage for the month of January, 2022

| Jan-22 | Malbase Substation | | | | | | | | | Nangkhor Substation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 400kV Bus Voltage (kV) | | | 220kV Bus Voltage (kV) | | | 66kV Bus Voltage (kV) | | | 132kV Bus Voltage (kV) | | |
| Date | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava |
| 1 | 424.50 | 408.00 | 418.21 | 223.00 | 214.50 | 219.79 | 67.00 | 64.00 | 65.54 | 136.30 | 131.70 | 134.01 |
| 2 | 427.00 | 405.50 | 419.21 | 226.50 | 214.00 | 220.83 | 68.00 | 64.30 | 66.40 | 136.90 | 131.12 | 133.73 |
| 3 | 426.50 | 321.50 | 410.27 | 225.00 | 214.50 | 219.96 | 68.00 | 65.00 | 66.08 | 136.50 | 130.49 | 133.56 |
| 4 | 426.00 | 408.00 | 417.15 | 224.00 | 214.50 | 219.15 | 67.00 | 64.00 | 65.91 | 135.27 | 129.40 | 133.51 |
| 5 | 426.00 | 407.50 | 416.50 | 224.50 | 214.00 | 218.96 | 68.00 | 64.00 | 65.75 | 136.31 | 129.32 | 133.51 |
| 6 | 424.50 | 409.50 | 418.35 | 223.00 | 214.50 | 219.25 | 67.00 | 64.50 | 65.94 | 135.30 | 131.74 | 133.23 |
| 7 | 424.50 | 406.50 | 417.65 | 224.00 | 214.00 | 219.29 | 67.00 | 64.00 | 65.73 | 136.50 | 131.32 | 134.29 |
| 8 | 425.00 | 407.00 | 418.94 | 223.50 | 214.00 | 220.04 | 67.00 | 65.00 | 66.02 | 135.78 | 130.08 | 133.34 |
| 9 | 427.00 | 322.00 | 415.54 | 226.50 | 216.00 | 221.19 | 67.18 | 65.00 | 66.30 | 136.30 | 130.29 | 133.61 |
| 10 | 429.00 | 409.50 | 418.73 | 228.00 | 215.00 | 220.21 | 68.00 | 64.20 | 65.93 | 136.10 | 130.08 | 133.24 |
| 11 | 426.00 | 236.50 | 401.83 | 225.00 | 214.00 | 219.63 | 68.00 | 65.00 | 66.10 | 136.70 | 130.90 | 133.63 |
| 12 | 427.50 | 412.00 | 421.02 | 226.00 | 217.00 | 222.06 | 67.00 | 65.00 | 66.15 | 136.50 | 131.30 | 133.76 |
| 13 | 428.50 | 408.50 | 419.81 | 225.00 | 214.50 | 220.63 | 68.00 | 65.00 | 66.35 | 135.69 | 130.20 | 133.29 |
| 14 | 426.00 | 407.50 | 419.13 | 224.00 | 215.50 | 220.65 | 68.00 | 65.00 | 66.38 | 135.40 | 130.20 | 133.24 |
| 15 | 425.00 | 407.50 | 418.83 | 224.00 | 213.00 | 219.85 | 67.00 | 64.00 | 66.02 | 134.86 | 129.40 | 133.40 |
| 16 | 427.00 | 404.50 | 419.83 | 224.50 | 214.00 | 221.02 | 68.00 | 64.00 | 66.52 | 136.10 | 129.87 | 134.18 |
| 17 | 428.50 | 407.50 | 419.23 | 226.50 | 215.00 | 221.13 | 68.50 | 65.00 | 66.45 | 136.30 | 130.87 | 134.08 |
| 18 | 427.00 | 407.50 | 418.46 | 225.00 | 214.50 | 220.38 | 68.00 | 65.00 | 66.33 | 143.40 | 131.90 | 134.55 |
| 19 | 424.50 | 408.50 | 417.42 | 225.00 | 214.50 | 220.19 | 68.00 | 64.40 | 66.11 | 135.90 | 130.70 | 133.88 |
| 20 | 426.50 | 408.00 | 418.77 | 225.00 | 215.00 | 220.46 | 68.00 | 65.00 | 66.28 | 135.90 | 129.60 | 133.61 |
| 21 | 425.00 | 407.50 | 418.54 | 224.00 | 215.00 | 220.69 | 68.00 | 64.00 | 66.21 | 136.31 | 131.50 | 134.14 |
| 22 | 427.00 | 410.50 | 419.71 | 225.00 | 216.00 | 220.77 | 67.00 | 65.00 | 66.11 | 136.50 | 130.91 | 133.86 |
| 23 | 423.50 | 409.00 | 418.73 | 224.50 | 216.00 | 221.44 | 67.00 | 65.00 | 66.48 | 136.52 | 130.70 | 134.42 |
| 24 | 425.50 | 404.50 | 417.85 | 224.50 | 214.50 | 220.33 | 68.00 | 64.50 | 65.97 | 135.42 | 131.12 | 134.04 |
| 25 | 425.00 | 405.50 | 417.21 | 224.50 | 214.50 | 219.90 | 67.00 | 65.00 | 65.88 | 135.90 | 131.74 | 134.01 |
| 26 | 425.00 | 407.50 | 418.60 | 224.50 | 216.00 | 220.77 | 68.00 | 65.00 | 66.33 | 136.52 | 131.95 | 134.51 |
| 27 | 425.00 | 402.00 | 416.60 | 225.00 | 212.50 | 220.00 | 68.00 | 64.00 | 66.00 | 136.52 | 131.33 | 134.60 |
| 28 | 424.00 | 407.00 | 416.77 | 223.50 | 215.00 | 219.69 | 68.00 | 65.00 | 66.21 | 136.73 | 130.08 | 134.01 |
| 29 | 424.00 | 404.50 | 416.79 | 224.50 | 213.00 | 218.46 | 67.00 | 64.00 | 65.29 | 136.73 | 130.29 | 133.93 |
| 30 | 424.50 | 406.50 | 419.27 | 223.50 | 214.50 | 220.40 | 67.00 | 64.50 | 66.04 | 135.60 | 130.70 | 133.67 |
| 31 | 427.00 | 404.50 | 418.29 | 224.50 | 212.00 | 219.81 | 67.00 | 63.00 | 65.66 | 136.10 | 131.12 | 133.59 |
| **Max** | **429.00** | | | **228.00** | | | **68.50** | | | **143.40** | | |
| **Min** | | **236.50** | | | **212.00** | | | **63.00** | | | **129.32** | |
| Source: TD, BPC | | | | | | | | | | | | |

Graph: Daily maximum, minimum and average Voltage for the month of January, 2022

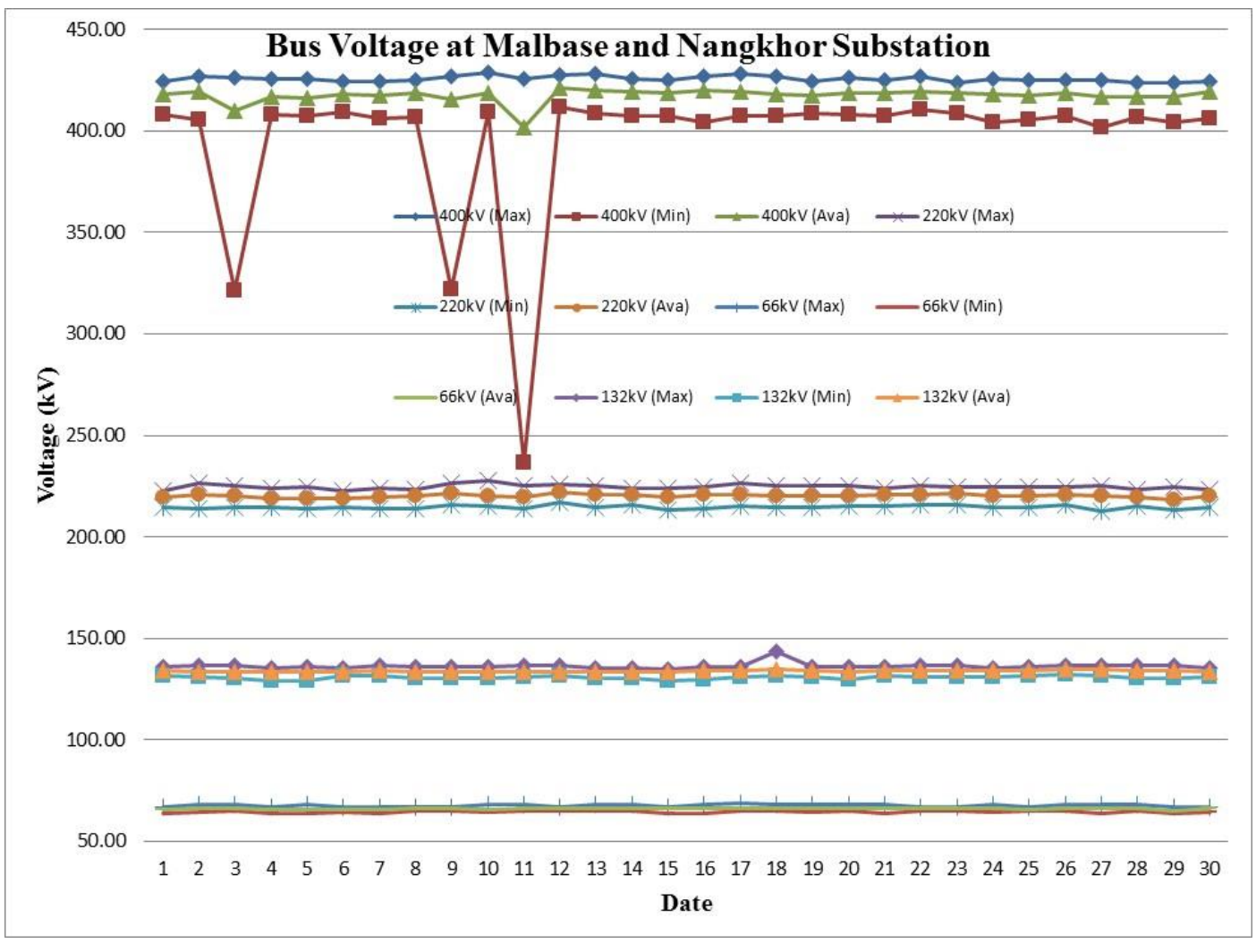


Table: Daily maximum, minimum and average Voltage for the month of February, 2022

| Feb-22 | Malbase Substation | | | | | | | | | Nangkhor Substation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 400kV Bus Voltage (kV) | | | 220kV Bus Voltage (kV) | | | 66kV Bus Voltage (kV) | | | 132kV Bus Voltage (kV) | | |
| Date | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava |
| 1 | 424.50 | 407.50 | 416.83 | 223.50 | 214.00 | 219.63 | 67.00 | 64.00 | 65.79 | 136.31 | 130.40 | 133.36 |
| 2 | 425.50 | 410.00 | 418.94 | 224.00 | 215.00 | 220.00 | 68.00 | 65.00 | 66.19 | 136.52 | 130.91 | 134.03 |
| 3 | 425.00 | 409.00 | 418.23 | 224.50 | 215.50 | 220.56 | 67.12 | 65.00 | 66.30 | 136.90 | 132.16 | 134.59 |
| 4 | 424.00 | 407.50 | 418.02 | 223.50 | 216.00 | 220.75 | 68.00 | 65.00 | 66.46 | 136.10 | 131.42 | 133.72 |
| 5 | 428.00 | 404.00 | 418.90 | 226.50 | 214.50 | 222.15 | 69.00 | 65.00 | 66.88 | 137.77 | 132.16 | 134.66 |
| 6 | 424.50 | 407.00 | 418.58 | 227.00 | 216.50 | 221.71 | 69.00 | 65.00 | 66.79 | 135.69 | 131.74 | 133.61 |
| 7 | 427.00 | 403.50 | 417.15 | 226.00 | 214.50 | 220.92 | 68.00 | 64.00 | 66.42 | 135.86 | 129.25 | 132.76 |
| 8 | 424.50 | 403.50 | 416.58 | 225.00 | 214.00 | 220.49 | 68.00 | 64.00 | 66.01 | 135.90 | 130.20 | 133.96 |
| 9 | 426.50 | 405.00 | 417.35 | 225.00 | 214.50 | 220.19 | 68.00 | 64.00 | 65.92 | 136.31 | 130.20 | 133.68 |
| 10 | 565.00 | 407.00 | 424.75 | 225.00 | 214.00 | 221.35 | 68.00 | 64.25 | 66.48 | 136.94 | 130.71 | 133.99 |
| 11 | 424.50 | 410.50 | 418.52 | 224.50 | 217.00 | 221.25 | 68.00 | 65.00 | 66.33 | 135.48 | 131.74 | 134.43 |
| 12 | 427.00 | 412.50 | 420.19 | 226.50 | 214.00 | 221.77 | 68.00 | 65.00 | 66.55 | 137.56 | 133.40 | 135.41 |
| 13 | 424.50 | 412.50 | 418.44 | 225.00 | 217.50 | 221.10 | 67.00 | 65.40 | 66.48 | 136.73 | 131.74 | 134.49 |
| 14 | 425.50 | 407.00 | 417.94 | 225.00 | 214.00 | 221.00 | 68.00 | 64.50 | 66.38 | 136.52 | 131.95 | 134.11 |
| 15 | 424.50 | 410.00 | 416.44 | 224.50 | 216.50 | 219.54 | 67.00 | 64.50 | 65.66 | 137.56 | 131.10 | 134.78 |
| 16 | 425.00 | 411.00 | 417.98 | 224.50 | 216.50 | 220.46 | 67.00 | 65.00 | 66.06 | 136.94 | 133.20 | 134.77 |
| 17 | 426.00 | 412.00 | 418.27 | 225.00 | 216.00 | 220.56 | 68.00 | 65.00 | 66.46 | 136.52 | 131.12 | 134.59 |
| 18 | 425.50 | 320.50 | 413.46 | 225.50 | 217.00 | 220.35 | 68.00 | 65.00 | 65.98 | 137.85 | 131.12 | 134.29 |
| 19 | 424.00 | 409.50 | 417.27 | 224.50 | 216.00 | 220.04 | 67.00 | 58.00 | 65.33 | 137.50 | 131.74 | 134.93 |
| 20 | 422.50 | 410.50 | 415.69 | 223.50 | 216.00 | 219.25 | 67.00 | 65.00 | 65.71 | 136.73 | 130.91 | 133.50 |
| 21 | 425.00 | 409.50 | 416.33 | 225.00 | 216.00 | 220.00 | 67.50 | 65.00 | 65.76 | 138.81 | 131.12 | 133.67 |
| 22 | 424.50 | 409.00 | 416.85 | 224.50 | 216.00 | 220.15 | 68.00 | 65.00 | 66.05 | 136.94 | 131.50 | 134.52 |
| 23 | 422.00 | 410.00 | 415.77 | 224.50 | 216.50 | 219.75 | 68.00 | 65.00 | 65.92 | 137.56 | 128.60 | 134.08 |
| 24 | 420.50 | 412.50 | 416.63 | 222.00 | 217.50 | 219.63 | 67.00 | 65.00 | 66.00 | 137.32 | 131.12 | 134.22 |
| 25 | 422.50 | 411.50 | 417.04 | 223.50 | 217.00 | 219.75 | 67.00 | 65.00 | 66.08 | 135.60 | 130.91 | 133.26 |
| 26 | 425.50 | 411.50 | 417.92 | 225.00 | 216.00 | 220.15 | 67.00 | 65.00 | 65.88 | 135.91 | 131.12 | 133.80 |
| 27 | 425.50 | 410.50 | 418.77 | 225.00 | 216.00 | 221.00 | 67.60 | 65.00 | 66.09 | 135.40 | 132.50 | 134.21 |
| 28 | 424.50 | 408.50 | 416.98 | 225.00 | 215.00 | 220.13 | 67.80 | 64.00 | 66.11 | 136.31 | 131.54 | 134.23 |
| 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 |
| **Max** | **565.00** | | | **227.00** | | | **69.00** | | | **138.81** | | |
| **Min** | | **320.50** | | | **214.00** | | | **58.00** | | | **128.60** | |
| Source: TD, BPC | | | | | | | | | | | | |

Graph: Daily maximum, minimum and average Voltage for the month of February, 2022

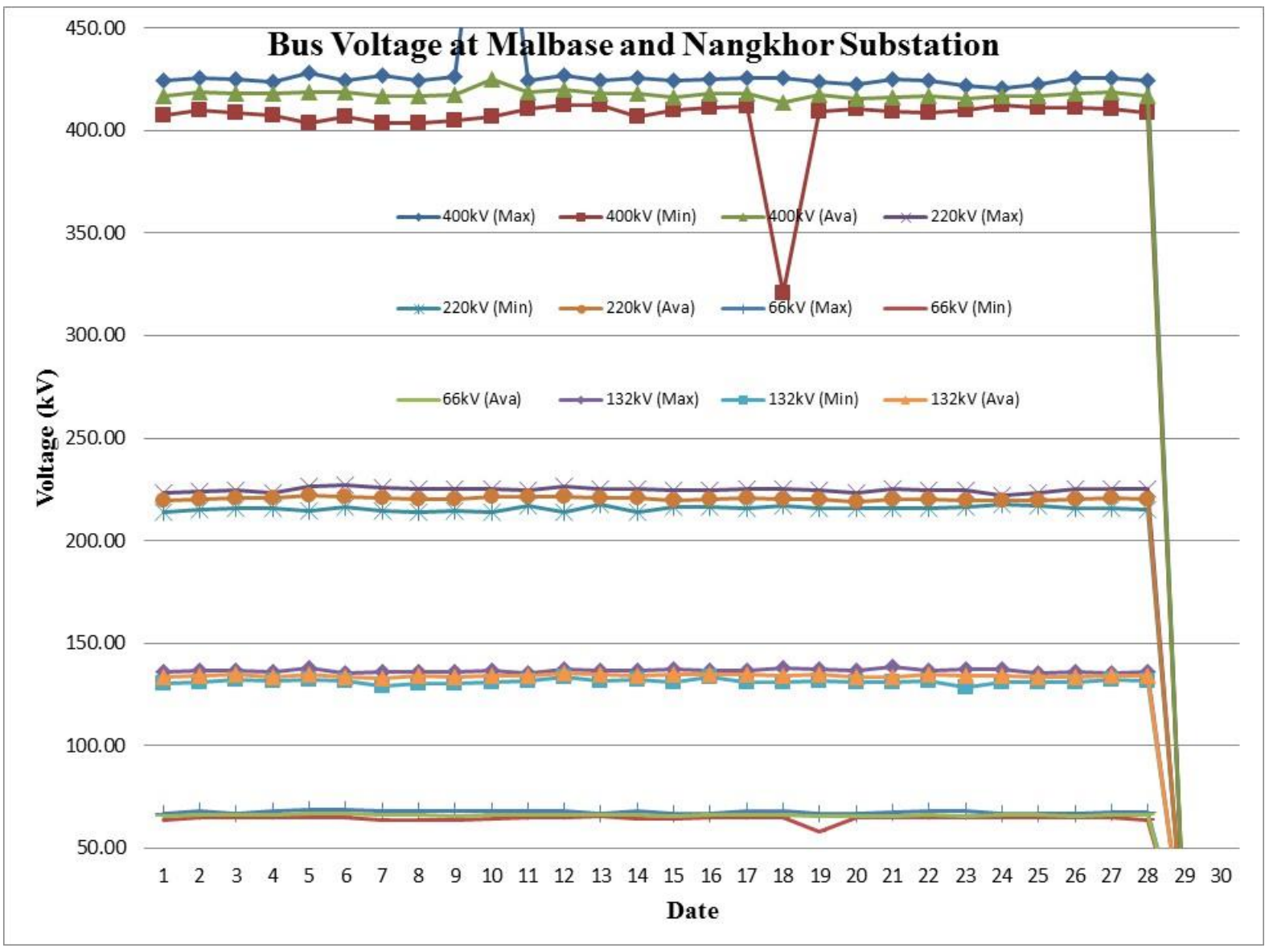
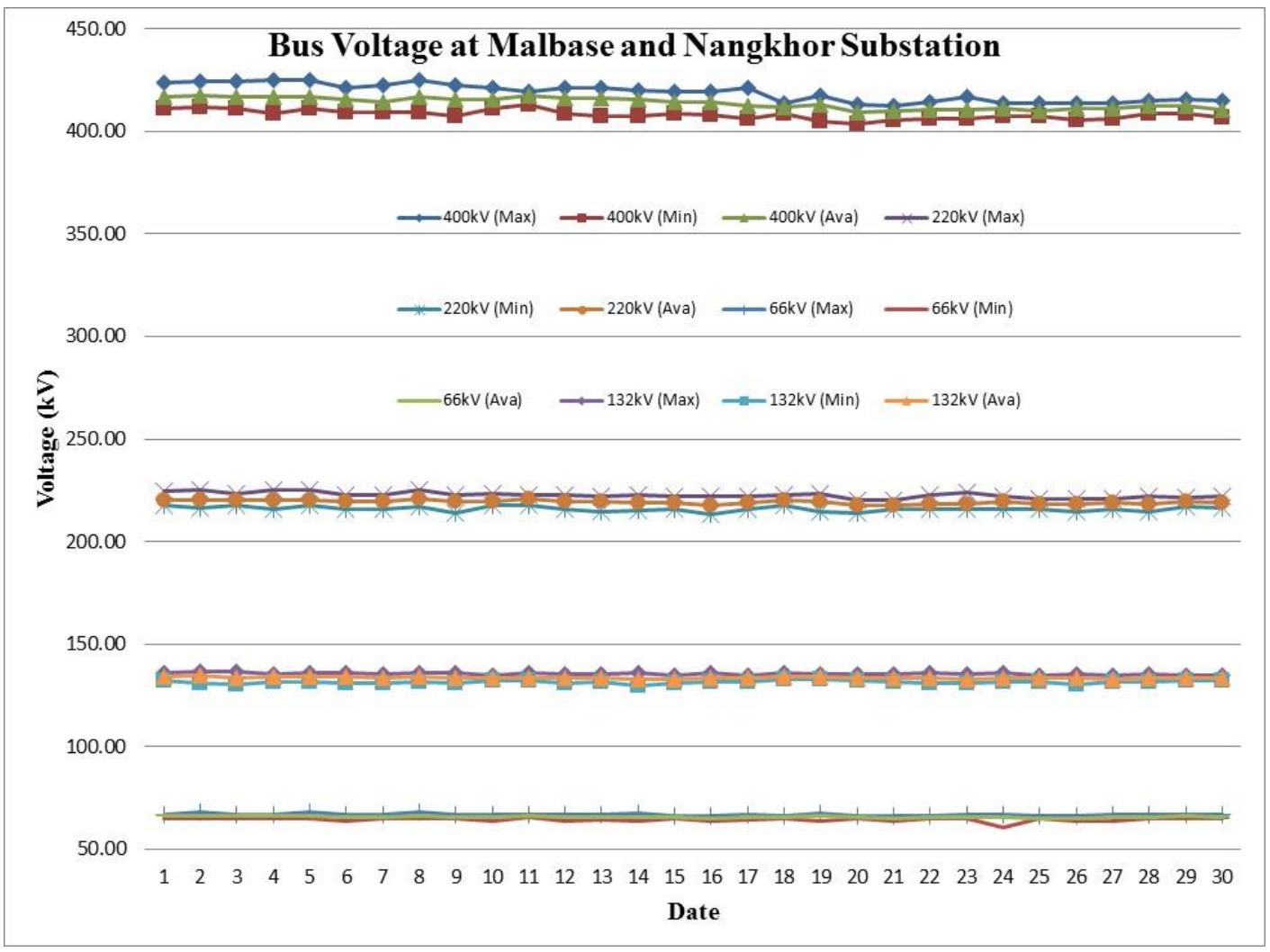


Table: Daily maximum, minimum and average Voltage for the month of March, 2022

| Mar-22 | Malbase Substation | | | | | | | | | Nangkhor Substation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 400kV Bus Voltage (kV) | | | 220kV Bus Voltage (kV) | | | 66kV Bus Voltage (kV) | | | 132kV Bus Voltage (kV) | | |
| Date | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava | Max | Min | Ava |
| 1 | 424.00 | 411.50 | 417.17 | 224.50 | 218.00 | 220.42 | 67.00 | 65.00 | 66.20 | 136.31 | 131.95 | 133.99 |
| 2 | 424.50 | 412.00 | 417.40 | 225.00 | 216.50 | 220.21 | 68.00 | 65.00 | 66.08 | 136.94 | 131.27 | 134.56 |
| 3 | 424.50 | 411.50 | 416.79 | 223.50 | 218.00 | 220.17 | 67.00 | 65.00 | 65.96 | 136.70 | 130.20 | 133.42 |
| 4 | 425.00 | 409.00 | 417.08 | 225.50 | 215.50 | 220.40 | 67.00 | 65.00 | 66.00 | 135.28 | 131.30 | 133.90 |
| 5 | 425.00 | 411.50 | 416.83 | 225.00 | 217.50 | 220.42 | 68.00 | 65.00 | 66.25 | 136.10 | 131.50 | 133.88 |
| 6 | 421.00 | 409.50 | 415.58 | 223.00 | 216.00 | 219.56 | 67.00 | 64.00 | 65.71 | 136.10 | 131.12 | 133.90 |
| 7 | 422.50 | 409.50 | 414.56 | 223.00 | 215.50 | 219.35 | 67.00 | 65.00 | 65.70 | 135.42 | 131.12 | 133.51 |
| 8 | 425.00 | 409.50 | 416.71 | 225.50 | 217.00 | 220.58 | 68.00 | 65.00 | 66.26 | 136.10 | 131.70 | 133.81 |
| 9 | 422.50 | 407.50 | 415.67 | 223.00 | 214.00 | 219.44 | 67.00 | 65.00 | 65.70 | 135.90 | 130.70 | 133.80 |
| 10 | 421.50 | 411.00 | 415.33 | 223.50 | 217.50 | 219.71 | 67.00 | 63.50 | 65.75 | 134.86 | 132.30 | 133.34 |
| 11 | 419.50 | 413.00 | 417.27 | 222.50 | 217.50 | 220.65 | 67.00 | 65.60 | 66.35 | 135.90 | 131.95 | 133.64 |
| 12 | 421.50 | 409.00 | 415.98 | 223.00 | 216.00 | 219.77 | 67.00 | 64.00 | 65.90 | 135.20 | 130.70 | 133.22 |
| 13 | 421.00 | 407.50 | 416.19 | 222.00 | 214.50 | 219.52 | 67.00 | 64.50 | 65.83 | 135.20 | 131.45 | 133.45 |
| 14 | 420.00 | 407.50 | 415.33 | 223.00 | 215.00 | 219.04 | 67.50 | 64.00 | 65.77 | 136.10 | 129.67 | 133.09 |
| 15 | 419.50 | 408.50 | 414.31 | 222.00 | 216.00 | 218.67 | 66.00 | 65.00 | 65.56 | 134.86 | 130.91 | 133.17 |
| 16 | 419.50 | 408.00 | 414.25 | 222.00 | 213.50 | 217.94 | 66.00 | 64.00 | 65.20 | 135.90 | 131.53 | 133.53 |
| 17 | 421.50 | 406.50 | 412.31 | 222.00 | 215.50 | 218.92 | 67.00 | 64.50 | 65.56 | 134.86 | 131.32 | 133.33 |
| 18 | 413.50 | 409.00 | 411.58 | 222.50 | 218.00 | 220.17 | 66.50 | 65.00 | 65.92 | 136.10 | 132.89 | 134.12 |
| 19 | 417.50 | 405.00 | 413.06 | 223.50 | 214.50 | 219.69 | 67.50 | 64.00 | 65.97 | 135.69 | 132.56 | 134.06 |
| 20 | 413.00 | 403.50 | 409.60 | 220.50 | 214.00 | 217.75 | 66.25 | 65.00 | 65.42 | 135.48 | 131.95 | 133.67 |
| 21 | 412.50 | 405.50 | 409.77 | 220.00 | 216.00 | 217.88 | 66.11 | 64.00 | 65.20 | 135.07 | 131.53 | 133.47 |
| 22 | 414.50 | 406.00 | 410.81 | 222.50 | 215.50 | 218.38 | 66.56 | 65.00 | 65.47 | 136.10 | 130.70 | 133.44 |
| 23 | 417.00 | 406.50 | 410.54 | 224.00 | 215.50 | 218.35 | 67.00 | 65.00 | 65.62 | 135.07 | 130.91 | 133.16 |
| 24 | 414.00 | 407.50 | 411.21 | 222.00 | 215.50 | 219.27 | 67.00 | 60.50 | 65.70 | 136.10 | 131.32 | 133.64 |
| 25 | 413.50 | 407.50 | 409.96 | 221.00 | 216.00 | 218.10 | 65.97 | 64.86 | 65.20 | 134.56 | 131.32 | 133.44 |
| 26 | 414.00 | 405.50 | 411.00 | 221.00 | 214.50 | 218.33 | 66.00 | 64.00 | 65.29 | 135.69 | 130.08 | 133.19 |
| 27 | 414.00 | 406.50 | 411.48 | 221.00 | 216.00 | 218.88 | 67.00 | 64.00 | 65.71 | 134.86 | 131.74 | 133.12 |
| 28 | 415.00 | 409.00 | 412.25 | 222.00 | 214.50 | 218.54 | 67.00 | 65.00 | 65.55 | 135.07 | 131.54 | 133.63 |
| 29 | 415.50 | 409.00 | 412.23 | 221.50 | 217.00 | 219.38 | 67.00 | 65.00 | 66.07 | 134.68 | 132.36 | 133.53 |
| 30 | 415.00 | 407.00 | 410.79 | 222.00 | 216.50 | 218.90 | 67.00 | 65.00 | 65.87 | 134.75 | 132.36 | 133.47 |
| 31 | 413.50 | 406.50 | 410.81 | 221.50 | 217.00 | 218.92 | 66.00 | 65.00 | 65.51 | 134.86 | 131.95 | 133.58 |
| **Max** | **425.00** | | | **225.50** | | | **68.00** | | | **136.94** | | |
| **Min** | | **403.50** | | | **213.50** | | | **60.50** | | | **129.67** | |
| Source: TD, BPC | | | | | | | | | | | | |

Graph: Daily maximum, minimum and average Voltage for the month of March, 2022



**Annexure-V**

# Eastern Grid Outages for January 2022

**MONTHLY OUTAGE REPORT FOR THE MONTH OF JANUNARY,2022 UNDER SMD DEOTHANG, TD, BPC.**

| | |
|---|---|
| **Division:** | **SMD-DEOTHANG** |
| **Substation:** | **132/33/11kV Nangkor Substation** |
| **Month:** | **Jan-22** |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| **132kV Feeders** | | | | | | | | | | | | | | | |
| 1 | 5MVA Transformer-I, 132/22/11kV | 132kV | Tripping | 1/2/2022 | 10:47 hrs | 1/2/2022 | 10:439 hrs | 0 | 2 | 0.68 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped on feeder fault | - | Tripped due to fault on 33kV Tsebar feeder |
| 2 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 1/2/2022 | 10:47 hrs | 1/2/2022 | 10:48 hrs | 0 | 1 | 0.52 | Non directional IDMT PROTN Relay operated | Non dirO/C relay-50A & tripping relay 86 operated | Tripped on feeder fault | - | Tripped due to fault on 33kV Tsebar feeder |
| 3 | 5MVA Transformer-I, 132/22/11kV | 132kV | Tripping | 1/3/2022 | 03:12 hrs | 1/3/2022 | 03:13 hrs | 0 | 1 | 0.42 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped due to fault on 33kV Tsebar feeder. |
| 4 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 1/3/2022 | 03:12 hrs | 1/3/2022 | 03:14 hrs | 0 | 2 | 0.25 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped due to fault on 33kV Tsebar feeder. |
| 5 | Nangkor-Nganglam | 132kV | Tripping | 1/12/2022 | 08:14 hrs | 1/12/2022 | 08:29 hrs | 0 | 15 | -14.4 | MiCOMP14DB & P442 | ***Directional -O/C & E/F Relay***: Start Ø CN, tripped Ø N,O/C start I>1, E/F1 start IN1>12, trip IN1>2.VAB=127.8kV, VBC=99.91kV,VCA=94.07kV,VAN=73.38kV,VBN=72.45kV,VCN=38.08kV,VN=0.01A=40.32A,IB=93.69A,IC=953.5A, INDerived=1.016kA, IN measured=1.013kA & tripping relay 86 operated at our end. ***Distance relay***: Start Ø CN, fault duration=203.4ms, relat trip time=0.005, fault location=44.14KM, IA=42.0A, IB=95.19A, IC=945.5A, VAN=73.54kV, VBN=72.87, VCN=38.31kV, fault resistance=5.824Ω, fault zone-Zone 3 | Tripped on fault | - | Informed to BPSO, and charged as per their instruction. |
| 6 | 5MVA Transformer-I, 132/22/11kV | 132kV | Tripping | 1/17/2022 | 09:00 hrs | 1/17/2022 | 09:05 hrs | 0 | 5 | 1.09 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped due to fault on 33kV Wamrong feeder |
| 7 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 1/17/2022 | 09:00 hrs | 1/17/2022 | 09:05 hrs | 0 | 5 | 0.82 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped due to fault on 33kV Wamrong feeder |

| | |
|---|---|
| **Division:** | **SMD-DEOTHANG** |
| **Substation:** | **132/33/11kV Nganglam Substation** |
| **Month:** | **Jan-22** |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| **132kV** | | | | | | | | | | | | | | | |
| 1 | Tingtibi-Nganglam | 132kV | Tripping | 12.01.2022 | 8:10 | 12.01.2022 | 8:25 | 0 | 15 | -28.91 | Micom relayP442 | IA=122.4A IB=243.1A IC=1.232KA Ph-CN Tripped ABC | Over Current | | Supply restored after confimation from BPSO and coodination to Tingtibi end |
| 2 | 3MVA Tr-II | 132kV | Tripping | 27.01.2022 | 14:58 | 27.01.2022 | 15:03 | #REF! | 5 | 0.752 | O/C & E/F Micom relay | | Due to 33kV Dechenling Feeder | | Supply restored after Isolating the 33kV Dechenling Feeder and withstood. |

| | |
|---|---|
| **Division:** | **SMD-DEOTHANG** |
| **Substation:** | **132/33kV Motanga Substation** |
| **Month:** | **Jan-22** |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| 1 | DML Factory Feeder | 132kV | Tripping | 1/7/2022 | 22:24:00 PM | 1/7/2022 | 22:28:00 PM | 0 | 4 | 0 | 86A & 86B OPTD | _ | _ | _ | Charged the feeder with a charging code 1039 from BPSO |
| 2 | Deothang Feeder | 132kV | Tripping | 1/8/2022 | 12:05 | 1/8/2022 | 12:19 | 0 | 14 | -24.62 | 86A & 86B OPTD | _ | _ | _ | Charged the feeder with a charging code 1046 from BPSO |
| 3 | Rangia Feeder | 132kV | Tripping | 1/8/2022 | 12:05 | 1/9/2022 | 0:51 | 12 | 46 | 4.42 | _ | _ | Y-Phase LA was punctured at Rangia end. | _ | Charged the feeder with a charging code 1048 from BPSO(Bhutan), 817 from NLDC(India) and 4588 from ERLDC(India). |
| 4 | DML Factory Feeder | 132kV | Tripping | 1/15/2022 | 12:43:00 PM | 15/1/2022 | 22:45:00 PM | 0 | 2 | 0 | 86A & 86B OPTD | _ | _ | _ | Charged the feeder with a charging code 1095 from BPSO |

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| **Division:** | **SMD-DEOTHANG** |
| **Substation:** | **132/33kV Phuntshothang Substation** |
| **Month:** | **Jan-22** |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| 1 | 132/33kV Transformer-II (10MVA) | 132kV | Transient Fault | 1/13/2022 | 16:03 | 1/13/2022 | 16:07 | | 4 | 0.49 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 3.6A,L2:159.6 A,L3:156.15 A,Lrc0.00 A. | er current and Earth fa | Unknown | Charged |
| 2 | 132/33kV Transformer-I (10MVA) | 132kV | Transient Fault | 1/26/2022 | 11:14 | 1/26/2022 | 11:17 | | 3 | 0.23 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 5.1A,L2:323.4A,L3:318.3 A,Lrc0.00 A. | er current and Earth fa | Unknown | Charged |
| 3 | 132/33kV Transformer-II (10MVA) | 132kV | Trip On Fault | 1/28/2022 | 8:30 | 1/28/2022 | 8:32 | | 2 | 0.92 | 86A and 86B | (DPHLPDOC1) Trip value; L1:68.1 A,L2:4.2A,L3:71.25A,Lrc0.00 A. | er current and Earth fa | Unknown | Charged |

**1. 400/220/132/33kV Jigmeling Substation**

| Sl. No. | Date of Tripping | Time of Outages/ Time of Tripping | Date of Normalization | Time of Fault was Cleared | Duration of Outages (Hrs) | MW before Outage (MW) | Name of feeder | Name of the Substation/lines Affected by the Fault | Reasons of Fault | Relay Operations | Fault Location(KM) | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **i) 66kV Above** | | | | | | | | | | | | | |
| 1 | 26.01.2022 | 18:39 hrs | 26.01.2022 | 18:47 hrs | 0 | 36.52 | 132kV Tingtibi | Tingtibi | Main 1; Relay General Trip, B phase trip Line loop B-G | SIPROTEC 7SA52 | Distance: 42.8 km | Transient | |
| **2. 220/66/33kV Dhajay Substation** | | | | | | | | | | | | | |
| **i) 66kV and above** | | | | | | | | | | | | | |
| 1 | 12.01.2022 | 05:38:20hrs | 12.01.2022 | 05:51:32hrs | | -16.96 | Jigmeling fee | Dhajay Su | o/c | Main -I=IA=1.76kA, IB=1.59kA, IC=1.57kA. main-2, Ia=0157.01A, Il | Tripped | | feeder restored after as |

# February 2022

**MONTHLY OUTAGE REPORT FOR THE MONTH OF FEBRUARY,2022 UNDER SMD DEOTHANG, TD, BPC.**

| | |
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| **Division:** | **SMD-DEOTHANG** |
| **Substation:** | **132/33/11kV Kilikhar Substation** |
| **Month:** | **Feb-22** |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| **132kV Feeders** | | | | | | | | | | | | | | | |
| 1 | 132KVI/commer | 132KV | Tripped | 2/5/2022 | 12:43hrs | 2/5/2022 | 12:50hrs | 0 | 7 | 3.420 | Nill | Nill | Tripped | | Tripped from Kurichu end |
| 2 | 132kV Corlung | 132KV | Tripped | 2/5/2022 | 14:13Hrs | 2/7/2022 | 19:10 hrs | 52 | 57 | 10.368 | Distance protection relay | Start Phase: CN, Trip Phase: ABC, Distance: 4.342kM towards Corlung SS, IA=3.228A, IB=0.00A, IC=563.2A, Zone 1. | Tripped | | Tripped due to heavy snowfall ( conductor snaaped at Korila Location KK 28 Y phase & KK 31 B phase) |
| 3 | 132kV Corlung | 132KV | Tripped | 2/8/2022 | 14:29Hrs | 2/8/2022 | 18:12hrs | 3 | 43 | 8.923 | NA | Nill | Shutdown | Maintenance of CVT | Shutdown Taken by Corlung Incharge to Maintenance work for CVT |

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| **Division:** | **SMD-DEOTHANG** |
| **Substation:** | **132/33/11kV Kanglung Substation** |
| **Month:** | **Feb-22** |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| | **132kV** | | | | | | | | | | | | | | |
| 1 | 5MVA Transformer - I | 132kV | Tripped | 09.02.2022 | 10:59 | 09.02.2022 | 11:08 | 0 | 9 | 1.992 | NA | NA | Due to out going feeder(UDZORONG) | NA | Both 5MVA transformer got tripped as line fault with Udzorong feeder. |
| | 5MVA Transformer - II | 132kV | Tripped | 09.02.2022 | 10:59 | 09.02.2022 | 11:08 | 0 | 9 | 1.932 | NA | NA | Due to out going feeder(UDZORONG) | NA | Both 5MVA transformer got tripped as line fault with Udzorong feeder. |
| 2 | 132KV Corlung | 132kV | Tripped | 21.02.2022 | 2:20 | 21.02.2022 | 2:44 | 0 | 24 | -4.248 | NA | NA | Gride fail from Kurichhu | NA | Gride fail from Kurichhu |
| | 5MVA Transformer -I | 132kV | Tripped | 22.02.2022 | 7:45 | 22.02.2022 | 9:08 | 1 | 23 | 2.271 | NA | NA | Due to out going feeder(UDZORONG) | NA | 5MVA transformer I got tripped as line fault with Udzorong feeder. Tripping coil burned and replaced |

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| Division: | SMD-DEOTHANG |
| Substation: | 132/33/11kV Nangkor Substation |
| Month: | Feb-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| **132kV Feeders** | | | | | | | | | | | | | | | |
| 1 | Nangkor-Deothang Line | 132kV | Tripping | 2/1/2022 | 15:26 hrs | 2/1/2022 | 15:37 hrs | 0 | 10 | 16.7 | MiCOMP14DB & Distance relay | ***Directional -O/C & E/F Relay***: Start Ø BN, tripped Ø N,O/C start I>1, E/F1 start IN1>12, trip IN1>2.VAB=82.38kV, VBC=82.52kV,VCA=126.1kV,VAN=68.89kV,VBN=19.78kV,VCN=73.9kV,VN=0.0IA=49.35A,IB=1.067kA,IC=96.93A, INDerived=11.101kA, IN measured=1.101kA & tripping relay 86 operated at our end. ***Distance relay***: Start Ø BN, fault duration=209.8ms, relay trip time=0.000, fault location=36.69KM, IA=50.40A, IB=1.070kA, IC=1.007A, VAN=66.55kV, VBN=33.89kV VCN=66.29kV, fault resistance=1.011Ω, fault zone-Zone 3 | Tripped on fault | | Informed to BPSO, and charged the feeder as per their instruction. |
| 2 | 5MVA Transformer-I, 132/22/11kV | 132kV | Tripping | 2/4/2022 | 19:06 hrs | 2/4/2022 | 19:11 hrs | 0 | 5 | 1.3 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped on feeder fault | - | Tripped due to fault on 33kV Wamrong feeder |
| 3 | 5MVA Transformer-I 132/22/11kV | 132kV | Tripping | 2/5/2022 | 07:32 hrs | 2/5/2022 | 07:36 hrs | 0 | 4 | 0.78 | Non directional IDMT PROTN Relay operated | Non dirO/C relay-50A & tripping relay 86 operated | Tripped on feeder fault | - | Tripped due to fault on 33kV Wamrong feeder |
| 4 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 2/5/2022 | 07:32 hrs | 2/5/2022 | 07:35 hrs | 0 | 3 | 0.55 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped due to fault on 33kV Wamrong feeder. |
| 5 | 5MVA Transformer-I, 132/22/11kV | 132kV | Tripping | 2/5/2022 | 08:53 hrs | 2/5/2022 | 08:56 hrs | 0 | 3 | 0.47 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped while test charging Wamrong feeder |
| 6 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 2/5/2022 | 08:53 hrs | 2/5/2022 | 08:55 hrs | 0 | 2 | 0.58 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped while test charging Wamrong feeder |
| 7 | 5MVA Transformer-I, 132/22/11kV | 132kV | Tripping | 2/5/2022 | 10:21 hrs | 2/5/2022 | 10:23 hrs | 0 | 2 | 0.99 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped while due to fault on Tsebar feeder |
| 8 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 2/5/2022 | 10:21 hrs | 2/5/2022 | 10:22 hrs | 0 | 1 | 1.25 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped while due to fault on Tsebar feeder |
| 9 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 2/5/2022 | 15:32 hrs | 2/5/2022 | 15:35 hrs | 0 | 3 | 1.09 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped while test charging Wamrong feeder |
| 10 | Nangkor-Nganglam | 132kV | Tripping | 2/6/2022 | 06:46 hrs | 2/6/2022 | 06:53 hrs | 0 | 7 | -12.45 | MiCOMP14DB | ***Directional -O/C & E/F Relay***:Tripped Ø N : Start Ø AN,O/C start I>1, E/F1 start IN1>12, trip IN1>2.VAB=104.5kV, VBC=133.4kV,VCA=107.1kV,VAN=47.16kV,VBN=75.89kV,VCN=74.78kV, VN=0.00,IA=600.3A,IB=89.91A,IC=37.20A, IN Derived=565.0A, IN measured=565.1A & tripping relay 86 operated at our end. | Tripped on fault | - | Informed to BPSO, and charged as per their instruction. |
| 11 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 2/6/2022 | 16:05 hrs | 2/6/2022 | 16:07 hrs | 0 | 2 | 0.86 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped while test charging Wamrong feeder |
| 12 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 2/20/2022 | 17:37 hrs | 2/20/2022 | 17:55 hrs | 0 | 8 | 1.49 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped due to feeder fault | - | Tripped due to fault on 33kV Wamrong, Yurung & Nanung feeders |
| 14 | Main Grid(Rangia Grid) | 132kV | Tripping | 2/21/2022 | 02:22 hrs | 2/21/2022 | 02:45 hrs | 0 | 23 | 7.1 | - | - | - | - | Supply failed from Rangia Substation |
| 15 | Nangkor-Nganglam Line | 132kV | Tripping | 2/25/2022 | 16:17 hrs | 2/25/2022 | 16:30 hrs | 0 | 13 | -7.22 | MiCOMP14DB & Distance Relay | ***Directional -O/C & E/F Relay***: Tripped Ø N : Start Ø BCN,O/C start I>1, E/F1 start IN1>12, trip IN1>2.VAB=108.8kV, VBC=69.76kV,VCA=105.8kV,VAN=74.6kV,VBN=43.78kV,VCN=44.14kV, VN=0.00,IA=29.94A,IB=853.2A,IC=828.2A, IN Derived=592.4A, IN measured=592.1A & tripping relay 86 operated at our end. ***Distance relay Indication***: Start Ø BC, TOC start, Tripped Elerts-No, Fault alarm-No, fault duration-136.9ms, relay trip time-0.00, IA-31.25A, IB-860.2A, IC-851.7A, VAN-74.62kV, VBN-43.86kV, VCN-44.07kV, fault zone-none. | Tripped on fault | - | Informed to BPSO, and charged the feeder as per their instruction. |

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| Division: | SMD-DEOTHANG |
| Substation: | 132/33/11kV Nganglam Substation |
| Month: | Feb-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| **132kV** | | | | | | | | | | | | | | | |
| 2 | Nganglam-Tingtibi | 132kV | Tripping | 05.02.2022 | 15:13 | 05.02.2022 | 15;49 | 0 | 36 | -24.46 | Micom relayP442 | IA= 15.77A IB= 1.314A IC= 1.328A Tripped on Zone 1 Fault Location 28.20km | Over Current | | Supply normalised with vide Closing code# 1221 issued by Madam Tshering Choden, BPSO |
| 3 | Nganglam-Tingtibi | 132kV | Tripping | 06.02.2022 | 06:49 | 07.02.2022 | 19:09 | 36 | 20 | -18.74 | Micom relayP442 | IA= 743.7A IB= 90.39A IC= 136.1A In= 833.4ATripped on Zone 3 Fault Location 297.19km | Earth Fault/Conductor Snapped | | Feeder Test charged at 07:00hrs from our end as per BPSO instruction with vide closing code# 1227 issued by Madam Karma Yangdon,BPSO but Tingtibi end observed one phase is missing at their end(R-PH) and around we recived a call saying that condoutor is Snapped at Paibang site and immediately the CB was hand tripped from our end and informed to BPSO. The supply was normalised after completing the restringing of Conductor with vide closing code# 1238 issued by Madam Choden |
| 5 | 3MVA Transformer | 132kV | Tripping | 20.02.2022 | 19:32 | 20.02.2022 | 19:39 | | 6 | 1.427 | | Tripped due to 33kV Panbang feeder fault | Earth Fault | | |
| 6 | Nangkhor-Nganglam | 132kV | Grid Fail | 21.02.2022 | 02:22 | 21.02.2022 | 02:45 | 0 | 23 | | NA | NA | Grid Fail | | Grid fail from Nangkhor end since the station is feede from single source as Nganglam-Tingtibi feeder is under shutdown |

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| Division: | SMD-DEOTHANG |
| Substation: | 132/33kV Motanga Substation |
| Month: | Feb-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| 1 | Deothang Feeder | 132kV | Tripping | 2/2/2022 | 5:29:00 PM | 2/2/2022 | 15:39:00 PM | 0 | 10 | -15.47 | OC on B-phase, EF, 86 A & B operated. | _ | transient fault | - | _ |
| 2 | Rangia Feeder | 132kV | Tripping | 2/2/2022 | 5:29:00 PM | 2/2/2022 | 15:59:00 PM | 0 | 30 | -12.09 | OC,Ef and 86A/B operated | _ | transient fault | _ | Charged the feeder with a charging code 1089 from BPSO(Bhutan), NLDC(India) 52 and NERLDC(India) 28 |
| 3 | DML Factory Feeder | 132kV | Tripping | 2/2/2022 | 5:29:00 PM | 2/2/2022 | 19:50:00 PM | 4 | 21 | 0 | 86A & 86B OPTD | _ | transient fault | _ | Charged from BPSO instruction verbally. |
| 4 | DML Factory Feeder | 132kV | Tripping | 2/3/2022 | 21:22:00 PM | 2/3/2022 | 21:27:00 PM | 0 | 5 | 0 | _ | _ | transient fault | _ | Charged from BPSO instruction verbally. |
| 5 | 15 MVA, TR-1(HV) | 132/33kV | Tripping | 2/5/2022 | 6:02:00AM | 2/5/2022 | 6:17:00AM | 0 | 15 | 0 | 50/51 OC, SEF | _ | transient fault | _ | _ |
| 6 | 15 MVA, TR-1(LV) | 132/33kV | Tripping | 2/5/2022 | 6:02:00AM | 2/5/2022 | 6:18:00AM | 0 | 16 | 0 | 86A & 86B OPTD | _ | transient fault | _ | _ |
| 7 | 33kV Azista feeder | 33kV | Tripping | 2/5/2022 | 6:22:00AM | 2/5/2022 | 7:41:00AM | 1 | 19 | 0 | _ | _ | _ | _ | _ |
| 8 | 15 MVA, TR-1(HV) | 132/33kV | Tripping | 2/5/2022 | 8:26:00AM | 2/5/2022 | 8:34:00AM | 0 | 8 | 0 | _ | OC & Ef | transient fault | _ | _ |
| 9 | 15 MVA, TR-1(LV) | 132/33kV | Tripping | 2/5/2022 | 8:26:00AM | 2/5/2022 | 8:36:00AM | 0 | 10 | 0 | 86A & 86B OPTD | OC & Ef | transient fault | _ | _ |
| 10 | 33kV Azista feeder | 33kV | Tripping | 2/5/2022 | 8:26:00AM | 2/5/2022 | 9:56:00AM | 1 | 30 | 0 | _ | OC & Ef | _ | _ | _ |
| 11 | 33kV Azista feeder | 33kV | Tripping | 2/5/2022 | 9:58:00AM | 2/5/2022 | 10:28:00AM | 0 | 20 | 0 | _ | _ | _ | _ | _ |
| 12 | 15 MVA, TR-1(HV) | 132/33kV | Tripping | 2/5/2022 | 10:58:00AM | 2/5/2022 | 10:38:00AM | 0 | 10 | 0 | _ | _ | transient fault | _ | _ |
| 13 | 15 MVA, TR-1(LV) | 132/33kV | Tripping | 2/5/2022 | 10:28:00AM | 2/5/2022 | 10:40:00AM | 0 | 12 | 0 | _ | _ | transient fault | _ | _ |
| 14 | 33kV Azista feeder | 33kV | Tripping | 2/5/2022 | 10:28:00AM | 2/5/2022 | 11:05:00AM | 0 | 37 | 0 | _ | _ | _ | _ | _ |
| 15 | DML Factory Feeder | 132kV | Tripping | 2/6/2022 | 23:39 | 6/2/2022 | 20:02 | 8 | 23 | 0 | 86A & 86B OPTD | _ | transient fault | _ | Charged the feeder with a charging code 1228 from BPSO. Feeder kept shutdown as per BPSO instruction. |
| 16 | Rangia Feeder | 132kV | Tripping | 2/21/2022 | 14:22 | 6/2/2022 | 14:44 | 0 | 22 | -17.12 | 86A & 86B OPTD | OC & Ef | transient fault | _ | Charged the feeder with a charging code 1231(BPSO), 2154(NLDC), 1447(NERLDC). Feeder kept shutdown. |
| 17 | 15 MVA, TR-1(LV) | 132/33kV | Tripping | 2/21/2022 | 14:22 | 6/2/2022 | 14:48 | 0 | 26 | 0,03 | _ | OC & Ef | transient fault | _ | |
| 18 | Rangia Feeder | 132kV | Tripping | 2/25/2022 | 19:01 | 2/25/2022 | 19:23 | 0 | 22 | -0.27 | 86A & 86B OPTD | OC & Ef | transient fault | _ | Charged the feeder with a charging code 1258(BPSO), 2644(NLDC), 1780(NERLDC). |

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| Division: | SMD-DEOTHANG |
| Substation: | 132/33kV Corlung Substation |
| Month: | Feb-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| 7 | 132 kV Khilikhar-Corlung Feeder | 132 kV | Trip on fault | 05.02.2022 | 12:29 hrs | 05.02.2022 | 12:58 hrs | 0 | 29 | -11.530 | Distance Relay (P442) | **Distance Relay (P442)** operated on Zone 1 trip, Recorded fault values : Started phase-BC, Tripped phase-ACB, fault duration-49.97 ms, relay trip time-79.79ms, fault location-33.35 km, IA-39.096A, IB-497.4A,IC-556.3A,VAN-75.12 kV,VBN-39.16kV,VCN-37.25 kV. | | | Informed to BPSO, and charged as per their instruction. |
| 8 | 132 kV Khilikhar-Corlung Feeder | 133 kV | Trip on fault | 05.02.2023 | 14:11 hrs | 07.02.2022 | 19:07 hrs | 28 | 56 | -9.930 | Distance Relay (P442) and Back up Relay (P14D) | **Distance Relay (P442)** operated on Zone 1 trip, Recorded fault values : Started phase-BN, Tripped phase-B, fault duration-49.97 ms, relay trip time-79.95ms, fault location-28.89 km, IA-25.46A,IB-606.6A,IC-43.16A, VAN-74.44 kV, VBN-14.65kV, VCN-77.39 kV. **Backup Relay (P14D)** : Started phase-BN, OC strated I>I- 1, EF 1 start IN1>- 1, IA-25.01A, IB-595.5 A, IC-44.80 A, VAB-84.71KV, VBC-82.07 KV,VCA-133.0 KV, IN-581.1 A, VAN-74.22kV, VBN-14.53 kV, VCN-77.18 kV, VN-58.54 kV. | Conductor snaped in between location KK-28 & KK-29 and in between Location no. KK-30 & KK-31 | | Test charge was done form khilikhar substation but line could not stand and line was kept shut down as per the instruction from BPSO. |

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| Division: | SMD-DEOTHANG |
| Substation: | 132/33kV Phuntshothang Substation |
| Month: | Feb-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | |
| 5 | 132/33kV Transformer-I (10MVA) | 132kV | Transient fault | 2/5/2022 | 1:56 | 2/5/2022 | 2:00 | | 4 | 0.14 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 6A,L2:65.55A,L3:65.4 A,Lr:0.00 A. | er current and Earth fa | Unknown | Charged |
| 10 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 2/5/2022 | 19:27 | 2/5/2022 | 19:40 | | 13 | 0.63 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 331.8A,L2:340.5A,L3:672.6A,Lr:0.00 A. | Over current | Unknown | Charged |

**1. 400/220/132/33kV Jigmeling Substation**

| Sl. No. | Date of Tripping | Time of Outages/ Time of Tripping | Date of Normalization | Time of Fault was Cleared | Duration of Outages (Hrs) | MW before Outage (MW) | Name of feeder | Name of the Substation/lines Affected by the Fault | Reasons of Fault | Relay Operations | Fault Location(KM) | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **i) 66kV Above** | | | | | | | | | | | | | |
| 1 | 08.02.2022 | 14:35 hrs | 08.02.2022 | 15:37 hrs | 1 | -26.09 | 400kV Alipurduar line 1 | Alipurduar SS | DTT | 7SA52 & 7SA611 | | | |
| 2 | 08.02.2022 | 16:59 hrs | | | | -25.6 | 400kV Alipurduar line 1 | Alipurduar SS | DTT | 7SA52 & 7SA612 | | | |
| 3 | 16.02.2022 | 20:31 hrs | 16.02.2022 | 21:08 hrs | 0 | 73.45 | 400kV Alipurduar line 2 | Alipurduar SS | DTT | 7SA52 & 7SA613 | | | |
| 4 | 17.06.2022 | 13:00 hrs | | | | 59.47 | 400kV Alipurduar line 2 | Alipurduar SS | DTT trip on L123 | 7SA52 & 7SA614 | | | |
| NO TRIPPING | | | | | | | | | | | | | |
| **4. 132/33kV Tintibi Substation** | | | | | | | | | | | | | |
| **i) 66kV & Above** | | | | | | | | | | | | | |
| 1 | 2/5/2022 | 15:18 | 2/5/2022 | 15:52 | 0 | 24.77 | 132kV Tingtibi-Nanglam fdr | 132kV Tingtibi-nanglam Line | Tempoary fault | Distance protection relay:Start phase:BCN,Trip Phase:ABC,Zone-1,Fault Location:31.62Km. | 31.62kM | Tempoary | |
| 2 | 2/6/2022 | 6:49 | 2/7/2022 | 19:08 | 0 | 19.08 | 132kV Tingtibi-Nanglam fdr | 132kV Tingtibi-nanglam Line | Conductor snped at TN-63&64 | Distance protection relay:Start phase:AN,Trip Phase:ABC,Zone-1,Fault Location:11.45Km. | 11.45 | Line fault | |

For March 2022

**MONTHLY OUTAGE REPORT FOR THE MONTH OF MARCH,2022 UNDER SMD DEOTHANG, TD, BPC.**

| Division: | SMD-DEOTHANG |
|---|---|
| Substation: | 132/33/11kV Kilikhar Substation |
| Month: | Mar-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Weather Condition during the Outage | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | | |
| **132kV Feeders** | | | | | | | | | | | | | | | | |
| 1 | Corlung | 132 | Tripped | 3/24/2022 | 14:50 hrs | 3/24/2022 | 14:58 hrs | | 8 | 12.456 | 86 | Relay Trip 80.27ms Fault duration 55.19ms IA 25.89A IB 14.00AIC 28.16A VAN 75.42kv VBN 78.41kv VCN 78.47kv Fault record Broken conductor | Transit Fault | NA | Clear | Tripped on O/C and E/F (Transit Fault) |

| Division: | SMD-DEOTHANG |
|---|---|
| Substation: | 132/33/11kV Nangkor Substation |
| Month: | Mar-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Weather Condition | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | | |
| **132kV Feeders** | | | | | | | | | | | | | | | | |
| 1 | 5MVA Transformer-I 132/22/11kV | 132kV | Tripping | 3/14/2022 | 07:25 hrs | 3/14/2022 | 07:30 hrs | 0 | 5 | 0.61 | Non directional IDMT PROTN Relay operated | Non dirO/C relay-50A & tripping relay 86 operated | Tripped on feeder fault | - | Clear | Tripped due to fault on 33kV Wamrong feeder |
| 2 | 5MVA Transformer-II, 132/22/11kV | 132kV | Tripping | 3/14/2022 | 07:25 hrs | 3/14/2022 | 07:27 hrs | 0 | 2 | 0.43 | Non directional IDMT PROTN Relay operated | O/C relay-50A & tripping relay 86 operated | Tripped on feeder fault | - | Heavy Rainfall | Tripped due to fault on 33kV Wamrong feeder. |
| 3 | Nangkor-Deothang | 132kV | Tripping | 3/24/2022 | 12:40 hrs | 3/24/2022 | 12:48 hrs | 0 | 8 | 21.7 | MiCOMP14DB | Directional -O/C & E/F Relay: Tripped Ø N : Start Ø CN,O/C start I>1, E/F1 start IN1>12, trip IN1>2.VAB=132.2kV, VBC=128.3kV,VCA=109.4kV,VAN=74.48kV,VBN=76.25kV,VCN=63.66kV,IA=123.0A,IB=121.4A,IC=538.8A, INDerived=444.9A, IN measured=444.5A & tripping relay 86 operated at our end. | Tripped on fault | - | Cloudy & Windy | Informed to BPSO, Thimphu & charged the feeder as per their instruction. |

| Division: | SMD-DEOTHANG |
|---|---|
| Substation: | 132/33/11kV Deothang Substation |
| Month: | Mar-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Weather Condition | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | | |
| 1 | Deothang-Nangkhor line | 132kV | Tripped | 24.03.2022 | 12:40 | 24.03.2022 | 12:48 | 0 | 8 | -32.868 | O/C and E/F at Nangkhor end | Nil | Grid fail | NA | Windy | At our end the breaker condition was in normal. |
| 2 | Deothang-Montonga line | 132kV | Tripped | 24.03.2022 | 12:40 | 24.03.2022 | 12:45 | 0 | 6 | 30.88 | O/C at Montonga end | Nil | Grid fail | NA | Windy | At our end the breaker condition was in normal. |

| Division: | SMD-DEOTHANG |
|---|---|
| Substation: | 132/33/11kV Nganglam Substation |
| Month: | Mar-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Weather Condition | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | | |
| **132kV** | | | | | | | | | | | | | | | | |
| 1 | Nganglam-Tingtibi | 132kV | Tripping | 14.03.2022 | 5:04 | 14.03.2022 | 12:38 | 7 | 34 | -10.82 | Micom relayP442 | IA -27.51A IB - 722.3A IC - 521.77A Fault Location 129km Zone 3 VAN - 76.48kV VBN - 42.20kV VCN 78.71kV Fault duration 198.2ms Relay Trip time 0s | Over Current/ Disc Insulator Punctured at Tingtibi Substation | | Sunny | Supply restoted after cooditation to Tingtibi end as per closing code 1307 issued by Madam Karma Choden, BPSO. |
| 2 | Nganglam-Motanga | 132kV | | 28.03.2022 | 15:49 | - | - | - | - | - | | | | | Clear | Line Test charging as per the BPSO Closing code# 1362 issued by Madam Karma Dema. |

| Division: | SMD-DEOTHANG |
|---|---|
| Substation: | 132/33kV Motanga Substation |
| Month: | Mar-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Weather Condition | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | | |
| 1 | Deothang Feeder | 132kV | Tripping | 3/24/2022 | 12:40 | 3/24/2022 | 12:45 | 0 | 5 | -31.89 | OC, 86 A & B operated. | OC, 86 A & B operated. | transient fault | - | Sunny | the feeder was charged after obtaining the verbal instruction from BPSO. |
| 2 | Rangjia Feeder | 132kV | Tripping | 3/24/2022 | 13:09:00 pm | 3/24/2022 | 14:11:00 pm | 1 | 2 | 2.45 | OC, 86 A & B operated. | OC, 86 A & B operated. | transient fault | _ | Normal | Charged the feeder with a charging code 1346 from BPSO(Bhutan), NLDC(India) 1788 and NERLDC(India) 3588 |
| 3 | 15 MVA, TR-1(HV) | 132/33kV | Tripping | 3/25/2022 | 17:08:00 PM | 3/25/2022 | 17:10:00 PM | 0 | 2 | 0.19 | 86A & 86B OPTD | OC, 86 A & B operated. REF protection trip, 50/51 tripand REF 615 protection trip | transient fault | _ | Normal | Charged from BPSO instruction verbally. |
| 4 | 15 MVA, TR HV) | 132/33kV | Tripping | 3/26/2022 | 0:29 | 3/26/2022 | 0:31 | 0 | 2 | 0.09 | OC, 86A & 86B OPTD | over current and earth fault relay operated. | transient fault | _ | Rainny | Charged from BPSO instruction verbally. |
| 5 | 15 MVA, TR (HV) | 132/33kV | Tripping | 3/30/2022 | 9:35:00AM | 3/30/2022 | 9:41:00AM | 0 | 6 | 0.21 | 86A & 86B OPTD | OC & Ef | transient fault | _ | Rainny | Transformer charged after verbal clearance from BPSO. |

| Division: | SMD-DEOTHANG |
|---|---|
| Substation: | 132/33kV Corlung Substation |
| Month: | Mar-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Weather Condition | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | | |
| 5 | 132 kV, 10 MVA Transformer-I | 132/33 kV | Tripping | 07.03.2022 | 22:07 hrs | 07.03.2022 | 22:19 hrs | 0 | 12 | 0.980 | Differtial Relay (P643) and 86 A & 86B | Started Phase BC,Triped phase BC, Diff proctection Start, Diff protection bias trip, Restricted EF start IREF>LV, Restricted EF Trip IREF>LV, Fault type Internal, System frequency 50.08, Fault duration 75.00ms, CB operated Time 65.00 ms, Relay Trip time 5.00 ms,IA-1 magnitude 5.219A, IB-1 magnitude 230.6 A, IC-1 Magnitude 226.9 A, IA-2 magnitude 0.00 A, IB-2 magnitude 0.00 A, IC-2 magnitude 433.6 mA, IA-3 magnitude 20.75 A,IB-3 magnitude 15.29 A, IC-3 magnitude 7.642 A, IA-HV magnitude 5.219 A, IB-HV magnitude 230.6 A, IC-HV magnitude 226.9 A, IA-LV magnitude 20.75, IB-LV magnitude 15.29, IC-LV magnitude 7.642 A, I2-HV magnitude 133.2 A, I2-LV magnitude 5.785 A, IN-HV measd mag 1.618 A, IN-LV measd mag 236.0 A, VAN magnitude 0.00 V,VBN 0.00 V,VCN 0.00V, Vx magnitude 130.3 kV, V1 magnitude 0.00V, V2 magnitude 0.00 V, VN derived mag 0.00 V, VAB magnitude 0.00 V, VBC magnitude 0.00 V, VCA magnitude 0.00 V, IA diff 0.005PU, IB diff 5.246 PU, IC diff 5.265 PU, IA bais 0.116 PU, IB bais 2.668 PU, IC bais 2.632 PU, REFLV HiZ Diff 166.3 A. | Transient fault | | Clear | Test Charge was done stand |

| Division: | SMD-DEOTHANG |
|---|---|
| Substation: | 132/33kV Phuntshothang Substation |
| Month: | Mar-22 |

| Sl. No. | Name of Feeder | Voltage Level | Type of Outage (Shutdown/Tripping) | Shutdown/Tripping Time | | Normalization Time | | Duration of Outage | | MW before Outage (MW) | Tripping Details | | Type/Cause of Fault | Reason for Shutdown | Weather Condition | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Date | Time | Date | Time | (Hrs) | (Min) | | Protecton Relay Optd | Fault Details (As recorded by relay) | | | | |
| 1 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 3/1/2022 | 7:59 | 3/1/2022 | 8:01 | | 2 | 0.97 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 4.05A,L2: 148.2A,L3:144.15A,Lrc:0.00 A. | er current and Earthf fa | Unknown | Sunny | Charged |
| 6 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 3/1/2022 | 8:42 | 3/1/2022 | 8:44 | | 2 | 0.71 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 232.2A,L2: 112.65A,L3:119.55A,Lrc:0.00 A. | Over current | Unknown | Sunny | Charged |
| 9 | 132/33kV Transformer-I (10MVA) | 132kV | Transient fault | 3/13/2022 | 5:50 | 3/13/2022 | 5:55 | | 5 | 0.17 | 86A and 86B | (DPHLPDOC1) Trip value; L1:158.1A,L2:1.2A,L3:159.3A,Lrc:0.00 A. | er current and Earthf fa | Unknown | clear | Charged |
| 24 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 3/24/2022 | 19:47 | 3/24/2022 | 19:50 | | 3 | 1.20 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 171.15A,L2: 179.7A,L3:351A,Lrc:0.00A. | Over current | Unknown | clear | Charged |
| 27 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 3/24/2022 | 19:57 | 3/24/2022 | 20:00 | | 3 | 1.2 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 165.9A,L2: 173.7A,L3:339.75A,Lrc:0.00A. | Over current | Unknown | clear | Charged |
| 34 | 132/33kV Transformer-I (10MVA) | 132kV | Transient fault | 3/25/2022 | 14:57 | 3/25/2022 | 14:59 | | 2 | 0.26 | 86A and 86B | (DPHLPDOC1) Trip value; L1:59.4A,L2:135.15A ,L3:104.1A,Lrc:0.00 A. | er current and Earthf fa | Unknown | Rainny | Charged |
| 37 | 132/33kV Transformer-I (10MVA) | 132kV | Transient fault | 3/25/2022 | 15:29 | 3/25/2022 | 15:32 | | 3 | 0.22 | 86A and 86B | (DPHLPDOC1) Trip value; L1:128.85A,L2:127.65A ,L3:1.35A,Lrc:0.00 A. | er current and Earthf fa | Unknown | Rainny | Charged |
| 40 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 3/25/2022 | 16:35 | 3/25/2022 | 16:39 | | 4 | 0.26 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 171.15A,L2: 179.7A,L3:351A,Lrc:0.00A. | Over current | Unknown | Rainny | Charged |
| 43 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 3/25/2022 | 19:27 | 3/25/2022 | 19:30 | | 3 | 0.69 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 168.75A,L2: 175.35A,L3:344.4A,Lrc:0.00A. | Over current | Unknown | Rainny | Charged |
| 46 | 132/33kV Transformer-II (10MVA) | 132kV | Transient fault | 3/26/2022 | 7:39 | 3/26/2022 | 7:42 | | 3 | 0.57 | 86A and 86B | (DPHLPDOC1) Trip value; L1: 168.75A,L2: 175.35A,L3:344.4A,Lrc:0.00A. | Earth Fault | Unknown | Sunny | Charged |

**1. 400/220/132/33kV Jigmeling Substation**

| Sl. No. | Date of Tripping | Time of Outages/ Time of Tripping | Date of Normalization | Time of Fault was Cleared | Duration of Outages (Hrs) | MW before Outage (MW) | Name of feeder | Name of the Substation/lines Affected by the Fault | Reasons of Fault | Relay Operations | Fault Location(KM) | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **i) 66kV Above** | | | | | | | | | | | | | |
| 1 | 08.02.2022 | 14:35 hrs | 08.02.2022 | 15:37 hrs | 1 | -26.09 | 400kV Alipurduar SS | Alipurduar SS | DTT | 7SA52 & 7SA611 | | | |
| 2 | 08.02.2022 | 16:59 hrs | | | | -25.6 | 400kV Alipurduar line 1 | Alipurduar SS | DTT | 7SA52 & 7SA612 | | | |
| 3 | 16.02.2022 | 20:31 hrs | 16.02.2022 | 21:08 hrs | 0 | 73.45 | 400kV Alipurduar line 2 | Alipurduar SS | DTT | 7SA52 & 7SA613 | | | |
| 4 | 17.06.2022 | 13:00 hrs | | | | 59.47 | 400kV Alipurduar line 2 | Alipurduar SS | DTT trip on L123 | 7SA52 & 7SA614 | | | |

**4. 132/33kV Tintibi Substation**

**i) 66kV & Above**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2/5/2022 | 15:18 | 2/5/2022 | 15:52 | 0 | 24.77 | 132kV Tingtibi-Nanglam fdr | 132kV Tingtibi-nanglam Line | Tempoary fault | Distance protection relay:Start phase:BCN,Trip Phase:ABC,Zone-1,Fault Location:31.62Km. | 31.62kM | Tempoary | |
| 2 | 2/6/2022 | 6:49 | 2/7/2022 | 19:08 | 0 | 19.08 | 132kV Tingtibi-Nanglam fdr | 132kV Tingtibi-nanglam Line | Conductor snped at TN-63&64 | Distance protection relay:Start phase:AN,Trip Phase:ABC,Zone-1,Fault Location:11.45Km. | 11.45 | Line fault | |

## Annexure-VI

# Western grid Outages for January 2022

| Sl No. | Date of Tripping | Time of outages | Date of Normalization | Time of fault was cleared | Duration of Outages (Hrs) | MW before outage (MW) | Feeder Name | Name of the Substation/lines affected by the fault | Reasons of fault | Relay operations | Exact location of fault [Line segment/ Substation] | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(B)66/33/11 kV Phuntsholing Substation** | | | | | | | | | | | | | |
| 1 | 06.01.2022 | 9:24 | 06.01.2022 | 11:16 | 1 | 0.66 | 5MVA TRF 66/11kV | 5MVA TRF 66/11kV | BUCH Trip | OLTC BUCH Trip, Tripping relay 86 | Substation | Tripped on Fault | At 09:19hrs 5MVA transformer (66/11kV) got tripped on OLTC BUCH. Couldn't reset the relay and informed to Rinchen Zangmo, Sr.Engineer regarding above fault. Issued shutdown with work permit no.339 for carrying out physical inspection. Released gas and cleaned contact parts. At 11:16hrs normalised the transformer. |
| **Sl. No.** | **Date of Tripping** | **Time of outages** | **Date of Normalization** | **Time of fault was cleared** | **Duration of Outages (Hrs)** | **MW before outage (MW)** | **Feeder Name** | **Name of the Substation/lines affacted by the fault** | **Reasons of fault** | **Relay operations** | **Exact location of fault [Line segment/ Substation]** | **Type of outages** | **Remarks** |
| | **(D) 66/33/11kV Lobeysa Substation** | | | | | | | | | | | | |
| | **66kV LSA - Basochu feeder** | | | | | | | | | | | | |
| 1 | 28.01.2022 | 12:32hrs | 28.01.2022 | 12:49hrs | 0 | -21.580 | 66kV LSA - Basochu feeder | | | 86 relay operated | | | 66kV LSA - Basochu feeder got tripped at 12:32hrs and charged the line as per BPSO at 12:49hrs and breaker towards hand tripped as per BPSO at 12:48hrs. |
| 2 | 28.01.2022 | 13:03hrs | 28.01.2022 | 13:11hrs | 0 | -6.840 | 66kV LSA - Basochu feeder | | | NA | | | 66kV LSA - Basochu feeder got tripped at 13:03hrs without any relay & breaker operation at our end and supply resumed at 13:11hrs from Basochu and supply extended to Daochula at 13:14hrs as per BPSO. |
| | **66kV LSA - Dochula feeder** | | | | | | | | | | | | |
| 1 | 28.01.2022 | 12:48hrs | 28.01.2022 | 13:14hrs | 0 | 15.190 | 66kV LSA - Dochula feeder | | | NA | | | 66kV LSA - Dochula feeder hand tripped as per BPSO at 12:48hrs and charged the feeder at 13:14hrs. |
| | **(G) 66/33/11kV Dechencholing substation** | | | | | | | | | | | | |
| 1 | 26.01.2022 | 14:40hrs | 26.01.2022 | 14:44Hrs | 0 | -33.98 | 66KV Sesmtokha IC | whole s/s fdr. | Supply failed from source. | | | | |
| 2 | 28.01.2022 | 12:36hrs | 28.01.2022 | 12:50Hrs | 0 | -33.54 | .-do- | whole s/s fdr. | Supply failed from source. | | | | |
| 3 | 29.01.2022 | 07:58hrs | 29.01.2022 | 08:16hrs | 0 | 3.642 | 66KV Damji line | Damji line | Transcend fault | 86A,86B, Dist trip, 3phase, Zone-I & Sotf/Tor trip. | Distance not shown | tripped | |
| | **(H) 66/11kV Haa Substation** | | | | | | | | | | | | |
| 1 | 27.01.2022 | 9:20hrs | | | | | 66/11kV 5MVA transformer - II | 66/11kV 5MVA transformer - II | Oil lekage from the 11kV terminal box of Y phase. | Bhuloz relay | Haa ss | Bhuloz relay was operated due to low oil level in the conservator tank of 66/11kV 5MVA transformer - ii and also oil leakage from the terminal box of LV line of transformer. The same was informed to maintenance head SMD, Semtokha for necessary action, due to lockdown the work couldn't be proceeded further, till then the supply was fed from 5MVA transformer - I. | Source fail from Chhukha power house, normalised the supply from the source. |
| | **(I) 220kV Substation Semtokha** | | | | | | | | | | | | |
| 1 | 28.01.2022 | 12:34hrs | 28.01.2022 | 12:49hrs | | -63.150 | 220kV Sem-CHP | Semtokha Substation | CB tripped at CHP end while doing test charge | | | Trasient | |
| 2 | 28.01.2022 | 12:32hrs | 28.01.2022 | 14:16hrs | 25 | -63.58 | 220kV Sem-BHP | 220kV SEM-BHP Line | Fault Loop= L1-N | Main-1&2 Trip, fault loop-L1-N (Ia=2.39KA, Ib=222.5A, Ic=130.1A) | Distance=5.2KM | Permanent | |
| 3 | 25.01.2022 | 12:08hrs | 25.01.2022 | 12:12hrs | | 34.69 | 66kV Sem-Dling Line | 66kV Sem-Dling Line | Broken Conductor | Distance Prtn. Optd, BRC Tr | - | Trasient | |
| 4 | 26.01.2022 | 14:39hrs | 26.01.2022 | 14:44hrs | | 34.69 | 66kV Sem-Dling Line | 66kV Sem-Dling Line | Broken Conductor | Distance Prtn. Optd, BRC Tr | - | Trasient | |
| | **(K) 66/33kV Changidaphu Substation** | | | | | | | | | | | | |
| 1 | 28.01.2022 | 12:34hrs | 28.01.2022 | 13:03hrs | | -3.95 | 66kV Changidaphu - Olakhaline | 66kV Changidaphu - Olakhaline | Grid failed | Dist. Protn. Optd, Zone-1, Rph trip | | Trasient | |
| | **(L) 66/33kV Damji Substation** | | | | | | | | | | | | |
| 1 | 25.01.2022 | 1207 hrs | 25.01.2022 | 1213 hrs | 0 | -3.24 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | Line trip from Semtokha Substation |
| 2 | 26.01.2022 | 1440 hrs | 26.01.2022 | 1445 hrs | 0 | -1.19 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | Line trip from Semtokha Substation |
| 3 | 29.01.2022 | 0753 hrs | 29.01.2022 | 0819 hrs | 0 | -3.01 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | Line trip from Dechencholing Substation |
| | **(M) 66/11kV Dochula Substation** | | | | | | | | | | | | |
| 1 | 28/1/2022 | 12.36 | 28/1/2022 | 12.53 | 0 | | 86 relay | Source Fail from Chukha & Basochu | Line fault between semtokha to Rurichu | Temporary fault | While charging the Rurichu line from semtokha Chukha got tripped due to the line fault in between Semtokha to Rurichu. | | |
| 2 | 28/1/2022 | 12.36 | 28/1/2022 | 12.58 | 0 | | 86 relay | Source Fail from Chukha & Basochu | Line fault between semtokha to Rurichu | Temporary fault | | | |

# February 2022

| Sl No. | Date of Tripping | Time of outages | Date of Normalization | Time of fault was cleared | Duration of Outages (Hrs) | MW before outage (MW) | Feeder Name | Name of the Substation/lines affected by the fault | Reasons of fault | Relay operations | Exact location of fault [Line segment/ Substation] | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(A) 400/220/66/11 kV Malbase Substation** | | | | | | | | | | | | | |
| **66kV & Above** | | | | | | | | | | | | | |
| 1 | 01.02.2022 | 16:59 | 01.02.2022 | 17:05 | 0 | 48 | 220kV Chukha Feeder | Malbase Substation | overcurrent on R phase. | Distance Zone 1, AR operated. | 9.4929 km | Overcurrent Outage | IL1=5.566kA,IL2=311A,IL3=386.9A |
| 2 | 01.02.2022 | 16:59 | 01.02.2022 | 17:12 | 0 | 22 | 50MVA Transformer III | Malbase Substation | | Differential Start, OLTC Buccholz Trip, Differential Trip. | _ | _ | IL1=89.97A<126.94 deg, IL2=79.88A<-178.9 deg ,IL3=130.9A< 129.26 deg. |
| 3 | 10.02.2022 | 15:37 | 10.02.2022 | 15:55 | 0 | 27 | 66kV Pasakha Feeder I | Industrial Site | | IEF-SON_Trip,86 Operated,General Trip. | _ | _ | IL1=228.08A<57.66 deg, IL2=209.67A<-147.73deg ,IL3=148.03A< -67.51deg. |
| 4 | 10.02.2022 | 15:37 | 10.02.2022 | 15:55 | 0 | 29 | 66kV Pasakha Feeder IV | Industrial Site | | IEF-SON_Trip,86 Operated,General Trip. | _ | _ | IL1=609.62A<-80.46 deg, IL2=552.45A<-115.14deg ,IL3=1719.66A< 69.45deg. |
| 5 | 10.02.2022 | 15:37 | 10.02.2022 | 15:55 | 0 | 27 | 66kV Pasakha Feeder II | Industrial Site | | IEF-SON_Trip,86 Operated,General Trip. | _ | _ | IL1=0.34A<139.27 deg, IL2=702.13A<133.46deg ,IL3=2369.77< -79.96deg. |
| 6 | 10.02.2022 | 15:37 | 10.02.2022 | 15:55 | 0 | - | 66kV Bus Coupler | Malbase Substation | | IEF-SON_Trip,86 Operated,General Trip. | _ | _ | IL1=552.12A<116.54 deg, IL2=29.01A<116.26deg ,IL3=332.77<84.69deg, Neutral current=1054.78<109.17deg. |
| 7 | 20.02.2022 | 23:12 | 20.02.2022 | 23:24 | 0 | 28 | 220 kV Chukha feeder | Malbase Substation | | AR Lockout Shot, Zone 1 Trip. | 9.281 km | _ | R phase=5.023kA,Y phase=5.039kA, Y phase=4.917kA. |
| **(B)220/66/11 kV Singhigoan Substation** | | | | | | | | | | | | | |
| 1 | 10.02.2022 | 15:38 | 10.02.2022 | 15:48 | 0 | 10 | 66kV Bhutan Concast Feeder | Singhigaon Substation | Overcurret on B phase | O/C Trip, DIR Time-trip,IE>>DIR trip,I >> DIR Trip. | Druk wang Factory | Overcurrent Outage | IL1=0.35kA,IL2=0.38kA,IL3=5.12kA |
| **(B)66/33/11 kV Phuntsholing Substation** | | | | | | | | | | | | | |
| 1 | 01.02.2022 | 16:58 | 01.02.2022 | 17:11 | 0 | 3.47 | 66kV Chukha feeder | 66kV Chukha feeder | Overcurrent | Ia-373.7A, Ib-1.041kA, Ic--982.1A, VAB-11.04kV, VBC-13.85kV, VCA-10.39kV, Inm- 409.3A, Ind-409.6A, VAN-5.177kV, VBN-7.872kV, VCN-7.222kV, 86 & 186 | Substation | Tripped on fault | 66kV Chukha-Pling feeder got tripped at both end (i.e Pling & Chukha end). At 17:11hrs normalised the feeder after getting clearance from BPSO. |
| 2 | 02.02.2022 | 8:04 | 02.02.2022 | 8:32 | 0 | 0.09 | 66kV Chukha feeder | 66kV Chukha feeder | Overcurrent | Ia-37.19A, Ib-775.5A, Ic--756.6A, VAB-58.57kV, VBC-21.83kV, VCA-55.87kV, Inm- 6.114A, Ind-6.078A, VAN-38.46kV, VBN-25.01kV, VCN-17.64kV, 86 & 186 | Substation | Tripped on fault | 66kV Chukha-Pling feeder got tripped at both end (i.e Pling & Chukha end). At 08:22hrs test charge the feeder after getting clearance from BPSO with charging code 1093 but got tripped on distance relay. Informed to BPSO and at 08:32hrs normalised the feeder after opening 66kV Pling- Gedu section line isolator at Gedu end. |
| 3 | 05.02.2022 | 5:26 | 05.02.2022 | 5:32 | 0 | -3.63 | 66kV Chukha feeder | 66kV Chukha feeder | Overcurrent | Ia-35.18A, Ib-976.9A, Ic--995.1A, VAB-60.83kV, VBC-13.79kV, VCA-58.43kV, Inm- 10.96A, Ind-10.85A, VAN-39.56kV, VBN-24.30kV, VCN-18.88kV, 86 & 186 | Substation | Tripped on fault | 66kV Chukha-Pling feeder got tripped at both end (i.e Pling & Chukha end). At 05:26hrs normalised the feeder after getting clearance from BPSO. |
| 4 | 20.02.2022 | 23:13 | 20.02.2022 | 23:25 | 0 | -2.30 | 66kV Chukha feeder | 66kV Chukha feeder | Distance relay | General Trip, 186 & 86 | Substation | Tripped on fault | 66kV Chukha-Pling feeder got tripped at both end (i.e Pling & Chukha end, weather condition at Chukha heavy lighting and rain). At 23:25hrs normalised the feeder after getting clearance from BPSO. |
| 5 | 21.02.2022 | 1:54 | 21.02.2022 | 2:22 | 0 | -2.00 | 66kV Chukha feeder | 66kV Chukha feeder | Distance relay | General Trip, 186 & 86 | Substation | Tripped on fault | 66kV Chukha-Pling feeder got tripped at both end (i.e Pling & Chukha end, weather condition at Chukha heavy lighting and rain). At 02:10hrs test charged with charging code 1230 from BPSO but got tripped on same fault. At 02:22hrs as per instruction from BPSO normalised the feeder after opening line isolator of 66kV Chukha-Gedu section from Gedu end. |
| 6 | 21.02.2022 | 15:28 | 21.02.2022 | 15:40 | 0 | -4.98 | 66kV Pling-Gomtu feeder | 66kV Pling-Gomtu feeder | | | Dhamdhum substaion | | At 15:29hrs 66kV Gomtu-Pling feeder got tripped from Gomtu end (i.e from Dhamdhum substation) and causing black out at Phuentsholing. At 15:36hrs normalised 66kV Pling-Malbase feeder with closing code 1235 from BPSO. Weather condition was raining with lightning. |
| 7 | 21.02.2022 | 15:36 | | | | idle | 66kV Pling-Malbase feeder | | | | | | At 15:29hrs 66kV Gomtu-Pling feeder got tripped from Gomtu end (i.e from Dhamdhum substation) and causing black out at Phuentsholing. At 15:36hrs normalised 66kV Pling-Malbase feeder with closing code 1235 from BPSO. Weather condition was raining with lightning. |
| 8 | 25.02.2022 | 16:17 | 25.02.2022 | 16:33 | 0 | -5.85 | 66kV Chukha-Pling feeder | 66kV Chukha feeder | Distance relay | General Trip, 186 & 86 | Substation | Tripped on fault | 66kV Chukha-Pling feeder got tripped at both end (i.e Pling & Chukha end and 66kV Gomtu feeder from end causing black out at Phuentsholing. At 16:20hrs charged 66kV Malbase feeder with closing code 1255 from BPSO. At 16:33hrs normalised 66kV Chukha-Pling feeder after getting clearance from BPSO. At 16:40hrs normalised 66kV Gomtu feeder with closing code 1256 from BPSO. |
| 9 | 25.02.2022 | 16:17 | 25.02.2022 | 16:40 | 0 | -2.75 | 66kV Pling-Gomtu feeder | 66kV Pling-Gomtu feeder | Distance relay | General Trip, time-41sec, fault imp- 6.68, fault angle-131deg, fault I- 4.09A, fault location- 45.7 and 186 & 86 | Substation | Tripped on fault | |
| 10 | | | 25.02.2022 | 16:20 | 16 | idle | 66kV Pling-Malbase feeder | | | | | | Both 66kV feeder got tripped causing black out at Phuentsholing. At 16:20hrs charged 66kV Pling-Malbase feeder with closing code 1256 from BPSO. |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(D) 66/33/11 kV Gedu Substation** | | | | | | | | | | | | | |
| 1 | 01.02.2022 | 16:58 | 01.02.2022 | 17:12 | 0 | 2.78 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| 2 | 02.02.2022 | 8:04 | 02.02.2022 | 8:42 | 0 | 2.8 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Phuntsholing end. |
| 3 | 05.02.2022 | 5:25 | 05.02.2022 | 5:32 | 0 | 1 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| 4 | 20.02.2022 | 23:10 | 20.02.2022 | 23:25 | 0 | 1.58 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| 5 | 21.02.2022 | 1:56 | 21.02.2022 | 2:21 | 0 | 0.93 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Phuntsholing end. |
| 6 | 21.02.2022 | 15:20 | 21.02.2022 | 15:35 | 0 | 2.33 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Phuntsholing end. |
| 7 | 25.02.2022 | 16:16 | 25.02.2022 | 16:34 | 0 | 2.9 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| **(E) 66/33/11 kV Gomtu Substation** | | | | | | | | | | | | | |
| 1 | 08.02.2022 | 18:57 | 09.02.2022 | 20:39 | 1 | 2.673 | 66/11kV 10MVA Transformer | Nil | Sparking occurred on LV terminal | Nil | Gomtu Substation | Shutdown | Taken shutdown for new replacement of LV cable termination by maintenance team. |
| 2 | 09.02.2022 | 08:11 | 09.02.2022 | 08:19 | 0 | 4.15 | 66/11kV 5MVA Transformer. | Gomtu Substation | Over load | 86 & 30AB Aux Operated | Gomtu Substation | | Due to over loading of Transformer got tripped. |
| 3 | 21.02.2022 | 15:27 | 21.02.2022 | 15:40 | 0 | -8.42 | 66kV Damdum feeder | Gomtu Substation | Nill | Nill | Dhamdhum substation | Transient fault | 66kV supply tripped from Damdum Substation, supply fed from P/ling at 15:40 hrs .66kV Damdum resumed at 17:01 hrs. |
| **(F) 220/66/33 kV Dhamdum Substation** | | | | | | | | | | | | | |
| 1 | 21.02.2022 | 15:27 | 21.02.2022 | 16:00 | 0 | 5.35 | 50/63MVA TRF.1 (203) | Dhamdum | Trainsent Fault | RET670 | N/A | N/A | Fault Mag.:128.11KV and Fault angle :-7.55Deg. |
| 2 | 21.02.2022 | 15:27 | 21.02.2022 | 15:59 | 0 | 5.32 | 50/63 MVA TRF 2 (205) | Dhamdum | Trainsent Fault | RET670 | N/A | N/A | Fault Mag.:128.11KV and Fault angle :-7.55Deg. |
| 3 | 21.02.2022 | 15:27 | 21.02.2022 | 17:01 | 1 | 8.1 | 66kV Gomtu fdr. | Gomtu | Trainsent Fault | REL670:General trip,Zone 1 trip R phase and 86 relay trip. | N/A | _ | Fault value:R phase fault mag.:3408.74Amp and fault angle :-74.35 deg. |

| Sl. No. | Date of Tripping | Time of outages | Date of Normalization | Time of fault was cleared | Duration of Outages (Hrs) | MW before outage (MW) | Feeder Name | Name of the Substation/lines affacted by the fault | Reasons of fault | Relay operations | Exact location of fault [Line segment/ Substation] | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **(A) 66kV Chumdu switching station** | | | | | | | | | | | | |
| 1 | 04.02.2022 | 2227hrs | 05.02.2022 | 1435hrs | 16hrs | 2.92WM | 66kV Pangbasa feeder | Pangbasa substation | due to heavy snow fall | G/trip, Y&B ph, CB open. | 66kV transmission line | Trip | |
| 2 | 05.02.2022 | 0013hrs | 05.02.2022 | 0028hrs | | 6.22MW | 66kV Jemina feeder | Fed from 66kV Chukha feerder | | G/trip, Y&B ph, CB open. | | | |
| 3 | | 0114hrs | | 0121hrs | | (-)3.99MW | | | | | | | |
| 4 | | 0212hrs | | 0222hrs | | 0.25MW | | | | | | | |
| 5 | | 0626hrs | | 1422hrs | 7hrs | 1.26MW | | | | | | | |
| 6 | | 0025hrs | | 0056hrs | | 3.02MW | 66kV Paro feeder | Paro substation | | G/trip, Y&B ph, CB open. | | | |
| 7 | | 0109hrs | | 1430hrs | 13hrs | 4.03MW | | | | | | | |
| 8 | | 2456hrs | | 0102hrs | | (-)7.95MW | 66kV Chukha feeder | Paro, Pangbasa, Jemina | | G/trip, Y&B ph, CB open. Dist prtn optd. | | | |
| 9 | | 0205hrs | | 0410hrs | 2hrs | (-)0.15MW | | | | | | | |
| 10 | | 0734hrs | 06.02.2022 | 1511hrs | 41hrs | (-)1.2MW | | Fed from 66kV Jemina feerder | | | | | |
| 11 | 08.02.2022 | 1106hrs | 08.02.2022 | 1243hrs | 1hr | 0.3MW | 66kV Chukha Feeder | Fed from 66kV Jemina feerder | For jumpering out at Wtsa T-Off | CB open, Line& Bus isolator open, E/switch closed | | | |
| 12 | 09.02.2022 | 1643hrs | 09.02.2022 | 1739hrs | | 0.45MW | | | For rejumpering out at Wtsa T-Off | | | | |
| 13 | 14.02.2022 | 0205hrs | 14.02.2022 | 0211hrs | | 3.88MW | 66kV Paro feeder | Paro substation | Transcient fault | CB open, OC | Chumdo end | trip | |
| 14 | | 0650hrs | | 0655hrs | | 2.58MW | | | | | | | |
| 15 | | 0705hrs | | 0721hrs | | 7.64MW | | | | | | | |
| 16 | 20.02.2022 | 2022hrs | 20.02.2022 | 2028hrs | | (-)15.75MW | 66kV Chukha feeder | Fed from 66kV Jemina feerder | Trip | CB open,Dist prtn optd, 3ph trip | | | |
| 17 | | 2100hrs | 21.02.2022 | 1226hrs | 15hrs | | | | | | | | |
| 18 | | 2131hrs | 20.02.2022 | 2141hrs | | 3.45MW | 66kV Pangbasa feeder | Pangbasa substation | Trip | G/trip, Dist prtn optd, 3ph | Chumdo end | Trip | |
| 19 | 21.02.2022 | 0846hrs | 21.02.2022 | 0939hrs | | (-)14.67MW | 66kV Jemina feeder | Paro,Pangbasa Watsa | Trip | No operation at chumdo end. | Changdaphu end | trip | |
| | **(B) 66/33kV Watsa Substation** | | | | | | | | | | | | |
| 1 | 5/2/2022 | 00:56hrs | 5/2/2022 | 01:02hrs | | .450MW | 66KV IC | Fdr. I and II | | Dist. Realay 21.8km, Gen. zone 1 at chukha end | 66KV IC | Tripped | |
| 2 | 5/2/2022 | 1:33hrs | 5/2/2022 | 1:35hrs | | .450MW | 66KV IC | Fdr. I and II | | Dist. Realay 21.8km, Gen. zone 1 at chukha end | 66KV IC | Tripped | |
| 3 | 5/2/2022 | 1:51hrs | 5/2/2022 | 1:56hrs | | .450MW | 66KV IC | Fdr. I and II | | Dist. Realay 21.8km, Gen. zone 1 at chukha end | 66KV IC | Tripped | |
| 4 | 5/2/2022 | 2:05hrs | 5/2/2022 | 3:02hrs | | .450MW | 66KV IC | Fdr. I and II | | Dist. Realay 21.8km, Gen. zone 1 at chukha end | 66KV IC | Tripped | |
| 5 | 5/2/2022 | 3:02hrs | 5/2/2022 | 5:10hrs | 2hrs | .450MW | 66KV IC | Fdr. I and II | | Dist. Realay 21.8km, Gen. zone 1 at chukha end | 66KV IC | Tripped | |
| 6 | 5/2/2022 | 7:34hrs | 6/2/2022 | 15:11hrs | 19hrs | .450MW | 66KV IC | Fdr. I and II | | Dist. Realay 21.8km, Gen. zone 1 at chukha end | 66KV IC | Tripped | 66KV back feeded from chumdo end after opening jumper towards chukha by TMD olakha |
| 9 | 16/2/2022 | 20:50hrs | 16/2/2022 | 20:56hrs | | .660MW | 66KV SF6 breaker | Fdr. I and II | OC,OCH, EF and EFH | OC,OCH, EF and EFH on B phase | Fdr. I Wanakha | Tripped | Test charge but line couldn't hold and breaker charged after opening Wanakha isolator |
| 10 | 20/2/2022 | 20:20hrs | 20/2/2022 | 20:28hrs | | .190MW | 66KV IC | Fdr. I and II | | Dist. Realay 14.9km, zone 1 at chukha end | 66KV IC | Tripped | |
| 11 | 20/2/2022 | 21:00hrs | 21/2/2022 | 12:26hrs | 15hrs | .190MW | 66KV IC | Fdr. I and II | Conductor got twisted at chapcha near greff canteen | Dist. Realay 14.9km, zone 1 at chukha end | 66KV IC | Tripped | Conductor got twisted with each other at chapcha near greff. Line charged after clearing fault by TMD Tsimalakha |
| | **(C) 66/33kV Olakha Substation** | | | | | | | | | | | | |
| 1 | 2/5/2022 | 1:15 | 2/5/2022 | 1:19 | | 2.92 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 4,12 & 13. 1.General trip. 2.Distance Optd. 4. Zone 2 Optd. 12.LBB Optd.13.U/V Optd. & Trip relay-86 & distance of fault at 18.8 km (Zone 2) | Fault on 66kV Olakha - Changidaphu line | Transient Fault | Reset all the operated relay & indication Chraged the 66kV line as per BPSO instruction given and hold normal. |
| 2 | 2/5/2022 | 2:28 | 2/5/2022 | 2:38 | | 0.83 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 3,12 & 13. 1.General trip. 2.Distance Optd. 3. Zone 1 Optd. 12.LBB Optd.13.U/V Optd. & Trip relay-86 & distance of fault at 3.7 km (Zone 1) | Fault on 66kV Olakha - Changidaphu line | Transient Fault | Reset all the operated relay & indication & consult with BPSO and charged the line & hold normal. |
| 3 | 2/5/2022 | 3:09 | 2/5/2022 | 3:15 | | 1.3 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 3,12 & 13. 1.General trip. 2.Distance Optd. 3. Zone 1 Optd. 12.LBB Optd.13.U/V Optd. & Trip relay-86 & distance of fault at 1.6 km (Zone 1) | Fault on 66kV Olakha - Changidaphu line | Transient Fault | Reset all the operated relay & indication & consult with BPSO and charged the line & hold normal. |
| 4 | 2/5/2022 | 3:27 | 2/5/2022 | 3:32 | | 1.3 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 3,12 & 13. 1.General trip. 2.Distance Optd. 3. Zone 1 Optd. 12.LBB Optd.13.U/V Optd. & Trip relay-86 & distance of fault at 1.8 km (Zone 1) | Fault on 66kV Olakha - Changidaphu line | Transient Fault | Reset all the operated relay & indication & consult with BPSO and charged the line & hold normal. |
| 5 | 2/5/2022 | 4:08 | 2/5/2022 | 4:14 | | 1.51 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 3,12 & 13. 1.General trip. 2.Distance Optd. 3. Zone 1 Optd. 12.LBB Optd.13.U/V Optd. & Trip relay-86 & distance of fault at 2.2 km (Zone 1) | Fault on 66kV Olakha - Changidaphu line | Transient Fault | Reset all the operated relay & indication & consult with BPSO and charged the line & hold normal. |
| 6 | 2/5/2022 | 5:53 | 2/5/2022 | 7:52 | 1 | 0.7 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 3,12 & 13. 1.General trip. 2.Distance Optd. 3. Zone 1 Optd. 12.LBB Optd.13.U/V Optd. & Trip relay-86 & distance of fault at 2.7 km (Zone 1) | Fault on 66kV Olakha - Changidaphu line | | As per the BPSO instruction given 66kVOlakha - Changidaphu breaker kept open due to continues tripping .Again as per BPSO instruction 66kV Olakha - Changidaphu breaker closed at 07:52 Hrs & hold normal. |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 2/5/2022 | 8:50 | 2/5/2022 | 10:53 | 2 | 0.0 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 3,12 & 13. 1.General trip. 2.Distance Optd. 3. Zone 1 Optd. 12.LBB Optd.13.U/V Optd. & Trip relay-86 & distance of fault at 1.4 km (Zone 1) | Fault on 66kV Olakha - Changidaphu line | | As per the BPSO instruction given 66kV Olakha - Changidaphu breaker closed at 8:56 hrs but it couldn't stand as Distance relays shows is 5.2 km on zone 1. Thereby 66kV breaker of Changedaphu was kept open as per BPSO instruction. After information 66kV Olakha - Changidaphu breaker closed /charged at 10:53 Hrs as per BPSO instruction and hold normal |
| 9 | 2/5/2022 | 14:45 | 2/5/2022 | 14:50 | | 0.0 | 66kV Olakha - Changidaphu line | Olakha Substation | Earth Fault and Over Current Operated | DISTANCE PROTN RELAY-21 Optd.Indication 1, 12 & 13. General Trip 12.LBB operated 13.U/V Optd. & Trip relay-86 ) | Line Segments | Due to Continuous snow Fall | Reset all the operated relay & indication and after consult with BPSO and charged the line & hold normal. |
| 10 | 2/5/2022 | 15:16 | 2/5/2022 | 15:18 | | 4.1 | 66kV Olakha - Changidaphu line | Olakha Substation | Earth Fault and Over Current Operated | DISTANCE PROTN RELAY-21 Optd.Indication 1, 12 & 13. General Trip 12.LBB operated 13.U/V Optd. & Trip relay-86 ) | Line Segments | Due to Continuous Show Fall | Reset all the operated relay & indication and after consult with BPSO and charged the line & hold normal. |
| 11 | 2/5/2022 | 12:26 | 2/5/2022 | 12:29 | | 13.8 | 20MVA Transformer - I | All the 33kV Outgoing feeders was effected | Directional Over Current and Earth fault along with 86 relay operated | Directional Over Current and Earth fault along with 86 relay operated. Indiaction. 1&5. 1. General Tripped 5. Over current and Earth fault operated | Line Segments | Temporary fault due to heavy snowfall | Reset the relays and test Charged the Transformer and hold normal |
| 12 | 2/5/2022 | 12:26 | 2/5/2022 | 12:29 | | 13.7 | 20MVA Transformer - II | All the 33kV Outgoing feeders was effected | Directional Over Current and Earth fault along with 86relay operated | Directional Over Current and Earth fault along with 86relay operated. Indiaction. 1&5. 1. General Tripped 5. Over current and Earth fault operated | Line Segments | Temporary fault due to heavy snowfall | Reset the relays and test Charged the Transformer and hold normal |
| 13 | 2/5/2022 | 13:08 | 2/5/2022 | 13:09 | | 14.7 | 20MVA Transformer - I | The 33kV outgoing was not effected as the feeders was fed from 20MVA Transformer II | Directional Over Current and Earth fault along with 86 relay operated | Directional Over Current and Earth fault along with 86 relay operated. Indiaction. 1&5. 1. General Tripped 5. Over current and Earth fault operated | Line Segments | Temporary fault due to heavy snowfall | Reset the relays and test Charged the Transformer and hold normal |
| 14 | 2/5/2022 | 14:45 | 2/5/2022 | 14:50 | | 15.9 | 20MVA Transformer - I | The 33kV outgoing was not effected as the feeders was fed from 20MVA Transformer II | Due to Tripping of 66kV Changedaphu feeders, 20MVA Transformer I was tripped | Only Relay 86 was operated | Line Segments | Temporary fault due to heavy snowfall | Reset the relays and test Charged the Transformer and hold normal |
| 15 | 2/5/2022 | 14:45 | 2/5/2022 | 14:50 | | | 66kV Bus Coupler | The 33kV outgoing was not effected as the feeders was fed from 20MVA Transformer II | Over Current and Earth fault along with 86 relay operated | Over current and Earth fault relay 50/51. Indication 1,2 3. 1.General trip. 2.Over current operated . 3. Earth Fault Operated along with Trip relay-86 | Line Segments | Temporary fault due to heavy snowfall | Reset the relays and test Charged the 66kV Bus and hold normal |
| 16 | 2/5/2022 | 15:16 | 2/5/2022 | 15:18 | | 8.5 | 20MVA Transformer - I | The 33kV outgoing was not effected as the feeders was fed from 20MVA Transformer II | Due to Tripping of 66kV Changedaphu feeders, 20MVA Transformer I was tripped | Only Relay 86 was operated | Line Segments | Temporary fault due to heavy snowfall | Reset the relays and test Charged the Transformer and hold normal |
| 17 | 2/5/2022 | 15:16 | 2/5/2022 | 15:18 | | | 66kV Bus Coupler | The 33kV outgoing was not effected as the feeders was fed from 20MVA Transformer II | Over Current and Earth fault along with 86 relay operated | Over current and Earth fault relay 50/51. Indication 1,2 3. 1.General trip. 2.Over current operated . 3. Earth Fault Operated along with Trip relay-86 | Line Segments | Temporary fault due to heavy snowfall | Reset the relays and test Charged the 66kV Bus and hold normal |
| 18 | 2/21/2022 | 8:48 | 2/21/2022 | 8:52 | | 19.91 | 66kV Olakha - Changidaphu line | Olakha Substation | Dist.Protn.Relay - 21 Optd. | DISTANCE PROTN RELAY-21 Optd.Indication 1,2 3,12 & 13. 1.General trip. 2.Distance Optd. 3. Zone 1 Optd. 12.LBB Optd.13.U/V Optd. & along with Trip relay-86 & distance of fault at 11.5 km (Zone 1) | Line Segments | Transient Fault | Reset all the operated relay & indication and after consult with BPSO and charged the line & hold normal. |

**(D) 66/33/11kV Lobeysa Substation**

**66kV LSA - Basochu feeder**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 05.02.2022 | 11:12hrs | 05.02.2022 | 11:20hrs | 0 | -4.180 | 66kV LSA - Basochu feeder | 66/33/11kV Lobeysa substation | | NA | | | 66kV LSA - Basochu feeder tripped at 11:12hrs and charged the line as per BPSO at 11:20hrs from Gewathang subsation. |

**66kV LSA - Dochula feeder**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 05.02.2022 | 01:43hrs | 05.02.2022 | 01:49hrs | 0 | 12.020 | 66kV LSA - Dochula feeder | NA | | Dist &86 relay operated | | | 66kV LSA - Dochula feeder tripped at 01:43hrs and informed to BPSO and charged at 01:49hrs as per BPSO. |
| 2 | 05.02.2022 | 02:13hrs | 05.02.2022 | 02:29hrs | 0 | 2.430 | 66kV LSA - Dochula feeder | NA | | Dist &86 relay operated | | | 66kV LSA - Dochula feeder tripped at 02:13hrs and informed to BPSO and charged at 02:29hrs as per BPSO with charging code 1212 . |
| 3 | 05.02.2022 | 09:13hrs | 05.02.2022 | 09:31hrs | 0 | | 66kV LSA - Dochula feeder | NA | | Dist &86 relay operated | | | 66kV LSA - Dochula feeder tripped at 09:13hrs and informed to BPSO and charged at 09:31hrs as per BPSO . |
| 4 | 05.02.2022 | 09:39hrs | 05.02.2022 | 10:04hrs | 0 | | 66kV LSA - Dochula feeder | NA | | Dist &86 relay operated | | | 66kV LSA - Dochula feeder tripped at 09:13hrs and informed to BPSO and charged at 09:31hrs as per BPSO . |
| 5 | 05.02.2022 | 10:58hrs | 05.02.2022 | 23:26hrs | 12 | 5.000 | 66kV LSA - Dochula feeder | NA | | Dist &86 relay operated | | | 66kV LSA - Dochula feeder tripped at 10:58hrs and informed to BPSO and charged at 23:26hrs as per BPSO with the closing code 1225 . |
| 6 | 15.02.2022 | 15:58hrs | 15.02.2022 | 16:11hrs | 0 | -8.010 | 66kV LSA - Dochula feeder | 66/33/11kV Lobeysa substation | | NA | | | 66kV LSA - Dochula feeder tripped at 15:58hrs and informed to BPSO and charged at 16:11hrs,at that time supply was feeded from Dochula to Gewathang end since their was line problem between Gewathang to Basochu(One phase conductor snapped) |
| 7 | 15.02.2022 | 18:28hrs | 16.02.2022 | 17:57hrs | 23 | -7.990 | 66kV LSA - Dochula feeder | 66/33/11kV Lobeysa substation | | Dist &86 relay operated | | | 66kV LSA - Dochula feeder tripped at 18:28hrs and informed to BPSO kept the feeder trip and the supply was resumed from Basochu at 19:03hrs and Dochula supply synorized at 17:57hrs on 16.02.2022 after rejumpering at tower No.31 with the closing code 1821. |

**(E) 66/33/11 kV Paro Substation**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 05.02.2022 | 00.25hrs | 05.02.2022 | 00.56hrs | | | 66kV Haa line | | | | | | |
| | | 01.09hrs | | 14.30hrs | 13 | | 66kV Haa line | | | | | | |
| 2 | 05.02.2022 | 24.56hrs | 01.02hrs | | 6 | | 66kV chumdo line | Paro ss | Due to heavy snow fall | No relay operation | | | |
| | | 02.05hrs | 04.10hrs | 2 | 5 | | | | | | | Long | |
| 3 | 14.02.2022 | 02.05hrs | 02.11hrs | | 6 | | 66kV chumdo line | Paro ss | Tripped from changedaphu | No relay operation | | transient | |
| | | 06.50hrs | 06.55hrs | | 5 | | | | | | | | |
| | | 07.05hrs | 07.21hrs | | 16 | | | | | | | | |
| 4 | 21.02.2022 | 08.46hrs | 21.02.2022 | 09.39hrs | | | 66kV chumdo line | Paro ss | Tripped from changedaphu | No relay operation | | transient | |

**(F) 66/33/11kV Jemina Substation**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 05.02.2022 | 0:07 | 05.02.2022 | 14:14 | 21 | 4.62 | Both 66kv feeder chumdu and changedaphu | Blackout | O/C | 186 &86 | line segment | | Upon test charging at 14:14 Hrs, line stood normal.(66kv olakha vie changedaphu fdr. Jumpering out at IT park area.) |
| 2 | 21.02.2022 | 8:48 | 21.02.2022 | 9:39 | 0 | | 66kv Changedaphu feeder | 66kv Changedaphu feeder | | No relay operation at jemina end. | line segment | | 66kv supply fail from changedaphu end and resumed at 09:39hrs. |

**(G) 66/33/11kV Dechencholing substation**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 01.02.2022 | 16:58hrs | 01.02.2022 | 17:05Hrs | 0 | -37.17 | 66KV Sesmtokha IC | whole s/s fdr. | Supply failed from source. According the Semtokha operator line tripped due to under voltage. | | | | |
| 2 | 05.02.2022 | 00:00hrs | 05.02.2022 | 00:05Hrs | 0 | 0.747 | 66KV Damji Fdr. | Damji line | Tripped on dist relay optd. | Dist relay, 86A, 86B Zone-I | not known | Tripped | Test charged the fdr after getting closing code; 1205 from BPSO fdr stand normal. |
| 3 | 05.02.2022 | 01:35hrs | 09.02.2022 | 10:46hrs | 105hrs | 0 | 66KV Damji Fdr. | Damji line | Tripped on dist relay & O/C relay | Dist relay, 86A, 86B Zone-I; 4.661KM; IA 5.530A; IB 1.819A; IC 1.820A | It is comfirmed that line has fault and issued the work permit to Olakha TMD for line patrolling, later they have found that two conductor was snapped and they re-stringing the conductor and brought back line to norma on dt 09.02.2022 at 10:46hrs. | | |
| 4 | 05.02.2022 | 09:13hrs | 05.02.2022 | 09:20hrs | 0 | -4.528 | 66KV Sesmtokha IC | whole s/s fdr. | Supply failed from Source. | | | | |
| 5 | 05.02.2022 | 09:39hrs | 05.02.2022 | 09:43hrs | 0 | -4.528 | .-do- | whole s/s fdr. | Supply failed from Source. | | | | |
| 6 | 05.02.2022 | 10:58hrs | 05.02.2022 | 11:04hrs | 0 | -5.439 | .-do- | whole s/s fdr. | Supply failed from Source. | | | | |
| 7 | 15.02.2022 | 13:58hrs | 15.02.2022 | 16:07 | 0 | -37.38 | 66KV Sesmtokha IC | whole s/s fdr. | Tripped on 86 relay optd | 86 relay optd. | …….. | Tripped | Test charged the fdr as per the instruction BPSO officials since there will be back out. |

**(H) 66/11kV Haa Substation**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 04.02.2022 | 20:19 | 04.02.2022 | 20:27 | 0 | -2.81 | 66kV Incomer | All the feeders | unknown | O/C | Pangbesa | Supply failed from Pangbesa substation on operating over current. The same was normalised from their end. | |
| 2 | 04.02.2022 | 20:54 | 04.02.2022 | 21:04 | 0 | -2.81 | 66kV Incomer | All the feeders | unknown | O/C on three phases | Chumdo | Supply failed from Pangbesa substation on operating over current. The same was normalised from their end. | |
| 3 | 04.02.2022 | 22:00 | 05.02.2022 | 15:19 | 18hrs | -2.81 | 66kV Incomer | All the feeders | conductor twisted | O/C on three phases | Chapcha | Supply failed from Chumdo substation on operating over current. The same was normalised from their end. | |
| 4 | 20.02.2022 | 21:31 | 20.02.2022 | 21:41 | 0 | -2.7 | 66kV Incomer | All the feeders | unknown | O/C on three phases | Chumdo end | Supply failed from Chumdo substation on operating over current on all the phases. The same was normalised from their end. | |
| 5 | 21.02.2022 | 8:48 | 21.02.2022 | 10:00 | 0 | -2.5 | 66kV Incomer | All the feeders | unknown | O/C on three phases | Chumdo end | Supply failed from Chumdo substation on operating over current on all the phases. The same was normalised from their end. | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **(I) 220kV Substation Semtokha** | | | | | | | | | | | | |
| | **66kV and above Tripping** | | | | | | | | | | | | |
| 1 | 06.02.2022 | 10:13hrs | 06.02.2022 | 10:25hrs | | -59.020 | 220kV Sem-BHP | Semtokha Substation | Phase to Phase Fault | Main-1 Zone 1 Trip, fault loop- L2-L2 | Distance= 11.3KM | Trasient | |
| 2 | 05.02.2022 | 01:43hrs | 05.02.2022 | 01:46hrs | | 43.09 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-N | Dir. EF Fault, fault loop- L1-N R,Y,Bph Trip | Distance=0.5KM | Trasient | |
| 3 | 05.02.2022 | 02:12hrs | 05.02.2022 | 02:16hrs | | 1.55 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, fault loop- L1-L2 | Distance=0.5KM | Trasient | |
| 4 | 05.02.2022 | 09:13hrs | 05.02.2022 | 09:20hrs | | 51.46 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, I>2 Trip, Y&Bph Trip,Fault loop=L1-L2 | Distance=0.00KM | Trasient | |
| 5 | 05.02.2022 | 09:39hrs | 05.02.2022 | 09:46hrs | | 5.45 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, I>2 Trip, Y&Bph Trip,Fault loop=L1-L2 | Distance=0.00KM | Trasient | |
| 6 | 05.02.2022 | 10:38hrs | 05.02.2022 | 10:40hrs | | 0.42 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, I>2 Trip, Y&Bph Trip,Fault loop=L1-L2 | Distance=0.00KM | Trasient | |
| 7 | 05.02.2022 | 10:58hrs | 05.02.2022 | 11:32hrs | | 0.42 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, I>2 Trip, Y&Bph Trip,Fault loop=L1-L2 | Distance=0.00KM | Trasient | |
| 8 | 05.02.2022 | 11:45hrs | 05.02.2022 | 22:44hrs | 11 | 0.42 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, I>2 Trip, Y&Bph Trip,Fault loop=L1-L2 | Distance=0.00KM | Trasient | |
| 9 | 15.02.2022 | 15:57hrs | 15.02.2022 | 16:11hrs | | 64.62 | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, fault loop- L1-L2, (Ia= 536.5A, Ib=525.8A, Ic=538.0A) | Distance=0.00KM | Trasient | |
| 10 | 15.02.2022 | 18:27hrs | 15.02.2022 | 18:39hrs | | | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L1-L2 | Dist. Prot. Optd, fault loop- L1-L2 | Distance=12.00KM | Trasient | |
| 11 | 15.02.2022 | 18:46hrs | 15.02.2022 | 18:59hrs | | | 66kV Sem-Dochula Line | Dochula Substation | Fault Loop= L2-N | Dist. Prot. Optd, Yph Trip, fault loop- L2-N | Distance=8.7KM | Trasient | |
| 12 | 05.02.2022 | 02:29hrs | 05.02.2022 | 02:33hrs | | 9.32 | 66kV Sem-Olakha Line | Olakha Substation | Overcurrent Trip | Back Up Relay Optd, I>> Trip, Y&Bph Trip | | Trasient | |
| 13 | 05.02.2022 | 03:10hrs | 05.02.2022 | 03:14hrs | | 8 | 66kV Sem-Olakha Line | Olakha Substation | Overcurrent Trip | Back Up Relay Optd, I>> Trip, Y&Bph Trip | | Trasient | |
| 14 | 05.02.2022 | 3:28hrs | 05.02.2022 | 03:31hrs | | 8 | 66kV Sem-Olakha Line | Olakha Substation | Overcurrent Trip | Back Up Relay Optd, I>> Trip, Y&Bph Trip | | Trasient | |
| 15 | 05.02.2022 | 04:09hrs | 05.02.2022 | 04:13hrs | | 6.11 | 66kV Sem-Olakha Line | Olakha Substation | Overcurrent Trip | Back Up Relay Optd, I>> Trip, Y&Bph Trip | | Trasient | |
| 16 | 05.02.2022 | 05:54hrs | 05.02.2022 | 05:56hrs | | 7.72 | 66kV Sem-Olakha Line | Olakha Substation | Overcurrent Trip | Back Up Relay Optd, I>> Trip, Y&Bph Trip | | Trasient | |
| 17 | 05.02.2022 | 08:52hrs | 05.02.2022 | 08:55hrs | | 15.17 | 66kV Sem-Olakha Line | Olakha Substation | Overcurrent Trip | Back Up Relay Optd, I>> Trip, Y&Bph Trip | | Trasient | |
| 18 | 01.02.2022 | 16:59hrs | 01.02.2022 | 17:06hrs | | 19.05 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Under Voltage | Dist. Prot Optd, Rph Under Volatge Trip | | Trasient | |
| 19 | 05.02.2022 | 01:43hrs | 05.02.2022 | 01:45hrs | | | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Overcurrent Trip | Dist. Prot Optd, Over current Trip | | Trasient | |
| 20 | 05.02.2022 | 02:12hrs | 05.02.2022 | 02:14hrs | | 4.78 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Overcurrent Trip | Dist. Prot Optd, Over current Trip | | Trasient | |
| 21 | 05.02.2022 | 09:39hrs | 05.02.2022 | 09:43hrs | | 4.78 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Under Voltage | Dist. Prot Optd, Under Voltage Trip | | Trasient | |
| 22 | 05.02.2022 | 10:38hrs | 05.02.2022 | 10:39hrs | | 5.21 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Under Voltage | Dist. Prot Optd, Under Voltage Trip | | Trasient | |
| 23 | 05.02.2022 | 10:58hrs | 05.02.2022 | 10:04hrs | | 5.51 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Under Voltage | Dist. Prot Optd, Under Voltage Trip | | Trasient | |
| 24 | 05.02.2022 | 11:45hrs | 05.02.2022 | 11:48hrs | | 5.51 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Under Voltage | Dist. Prot Optd, Under Voltage Trip | | Trasient | |
| 25 | 05.02.2022 | 18:41hrs | 05.02.2022 | 18:49hrs | | 5.51 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Under Voltage | Dist. Prot Optd, Under Voltage Trip | | Trasient | |
| 26 | 05.02.2022 | 15:58hrs | 05.02.2022 | 16:06hrs | | 33.3 | 66kV Sem-Dechencholing_Line | Dechencholing Substation | Broken Conductor | Dist. Prot Optd, Broken conductor Trip | | Trasient | |
| **66kV and above Shutdown** | | | | | | | | | | | | | |
| 16.02.2022 | 14:40hrs | 16.02.2022 | 17:53hrs | 3.00 | 50.520 | Dochula Subsation | Shutdown availed by Mr. Chundu Gyeltshen, TMD Olakha for re-conducting | | | | Trasient | | |
| **/33/11kV Pangbesa substation** | | | | | | | | | | | | | |
| 04.02.2022 | 20.15hrs | 04.02.2022 | 20.29hrs | 0 | 2.25 | Haa line out | Haa substation | Due to heavy snow fall | Distance | | transient | | |
| 04.02.2022 | 20.55hrs | 04.02.2022 | 21.06hrs | 0 | 2.18 | Haa line out | Haa substation | Due to heavy snow fall | Distance | | transient | | |
| 04.02.2022 | 22.27hrs | 05.02.2022 | 14.35hrs | 16 | | 66kV chumdo line | Pangbasa /Haa substation | Due to heavy snow fall | No relay operation | | Long | | |
| 05.02.2022 | 22.27hrs | 05.02.2022 | 14.35hrs | 16 | | 66kV chumdo line | Pangbasa /Haa substation | Due to heavy snow fall | No relay operation | | Long | | |
| 05.02.2022 | 24.56hrs | 05.02.2022 | 01.02hrs | 0 | | 66kV chumdo line | Pangbasa /Haa substation | Due to heavy snow fall | No relay operation | | | | |
| | 02.05hrs | | 04.10hrs | 0 | | | | | | | Long | | |
| 20.02.2022 | 21.31hrs | 20.02.2022 | 21.41hrs | | | 66kV chumdo line | Pangbasa /Haa substation | Tripped from chumdo | | | transient | | |
| 21.02.2022 | 21.31hrs | 20.02.2022 | 21.41hrs | | | 66kV chumdo line | Pangbasa /Haa substation | Tripped from changedaphu | No relay operation | | transient | | |
| **(K) 66/33kV Changidaphu Substation** | | | | | | | | | | | | | |
| 05.02.2022 | 04:11hrs | 05.02.2022 | 06:01hrs | 1 | | 66kV Changidaphu - Jemina Line | Changidaphu, Jemina, Chumdu, Paro and Haa Substation | Grid failed | CB hand tripped from Jemana end as per BPSO advice | | Trasient | | |
| 21.02.2022 | 08:49hrs | 21.02.2022 | 09:38hrs | | 19.31 | 66kV Changidaphu - Jemina Line | Changidaphu | Grid failed | Dist. Prtn trip, Zone 1 Y&Bph trip. | | Trasient | | |
| 05.02.2022 | 06:00hrs | 05.02.2022 | 08:19hrs | 2 | | 66kV Changidaphu - Olakha Line | Olakha, Changidaphu, Jemina, Chumdu, Paro and Haa Substation | Over Current | Dist. Prtn trip, Zone 1 RY&Bph trip, Over Current trip | | Trasient | | |
| **(L) 66/33kV Damji Substation** | | | | | | | | | | | | | |
| 01.02.2022 | 1658 hrs | 01.02.2022 | 1707 hrs | 0 | -4.45 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | Line trip from Semtokha Substation due to under voltage | |
| 05.02.2022 | 0001 hrs | 11.02.2022 | 1115 hrs | 6 days & 11 hrs | -2.72 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | 66 kV Line Fault between Dling & Damji Substation, kept feeder open | |
| 15.02.2022 | 1559 hrs | 15.02.2022 | 1607 hrs | 0 | -3.67 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | Line trip from Semtokha Substation | |
| **(M) 66/11kV Dochula Substation** | | | | | | | | | | | | | |
| 16/2/2022 | 14:40 | 16/2/2022 | 18:07 | 3 | 50.07MW | | Shut down taken to connect jumpering at Dochula Tower location SW31 with opening code 0365 and closing code 1281 | | Tower location SW31 | Connection of jumper | | | |

For March 2022

| Sl No. | Date of Tripping | Time of outages | Date of Normalization | Time of fault was cleared | Duration of Outages (Hrs) | MW before outage (MW) | Feeder Name | Name of the Substation/lines affected by the fault | Reasons of fault | Relay operations | Exact location of fault [Line segment/ Substation] | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(A) 400/220/66/11 kV Malbase Substation** | | | | | | | | | | | | | |
| **66kV & Above** | | | | | | | | | | | | | |
| 1 | 13.03.2022 | 23:08 | 14.03.2022 | 13:05 | 13 | | 66kV Pasakha feeder IV | Malbase s/s | Overcurrent & Earthfault | 51N-start,IOC-50-start,86 optd,general trip,IEF 50N trip. | | | R phase=1916.55A<-166.86 deg, Y phase=101.55A<4.6deg, B phase=67.821A<-61.93deg, N=1916.55<-166.86deg. |
| 2 | 13.03.2022 | 23:08 | 13.03.2022 | 23:23 | 0 | | 66kV Pasakha feeder I | Malbase s/s | Overcurrent & Earthfault | 51N-start,IOC-50-start,86 optd,general trip. | | | R phase=2553.36A<-162.73 deg, Y phase=54.6A<-154.5deg, B phase=61.34A<-179.5deg, N=2666.11A<17.02deg. |
| 3 | 13.03.2022 | 23:08 | 13.03.2022 | 23:23 | 0 | | 66kV Pasakha feeder II | Malbase s/s | Overcurrent & Earthfault | 51N-start,IOC-50-start,86 optd,general trip. | | | R phase=2306.81A<-170.6deg, Y phase=591.24A<93.34deg, B phase=546.46A<47.67deg, N=2386.81A<-170.6deg. |
| 4 | 13.03.2022 | 23:08 | 13.03.2022 | 23:23 | 0 | | 66kV Bus coupler | Malbase s/s | Overcurrent & Earthfault | 50N trip | | | R phase=554.4A<-19.92deg, Y phase=110.64A<-16.44deg, B phase=110.65A<-32.1deg, N=777.63A<21.78deg. |
| **(B)220/66/11 kV Singhigoan Substation** | | | | | | | | | | | | | |
| 1 | 13.03.2022 | 23:08 | 14.03.2022 | 13:04 | 13 | -2 | 66kV Bhutan Concast Feeder | Singhigoan substation | overcurrent | IE>> DIR trip, I>> DIR trip, Directional time o/c trip. | - | | IL1=50.16kA, IL2=0.4kA, IL3=0.3kA. |
| **(D) 66/33/11 kV Gedu Substation** | | | | | | | | | | | | | |
| 1 | 01.02.2022 | 16:58 | 01.02.2022 | 17:12 | 0 | 2.78 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| 2 | 02.02.2022 | 8:04 | 02.02.2022 | 8:42 | 0 | 2.8 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Phuntsholing end. |
| 3 | 05.02.2022 | 5:25 | 05.02.2022 | 5:32 | 0 | 1 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| 4 | 20.02.2022 | 23:10 | 20.02.2022 | 23:25 | 0 | 1.58 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| 5 | 21.02.2022 | 1:56 | 21.02.2022 | 2:21 | 0 | 0.93 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Phuntsholing end. |
| 6 | 21.02.2022 | 15:20 | 21.02.2022 | 15:35 | 0 | 2.33 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Phuntsholing end. |
| 7 | 25.02.2022 | 16:16 | 25.02.2022 | 16:34 | 0 | 2.9 | 66kV Incomer | Gedu Substation | Bad weather condition | | Line segment | | Tripped on both the 66kV Chukha and Phuntsholing end. Charged from Chukha end. |
| **(F) 220/66/33 kV Dhamdum Substation** | | | | | | | | | | | | | |
| 1 | 21.02.2022 | 15:27 | 21.02.2022 | 16:00 | 0 | 5.35 | 50/63MVA TRF.1 (203) | Dhamdum | Trainsent Fault | RET670 | N/A | N/A | Fault Mag.:128.11KV and Fault angle :-7.55Deg. |
| 2 | 21.02.2022 | 15:27 | 21.02.2022 | 15:59 | 0 | 5.32 | 50/63 MVA TRF 2 (205) | Dhamdum | Trainsent Fault | RET670 | N/A | N/A | Fault Mag.:128.11KV and Fault angle :-7.55Deg. |
| 3 | 21.02.2022 | 15:27 | 21.02.2022 | 17:01 | 1 | 8.1 | 66kV Gomtu fdr. | Gomtu | Trainsent Fault | REL670:General trip,Zone 1 trip R phase and 86 relay trip. | N/A | _ | Fault value:R phase fault mag.:3408.74Amp and fault angle :-74.35 deg. |

**Tripping Report for the month of MARCH 2022**

| Sl. No. | Date of Tripping | Time of outages | Date of Normalization | Time of fault was cleared | Duration of Outages (Hrs) | MW before outage (MW) | Feeder Name | Name of the Substation/lines affacted by the fault | Reasons of fault | Relay operations | Exact location of fault [Line segment/ Substation] | Type of outages | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **(A) 66kV Chumdu switching station** | | | | | | | | | | | | |
| 1 | 07.03.2022 | 1244hrs | 07.03.2022 | 1305hrs | | 1.38WM | 66kV Jemina feeder | Fed from 66kV Chukha | Trip | O/c, 3ph, CB open | Chumdo | Trip | |
| | **(B) 66/33kV Watsa Substation** | | | | | | | | | | | | |
| 1 | 15/3/2022 | 14:33hrs | 15/3/2022 | 14:36hrs | | .260MW | 66KV SF6 breaker | Fdr. I and II | OC,OCH, EF and EFH on ABC phase | OC,OCH, EF and EFH on ABC phase | 66KV SF6 breaker | Tripped | LT line cutoff and touches HT line at lomji chapcha as per ESD Chapcha |
| | **(D) 66/33/11kV Lobeysa Substation** | | | | | | | | | | | | |
| | **66kV LSA - Basochu feeder** | | | | | | | | | | | | |
| 1 | 07.03.2022 | 12:53hrs | 07.03.2022 | 13:04hrs | 0 | -18.990 | 66kV LSA - Basochu feeder | 66/33/11kV Lobeysa substation | | NA | | | 66kV LSA - Basochu feeder tripped at 12:53hrs and charged the line as per BPSO at 13:04hrs .(Grid fail) |
| | **66kV LSA - Dochula feeder** | | | | | | | | | | | | |
| 1 | 07.03.2022 | 12:53hrs | 07.03.2022 | 13:04hrs | 0 | 14.000 | 66kV LSA - Dochula feeder | 66/33/11kV Lobeysa substation | | NA | | | 66kV LSA -Dochula feeder tripped at 12:53hrs and charged the line as per BPSO at 13:04hrs .(Grid fail) |
| | **(G) 66/33/11kV Dechencholing substation** | | | | | | | | | | | | |
| 1 | 07.03.2022 | 12:52hrs | 07.03.2022 | 13:03Hrs | 0 | -30.71 | 66KV Sesmtokha IC | whole s/s fdr. | Supply failed from source. | | | | |
| 2 | 20.03.2022 | 14:56hrs | 20.03.2022 | 15:05hrs | 0 | -28.28 | 66KV Sesmtokha IC | whole s/s fdr. | Supply failed from source. | | | | |
| 3 | 20.03.2022 | 14:28hrs | 24.03.2022 | 22:09hrs | 104hrs | 3.942 | 66KV Damji Fdr. | Tripped at Semtokha I/C | While test charging fdr was not hold; then Olakha TMD team had started doing line patrolling about three days; however TMD didn't find the fault; later fault was at Substation side; then | | | | |
| 4 | 23.03.2022 | 22:43hrs | 23.03.2022 | 22:50Hrs | 0 | -19.48 | 66KV Sesmtokha IC | whole s/s fdr. | Supply failed from source. | | | | |
| 5 | 25.03.2022 | 20:25hrs | 28.03.2022 | 16:51hrs | 66hrs | 3.957 | 66KV Damji Fdr. | Damji line | Tripped on over current & Earthfault relay optd. | O/C & E/F relay, 86A, 86B | Damji S/S | Tripped | Operater observed heavy spark in Y phase Cable joint at Damji end it took few days to repair the cable and charging the fdr. |
| | | | | **66KV side Shut down** | | | | | | | | | |
| 1 | 09.03.2022 | 11:05hrs | 09.03.2022 | 13:07hrs | 2hrs | 4.081 | 66KV Damji Fdr. | Damji line | Shut down taken by Lobeysa TMD team to cleared the ROW of Damji line toward Gasa site. | | | | |
| | **(H) 66/11kV Haa Substation** | | | | | | | | | | | | |
| 1 | 19.03.2022 | 12:35 | 19:03.2 | 12:44 | 0 | -2.01 | All the feeders | unknown | O/C | Chumdo | Supply failed from Chomdo substation on operating over current. The same was normalised from their end. | Supply failed from Pangbesa substation on operating over current. The same was normalised from their end. | |
| | **(I) 220kV Substation Semtokha** | | | | | | | | | | | | |
| 1 | 20.03.2022 | 14:26hrs | 20.03.2022 | 14:30hrs | | 29.020 | 66kV Sem-Dechencholing Line | Dechencholing Substation | Earth Fault | Dist. Trip, In>> trip | | Trasient | |
| 2 | 20.03.2022 | 14:33hrs | 20.03.2022 | 14:40hrs | | 29.020 | 66kV Sem-Dechencholing Line | Dechencholing Substation | Earth Fault | Dist. Trip, In>> trip | | Trasient | |
| 3 | 20.03.2022 | 14:58hrs | 20.03.2022 | 15:04hrs | | 14.330 | 66kV Sem-Dechencholing Line | Dechencholing Substation | Earth Fault | Dist. Trip, In>> trip | | Trasient | |
| 4 | 23.03.2022 | 22:46hrs | 23.02.2022 | 22:50hrs | | 19.580 | 66kV Sem-Dechencholing Line | Dechencholing Substation | Earth Fault | Dist. Trip, In>> trip | | Trasient | |
| **J)66/33/11kV Pangbesa substation** | | | | | | | | | | | | | |
| 1 | 19.03.2022 | 12.30hrs | 19.03.2022 | 12.35hrs | 0 | 1.45 | Haa line out | Haa substation | O/C | Distance | | transient | Sunny weather |
| | **(L) 66/33kV Damji Substation** | | | | | | | | | | | | |
| 1 | 07.03.2022 | 1255 hrs | 07.03.2022 | 1306 hrs | 0 | -3.94 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | Line tripped from Semtokha Substation |
| 2 | 09.03.2022 | 1100 | 09.03.2022 | 1309 hrs | 2 | -3.97 | 66 kV Incoming Line | Whole Substation | Shutdown | NA | | | Shutdown avail by Mr. Karma Wangda, TLSMD, Lobesa for RoW clearing |
| 3 | 20.03.2022 | 1425 hrs | 24.03.2022 | 2209 hrs | 127 | -3.9 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | 66 kV Line Fault due to cable termination kit failure at Gantry of Damji Substation. Used Incomer II cable |
| 4 | 25.03.2022 | 2025 hrs | 28.03.2022 | 1653 hrs | 92 | -3.9 | 66 kV Incoming Line | Whole Substation | Trip | NA | | | 66 kV Line Fault due to cable termination kit failure at Incomer II of Gantry at Damji Substation. Restore incomer I cable. Closed CB of 66 kV line at 1824 hrs |