

**BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT**

Maximum Load/Demand till Date

Date: **October 17, 2021**  
Hours: **19:00 Hours**

| Date      | Time     | Load(MW) |
|-----------|----------|----------|
| 27-Dec-18 | 18:18hrs | 399.35MW |

| Sl. No.      | Hydropower Plant | Unit   | MW            | Transmission Lines and Elements                                      | Load (MW)     | Sign | Remarks  |
|--------------|------------------|--|---------------|--|---------------|------|--|
| 1            | 1020MW THP       | Unit- I  | 0.00          | 400kV THP - Siliguri Line - I  | 0.00          |      | Unit-I under AMP.<br>400kV THP-Siliguri line I under breakdown.  |
|              |                  | Unit- II   | 97.55         | 400kV THP - Siliguri Line - II                                       | 238.30        | +    |  |
|              |                  | Unit- III  | 167.00        | 400kV THP - Siliguri Line- IV  | 228.31        | +    |  |
|              |                  | Unit- IV   | 167.16        | 400kV THP - Malbase Line - III                                       | 295.56        | +    |  |
|              |                  | Unit- V  | 167.74        | 400kV Malbase - Siliguri Line  | 208.61        | +    |  |
|              |                  | Unit- VI   | 167.82        | -  | -             | -    |  |
|              |                  | <b>Total</b>   | <b>767.27</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b> | <b>0.665%</b> |      |  |
| 2            | 720MW MHP        | Unit-I   | 140.15        | 400kV MHP - Jigmeling Line - I                                       | 198.25        | +    | Unit-II & Unit III on standby.<br>400kV MHP-JLG Line II & IV on standby.<br>132kV MHP_Yurmoo Line I & II not in service.<br>400kV JLG_ALI Line I (Interim) on standby. |
|              |                  | Unit-II  | 0.00          | 400kV MHP - Jigmeling Line - II                                      | 0.00          |      |  |
|              |                  | Unit-III   | 140.35        | 400kV MHP - Jigmeling Line - III                                     | 200.14        | +    |  |
|              |                  | Unit-IV  | 120.32        | 400kV MHP - Jigmeling Line - IV                                      | 0.00          |      |  |
|              |                  | -  | -             | 132kV MHP - Yurmo Line - I   | 0.00          |      |  |
|              |                  | -  | -             | 132kV MHP - Yurmo Line - II  | 0.00          |      |  |
|              |                  | -  | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                              | -9.93         | -    |  |
|              |                  | -  | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                      | 0.00          |      |  |
|              |                  | -  | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                     | 99.63         | +    |  |
|              |                  | -  | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                       | 152.61        | +    |  |
|              |                  | -  | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                      | 151.65        | +    |  |
|              |                  | -  | -             | 80MVA, 220/132kV ICT - I (HV)  | 26.83         | +    |  |
|              |                  | -  | -             | 80MVA, 220/132kV ICT - II (HV)                                       | 27.15         | +    |  |
|              |                  | -  | -             | 220kV Tsirang - Jigmeling Line                                       | 66.57         | +    |  |
| -            | -                | 132kV Gelephu - Salakati Line  | 13.29         | +  |               |      |  |
| <b>Total</b> | <b>400.82</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b> | <b>0.606%</b> |  |               |      |  |
| 3            | 336MW CHP        | Unit- I  | 91.39         | 220kV CHP - Birpara Line- I  | 87.47         | +    | 66kV CHP_Gedu line opened at 10:01hrs (08/10/2021) to regulate 66kV voltage.   |
|              |                  | Unit- II   | 91.25         | 220kV CHP - Birpara Line- II   | 87.18         | +    |  |
|              |                  | Unit- III  | 91.90         | 220kV CHP - Malbase Line- III  | 123.25        | +    |  |
|              |                  | Unit- IV   | 91.41         | 220kV CHP - Semtokha Line- IV  | 41.74         | +    |  |
|              |                  | -  | -             | 220kV Malbase - Birpara Line   | 46.63         | +    |  |
|              |                  | -  | -             | 66kV CHP - Chumdo Line   | 23.93         | +    |  |
|              |                  | -  | -             | 66kV CHP - Gedu Line   | 0.00          |      |  |
|              |                  | -  | -             | 3x3MVA, 66/11kV TFR  | 1.40          | +    |  |
| <b>Total</b> | <b>365.95</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b> | <b>0.268%</b> |  |               |      |  |
| 4            | 24MW BHP (U/S)   | Unit- I  | 10.60         | 220kV BHP - Semtokha Line  | 46.44         | +    |  |
|              |                  | Unit- II   | 10.40         | 66kV BHP - Lobeysa Line  | 31.50         | +    |  |
|              |                  | <b>Total</b>   | <b>21.00</b>  | 220kV BHP - Tsirang Line   | -19.14        | -    |  |
| 5            | 40MW BHP (L/S)   | Unit- I  | 19.20         | 5MVA, 66/11kV TFR  | 0.00          |      |  |
|              |                  | Unit- II   | 19.10         | 30MVA ICT, 220/66kV (HV)   | 10.71         | +    |  |
|              |                  | <b>Total</b>   | <b>38.30</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b> | <b>0.843%</b> |      |  |
| 6            | 126MW DHP        | Unit-I   | 50.38         | 220kV DHP - Tsirang Line   | 87.93         | +    | 220kV DHP_Dagapela Line on standby.  |
|              |                  | Unit-II  | 38.00         | 220kV DHP - Dagapela Line  | 0.00          |      |  |
|              |                  | -  | -             | 220kV Jigmeling - Dagapela Line                                      | 2.41          | +    |  |
|              |                  | -  | -             | 5MVA, 220/33kV TFR   | 0.40          | +    |  |
|              |                  | <b>Total</b>   | <b>88.38</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b> | <b>0.057%</b> |      |  |
| 7            | 60MW KHP         | Unit- I  | 16.50         | 132kV KHP - Nangkhon Line  | 37.26         | +    |  |
|              |                  | Unit-II  | 16.50         | 132kV KHP - Kilikhar Line  | 27.81         | +    |  |
|              |                  | Unit- III  | 16.50         | 5MVA, 132/11kV TFR   | 0.40          | +    |  |
|              |                  | Unit- IV   | 16.50         | 132kV Motanga - Rangia Line  | 41.98         | +    |  |
|              |                  | <b>Total</b>   | <b>66.00</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b> | <b>0.803%</b> |      |  |

**Note: Generation-Load Summary (MW) for October 17, 2021 at 19:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW, %) | Auxiliary Consumption & Transformation Losses (MW) at Generator end. |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|-----------------------------|--|
| 1      | Western Grid | 1,280.90              | 317.83                                | 313.61                             | 896.50                      | 4.22   |
| 2      | Eastern Grid | 466.82                | 74.23                                 | 71.27                              | 459.16                      | 2.96   |
|        | <b>Total</b> | <b>1,747.72</b>       | <b>392.06</b>                         | <b>384.88</b>                      | <b>1,355.66</b>             | <b>7.18</b>  |

**Note: Generation-Load Summary for October 17, 2020 at 19:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW) | Auxiliary Consumption & Transformation Losses |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|---|
| 1      | Western Grid | 1,037.80              | 225.49                                | 214.09                             | 759.21                   | 11.40   |
| 2      | Eastern Grid | 454.22                | 40.72                                 | 36.90                              | 466.60                   | 3.82  |
|        | <b>Total</b> | <b>1,492.02</b>       | <b>266.21</b>                         | <b>250.99</b>                      | <b>1,225.81</b>          | <b>15.22</b>                                  |

**NOTE-BHP, MHPA and Rangia data collected from site**

1. The Instantaneous load balance is calculated as (Total generation - (Total export-Import) - Total domestic load) do not tend towards zero. This could be due to the following reasons:

- i) Not all the meters are digital and nor are all the meter at all locations can be read at same time (say 9:00hrs) due to many meter to be read manually.
- ii) The clocks of all the locations are not synchronized.

2. This report is generated to give an idea of the generation & load flow for the system at a particular instant.

**BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT**

**Maximum Load/Demand till Date**

|               |                         |
|---------------|-------------------------|
| <b>Date:</b>  | <b>October 18, 2021</b> |
| <b>Hours:</b> | <b>09:00 Hours</b>      |

|             |             |                 |
|-------------|-------------|-----------------|
| <b>Date</b> | <b>Time</b> | <b>Load(MW)</b> |
| 27-Dec-18   | 18:18hrs    | 399.35MW        |

| Sl. No.      | Hydropower Plant | Unit  | MW            | Transmission Lines and Elements   | Load (MW)     | Sign | Remarks  |
|--------------|------------------|---|---------------|---|---------------|------|--|
| 1            | 1020MW THP       | Unit- I   | 0.00          | 400kV THP - Siliguri Line - I   | 0.00          |      | Unit-I under AMP<br>400kV THP-Siliguri line I<br>under breakdown.  |
|              |                  | Unit- II  | 97.28         | 400kV THP - Siliguri Line - II  | 235.29        | +    |  |
|              |                  | Unit- III   | 138.80        | 400kV THP - Siliguri Line- IV   | 224.08        | +    |  |
|              |                  | Unit- IV  | 167.97        | 400kV THP - Malbase Line - III  | 273.10        | +    |  |
|              |                  | Unit- V   | 167.17        | 400kV Malbase - Siliguri Line   | 210.78        | +    |  |
|              |                  | Unit- VI  | 167.57        | -   | -             | -    |  |
|              |                  | <b>Total</b>  | <b>738.79</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.855%</b> |      |  |
| 2            | 720MW MHP        | Unit-I  | 135.21        | 400kV MHP - Jigmeling Line - I  | 199.76        | +    | MHP Unit II on standby.<br>400kV MHP-JLG Line II &<br>IV on standby.<br>132kV MHP_Yurmoo line I &<br>II not in service.<br>400kV JLG_ALI Line I<br>(Interim) on standby. |
|              |                  | Unit-II   | 0.00          | 400kV MHP - Jigmeling Line - II   | 0.00          |      |  |
|              |                  | Unit-III  | 130.72        | 400kV MHP - Jigmeling Line - III  | 200.57        | +    |  |
|              |                  | Unit-IV   | 135.49        | 400kV MHP - Jigmeling Line - IV   | 0.00          |      |  |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00          |      |  |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 0.00          |      |  |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | -22.76        | -    |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 0.00          |      |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | 102.54        | +    |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | 157.89        | +    |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 156.92        | +    |  |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 21.08         | +    |  |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 21.38         | +    |  |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | 67.44         | +    |  |
| -            | -                | 132kV Gelephu - Salakati Line   | 17.10         | +   |               |      |  |
| <b>Total</b> | <b>401.42</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.272%</b> |   |               |      |  |
| 3            | 336MW CHP        | Unit- I   | 91.50         | 220kV CHP - Birpara Line- I   | 79.25         | +    | 66kV CHP_Gedu line opened<br>at 10:01hrs (08/10/2021) to<br>regulate 66kV voltage.   |
|              |                  | Unit- II  | 90.55         | 220kV CHP - Birpara Line- II  | 79.59         | +    |  |
|              |                  | Unit- III   | 91.05         | 220kV CHP - Malbase Line- III   | 133.41        | +    |  |
|              |                  | Unit- IV  | 91.46         | 220kV CHP - Semtokha Line- IV   | 53.93         | +    |  |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | 26.10         | +    |  |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 16.81         | +    |  |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 0.00          |      |  |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 0.96          | +    |  |
| <b>Total</b> | <b>364.56</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.167%</b> |   |               |      |  |
| 4            | 24MW BHP (U/S)   | Unit- I   | 9.30          | 220kV BHP - Semtokha Line   | 29.00         | +    |  |
|              |                  | Unit- II  | 9.50          | 66kV BHP - Lobeyssa Line  | 28.00         | +    |  |
|              |                  | <b>Total</b>  | <b>18.80</b>  | 220kV BHP - Tsirang Line  | -4.30         | -    |  |
| 5            | 40MW BHP (L/S)   | Unit- I   | 17.10         | 5MVA, 66/11kV TFR   | 0.00          |      |  |
|              |                  | Unit- II  | 17.10         | 30MVA ICT, 220/66kV (HV)  | 9.23          | +    |  |
|              |                  | <b>Total</b>  | <b>34.20</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.566%</b> |      |  |
| 6            | 126MW DHP        | Unit-I  | 45.35         | 220kV DHP - Tsirang Line  | 73.92         | +    | 220kV DHP_Dagapela Line<br>on standby.   |
|              |                  | Unit-II   | 28.97         | 220kV DHP - Dagapela Line   | 0.00          |      |  |
|              |                  | -   | -             | 220kV Jigmeling - Dagapela Line   | 2.01          | +    |  |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.30          | +    |  |
|              |                  | <b>Total</b>  | <b>74.32</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.135%</b> |      |  |
| 7            | 60MW KHP         | Unit- I   | 16.55         | 132kV KHP - Nangkhoh Line   | 41.71         | +    |  |
|              |                  | Unit-II   | 16.63         | 132kV KHP - Kilikhar Line   | 23.69         | +    |  |
|              |                  | Unit- III   | 16.65         | 5MVA, 132/11kV TFR  | 0.35          | +    |  |
|              |                  | Unit- IV  | 16.62         | 132kV Motanga - Rangia Line   | 33.79         | +    |  |
|              |                  | <b>Total</b>  | <b>66.45</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.053%</b> |      |  |

**Note: Generation-Load Summary (MW) for October 18, 2021 at 09:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW) | Auxiliary Consumption & Transformation Losses (MW) at Generator end. |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|--|
| 1      | Western Grid | 1,230.67              | 308.14                                | 302.82                             | 855.09                   | 5.32   |
| 2      | Eastern Grid | 467.87                | 67.07                                 | 65.28                              | 468.24                   | 1.79   |
|        | <b>Total</b> | <b>1,698.54</b>       | <b>375.21</b>                         | <b>368.10</b>                      | <b>1,323.33</b>          | <b>7.11</b>  |

**Note: Generation-Load Summary for October 18, 2020 at 09:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW) | Auxiliary Consumption & Transformation Losses |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|---|
| 1      | Western Grid | 976.93                | 176.52                                | 168.82                             | 747.31                   | 7.70  |
| 2      | Eastern Grid | 440.62                | 36.09                                 | 32.78                              | 457.63                   | 3.31  |
|        | <b>Total</b> | <b>1,417.55</b>       | <b>212.61</b>                         | <b>201.60</b>                      | <b>1,204.94</b>          | <b>11.01</b>                                  |

**NOTE-BHP,MHPA & Rangia data collected from site**

1. The Instantaneous load balance is calculated as (Total generation - (Total export-Import) - Total domestic load) do not tend towards zero. This could be due to the following reasons:

- i) Not all the meters are digital and nor are all the meter at all locations can be read at same time (say 9:00hrs) due to many meter to be read manually.
- ii) The clocks of all the locations are not synchronized.

2. This report is generated to give an idea of the generation & load flow for the system at a particular instant.