

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

**Coincidental Maximum Load**

**Date:** September 25, 2022  
**Hours:** 19:00 Hours

**Date:** 30-Aug-22      **Time:** 19:23 hrs      **Load(MW):** 536.69

| Sl. No.      | Hydropower Plant | Unit  | MW            | Transmission Lines and Elements   | Load (MW)    | Remarks   |
|--------------|------------------|---|---------------|---|--------------|---|
| 1            | 1020MW THP       | Unit- I   | 187.15        | 400kV THP - Siliguri Line - I   | 233.00       |   |
|              |                  | Unit- II  | 187.10        | 400kV THP - Siliguri Line - II  | 231.00       |   |
|              |                  | Unit- III   | 79.90         | 400kV THP - Siliguri Line - IV  | 224.00       |   |
|              |                  | Unit- IV  | 160.50        | 400kV THP - Malbase Line - III  | 281.00       |   |
|              |                  | Unit- V   | 187.00        | 400kV Malbase - Siliguri Line   | 208.73       |   |
|              |                  | Unit- VI  | 187.20        | -   | -            |   |
|              |                  | <b>Total</b>  | <b>988.85</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>2.01%</b> |   |
| 2            | 720MW MHP        | Unit-I  | 197.56        | 400kV MHP - Jigmeling Line - I  | 335.20       | Unit-I under shutdown<br>400kV MHP-JLG Line II & IV on Standby.<br>132kV MHP_Yurmo line I not in service.<br>400kV JLG_ALL Line I (Interim) on Standby. |
|              |                  | Unit-II   | 197.40        | 400kV MHP - Jigmeling Line - II   | 0.00         |   |
|              |                  | Unit-III  | 135.54        | 400kV MHP - Jigmeling Line - III  | 337.30       |   |
|              |                  | Unit-IV   | 196.43        | 400kV MHP - Jigmeling Line - IV   | 0.00         |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00         |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 50.10        |   |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 54.84        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 0.00         |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | 152.11       |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | 228.30       |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 229.11       |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 26.64        |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 27.02        |   |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -18.83       |   |
| -            | -                | 132kV Gelephu - Salakati Line   | 16.94         |   |              |   |
| <b>Total</b> | <b>726.93</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.60%</b>  |   |              |   |
| 3            | 336MW CHP        | Unit- I   | 92.29         | 220kV CHP - Birpara Line- I   | 75.94        |   |
|              |                  | Unit- II  | 91.84         | 220kV CHP - Birpara Line- II  | 75.70        |   |
|              |                  | Unit- III   | 91.92         | 220kV CHP - Malbase Line- III   | 121.07       |   |
|              |                  | Unit- IV  | 76.00         | 220kV CHP - Semtokha Line- IV   | 55.10        |   |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | 31.20        |   |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 15.90        |   |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 5.80         |   |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 1.65         |   |
| <b>Total</b> | <b>352.05</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.25%</b>  |   |              |   |
| 4            | 24MW BHP (U/S)   | Unit- I   | 12.30         | 220kV BHP - Semtokha Line   | 55.80        |   |
|              |                  | Unit- II  | 12.10         | 66kV BHP - Lobeyasa Line  | 27.21        |   |
|              |                  | <b>Total</b>  | <b>24.40</b>  | 220kV BHP - Tsirang Line  | -18.05       |   |
| 5            | 40MW BHP (L/S)   | Unit- I   | 20.50         | 5MVA, 66/11kV TFR   | 0.68         |   |
|              |                  | Unit- II  | 21.10         | 30MVA ICT, 220/66kV (HV)  | 4.00         |   |
|              |                  | <b>Total</b>  | <b>41.60</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.55%</b> |   |
| 6            | 126MW DHP        | Unit-I  | 42.39         | 220kV DHP - Tsirang Line  | 0.00         | 220kV DHP_Tsirang Line on Standby.  |
|              |                  | Unit-II   | 41.01         | 220kV DHP - Dagapela Line   | 82.94        |   |
|              |                  | -   | -             | 220kV Jigmeling - Dagapela Line   | -20.43       |   |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.30         |   |
| <b>Total</b> | <b>83.40</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b>      | <b>0.19%</b>  |   |              |   |
| 7            | 60MW KHP         | Unit- I   | 16.57         | 132kV KHP - Nangkhoh Line   | 37.95        |   |
|              |                  | Unit-II   | 16.55         | 132kV KHP - Kilikhar Line   | 27.25        |   |
|              |                  | Unit- III   | 16.50         | 5MVA, 132/11kV TFR  | 0.57         |   |
|              |                  | Unit- IV  | 16.62         | 132kV Motanga - Rangia Line   | 44.63        |   |
|              |                  | <b>Total</b>  | <b>66.24</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.71%</b> |   |

**Note: Generation-Load Summary (MW) for September 25, 2022 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) |
|--------------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|--|
| 1            | Western Grid | 1,490.30              | 409.13                                | 387.87                             | 1,079.57                 | 21.26  |
| 2            | Eastern Grid | 793.17                | 123.68                                | 118.88                             | 671.09                   | 4.80   |
| <b>Total</b> |              | <b>2,283.47</b>       | <b>532.81</b>                         | <b>506.75</b>                      | <b>1,750.66</b>          | <b>26.06</b>                                       |

**Note: Generation-Load Summary for September 25, 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) |
|--------------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|--|
| 1            | Western Grid | 1,672.11              | 306.59                                | 300.51                             | 1,296.42                 | 6.08   |
| 2            | Eastern Grid | 614.94                | 73.64                                 | 70.53                              | 610.40                   | 3.11   |
| <b>Total</b> |              | <b>2,287.05</b>       | <b>380.23</b>                         | <b>371.04</b>                      | <b>1,906.82</b>          | <b>9.19</b>  |

**NOTE- All data collected from site.**

1. The Instantaneous load balance,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**

**Coincidental Maximum Load**

**Date:** September 26, 2022  
**Hours:** 09:00 Hours

| Date      | Time      | Load(MW) |
|-----------|-----------|----------|
| 30-Aug-22 | 19:23 hrs | 536.69   |

| Sl. No.      | Hydropower Plant | Unit  | MW            | Transmission Lines and Elements   | Load (MW)    | Remarks  |
|--------------|------------------|---|---------------|---|--------------|--|
| 1            | 1020MW THP       | Unit- I   | 186.92        | 400kV THP - Siliguri Line - I   | 237.00       |  |
|              |                  | Unit- II  | 186.80        | 400kV THP - Siliguri Line - II  | 236.00       |  |
|              |                  | Unit- III   | 80.40         | 400kV THP - Siliguri Line- IV   | 269.00       |  |
|              |                  | Unit- IV  | 161.50        | 400kV THP - Malbase Line - III  | 229.00       |  |
|              |                  | Unit- V   | 187.70        | 400kV Malbase - Siliguri Line   | 216.73       |  |
|              |                  | Unit- VI  | 187.60        | -   | -            |  |
|              |                  | <b>Total</b>  | <b>990.92</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>2.01%</b> |  |
| 2            | 720MW MHP        | Unit-I  | 160.32        | 400kV MHP - Jigmeling Line - I  | 282.42       | 400kV MHP-JLG Line II & IV on Standby.<br>132kV MHP_Yurmoo line I not in service.<br>400kV JLG_ALI Line II (Interim) on Standby. |
|              |                  | Unit-II   | 160.77        | 400kV MHP - Jigmeling Line - II   | 0.00         |  |
|              |                  | Unit-III  | 135.33        | 400kV MHP - Jigmeling Line - III  | 283.31       |  |
|              |                  | Unit-IV   | 160.53        | 400kV MHP - Jigmeling Line - IV   | 0.00         |  |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00         |  |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 48.00        |  |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 24.37        |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 133.83       |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | 0.00         |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | 200.03       |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 200.71       |  |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 16.71        |  |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 17.02        |  |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -7.34        |  |
| -            | -                | 132kV Gelephu - Salakati Line   | 9.20          |   |              |  |
| <b>Total</b> | <b>616.95</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.52%</b>  |   |              |  |
| 3            | 336MW CHP        | Unit- I   | 92.26         | 220kV CHP - Birpara Line- I   | 73.05        |  |
|              |                  | Unit- II  | 91.84         | 220kV CHP - Birpara Line- II  | 72.97        |  |
|              |                  | Unit- III   | 92.24         | 220kV CHP - Malbase Line- III   | 133.61       |  |
|              |                  | Unit- IV  | 76.40         | 220kV CHP - Semtokha Line- IV   | 50.22        |  |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | 16.96        |  |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 12.10        |  |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 6.40         |  |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 1.43         |  |
| <b>Total</b> | <b>352.74</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.84%</b>  |   |              |  |
| 4            | 24MW BHP (U/S)   | Unit- I   | 11.80         | 220kV BHP - Semtokha Line   | 44.90        |  |
|              |                  | Unit- II  | 11.50         | 66kV BHP - Lobeyasa Line  | 24.53        |  |
|              |                  | <b>Total</b>  | <b>23.30</b>  | 220kV BHP - Tsirang Line  | -5.72        |  |
| 5            | 40MW BHP (L/S)   | Unit- I   | 20.50         | 5MVA, 66/11kV TFR   | 0.38         |  |
|              |                  | Unit- II  | 21.10         | 30MVA ICT, 220/66kV (HV)  | 2.23         |  |
|              |                  | <b>Total</b>  | <b>41.60</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.25%</b> |  |
| 6            | 126MW DHP        | Unit-I  | 39.34         | 220kV DHP - Tsirang Line  | 0.00         | 220kV DHP_TSI Line on Standby.   |
|              |                  | Unit-II   | 38.99         | 220kV DHP - Dagapela Line   | 77.88        |  |
|              |                  | -   | -             | 220kV Jigmeling - Dagapela Line   | -16.35       |  |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.20         |  |
| <b>Total</b> | <b>78.33</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.32%</b>  |   |              |  |
| 7            | 60MW KHP         | Unit- I   | 16.50         | 132kV KHP - Nangkhoh Line   | 41.61        |  |
|              |                  | Unit-II   | 16.50         | 132kV KHP - Kilikhar Line   | 23.50        |  |
|              |                  | Unit- III   | 16.50         | 5MVA, 132/11kV TFR  | 0.40         |  |
|              |                  | Unit- IV  | 16.50         | 132kV Motanga - Rangia Line   | 41.93        |  |
|              |                  | <b>Total</b>  | <b>66.00</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.74%</b> |  |

**Note: Generation-Load Summary (MW) for September 26, 2022 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) |
|--------------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|--|
| 1            | Western Grid | 1,486.89              | 356.17                                | 332.23                             | 1,121.71                 | 23.94  |
| 2            | Eastern Grid | 682.95                | 106.26                                | 102.55                             | 585.70                   | 3.71   |
| <b>Total</b> |              | <b>2,169.84</b>       | <b>462.43</b>                         | <b>434.78</b>                      | <b>1,707.41</b>          | <b>27.65</b>                                       |

**Note: Generation-Load Summary for September 26, 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) |
|--------------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|--|
| 1            | Western Grid | 1,340.68              | 290.15                                | 282.87                             | 977.77                   | 7.28   |
| 2            | Eastern Grid | 576.57                | 53.90                                 | 50.70                              | 595.43                   | 3.20   |
| <b>Total</b> |              | <b>1,917.25</b>       | <b>344.05</b>                         | <b>333.57</b>                      | <b>1,573.20</b>          | <b>10.48</b>                                       |

**Notes: All WDC datas collected from site.**

1. The Instantaneous load balance,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.
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