

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

**Coincidental Maximum Load**

|               |                         |
|---------------|-------------------------|
| <b>Date:</b>  | <b>January 18, 2023</b> |
| <b>Hours:</b> | <b>18:00 Hours</b>      |

|             |             |                 |
|-------------|-------------|-----------------|
| <b>Date</b> | <b>Time</b> | <b>Load(MW)</b> |
| 28-Dec-22   | 18:03:26hrs | 629.23          |

| Sl. No.      | Hydropower Plant | Unit  | MW            | Transmission Lines and Elements   | Load (MW)     | Remarks   |
|--------------|------------------|---|---------------|---|---------------|---|
| 1            | 1020MW THP       | Unit- I   | 0.00          | 400kV THP - Siliguri Line - I   | 0.00          | Unit-I, II & III under Shutdown.<br>Unit-V on Standby.<br>400kV THP- Siliguri Line I on Standby.  |
|              |                  | Unit- II  | 0.00          | 400kV THP - Siliguri Line - II  | 81.64         |   |
|              |                  | Unit- III   | 0.00          | 400kV THP - Siliguri Line- IV   | 77.00         |   |
|              |                  | Unit- IV  | 119.37        | 400kV THP - Malbase Line - III  | 77.22         |   |
|              |                  | Unit- V   | 0.00          | 400kV Malbase - Siliguri Line   | 75.86         |   |
|              |                  | Unit- VI  | 119.22        | -   | -             |   |
|              |                  | <b>Total</b>  | <b>238.59</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.14%</b>  |   |
| 2            | 720MW MHP        | Unit-I  | 0.00          | 400kV MHP - Jigmeling Line - I  | 0.00          | Unit-I under Breakdown.<br>Unit-III under Shutdown.<br>400kV MHP-JLG Line I,II & III on Standby.<br>132kV MHP_Yurmo Line- I not in service.<br>400kV JLG_ALI line- II (Direct) on Standby.<br>400kV JLG_ALI Line- I (Interim) on Standby. |
|              |                  | Unit-II   | 80.40         | 400kV MHP - Jigmeling Line - II   | 0.00          |   |
|              |                  | Unit-III  | 0.00          | 400kV MHP - Jigmeling Line - III  | 0.00          |   |
|              |                  | Unit-IV   | 80.20         | 400kV MHP - Jigmeling Line - IV   | 76.77         |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00          |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 82.07         |   |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 136.47        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 0.00          |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | -21.09        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | -33.51        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 0.00          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 1.99          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 2.08          |   |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -69.21        |   |
| -            | -                | 132kV Gelephu - Salakati Line   | -18.48        |   |               |   |
| <b>Total</b> | <b>160.60</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.10%</b>  |   |               |   |
| 3            | 336MW CHP        | Unit- I   | 0.00          | 220kV CHP - Birpara Line- I   | -22.83        | Unit-I on Standby.<br>Unit-II under Shutdown.<br>220kV CHP_Birpara Line II on Standby.  |
|              |                  | Unit- II  | 0.00          | 220kV CHP - Birpara Line- II  | 0.00          |   |
|              |                  | Unit- III   | 77.39         | 220kV CHP - Malbase Line- III   | 63.63         |   |
|              |                  | Unit- IV  | 69.82         | 220kV CHP - Semtokha Line- IV   | 73.15         |   |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | -86.83        |   |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 24.25         |   |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 6.48          |   |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 1.08          |   |
| <b>Total</b> | <b>147.21</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.98%</b>  |   |               |   |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00          | 220kV BHP - Semtokha Line   | 76.80         | L/S & U/S Unit-I on Standby.  |
|              |                  | Unit- II  | 6.60          | 66kV BHP - Lobeyasa Line  | 27.84         |   |
|              |                  | <b>Total</b>  | <b>6.60</b>   | <b>220kV BHP - Tsirang Line</b>   | <b>-85.55</b> |   |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00          | 5MVA, 66/11kV TFR   | 1.32          | L/S & U/S Unit-I on Standby.  |
|              |                  | Unit- II  | 13.50         | 30MVA ICT, 220/66kV (HV)  | 22.73         |   |
|              |                  | <b>Total</b>  | <b>13.50</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>-1.54%</b> |   |
| 6            | 126MW DHP        | Unit-I  | 21.48         | 220kV DHP - Tsirang Line  | 21.26         | Unit-II under shutdown.<br>220kV DHP_Dagapela Line on Standby.  |
|              |                  | Unit-II   | 0.00          | 220kV DHP - Dagapela Line   | 0.00          |   |
|              |                  | -   | -             | 220kV Jigmeling - Dagapela Line   | 62.67         |   |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.20          |   |
| <b>Total</b> | <b>21.48</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b>      | <b>0.09%</b>  |   |               |   |
| 7            | 60MW KHP         | Unit- I   | 14.96         | 132kV KHP - Nangkhoh Line   | 10.32         | Unit-III under Shutdown.<br>Unit-IV on Standby.   |
|              |                  | Unit-II   | 15.01         | 132kV KHP - Kilikhar Line   | 18.41         |   |
|              |                  | Unit- III   | 0.00          | 5MVA, 132/11kV TFR  | 0.86          |   |
|              |                  | Unit- IV  | 0.00          | 132kV Motanga - Rangia Line   | 3.18          |   |
|              |                  | <b>Total</b>  | <b>29.97</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.27%</b>  |   |

**Note: Generation-Load Summary (MW) for January 18, 2023 at 18:00hrs.**

| 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 | 427.38                | 371.75                                | 367.86                             | 124.84                   | 3.89   |
| 2            | Eastern Grid | 190.57                | 191.26                                | 189.12                             | -69.90                   | 2.14   |
| <b>Total</b> |              | <b>617.95</b>         | <b>563.01</b>                         | <b>556.98</b>                      | <b>54.94</b>             | <b>6.03</b>  |

**Note: Generation-Load Summary for January 18, 2022 at 18:00hrs.**

| 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 | 223.79                | 351.17                                | 350.53                             | -73.00                   | 0.64   |
| 2            | Eastern Grid | 250.67                | 103.81                                | 101.71                             | 92.48                    | 2.10   |
| <b>Total</b> |              | <b>474.46</b>         | <b>454.98</b>                         | <b>452.24</b>                      | <b>19.48</b>             | <b>2.74</b>  |

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:** January 19, 2023  
**Hours:** 09:00 Hours

**Date:** 28-Dec-22      **Time:** 18:03:26hrs      **Load(MW):** 629.23

| Sl. No.      | Hydropower Plant | Unit  | MW            | Transmission Lines and Elements   | Load (MW)     | Remarks   |
|--------------|------------------|---|---------------|---|---------------|---|
| 1            | 1020MW THP       | Unit- I   | 0.00          | 400kV THP - Siliguri Line - I   | 0.00          | Unit-I, II under Shutdown.<br>Unit- III & V on Standby.<br>400kV THP- Siliguri Line I on Standby<br>400kV Tala-Siliguri line IV under Shutdown.   |
|              |                  | Unit- II  | 0.00          | 400kV THP - Siliguri Line - II  | 75.35         |   |
|              |                  | Unit- III   | 0.00          | 400kV THP - Siliguri Line- IV   | 0.00          |   |
|              |                  | Unit- IV  | 127.71        | 400kV THP - Malbase Line - III  | 158.30        |   |
|              |                  | Unit- V   | 0.00          | 400kV Malbase - Siliguri Line   | 53.91         |   |
|              |                  | Unit- VI  | 109.95        | -   | -             |   |
|              |                  | <b>Total</b>  | <b>237.66</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.69%</b>  |   |
| 2            | 720MW MHP        | Unit-I  | 0.00          | 400kV MHP - Jigmeling Line - I  | 0.00          | Unit-I under Breakdown.<br>Unit-III under Shutdown.<br>400kV MHP-JLG Line I,II & III on Standby.<br>132kV MHP_Yurmo Line- I not in service.<br>400kV JLG_ALI line- II (Direct) on Standby.<br>400kV JLG_ALI Line- I (Interim) on Standby. |
|              |                  | Unit-II   | 70.25         | 400kV MHP - Jigmeling Line - II   | 0.00          |   |
|              |                  | Unit-III  | 0.00          | 400kV MHP - Jigmeling Line - III  | 0.00          |   |
|              |                  | Unit-IV   | 70.39         | 400kV MHP - Jigmeling Line - IV   | 63.87         |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00          |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 75.92         |   |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 114.20        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 0.00          |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | -19.63        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | -30.60        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 0.00          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 5.08          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 5.25          |   |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -41.42        |   |
| -            | -                | 132kV Gelephu - Salakati Line   | -9.89         |   |               |   |
| <b>Total</b> | <b>140.64</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.60%</b>  |   |               |   |
| 3            | 336MW CHP        | Unit- I   | 0.00          | 220kV CHP - Birpara Line- I   | -6.12         | Unit-I on Standby.<br>Unit-II under Shutdown.<br>220kV CHP_Birpara Line II on Standby.  |
|              |                  | Unit- II  | 0.00          | 220kV CHP - Birpara Line- II  | 0.00          |   |
|              |                  | Unit- III   | 68.22         | 220kV CHP - Malbase Line- III   | 28.92         |   |
|              |                  | Unit- IV  | 66.53         | 220kV CHP - Semtokha Line- IV   | 82.07         |   |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | -32.42        |   |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 21.75         |   |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 6.84          |   |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 0.79          |   |
| <b>Total</b> | <b>134.75</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.37%</b>  |   |               |   |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00          | 220kV BHP - Semtokha Line   | 55.10         | L/S & U/S unit-I on Standby   |
|              |                  | Unit- II  | 6.60          | 66kV BHP - Lobeyasa Line  | 24.79         |   |
|              |                  | <b>Total</b>  | <b>6.60</b>   | <b>220kV BHP - Tsirang Line</b>   | <b>-60.54</b> |   |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00          | 5MVA, 66/11kV TFR   | 0.60          | L/S & U/S unit-I on Standby   |
|              |                  | Unit- II  | 13.50         | 30MVA ICT, 220/66kV (HV)  | 18.96         |   |
|              |                  | <b>Total</b>  | <b>13.50</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.75%</b>  |   |
| 6            | 126MW DHP        | Unit-I  | 21.76         | 220kV DHP - Tsirang Line  | 21.54         | Unit-II under Shutdown.<br>220kV DHP_Dagapela Line on Standby.  |
|              |                  | Unit-II   | 0.00          | 220kV DHP - Dagapela Line   | 0.00          |   |
|              |                  | -   | -             | 220kV Jigmeling - Dagapela Line   | 62.12         |   |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.20          |   |
| <b>Total</b> | <b>21.76</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.09%</b>  |   |               |   |
| 7            | 60MW KHP         | Unit- I   | 12.47         | 132kV KHP - Nangkhoh Line   | 9.36          | Unit-III under Shutdown.<br>Unit-IV on Standby.   |
|              |                  | Unit-II   | 12.52         | 132kV KHP - Kilikhar Line   | 14.67         |   |
|              |                  | Unit- III   | 0.00          | 5MVA, 132/11kV TFR  | 0.63          |   |
|              |                  | Unit- IV  | 0.00          | 132kV Motanga - Rangia Line   | 1.84          |   |
|              |                  | <b>Total</b>  | <b>24.99</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.32%</b>  |   |

**Note: Generation-Load Summary (MW) for January 19, 2023 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 | 414.27                | 364.97                                | 360.29                             | 90.72                    | 4.68   |
| 2            | Eastern Grid | 165.63                | 182.49                                | 181.31                             | -58.28                   | 1.18   |
| <b>Total</b> |              | <b>579.90</b>         | <b>547.46</b>                         | <b>541.60</b>                      | <b>32.44</b>             | <b>5.86</b>  |

**Note: Generation-Load Summary for January 19, 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 | 215.83                | 324.72                                | 323.83                             | -69.71                   | 0.89   |
| 2            | Eastern Grid | 226.33                | 84.51                                 | 83.31                              | 102.64                   | 1.20   |
| <b>Total</b> |              | <b>442.16</b>         | <b>409.23</b>                         | <b>407.14</b>                      | <b>32.93</b>             | <b>2.09</b>  |

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.

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