

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

**Coincidental Maximum Load**

**Date:** January 7, 2022  
**Hours:** 18:00 Hours

**Date**      **Time**      **Load(MW)**  
 30-Dec-21      18:00hrs      487.76

| 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          | THP under total shutdown.  |
|              |                  | Unit- II  | 0.00         | 400kV THP - Siliguri Line - II  | 0.00          |  |
|              |                  | Unit- III   | 0.00         | 400kV THP - Siliguri Line - IV  | 0.00          |  |
|              |                  | Unit- IV  | 0.00         | 400kV THP - Malbase Line - III  | 0.00          |  |
|              |                  | Unit- V   | 0.00         | 400kV Malbase - Siliguri Line   | -68.16        |  |
|              |                  | Unit- VI  | 0.00         | -   | -             |  |
|              |                  | <b>Total</b>  | <b>0.00</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.00%</b>  |  |
| 2            | 720MW MHP        | Unit-I  | 114.20       | 400kV MHP - Jigmeling Line - I  | 232.04        | Unit-II on Standby.<br>Unit-IV under Annual Maintenance.<br>400kV MHP-JLG Line II, III & IV on standby.<br>132kV MHP_Yurmo line I & II not in service.<br>400kV JLG_ALI Line II (Interim) on standby.<br>400kV JLG_ALI Line I (Direct) on standby. |
|              |                  | Unit-II   | 0.00         | 400kV MHP - Jigmeling Line - II   | 0.00          |  |
|              |                  | Unit-III  | 119.40       | 400kV MHP - Jigmeling Line - III  | 0.00          |  |
|              |                  | Unit-IV   | 0.00         | 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)                                   | 99.77         |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 53.54         |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | 0.00          |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | 0.00          |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 81.25         |  |
|              |                  | -   | -            | 80MVA, 220/132kV ICT - I (HV)   | 26.40         |  |
|              |                  | -   | -            | 80MVA, 220/132kV ICT - II (HV)  | 26.77         |  |
|              |                  | -   | -            | 220kV Tsirang - Jigmeling Line  | -44.30        |  |
| -            | -                | 132kV Gelephu - Salakati Line   | 0.08         |   |               |  |
| <b>Total</b> | <b>233.60</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.67%</b> |   |               |  |
| 3            | 336MW CHP        | Unit- I   | 91.74        | 220kV CHP - Birpara Line- I   | 0.00          | Unit-III on Standby.<br>Unit IV under Annual Maintenance.<br>220kV CHP_Birpara Line I & II under breakdown.  |
|              |                  | Unit- II  | 91.91        | 220kV CHP - Birpara Line- II  | 0.00          |  |
|              |                  | Unit- III   | 0.00         | 220kV CHP - Malbase Line- III   | 83.36         |  |
|              |                  | Unit- IV  | 0.00         | 220kV CHP - Semtokha Line- IV   | 74.24         |  |
|              |                  | -   | -            | 220kV Malbase - Birpara Line  | -25.39        |  |
|              |                  | -   | -            | 66kV CHP - Chumdo Line  | 20.66         |  |
|              |                  | -   | -            | 66kV CHP - Gedu Line  | 3.42          |  |
|              |                  | -   | -            | 3x3MVA, 66/11kV TFR   | 1.95          |  |
| <b>Total</b> | <b>183.65</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.01%</b> |   |               |  |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00         | 220kV BHP - Semtokha Line   | 63.60         | U/S unit-I and L/S Unit-I under maintenance.   |
|              |                  | Unit- II  | 8.60         | 66kV BHP - Lobeyasa Line  | 28.59         |  |
|              |                  | <b>Total</b>  | <b>8.60</b>  | <b>220kV BHP - Tsirang Line</b>   | <b>-67.84</b> |  |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00         | 5MVA, 66/11kV TFR   | 0.87          | U/S unit-I and L/S Unit-I under maintenance.   |
|              |                  | Unit- II  | 16.70        | 30MVA ICT, 220/66kV (HV)  | 21.16         |  |
|              |                  | <b>Total</b>  | <b>16.70</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.32%</b>  |  |
| 6            | 126MW DHP        | Unit-I  | 0.00         | 220kV DHP - Tsirang Line  | 27.70         | Unit-I under Annual Maintenance.<br>220kV DHP-Dagapela Line on standby.  |
|              |                  | Unit-II   | 28.47        | 220kV DHP - Dagapela Line   | 0.00          |  |
|              |                  | -   | -            | 220kV Jigmeling - Dagapela Line   | 2.46          |  |
|              |                  | -   | -            | 5MVA, 220/33kV TFR  | 0.76          |  |
| <b>Total</b> | <b>28.47</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b>      | <b>0.04%</b> |   |               |  |
| 7            | 60MW KHP         | Unit- I   | 15.05        | 132kV KHP - Nangkhoh Line   | 10.93         | Unit III on standby.<br>Unit-IV under Annual Maintenance.  |
|              |                  | Unit-II   | 15.11        | 132kV KHP - Kilikhar Line   | 18.03         |  |
|              |                  | Unit- III   | 0.00         | 5MVA, 132/11kV TFR  | 0.75          |  |
|              |                  | Unit- IV  | 0.00         | 132kV Motanga - Rangia Line   | 0.00          |  |
|              |                  | <b>Total</b>  | <b>30.16</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.49%</b>  |  |

**Note: Generation-Load Summary (MW) for January 07, 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 | 237.42                | 375.27                                | 375.16                             | -93.55                   | 0.11   |
| 2            | Eastern Grid | 263.76                | 84.59                                 | 82.58                              | 134.87                   | 2.01   |
| <b>Total</b> |              | <b>501.18</b>         | <b>459.86</b>                         | <b>457.74</b>                      | <b>41.32</b>             | <b>2.12</b>  |

**Note: Generation-Load Summary for January 07, 2021 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 | 311.09                | 272.79                                | 272.62                             | 26.36                    | 0.17   |
| 2            | Eastern Grid | 136.34                | 56.72                                 | 56.33                              | 91.56                    | 0.39   |
| <b>Total</b> |              | <b>447.43</b>         | <b>329.51</b>                         | <b>328.95</b>                      | <b>117.92</b>            | <b>0.56</b>  |

**NOTE- MHP and BHP 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**

|               |                        |
|---------------|------------------------|
| <b>Date:</b>  | <b>January 8, 2022</b> |
| <b>Hours:</b> | <b>09:00 Hours</b>     |

|             |             |                 |
|-------------|-------------|-----------------|
| <b>Date</b> | <b>Time</b> | <b>Load(MW)</b> |
| 30-Dec-21   | 18:00hrs    | 487.76          |

| 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          | THP under total shutdown.  |
|              |                  | Unit- II  | 0.00         | 400kV THP - Siliguri Line - II  | 0.00          |  |
|              |                  | Unit- III   | 0.00         | 400kV THP - Siliguri Line- IV   | 0.00          |  |
|              |                  | Unit- IV  | 0.00         | 400kV THP - Malbase Line - III  | 0.00          |  |
|              |                  | Unit- V   | 0.00         | 400kV Malbase - Siliguri Line   | -60.66        |  |
|              |                  | Unit- VI  | 0.00         | -   | -             |  |
|              |                  | <b>Total</b>  | <b>0.00</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.00%</b>  |  |
| 2            | 720MW MHP        | Unit-I  | 134.76       | 400kV MHP - Jigmeling Line - I  | 215.51        | Unit-II on Standby.<br>Unit-IV under Annual Maintenance.<br>400kV MHP-JLG Line II, III & IV on standby.<br>132kV MHP_Yurmo line I & II not in service.<br>400kV JLG_ALI Line II (Interim) on standby.<br>400kV JLG_ALI Line I (Direct) on standby. |
|              |                  | Unit-II   | 0.00         | 400kV MHP - Jigmeling Line - II   | 0.00          |  |
|              |                  | Unit-III  | 81.76        | 400kV MHP - Jigmeling Line - III  | 0.00          |  |
|              |                  | Unit-IV   | 0.00         | 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)                                   | 89.58         |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 48.23         |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | 0.00          |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | 0.00          |  |
|              |                  | -   | -            | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 75.09         |  |
|              |                  | -   | -            | 80MVA, 220/132kV ICT - I (HV)   | 19.10         |  |
|              |                  | -   | -            | 80MVA, 220/132kV ICT - II (HV)  | 19.39         |  |
|              |                  | -   | -            | 220kV Tsirang - Jigmeling Line  | -35.58        |  |
| -            | -                | 132kV Gelephu - Salakati Line   | 0.96         |   |               |  |
| <b>Total</b> | <b>216.52</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.47%</b> |   |               |  |
| 3            | 336MW CHP        | Unit- I   | 88.64        | 220kV CHP - Birpara Line- I   | 0.00          | Unit-III on Standby.<br>Unit-IV under Annual Maintenance.<br>220kV CHP_Birpara Line-I & II under breakdown..   |
|              |                  | Unit- II  | 81.33        | 220kV CHP - Birpara Line- II  | 0.00          |  |
|              |                  | Unit- III   | 0.00         | 220kV CHP - Malbase Line- III   | 80.08         |  |
|              |                  | Unit- IV  | 0.00         | 220kV CHP - Semtokha Line- IV   | 66.57         |  |
|              |                  | -   | -            | 220kV Malbase - Birpara Line  | -33.79        |  |
|              |                  | -   | -            | 66kV CHP - Chumdo Line  | 18.36         |  |
|              |                  | -   | -            | 66kV CHP - Gedu Line  | 3.03          |  |
|              |                  | -   | -            | 3x3MVA, 66/11kV TFR   | 1.65          |  |
| <b>Total</b> | <b>169.97</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.16%</b> |   |               |  |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00         | 220kV BHP - Semtokha Line   | 59.50         | U/S unit-I and L/S Unit-I under maintenance.   |
|              |                  | Unit- II  | 8.50         | 66kV BHP - Lobeyasa Line  | 26.42         |  |
|              |                  | <b>Total</b>  | <b>8.50</b>  | <b>220kV BHP - Tsirang Line</b>   | <b>-61.22</b> |  |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00         | 5MVA, 66/11kV TFR   | 0.61          |  |
|              |                  | Unit- II  | 16.80        | 30MVA ICT, 220/66kV (HV)  | 18.77         |  |
|              |                  | <b>Total</b>  | <b>16.80</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>-0.04%</b> |  |
| 6            | 126MW DHP        | Unit-I  | 0.00         | 220kV DHP - Tsirang Line  | 28.04         | Unit-I under Annual Maintenance.<br>220kV DHP_Dagapela Line on standby.  |
|              |                  | Unit-II   | 28.76        | 220kV DHP - Dagapela Line   | 0.00          |  |
|              |                  | -   | -            | 220kV Jigmeling - Dagapela Line   | 15.47         |  |
|              |                  | -   | -            | 5MVA, 220/33kV TFR  | 0.70          |  |
| <b>Total</b> | <b>28.76</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.07%</b> |   |               |  |
| 7            | 60MW KHP         | Unit- I   | 15.05        | 132kV KHP - Nangkhoh Line   | 13.64         | Unit III on standby.<br>Unit-IV under Annual Maintenance.  |
|              |                  | Unit-II   | 15.08        | 132kV KHP - Kilikhar Line   | 15.41         |  |
|              |                  | Unit- III   | 0.00         | 5MVA, 132/11kV TFR  | 0.80          |  |
|              |                  | Unit- IV  | 0.00         | 132kV Motanga - Rangia Line   | 3.81          |  |
|              |                  | <b>Total</b>  | <b>30.13</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.93%</b>  |  |

**Note: Generation-Load Summary (MW) for January 08, 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 | 224.03                | 354.06                                | 353.77                             | -94.45                   | 0.29   |
| 2            | Eastern Grid | 246.65                | 82.98                                 | 81.69                              | 128.09                   | 1.29   |
| <b>Total</b> |              | <b>470.68</b>         | <b>437.04</b>                         | <b>435.46</b>                      | <b>33.64</b>             | <b>1.58</b>  |

**Note: Generation-Load Summary for January 08, 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 | 334.75                | 249.70                                | 237.72                             | 76.29                    | 11.98  |
| 2            | Eastern Grid | 136.44                | 44.25                                 | 43.26                              | 100.95                   | 0.99   |
| <b>Total</b> |              | <b>471.19</b>         | <b>293.95</b>                         | <b>280.98</b>                      | <b>177.24</b>            | <b>12.97</b>                                       |

**NOTE-BHP 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.