

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

**Coincidental Maximum Load**

|               |                         |
|---------------|-------------------------|
| <b>Date:</b>  | <b>January 28, 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 & IV under Shutdown.<br>Unit III & V on Standby.<br>400kV THP- Siliguri Line I & IV on Standby.  |
|              |                  | Unit- II  | 136.35        | 400kV THP - Siliguri Line - II  | 76.16         |   |
|              |                  | Unit- III   | 0.00          | 400kV THP - Siliguri Line- IV   | 0.00          |   |
|              |                  | Unit- IV  | 0.00          | 400kV THP - Malbase Line - III  | 158.76        |   |
|              |                  | Unit- V   | 0.00          | 400kV Malbase - Siliguri Line   | 51.71         |   |
|              |                  | Unit- VI  | 100.51        | -   | -             |   |
|              |                  | <b>Total</b>  | <b>236.86</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.82%</b>  |   |
| 2            | 720MW MHP        | Unit-I  | 75.37         | 400kV MHP - Jigmeling Line - I  | 0.00          | Unit-II under AMP.<br>Unit-III under Shutdown.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   | 0.00          | 400kV MHP - Jigmeling Line - II   | 0.00          |   |
|              |                  | Unit-III  | 0.00          | 400kV MHP - Jigmeling Line - III  | 0.00          |   |
|              |                  | Unit-IV   | 76.17         | 400kV MHP - Jigmeling Line - IV   | 68.54         |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00          |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 82.65         |   |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 122.99        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 0.00          |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | -25.45        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | -34.44        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 0.00          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 8.06          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 8.25          |   |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -41.59        |   |
| -            | -                | 132kV Gelephu - Salakati Line   | -8.91         |   |               |   |
| <b>Total</b> | <b>151.54</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.23%</b>  |   |               |   |
| 3            | 336MW CHP        | Unit- I   | 0.00          | 220kV CHP - Birpara Line- I   | -6.78         | 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   | 70.45         | 220kV CHP - Malbase Line- III   | 25.47         |   |
|              |                  | Unit- IV  | 60.93         | 220kV CHP - Semtokha Line- IV   | 82.19         |   |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | -30.86        |   |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 21.94         |   |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 6.49          |   |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 0.91          |   |
| <b>Total</b> | <b>131.38</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.88%</b>  |   |               |   |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00          | 220kV BHP - Semtokha Line   | 51.57         | L/S & U/S Unit-I on Standby.  |
|              |                  | Unit- II  | 6.13          | 66kV BHP - Lobeysa Line   | 25.18         |   |
|              |                  | <b>Total</b>  | <b>6.13</b>   | <b>220kV BHP - Tsirang Line</b>   | <b>-58.02</b> |   |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00          | 5MVA, 66/11kV TFR   | 0.67          | L/S & U/S Unit-I on Standby.  |
|              |                  | Unit- II  | 12.91         | 30MVA ICT, 220/66kV (HV)  | 19.71         |   |
|              |                  | <b>Total</b>  | <b>12.91</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>-1.89%</b> |   |
| 6            | 126MW DHP        | Unit-I  | 20.27         | 220kV DHP - Tsirang Line  | 20.01         | 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   | 67.06         |   |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.20          |   |
| <b>Total</b> | <b>20.27</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b>      | <b>0.30%</b>  |   |               |   |
| 7            | 60MW KHP         | Unit- I   | 0.00          | 132kV KHP - Nangkhoh Line   | 7.26          | Unit-I on Standby.<br>Unit-IV under AMP   |
|              |                  | Unit-II   | 12.58         | 132kV KHP - Kilikhar Line   | 16.81         |   |
|              |                  | Unit- III   | 12.62         | 5MVA, 132/11kV TFR  | 0.78          |   |
|              |                  | Unit- IV  | 0.00          | 132kV Motanga - Rangia Line   | 6.56          |   |
|              |                  | <b>Total</b>  | <b>25.20</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.39%</b>  |   |

**Note: Generation-Load Summary (MW) for January 28, 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 | 407.55                | 358.91                                | 356.11                             | 90.23                    | 2.80   |
| 2            | Eastern Grid | 176.74                | 197.39                                | 196.69                             | -62.24                   | 0.70   |
| <b>Total</b> |              | <b>584.29</b>         | <b>556.30</b>                         | <b>552.80</b>                      | <b>27.99</b>             | <b>3.50</b>  |

**Note: Generation-Load Summary for January 28, 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 | 201.73                | 367.01                                | 365.61                             | -151.75                  | 1.40   |
| 2            | Eastern Grid | 278.31                | 90.55                                 | 88.37                              | 174.23                   | 2.18   |
| <b>Total</b> |              | <b>480.04</b>         | <b>457.56</b>                         | <b>453.98</b>                      | <b>22.48</b>             | <b>3.58</b>  |

**Remarks: All the load 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 29, 2023</b> |
| <b>Hours:</b> | <b>09:00 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 & IV under Shutdown.<br>Unit-III & V on Standby.<br>400kV THP- Siliguri Line I & IV on Standby..   |
|              |                  | Unit- II  | 152.59        | 400kV THP - Siliguri Line - II  | 89.54         |   |
|              |                  | Unit- III   | 0.00          | 400kV THP - Siliguri Line- IV   | 0.00          |   |
|              |                  | Unit- IV  | 0.00          | 400kV THP - Malbase Line - III  | 172.14        |   |
|              |                  | Unit- V   | 0.00          | 400kV Malbase - Siliguri Line   | 64.75         |   |
|              |                  | Unit- VI  | 110.83        | -   | -             |   |
|              |                  | <b>Total</b>  | <b>263.42</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.66%</b>  |   |
| 2            | 720MW MHP        | Unit-I  | 60.16         | 400kV MHP - Jigmeling Line - I  | 0.00          | Unit-II on standby.<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   | 0.00          | 400kV MHP - Jigmeling Line - II   | 0.00          |   |
|              |                  | Unit-III  | 0.00          | 400kV MHP - Jigmeling Line - III  | 0.00          |   |
|              |                  | Unit-IV   | 65.31         | 400kV MHP - Jigmeling Line - IV   | 53.78         |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00          |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 70.72         |   |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 113.42        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 0.00          |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | -23.27        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | -34.49        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 0.00          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 3.39          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 3.52          |   |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -40.17        |   |
| -            | -                | 132kV Gelephu - Salakati Line   | -13.36        |   |               |   |
| <b>Total</b> | <b>125.47</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.77%</b>  |   |               |   |
| 3            | 336MW CHP        | Unit- I   | 0.00          | 220kV CHP - Birpara Line- I   | -13.00        | 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   | 55.50         | 220kV CHP - Malbase Line- III   | 27.64         |   |
|              |                  | Unit- IV  | 58.17         | 220kV CHP - Semtokha Line- IV   | 70.11         |   |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | -42.26        |   |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 19.36         |   |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 8.00          |   |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 0.77          |   |
| <b>Total</b> | <b>113.67</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.69%</b>  |   |               |   |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00          | 220kV BHP - Semtokha Line   | 53.30         | L/S & U/S unit-I on Standby   |
|              |                  | Unit- II  | 6.30          | 66kV BHP - Lobeyasa Line  | 23.06         |   |
|              |                  | <b>Total</b>  | <b>6.30</b>   | <b>220kV BHP - Tsirang Line</b>   | <b>-57.51</b> |   |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00          | 5MVA, 66/11kV TFR   | 0.54          | L/S & U/S unit-I on Standby   |
|              |                  | Unit- II  | 13.00         | 30MVA ICT, 220/66kV (HV)  | 17.45         |   |
|              |                  | <b>Total</b>  | <b>13.00</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>-0.47%</b> |   |
| 6            | 126MW DHP        | Unit-I  | 20.33         | 220kV DHP - Tsirang Line  | 20.12         | 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   | 66.73         |   |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.20          |   |
| <b>Total</b> | <b>20.33</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.05%</b>  |   |               |   |
| 7            | 60MW KHP         | Unit- I   | 15.00         | 132kV KHP - Nangkhoh Line   | 13.57         | Unit-II on Standby.<br>Unit-IV under AMP  |
|              |                  | Unit-II   | 0.00          | 132kV KHP - Kilikhar Line   | 15.50         |   |
|              |                  | Unit- III   | 15.02         | 5MVA, 132/11kV TFR  | 0.63          |   |
|              |                  | Unit- IV  | 0.00          | 132kV Motanga - Rangia Line   | 5.83          |   |
|              |                  | <b>Total</b>  | <b>30.02</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.07%</b>  |   |

**Note: Generation-Load Summary (MW) for January 29, 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 | 416.72                | 357.86                                | 355.41                             | 99.03                    | 2.45   |
| 2            | Eastern Grid | 155.49                | 180.61                                | 179.32                             | -65.29                   | 1.29   |
| <b>Total</b> |              | <b>572.21</b>         | <b>538.47</b>                         | <b>534.73</b>                      | <b>33.74</b>             | <b>3.74</b>  |

**Note: Generation-Load Summary for January 29, 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 | 211.88                | 345.45                                | 343.89                             | -139.09                  | 1.56   |
| 2            | Eastern Grid | 191.31                | 81.18                                 | 78.56                              | 115.65                   | 2.62   |
| <b>Total</b> |              | <b>403.19</b>         | <b>426.63</b>                         | <b>422.45</b>                      | <b>-23.44</b>            | <b>4.18</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.