

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

**Coincidental Maximum Load**

|               |                         |
|---------------|-------------------------|
| <b>Date:</b>  | <b>February 2, 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  | 110.50        | 400kV THP - Siliguri Line - II  | 81.50         |  |
|              |                  | Unit- III   | 0.00          | 400kV THP - Siliguri Line- IV   | 0.00          |  |
|              |                  | Unit- IV  | 0.00          | 400kV THP - Malbase Line - III  | 162.05        |  |
|              |                  | Unit- V   | 0.00          | 400kV Malbase - Siliguri Line   | 58.25         |  |
|              |                  | Unit- VI  | 135.12        | -   | -             |  |
|              |                  | <b>Total</b>  | <b>245.62</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.84%</b>  |  |
| 2            | 720MW MHP        | Unit-I  | 69.86         | 400kV MHP - Jigmeling Line - I  | 0.00          | Unit-II under AMP.<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 & II (Interim) under Shutdown. |
|              |                  | Unit-II   | 0.00          | 400kV MHP - Jigmeling Line - II   | 0.00          |  |
|              |                  | Unit-III  | 0.00          | 400kV MHP - Jigmeling Line - III  | 0.00          |  |
|              |                  | Unit-IV   | 60.01         | 400kV MHP - Jigmeling Line - IV   | 64.44         |  |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00          |  |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 64.48         |  |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 120.18        |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | 0.00          |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | 0.00          |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | -57.04        |  |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 0.00          |  |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 1.53          |  |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 1.62          |  |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -48.93        |  |
| -            | -                | 132kV Gelephu - Salakati Line   | -18.49        |   |               |  |
| <b>Total</b> | <b>129.87</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.73%</b>  |   |               |  |
| 3            | 336MW CHP        | Unit- I   | 62.73         | 220kV CHP - Birpara Line- I   | -11.08        | Unit-II under AMP.<br>Unit-III on Standby.<br>220kV CHP_Birpara Line II on Standby.  |
|              |                  | Unit- II  | 0.00          | 220kV CHP - Birpara Line- II  | 0.00          |  |
|              |                  | Unit- III   | 0.00          | 220kV CHP - Malbase Line- III   | 19.13         |  |
|              |                  | Unit- IV  | 57.03         | 220kV CHP - Semtokha Line- IV   | 81.48         |  |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | -32.23        |  |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 22.67         |  |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 6.00          |  |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 0.87          |  |
| <b>Total</b> | <b>119.76</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.58%</b>  |   |               |  |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00          | 220kV BHP - Semtokha Line   | 56.97         | L/S & U/S Unit-I on Standby.   |
|              |                  | Unit- II  | 5.84          | 66kV BHP - Lobeyasa Line  | 25.88         |  |
|              |                  | <b>Total</b>  | <b>5.84</b>   | <b>220kV BHP - Tsirang Line</b>   | <b>-64.92</b> |  |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00          | 5MVA, 66/11kV TFR   | 0.71          | L/S & U/S Unit-I on Standby.   |
|              |                  | Unit- II  | 12.35         | 30MVA ICT, 220/66kV (HV)  | 20.75         |  |
|              |                  | <b>Total</b>  | <b>12.35</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>-2.47%</b> |  |
| 6            | 126MW DHP        | Unit-I  | 19.54         | 220kV DHP - Tsirang Line  | 19.31         | 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   | 66.95         |  |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.22          |  |
| <b>Total</b> | <b>19.54</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Gen. end</b>      | <b>0.05%</b>  |   |               |  |
| 7            | 60MW KHP         | Unit- I   | 15.17         | 132kV KHP - Nangkhoh Line   | 11.87         | Unit-II on Standby.<br>Unit-IV under AMP   |
|              |                  | Unit-II   | 0.00          | 132kV KHP - Kilikhar Line   | 17.36         |  |
|              |                  | Unit- III   | 15.14         | 5MVA, 132/11kV TFR  | 0.73          |  |
|              |                  | Unit- IV  | 0.00          | 132kV Motanga - Rangia Line   | 4.32          |  |
|              |                  | <b>Total</b>  | <b>30.31</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>1.15%</b>  |  |

**Note: Generation-Load Summary (MW) for February 02, 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 | 403.11                | 355.60                                | 353.28                             | 96.44                    | 2.32   |
| 2            | Eastern Grid | 160.18                | 182.46                                | 181.16                             | -71.21                   | 1.30   |
| <b>Total</b> |              | <b>563.29</b>         | <b>538.06</b>                         | <b>534.44</b>                      | <b>25.23</b>             | <b>3.62</b>  |

**Note: Generation-Load Summary for February 02, 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 | 219.69                | 357.46                                | 355.66                             | -83.98                   | 1.80   |
| 2            | Eastern Grid | 249.49                | 87.89                                 | 86.01                              | 107.81                   | 1.88   |
| <b>Total</b> |              | <b>469.18</b>         | <b>445.35</b>                         | <b>441.67</b>                      | <b>23.83</b>             | <b>3.68</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**

|               |                         |
|---------------|-------------------------|
| <b>Date:</b>  | <b>February 3, 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  | 135.55        | 400kV THP - Siliguri Line - II  | 75.56         |   |
|              |                  | Unit- III   | 0.00          | 400kV THP - Siliguri Line- IV   | 0.00          |   |
|              |                  | Unit- IV  | 0.00          | 400kV THP - Malbase Line - III  | 148.74        |   |
|              |                  | Unit- V   | 0.00          | 400kV Malbase - Siliguri Line   | 52.80         |   |
|              |                  | Unit- VI  | 90.04         | -   | -             |   |
|              |                  | <b>Total</b>  | <b>225.59</b> | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.57%</b>  |   |
| 2            | 720MW MHP        | Unit-I  | 64.16         | 400kV MHP - Jigmeling Line - I  | 0.00          | Unit-II under AMP.<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- II (Interim) under Shutdown. |
|              |                  | Unit-II   | 0.00          | 400kV MHP - Jigmeling Line - II   | 0.00          |   |
|              |                  | Unit-III  | 0.00          | 400kV MHP - Jigmeling Line - III  | 0.00          |   |
|              |                  | Unit-IV   | 64.31         | 400kV MHP - Jigmeling Line - IV   | 55.51         |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - I  | 0.00          |   |
|              |                  | -   | -             | 132kV MHP - Yurmo Line - II   | 73.23         |   |
|              |                  | -   | -             | 500MVA, 400/220kV ICT at Jigmeling (HV)                                   | 116.56        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Interim)                           | -24.33        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Interim)                          | 0.00          |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - I (Direct)                            | -37.85        |   |
|              |                  | -   | -             | 400kV Jigmeling - Alipurduar Line - II (Direct)                           | 0.00          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - I (HV)   | 2.52          |   |
|              |                  | -   | -             | 80MVA, 220/132kV ICT - II (HV)  | 2.63          |   |
|              |                  | -   | -             | 220kV Tsirang - Jigmeling Line  | -45.02        |   |
| -            | -                | 132kV Gelephu - Salakati Line   | -14.71        |   |               |   |
| <b>Total</b> | <b>128.47</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>-0.21%</b> |   |               |   |
| 3            | 336MW CHP        | Unit- I   | 59.05         | 220kV CHP - Birpara Line- I   | -7.74         | Unit-III on Standby.<br>Unit-II under AMP.<br>220kV CHP_Birpara Line II on Standby.   |
|              |                  | Unit- II  | 0.00          | 220kV CHP - Birpara Line- II  | 0.00          |   |
|              |                  | Unit- III   | 0.00          | 220kV CHP - Malbase Line- III   | 15.79         |   |
|              |                  | Unit- IV  | 56.33         | 220kV CHP - Semtokha Line- IV   | 79.35         |   |
|              |                  | -   | -             | 220kV Malbase - Birpara Line  | -24.79        |   |
|              |                  | -   | -             | 66kV CHP - Chumdo Line  | 21.88         |   |
|              |                  | -   | -             | 66kV CHP - Gedu Line  | 5.00          |   |
|              |                  | -   | -             | 3x3MVA, 66/11kV TFR   | 0.71          |   |
| <b>Total</b> | <b>115.38</b>    | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.34%</b>  |   |               |   |
| 4            | 24MW BHP (U/S)   | Unit- I   | 0.00          | 220kV BHP - Semtokha Line   | 54.08         | L/S & U/S unit-I on Standby   |
|              |                  | Unit- II  | 5.87          | 66kV BHP - Lobeyasa Line  | 24.72         |   |
|              |                  | <b>Total</b>  | <b>5.87</b>   | <b>220kV BHP - Tsirang Line</b>   | <b>-60.67</b> |   |
| 5            | 40MW BHP (L/S)   | Unit- I   | 0.00          | 5MVA, 66/11kV TFR   | 0.51          | L/S & U/S unit-I on Standby   |
|              |                  | Unit- II  | 12.38         | 30MVA ICT, 220/66kV (HV)  | 19.34         |   |
|              |                  | <b>Total</b>  | <b>12.38</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>-2.14%</b> |   |
| 6            | 126MW DHP        | Unit-I  | 19.34         | 220kV DHP - Tsirang Line  | 19.14         | 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   | 66.49         |   |
|              |                  | -   | -             | 5MVA, 220/33kV TFR  | 0.10          |   |
| <b>Total</b> | <b>19.34</b>     | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.52%</b>  |   |               |   |
| 7            | 60MW KHP         | Unit- I   | 14.52         | 132kV KHP - Nangkhoh Line   | 12.74         | Unit-II on Standby.<br>Unit-IV under AMP.   |
|              |                  | Unit-II   | 0.00          | 132kV KHP - Kilikhar Line   | 15.43         |   |
|              |                  | Unit- III   | 14.64         | 5MVA, 132/11kV TFR  | 0.74          |   |
|              |                  | Unit- IV  | 0.00          | 132kV Motanga - Rangia Line   | 6.17          |   |
|              |                  | <b>Total</b>  | <b>29.16</b>  | <b>Auxiliary Consumption &amp; Transformation Losses at Generator end</b> | <b>0.86%</b>  |   |

**Note: Generation-Load Summary (MW) for February 03, 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 | 378.56                | 327.75                                | 326.36                             | 95.83                    | 1.39   |
| 2            | Eastern Grid | 157.63                | 183.33                                | 183.35                             | -70.72                   | -0.02  |
| <b>Total</b> |              | <b>536.19</b>         | <b>511.08</b>                         | <b>509.71</b>                      | <b>25.11</b>             | <b>1.37</b>  |

**Note: Generation-Load Summary for February 03, 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 | 200.37                | 302.47                                | 300.01                             | -63.61                   | 2.46   |
| 2            | Eastern Grid | 208.46                | 80.21                                 | 77.11                              | 89.76                    | 3.10   |
| <b>Total</b> |              | <b>408.83</b>         | <b>382.68</b>                         | <b>377.12</b>                      | <b>26.15</b>             | <b>5.56</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.