

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

Maximum Load/Demand till Date

|        |                  |
|--------|------------------|
| Date:  | November 7, 2020 |
| Hours: | 19:00 Hours      |

| Date      | Time     | Load(MW) |
|-----------|----------|----------|
| 27-Dec-18 | 18:18hrs | 399.35MW |

| Sl. No.  | Hydropower Plant | Unit         | MW                       | Name of Feeders  | Load (MW)      | Sign | Remarks  |
|----------|------------------|--------------|--------------------------|--|----------------|------|--|
| 1        | 1020MW THP       | Unit- I      | 0.00                     | 400kV THP - Siliguri Fdr- I                              | 248.11         | +    | Unit-I under shutdown<br>Unit- II & 400kV THP-SIL<br>Fdr III under Standby.<br>400kV Tala-Malbase & ICT<br>under shutdown.   |
|          |                  | Unit- II     | 0.00                     | 400kV THP - Siliguri Fdr- II                             | 246.76         | +    |  |
|          |                  | Unit- III    | 100.41                   | 400kV THP - Siliguri Fdr- IV                             | 0.00           |      |  |
|          |                  | Unit- IV     | 150.73                   | 400kV THP - Malbase Fdr- III                             | 0.00           |      |  |
|          |                  | Unit- V      | 149.47                   | 400kV Malbase - Siliguri                                 | 0.00           |      |  |
|          |                  | Unit- VI     | 100.57                   | -  | -              | -    |  |
|          |                  | <b>Total</b> | <b>501.18</b>            | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>1.259%</b>  |      |  |
| 2        | 720MW MHP        | Unit-I       | 180.00                   | 400kV MHP - Jigmeling Fdr - I                            | 0.00           |      | Unit-I & II under Standby.<br>Unit-III under AMP(22/09/20-<br>30/11/2020).<br>400kV MHP-Jigmeling Fdr II<br>under Breakdown.<br>400kV MHP-Jigmeling Fdr I<br>under shutdown. |
|          |                  | Unit-II      | 0.00                     | 400kV MHP - Jigmeling Fdr - II                           | 0.00           |      |  |
|          |                  | Unit-III     | 0.00                     | 400kV MHP - Jigmeling Fdr - III                          | 0.00           |      |  |
|          |                  | Unit-IV      | 180.00                   | 400kV MHP - Jigmeling Fdr - IV                           | 358.90         | +    |  |
|          |                  | -            | -                        | 200MVA, 400/132kV ICT                                    |                |      |  |
|          |                  | -            | -                        | (Local Load)   |                |      |  |
|          |                  | <b>Total</b> | <b>360.00</b>            | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>0.306%</b>  |      |  |
| 3        | 336MW CHP        | Unit- I      | 74.46                    | 220kV CHP - Birpara Fdr- I                               | 43.25          | +    | Unit II under Annual<br>Maintenance  |
|          |                  | Unit- II     | 0.00                     | 220kV CHP - Birpara Fdr- II                              | 43.00          | +    |  |
|          |                  | Unit- III    | 74.51                    | 220kV CHP - Malbase Fdr- III                             | 101.61         | +    |  |
|          |                  | Unit- IV     | 75.23                    | 220kV CHP - Semtokha Fdr- IV                             | 18.48          | -    |  |
|          |                  | -            | -                        | 220kV Malbase - Birpara Fdr.                             | -8.00          | -    |  |
|          |                  | -            | -                        | 66kV CHP - Chumdo Fdr.                                   | 10.81          | +    |  |
|          |                  | -            | -                        | 66kV CHP - Gedu Fdr.                                     | 4.15           | +    |  |
|          |                  | -            | -                        | 3x3MVA, 66/11kV TFR                                      | 1.49           | +    |  |
|          |                  | <b>Total</b> | <b>224.20</b>            | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>0.629%</b>  |      |  |
| 4        | 24MW BHP (U/S)   | Unit- I      | 6.81                     | 220kV BHP - Semtokha Fdr.                                | 27.44          | +    |  |
|          |                  | Unit- II     | 6.81                     | 66kV BHP - Lobeysa Fdr.                                  | 14.48          | +    |  |
|          | <b>Total</b>     | <b>13.62</b> | 220kV BHP - Tsirang Fdr. | -1.10  | -              |      |  |
|          | 40MW BHP (L/S)   | Unit- I      | 13.87                    | 5MVA, 66/11kV TFR  | 0.64           | +    |  |
| Unit- II |                  | 13.86        | 30MVA ICT, 220/66kV      |  |                |      |  |
|          |                  | <b>Total</b> | <b>27.73</b>             | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>-0.266%</b> |      |  |
| 5        | 126MW DHPC       | Unit-I       | 48.27                    | 220kV DHPC - Tsirang Fdr.                                | 48.02          | +    | Unit II Standby  |
|          |                  | Unit-II      | 0.00                     | 220kV Jigmeling - Dagapela Fdr.                          | 1.90           | +    |  |
|          |                  | -            | -                        | 5MVA, 220/33kV TFR                                       |                |      |  |
|          |                  | <b>Total</b> | <b>48.27</b>             | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>0.518%</b>  |      |  |
| 6        | 60MW KHP         | Unit- I      | 0.00                     | 132kV KHP - Nangkhon Fdr- I                              | 23.00          | +    | Unit I Annual Maintenance  |
|          |                  | Unit-II      | 14.30                    | 132kV KHP - Kilikhar Fdr- II                             | 19.17          | +    |  |
|          |                  | Unit- III    | 14.30                    | 5MVA, 132/11kV TFR                                       | 0.27           | +    |  |
|          |                  | Unit- IV     | 14.30                    | 132kV Gelephu - Salakati Fdr.                            | 3.93           | +    |  |
|          |                  | -            | -                        | 132kV Motanga - Rangia Fdr.                              | 30.01          | +    |  |
|          |                  | -            | -                        | 220kV Tsirang - Jigmeling                                | 44.00          | +    |  |
|          |                  | <b>Total</b> | <b>42.90</b>             | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>1.072%</b>  |      |  |

**Note: Generation-Load Summary for November 07, 2020 at 19:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW) | Load Balance (MW) |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|-------------------|
| 1      | Western Grid | 815.00                | 197.88                                | 191.92                             | 573.12                   | 5.96              |
| 2      | Eastern Grid | 402.90                | 54.06                                 | 52.50                              | 392.84                   | 1.56              |
|        | <b>Total</b> | <b>1,217.90</b>       | <b>251.94</b>                         | <b>244.42</b>                      | <b>965.96</b>            | <b>7.52</b>       |

**Note: Generation-Load Summary for November 07, 2019 at 19:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW) | Load Balance (MW) |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|-------------------|
| 1      | Western Grid | 760.93                | 280.76                                | 276.77                             | 442.28                   | 3.99              |
| 2      | Eastern Grid | 253.98                | 65.61                                 | 64.42                              | 226.26                   | 1.19              |
|        | <b>Total</b> | <b>1,014.91</b>       | <b>346.37</b>                         | <b>341.19</b>                      | <b>668.54</b>            | <b>5.18</b>       |

**NOTE: MHP, MAL, KHP & Motanga datas collected from site.**

- The Instantaneous load balance is calculated as (Total generation - (Total export-Import) - Total domestic load) do not tend towards zero. This could be due to the following reasons:
  - 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.
  - The clocks of all the locations are not synchronized.
- 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**

Maximum Load/Demand till Date

|        |                  |
|--------|------------------|
| Date:  | November 8, 2020 |
| Hours: | 09:00 Hours      |

| Date      | Time     | Load(MW) |
|-----------|----------|----------|
| 27-Dec-18 | 18:18hrs | 399.35MW |

| Sl. No. | Hydropower Plant | Unit         | MW            | Name of Feeders  | Load (MW)      | Sign | Remarks   |
|---------|------------------|--------------|---------------|--|----------------|------|---|
| 1       | 1020MW THP       | Unit- I      | 0.00          | 400kV THP - Siliguri Fdr- I                              | 187.37         | +    | Unit-I under shutdown<br>Unit- II & 400kV THP-SIL<br>Fdr III under Standby.<br>400kV Tala-Malbase & ICT<br>under shutdown.  |
|         |                  | Unit- II     | 0.00          | 400kV THP - Siliguri Fdr- II                             | 184.53         | +    |   |
|         |                  | Unit- III    | 100.03        | 400kV THP - Siliguri Fdr- IV                             | 0.00           |      |   |
|         |                  | Unit- IV     | 81.19         | 400kV THP - Malbase Fdr- III                             | 0.00           |      |   |
|         |                  | Unit- V      | 99.19         | 400kV Malbase - Siliguri                                 | 0.00           |      |   |
|         |                  | Unit- VI     | 100.70        | -  | -              | -    |   |
|         |                  | <b>Total</b> | <b>381.11</b> | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>2.417%</b>  |      |   |
| 2       | 720MW MHP        | Unit-I       | 90.16         | 400kV MHP - Jigmeling Fdr - I                            | 0.00           |      | Unit-III under maintenance<br>(22/09/20-30/11/2020).<br>Unit-II under standby.<br>400kV MHP-JLG Fdr II under<br>Breakdown.<br>400kV MHP-JLG Fdr I under<br>shutdown |
|         |                  | Unit-II      | 0.00          | 400kV MHP - Jigmeling Fdr - II                           | 0.00           |      |   |
|         |                  | Unit-III     | 0.00          | 400kV MHP - Jigmeling Fdr - III                          | 112.66         | +    |   |
|         |                  | Unit-IV      | 135.47        | 400kV MHP - Jigmeling Fdr - IV                           | 112.18         | +    |   |
|         |                  | -            | -             | 200MVA, 400/132kV ICT<br>(Local Load)                    |                |      |   |
|         |                  | -            | -             |  |                |      |   |
|         |                  | <b>Total</b> | <b>225.63</b> | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>0.350%</b>  |      |   |
| 3       | 336MW CHP        | Unit- I      | 62.68         | 220kV CHP - Birpara Fdr- I                               | 40.66          | +    | Unit II under Annual<br>Maintenance   |
|         |                  | Unit- II     | 0.00          | 220kV CHP - Birpara Fdr- II                              | 40.87          | +    |   |
|         |                  | Unit- III    | 63.91         | 220kV CHP - Malbase Fdr- III                             | 88.72          | +    |   |
|         |                  | Unit- IV     | 62.32         | 220kV CHP - Semtokha Fdr- IV                             | 5.10           | -    |   |
|         |                  | -            | -             | 220kV Malbase - Birpara Fdr.                             | -12.00         | -    |   |
|         |                  | -            | -             | 66kV CHP - Chumdo Fdr.                                   | 8.11           | +    |   |
|         |                  | -            | -             | 66kV CHP - Gedu Fdr.                                     | 3.34           | +    |   |
|         |                  | -            | -             | 3x3MVA, 66/11kV TFR                                      | 1.03           | +    |   |
|         |                  | <b>Total</b> | <b>188.91</b> | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>0.572%</b>  |      |   |
| 4       | 24MW BHP (U/S)   | Unit- I      | 6.75          | 220kV BHP - Semtokha Fdr.                                | 31.46          | +    |   |
|         |                  | Unit- II     | 6.75          | 66kV BHP - Lobeysa Fdr.                                  | 12.99          | +    |   |
|         |                  | <b>Total</b> | <b>13.50</b>  | 220kV BHP - Tsirang Fdr.                                 | -3.08          | -    |   |
|         | 40MW BHP (L/S)   | Unit- I      | 13.94         | 5MVA, 66/11kV TFR  | 0.44           | +    |   |
|         |                  | Unit- II     | 14.28         | 30MVA ICT, 220/66kV                                      |                |      |   |
|         |                  | <b>Total</b> | <b>28.22</b>  | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>-0.319%</b> |      |   |
| 5       | 126MW DHPC       | Unit-I       | 47.74         | 220kV DHPC - Tsirang Fdr.                                | 47.50          | +    | Unit-II Standby   |
|         |                  | Unit-II      | 0.00          | 220kV Jigmeling - Dagapela Fdr.                          | 1.20           | +    |   |
|         |                  | -            | -             | 5MVA, 220/33kV TFR                                       |                |      |   |
|         |                  | <b>Total</b> | <b>47.74</b>  | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>0.503%</b>  |      |   |
| 6       | 60MW KHP         | Unit- I      | 0.00          | 132kV KHP - Nangkhon Fdr- I                              | 23.00          | +    | Unit I Annual Maintenance   |
|         |                  | Unit-II      | 13.05         | 132kV KHP - Kilikhar Fdr- II                             | 15.17          | +    |   |
|         |                  | Unit- III    | 13.00         | 5MVA, 132/11kV TFR                                       | 0.17           | +    |   |
|         |                  | Unit- IV     | 13.03         | 132kV Gelephu - Salakati Fdr.                            | 6.79           | +    |   |
|         |                  | -            | -             | 132kV Motanga - Rangia Fdr.                              | 22.42          | +    |   |
|         |                  | -            | -             | 220kV Tsirang - Jigmeling                                | 42.47          | +    |   |
|         |                  | <b>Total</b> | <b>39.08</b>  | <b>Error at Station/Auxiliary<br/>Consumption/Losses</b> | <b>1.901%</b>  |      |   |

Note: Generation-Load summary for November 08, 2020 at 09:00hrs.

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW) | Load Balance (MW) |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|-------------------|
| 1      | Western Grid | 659.48                | 175.58                                | 166.34                             | 441.43                   | 9.24              |
| 2      | Eastern Grid | 264.71                | 53.13                                 | 51.60                              | 254.05                   | 1.53              |
|        | <b>Total</b> | <b>924.19</b>         | <b>228.71</b>                         | <b>217.94</b>                      | <b>695.48</b>            | <b>10.77</b>      |

Note: Generation-Load Summary for November 08, 2019 at 09:00hrs

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import (MW) | Load Balance (MW) |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|--------------------------|-------------------|
| 1      | Western Grid | 595.17                | 267.48                                | 255.47                             | 298.2                    | 12.01             |
| 2      | Eastern Grid | 259.37                | 60.10                                 | 54.46                              | 228.76                   | 5.64              |
|        | <b>Total</b> | <b>854.54</b>         | <b>327.58</b>                         | <b>309.93</b>                      | <b>526.96</b>            | <b>17.65</b>      |

NOTES: KHP,MHP,MAL & Motanga datas collected from site.

- The Instantaneous load balance is calculated as (Total generation - (Total export-Import) - Total domestic load) do not tend towards zero. This could be due to the following reasons:
  - 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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