

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

Maximum Load/Demand till Date

|        |                |
|--------|----------------|
| Date:  | April 10, 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  | 158.03        | 400kV THP - Siliguri Fdr- I                          | 104.03    | +           | Unit- II & V standby. Unit-III & IV under shutdown. 400kV THP-SIL II standby & 400kV Mal-Siliguri under shutdown. |
|              |                  | Unit- II   | 0.00          | 400kV THP - Siliguri Fdr- II                         | 0.00      | +           |   |
|              |                  | Unit- III  | 0.00          | 400kV THP - Siliguri Fdr- IV                         | 98.81     | +           |   |
|              |                  | Unit- IV   | 0.00          | 400kV THP - Malbase Fdr- III                         | 89.60     | +           |   |
|              |                  | Unit- V  | 0.00          | 400kV Malbase - Siliguri                             | 0.00      | +           |   |
|              |                  | Unit- VI   | 140.08        | -  | -         | -           |   |
|              |                  | <b>Total</b>   | <b>298.11</b> | <b>Error at Station/Auxiliary Consumption/Losses</b> |           | <b>5.67</b> |   |
| 2            | 720MW MHP        | Unit-I   | 0.00          | 400kV MHP - Jigmeling Fdr - I                        | 65.50     | +           | Unit- I,III & IV under standby. 400kV MHP-JLG II & III standby.   |
|              |                  | Unit-II  | 133.41        | 400kV MHP - Jigmeling Fdr - II                       | 0.00      | +           |   |
|              |                  | Unit-III   | 0.00          | 400kV MHP - Jigmeling Fdr - III                      | 0.00      | +           |   |
|              |                  | Unit-IV  | 0.00          | 400kV MHP - Jigmeling Fdr - IV                       | 66.50     | +           |   |
|              |                  | -  | -             | 200MVA, 400/132kV ICT                                |           |             |   |
|              |                  | -  | -             | (Local Load)   |           |             |   |
|              |                  | <b>Total</b>   | <b>133.41</b> | <b>Error at Station/Auxiliary Consumption/Losses</b> |           | <b>1.41</b> |   |
| 3            | 336MW CHP        | Unit- I  | 0.00          | 220kV CHP - Birpara Fdr- I                           | 47.30     | +           | Unit-I, IV & 220kV CHP-Mal under shutdown.  |
|              |                  | Unit- II   | 80.93         | 220kV CHP - Birpara Fdr- II                          | 47.09     | +           |   |
|              |                  | Unit- III  | 66.95         | 220kV CHP - Malbase Fdr- III                         | 0.00      | +           |   |
|              |                  | Unit- IV   | 0.00          | 220kV CHP - Sementokha Fdr- IV                       | 31.96     | +           |   |
|              |                  | -  | -             | 220kV Malbase - Birpara Fdr.                         | -61.26    | +           |   |
|              |                  | -  | -             | 66kV CHP - Chumdo Fdr.                               | 11.56     | +           |   |
|              |                  | -  | -             | 66kV CHP - Gedu Fdr.                                 | 6.29      | +           |   |
|              |                  | -  | -             | 3x3MVA, 66/11kV TFR                                  | 1.59      | +           |   |
|              |                  | <b>Total</b>   | <b>147.88</b> | <b>Error at Station/Auxiliary Consumption/Losses</b> |           | <b>2.09</b> |   |
| 4            | 24MW BHP (U/S)   | Unit- I  | 4.89          | 220kV BHP - Sementokha Fdr.                          | 16.12     | +           | U/S Unit-II under shutdown./L/S Unit I standby  |
|              |                  | Unit- II   | 0.00          | 66kV BHP - Lobeysa Fdr.                              | 13.04     | +           |   |
|              |                  | <b>Total</b>   | <b>4.89</b>   | 220kV BHP - Tsirang Fdr.                             | -14.20    | -           |   |
|              | 40MW BHP (L/S)   | Unit- I  | 0.00          | 5MVA, 66/11kV TFR                                    | 0.73      | +           |   |
|              |                  | Unit- II   | 10.24         | 30MVA ICT, 220/66kV                                  |           |             |   |
| <b>Total</b> | <b>10.24</b>     | <b>Error at Station/Auxiliary Consumption/Losses</b> |               | <b>0.56</b>  |           |             |   |
| 5            | 126MW DHPC       | Unit-I   | 18.19         | 220kV DHPC - Tsirang Fdr.                            | 17.97     | +           | Unit-II Standby   |
|              |                  | Unit-II  | 0.00          | 220kV Jigmeling - Dagapela Fdr.                      |           |             |   |
|              |                  | -  | -             | 5MVA, 220/33kV TFR                                   |           |             |   |
|              |                  | <b>Total</b>   | <b>18.19</b>  | <b>Error at Station/Auxiliary Consumption/Losses</b> |           | <b>0.22</b> |   |
| 6            | 60MW KHP         | Unit- I  | 12.58         | 132kV KHP - Nangkhor Fdr- I                          | 15.23     | +           | Unit-II & IV Standby  |
|              |                  | Unit-II  | 0.00          | 132kV KHP - Kilikhar Fdr- II                         | 11.15     | +           |   |
|              |                  | Unit- III  | 15.07         | 5MVA, 132/11kV TFR                                   | 0.45      | +           |   |
|              |                  | Unit- IV   | 0.00          | 132kV Gelephu - Salakati Fdr.                        | -20.59    | -           |   |
|              |                  | -  | -             | 132kV Motanga - Rangia Fdr.                          | -6.04     | +           |   |
|              |                  | -  | -             | 220kV Tsirang - Jigmeling                            | 1.47      | +           |   |
|              |                  | <b>Total</b>   | <b>27.65</b>  | <b>Error at Station/Auxiliary Consumption/Losses</b> |           | <b>0.82</b> |   |

**Note: Load summary on April 10, 2020 at 19:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import | Load Balance |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|---------------------|--------------|
| 1      | Western Grid | 479.31                | 241.87                                | 234.45                             | 235.97              | 7.42         |
| 2      | Eastern Grid | 161.06                | 57.16                                 | 54.93                              | 105.37              | 2.23         |
|        | <b>Total</b> | <b>640.37</b>         | <b>299.03</b>                         | <b>289.38</b>                      | <b>341.34</b>       | <b>9.65</b>  |

**Note: Load Summary on April 10, 2019 at 19:00hrs**

| Sl. No | Region          | 19:00Hrs Load (MW) | Day Peak Load (MW) | Month Peak Load (MW) |
|--------|-----------------|--------------------|--------------------|----------------------|
| 1      | Western Grid    | 276.70             | 276.70             | 286.38               |
| 2      | Eastern Grid    | 51.71              | 51.71              | 62.64                |
|        | <b>National</b> | <b>328.41</b>      | <b>328.41</b>      | <b>349.02</b>        |

**NOTES:KHP & BHP-TSI feeder Loads 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:  | April 11, 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  | 129.97        | 400kV THP - Siliguri Fdr- I                          | 62.41       | +    | Unit- II & V standby. Unit-III & IV under shutdown. 400kV THP-SIL II standby. 400kV MAL_SIL under shutdown. |
|              |                  | Unit- II   | 0.00          | 400kV THP - Siliguri Fdr- II                         | 0.00        | +    |   |
|              |                  | Unit- III  | 0.00          | 400kV THP - Siliguri Fdr- IV                         | 59.27       | +    |   |
|              |                  | Unit- IV   | 0.00          | 400kV THP - Malbase Fdr- III                         | 73.91       | +    |   |
|              |                  | Unit- V  | 0.00          | 400kV Malbase - Siliguri                             | 0.00        | +    |   |
|              |                  | Unit- VI   | 70.24         | -  | -           | -    |   |
|              |                  | <b>Total</b>   | <b>200.21</b> | <b>Error at Station/Auxiliary Consumption/Losses</b> | <b>4.62</b> |      |   |
| 2            | 720MW MHP        | Unit-I   | 0.00          | 400kV MHP - Jigmeling Fdr - I                        | 89.00       | +    | Unit-I Standby & Unit IV AMP. 400kV MHP-JLG II & III Standby.   |
|              |                  | Unit-II  | 88.89         | 400kV MHP - Jigmeling Fdr - II                       | 0.00        | +    |   |
|              |                  | Unit-III   | 90.17         | 400kV MHP - Jigmeling Fdr - III                      | 0.00        | +    |   |
|              |                  | Unit-IV  | 0.00          | 400kV MHP - Jigmeling Fdr - IV                       | 89.00       | +    |   |
|              |                  | -  | -             | 200MVA, 400/132kV ICT                                |             |      |   |
|              |                  | -  | -             | (Local Load)   |             |      |   |
|              |                  | <b>Total</b>   | <b>179.06</b> | <b>Error at Station/Auxiliary Consumption/Losses</b> | <b>1.06</b> |      |   |
| 3            | 336MW CHP        | Unit- I  | 0.00          | 220kV CHP - Birpara Fdr- I                           | 45.55       | +    | Unit-I & IV under shutdown. 220kV CHP-MAL under shutdown  |
|              |                  | Unit- II   | 63.85         | 220kV CHP - Birpara Fdr- II                          | 45.46       | +    |   |
|              |                  | Unit- III  | 53.99         | 220kV CHP - Malbase Fdr- III                         | 0.00        | +    |   |
|              |                  | Unit- IV   | 0.00          | 220kV CHP - Sementokha Fdr- IV                       | 12.03       | +    |   |
|              |                  | -  | -             | 220kV Malbase - Birpara Fdr.                         | -75.69      | -    |   |
|              |                  | -  | -             | 66kV CHP - Chumdo Fdr.                               | 6.33        | +    |   |
|              |                  | -  | -             | 66kV CHP - Gedu Fdr.                                 | 6.26        | +    |   |
|              |                  | <b>Total</b>   | <b>117.84</b> | <b>Error at Station/Auxiliary Consumption/Losses</b> | <b>1.22</b> |      |   |
| 4            | 24MW BHP (U/S)   | Unit- I  | 4.84          | 220kV BHP - Sementokha Fdr.                          | 20.63       | +    | U/S Unit-II under shutdown and LS Unit I under standby.   |
|              |                  | Unit- II   | 0.00          | 66kV BHP - Lobeysa Fdr.                              | 9.70        | +    |   |
|              |                  | <b>Total</b>   | <b>4.84</b>   | 220kV BHP - Tsirang Fdr.                             | -15.32      | -    |   |
|              | 40MW BHP (L/S)   | Unit- I  | 0.00          | 5MVA, 66/11kV TFR                                    | 0.36        | +    |   |
|              |                  | Unit- II   | 10.53         | 30MVA ICT, 220/66kV                                  |             |      |   |
| <b>Total</b> | <b>10.53</b>     | <b>Error at Station/Auxiliary Consumption/Losses</b> | <b>0.00</b>   |  |             |      |   |
| 5            | 126MW DHPC       | Unit-I   | 0.00          | 220kV DHPC - Tsirang Fdr.                            | 16.91       | +    | Unit I standby.   |
|              |                  | Unit-II  | 17.19         | 220kV Jigmeling - Dagapela Fdr.                      |             |      |   |
|              |                  | -  | -             | 5MVA, 220/33kV TFR                                   |             |      |   |
|              |                  | <b>Total</b>   | <b>17.19</b>  | <b>Error at Station/Auxiliary Consumption/Losses</b> | <b>0.28</b> |      |   |
| 6            | 60MW KHP         | Unit- I  | 16.50         | 132kV KHP - Nangkhon Fdr- I                          | 26.07       | +    | Unit-III & Unit-IV standby. 220kV JLG-TSI line tripped (Maintenance going on )                              |
|              |                  | Unit-II  | 15.01         | 132kV KHP - Kilikhar Fdr- II                         | 3.96        | +    |   |
|              |                  | Unit- III  | 0.00          | 5MVA, 132/11kV TFR                                   | 0.38        | +    |   |
|              |                  | Unit- IV   | 0.00          | 132kV Gelephu - Salakati Fdr.                        | -11.11      | -    |   |
|              |                  | -  | -             | 132kV Motanga - Rangia Fdr.                          | 2.29        | +    |   |
|              |                  | -  | -             | 220kV Tsirang - Jigmeling                            | 0.00        | +    |   |
|              |                  | <b>Total</b>   | <b>31.51</b>  | <b>Error at Station/Auxiliary Consumption/Losses</b> | <b>1.10</b> |      |   |

**Note: Load summary on April 11, 2020 at 09:00hrs.**

| Sl. No | Region       | Total Generation (MW) | Total Load [Generation - Export (MW)] | Total Load [Feeder Summation (MW)] | Total Export/Import | Load Balance |
|--------|--------------|-----------------------|---------------------------------------|------------------------------------|---------------------|--------------|
| 1      | Western Grid | 350.61                | 213.61                                | 207.49                             | 137.00              | 6.12         |
| 2      | Eastern Grid | 210.57                | 41.39                                 | 39.23                              | 169.18              | 2.16         |
|        | <b>Total</b> | <b>561.18</b>         | <b>255.00</b>                         | <b>246.72</b>                      | <b>306.18</b>       | <b>8.28</b>  |

**Note: Load Summary on April 11, 2019 at 09:00hrs**

| Sl. No | Region          | 09:00Hrs Load (MW) | Day Peak Load (MW) | Month Peak Load (MW) |
|--------|-----------------|--------------------|--------------------|----------------------|
| 1      | Western Grid    | 232.70             | 269.07             | 286.38               |
| 2      | Eastern Grid    | 33.80              | 53.80              | 62.64                |
|        | <b>National</b> | <b>266.50</b>      | <b>322.87</b>      | <b>349.02</b>        |

**NOTES: KHP and TSI load 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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