

BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT

Coincidental Maximum Load

| | |
|---------------|-------------------------|
| Date: | February 6, 2022 |
| Hours: | 18:00 Hours |

| | | |
|-------------|-------------|-----------------|
| Date | Time | Load(MW) |
| 12-Jan-22 | 18:00hrs | 492.25 |

| 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 | -34.14 | |
| | | Unit- VI | 0.00 | - | - | |
| | | Total | 0.00 | Auxiliary Consumption & Transformation Losses at Generator end | 0.00% | |
| 2 | 720MW MHP | Unit-I | 100.21 | 400kV MHP - Jigmeling Line - I | 184.49 | Unit-IV on Standby. Unit-II under Annual Maintenance. 400kV MHP-JLG Line II, III & IV on standby. 132kV MHP_Yurmo line I & II not in service. 400kV JLG_ALI Line II (Interim) on Standby. 400kV JLG_ALI Line II (Direct) on Standby. |
| | | Unit-II | 0.00 | 400kV MHP - Jigmeling Line - II | 0.00 | |
| | | Unit-III | 86.27 | 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) | 75.25 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 42.54 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 64.85 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 4.81 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 4.87 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -75.57 | |
| - | - | 132kV Gelephu - Salakati Line | -2.69 | | | |
| Total | 186.48 | Auxiliary Consumption & Transformation Losses at Generator end | 1.07% | | | |
| 3 | 336MW CHP | Unit- I | 84.40 | 220kV CHP - Birpara Line- I | 10.91 | Unit-II on Standby. Unit-III under Annual Maintenance. 220kV CHP_Birpara Line II under Shutdown. 66kV CHP-Watsa line Faulty and 66kV CHM_Watsa in Service. |
| | | Unit- II | 0.00 | 220kV CHP - Birpara Line- II | 0.00 | |
| | | Unit- III | 0.00 | 220kV CHP - Malbase Line- III | 65.31 | |
| | | Unit- IV | 83.24 | 220kV CHP - Semtokha Line- IV | 80.45 | |
| | | - | - | 220kV Malbase - Birpara Line | -33.47 | |
| | | - | - | 66kV CHP - Chumdo Line | 0.30 | |
| | | - | - | 66kV CHP - Gedu Line | 6.98 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.85 | |
| Total | 167.64 | Auxiliary Consumption & Transformation Losses at Generator end | 1.10% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 0.00 | 220kV BHP - Semtokha Line | 71.80 | U/S and L/S Unit-I under maintenance. |
| | | Unit- II | 8.90 | 66kV BHP - Lobeyasa Line | 25.77 | |
| | | Total | 8.90 | 220kV BHP - Tsirang Line | -71.32 | |
| 5 | 40MW BHP (L/S) | Unit- I | 0.00 | 5MVA, 66/11kV TFR | 0.98 | |
| | | Unit- II | 18.10 | 30MVA ICT, 220/66kV (HV) | 18.13 | |
| | | Total | 18.10 | Auxiliary Consumption & Transformation Losses at Generator end | -0.85% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 0.00 | Unit-I under Annual Maintenance. 220kV DHP-Tsirang Line under maintenance. |
| | | Unit-II | 27.50 | 220kV DHP - Dagapela Line | 27.28 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | -10.22 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.20 | |
| Total | 27.50 | Auxiliary Consumption & Transformation Losses at Gen. end | 0.07% | | | |
| 7 | 60MW KHP | Unit- I | 16.09 | 132kV KHP - Nangkhoh Line | 26.94 | Unit-II under Annual Maintenance. Unit-III on Standby. |
| | | Unit-II | 0.00 | 132kV KHP - Kilikhar Line | 4.13 | |
| | | Unit- III | 0.00 | 5MVA, 132/11kV TFR | 0.78 | |
| | | Unit- IV | 16.13 | 132kV Motanga - Rangia Line | -15.06 | |
| | | Total | 32.22 | Auxiliary Consumption & Transformation Losses at Generator end | 1.15% | |

Note: Generation-Load Summary (MW) for February 06, 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 | 222.14 | 354.41 | 352.78 | -56.70 | 1.63 |
| 2 | Eastern Grid | 218.70 | 53.49 | 51.13 | 89.64 | 2.36 |
| Total | | 440.84 | 407.90 | 403.91 | 32.94 | 3.99 |

Note: Generation-Load Summary for February 06, 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 | 416.17 | 264.67 | 262.20 | 136.13 | 2.47 |
| 2 | Eastern Grid | 135.75 | 55.01 | 54.60 | 96.11 | 0.41 |
| Total | | 551.92 | 319.68 | 316.80 | 232.24 | 2.88 |

NOTE- BHP 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

| | |
|---------------|-------------------------|
| Date: | February 7, 2022 |
| Hours: | 09:00 Hours |

| | | |
|-------------|-------------|-----------------|
| Date | Time | Load(MW) |
| 12-Jan-22 | 18:00hrs | 492.25 |

| 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 | -47.27 | |
| | | Unit- VI | 0.00 | - | - | |
| | | Total | 0.00 | Auxiliary Consumption & Transformation Losses at Generator end | 0.00% | |
| 2 | 720MW MHP | Unit-I | 81.84 | 400kV MHP - Jigmeling Line - I | 154.10 | Unit IV on Standby. Unit-II under Annual Maintenance. 400kV MHP-JLG Line II, III & IV on standby. 132kV MHP_Yurmo line I & II not in service. 400kV JLG_ALI Line II (Interim) on Standby. 400kV JLG_ALI Line II (Direct) on Standby. |
| | | Unit-II | 0.00 | 400kV MHP - Jigmeling Line - II | 0.00 | |
| | | Unit-III | 74.12 | 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) | 61.11 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 36.46 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 55.15 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 6.38 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 6.49 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -62.77 | |
| - | - | 132kV Gelephu - Salakati Line | 1.98 | | | |
| Total | 155.96 | Auxiliary Consumption & Transformation Losses at Generator end | 1.19% | | | |
| 3 | 336MW CHP | Unit- I | 90.80 | 220kV CHP - Birpara Line- I | 22.55 | Unit-II on Standby. Unit-III under Annual Maintenance. 220kV CHP_Birpara Line II under Shutdown. 66kV CHP-Watsa line Faulty and 66kV CHM_Watsa in Service. |
| | | Unit- II | 0.00 | 220kV CHP - Birpara Line- II | 0.00 | |
| | | Unit- III | 0.00 | 220kV CHP - Malbase Line- III | 83.04 | |
| | | Unit- IV | 90.63 | 220kV CHP - Semtokha Line- IV | 65.48 | |
| | | - | - | 220kV Malbase - Birpara Line | -27.13 | |
| | | - | - | 66kV CHP - Chumdo Line | 0.00 | |
| | | - | - | 66kV CHP - Gedu Line | 6.13 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.49 | |
| Total | 181.43 | Auxiliary Consumption & Transformation Losses at Generator end | 1.51% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 0.00 | 220kV BHP - Semtokha Line | 63.00 | U/S and L/S Unit-I under maintenance. |
| | | Unit- II | 7.90 | 66kV BHP - Lobeyasa Line | 24.03 | |
| | | Total | 7.90 | 220kV BHP - Tsirang Line | -59.56 | |
| 5 | 40MW BHP (L/S) | Unit- I | 0.00 | 5MVA, 66/11kV TFR | 0.64 | |
| | | Unit- II | 20.10 | 30MVA ICT, 220/66kV (HV) | 16.97 | |
| | | Total | 20.10 | Auxiliary Consumption & Transformation Losses at Generator end | -0.39% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 0.00 | Unit-I under Annual Maintenance. 220kV DHP_Tsirang Line under maintenance. |
| | | Unit-II | 30.48 | 220kV DHP - Dagapela Line | 30.28 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | -14.61 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.10 | |
| Total | 30.48 | Auxiliary Consumption & Transformation Losses at Generator end | 0.33% | | | |
| 7 | 60MW KHP | Unit- I | 15.05 | 132kV KHP - Nangkhoh Line | 26.04 | Unit-II under Annual Maintenance. Unit-III on Standby. |
| | | Unit-II | 0.00 | 132kV KHP - Kilikhar Line | 3.09 | |
| | | Unit- III | 0.00 | 5MVA, 132/11kV TFR | 0.65 | |
| | | Unit- IV | 15.11 | 132kV Motanga - Rangia Line | -13.03 | |
| | | Total | 30.16 | Auxiliary Consumption & Transformation Losses at Generator end | 1.26% | |

Note: Generation-Load Summary (MW) for February 07, 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 | 239.91 | 354.53 | 351.80 | -51.85 | 2.73 |
| 2 | Eastern Grid | 186.12 | 42.79 | 40.55 | 80.56 | 2.24 |
| Total | | 426.03 | 397.32 | 392.35 | 28.71 | 4.97 |

Note: Generation-Load Summary for February 07, 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 | 371.99 | 240.68 | 233.56 | 120.61 | 7.12 |
| 2 | Eastern Grid | 136.54 | 46.03 | 45.68 | 101.21 | 0.35 |
| Total | | 508.53 | 286.71 | 279.24 | 221.82 | 7.47 |

NOTE-BHP data collected from Site.

- 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:
 - 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.