

BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT

Coincidental Maximum Load

| | |
|---------------|------------------------|
| Date: | January 5, 2022 |
| Hours: | 18:00 Hours |

| | | |
|-------------|-------------|-----------------|
| Date | Time | Load(MW) |
| 30-Dec-21 | 18:00hrs | 487.76 |

| 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 | -59.62 | |
| | | Unit- VI | 0.00 | - | - | |
| | | Total | 0.00 | Auxiliary Consumption & Transformation Losses at Generator end | 0.00% | |
| 2 | 720MW MHP | Unit-I | 146.70 | 400kV MHP - Jigmeling Line - I | 230.19 | Unit-II on Standby. Unit-IV 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 I (Direct) on standby. |
| | | Unit-II | 0.00 | 400kV MHP - Jigmeling Line - II | 0.00 | |
| | | Unit-III | 85.17 | 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) | 118.56 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 43.09 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 65.97 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 29.81 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 30.29 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -41.85 | |
| - | - | 132kV Gelephu - Salakati Line | -6.49 | | | |
| Total | 231.87 | Auxiliary Consumption & Transformation Losses at Generator end | 0.72% | | | |
| 3 | 336MW CHP | Unit- I | 84.55 | 220kV CHP - Birpara Line- I | 0.00 | Unit-II on Standby. Unit IV under Annual Maintenance. 220kV CHP_Birpara Line I & II under breakdown. |
| | | Unit- II | 84.44 | 220kV CHP - Birpara Line- II | 0.00 | |
| | | Unit- III | 0.00 | 220kV CHP - Malbase Line- III | 59.00 | |
| | | Unit- IV | 0.00 | 220kV CHP - Semtokha Line- IV | 83.09 | |
| | | - | - | 220kV Malbase - Birpara Line | -28.43 | |
| | | - | - | 66kV CHP - Chumdo Line | 22.02 | |
| | | - | - | 66kV CHP - Gedu Line | 3.26 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.96 | |
| Total | 168.99 | Auxiliary Consumption & Transformation Losses at Generator end | -0.20% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 0.00 | 220kV BHP - Semtokha Line | 61.80 | U/S unit-I and L/S Unit-I under maintenance. |
| | | Unit- II | 8.70 | 66kV BHP - Lobeyasa Line | 29.40 | |
| | | Total | 8.70 | 220kV BHP - Tsirang Line | -66.22 | |
| 5 | 40MW BHP (L/S) | Unit- I | 0.00 | 5MVA, 66/11kV TFR | 0.90 | U/S unit-I and L/S Unit-I under maintenance. |
| | | Unit- II | 17.20 | 30MVA ICT, 220/66kV (HV) | 21.95 | |
| | | Total | 17.20 | Auxiliary Consumption & Transformation Losses at Generator end | 0.08% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 28.62 | Unit-I under Annual Maintenance. 220kV DHP-Dagapela Line on standby. |
| | | Unit-II | 29.52 | 220kV DHP - Dagapela Line | 0.00 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | 16.68 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.80 | |
| Total | 29.52 | Auxiliary Consumption & Transformation Losses at Gen. end | 0.34% | | | |
| 7 | 60MW KHP | Unit- I | 15.10 | 132kV KHP - Nangkhor Line | 9.01 | Unit III on standby. Unit-IV under Annual Maintenance. |
| | | Unit-II | 15.07 | 132kV KHP - Kilikhar Line | 19.99 | |
| | | Unit- III | 0.00 | 5MVA, 132/11kV TFR | 0.78 | |
| | | Unit- IV | 0.00 | 132kV Motanga - Rangia Line | 10.68 | |
| | | Total | 30.17 | Auxiliary Consumption & Transformation Losses at Generator end | 1.29% | |

Note: Generation-Load Summary (MW) for January 05, 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 | 224.41 | 354.31 | 354.53 | -88.05 | -0.22 |
| 2 | Eastern Grid | 262.04 | 106.94 | 104.87 | 113.25 | 2.07 |
| Total | | 486.45 | 461.25 | 459.40 | 25.20 | 1.85 |

Note: Generation-Load Summary for January 05, 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 | 398.53 | 277.87 | 273.00 | 103.79 | 4.87 |
| 2 | Eastern Grid | 135.53 | 61.84 | 61.21 | 90.56 | 0.63 |
| Total | | 534.06 | 339.71 | 334.21 | 194.35 | 5.50 |

NOTE- BHP data 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: January 6, 2022
Hours: 09:00 Hours

Date: 30-Dec-21 **Time:** 18:00hrs **Load(MW):** 487.76

| 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 | -62.36 | |
| | | Unit- VI | 0.00 | - | - | |
| | | Total | 0.00 | Auxiliary Consumption & Transformation Losses at Generator end | 0.00% | |
| 2 | 720MW MHP | Unit-I | 74.44 | 400kV MHP - Jigmeling Line - I | 203.86 | Unit-II on Standby. Unit-IV 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 I (Direct) on standby. |
| | | Unit-II | 0.00 | 400kV MHP - Jigmeling Line - II | 0.00 | |
| | | Unit-III | 130.76 | 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) | 95.85 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 41.61 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 63.57 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 23.48 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 23.77 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -32.90 | |
| - | - | 132kV Gelephu - Salakati Line | 0.19 | | | |
| Total | 205.20 | Auxiliary Consumption & Transformation Losses at Generator end | 0.65% | | | |
| 3 | 336MW CHP | Unit- I | 82.57 | 220kV CHP - Birpara Line- I | 0.00 | Unit-III on Standby. Unit-IV under Annual Maintenance. 220kV CHP_Birpara Line-I & II under breakdown.. |
| | | Unit- II | 86.79 | 220kV CHP - Birpara Line- II | 0.00 | |
| | | Unit- III | 0.00 | 220kV CHP - Malbase Line- III | 70.70 | |
| | | Unit- IV | 0.00 | 220kV CHP - Semtokha Line- IV | 75.18 | |
| | | - | - | 220kV Malbase - Birpara Line | -25.24 | |
| | | - | - | 66kV CHP - Chumdo Line | 19.05 | |
| | | - | - | 66kV CHP - Gedu Line | 2.68 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.67 | |
| Total | 169.36 | Auxiliary Consumption & Transformation Losses at Generator end | 0.05% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 0.00 | 220kV BHP - Semtokha Line | 56.30 | U/S unit-I and L/S Unit-I under maintenance. |
| | | Unit- II | 8.70 | 66kV BHP - Lobeyasa Line | 27.00 | |
| | | Total | 8.70 | 220kV BHP - Tsirang Line | -58.31 | |
| 5 | 40MW BHP (L/S) | Unit- I | 0.00 | 5MVA, 66/11kV TFR | 0.60 | |
| | | Unit- II | 16.90 | 30MVA ICT, 220/66kV (HV) | 19.11 | |
| | | Total | 16.90 | Auxiliary Consumption & Transformation Losses at Generator end | 0.04% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 28.40 | Unit-I under Annual Maintenance. 220kV DHP_Dagapela Line on standby. |
| | | Unit-II | 29.27 | 220kV DHP - Dagapela Line | 0.00 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | 15.59 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.86 | |
| Total | 29.27 | Auxiliary Consumption & Transformation Losses at Generator end | 0.03% | | | |
| 7 | 60MW KHP | Unit- I | 15.14 | 132kV KHP - Nangkhoh Line | 12.14 | Unit III on standby. Unit-IV under Annual Maintenance. |
| | | Unit-II | 15.03 | 132kV KHP - Kilikhar Line | 16.98 | |
| | | Unit- III | 0.00 | 5MVA, 132/11kV TFR | 0.89 | |
| | | Unit- IV | 0.00 | 132kV Motanga - Rangia Line | 12.13 | |
| | | Total | 30.17 | Auxiliary Consumption & Transformation Losses at Generator end | 0.53% | |

Note: Generation-Load Summary (MW) for January 06, 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 | 224.23 | 344.73 | 344.63 | -87.60 | 0.10 |
| 2 | Eastern Grid | 235.37 | 84.97 | 83.47 | 117.50 | 1.50 |
| Total | | 459.60 | 429.70 | 428.10 | 29.90 | 1.60 |

Note: Generation-Load Summary for January 06, 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 | 396.60 | 233.70 | 229.74 | 147.20 | 3.96 |
| 2 | Eastern Grid | 140.89 | 52.33 | 51.38 | 104.26 | 0.95 |
| Total | | 537.49 | 286.03 | 281.12 | 251.46 | 4.91 |

NOTE-BHP data 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.