

BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT

Coincidental Maximum Load

| | |
|---------------|----------------------|
| Date: | March 4, 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 | -51.91 | |
| | | Unit- VI | 0.00 | - | - | |
| | | Total | 0.00 | Auxiliary Consumption & Transformation Losses at Generator end | 0.00% | |
| 2 | 720MW MHP | Unit-I | 0.00 | 400kV MHP - Jigmeling Line - I | 220.21 | Unit-I & II under Annual Maintenance .400kV MHP-JLG Line III under Annual Maintenance . 400kV MHP-JLG Line II & IV on standby. 132kV MHP_Yurmoo line I & II not in service. 400kV JLG-ALI I (Interim) on standby. 400kV JLG_ALI Line II (Direct) on standby |
| | | Unit-II | 0.00 | 400kV MHP - Jigmeling Line - II | 0.00 | |
| | | Unit-III | 100.68 | 400kV MHP - Jigmeling Line - III | 0.00 | |
| | | Unit-IV | 120.48 | 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) | 100.23 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 45.81 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 74.33 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 20.54 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 20.60 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -74.64 | |
| - | - | 132kV Gelephu - Salakati Line | -11.64 | | | |
| Total | 221.16 | Auxiliary Consumption & Transformation Losses at Generator end | 0.43% | | | |
| 3 | 336MW CHP | Unit- I | 0.00 | 220kV CHP - Birpara Line- I | 4.94 | Unit-I under maintenance. Unit IV on standby |
| | | Unit- II | 86.35 | 220kV CHP - Birpara Line- II | 4.90 | |
| | | Unit- III | 80.06 | 220kV CHP - Malbase Line- III | 72.92 | |
| | | Unit- IV | 0.00 | 220kV CHP - Semtokha Line- IV | 61.46 | |
| | | - | - | 220kV Malbase - Birpara Line | -48.18 | |
| | | - | - | 66kV CHP - Chumdo Line | 17.67 | |
| | | - | - | 66kV CHP - Gedu Line | 2.53 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.54 | |
| Total | 166.41 | Auxiliary Consumption & Transformation Losses at Generator end | 0.27% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 7.20 | 220kV BHP - Semtokha Line | 67.50 | U/S Unit-II & L/S Unit-II under AMP. |
| | | Unit- II | 0.00 | 66kV BHP - Lobeyasa Line | 24.36 | |
| | | Total | 7.20 | 220kV BHP - Tsirang Line | -71.42 | |
| 5 | 40MW BHP (L/S) | Unit- I | 13.60 | 5MVA, 66/11kV TFR | 0.61 | U/S Unit-II & L/S Unit-II under AMP. |
| | | Unit- II | 0.00 | 30MVA ICT, 220/66kV (HV) | 17.96 | |
| | | Total | 13.60 | Auxiliary Consumption & Transformation Losses at Generator end | -1.20% | |
| 6 | 126MW DHP | Unit-I | 26.23 | 220kV DHP - Tsirang Line | 0.00 | Unit-II under Annual Maintenance. 220kV DHP_Tsirang Line on Standby. |
| | | Unit-II | 0.00 | 220kV DHP - Dagapela Line | 26.02 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | -16.90 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.15 | |
| Total | 26.23 | Auxiliary Consumption & Transformation Losses at Gen. end | 0.23% | | | |
| 7 | 60MW KHP | Unit- I | 0.00 | 132kV KHP - Nangkhoh Line | 10.90 | Unit-I under AMP. Unit-IV on Standby. |
| | | Unit-II | 14.51 | 132kV KHP - Kilikhar Line | 17.12 | |
| | | Unit- III | 14.53 | 5MVA, 132/11kV TFR | 0.62 | |
| | | Unit- IV | 0.00 | 132kV Motanga - Rangia Line | 13.15 | |
| | | Total | 29.04 | Auxiliary Consumption & Transformation Losses at Generator end | 1.38% | |

Note: Generation-Load Summary (MW) for March 04, 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 | 213.44 | 378.33 | 378.07 | -90.25 | 0.26 |
| 2 | Eastern Grid | 250.20 | 53.91 | 52.56 | 121.65 | 1.35 |
| Total | | 463.64 | 432.24 | 430.63 | 31.40 | 1.61 |

Note: Generation-Load Summary for March 04, 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 | 289.10 | 258.15 | 255.30 | 15.23 | 2.85 |
| 2 | Eastern Grid | 110.33 | 81.28 | 79.69 | 44.77 | 1.59 |
| Total | | 399.43 | 339.43 | 334.99 | 60.00 | 4.44 |

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: | March 5, 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 | -47.02 | |
| | | Unit- VI | 0.00 | - | - | |
| | | Total | 0.00 | Auxiliary Consumption & Transformation Losses at Generator end | 0.00% | |
| 2 | 720MW MHP | Unit-I | 0.00 | 400kV MHP - Jigmeling Line - I | 172.33 | Unit-I & II under Annual Maintenance. 400kV MHP-JLG Line III under Annual Maintenance. 400kV MHP-JLG Line II & IV on standby. 132kV MHP_Yurmoo line I & II not in service. 400kV JLG-ALI I (Interim) on standby. 400kV JLG_ALI Line II (Direct) on standby |
| | | Unit-II | 0.00 | 400kV MHP - Jigmeling Line - II | 0.00 | |
| | | Unit-III | 82.18 | 400kV MHP - Jigmeling Line - III | 0.00 | |
| | | Unit-IV | 90.55 | 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) | 76.76 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 36.36 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 56.89 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 16.42 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 16.63 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -62.53 | |
| - | - | 132kV Gelephu - Salakati Line | -6.87 | | | |
| Total | 172.73 | Auxiliary Consumption & Transformation Losses at Generator end | 0.23% | | | |
| 3 | 336MW CHP | Unit- I | 0.00 | 220kV CHP - Birpara Line- I | 11.28 | Unit-IV standby. Unit-I under Annual Maintenance. |
| | | Unit- II | 85.69 | 220kV CHP - Birpara Line- II | 11.60 | |
| | | Unit- III | 81.82 | 220kV CHP - Malbase Line- III | 68.08 | |
| | | Unit- IV | 0.00 | 220kV CHP - Semtokha Line- IV | 56.45 | |
| | | - | - | 220kV Malbase - Birpara Line | -32.89 | |
| | | - | - | 66kV CHP - Chumdo Line | 15.38 | |
| | | - | - | 66kV CHP - Gedu Line | 2.47 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.45 | |
| Total | 167.51 | Auxiliary Consumption & Transformation Losses at Generator end | 0.48% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 7.60 | 220kV BHP - Semtokha Line | 57.90 | U/S Unit-II & L/S Unit-II under AMP. |
| | | Unit- II | 0.00 | 66kV BHP - Lobeyasa Line | 22.25 | |
| | | Total | 7.60 | 220kV BHP - Tsirang Line | -59.25 | |
| 5 | 40MW BHP (L/S) | Unit- I | 13.50 | 5MVA, 66/11kV TFR | 0.46 | |
| | | Unit- II | 0.00 | 30MVA ICT, 220/66kV (HV) | 15.24 | |
| | | Total | 13.50 | Auxiliary Consumption & Transformation Losses at Generator end | -1.23% | |
| 6 | 126MW DHP | Unit-I | 27.45 | 220kV DHP - Tsirang Line | 0.00 | Unit-II under Annual maintenance. 220kV DHP_Tsirang Line on Standby. |
| | | Unit-II | 0.00 | 220kV DHP - Dagapela Line | 27.21 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | -18.27 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.15 | |
| Total | 27.45 | Auxiliary Consumption & Transformation Losses at Generator end | 0.33% | | | |
| 7 | 60MW KHP | Unit- I | 0.00 | 132kV KHP - Nangkhoh Line | 15.26 | Unit-I under AMP. Unit-IV on Standby. |
| | | Unit-II | 15.07 | 132kV KHP - Kilikhar Line | 13.96 | |
| | | Unit- III | 15.05 | 5MVA, 132/11kV TFR | 0.52 | |
| | | Unit- IV | 0.00 | 132kV Motanga - Rangia Line | 0.00 | |
| | | Total | 30.12 | Auxiliary Consumption & Transformation Losses at Generator end | 1.26% | |

Note: Generation-Load Summary (MW) for March 05, 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 | 216.06 | 335.62 | 334.99 | -57.03 | 0.63 |
| 2 | Eastern Grid | 202.85 | 53.94 | 53.16 | 86.38 | 0.78 |
| Total | | 418.91 | 389.56 | 388.15 | 29.35 | 1.41 |

Note: Generation-Load Summary for March 05, 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 | 156.02 | 228.01 | 225.34 | -78.30 | 2.67 |
| 2 | Eastern Grid | 149.42 | 75.86 | 74.02 | 79.87 | 1.84 |
| Total | | 305.44 | 303.87 | 299.36 | 1.57 | 4.51 |

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.