

BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT

Coincidental Maximum Load

| | |
|---------------|--------------------|
| Date: | May 8, 2022 |
| Hours: | 19:00 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 | Unit-II & V under annual maintenance & Unit-I on standby. 400kV THP-Siliguri line I & II under breakdown. |
| | | Unit- II | 0.00 | 400kV THP - Siliguri Line - II | 0.00 | |
| | | Unit- III | 137.61 | 400kV THP - Siliguri Line- IV | 139.49 | |
| | | Unit- IV | 119.82 | 400kV THP - Malbase Line - III | 224.21 | |
| | | Unit- V | 0.00 | 400kV Malbase - Siliguri Line | 122.80 | |
| | | Unit- VI | 108.96 | - | - | |
| | | Total | 366.39 | Auxiliary Consumption & Transformation Losses at Generator end | 0.73% | |
| 2 | 720MW MHP | Unit-I | 110.10 | 400kV MHP - Jigmeling Line - I | 0.00 | Unit- III under Shutdown. Unit- II on Standby. 400kV MHP-JLG Line I & 400kV MHP-JLG Line III on standby. 132kV MHP_Yurmoo 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 | 109.19 | |
| | | Unit-III | 0.00 | 400kV MHP - Jigmeling Line - III | 0.00 | |
| | | Unit-IV | 110.32 | 400kV MHP - Jigmeling Line - IV | 109.48 | |
| | | - | - | 132kV MHP - Yurmo Line - I | 0.00 | |
| | | - | - | 132kV MHP - Yurmo Line - II | 0.00 | |
| | | - | - | 500MVA, 400/220kV ICT at Jigmeling (HV) | 103.22 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 45.89 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 68.06 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 31.97 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 32.50 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -30.22 | |
| - | - | 132kV Gelephu - Salakati Line | 2.40 | | | |
| Total | 220.42 | Auxiliary Consumption & Transformation Losses at Generator end | 0.79% | | | |
| 3 | 336MW CHP | Unit- I | 44.37 | 220kV CHP - Birpara Line- I | 29.38 | Unit-IV on Standby. |
| | | Unit- II | 51.93 | 220kV CHP - Birpara Line- II | 29.42 | |
| | | Unit- III | 91.39 | 220kV CHP - Malbase Line- III | 36.27 | |
| | | Unit- IV | 0.00 | 220kV CHP - Semtokha Line- IV | 70.62 | |
| | | - | - | 220kV Malbase - Birpara Line | 20.16 | |
| | | - | - | 66kV CHP - Chumdo Line | 17.40 | |
| | | - | - | 66kV CHP - Gedu Line | 2.52 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.53 | |
| Total | 187.69 | Auxiliary Consumption & Transformation Losses at Generator end | 0.29% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 6.30 | 220kV BHP - Semtokha Line | 42.30 | L/S Unit-II under AMP. U/S Unit-II on Standby |
| | | Unit- II | 0.00 | 66kV BHP - Lobeyasa Line | 20.95 | |
| | | Total | 6.30 | 220kV BHP - Tsirang Line | -45.03 | |
| 5 | 40MW BHP (L/S) | Unit- I | 12.50 | 5MVA, 66/11kV TFR | 0.63 | L/S Unit-II under AMP. U/S Unit-II on Standby |
| | | Unit- II | 0.00 | 30MVA ICT, 220/66kV (HV) | 15.44 | |
| | | Total | 12.50 | Auxiliary Consumption & Transformation Losses at Generator end | -0.27% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 24.25 | Unit-I on standby. 220kV DHP_Dagapela Line on Standby. |
| | | Unit-II | 24.49 | 220kV DHP - Dagapela Line | 0.00 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | 8.38 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.20 | |
| Total | 24.49 | Auxiliary Consumption & Transformation Losses at Gen. end | 0.16% | | | |
| 7 | 60MW KHP | Unit- I | 12.10 | 132kV KHP - Nangkhoh Line | 18.81 | Unit-III on Standby. |
| | | Unit-II | 12.12 | 132kV KHP - Kilikhar Line | 16.20 | |
| | | Unit- III | 0.00 | 5MVA, 132/11kV TFR | 0.51 | |
| | | Unit- IV | 12.13 | 132kV Motanga - Rangia Line | 17.85 | |
| | | Total | 36.35 | Auxiliary Consumption & Transformation Losses at Generator end | 2.28% | |

Note: Generation-Load Summary (MW) for May 08, 2022 at 19:00hrs.

| 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 | 597.37 | 286.34 | 283.11 | 341.25 | 3.23 |
| 2 | Eastern Grid | 256.77 | 92.35 | 89.77 | 134.20 | 2.58 |
| Total | | 854.14 | 378.69 | 372.88 | 475.45 | 5.81 |

Note: Generation-Load Summary for May 08, 2021 at 19:00hrs.

| 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 | 489.81 | 219.25 | 213.79 | 248.69 | 5.46 |
| 2 | Eastern Grid | 286.53 | 55.67 | 53.62 | 252.73 | 2.05 |
| Total | | 776.34 | 274.92 | 267.41 | 501.42 | 7.51 |

NOTE- MHP, KHP, JLG & 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: | May 9, 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 | Unit-II & V under annual maintenance & Unit-I on standby. 400kV THP-Siliguri line I & II under breakdown. |
| | | Unit- II | 0.00 | 400kV THP - Siliguri Line - II | 0.00 | |
| | | Unit- III | 137.59 | 400kV THP - Siliguri Line- IV | 141.70 | |
| | | Unit- IV | 109.49 | 400kV THP - Malbase Line - III | 211.62 | |
| | | Unit- V | 0.00 | 400kV Malbase - Siliguri Line | 128.38 | |
| | | Unit- VI | 108.96 | - | - | |
| | | Total | 356.04 | Auxiliary Consumption & Transformation Losses at Generator end | 0.76% | |
| 2 | 720MW MHP | Unit-I | 119.77 | 400kV MHP - Jigmeling Line - I | 0.00 | Unit- III under Shutdown. Unit- II on Standby. 400kV MHP-JLG Line I & 400kV MHP-JLG Line III on standby. 132kV MHP_Yurmoo 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 | 119.92 | |
| | | Unit-III | 0.00 | 400kV MHP - Jigmeling Line - III | 0.00 | |
| | | Unit-IV | 122.03 | 400kV MHP - Jigmeling Line - IV | 120.27 | |
| | | - | - | 132kV MHP - Yurmo Line - I | 0.00 | |
| | | - | - | 132kV MHP - Yurmo Line - II | 0.00 | |
| | | - | - | 500MVA, 400/220kV ICT at Jigmeling (HV) | 66.23 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 68.81 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 103.35 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 19.01 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 19.30 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -20.08 | |
| - | - | 132kV Gelephu - Salakati Line | 11.40 | | | |
| Total | 241.80 | Auxiliary Consumption & Transformation Losses at Generator end | 0.67% | | | |
| 3 | 336MW CHP | Unit- I | 44.47 | 220kV CHP - Birpara Line- I | 26.84 | Unit- IV on standby. |
| | | Unit- II | 42.90 | 220kV CHP - Birpara Line- II | 27.00 | |
| | | Unit- III | 91.36 | 220kV CHP - Malbase Line- III | 58.74 | |
| | | Unit- IV | 0.00 | 220kV CHP - Semtokha Line- IV | 50.76 | |
| | | - | - | 220kV Malbase - Birpara Line | -1.50 | |
| | | - | - | 66kV CHP - Chumdo Line | 10.13 | |
| | | - | - | 66kV CHP - Gedu Line | 4.26 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 0.93 | |
| Total | 178.73 | Auxiliary Consumption & Transformation Losses at Generator end | 0.04% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 8.30 | 220kV BHP - Semtokha Line | 44.60 | L/S Unit-II under AMP. U/S Unit-II on Standby |
| | | Unit- II | 0.00 | 66kV BHP - Lobeyssa Line | 19.63 | |
| | | Total | 8.30 | 220kV BHP - Tsirang Line | -40.70 | |
| 5 | 40MW BHP (L/S) | Unit- I | 15.50 | 5MVA, 66/11kV TFR | 0.38 | L/S Unit-II under AMP. U/S Unit-II on Standby |
| | | Unit- II | 0.00 | 30MVA ICT, 220/66kV (HV) | 11.87 | |
| | | Total | 15.50 | Auxiliary Consumption & Transformation Losses at Generator end | -0.46% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 28.74 | Unit-I under Annual Maintenance. 220kV DHP_Dagapela Line on Standby. |
| | | Unit-II | 28.99 | 220kV DHP - Dagapela Line | 0.00 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | 7.73 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.20 | |
| Total | 28.99 | Auxiliary Consumption & Transformation Losses at Generator end | 0.17% | | | |
| 7 | 60MW KHP | Unit- I | 13.47 | 132kV KHP - Nangkhor Line | 37.68 | Unit-III on Standby. 132kV Motanga - Rangia Line under Shutdown. |
| | | Unit-II | 13.49 | 132kV KHP - Kilikhar Line | 2.00 | |
| | | Unit- III | 0.00 | 5MVA, 132/11kV TFR | 0.46 | |
| | | Unit- IV | 13.46 | 132kV Motanga - Rangia Line | 0.00 | |
| | | Total | 40.42 | Auxiliary Consumption & Transformation Losses at Generator end | 0.68% | |

Note: Generation-Load Summary (MW) for May 09, 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 | 587.56 | 285.22 | 282.49 | 322.42 | 2.73 |
| 2 | Eastern Grid | 282.22 | 78.58 | 76.69 | 183.56 | 1.89 |
| Total | | 869.78 | 363.80 | 359.18 | 505.98 | 4.62 |

Note: Generation-Load Summary for May 09, 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 | 428.91 | 196.66 | 189.93 | 217.60 | 6.73 |
| 2 | Eastern Grid | 309.83 | 57.13 | 55.31 | 267.35 | 1.82 |
| Total | | 738.74 | 253.79 | 245.24 | 484.95 | 8.55 |

NOTE-BHP, KHP, JLG & MHP 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.
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