

BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT

Coincidental Maximum Load

| | |
|---------------|-----------------------|
| Date: | April 26, 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 | 78.37 | 400kV THP - Siliguri Line - I | 0.00 | Unit-III under annual maintenance & Unit-II & V on standby. 400kV THP-Siliguri line I & II under breakdown |
| | | Unit- II | 0.00 | 400kV THP - Siliguri Line - II | 0.00 | |
| | | Unit- III | 0.00 | 400kV THP - Siliguri Line- IV | 76.65 | |
| | | Unit- IV | 80.42 | 400kV THP - Malbase Line - III | 170.45 | |
| | | Unit- V | 0.00 | 400kV Malbase - Siliguri Line | 56.13 | |
| | | Unit- VI | 89.51 | - | - | |
| | | Total | 248.30 | Auxiliary Consumption & Transformation Losses at Generator end | 0.48% | |
| 2 | 720MW MHP | Unit-I | 69.73 | 400kV MHP - Jigmeling Line - I | 0.00 | Unit- III & IV on Standby. 400kV MHP-JLG Line I & 400kV MHP-JLG Line III 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 | 179.72 | 400kV MHP - Jigmeling Line - II | 123.49 | |
| | | Unit-III | 0.00 | 400kV MHP - Jigmeling Line - III | 0.00 | |
| | | Unit-IV | 0.00 | 400kV MHP - Jigmeling Line - IV | 123.72 | |
| | | - | - | 132kV MHP - Yurmo Line - I | 0.00 | |
| | | - | - | 132kV MHP - Yurmo Line - II | 0.00 | |
| | | - | - | 500MVA, 400/220kV ICT at Jigmeling (HV) | 107.43 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 54.82 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 82.16 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 24.28 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 24.81 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -69.01 | |
| - | - | 132kV Gelephu - Salakati Line | -6.19 | | | |
| Total | 249.45 | Auxiliary Consumption & Transformation Losses at Generator end | 0.90% | | | |
| 3 | 336MW CHP | Unit- I | 0.00 | 220kV CHP - Birpara Line- I | 8.94 | Unit-I on Standby. Unit-II under Annual Maintenance. |
| | | Unit- II | 0.00 | 220kV CHP - Birpara Line- II | 8.82 | |
| | | Unit- III | 69.31 | 220kV CHP - Malbase Line- III | 35.33 | |
| | | Unit- IV | 60.26 | 220kV CHP - Semtokha Line- IV | 54.81 | |
| | | - | - | 220kV Malbase - Birpara Line | -13.40 | |
| | | - | - | 66kV CHP - Chumdo Line | 13.84 | |
| | | - | - | 66kV CHP - Gedu Line | 4.98 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 1.52 | |
| Total | 129.57 | Auxiliary Consumption & Transformation Losses at Generator end | 1.03% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 0.00 | 220kV BHP - Semtokha Line | 57.00 | U/S Unit-I & L/S Unit-II under AMP. |
| | | Unit- II | 5.20 | 66kV BHP - Lobeyasa Line | 21.00 | |
| | | Total | 5.20 | 220kV BHP - Tsirang Line | -62.19 | |
| 5 | 40MW BHP (L/S) | Unit- I | 11.60 | 5MVA, 66/11kV TFR | 0.67 | U/S Unit-I & L/S Unit-II under AMP. |
| | | Unit- II | 0.00 | 30MVA ICT, 220/66kV (HV) | 17.24 | |
| | | Total | 11.60 | Auxiliary Consumption & Transformation Losses at Generator end | 1.90% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 0.00 | Unit-I under Annual Maintenance. 220kV DHP_Tsirang Line on Standby. |
| | | Unit-II | 18.78 | 220kV DHP - Dagapela Line | 18.53 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | -10.28 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.20 | |
| Total | 18.78 | Auxiliary Consumption & Transformation Losses at Gen. end | 0.27% | | | |
| 7 | 60MW KHP | Unit- I | 0.00 | 132kV KHP - Nangkhor Line | 0.00 | Unit-I on Standby. 132kV KHP-NKO line under shutdown |
| | | Unit-II | 13.37 | 132kV KHP - Kilikhar Line | 39.42 | |
| | | Unit- III | 13.38 | 5MVA, 132/11kV TFR | 0.20 | |
| | | Unit- IV | 13.39 | 132kV Motanga - Rangia Line | 25.40 | |
| | | Total | 40.14 | Auxiliary Consumption & Transformation Losses at Generator end | 1.30% | |

Note: Generation-Load Summary (MW) for April 26, 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 | 413.45 | 335.04 | 332.14 | 137.14 | 2.90 |
| 2 | Eastern Grid | 289.59 | 74.67 | 71.91 | 156.19 | 2.76 |
| Total | | 703.04 | 409.71 | 404.05 | 293.33 | 5.66 |

Note: Generation-Load Summary for April 26, 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 | 390.65 | 229.50 | 222.51 | 150.55 | 6.99 |
| 2 | Eastern Grid | 201.64 | 67.01 | 66.06 | 145.23 | 0.95 |
| Total | | 592.29 | 296.51 | 288.57 | 295.78 | 7.94 |

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.

BHUTAN POWER SYSTEM OPERATOR LOAD-GENERATION BALANCE REPORT

Coincidental Maximum Load

| | |
|---------------|-----------------------|
| Date: | April 27, 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 | 78.15 | 400kV THP - Siliguri Line - I | 0.00 | Unit-III & Unit-V under annual maintenance & Unit- II on standby. 400kV THP-Siliguri line I & II under breakdown |
| | | Unit- II | 0.00 | 400kV THP - Siliguri Line - II | 0.00 | |
| | | Unit- III | 0.00 | 400kV THP - Siliguri Line- IV | 95.48 | |
| | | Unit- IV | 79.78 | 400kV THP - Malbase Line - III | 150.20 | |
| | | Unit- V | 0.00 | 400kV Malbase - Siliguri Line | 83.13 | |
| | | Unit- VI | 89.74 | - | - | |
| | | Total | 247.67 | Auxiliary Consumption & Transformation Losses at Generator end | 0.80% | |
| 2 | 720MW MHP | Unit-I | 0.00 | 400kV MHP - Jigmeling Line - I | 0.00 | Unit- I & III 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 | 179.79 | 400kV MHP - Jigmeling Line - II | 159.00 | |
| | | Unit-III | 0.00 | 400kV MHP - Jigmeling Line - III | 0.00 | |
| | | Unit-IV | 140.56 | 400kV MHP - Jigmeling Line - IV | 159.46 | |
| | | - | - | 132kV MHP - Yurmo Line - I | 0.00 | |
| | | - | - | 132kV MHP - Yurmo Line - II | 0.00 | |
| | | - | - | 500MVA, 400/220kV ICT at Jigmeling (HV) | 85.34 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Interim) | 91.51 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Interim) | 0.00 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - I (Direct) | 138.39 | |
| | | - | - | 400kV Jigmeling - Alipurduar Line - II (Direct) | 0.00 | |
| | | - | - | 80MVA, 220/132kV ICT - I (HV) | 9.46 | |
| | | - | - | 80MVA, 220/132kV ICT - II (HV) | 9.59 | |
| | | - | - | 220kV Tsirang - Jigmeling Line | -76.29 | |
| - | - | 132kV Gelephu - Salakati Line | -7.22 | | | |
| Total | 320.35 | Auxiliary Consumption & Transformation Losses at Generator end | 0.59% | | | |
| 3 | 336MW CHP | Unit- I | 0.00 | 220kV CHP - Birpara Line- I | 4.50 | Unit-I on Standby. Unit-II under Annual Maintenance. |
| | | Unit- II | 0.00 | 220kV CHP - Birpara Line- II | 4.65 | |
| | | Unit- III | 69.43 | 220kV CHP - Malbase Line- III | 63.21 | |
| | | Unit- IV | 52.80 | 220kV CHP - Semtokha Line- IV | 33.09 | |
| | | - | - | 220kV Malbase - Birpara Line | -41.11 | |
| | | - | - | 66kV CHP - Chumdo Line | 9.59 | |
| | | - | - | 66kV CHP - Gedu Line | 5.58 | |
| | | - | - | 3x3MVA, 66/11kV TFR | 0.91 | |
| Total | 122.23 | Auxiliary Consumption & Transformation Losses at Generator end | 0.57% | | | |
| 4 | 24MW BHP (U/S) | Unit- I | 0.00 | 220kV BHP - Semtokha Line | 66.15 | U/S Unit-I & L/S Unit-II under AMP. |
| | | Unit- II | 5.40 | 66kV BHP - Lobeyasa Line | 20.04 | |
| | | Total | 5.40 | 220kV BHP - Tsirang Line | -69.19 | |
| 5 | 40MW BHP (L/S) | Unit- I | 11.50 | 5MVA, 66/11kV TFR | 0.34 | U/S Unit-I & L/S Unit-II under AMP. |
| | | Unit- II | 0.00 | 30MVA ICT, 220/66kV (HV) | 15.14 | |
| | | Total | 11.50 | Auxiliary Consumption & Transformation Losses at Generator end | -2.60% | |
| 6 | 126MW DHP | Unit-I | 0.00 | 220kV DHP - Tsirang Line | 0.00 | Unit-I under Annual Maintenance. 220kV DHP_Tsirang Line on Standby. |
| | | Unit-II | 18.47 | 220kV DHP - Dagapela Line | 18.23 | |
| | | - | - | 220kV Jigmeling - Dagapela Line | -10.33 | |
| | | - | - | 5MVA, 220/33kV TFR | 0.20 | |
| Total | 18.47 | Auxiliary Consumption & Transformation Losses at Generator end | 0.22% | | | |
| 7 | 60MW KHP | Unit- I | 15.23 | 132kV KHP - Nangkhoh Line | 60.31 | 132kV KHP-Kilikhar line under shutdown. |
| | | Unit-II | 15.25 | 132kV KHP - Kilikhar Line | 0.00 | |
| | | Unit- III | 15.27 | 5MVA, 132/11kV TFR | 0.28 | |
| | | Unit- IV | 15.35 | 132kV Motanga - Rangia Line | 21.44 | |
| | | Total | 61.10 | Auxiliary Consumption & Transformation Losses at Generator end | 0.83% | |

Note: Generation-Load Summary (MW) for April 27, 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 | 405.27 | 324.58 | 322.29 | 146.65 | 2.29 |
| 2 | Eastern Grid | 381.45 | 71.37 | 68.97 | 244.12 | 2.40 |
| Total | | 786.72 | 395.95 | 391.26 | 390.77 | 4.69 |

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| 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 | 341.59 | 215.20 | 209.83 | 114.59 | 5.37 |
| 2 | Eastern Grid | 227.56 | 53.89 | 50.43 | 185.47 | 3.46 |
| Total | | 569.15 | 269.09 | 260.26 | 300.06 | 8.83 |

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.
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