



Grid Discipline Mechanism Regulation 2024

Electricity Regulatory Authority
Ministry of Energy and Natural Resources

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Grid Discipline Mechanism Regulation 2024

In exercise of the power conferred by Section 11.1 (i) of the Electricity Act of Bhutan 2001, the Electricity Regulatory Authority, hereby, adopts the Grid Discipline Mechanism Regulation 2024 as follows:

CHAPTER 1 PRELIMINARY

Title and Commencement

1. This Regulation is called the Grid Discipline Mechanism Regulation 2024.
2. This Regulation comes into force from January 1, 2024.

Scope

3. This Regulation is applicable to all Grid Users in Bhutan.

Objective

4. This Regulation aims to enhance Grid Discipline requiring Grid Users to adhere to their schedule of drawal and injection of electricity from or to the grid through disciplinary mechanism.

Dispensation

5. The Authority may, in particular cases, give dispensation from this Regulation.

CHAPTER 2 ROLES AND RESPONSIBILITIES

Roles and Responsibilities of System Operator

6. The System Operator shall:

- (1) seek day ahead demand schedule forecast from Transmission and Distribution Licensee;
- (2) seek day ahead generation schedule and inflow forecast from Generation Licensee;
- (3) perform supply and demand matching analysis;
- (4) coordinate with Generation, Transmission and Distribution Licensees for dispatch of power;
- (5) monitor adherence to scheduled demand by EIC and Distribution Licensee;
- (6) monitor adherence to scheduled generation by Generation Licensee;
- (7) revised export schedule within the timeline specified by relevant regulation of regional counterpart agencies if any;
- (8) prepare and issue the statement of charges for deviation by Generation Licensee, Distribution Licensee;
- (9) settle grid related charges with Trader; and
- (10) maintain deviation pool account.

Role and Responsibilities of Transmission and Distribution Licensee

7. Transmission and Distribution Licensee shall:

- (1) submit the Day Ahead Demand Schedule forecast of all EICs and residential load to the System Operator;
- (2) provide actual block-wise energy consumption data of all EICs to System Operator periodically as per Grid Discipline Mechanism Regulation;
- (3) inform the System Operator on the revised demand schedule within the timeline specified by System Operator, if any; and
- (4) maintain reliable and quality power supply, and inform the System Operator of planned and emergency shutdown, if any, as per the Grid Code Regulation.

Role and Responsibilities of Generation Licensee

8. Generation Licensee shall:

- (1) submit the block-wise Day Ahead generation schedule and inflow forecast to System Operator;

- (2) provide actual generation data to System Operator;
- (3) inform the System Operator on the revised generation schedule within the timeline specified by System Operator; and
- (4) maintain uninterrupted generation availability, and inform the System Operator of planned and emergency shutdown, if any, as per the Grid Code Regulation.

Role and Responsibilities of Trader

9. The Trader shall:

- (1) prepare the purchase or sale bid in accordance with the supply-demand matching analysis results provided by the System Operator;
- (2) purchase or sale of electricity in the market platform directly or through cross-border trader;
- (3) share the bid result and inform on the unsuccessful bids, if any, with the System Operator, Generation, Transmission and Distribution Licensees;
- (4) settle grid related charges with the System Operator;
- (5) settle cross-border grid related charges with SNA of exporting or importing country; and
- (6) carry out any other function as per the procedures and rules defined in the Grid Discipline Mechanism Regulation.

Role and Responsibilities of Energy Intensive Consumers (EIC)

10. Energy Intensive Consumers (EIC) shall:

- (1) submit block-wise Day ahead demand schedule to Transmission and Distribution Licensee;
- (2) adhere to scheduled demand; and
- (3) closely monitor schedule and actual drawal, inform Transmission and Distribution Licensee immediately if there is any change in demand and revise the schedule.

CHAPTER 3
SCHEDULING AND DISPATCH PROCEDURE

11. EIC shall provide their Day-Ahead demand Schedule for next day in Time Block to the Transmission and Distribution Licensee by 0800 hours of each day.
12. All generating stations shall estimate their inflows and calculate their respective energy generation capability and maximum Ex-Bus deliverable power for the next day on Time Block by 0700 hours of each day. The Ex-Bus power available shall be calculated excluding the auxiliary consumptions and other generation constraining factors such as maintenance that might restrict generation in any period during the next day. The total energy capability and anticipated power capability on Time Block that can be delivered to the Transmission System, on an Ex-Power Plant basis shall be accordingly calculated after deduction of auxiliary demands.
13. All generating stations including embedded generators shall submit the station-wise Ex-Power Plant energy generation and inflow forecast for 2400 hours of the following day to the System Operator by 0800 hours of each day.
14. Distribution Licensee, after deducting supply to be met from their own generation sources, if any, shall submit their forecasted demand schedule including the forecast schedule submitted by EIC for next day in Time Block to the System Operator by 0800 hours of each day.
15. The System Operator shall compile available Ex-Bus energy generation forecast and demand estimate of the entire Power System in the Time Block of the following day and submit the energy quantum to be imported or exported after taking into account of the national transmission losses to the Trader by 0930 hours.
16. Trader shall submit to the regional counterpart agencies on the expected Cross Border energy transfer at the identified regional border point by 1030 hours of each day.
17. Trader shall receive from the regional counterpart agencies of any modification required in the Cross Border transfer arising from any anticipated transmission constraints and shall communicate to the System Operator for any reschedule of energy by 1330 hours.
18. The Trader shall share the bid result or unsuccessful bids if any to the System Operator by 1800 hours upon receipt from regional counterpart agencies.
19. The System Operator after receipt of the bid result from the Trader shall issue Time Block:
 - (1) Generation Schedule to each generating stations, excluding embedded and off-grid generators of the following day;
 - (2) Net-Drawal Schedule for distribution Licensees and EIC, including the necessary power allocation required of the following day, if any.

20. The Distribution Licensees shall accordingly intimate the EIC of the finalized net drawal schedule.
21. The System Operator shall ensure that the daily dispatch schedules of the generating stations are operationally reasonable and efficient. The Generation Licensees shall be responsible to furnish the typical ramping up and down capabilities of their machines to the System Operator.
22. The System Operator shall revise the schedules in the following circumstances and accordingly inform the regional counterpart agencies affecting the Cross Border power transfers:
 - (1) in case of Forced Majeure Outage of the generating unit or due to sudden change in the hydrological inflow, where the revised schedules shall be based on the revised capability declared by the concerned generating stations; and
 - (2) in the event of evacuation constraints of power due to outage, failure or other limitations in the Transmission System and sudden demand change in the Distribution System or any exigencies.
23. The revised schedules for the remaining period of the day shall be intimated to System Operator at least one and half hour before coming into effect.
24. The surplus energy or unsuccessful bids from the trading day shall be traded in the Real Time Market.
25. The System Operator shall provide the surplus or unsuccessful quantum of energy to the Trader accordingly.
25. The scheduled generation and scheduled drawal shall be deemed to have been revised equal to their actual generation and drawal for the affected period upon any disturbances in the Transmission System within the country. Statement on occurrence of Transmission System disturbance and its duration shall be issued by the System Operator.
26. The System Operator, any point of time, may revise the schedules on its own initiative for purpose of safe, secure and reliable operation of the power system.
27. The actual generation and load demand of the previous day shall be issued by the System Operator daily, taking into account all ex-ante changes in dispatch schedule of generation and energy drawal schedule. The Transmission and Distribution Licensee shall issue the individual actual load demand to EIC daily. The historical schedules and dispatch shall be referred for continuously refinement of demand estimation.
28. The scheduling submitted by the generating stations, distribution Licensee, the final schedules issued by the System Operator; and the actual schedules implemented shall be made available for a period of five (5) days to all concerned parties for verification.

29. The System Operator shall review and rectify the schedules shared under the Section 28 of this Regulation where necessary.
30. All planned shutdown of Licensee's system and EIC system shall be intimated to the System Operator and to other affected parties connected either to Transmission System or Distribution System as specified in the Grid Code Operationalization.
31. In the event of emergency shutdown, concerned Licensees and EIC shall immediately inform of the likely restoration time to the System Operator and the affected parties.
32. The System operator shall properly document all the information received within the provisions of the Grid Code Regulation, including the forecasted generation schedules of each generating stations, the drawal schedules of Transmission and Distribution Licensee and EIC and all revised schedules with corresponding reasons.
33. The billing shall be based on the scheduled energy quantum.
34. The difference between the schedule and actual export or import or generation or consumption shall be settled through Deviation Settlement Mechanism (DSM) of Regional and Grid Discipline Mechanism.

CHAPTER 4 COMPUTATION OF DEVIATION

35. Deviation in a time block for general sellers shall be computed as follows:

$$\text{Deviation for seller (in MWh)} = \text{Actual generation} - \text{Scheduled generation}$$

$$\begin{aligned} \text{Deviation for seller (in \%)} \\ = \frac{\text{Actual generation (MWh)} - \text{scheduled generation (MWh)}}{\text{scheduled generation (MWh)}} \times 100 \end{aligned}$$

36. Deviation in a time block for buyers shall be computed as follows:

$$\text{Deviation for Buyer (in MWh)} = \text{Actual drawal} - \text{Scheduled drawal}$$

$$\text{Deviation for Buyer (in \%)} = \frac{\text{Actual drawal (MWh)} - \text{scheduled drawal (MWh)}}{\text{scheduled drawal (MWh)}} \times 100$$

CHAPTER 5
CHARGES FOR DEVIATION

37. Charges for Bhutan as Seller is as follows:

Scenario	Generation	Load	National status	Payable/Receivable Generator	Payable/Receivable Consumer	Overall Net
1	UI	UD	UI	Payable @ Regional DSM rate (w.r.t India) for the overall deviation and balance deviation quantum at weighted average export tariff.	Receivable @ 90% of weighted average domestic generation tariff for under drawal quantum.	Pool
2	UI	UD	OI	Payable @ weighted average export tariff for under injected quantum.	Receivable @Regional DSM rate (w.r.t India) for overall deviation and receivable @ 90% of weighted average domestic generation tariff for balance under drawal quantum.	Pool
3	UI	OD	UI	Payable @ Regional DSM rate (w.r.t. India) for under injected quantum.	Payable @Regional DSM rate (w.r.t India) for over drawal quantum.	
4	OI	OD	UI	Receivable @ 90% weighted average domestic generation tariff for over injected quantum.	Payable @ Regional DSM rate (w.r.t India) for the overall deviation and balance deviation quantum at weighted average export tariff.	Pool
5	OI	UD	OI	Receivable @ Regional DSM rate (w.r.t India) for over injected quantum.	Receivable @ Regional DSM rate (w.r.t India) for the under drawal quantum.	0
6	OI	OD	OI	Receivable @Regional DSM rate (w.r.t India) for overall deviation and receivable @ 90% weighted average domestic generation tariff for balance over injected quantum.	Payable @ weighted average export tariff for over drawal quantum.	Pool

38. Charges for Bhutan as buyer is as follows:

Scenario	Generation	Load	National status	Payable/Receivable Generator	Payable/Receivable Consumer	Overall Net
1	UI	UD	OD	Payable @ Regional DSM rate (w.r.t India) for the overall deviation and balance deviation quantum at weighted average export tariff.	Receivable @ 90% of weighted average domestic generation tariff for under drawal quantum.	Pool
2	OI	UD	UD	Receivable @ Regional DSM rate (w.r.t India) for over injected quantum.	Receivable @ Regional DSM rate (w.r.t India) for under drawal quantum.	0
3	UI	OD	OD	Payable @ Regional DSM rate (w.r.t India) under injected quantum.	Payable @ Regional DSM rate (w.r.t India) for over drawal quantum.	0
4	OI	OD	OD	Receivable @ 90% of weighted average domestic generation tariff for over injected quantum.	Payable @ Regional DSM rate (w.r.t India) for the overall deviation and balance deviation quantum at weighted average export tariff.	Pool
5	UI	UD	UD	Payable @ weighted average export tariff for under injected quantum.	Receivable @ Regional DSM rate (w.r.t India) for overall deviation and receivable @ 90% of weighted average domestic generation tariff for balance under drawal quantum.	Pool
6	OI	OD	UD	Receivable @ Regional DSM rate (w.r.t India) for overall deviation and receivable @ 90% weighted average domestic generation tariff for balance over injected quantum.	Payable @ weighted average export tariff for over drawal quantum.	Pool

39. Injection of infirm power shall be properly coordinated with System Operator as per the Grid Code Regulation and the charges for deviation for injection of infirm power shall be zero.

40. The charges for deviation for drawal of start-up power before COD of a generating unit or for drawal of power to run the auxiliaries during shut down of a generating station shall be payable at the weighted average export tariff as determined by the Authority.

41. The Deviation Charges shall be settled as below:

- (1) The scenario described in Section 37 of this Regulation shall be applicable when the deviations caused due to untimely scheduled maintenance, Grid failure, Outages due to Third Party and Grid Stability specifically Bhutan as a seller to regional power market.
- (2) The scenario described in Section 38 of this Regulation shall be applicable when the deviations caused due to untimely scheduled maintenance, Grid failure, Outages due to Third Party and Grid Stability specifically Bhutan as a buyer to regional power market.
- (3) Deviation caused due to Forced Majeure Outages, any payable or receivable to regional power market shall be borne by all the Generation Licensee, Transmission and Distribution Licensee and EIC based on the individual deviation and shall be zero payable or receivable for domestic deviation settlement.

CHAPTER 6
ACCOUNTING OF CHARGES FOR DEVIATION

42. Generation, Transmission and Distribution Licensee shall submit actual block wise generation and energy drawal of the previous week to the System Operator by every Monday.
43. System Operator shall prepare and issue the statement of charges for deviation to Transmission, Distribution and Generation Licensees respectively every after two (2) days from receiving deviation settlement statement from regional counterpart.
44. Transmission and Distribution Licensee shall issue deviation charges statement to individual EIC upon receiving the deviation charges statement from the System Operator.
45. Transmission and Distribution Licensee shall be liable for any payment or receivable of deviation charges for LV and MV consumers consuming less than 2MW as per the deviation charges statement.
46. The Generation Licensee and Transmission and Distribution Licensee shall make the payment of deviation charges within three (3) working days of issuance of deviation charges statement by the System Operator, failing which late payment surcharge @ 0.07% on the deviation amount shall be payable for each day of delay.
47. The Deviation Pool account shall be maintained by System Operator for any payable and receivables from or to the Licensees and EICs as per the deviation charges statement.
48. System Operator shall maintain separate books of accounts for principal amount and interest accrued of deviation charges.
49. In case of deficit in the Deviation Pool Account, any payable by Generation Licensee, Transmission Licensee, Distribution Licensee and EIC to the pool account shall be as per their deviation energy quantum while any receivables shall be as per the fund available in the pool account.

CHAPTER 7 MISCELLANEOUS

Dispute Settlement

50. Any disputes in relation to the Grid Discipline Mechanism shall be resolved in accordance with the Dispute Resolution Procedures of the Authority.

Compliance

51. Person contravening any Sections of this Regulation shall be liable for sanctions in accordance with the Penalty Rules and Regulations 2024 of the ERA.

Amendment

52. The Authority may amend this Regulation as and when required.

Definitions

53. In this Regulation unless the context otherwise provides:

- (1) **“Actual drawal”** means the amount of electricity drawn by a Buyer as measured by the interface meters;
- (2) **“Authority”** means Electricity Regulatory Authority established pursuant to Part 2 of Electricity Act of Bhutan 2001;
- (3) **“Buyer”** means a person purchasing electricity through a transaction schedule;
- (4) **“Days”** mean working days exclusion of Saturday, Sunday and Government Holidays;
- (5) **“Deviation Pool Account”** means the Account to be maintained and operated by the System Operator for any payable and receivables from the Licensees and EICs for settlement of deviation charges;
- (6) **“Distribution System”** means any system consisting mainly of cable, service lines and overhead lines, electrical plant and meters having design voltage of 33kV and below owned or operated by a Licensee for distribution or for retail supply and used for the transportation of electricity from a transmission system or generating sets or other points to the point of delivery to consumers, and includes any electrical plant and meters owned or operated by the Licensee in connection with the distribution of electricity. The Distribution System shall not include any part of a Transmission System, except where used for the supply of electricity to a single consumer or group of consumers;
- (7) **“Embedded Generator”** means a generator which is connected to a Distribution System;
- (8) **“EIC”** means Energy intensive Consumers (HV and MV industries) with contract demand more than or equal to 2MW;
- (9) **“Forced majeure outages”** means outages caused by natural calamities which are beyond the control of Licensee;
- (10) **“Generation licensee”** means an entity who has obtained a License from the Authority responsible for the generation of electricity;
- (11) **“Grid code”** means the Grid Code Regulation of Bhutan issued by the Regulatory;
- (12) **“Grid stability”** means the revision of schedules on its own initiative by the System for purpose of effective operation of the Power System;
- (13) **“Grid Users”** means any person connected to Transmission and Distribution System;

- (14) **“Forced majeure outages”** means outages caused by natural calamities which are beyond the control of Licensee;
- (15) **“HV”** means high voltage of 66kV and above;
- (16) **“LV”** means low voltage of 11kV and below;
- (17) **“MV”** means medium voltage of 11kV and above but less than 66kV;
- (18) **“Outages due to third party”** means outages caused by any third-party entities which are beyond the control of Transmission and Distribution Licensee;
- (19) **“Over drawal (OD)”** means drawing power of quantum more than the scheduled demand;
- (20) **“Over injection (OI)”** means injecting power of quantum more than the scheduled generation;
- (21) **“Person”** means Generation Licensee, Transmission Licensee, Distribution Licensee, System Operators and any individual or agency utilizing Grid;
- (22) **“Scheduled generation”** means the scheduled of generation and injection in MW for a time block at ex-bus;
- (23) **“Scheduled drawal”** means the scheduled of drawal in MW for a time block at ex-bus;
- (24) **“Seller”** means a person, including a generation station, supplying electricity through a transaction scheduled;
- (25) **“Settlement Nodal Agency (SNA)”** means the nodal agency designated by the Government for settlement of grid operation related charges with cross border SNA;
- (26) **“System Operator”** means the person/s designated by the Authority in this role, whose function is defined under section 39 of the Act;
- (27) **“Time block”** means time duration block starting at 00.00 hours at an interval specified by the Authority for recording the energy meter values, presently defined at 15 minutes time duration block and is subjected to revision from time to time;
- (28) **“Trader”** means person or an entity involved in purchase or sale of electricity;
- (29) **“Transmission System”** means an electricity network operating at a nominal voltage of 66kV and above or as deemed by the Authority to be part of the transmission network;
- (30) **“Transmission and Distribution Licensee”** means a person who has obtained a License for transmission and distribution of electricity in pursuant to section 22 of the Act;
- (31) **“Weighted average export tariff”** means the weighted average of export tariff of generating plants as determined by the Authority;
- (32) **“Weighted average domestic generation tariff”** means the generation tariff as determined by the Authority in accordance with Tariff Determination Regulation of ERA;
- (33) **“Under drawal (UD)”** means drawing power less than the scheduled demand;
- (34) **“Under Injection (UI)”** means injecting power of quantum less than the scheduled generation; and