

**BHUTAN ELECTRICITY AUTHORITY**



**Regulation**  
**for**  
**Grid Integration of Alternative Renewable Energy Sources**  
**(2021)**

## TABLE OF CONTENTS

PREAMBLE .....	1
TITLE AND COMMENCEMENT .....	1
SCOPE .....	1
PURPOSE .....	1
AMENDMENT.....	1
INTERCONNECTION CODE.....	2
OPERATING CODE .....	4
DEFINITIONS.....	5
ABBREVIATIONS .....	7

## **PREAMBLE**

In exercise of power conferred by section 11.1(i) and (viii) of the Electricity Act of Bhutan 2001, the Bhutan Electricity Authority hereby frames and adopts Regulation for Grid Integration of Alternative Renewable Energy Sources.

## **TITLE AND COMMENCEMENT**

1. This Regulation shall:
  - (1) Be cited as Regulation for Grid Integration of Alternative Renewable Energy Sources 2021; and
  - (2) Come into force from 1<sup>st</sup> July 2021

## **SCOPE**

2. This Regulation shall be applicable to the Alternative Renewable Energy Generating Facilities for integration to the Transmission or Distribution System.

## **PURPOSE**

3. The purpose of this Regulation shall be to:
  - (1) Provide minimum technical requirements for seamless integration of Alternative Renewable Energy Generating Facilities to the Transmission or Distribution System; and
  - (2) Ensure reliable and efficient operation of the Power System.

## **AMENDMENT**

4. This regulation maybe amended as and when deemed necessary by the Authority.

## **INTERCONNECTION CODE**

5. An Applicant seeking connection to the Transmission or Distribution System shall submit an application to the Transmission or Distribution licensee stating the purpose of the proposed Interconnection including geographical location, quantum of electricity to be generated, technical specification of RE Generating Facilities, and construction schedule.
6. Within fifteen (15) days, the Transmission or Distribution Licensee shall acknowledge its receipt and state in writing whether or not the application is complete.
7. The Transmission or Distribution Licensee shall require the Applicant to provide additional information within prescribed time of thirty (30) days if the application is incomplete, and in case if the Applicant fails to submit the required information within prescribed time, the Transmission or Distribution Licensee may refuse the connection. The application shall be considered complete only when all required information is provided by the Alternative Renewable Energy Generator.
8. The Transmission or Distribution Licensee shall conduct necessary system studies to determine Point of Interconnection and equipment to be connected to the Transmission or Distribution System.
9. The Transmission or Distribution Licensee shall seek approval from the System Operator for the proposed Interconnection.
10. The Transmission or Distribution Licensee shall communicate its decision on acceptance or rejection for Interconnection to the Applicant within three (3) months after the date of receipt of complete application.
11. On acceptance of Interconnection, the Transmission or Distribution Licensee shall notify the Applicant its decision and the Interconnection Agreement to be executed.
12. The Applicant shall pay Interconnection fees as approved by the Authority.
13. The Applicant shall be responsible for laying transmission or distributions lines for connecting to the nearest sub-station/network.
14. The System Operator shall issue Commercial Operation Date within a reasonable time after receipt of complete application from the Applicant.
15. The Applicant shall be liable for penalty if the Applicant fails to utilize the allocated transmission or distribution network capacity for wheeling of power as per the Interconnection Agreement. Similarly, if the Transmission or Distribution Licensee fails to provide the allocated transmission or distribution network capacity for wheeling of power, the Transmission or Distribution Licensee shall be liable for penalty as per the Interconnection Agreement.

16. Voltage for Interconnection with Distribution System shall be 0.23/0.40/6.60/11/33 kV.
17. Voltage for Interconnection with Transmission System shall be 66/132/220/400kV.
18. The requirements for Interconnection between Alternative Renewable Energy Generating Facilities and Transmission or Distribution System shall be specified in the Interconnection Agreement.
19. The Interconnection Agreement shall specify the following, but not limited to:
  - (1) Provision requiring both parties to comply with Regulations, codes and standards issued by the Authority;
  - (2) Technical specification of the Alternative Renewable Energy Generating Facilities such as quantum of electricity generated, allocated transmission or distribution network capacity;
  - (3) Description of the Point of Interconnection including the technical arrangement;
  - (4) Site responsibility schedule;
  - (5) Site common drawing;
  - (6) Minimum requirement on protection;
  - (7) Meter, metering, testing and communication requirement; and
  - (8) Site access procedure for installation, operation, maintenance of the Alternative Renewable Energy Generating Facilities.

## **OPERATING CODE**

20. The Alternative Renewable Energy Generating Facilities shall not inject direct current beyond limits as per IEC standards or equivalent international standards.
21. The Alternative Renewable Energy Generating Facilities shall not exceed the harmonic injection limits as per IEC standards or equivalent international standards.
22. The Alternative Renewable Energy Generators shall provide access to the System Operator for acquiring real time operational data such as voltage, frequency, line flows, status of breaker, isolator position and other parameters as required by the System Operator.
23. The Alternative Renewable Energy Generator shall coordinate their protection requirements with the System Operator and Transmission or Distribution Licensee.
24. The metering facility shall have the capability for measurement of bi-directional flow of energy and net energy consumption at point of Interconnection
25. The Alternative Renewable Energy Generator shall comply with Safety Regulation and Safety Code of the Authority while operating and maintaining its generating facilities.
26. In the event of an Emergency or during unsafe operating condition, the Transmission or Distribution Licensee upon direction by the System Operator may disconnect the Alternative Renewable Energy Generating Facilities from Distribution or Transmission system at any time, with or without notice. However, the System Operator shall provide written explanation within one (1) week from the date of occurrence of the event.
27. The Alternative Renewable Energy Generating Facilities may be disconnected by the Transmission or Distribution Licensee based on the instruction and the procedures developed by the System Operator.
28. The System Operator shall coordinate outages of the Alternative Renewable Energy Generating Facilities as per the Grid Code Regulation.

## **DEFINITIONS**

- (1) “Act” means the Electricity Act of Bhutan 2001;
- (2) “Authority” means the Bhutan Electricity Authority;
- (3) “Applicant” means the entity submitting an Interconnection request pursuant to this Regulation;
- (4) “Bhutan Electricity Authority” means the authority of that name established pursuant to Part 2 of the Act;
- (5) “Commercial Operation Date” means the initial date of commercial operation of the RE Generator which is the mean date of acceptance test of all generating facilities having been successfully conducted by the RE Generator;
- (6) “Distribution Licensee” means a person who has obtained a license to distribute electricity in pursuant to section 22 of the Act;
- (7) “Distribution System” means any system consisting of cable, service lines and overhead lines, electrical plant and meters having design voltage of 33 kV and below owned or operated by a Licensee for distribution or for retail supply from a transmission system or generating sets to the point of delivery to consumers;
- (8) “Emergency” means actual or imminent occurrence of an event /incident which endangers or threatens to endanger the safety or health of any person or which destroys or damages, or threatens to destroy or damage, any property;
- (9) “Grid Code” means a document describing the approach and the responsibilities for planning and operation of power system issued by the Authority;
- (10) “Interconnection” means the physical connection of the RE Generating Facility in accordance with the requirements of this Regulation so that operation with Distribution or Transmission System can occur;
- (11) “Interconnection Agreement” means an agreement between the RE Generator and the Transmission or Distribution Licensee setting out terms relating to Interconnection to the Transmission or Distribution System;
- (12) “License” means a license issued under the provisions of Part 3 of the Act;
- (13) “Meter” means equipment used for measuring electrical quantity;
- (14) “Point of Interconnection” means the point where the Renewable Energy Generating Facilities connect with Distribution or Transmission System;
- (15) “Power System” means the total system relating to Power Supply including associated generation, transmission and distribution networks;

- (16) “Renewable Energy Generator” means the entity using RE technologies that cover solar (both PV and thermal), wind, bio-energy, geo-thermal, hybrid system, pico/micro/mini/small hydro and waste to energy. While large hydropower (above 25MW) although considered as renewable energy is not under the scope of this Regulation;
- (17) “Renewable Energy (RE) Generating Facilities” means the equipment and installations used by RE Generator to generate electrical energy, including civil, electrical and hydro-mechanical works;
- (18) “Site Common Drawings” means drawings prepared for each Interconnection point, which incorporates layout drawings, electrical layout drawings, common protection/control drawings and common service drawings;
- (19) “Site Responsibility Schedule” means a schedule specifying the ownership and responsibility for all the equipment at a site where the Interconnection is made;
- (20) “System Operator” means the person/s designated by the Authority in this role, whose function is defined under section 39 of the Act;
- (21) “Transmission Licensee” means a person who has obtained a License for transmission of electricity pursuant to section 22 of the Act; and
- (22) “Transmission System” means a network operating at a nominal voltage of 66 kV and above or as is deemed by the Authority to be a part of the transmission network.



**ABBREVIATIONS**

- (1) BEA: Bhutan Electricity Authority;
- (2) IEC: International Electrotechnical Commission;
- (3) kV: Kilovolts;
- (4) kW: Kilowatts;
- (5) MW: Megawatts; and
- (6) RE: Renewable Energy;