

HIMACHAL PRADESH ELECTRICITY REGULATORY COMMISSION, SHIMLA

NOTIFICATION

No.: HPERC-Grid Code(388).-

Shimla, the 24th December, 2025

In exercise of the powers conferred under Sub-section (1)(h) of Section 86, Sub-section (2) (zp) of Section 181 of the Electricity Act, 2003 (36 of 2003), read with Section 21 of the General Clauses Act, 1897 (10 of 1897), and all other powers enabling it in this behalf, the Himachal Pradesh Electricity Regulatory Commission proposes to make the following Regulations, namely “the Himachal Pradesh Electricity Regulatory Commission (Himachal Pradesh Electricity Grid Code) Regulations, 2025,” by repealing the Himachal Pradesh Electricity Grid Code, 2008 published in Rajpatra, Himachal Pradesh on 11th August, 2008 and notice is hereby given that the said draft Regulations shall be taken into consideration after the expiry of thirty (30) days from the date of their publication in Rajpatra, Himachal Pradesh, together with objections and suggestions if any, received within the stipulated period.

The text of the proposed Regulations is also available on the Commission’s website i.e. <http://www.hperc.org>.

The objections and suggestions in this behalf should be addressed to the Secretary, Himachal Pradesh Electricity Regulatory Commission, Vidyut Aayog Bhawan, Block No.-37, SDA Complex, Kasumpti, Shimla-171009.

DRAFT REGULATIONS

CHAPTER-I

PRELIMINARY

- 1. Short title, commencement and extent.**-(1) These Regulations may be called the Himachal Pradesh Electricity Regulatory Commission (Himachal Pradesh Electricity Grid Code) Regulations, 2025.
(2) These Regulations shall come into force from the date of publication in Rajpatra, Himachal Pradesh.
(3) These Regulations shall extend to the whole of the State of Himachal Pradesh.
- 2. Scope and Extent of Application.**- (1) These Regulations shall apply to all Users that connect with and/ or utilize the Intra-State Transmission System (IaSTS) including State Load Despatch Centre, State Transmission Utility and all Intra-State Transmission Licensees which are required to abide by the

principles and procedures defined in these Regulations to the extent it applies to them.

(2) These Regulations shall apply for the Intra-State flow of electricity. For the Inter-State transmission of electricity, Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023 shall be applicable.

(3) These Regulations shall not affect the obligations of the State Transmission Utility (STU), State Load Despatch Centre (SLDC) and Users as laid down under the CERC (Indian Electricity Grid Code) Regulations, 2023, and/or such obligation provided in the Electricity Act, 2003 and Rules and Regulations made thereunder.

3. **Definitions.**- In these Regulations, unless the context otherwise requires,-

Sr. No.	Particulars	Definition
(1)	'Act'	means the Electricity Act, 2003 (36 of 2003);
(2)	'Ancillary Services'	in relation to power system operation, means the services necessary to support the grid operation in maintaining power quality, reliability and security of the grid and includes Primary Reserve Ancillary Service, Secondary Reserve Ancillary Service, Tertiary Reserve Ancillary Service, active power support for load following, reactive power support, black start and such other services as defined in these Regulations;
(3)	'Ancillary Services Regulations' or 'AS Regulations':	means the Central Electricity Regulatory Commission (Ancillary Services) Regulations, 2022;
(4)	'Appendix'	means Appendix to these Regulations;
(5)	'Area Control Error' or 'ACE'	shall have the same meaning as per sub-regulation (3) of the Regulation 45 of these Regulations;
(6)	'Area Load Despatch Centre' or 'ALDC':	means a Load Despatch Centre established by the distribution licensee (Discom) operating in the State to carry out the relevant operating directives issued by the SLDC to the distribution licensee and to assist SLDC for safe and integrated operation of the concerned network.;
(7)	'Automatic Generation Control' or 'AGC'	means a mechanism that automatically adjusts the generation of a control area to maintain its interchange schedule plus its share of frequency response;
(8)	'Automatic Voltage Regulator' or 'AVR'	means a continuously acting automatic excitation control system to control the voltage of a generating unit measured at the generator terminals;
(9)	'Available Transfer Capability' or 'ATC'	means available power transfer capability across control areas or between ISTS and state network

		declared by the State load despatch centre for scheduling transactions in a specific direction with due consideration for the network security. Mathematically, ATC is the Total Transfer Capability less Transmission Reliability Margin;
(10)	‘Auxiliary Energy Consumption’	shall have the same meaning as defined in the HPERC Renewable Energy Tariff Regulations/ MYT Generation Tariff Regulations;
(11)	‘Available Capacity’	shall have the same meaning as defined in the Himachal Pradesh Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024;
(12)	‘Beneficiary’	means a person who has a share in an inter State Generating Station, and State Sector Generating Station ;
(13)	‘Bilateral Transaction’	means a transaction, other than collective transaction, for exchange of power between a specified buyer and a specified seller directly or through a trading licensee or at a Power Exchange;
(14)	‘Blackout State’	means a condition at a specific time where a part or all the operations of the power system have got suspended;
(15)	‘Black Start Procedure’	means the procedure necessary to recover from a partial or a total blackout in the HP Control Area;
(16)	‘Bulk Consumer’	shall have the same meaning as defined in CEA Technical Standards for Connectivity;
(17)	‘Buyer’	shall have the same meaning as defined in the Himachal Pradesh Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024;
(18)	‘Captive Generating Plant’	shall have the same meaning as defined in the Act;
(19)	‘CEA Grid Standards’	means the Central Electricity Authority (Grid Standards) Regulations, 2010;
(20)	‘CEA Technical Standards for Communication’	means the Central Electricity Authority (Technical Standards for Communication System in Power System Operation) Regulations, 2020;
(21)	‘CEA Technical Standards for Connectivity’	means the Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007;
(22)	‘CEA Technical Standards for Construction’	means the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010;
(23)	‘Central Generating Station’	means the generating station owned by a company owned or controlled by the Central Government;
(24)	‘Central Transmission Utility’ or ‘CTU’	means any government company, which the Central Government may notify under sub-section (1) of Section 38 of the Act;
(25)	‘Collective Transaction’	shall have the same meaning as defined in the Central Electricity Regulatory Commission (Power Market) Regulations, 2021;

(26)	‘Commission’	means the Himachal Pradesh Electricity Regulatory Commission;
(27)	‘Communication System’	shall have the same meaning as defined in the Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017;
(28)	‘Congestion’	means a situation where the demand for transmission capacity or power flow on any transmission corridor exceeds its Available Transfer Capability;
(29)	‘Connectivity Agreement’	means an agreement between STU and any other person(s) setting out the terms and conditions relating to connection to and/or use of the Intra-State Transmission System in terms of HPERC (Grant of Connectivity, Long-Term and Medium-Term intra-State Open Access and Related Matters) Regulations, 2010;
(30)	‘Connectivity’	means the state of getting connected to the intra-State transmission system by a generating station including a captive generating plant, a bulk consumer or an Intra-State Transmission and distribution licensee, in terms of the HPERC (Grant of Connectivity, Long-Term and Medium-Term intra-State Open Access and Related Matters) Regulations, 2010;
(31)	‘Control Area’	means an electrical system bounded by interconnections (tie lines), metering and telemetry which controls its generation and/or load to maintain its interchange schedule with other control areas and contributes to regulation of frequency as specified in these Regulations;
(32)	‘Control Centre’	includes NLDC or NRLDC or Renewable Energy Management Center (REMC) or SLDC or Area LDC or Sub-LDC or Discom LDC including main and backup Centres, as applicable;
(33)	‘Date of Commercial Operation’ or ‘COD’	shall have the same meaning as specified under Regulation 42 of these Regulations;
(34)	‘Declared Capacity’ or ‘DC’	in relation to a generating station means, the capability to deliver ex-bus electricity in MW declared by such generating station in relation to any time-block of the day as defined in the Grid Code or whole of the day, duly taking into account the availability of fuel or water, and subject to further qualification as per provisions of Chapter-8 of these Regulations;
(35)	‘Demand’	means the demand of active power in MW and reactive power in MVAR;
(36)	‘Demand Response’	means variation in electricity usage by the end consumers or by a control area manually or automatically, on standalone or aggregated basis, in response to the system requirements as identified by the State Load Despatch Centre;

(37)	‘Despatch Schedule’	means the ex-power plant net MW and MWh output of a generating station, for a time block, scheduled to be injected to the Grid from time to time;
(38)	‘DSM Regulations’	means the Himachal Pradesh Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2024;
(39)	‘Disturbance Recorder’ or ‘DR’	means a device for recording the behavior of the pre-selected digital and analog values of the system parameters during an event;
(40)	‘Data Acquisition System’ or ‘DAS’	means a system for recording the sequence of operation in time, of the relays or equipment as well as the measurement of pre-selected system parameters;
(41)	‘Drawal Schedule’	means the summation of the station-wise expower plant drawal schedules from all ISGS, drawal from or injection to regional grid under GNA and T-GNA and intra-State Schedule under LTA, MTOA and STOA;
(42)	‘Emergency state’	means the state in which one or more operational parameters are outside their operating limit or many of the equipment connected to the grid are operating above their respective loading limit;
(43)	‘Energy Charge’	means the energy charge for the generating stations whose tariffs are determined by the Commission under Section 62 of the Act.
(44)	‘Energy Storage System’ or ‘ESS’	in relation to the electricity system, means a facility where electrical energy is converted into any form of energy which can be stored, and subsequently reconverted into electrical energy and injected back into the grid;
(45)	‘Event’	means an unscheduled or unplanned occurrence in the grid including faults, incidents and breakdowns;
(46)	‘Event Logging Facilities’	means a device for recording the chronological sequence of operations, of the relays and other equipment;
(47)	‘Ex-Power Plant’	means net MW or MWh output of a generating station, after deducting auxiliary consumption and transformation losses;
(48)	‘Fault Locator’ or ‘FL’	means a device installed at the end of a transmission line to measure or indicate the distance at which a line fault may have occurred;
(49)	‘Flat frequency control’	means a mechanism for correcting ACE by factoring in only the frequency deviation and ignoring the deviation of net actual interchange from net scheduled interchange;
(50)	‘Flat tie-line control’	means a mechanism for correcting ACE by factoring in only the deviation of net actual interchange from net scheduled interchange ignoring frequency deviation;
(51)	‘Flexible Alternating Current Transmission’	means a power electronics based system and other static equipment that provide control of

	System' or 'FACTS'	one or more AC transmission system parameters to improve power system stability, enhance controllability and increase power transfer capability of transmission systems;
(52)	'Forced Outage'	means an outage of a generating unit or a transmission facility due to a fault or any other reasons which have not been planned;
(53)	'Free Governor Mode of Operation'	means the mode of operation of governor where machines are loaded or unloaded directly in response to grid frequency i.e machine unloads when grid frequency is more than 50 Hz and loads when grid frequency is less than 50 Hz amount of loading or unloading is proportional to the governor droop;
(54)	'Frequency Response Characteristics' or 'FRC'	means automatic, sustained change in the power consumption by load or output of the generators that occurs immediately after a change in the load-generation balance of a control area and which is in a direction to oppose any change in frequency. Mathematically it is equivalent to $FRC = \text{Change in Power } (\Delta P) / \text{Change in Frequency } (\Delta f)$;
(55)	'Frequency Response Obligation' or 'FRO'	means the minimum frequency response a control area has to provide in the event of any frequency deviation;
(56)	'Frequency Response Performance' or 'FRP'	means the ratio of actual frequency response with frequency response obligation;
(57)	'Generating Unit'	means (a) an unit of a generating station (other than those covered in sub-clauses (b) and (c) of this clause) having electrical generator coupled to a prime mover within a power station together with all plant and apparatus at the power station which relate exclusively to operation of that turbo-generator; b) an inverter along with associated photovoltaic modules and other equipment in respect of generating station based on solar photo voltaic technology; c) a wind turbine generator with associated equipment, in respect of generating station based on wind energy; d) in respect of RHGS, combination of hydro generator under sub-clause (a); or solar generator under sub-clause (b) or wind generator under sub-clause (c) of this clause;
(58)	'GNA Regulations'	means the Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State Transmission System) Regulations, 2022;
(59)	'GNA Grantee'	means a person who has been granted GNA or is deemed to have been granted GNA under GNA Regulations;
(60)	'Governor Droop'	in relation to the operation of the governor of a generating unit means the percentage drop in

		system frequency which would cause the generating unit under governor action to change its output from no load to full load;
(61)	‘Grid Security’	means the power system’s capability to retain a normal state or to return to a normal state as soon as possible, and which is characterized by operational security limits;
(62)	Indian Electricity Grid Code (IEGC)	means the Indian Electricity Grid Code specified under clause (h) of sub-section (1) of section 79 of the Act by the Central Electricity Regulatory Commission;
(63)	‘Inertia’	means the contribution to the capability of the power system to resist changes in frequency by means of an inertial response from a generating unit, network element or other equipment that is coupled with the power system and synchronized to the frequency of the power system;
(64)	‘Infirm Power’	means the electricity injected into the grid prior to the date of commercial operation of a unit of the generating station;
(65)	‘Intermediary Procurer’	shall have the same meaning as defined in Electricity (Amendment) Rules, 2022
(66)	‘Inter-State Generating Station’ or ‘ISGS’	means a central generating station or any other generating station having a scheme for generation and sale of electricity in more than one state;
(67)	‘Inter-State Transmission System’ or ‘ISTS’	shall have the same meaning as defined in sub-section (36) of Section 2 of the Act;
(68)	‘Intra-State Transmission System’ or ‘IaSTS’	means the transmission system owned by the State Transmission Utility (STU), transmission licensee, distribution licensee or the transmission system of any other person who has been granted license by the Commission to establish or operate distribution lines within the HP Control Area;
(69)	‘Load’	means the active, reactive or apparent power consumed by a utility/installation of consumer;
(70)	‘Maximum Continuous Rating’ or ‘MCR’	means the maximum continuous output in MW at the generator terminals guaranteed by the manufacturer at rated parameters;
(71)	‘Merit Order’	means the order of ranking of available electricity generation in ascending order from least energy charge to highest energy charge to be used for deciding despatch instructions to minimize the overall cost of generation;
(72)	‘Minimum Turndown Level’	means the minimum output power expressed in percentage of maximum continuous power rating that the generating unit can sustain continuously; to be on bar and includes minimum power level as defined in CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023;
(73)	‘Nadir Frequency’	means minimum frequency after a contingency in case of generation loss and maximum

		frequency after a contingency in case of load loss;
(74)	‘National Grid’	means the entire inter-connected electric power network of the country;
(75)	‘National Load Despatch Centre’ or ‘NLDC’	means the centre established under sub-section (1) of section 26 of the Act;
(76)	‘Net Drawal Schedule’	means the drawal schedule of a state entity which are the algebraic sum of all its transactions through the inter-State transmission system at ISTS periphery after deducting the transmission losses and the algebraic sum of all its transactions through the intra-State transmission system;
(77)	‘Net Injection Schedule’	means the injection schedule of a state entity which are the algebraic sum of all its transactions through the inter-State transmission system at ISTS periphery and the algebraic sum of all its transactions through the intra-State transmission system;
(78)	‘Normal State’	means the state in which the operational parameters of the power system are within their respective operational limits and equipments are within their respective loading limits;
(79)	‘Off-Bar Declared Capacity’	means the difference between Declared Capacity and On-Bar Declared Capacity in MW;
(80)	‘On-Bar Declared Capacity’	in relation to a generating station means the capability to deliver ex-bus electricity in MW from the units on-bar declared by such generating station in relation to any time block of the day or whole of the day, duly taking into account the availability of fuel and water and subject to further qualification in the relevant Regulations;
(81)	‘On-Bar Installed Capacity’	means the summation of name plate capacities or the capacities as approved by the Commission from time to time, of all units of the generating station in MW which are on-bar;
(82)	‘Operation and Co-ordination Committee’ or ‘OCC’	means a Committee constituted by the Commission under Regulations 10 of these Regulations;
(83)	‘Operational Parameters’	means the parameters for system security as specified by the system operator including frequency, voltage at station-bus, angular separation, damping ratio, short circuit level, inertia;
(84)	‘Pool Account’	means Deviation Pool Account as defined in the HPERC DSM Regulations, 2024;
(85)	‘Pooling Station’	means the IaSTS grid sub-station where pooling of generation of connected individual generating stations is done for interfacing with the next higher voltage level;
(86)	‘Power System’	shall have the same meaning as defined in sub-section (50) of section 2 of the Act;

(87)	‘Primary Reserve’	shall have the same meaning as per sub-regulation (3) of the Regulation 45 of these Regulations;
(88)	‘Protection Co-ordination Committee’ or ‘PCC’	means a Committee constituted by the Commission under Regulation 10 of these Regulations;
(89)	‘Qualified Coordinating Agency’ or ‘QCA’	shall have same meaning as defined in the sub-regulation (v) of Regulation 2 of HPERC (Deviation Settlement Mechanism and Related Matters) Regulations, 2024;
(90)	‘Ramp Rate’	means rate of change of a generating station output expressed in %MW per minute;
(91)	‘Rate of Change of Frequency’ or ‘df/dt’	means the time derivative of the power system frequency which negates short term transients and therefore reflects the actual change in synchronous network frequency;
(92)	‘Reference contingency’	means the maximum positive power deviation occurring instantaneously between generation and demand and considered for estimation of reserves;
(93)	‘Northern Regional Power Committee’ or ‘NRPC’	shall have the same meaning as defined under clause (55) of section 2 of the Act;
(94)	‘Restorative State’	means a condition in which control action is being taken to reconnect the system elements and to restore system load;
(95)	‘Northern Regional Load Despatch Centre’ ‘NRLDC’ or ‘RLDC’	means the Centre established under subsection (1) of Section 27 of the Act;
(96)	‘Renewable Energy Generating Station’ or ‘REGS’	means a generating station based on a renewable source of energy with or without Energy Storage System and shall include Renewable Hybrid Generating Station;
(97)	‘Renewable Hybrid Generating Station’ or ‘RHGS’	means a generating station based on hybrid of two or more renewable source(s) of energy with or without Energy Storage System, connected at the same inter-connection point;
(98)	‘Resilience’	means the ability to withstand and reduce the magnitude or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, or rapidly recover from such an event;
(99)	‘Secondary Reserve’	shall have the same meaning as per Regulation 45 of these Regulations;
(100)	‘Secondary Reserve Ancillary Service’ or ‘SRAS’	shall have the same meaning as per sub-regulation (3) of the Regulation 45 of these Regulations;
(101)	‘Secondary Reserve Ancillary Service Provider’ or ‘SRAS Provider’	shall have the same meaning as per sub-regulation (3) of the Regulation 45 of these Regulations;
(102)	‘Seller’	shall have the same meaning as defined in the Himachal Pradesh Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024;

(103)	'Share'	means percentage or MW entitlement of a beneficiary in an ISGS either notified by Government of India or agreed between the generating company and beneficiary through contracts and implemented through GNA or TGNA, as the case may be;
(104)	'State Load Despatch Centre' or 'SLDC'	means the Centre established under sub-section (1) of section 31 of the Act;
(105)	'State Transmission Utility' or 'STU'	means the board or the government company specified as such by the concerned State Government under sub-section (1) of section 39 of the Act;
(106)	State Sector Generating Stations (SSGS)	Generating Stations connected with the State Power Grid including IPP, Captive Generating Plant, Co-Generators and NCES, for the purpose of scheduling/dispatching, these Regulations shall apply to such SSGS;
(107)	'System Constraint'	means a situation in which there is a need to prepare and activate a remedial action in order to respect operational security limits;
(108)	'System State'	means the operational state of the power system in relation to the operational security limits which can be normal state, alert state, emergency state, extreme emergency state and restorative state;
(109)	'Tertiary Reserve'	shall have the same meaning as per sub-regulation (3) of the Regulation 45 of these Regulations;
(110)	'Tie-line bias control'	means a mechanism of correcting ACE by factoring in deviation of net actual interchange from net scheduled interchange as well as frequency deviation;
(111)	'Time Block'	means block of duration as specified by the Commission for which energy meters record values of specified electrical parameters with first time block starting at 00.00 Hours, presently of fifteen (15) minutes duration;
(112)	'Total Transfer Capability' or 'TTC'	means the amount of electric power that can be transferred reliably over the inter-control area transmission system under a given set of operating conditions considering the effect of occurrence of the worst credible contingency;
(113)	'Transmission Planning Criteria'	means the criteria issued by CEA for transmission system planning;
(114)	'Transmission Reliability Margin' or 'TRM'	'means the amount of margin earmarked in the total transfer capability to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions;
(115)	'Trial Operation' or 'Trial Run'	shall have the same meaning as specified in Chapter -6 of these Regulations, as applicable;
(116)	'User'	means and includes generating company, captive generating plant, energy storage system, transmission licensee including deemed transmission licensee, distribution licensee, solar park developer, wind park

		developer, wind-solar photo voltaic hybrid system, or bulk consumer which is or whose electrical plant is connected to the grid at voltage level 11 kV and above including open access consumers/generators availing open access;
(117)	'Voltage Stability'	means the ability of a transmission system to maintain steady acceptable voltages at all nodes in the transmission system in the normal situation and after being subjected to a disturbance;

(118) Words and expressions used in these Regulations that are not defined herein but defined in the Act and other Regulations of the Himachal Pradesh Electricity Regulatory Commission (HPERC) and Central Electricity Regulatory Commission (CERC) shall have the meaning as assigned to them under the Act or the said Regulations of the Commission; and

(119) Reference to any Acts, Rules and Regulations shall include amendments or consolidation or re-enactment thereof.

CHAPTER-2
MANAGEMENT OF THE HIMACHAL PRADESH ELECTRICITY GRID CODE
(HPEGC)

4. **Introduction.**- (1) STU is required to implement and comply with the HPEGC (Grid Code or State Grid Code) and periodically review the same and its implementation. For the above purpose, a Grid Code Review Committee shall be established under Regulation 7 of these Regulations.
- (2) All revisions in the Grid Code shall be proposed by majority votes in the meeting of Grid Code Review Committee. In the event of equality of votes, the matter shall be referred to the Commission for decision. All revision in the Grid Code made by the Grid Code Review Committee shall be submitted to the Commission for approval.
- (3) The changes/amendments proposed by the Grid Code Review Committee should be consistent with the IEGC and amendments thereof.
- (4) The Commission may issue directives requiring STU to submit proposal for amendments in the Grid Code and STU shall forthwith comply with such directives within timelines contained therein.
5. **Objective.**-The objective of this Chapter is to define the method of managing the State Grid Code, submitting and pursuing of any proposed change to the State Grid Code and the responsibilities of all Users to effect such change.
6. **Responsibilities.**- (1) The STU shall be responsible for managing and enforcing the Grid Code.
- (2) The STU shall establish and service the requirements of the Grid Code Review Committee in accordance with the provisions of Regulation 18 of these Regulations.
- (3) The State Load Despatch Centre shall discharge its functions assigned to it under the provisions of the Act and HPEGC in an independent and unbiased manner.
7. **Grid Code Review Committee.**- (1) The Commission shall, by order, approve the constitution of Grid Code Review Committee.
- (2)The STU shall inform all Users in writing, the name and address of the Chairman and Members of the Grid Code Review Committee within fifteen (15) days of the constitution of the Grid Code Review Committee and any subsequent changes thereafter.
8. **Grid Code Review Committee Proceedings.**- (1) Member Secretary of the Grid Code Review Committee shall be responsible for arranging the meetings in a time bound manner. The procedure to be followed by the Committee in conducting its

business shall be formulated by the Committee and shall be approved by the Commission. The Committee shall meet at least once in a year.

(2) The functions of the Grid Code Review Committee shall be as follows:-

- (a) To keep the Grid Code and its implementation under scrutiny and review;
- (b) To propose any revision, if necessary, in the HPEGC consequent of analysis report on major grid disturbance soon after its occurrence. The recommendations of the Committee shall be submitted to Commission for approval and issuing directives to the Users for taking necessary remedial measures, as may be deemed fit, to prevent reoccurrence;
- (c) To consider all requests for amendment to the HPEGC, which any User makes and take action as per clause (b) above, if found appropriate after consideration;
- (d) To issue guidelines on the interpretation and implementation of the Grid Code; and
- (e) To examine problems/ issues raised by Users.

(3) The STU may schedule meetings with a User or group of Users to discuss the issues in implementation of the Grid Code and prepare proposals for the Grid Code Review Committee meeting.

(4) If the Committee considers it necessary to discuss any special issue with the Commission, the Committee may send an appropriate proposal to the Commission alongwith a copy of Minutes of Meeting (MoM) wherein the issue was identified. The Commission may take up the issue for consideration in a manner as deemed fit by it.

9. **HPEGC Review and Revisions.**- (1) Any written request seeking review/ modification/amendment of the Grid Code shall be sent to the STU. If the request is sent direct to the Commission, the same shall be forwarded to the STU for taking further action.

(2) The Member Secretary of the Committee shall present all proposals for revision of the Grid Code before the Grid Code Review Committee for its consideration.

(3) The Member Secretary of the Committee shall send to the Commission, the following reports at the conclusion of each review meeting of the Committee:-

- (a) A report on the outcome of such review meeting;

- (b) Any proposed revisions to the Grid Code as the STU reasonably thinks necessary for the achievement of the objectives of this Code; and
 - (c) All written representations or objections from Users arising during the review/consultation process.
- (4) All revisions in the Grid Code shall be made by the Commission and the STU shall convey to all Users, revisions in the Grid Code after amendment by the Commission and shall make available a copy of the respective parts of Grid Code in force to any person requesting it on payment of cost thereof.
- (5) The Commission shall have the power to review the HPEGC as and when required.

10. **Committees.**- (1) The STU shall be responsible for implementation of Grid Code whereas, the Grid Code Review Committee shall be responsible for management of Grid Code and for proposing any changes or modifications in the Grid Code. The STU shall submit the proposal to the Commission for constitution of the following Committees and other Committees as deemed fit for implementation of the Grid Code within thirty (30) days of the date of publication of these Regulations in Rajpatra:

(a)	System Operation Code	Operation and Co-ordination Committee (OCC)
(b)	Protection Code	Protection Co-ordination Committee (PCC)

(2) The Commission shall, by order, approve the constitution of said Committees.

11. **Operation and Co-ordination Committee (OCC).**- (1) The Operation and Co-ordination Committee (OCC) shall means at least once in two months and deliberate on all technical and operational aspects of this Grid Code, except Protection and Metering Code.

(2) The procedure to be followed by the Operation and Co-ordination Committee in conducting its business shall be formulated by the respective Committee and shall be approved by the Grid Code Review Committee.

(3) The Operation and Co-ordination Committee (OCC) shall perform the following functions:-

- (i) Review of existing inter-connection and equipment for alteration, if necessary, so as to comply with the Connection Code;
- (ii) Review the load management through under frequency, time differential (df/dt) relays and Advanced Distribution Management System (ADMS) etc.;
- (iii) Transmission system planning coordination for the State as a whole;
- (iv) Issues related to energy accounting and scheduling of intra-State energy;

- (v) To discuss and resolve issues pertaining to availability of real time data through Supervisory Control and Data Acquisition (SCADA);
- (vi) Review the voice communication facility among SLDC and Users;
- (vii) Review and analyse the grid disturbances and system restoration procedure;
- (viii) Review and finalize Outage Plan of State Transmission System;
- (ix) Review the installation of Disturbance Recorders, Event Loggers in the State Transmission System;
- (x) Review and study the implementation of free governing/ restricted governing system for all eligible generating stations; and
- (xi) Any other matter related to technical and operational parameters.

12. **Protection Co-ordination Committee (PCC).**- (1) The Protection Co-ordination Committee (PCC) shall ensure implementation of Protection Code by the Users and discharge their obligations under the Protection Code. The Committee shall meet at least once in three (3) months.

(2)The procedure to be followed by the Protection Co-ordination Committee in conducting their business shall be formulated by the respective Committee and shall be approved by the Grid Code Review Committee.

(3) Protection Co-ordination Committee (PCC) shall conduct the following functions:-

- (i) To keep Protection Code and its implementation under scrutiny and review;
- (ii) To consider all the requests for amendment to the Protection Code made by Users;
- (iii)To issue guidelines on the interpretation and implementation of the Protection Code; and
- (iv) Any other matter related to coordination amongst Users in relation to protection and relays.

CHAPTER 3

RESOURCE ADEQUACY CODE AND SYSTEM PLANNING CODE

13. **Resource Adequacy Code.**- This chapter covers the integrated resource planning including demand forecasting, generation resource adequacy planning and transmission resource adequacy assessment, required for secure grid operation. The planning of generation and transmission resources shall meet the projected demand in compliance with specified reliability standards for serving the load with optimum generation mix with a focus on integration of environmental friendly technologies after taking into account the need, inter alia, for flexible resources, storage systems for energy shift and demand response measures for managing the intermittency and variability of renewable energy sources.
14. **Integrated Resource Planning.**- The integrated resource planning shall include,-
- (a) demand forecasting and resource adequacy planning; and
 - (b) transmission resource planning.
15. **Demand Forecasting and Resources Adequacy Planning.**- (1) The provisions related to demand assessment forecasting and Resources Adequacy Planning shall be governed by the provisions of Himachal Pradesh Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2025 and as per the Resource Adequacy Guidelines issued by the Central/ State Government from time to time.
- (2) In order to ensure optimum and least cost generation resource procurement planning, each distribution licensee of the State or any agency on its behalf shall give due consideration to the factors such as its share in the State, regional and national coincident peak, seasonal requirement and possibility of sharing generation capacity seasonally with other States.
16. **Transmission Resource Adequacy Planning.**- (1) The STU shall undertake assessment and planning of the Intra-State transmission system as per the provisions of the Act and shall inter alia take into account:-
- (a) import and export capability adjoining State periphery of ISTS and the STU interface; and
 - (b) adequate power transfer capability across the Intra-State Transmission System.
17. **System Planning Code.**- (1) The System Planning Code specifies the procedure to be applied by STU in the planning and development of the State Transmission

System and also specifies the method for data submission by Users to STU for development of Intra-State Transmission System. The provisions of System Planning Code are intended to enable STU to produce a plan in consultation with Users, to provide an efficient, coordinated, secure and economical State Transmission System to satisfy requirement of future demand.

(2) In accordance with Section 39(2)(b) of the Act, STU shall discharge all functions of planning and coordination relating to intra-State transmission system with Central Transmission Utility, State Governments, Generating Companies, Regional Power Committees, Central Electricity Authority (CEA), Licensees and any other person notified by the State Government in this behalf.

(3) In accordance with Section 39(2)(b) of the Act, STU shall inter-alia provide non-discriminatory open access to its transmission system for use by,-

- (a) any Licensee or generating company on payment of the transmission charges; or
- (b) any consumer as and when such open access is provided by the State Commission under sub-section (2) of section 42 of the Act, on payment of the transmission charges and a surcharge thereon, as may be specified by the State Commission.

(4) A requirement for reinforcement or extension of the State Transmission System may arise for a number of reasons, including but not limited to the following:-

- (i) Development on a User's system already connected to the State Transmission System;
- (ii) The introduction of a new connection point between the User's system and the State Transmission System;
- (iii) Evacuation system for Generating Stations within or outside the State;
- (iv) Reactive Compensation;
- (v) A general increase in system capacity (due to addition of generation or system load) to remove operating constraints and maintain standards of security;
- (vi) Transient or steady state stability considerations; and
- (vii) Cumulative effect of any of the above.

(5) The reinforcement or extension of the State Transmission System may involve work at an entry or exit point (connection point) of a User or the State Transmission System. Development of all User's systems must be planned well in advance to permit consents and way leaves to be obtained and detailed engineering design/construction work to be completed, STU may require information from the Users and vice versa. To this effect, the Planning Code

imposes time scale, for exchange of necessary information between STU and Users, wherever appropriate, to the confidentiality of such information.

(6) The Planning Code provides the following:-

- (i) Defines the procedure for the exchange of information between STU and User in respect of any proposed User development on the User's system, which may have an impact on the performance of the User;
- (ii) Details of the information which STU shall make available to Users in order to facilitate the identification and evaluation of opportunities for use or connection to State Transmission System;
- (iii) Details of the information required by STU from Users to enable the STU to plan the development of its Transmission System to facilitate proposed User developments; and
- (iv) Specifies planning and design standards, which will be applied by the STU in planning and development of the power system.

18. **Planning Policy.-** (1) The STU would develop a perspective transmission plan for next ten(10) years on annual rolling basis for Intra-State Transmission System. The perspective transmission plan would be updated every year to take care of the revisions in load projections and generation capacity additions. The perspective plan shall be submitted to the Commission for approval.

(2) The STU shall carry out annual planning process corresponding to a five (5) years forward term for identification of major State Transmission System, which shall fit into National Power Plan formulated by Central Government long-term plan developed by CEA and the five (5) years plan prepared by Central Transmission Utility.

(3) The STU shall follow the following steps in planning:-

- (i) Based on the Resource Adequacy Plan, Distribution Licensee(s) shall provide the details of the demand forecasting and resource adequacy planning data, methodology and assumptions on which the forecasts are based to the STU. Such forecasts would be reviewed and updated by the Distribution Licensees from time to time;
- (ii) STU shall prepare a transmission plan for the State Transmission System, including provision for VAR compensation needed in the State Transmission System;
- (iii) The reactive power planning exercise shall be carried out by STU in consultation with NRLDC/NRPC/SLDC/Distribution Licensee(s) for installation of reactive compensation equipment;
- (iv) Special attention shall be accorded by the STU towards planning of capacitors, reactors, Static Volt Ampere Reactive Compensator (SVC), Static Volt Ampere Reactive Generator (SVG) and Flexible Alternating Current Transmission Systems (FACTS) and any other equipment which

is typically used to regulate and control the voltage within the specified limits;

- (v) The STU's planning department shall use load flow, short circuit and transient stability study, relay coordination study and other techniques for transmission system planning;
- (vi) The STU's planning department shall simulate the contingency and system constraint conditions for the system for transmission system planning; and
- (vii) The planning criteria shall be as per the latest CEA Manual on Transmission Planning Criteria and amendment thereof.

(4) All the Users shall supply to the STU, the desired planning data by 31st May every year to enable the STU to formulate and finalise the plan by 30th September each year for the next five (5) years.

19. Planning Responsibility:- (1) The primary responsibility of demand forecasting within Distribution Licensees area of supply rests with Distribution Licensees. The Distribution Licensees shall determine their peak demand and energy forecasts for each category for each of the succeeding five (5) years and demand and energy forecasts for each category for each of the succeeding five (5) years and submit the same annually by 31st May to the STU alongwith details of the Demand forecasting and resource adequacy planning, data, methodology and assumptions on which the forecasts are based alongwith their proposals for transmission system augmentation. The demand forecasts shall be updated annually or whenever major changes are made in the existing forecasts or planning.

(2) State Sector Generating Stations (SSGS) shall provide their generation capacity to the STU for evacuating power from their power stations for each of the succeeding five (5) years alongwith their proposal for transmission system augmentation and submit the same annually by 31st May to the STU. The generation forecasts/projections shall be updated annually or whenever major changes are made in the existing forecasts or planning.

(3) The STU shall obtain Renewable Capacity Addition Plan issued by Department of NES, Government of Himachal Pradesh/Directorate of Energy(DoE)/Himachal Pradesh Energy Development Agency (HIMURJA)/ Distribution licensee or any other person/Agency notified by the State Government in this behalf.

- (4) Distribution Licensee shall provide details of Long-term Access and Medium-term Open Access agreements or Power Purchase Agreements (PPAs) signed with ISGS/IPPs/REGs for the succeeding five (5) years to STU annually by 31st May.
- (5) The planning for strengthening the State Transmission System for wheeling of power from outside State stations/ISGS shall be initiated by the STU.
- (6) Operation and Co-ordination Committee (OCC) shall review and approve the demand forecasts and the methodology followed in this regard.

20. **Planning Data.**- (1) To enable the STU to conduct system Studies and prepare perspective plans for electricity demand, generation and transmission, the Users shall furnish the following data to the STU from time to time:-

- (a) Standard Planning Data of Generation/ Distribution (Appendix-A); and
- (b) Detailed Planning Data Generation/ Distribution (Appendix-B)

(2) To enable Users to co-ordinate planning, design and operation of their plants and systems with the State Transmission System, they may seek the following data of Transmission System as applicable to them, which the STU shall supply from time to time:-

- (a) Standard Planning Data (Transmission) (Appendix-A);
- (b) Detailed Planning Data (Transmission) (Appendix-B); and
- (c) To supply Annual Transmission Planning Report, Power Map and any other information as the Commission may specify.

21. **Implementation of Transmission Plan.**- The actual programme for implementation of transmission plan will be determined by the STU in consultation with other Transmission Licensee(s). The STU/ Transmission Licensee shall ensure the completion of such plan within the required time frame.

CHAPTER-4
CONNECTION/CONNECTIVITY CODE

22. **General.**- (1) This chapter covers the technical and design criteria for connectivity, procedure and requirements for physical connection and integration of grid elements.
- (2) The connectivity to the IaSTS shall be granted by STU in accordance with the HPERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in intra-State Transmission and related matters) Regulations, 2010 and as per GNA Regulations or such Regulations as may notified by the Commission.
- (3) Users seeking to get connected to the IaSTS for the first time shall fulfill the requirements and follow the procedures specified under this Code. The transmission licensees shall comply with the technical requirements specified under this Connection Code.
- (4) After grant of connectivity and prior to the declaration of commercial operation, the tests as specified under Chapter-6 of these Regulations shall be performed.
23. **Compliance with existing Rules and Regulations.**-All Users connected to or seeking connection to the grid shall comply with the following Act/Regulations and amendment issued from time to time, such as:-
- (a) The Electricity Act, 2003;
 - (b) Central Electricity Authority (Installation and Operation of Meters)Regulations, 2006;
 - (c) Central Electricity Authority(Technical Standards for Connectivity to the Grid)Regulations, 2007;
 - (d) Central Electricity Authority (Grid Standards) Regulations, 2010;
 - (e) Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines)Regulations, 2010;
 - (f) Central Electricity Authority (Measures Relating to Safety & Electric Supply) Regulations, 2010;
 - (g) HPERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in intra-State Transmission and related matters) Regulations, 2010;
 - (h) Central Electricity Authority (Technical Standards for Communication System in Power System Operation) Regulations, 2020;
 - (i) Central Electricity Authority (Cyber Security in Power Sector) Guidelines, 2021;
 - (j) Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022;
 - (k) Central Electricity Authority (Measures Relating to Safety & Electric Supply) Regulations, 2023 and amendment thereof ; and
 - (l) Any other Regulations and standard as specified from time to time.

24. **Procedure for Connection.-** (1) The grant of connectivity to the IaSTS by the STU shall be governed by the HPERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in intra-State Transmission and related matters) Regulations, 2010;
- (2) SLDC, in coordination with STU after due consultation of stakeholders, shall prepare a detailed procedure covering modalities for first time energization and integration of new or modified power system element and submit for approval of the Commission. The procedure shall specify requirements for integration with the grid such as protection, telemetry and communication systems; metering; statutory clearances; modeling data requirements for system studies and timeline for submission of data for system study. In the absence of such procedure of SLDC, the NLDC procedure shall apply for the elements.
- (3) Post completion of all physical arrangements of connectivity and necessary site tests, the concerned user shall request the SLDC for permission of first time energisation in the specified format as per the procedure published by SLDC.
25. **Connectivity Agreement.-** In case of Users seeking connectivity to the IaSTS under HPERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in intra-State Transmission and related matters) Regulations, 2010, Connectivity Agreement shall be signed between such Users and STU. In case of multiple Generators connected at same station, the Site Responsibility Schedule including the responsibility for operation and protection co-ordination and data sharing among the licensees, shall be specified in the Connectivity Agreement.

Technical Requirements.- The STU, in consultation with SLDC shall carry out a joint system study six (6) months before the expected date of first energization of a new power system element to identify operational constraints, if any. In case of constraints, the STU shall identify measures for facilitating the integration of the element, subject to grid security. The connectivity grantee and transmission licensee shall furnish all technical data i.e. network data, relay settings and other relevant data to the STU and SLDC at least seven (7) months before, for necessary technical studies. The STU shall publish detailed Procedure covering modalities for carrying out interconnection studies.

26. **Data and Communication Facilities.-** (1) Reliable and efficient speech and data communication systems shall be provided by the all Users including Independent Power Producers and Distributed Energy Resources having PPA/agreements with

Discom connected at any voltage level to facilitate necessary communication and data exchange and supervision/control of the grid by the SLDC, under normal and abnormal conditions in accordance with the CEA Technical Standards for Communication. All Users including Independent Power Producers (IPPs) and Distributed Energy Resources shall provide system for telemeter power system parameter such as power flow, voltage and status of switches/ transformer taps etc. in line with interface requirements and other guidelines to the SLDC.

(2) The associated communication system to facilitate data flow up to SLDC shall also be established by the all Users including Independent Power Producers and Distributed Energy Resources connected at any voltage level as specified by STU/ Discom in connectivity agreement. The above-mentioned entities in coordination with STU/Discom shall provide the required facilities as specified in the connectivity agreement.

(3) All Users including Independent Power Producers and Distributed Energy Resources at any voltage level shall provide adequate reliable and redundant communication facility with SLDC to ensure exchange of data/ information to maintain reliability and security of the grid on 24x7 basis. All user shall maintain the communication channel availability at 99.9% annually:

Provided that with redundant back-up communication system, the availability of communication system should be 100%.

(4) Communications Plant Availability report of tele-metered station with percentage availability shall be submitted by SLDC to HPERC on monthly basis.

(5) The seamless real-time data availability which affects the drawl of the state vis-à-vis Over Drawl (OD)/Under Drawl (UD) is to be maintained for interstate points and open access Users on round the clock basis using reliable redundant communication media. Reliable telemetry & communication media is to be provided/updated, if required by these Users within 03 (Three) months from the date of notification of these Regulation:

Provided that after completion of 3 (three) months period, in case reliable data availability is not maintained by the Users continuously for a period of 15 days, a notice shall be served by SLDC for providing seamless data availability at SLDC end within 3 (three) days from the date of receipt of notice. In case reliable data is not provided at SLDC within such period, Users shall be liable to pay a penalty as determined by the Commission per day per station to SLDC for

the period beyond notice period during which data remained unavailable in SLDC.

(6) All Users availing Open Access whose Real Time data is not reporting to SLDC for a period of 15 days beyond notice period, the NOC of such entity shall be withdrawn and shall not be issued till the availability of Real Time Data at SLDC.

Chapter -5

PROTECTION CODE

27. **Introduction.-** Protecting the State Transmission System and User's systems from faults and to ensure the reliability and safety of the electrical grid is of utmost importance. The reliable and safe operation of the electrical grid, certain minimum standards for protection need to be established. These standards specify the requirements for protective devices, schemes, and procedures to detect and mitigate faults and abnormalities in the power system. The objective of this chapter is to define the minimum protection requirements for any equipment connected to the State Transmission System and thereby safeguard the system from disruption due to faults.
28. **Protection Principles.-** (1) Electrical equipment connected to the State Transmission System shall be covered by minimum specified protection. This protection is designed to achieve the following critical objectives:
- (i) **Reliability:** ensuring the reliable operation of the equipment and the system as a whole;
 - (ii) **Selectivity:** enabling the selective identification and isolation of faulty section or issues in the system;
 - (iii) **Speed:** providing fast responses to faults to minimize downtime and disruptions;
 - (iv) **Stability:** maintaining the overall stability of the electrical system; and
 - (v) **Sensitivity:** detecting even minor abnormalities or faults promptly.
- (2) All Users connected to the State Transmission System are expected to cooperate with the State Transmission Utility (STU) in ensuring that the protection settings of their equipment are correctly configured. This cooperation is essential for achieving the effective and non-discriminatory removal of faulty lines or equipment within the specified time frames outlined in the code.
- (3) Protection settings should not be altered, and protection relays should not be bypassed or disconnected without consultation and agreement between all affected Users.

- (4) In cases where protection is bypassed or disconnected by agreement, there is an obligation to rectify the cause of the bypass and restore protection to its normal condition as quickly as possible.
- (5) If an agreement cannot be reached regarding the bypass or disconnection of protection, the electrical equipment in-question must be removed from service immediately. This strict measure is taken to prioritize the safety and stability of the electrical system.
- (6) The NRPC/SLDC shall advise the STU regarding,-
- (i) Planning for upgrading and strengthening protection system based on analysis of grid disturbance and partial/total black out in the State Transmission System; and
 - (ii) Planning of Islanding and System Split schemes and installation of Under Frequency Relays and df/dt relays.
- (7) The STU shall be responsible for arranging periodical meetings of the PCC. The unsatisfactory protection issues shall be reported to STU for investigation of any malfunctioning of protection system. Users shall take prompt action to correct any protection mal-function or issue as discussed and agreed to in these periodical meetings. PCC shall decide the date from which the existing protection provided in STU and/ or User systems not meeting the minimum requirement as stipulated in this Code is required to be changed:

Provided that if, it is felt by STU that user's protection system does not comply with the norms, user is bound to get his protection system checked/ tested/ inspected by STU, and if required replaced by new ones after its inspection and testing, so that there is no adverse impact on State Grid or STU's system.

- (8) PLCC system, Optical fibre cable, V-Sat or any other communication system shall be used with the approval of PCC.

29. Fault Clearance Times.- (1) From stability consideration, the maximum fault clearance times for faults on any User's system directly connected to

the State Transmission System, or any faults on the State Transmission System itself, shall be as follows:-

Voltage Class	Target Fault clearance Time
kV	msec.
400	100
220	160
132	160
66	300

Lower fault clearing time than above are also preferable.

(2) Lower fault clearance times for faults on Users system may be agreed to but only if, in STU's opinion, system conditions allow this. At generating stations, line faults should be cleared at the generating station end within the critical clearing time so that the generators remain in synchronism.

30. Generator Requirements.- All Generating Units and all associated electrical equipment of the Generating Units connected to the State Transmission System shall have adequate protection so that the State Transmission System does not suffer due to any disturbances originating from the Generation units. As per the CBIP Publication No.274 Section-1, the generator protection schemes shall cover at least differential protection, back up protection, Stator & Rotor Earth fault protection, field ground/field failure protection (not applicable to brush-less excitation system), negative sequence protection, under frequency, over flux protection, inter-turn. Differential protection for generator, restricted E/F for Generator Transformer, back-up impedance protection, pole slipping protection (applicable to units above 200 MW), reverse power protection etc.

CHAPTER-6
COMMISSIONING AND COMMERCIAL OPERATION CODE

31. **General.-** This chapter covers aspects related to (i) drawl of startup power from and injection of infirm power into the grid, (ii) trial run operation (iii) documents and tests required to be furnished before declaration of COD,(iv) requirements for declaration of COD.

32. **Drawal of Start Up Power and Injection of Infirm Power.-** (1) A unit of a generating station including unit of a captive generating plant that has been granted connectivity to the Intra-State Transmission System in accordance with relevant HPERC Regulations shall be allowed to inter-change power with the grid during the commissioning period, including testing and full load testing before the COD.

(2) The period for which such inter-change allowed, shall be as follows:-

- (a) Drawal of start-up power shall not exceed one year prior to the expected date of first synchronization and nine months after the date of first synchronization;
- (b) Injection of infirm power shall not exceed one year from the date of first synchronization for generating stations other than REGS and ESS (except Hydro PSP ESS); and
- (c) Injection of infirm power shall not exceed 45 (forty-five) days from the date of first time energisation and integration (FTC) approval for REGS and ESS (except Hydro PSP ESS).

(3) Notwithstanding the provisions of sub-regulation (2) of this Regulation, the Commission may allow extension of the period for inter-change of power beyond the stipulated period on an application made by the generating station at least two months in advance of the completion of the stipulated period:

Provided that for REGS and ESS (except Hydro PSP ESS), extension of period for injection of infirm power beyond the stipulated period may be allowed-

- (a) for a period up to three months by SLDC on an application(s) made by such generating station or ESS(except Hydro PSP ESS) to SLDC along with detailed reasons, at least 10 days in advance of the completion of the stipulated period,

- (b) for a period beyond three months, by the Commission on an application(s) made by such generating station or ESS(except Hydro PSP ESS) along with detailed reasons, at least 15 days in advance of the completion of the stipulated period.
- (4) Drawal of start-up power shall be subject to payment of applicable transmission/wheeling charges.
- (5) The charges for deviation for drawal of start-up power or for injection of infirm power shall be as per the applicable Himachal Pradesh Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2024.
- (6) Start-up power shall not be used by the generating station for construction activities.
- (7) The onus of proving that the interchange of infirm power from the unit(s) of the generating station is for the purpose of pre-commissioning activities, testing and commissioning, shall rest with the generating station, and the SLDC shall seek such information on each occasion of the interchange of power before COD. For this, the generating station shall furnish to the SLDC relevant details, such as those relating to the specific commissioning activity, testing, and full load testing, its duration and the intended period of interchange. The generating station shall submit a tentative plan for the quantum and time of injection of infirm power on day ahead basis to the SLDC.
- (8) In the case of multiple generating units of the same generating station or multiple generating stations owned by different entities connected at a common IaSTS interface point, SLDC shall ensure segregation of firm power from generating units that have achieved COD from power injected or drawn by generating units which have not achieved COD through appropriate accounting of energy.
- (9) SLDC shall stop the drawal of the start-up Power in the following events:-
- (a) In case, it is established that the start-up power has been used by the generating station for construction activity; and
 - (b) In the case of default in payment of monthly transmission/wheeling

charges, applicable SLDC Fees and Charges and deviation charges under the applicable Himachal Pradesh Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2024.

33. Data to be Furnished Prior to Notice of Synchronisation and Trial-Run.-

Save as provided in the Power Purchase Agreements (PPAs), the following details, as applicable, shall be furnished by the IaSTS to the SLDC, Chief Electrical Inspectorate, beneficiaries of the generating station and concerned authorized person, as the case may be, prior to notice of synchronisation and trial-run:-

**TABLE 1:
Details to be Furnished By Generating Entity Prior To Synchronisation and Trial-Run**

Description	Units
Installed Capacity of generating station	MW
Installed Capacity of generating station	MVA
MCR	MW
Number x unit size	No x MW
Time required for cold start	Minute
Time required for warm start	minute
Time required for hot start	Minute
Time required for combined cycle operation under cold conditions	Minute
Time required for combined cycle operation under warm conditions	Minute
Ramping up capability	% per minute
Ramping down capability	% per minute
Minimum turn down level	% of MCR
Minimum turn down level	MW(ex-bus)
Inverter Loading Ratio(DC/AC capacity)	
Name of QCA (where applicable)	
Full reservoir level(FRL)	Meter
Design Head	Meter
Minimum draw down level(MDDL)	Meter
Water released at Design Head	M ³ / MW
Unit-wise forbidden zones	MW

34. Notice of Synchronisation and Trial-Run.- (1) Save as provided in the Power Purchase Agreements (PPAs), the generating company proposing its generating station or a unit thereof for synchronisation and trial-run or repeat of trial-run shall give a notice of not less than seven (7) days to the SLDC, Chief Electrical Inspectorate, beneficiaries of the generating station and concerned authorized person, as the case may be, including intermediary procurers, wherever identified:

Provided that in case the repeat trial-run is to take place within forty eight (48) hours of the failed trial-run, fresh notice shall not be required.

- (2) The transmission licensee proposing its transmission system or an element thereof for synchronization/energization and trial-run shall give a notice of not less than seven (7) days to the Electrical Inspectorate, SLDC, STU and/or distribution licensees of the State and the owner of the inter-connecting system.
- (3) The SLDC shall allow synchronization/energization followed by commencement of the trial run from the requested date or in the case of any system constraints, not later than seven (7) days from the proposed date of the trial-run. The trial-run shall commence from the time and date as decided and informed by the SLDC.
- (4) A generating station shall be required to undergo a trial-run in accordance with Regulation 35 of these Regulations after completion of Renovation and Modernization for extension of the useful life of the project as per the relevant applicable Regulations.

35. Trial-Run of Generating Unit.- (1) Trial-run of the Thermal Generating Unit shall be carried out in accordance with the CERC (Indian Electricity Grid Code), Regulations, 2023 if required at any point of time.

(2) Save as provide in the Power Purchase Agreement (PPA), the trial-run of Hydro Generating Unit shall be carried out in accordance with the following provisions:-

- (a) A hydrogenating unit shall be in continuous operation at MCR for twelve (12) hours:

Provided that-

- (i) short interruption or load reduction shall be permissible with a corresponding increase in duration of the test;
- (ii) interruption or partial loading may be allowed with the condition that the average load during the duration of trial run shall not be less than MCR excluding period of interruption but including the corresponding extended period;
- (iii) cumulative interruption of more than four (4) hours shall call for a repeat of trial-run; and

(iv) if it is not possible to demonstrate the MCR due to insufficient reservoir or pond level or insufficient in flow, COD may be declared, subject to the condition that the same shall be demonstrated immediately when sufficient water is available after COD:

Provided further that if such a generating station is not able to demonstrate the MCR when sufficient water is available, the generating company shall de-rate the capacity in terms of clause (b) of this sub-regulation, and such de-rating shall be effective from COD.

(b) Where, on the basis of the trial run, a hydro generating unit fails to demonstrate the unit capacity corresponding to MCR, the generating company shall have the option to either de-rate the capacity or go for a repeat trial run. If the generating company decides to de-rate the unit capacity, the de-rated capacity in such cases shall not be more than 90% of the demonstrated capacity to cater for primary response.

(3) Trial-Run of Wind/Solar /ESS/Hybrid Generating Station.-

(a) Save as provide in the PPA, trial run of the solar inverter unit(s) shall be performed for a minimum capacity aggregating to 100 kW;

(b) Successful trial run of a solar inverter unit(s) covered under clause (a) of this sub-regulation shall mean the flow of power and communication signal for not less than four hours on a cumulative basis between sunrise and sunset in a single day with the requisite metering system, power plant controller, telemetry and protection system in service. The generating company shall record the output of the unit(s) during the trial-run and shall corroborate its performance with the temperature and solar irradiation recorded at site during the day and plant design parameters:

Provided that:

- (i) The output below the corroborated performance level with the solar irradiation of the day shall call for a repeat of the trial-run;
- (ii) if it is not possible to demonstrate the rated capacity of the plant due to insufficient solar irradiation, COD may be declared

subject to the condition that the same shall be demonstrated immediately when sufficient solar irradiation is available after COD, within one year from the date of COD:

Provided further that if such a generating station is not able to demonstrate the rated capacity when sufficient solar irradiation is available after COD, the generating company shall de-rate the capacity in terms of clause (h) of this sub-regulation;

- (iii) In the case of solar generation contracts of the rated capacity with end Users are in AC and generation at back end of inverters is DC. Generally, output of the invertors below the rated capacity of the plant due to different losses and generator may not be able to demonstrate the rated capacity leading to re-running of the trails and de-rating of the plants.
- (c) Trial-run of a wind turbine(s) shall be performed for a minimum capacity aggregating to 100 kW.
- (d) Successful trial run of a wind turbine(s) covered under sub-clause (c) of this clause shall mean the flow of power and communication signal for a period of not less than four (4) hours on a cumulative basis in a single day during periods of wind availability with the requisite metering system, power plant controller, telemetry and protection system in service. The generating company shall record the output of the unit(s) during the trial run and corroborate its performance with the wind speed recorded at the site(s) during the day and plant design parameters:

Provided that-

- (i) the output below the corroborated performance level with the wind speed of the day shall call for a repeat of the trial-run;
- (ii) if it is not possible to demonstrate the rated capacity of the plant due to insufficient wind velocity, COD may be declared subject to the condition that the same shall be demonstrated immediately when sufficient wind velocity is available after COD, within one year from the date of COD:

Provided further that if such a generating station is not able to demonstrate the rated capacity when sufficient wind velocity is available after COD, the generating company shall de-rate the capacity in terms of clause (h) of this sub-regulation.

- (e) Successful trial-run of a standalone Energy Storage System(ESS) shall mean one cycle of charging and discharging of energy as per the design capabilities with the requisite metering, telemetry and protection system being in service.
- (f) Successful trial run of a pumped storage plant shall mean one (1) cycle of turbo-generator and pumping motor mode as per the design capabilities upto the rated water drawing levels with the requisite metering, telemetry and protection system being in service:

Provided that if it is not possible to demonstrate the design capabilities up to the rated water drawing levels due to insufficient reservoir levels, the COD may be declared after demonstrating the capabilities at available water drawing levels, subject to the condition that design capabilities up to the rated water drawing levels shall be demonstrated immediately when sufficient reservoir level is available after COD:

Provided further that if such a generating station is not able to demonstrate the design capabilities when sufficient water is available, the generating company shall have the option to either go for a repeat trial run or de-rate the capacity. If the generating company decides to de-rate the unit capacity in terms of clause (b) sub-regulation (2) of Regulation 35 of these Regulations and such de-rating shall be effective from the COD.

- (g) Successful trial run of a hybrid system shall mean successful trial run of each individual source of the hybrid system in accordance with the applicable provisions of these Regulations.
- (h) Where, on the basis of the trial run, solar/wind/storage/hybrid generating station fails to demonstrate its rated capacity, the generating company shall have the option to either go for a repeat trial run or de-rate the capacity.
- (i) Notwithstanding the provisions contained in this Regulation, where Power purchase Agreement provides for a specific capacity that can be declared COD, trial-run shall be allowed for such capacity in terms of such Power purchase agreement.

36. **Trial Run of Intra-State Transmission System.-** Trial run of a transmission system or an element thereof shall mean successful energization of the transmission system or the element thereof at its nominal system voltage through interconnection with the grid for a continuous twenty four (24) hours flow of power and communication signal from the sending end to the receiving end and with the requisite metering system, telemetry and protection system:

Provided that under exceptional circumstances and with the prior approval of CEA or the Chief Electrical Inspectorate, a transmission element can be energised at lower nominal system voltage level.

37. **Documents and Tests Prior to Declaration of Commercial Operation.-**

- (1) Notwithstanding the requirements in other standards, codes, contracts and power purchase agreement for ensuring grid security, the tests as specified in the following clauses shall be scheduled and carried out in coordination with SLDC, STU/Distribution Licensee/transmission licensee, Chief Electrical Inspectorate and authorized person for the purpose, if any, by the generating company, as the case may be, and relevant reports and other documents as specified shall be submitted to the SLDC before a certificate of successful trial run is issued to such a generating company or the transmission licensee, as the case may be.
- (2) The hydro generating stations having a capacity of more than 25 MW shall submit documents confirming the enablement of automatic operation of the plant from the load despatch centre by integrating the controls and telemetering features of their system into the automatic generation control in accordance with the CEA Technical Standards for Construction and the CEA Technical Standards for Connectivity.
- (3) Documents and Tests Required for Thermal (coal/lignite) Generating Stations shall be in accordance with the CERC (Indian Electricity Grid Code) Regulations, 2023.
- (4) Documents and Tests Required for Hydro Generating Stations including

Pumped Storage Hydro Generating Station.-

- a) The generating company shall submit OEM documents for the turbine, generator capability curve indicating the operating zone(s) and forbidden zone(s). In order to demonstrate the operating flexibility of the generating unit, it shall be operated below and above the forbidden zone(s);
- b) The following tests shall be performed considering the water availability and head:-
 - (i) Primary response through injecting a frequency test signal with a step change of ± 0.1 Hz for various loadings within the operating zone;
 - (ii) Reactive power capability as per the generator capability curve considering over-excitation and under-excitation limiter settings;
 - (iii) Black start capability, wherever feasible; and
 - (iv) Operation in synchronous condenser mode wherever such system installed.

(5) Documents and Test Required for Gas Turbine based Generating Stations.-

Documents and Tests Required for Gas Turbine based Generating Stations shall be in accordance with the CERC (Indian Electricity Grid Code) Regulations, 2023.

(6) Documents and Tests Required for the Generating Stations based on wind and solar resources:-

- (a) The generating company shall submit a certificate confirming compliance with CEA Technical Standards for Connectivity in accordance with Regulation 41 of these Regulations;
- (b) Type test report for Fault Ride through Test (Low Voltage Ride through (LVRT) and High Voltage Ride through (HVRT) for units commissioned after the specified date as per CEA Technical Standards for Connectivity mandating LVRT and HVRT capability shall be submitted;
- (c) The following tests shall be performed at the point of interconnection:-

- (i) Frequency response of machines in case of wind sources as per the CEA Technical Standards for Connectivity; and
- (ii) Reactive power capability as per OEM rating at the available irradiance or the wind energy, as the case may be:

Provided that the generating company may submit offline simulation studies for the specified tests, in case testing is not feasible before COD, subject to the condition that tests shall be performed within a period of one year from the date of achieving COD.

(7) Documents and Tests Required for Energy Storage Systems:-

- (a) The ESS shall submit a certificate confirming compliance with the CEA Technical Standards for Connectivity in accordance with Regulation 41 of these Regulations;
- (b) The following tests shall be performed at the point of interconnection:
 - (i) Power output capability in MW and energy output capacity in MWh;
 - (ii) Frequency response of ESS; and
 - (iii) Ramping capability as per design.

(8) Documents and Tests Required for Transmission System:-

Documents and Tests Required for Transmission System shall be in accordance with the CERC (Indian Electricity Grid Code) Regulations, 2023 or as per these Regulations, as the case may be.

(9) Documents and Tests Required for SVC or STATCOM:-

Documents and Tests Required for SVC or STATCOM shall be in accordance with the CERC (Indian Electricity Grid Code) Regulations, 2023.

38. Certificate Of Successful Trial-Run.- (1) Save as provided in the power purchase agreement(s), in case any objection is raised by a beneficiary in writing to the SLDC with a copy to all concerned regarding the trial-run within two (2) days of completion of such trial run, the SLDC shall, within five (5) days of receipt of such objection, in coordination with the concerned entities and the beneficiaries, decide if the trial-run was successful or if

there is a need for a repeat trial-run.

- (2) After completion of a successful trial-run and receipt of documents and test reports as per Regulation 37 of these Regulations, the SLDC shall issue a certificate to that effect to the concerned generating station, ESS or transmission licensee, as the case may be, with a copy to their respective beneficiary(ies), within three days.

39. Declaration by Generating Company.- (1) Thermal Generating Station shall certify or made declaration as per provisions of CERC (Indian Electricity Grid Code) Regulations, 2023.

- (2) Hydro Generating Station.- (a) The generating company shall certify that,-
- (i) the generating station or unit thereof meets the requirement and relevant provisions of the CEA Technical Standards for Construction, CEA Technical Standards for Connectivity, CEA Technical Standards for Communication, Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2010 and these Regulations, as applicable;
 - (ii) the main plant equipment and auxiliary systems including the drainage de-watering system, primary and secondary cooling system, LP and HP air compressor and fire fighting system have been commissioned and are capable of full load operation of units on a sustained basis; and
 - (iii) permanent electric supply systems including emergency supplies and all necessary Instrumentations Control and Protection Systems Governor and Automatic Voltage Regulators (AVR) for full load operation of the unit are put into service.
- (b) The certificates required under clause (a) of this sub-regulation shall be signed by the authorized signatory not below the rank of CMD or CEO or MD of the generating company and shall be submitted to the SLDC, STU, Chief Electrical Inspectorate, State Government or authority prescribed for such purpose before the declaration of COD.

40. Declaration by Transmission Licensee.- The transmission licensee shall submit a certificate signed by the authorized signatory not below the rank of CMD or CEO or MD of the company to the SLDC before declaration of

COD that the transmission line, sub-station and communication system conform to the CEA Technical Standards for Construction, CEA Technical Standards for Connectivity, CEA Technical Standards for Communication, Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2010 and these Regulations and are capable of operation to their full capacity.

41. Declaration by Wind, Solar, Storage, and Hybrid Generating Station.-

The generating station based on wind and solar resources, the ESS and the hybrid generating station shall submit a certificate signed by the authorized signatory not below the rank of CMD or CEO or MD to the SLDC, STU, Chief Electrical Inspectorate, State Government or authority prescribed for such purpose before declaration of COD, that the said generating station or the ESS as the case may be, including main plant equipment such as wind turbines or solar inverters or auxiliary systems, as the case may be, has complied with all relevant provisions of CEA Technical Standards for Connectivity, CEA Technical Standards for Communication, Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2010 and these Regulations.

42. Declaration of Commercial Operation/Commercial Operation Date (COD).-

(1) A generating station or unit thereof or a transmission system or an element thereof or ESS may declare commercial operation as follows and inform SLDC, Chief Electrical Inspectorate State Government or authority prescribed for such purpose and its beneficiaries:

(a) Thermal Generating Station or a unit thereof as per CERC (Indian Electricity Grid Code) Regulations, 2023.

(b) Hydro Generating Station-

(i) The commercial operation date in the case of a unit of the hydro generating station including a pumped storage hydro generating station shall be the date declared by the generating station after a success full trial-run at MCR or de-rated capacity as per clause (b) of sub-regulation (2) of Regulation 35, as the case may be, and

submission of a declarations per sub-regulation (2) of Regulation 39 of these Regulations:

Provided that necessary clearances shall be obtained before declaration of COD from the respective agencies appointed for giving such clearances.

(ii) In the case of the generating station, the COD of the last unit of the generating station shall be considered as the COD of the generating station.

(c) Transmission System.-

(i) The commercial operation date in the case of an Intra-State Transmission System or an element thereof shall be the date declared by the transmission licensee on which the Transmission System or an element thereof is in regular service at 00.00 hours after successful trial operation for transmitting electricity and communication signals from the sending end to the receiving end as per Regulation 36 and submission of a declaration as per Regulation 40 of these Regulation:

Provided that the commercial operation date of a transmission element that is a part of the Associated Transmission System (ATS) shall be declared only after a successful trial-run of the last element of the said ATS:

Provided further that where only some of the transmission elements of the ATS have achieved a successful trial run and the Connectivity grantee under HPERC (Grant of Connectivity, Long-term and Medium-term intra-State Open Access and Related Matters) Regulations, 2010 seeks commercial operation of such elements for utilization by such grantee and is agreed upon by the State Transmission Utility, the commercial operation date of such transmission elements of the ATS may be declared by the transmission licensee as per this Regulation:

Provided also that where only some of the transmission element(s) of the ATS have achieved a successful trial run and if the operation of such transmission elements is certified by the NRPC/SLDC for improving the performance, safety and security of the grid, the commercial operation date of such transmission element(s) of the ATS may be declared by the transmission licensee as per this Regulation:

Provided also that in case a transmission system or an element there of executed under regulated tariff mechanism is prevented

from regular service on or after the scheduled COD for reasons not attributable to the transmission licensee or its supplier or its contractors but is on account of the delay in commissioning of the concerned generating station or in commissioning of the upstream or downstream transmission system of other transmission licensee, the transmission licensee shall approach the Commission through an appropriate petition alongwith a certificate from the CTU/STU to the effect that the transmission system is complete as per the applicable CEA Standards, for approval of the commercial operation date of such transmission system or an element thereof:

Provided also that in the case of intra-State Transmission System executed through Tariff Based Competitive Bidding, the transmission licensee may declare deemed COD of the IaSTS in accordance with the provisions of the Transmission Service Agreement after obtaining:-

- (a) a certificate from the STU to the effect that the transmission system is complete as per the specifications of the bidding guidelines and applicable CEA Standards; and
- (b) no load charging certificate from the NRLDC/SLDC, where no load charging is possible.

- (ii) The COD of a transmission element of the transmission system under Tariff Based Competitive Bidding shall be declared only after the declaration of the COD of all the pre-required transmission elements as per the Transmission Services Agreement:

Provided that in case any transmission element is required in the interest of the power system as certified by the NRPC/SLDC, the COD of the said transmission element may be declared prior to the declaration of the COD of its pre-required transmission elements.

- (d) Communication System.- Date of commercial operation in relation to a communication system or an element thereof shall mean the date declared by the transmission licensee from 00.00 hours of which a communication system or element thereof shall be put into service after completion of the site acceptance test including transfer of voice and data to the SLDC as certified by such SLDC.

(e) Generating Stations based on Wind and Solar resources; ESS and Hybrid Generating Station.-

(i) The commercial operation date in the case of units of a renewable generating station shall mean the date declared by the generating station after undergoing a successful trial run/submission of declaration as per this Regulation, and subject to fulfillment of other conditions, if any, as per PPA:

Provided that necessary clearances shall be obtained before declaration of COD from the respective agencies authorised for such clearances.

(ii) In the case of a generating station as a whole, the commercial operation date of the last unit of the generating station shall be considered as the COD of the generating station.

(2) On declaration of commercial operation date, scheduling of the generating station or unit thereof shall start from 00.00 hours of D+2 (where D is the date when a generating station intimates the commercial operation of the generating station or unit thereof) or the commercial operation date declared by the generating station or unit thereof, whichever is earlier.

CHAPTER-7
OPERATING CODE

43. Operating Philosophy.- (1) All entities, such as SLDC, STU, Discom, power exchanges, QCAs, SNAs, licensees, generating stations, and other state grid connected entities shall at all times function in coordination to ensure integrity, stability and resilience of the grid and achieve economy and efficiency in the operation of power system.

(2) SLDC shall supervise overall Operation of the State grid.

(3) SLDC, in coordination with OCC, shall develop, document, and maintain detailed operating procedures for managing the IaSTS. These operating procedures shall include the following:-

(a) Black start procedures;

(b) System restoration procedures for partial grid failure;

(c) Load curtailment procedures;

(d) Renewable energy curtailment procedures;

(e) Islanding procedures; and

(f) Any other procedure considered appropriate by the SLDC:

Provided that such procedures shall be developed in consultation with Users, licensees, renewable energy developers and SLDC within six months from the date of notification of these Regulations:

Provided further that such procedures, after consultation with OCC, shall be provided to all the Users. A copy of the same shall be uploaded on SLDC's website and submitted to the Commission for information.

(4) Every generating station, and transmission substation of 66 kV and above shall have a control room manned by qualified operating personnel round the clock. Alternatively, the same may be operated round the clock from a remotely located control room, subject to the condition that such remote operation does not result in a delay in the execution of any switching instructions and information flow:

Provided that a transmission licensee owning a transmission line but not owning the connected Sub-station, shall have a co-ordination centre functioning round the clock, manned by qualified

personnel for operational co-ordination with the State load despatch centre and equipped to carry out the operations as directed by State load despatch centre.

- (5) The control rooms of the SLDC including Area/Sub-load Despatch Centres, Generating Stations, Sub-stations of 66 kV and above and any other control centre of Transmission Licensees and Users shall be managed Round the Clock by qualified and adequately trained personnel:

Provided that the control centre(s) of distribution licensees (with recorded peak demand more than 100 MW) including Indian Railways shall carry out functions such as demand forecasting, load management, power management and real time revisions in schedule, demand curtailment etc. The control rooms shall have regular interaction with SLDC and act upon the instructions received from SLDC. The distribution licensees shall also develop online tracking and monitoring system for distributed generation including rooftop solar PV systems upto and above 100 kW within its licensee area for facilitating decisions of revision of drawl schedule during intra-day operation.

- (6) QCA shall have coordination centres functioning round the clock, manned by qualified personnel for operational coordination with the SLDC and generating stations. ESS and Bulk Consumers shall have coordination centres functioning round the clock and manned by qualified personnel for operational coordination with the SLDC.

44. **System Security:-** (1) All Users shall operate their respective power systems in an integrated manner at all times in coordination with SLDC. All switching operations, manually or automatic, shall be based on,-

- (a) Instructions/Guidelines issued by SLDC;
- (b) Directives of the Commission; and
- (c) Decisions/Recommendations made by the OCC.

- (2) No part of the State Transmission System shall be deliberately isolated from the rest of the IaSTS except-

- (a) Under an emergency and conditions in which such isolation will prevent a total grid collapse and/or will enable early restoration of power supply;

- (b) When serious damage to the equipment is imminent and such isolation would prevent it;
 - (c) When such isolation is specifically instructed by the SLDC;
 - (d) On the operation of under frequency/ islanding scheme as approved by NRPC/SLDC; and
 - (e) For the safety of human and/or animal life.
- (3) Any such isolation shall be reported to the SLDC within the next 15 minutes from such occurrence.
- (4) Complete synchronization of the IaSTS shall be restored as soon as the conditions permit. The restoration process shall be supervised by SLDC, in coordination with NRLDC in accordance with the operating procedures formulated by the SLDC.
- (5) The SLDC, in consultation with the STU, distribution licensee and Users, shall prepare a list of important elements in the State grid and make the said list available to all concerned.
- (6) No important element of the IaSTS shall be deliberately opened or removed from service at any time, except when specifically instructed by SLDC or with a specific and prior clearance of SLDC. The list of such important grid elements on which the above stipulations apply shall be prepared by the SLDC in consultation with the Transmission Licensees and Users and shall be available on the SLDC's website:
- Provided that, in case of opening/removal of any important element of the IaSTS under an emergency situation, the same shall be communicated to SLDC at the earliest after the event:
- Provided further that any emergency tripping not advised or permitted by the SLDC shall be put up before the OCC for ratification, in the subsequent meeting.
- (7) Any tripping, whether manual or automatic, of any of the elements of the IaSTS, referred in sub-regulation (6), shall be precisely intimated by the concerned Transmission Licensee or User to the SLDC within one time block. The reason, to the extent determined, and likely time of restoration shall also be intimated within half an hour. All reasonable attempts shall be made for the elements' restoration as soon as possible:

Provided that the information/data from disturbance recorder, sequential event logger outputs, etc., containing the sequence of tripping and restoration or any other information as asked, shall be sent to SLDC for the purpose of analysis:

SLDC and the Users shall ensure restoration of such elements within the estimated time of restoration as intimated.

- (8) The isolated, taken out or switched off elements shall be restored as soon as the system conditions permit. The restoration process shall be supervised by the State Load Despatch Centre, in coordination with NRLDC, STU and concerned Users in accordance with the system restoration procedures of SLDC.
- (9) All Users, STU and SLDC shall carry out maintenance of their respective power system elements in accordance with the provisions of the Grid Standards specified by the Authority. Any prolonged outage of the power system elements of any Users/STU which is causing or likely to cause danger to the grid or sub-optimal operation of the grid shall regularly be monitored by SLDC. SLDC shall report such outages to OCC and PCC. OCC and PCC shall suggest an action plan and provide instructions to restore such elements in a specified time period.
- (10) Except in an emergency, or when it becomes necessary to prevent imminent damage to critical equipment, no user shall suddenly reduce its generating unit output by more than ten (10) MW without prior permission of the SLDC.
- (11) Except in an emergency, or when it becomes necessary to prevent imminent damage to critical equipment, no user shall cause a sudden variation in its load by more than five (5) MW without the prior permission of the SLDC.
- (12) All generating units shall have their Automatic Voltage Regulators (AVRs), Power System Stabilizers (PSSs), voltage (reactive power) controllers (Power Plant Controller) and any other systems required in operation, as per the CEA Technical Standards for Connectivity. If a generating unit with a capacity higher than twenty ten (10) MW is required to be operated without its AVR or voltage controller in service, the generating station shall

immediately inform the SLDC of the reasons thereof and the likely duration of such operation and obtain its permission. A generating unit shall be capable of continuously supplying its normal rated active and/or reactive output at the rated system frequency and voltage, subject to the design limitations specified by the manufacturer.

- (13) The tuning of AVR, PSS, Voltage Controllers (PPC) including for low and high voltage ride through capability of wind and solar generators or any other requirement as per CEA Technical Standards for Connectivity shall be carried out by the respective generating station:
 - (a) at least once every five (5) years;
 - (b) based on operational feedback provided by the SLDC after analysis of a grid event or disturbance;
 - (c) in case of major network changes or fault level changes near the generating station as reported by SLDC; and
 - (d) in case of a major change in the excitation system of the generating station.
- (14) Power System Stabilizers (PSSs), AVRs of generating units and reactive power controllers shall be properly tuned by the generating station as per the plan and the procedure prepared by the NRPC. In case the tuning is not complied with as per the plan and procedure, the SLDC shall issue notice to the defaulting generating station to complete the tuning within a specified time, failing which the SLDC may approach the Commission under section 33 of the Act.
- (15) Provisions of protection and relay settings shall be coordinated periodically throughout the State grid, as per the plan finalized by the NRPC/SLDC in accordance with the Protection, Testing and Commissioning Code of these Regulations.
- (16) NRPC/SLDC shall prepare the islanding schemes in accordance with the CEA Grid Standards for identified generating stations, cities and locations and ensure their implementation. The islanding schemes shall

be reviewed and augmented depending on the assessment of critical loads at least once a year or earlier, if required.

- (17) Mock drill of the islanding schemes shall be carried out annually by the SLDC in coordination with the STU and other Users involved in the islanding scheme. In case mock drill with field testing is not possible to be carried out for a particular scheme, simulation testing shall be carried out by the SLDC.
- (18) All distribution licensees, STU and bulk consumers shall provide Under Frequency Relays (UFR) and df/dt relays for automatic load shedding in their respective systems to arrest frequency drop that could result in grid failure as per the plan given by the NRPC from time to time. The default UFR settings shall be as specified in Table-2 below:

Table 2: Default UFR Settings

Sr. No.	Stage of UFR Operation	Frequency (Hz)
1	Stage-1	49.40
2	Stage-2	49.20
3	Stage-3	49.00
4	Stage-4	48.80

Note 1: STU shall plan UFR settings and df/dt for load shedding schemes depending on load and generation balance in coordination with and approval of the concerned NRPC/SLDC.

Sr. No.	Stage of UFR Operation	Frequency (Hz)
Note 2: Pumped storage hydro plants operating in pumping mode or ESS operating in charging mode shall be automatically disconnected before the first stage of UFR.		

The load shedding for each stage of UFR operation, in percentage of demand (MW) shall be as finalized by the NRPC/SLDC.

- (19) The following shall be factored in while designing and implementing the UFR and df/dt relay schemes:-
- The under-frequency and df/dt load shedding relays are always functional;
 - Demand disconnection shall not be set with any time delay in addition to the operating time of the relays and circuit breakers;
 - There shall be a uniform spatial spread of feeders selected for UFR and df/dt disconnection;
 - All distribution licensee, STU & bulk consumers shall establish the system for telemetry of UFR and df/dt relays alongwith real time data such as power flow, frequency and digital status of circuit breakers

and isolator. SLDC shall integrate& monitor the combined load in MW of these feeders at all times. SLDC shall share the above data with the NRLDC in real time and submit a monthly exception report to the NRPC. NRLDC shall inform SLDC as well as the NRPC on quarterly basis, durations during the quarter when the combined load in MW of these feeders was below the level considered while designing the UFR scheme by the NRPC. SLDC shall inform the same to the concerned Users/entities for corrective measures. The concerned Users/entities shall take the corrective measures within a reasonable period and inform the SLDC, failing which suitable penalty shall be imposed by SLDC as per section 33 of the Electricity Act, 2003; and

(e) SLDC shall report the actual operation of UFR and df/dt schemes and load relief to the NRLDC and NRPC and publish the monthly report on its website.

(20) Users and Transmission Licensees shall facilitate identification, installation and commissioning of System Protection Schemes in the power system (including inter- tripping and runback) as finalized by OCC, to operate the IaSTS closer to their limits and protect against situations including voltage collapse, cascading and tripping of the important corridor:

Provided that such schemes shall always be kept in service. If any such scheme is to be taken out of service, prior permission of SLDC shall be obtained indicating the reasons and period of the anticipated outage from service:

Provided further that such schemes shall be prepared by STU after due consultations with OCC and PCC

(21) SLDC, STU and Users shall operate in a manner to ensure that the steady state grid voltage as per the CEA Grid Standards remains within the following operating range:

TABLE 3: Voltage Range

Voltage (kV rms)		
Nominal	Maximum	Minimum
400	420	380
230*	245*	207*
220	245	198
132	145	122
110	121	99
66	72	60
33	36	30

*As per CEA Manual on Transmission Planning Criteria, 2023.

(22) SLDC shall take appropriate measures to control the voltage as per its operating procedures.

(23) The concerned Users shall implement defence mechanisms as finalized by the NRPC to prevent voltage collapse and cascade tripping.

(24) All defence mechanisms shall always be in operation and any exception shall be immediately intimated by the concerned user to the SLDC along with the reasons and the likely duration of such exception. The concerned user shall also obtain permission from the SLDC.

45. Frequency Control and Reserves.- (1) The National Reference Frequency shall be 50.000 Hz and the allowable band of frequency shall be 49.900-50.050 Hz. The SLDC, in coordination with NRLDC, Users, STU and Transmission Licensees shall make all possible efforts to ensure that frequency remains within the band of 49.90 Hz to 50.05 Hz as specified in the CERC (Indian Electricity Grid Code) Regulations, 2023.

(2) All Users shall adhere to their schedule of injection or drawl, as the case may be, and take such action as required under these Regulations and as directed by NRLDC or SLDC so that the grid frequency is maintained and remains within the allowable band.

(3) **Reserves.-** Notwithstanding anything contained in these Regulations, for the purpose of Primary, Secondary and Tertiary reserves, the provisions of Central Electricity Regulatory Commission (Ancillary Services) Regulations, 2022 and the relevant provisions relating to reserves provided in the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023 shall be applicable mutatis mutandis, till such time the Commission notifies Ancillary Services Regulations and specify its own procedures in this effect.

46. Operational Planning.- (1) Time Horizon-

(a) Operational planning shall be carried out in advance by SLDC with Monthly and Yearly time horizons in co- ordination with STU and Users;

(b) Operational planning shall be carried out in advance by SLDC on Intra-day, Day Ahead, Weekly time horizons;

- (c) SLDC in consultation with NRLDC shall issue procedures and formats for data collection to carry out-
 - (i) Operational planning analysis;
 - (ii) Real-time monitoring;
 - (iii) Real-time assessments; and
 - (d) SLDC may also issue procedures and formats for data collection for the above purposes.
- (2) Demand Estimation.- (a) The SLDC shall carry out demand estimation as part of operational planning after duly factoring in the demand estimation done by STU as part of resource adequacy planning referred to in Chapter 3 of these Regulations. Demand estimation by SLDC shall be for both active power and reactive power incidents on the transmission system based on the details collected from distribution licensees, grid-connected distributed generation resources, captive power plants and other bulk consumers embedded with the system within the State;
- (b) The SLDC shall develop methodology for daily, weekly, monthly, yearly demand estimation in MW and MWh for operational analysis as well as resource adequacy purposes. The SLDC, while estimating demand may utilize state of the art tools, weather data, historical data and any other data. For this purpose, all distribution licensees shall maintain a historical database of demand;
 - (c) The demand estimation by the SLDC shall be done on day ahead basis with time block wise granularity for the daily operation and scheduling. In case SLDC observes a major change in demand in real time for the day, it shall immediately submit the revised demand estimate to NRLDC for demand estimate correction;
 - (d) The SLDC shall submit node-wise morning peak, evening peak, day schedule and night off-peak estimated demand in MW and MVA on a monthly and quarterly basis for the nodes 66 kV and above for the preparation of scenarios for computation of TTC and ATC by NRLDC and NLDC;

- (e) The SLDC shall also estimate peak and off-peak demand (active as well as reactive power) on a weekly and monthly basis for load generation balance planning as well as for operational planning analysis, which shall be a part of the operational planning data. The demand estimates mentioned above shall have granularity of a time block. The estimate shall cover the load incident on the grid as well as the net load incident taking into account embedded generation in the form of roof-top solar and other distributed generation;
- (f) The entities such as bulk consumers or distribution licensees shall estimate and furnish such a demand estimate to the SLDC;
- (g) Based on the demand estimate furnished by the bulk consumers or distribution licensees, the SLDC shall prepare the state demand estimate;
- (h) Timeline for submission of demand estimate data by the bulk consumers or distribution licensees to the SLDC shall be as follows:-

**TABLE 5:
TIMELINE FOR DEMAND ESTIMATION**

Daily demand estimation	08:00 hours of previous day;
Weekly demand estimation	First working day of previous week;
Monthly demand estimation	Fourth day of previous month;
Yearly demand estimation	29 th September of the previous year; and

- (i) The SLDC shall compute forecasting error for intra-day, day-ahead, weekly, monthly and yearly forecasts and analyses the same in order to reduce forecasting error in the future. The computed forecasting errors shall be made available by the SLDC on its websites.
- (3) Generation Estimation.- (a) The modalities of generation estimation by entities shall be as per Procedure referred in this Regulation; and
- (b) The SLDC shall forecast generation from wind, solar, ESS and Renewable Energy hybrid generating stations that are intra-state entities, for different time horizons as referred to in clause (a) of sub-regulation (1) of this Regulation for the purpose of operational planning:

Provided that Discom shall forecast generation from wind, solar, ESS and Renewable Energy hybrid generating stations having PPA with distribution licensee for different time horizons i.e.

intra-day, day ahead, week ahead, monthly and yearly and submit it to the SLDC.

- (4) Adequacy of Resources.- (a) The SLDC shall estimate and ensure the adequacy of resources, identify generation reserves, demand response capacity and generation flexibility requirements with due regard to the resource adequacy framework as specified under Chapter 3 of these Regulations;
- (b) Generating Stations shall furnish the time block-wise information of generation forecast and injection schedule for the following day to the SLDC;
- (c) Bulk Consumers and buyer, other than distribution licensee, shall furnish the time block wise information of demand forecast and planned procurement of power through other bilateral or collective transactions, if any;
- (d) The Discom shall furnish time block-wise information for the following day in respect of all entities having PPA with distribution licensee to the SLDC with due regard to the following:-
- (i) Demand forecast in its control area;
 - (ii) Renewable energy generation forecast in its control area;
 - (iii) Injection schedule of generating station;
 - (iv) Requisition from regional entity generating stations;
 - (v) Secondary and planned procurement through Tertiary reserve requirement; and
 - (vi) Planned procurement of power through other bilateral or collective transactions, if any.
- (e) Based on the information received as per clause (b), (c) and (d) of this sub-regulation, the SLDC shall furnish time block-wise information for the following day in respect of all intra-state entities to the NRLDC who shall validate the adequacy of resources with due regard to the following:
- (i) Demand forecast aggregated for the control area;
 - (ii) Renewable energy generation forecast for the control area;
 - (iii) Injection schedule for intra-State entity generating station;
 - (iv) Requisition from regional entity generating stations;

- (v) Secondary and planned procurement through Tertiary reserve requirement; and
- (vi) Planned procurement of power through other bilateral or collective transactions, if any.

47. Outage Planning.- (1) All Users including buyers and sellers and Transmission Licensees shall provide the SLDC with their proposed planned outage programmes in writing for the next financial year by 30th September of each year in such a format stipulated by the NRPC. These shall contain identification of each Generating Unit/Transmission Line/ Interconnecting Transformer for which outage is being planned, reasons for the outage, the preferred date for each outage and its duration and where there is flexibility, the earliest start date and latest end date:

Provided that ALDC under distribution licensee shall provide the above mentioned information alongwith Load Generation Balance Report (LGBR) for peak and off peak scenario as well as annual plan for managing deficits/surpluses indicated in the Load Generation Balance Report (LGBR) to the SLDC for the next financial year by 30th September of each year in such format as stipulated by the NRPC.

(2) The SLDC shall prepare the outage programme for the next financial year by 31st October of each year for the IaSTS:

Provided that outage plan shall be developed after considering system security and reliability and shall be developed such that the extent of unmet system demand on account of such a plan is kept to a minimum:

Provided further that in case of hydro generating stations such a plan shall also endeavor to maximize the utilization of water for the purpose of power generation subject to applicable constraints related to alternate use of such water:

Provided further that outage of wind generator may be planned during lean wind season, outage of solar, if required during the rainy season and outage of run-of-the- river hydropower plant in the lean water season.

(3) All Users and STU shall follow annual outage plans published by the SLDC. If any deviation is required, the same shall be obtained with the prior permission of the SLDC. The outage planning of run-of-the-river hydro plant, wind and solar power plant and its associated evacuation network shall be

planned to extract maximum power from these renewable sources of energy.

- (4) Transmission Outage Planning shall be harmonized with Generation Outage Planning and Distribution System Outage Planning shall be harmonized with Generation and Transmission Outage Planning.
- (5) The final outage plan for next year shall be intimated to all Users and Transmission Licensee latest by 31st December of each year:

Provided that the SLDC shall finalize the outage plan in consultation with the Users and Transmission Licensee:

Provided further that the above annual outage plan shall be reviewed by the SLDC on monthly basis in coordination with all concerned parties, and adjustments made wherever found necessary.

- (6) Each User or Transmission Licensee shall, at least two weeks prior to availing an outage as per the planned schedule, inform the SLDC about the outage and obtain prior approval from it to avail outage.
- (7) The SLDC shall have the authority to defer any planned outage in case of occurrence of any of the following events:-

- (a) Major grid disturbances (e.g., partial/total blackout);
- (b) System isolation; and
- (c) Any other event in the system that may have an adverse impact on the system security by the proposed outage:

Provided that the SLDC shall inform about the revised outage plan, with appropriate reasons for revisions in the outage plan, as soon as possible.

- (8) In case of emergency in the system, which may include events like loss of generation, breakdown of the transmission line, grid disturbances and system isolation, the SLDC may appropriately review the situation before clearance of the planned outage:

Provided that scheduled outage of power stations of 10 MW capacity and above as notified by the SLDC from time to time, will be subject to annual planning.

- (9) The SLDC shall prepare and submit to NRPC its outage plan in writing for the next financial year by 31st October for each year. These shall contain identification of each Generating Unit/Transmission Line/ Interconnecting

Transformer for which outage is being planned, reasons for the outage, the preferred date for each outage and its duration and where there is flexibility, the earliest start date and latest finishing date. The SLDC shall submit Load Generation Balance Report for peak as well as off-peak scenario by 31st October for the next financial year to NRPC. The annual plans for managing deficits/surpluses shall be clearly indicated in the Load Generation Balance Report (LGBR).

- (10) Scheduled outage of power stations and EHV transmission lines affecting regional power system shall be affected only with the approval of NRLDC in coordination with the SLDC.
- (11) The SLDC shall upload quarterly, half-yearly, yearly outage reports on its website.
- (12) In respect of scheduled outage referred in this Regulation, a calendar shall be formulated in respect of Annual Outage Planning for the ensuing financial year. Such outage plan shall be deliberated and finalized in the meeting of the OCC.
- (13) Protection relay related outages, auto-reclosure outages and System Protection Scheme (SPS) testing outages shall be planned on a monthly basis with the prior permission of the NRPC. The SLDC shall also consult the PCC for such planning.

48. Operational Planning Study.- (1) Based on the operational planning analysis data, operational planning study shall be carried out by various agencies for time horizons as under:

**TABLE 7:
Time Horizon for Operational Planning Study**

Time horizon of operational planning study	Agency	Means for carrying out study
Real time and Intra- day	SLDC	For various operating conditions using online/ offline SCADA/EMS system
Day-ahead	SLDC	For various operating conditions using offline tools
Weekly	SLDC	For various operating conditions using offline tools
Monthly/Yearly	SLDC/OCC and NRPC	For various operating conditions using offline tools

- (2) The SLDC shall utilize network estimation tool integrated in their EMS and SCADA systems for the real time operational planning study. All Users

shall make available at all times real time error free operational data for the successful execution of network analysis using EMS/SCADA. Failure to make available such data shall be immediately reported to the SLDC, alongwith a firm timeline for restoration. The performance of online network estimation tools at SLDC shall be reviewed in the quarterly operational meeting of OCC and PCC. Any telemetry related issues impacting the online network estimation tool shall be monitored by OCC and PCC for their early resolution.

- (3) All the Users, STU and distribution licensees shall provide their system elements details to the SLDC at the earliest:

Provided that STU and distribution licensees shall provide all the technical data to the SLDC at least seven (7) months before the commissioning of new elements.

- (4) Based on the information received from Users, STU and distribution licensees, SLDCs shall perform day-ahead, weekly, monthly and yearly operational studies for the HP State control area for-

- (a) Assessment and declaration of total transfer capability (TTC) and available transfer capability (ATC) for the import or export of electricity by the State. TTC and ATC shall be revised from time to time based on the commissioning of new elements and other grid conditions and shall be published on the SLDC website with all the assumptions and limiting constraints;
- (b) planned outage assessment;
- (c) special scenario assessment;
- (d) system protection scheme assessment;
- (e) natural disaster assessment; and
- (f) Any other study relevant in operational scenario.

- (5) Operational planning study shall be done to assess whether the planned operations shall result in deviations from any of the system operational limits defined under these Regulations and applicable CEA Standards. The deviations, if any, shall be reviewed in the monthly operational meeting of NRPC and significant deviations shall be monitored by NRPC for early resolution.

- (6) The SLDC shall maintain records of the completed operational planning study, including date specific power flow study results, the operational plan and minutes of meetings on operational study.
 - (7) The SLDC shall have operating plans to address potential deviations from system operational limit identified as a result of the operational planning study. These operating plans shall be communicated to Users in advance so that they can take corrective measures. In case any User is unable to adhere to such an operating plan, it shall inform the SLDC in advance with detailed reasons and explanations for the non-adherence. These detailed reasons and explanations shall be discussed quarterly by the OCC and a quarterly report shall be submitted to the Grid Code Review Committee and to the Commission.
 - (8) The SLDC shall undertake a study on the impact of new elements to be commissioned in the intra-state system in the next six (6) months on the TTC and ATC for the State and share the results of the studies with NRLDC.
 - (9) The SLDC shall compare the results of the studies of the impact of new elements on the system and transfer capability addition with those of the interconnection and planning studies by STU, and any significant variations observed shall be communicated to STU and NRPC so that immediate and long-term mitigation measures shall be taken.
 - (10) Defence mechanisms like system protection scheme, load-rejection scheme, generation run-back, islanding scheme or any other scheme for system security shall be proposed by the concerned user or SLDC or STU and shall be deployed as finalized by the PCC and NRPC.
49. **System Restoration.**- (1) Detailed plans and procedures for restoration after partial/total blackout of each User/Transmission Licensee shall be finalized by the concerned Users and Transmission Licensees in coordination with the SLDC. The procedure should be reviewed, confirmed, and/or revised once every subsequent year. Mock trial runs of the

procedure or different subsystem shall be carried out by the User/ Transmission Licensee at least once every six months under intimation to the SLDC. In case mock drill with field testing is not possible to be carried out for a particular scheme, simulation testing shall be carried out by the SLDC:

Provided that Users shall agree to such plans and procedure and promptly inform the SLDC in advance wherever they have difficulty in complying the same.

(2) Detailed procedure for restoration of IaSTS shall include the following contingencies and shall be in conformity with system restoration procedure of NRLDC:-

- (a) Total system blackout;
- (b) Partial system blackout; and
- (c) Synchronization of islands of splits of system:

Provided that such procedure shall consider the generation capabilities and operational constraints of ISTS and IaSTS.

(3) Detailed procedures for restoration post partial and total blackout of each user system within a region shall be prepared by the concerned user in coordination with the SLDC. The concerned user shall review the procedure every year and update the same. The user shall carry out a mock trial run of the procedure for different sub-systems including black-start of generating units alongwith grid forming capability of inverter based generating station and black-start support at least once a year under intimation to the SLDC. Diesel generator sets and other standalone auxiliary supply source to be used for black start shall be tested on a weekly basis and the User shall send the test reports to the SLDC on a quarterly basis.

(4) Simulation studies shall be carried out by each User in coordination with the SLDC for preparing, reviewing and updating the restoration procedures considering the following:-

- (a) Black start capability of the generator;
- (b) Ability of black start generator to build cranking path and sustain island;

- (c) Impact of block load switching in or out;
- (d) Line/transformer charging;
- (e) Reduced fault levels;and
- (f) Protection settings under restoration condition.

- (5) List of generating stations with black start facility, inter-State ties, synchronizing points and essential loads to be restored on priority, shall be prepared and will be available with the SLDC. The list shall be reviewed and confirmed by OCC and PCC.
- (6) During the restoration process following a blackout, the SLDC is authorized to operate with reduced security standards for voltage and frequency and may direct the implementation of such operational measures, namely, suspension of secondary or tertiary frequency control, power market activities, defense schemes, reduced governor droop setting as necessary, in order to achieve the fastest possible recovery of the grid.
- (7) All communication channels required for restoration process shall be used for the operational communication only till the grid normalcy is restored.
- (8) Any entity extending black start support by way of injection of power as identified in sub-regulation (5) of this Regulation shall be paid for actual injection @110 % of the normal rate of charges for deviation in accordance with DSM Regulations for the last block in which the grid was available. The NLDC procedure in this regard shall be followed until any regulations/procedure in this regard is prepared and approved by the Commission.
- (9) All Users shall pay special attention to carry out the procedures so that secondary collapse due to undue haste or inappropriate loading is avoided. Despite the urgency of the situation, careful, prompt, and complete logging of all operations and operational messages shall be ensured by all the Users to facilitate subsequent investigation into the incident and the efficiency of the restoration process. Such investigation shall be conducted promptly after the incident.
- (10) The SLDC shall carry out the post-disturbance analysis of all major grid

disturbances resulting into total or partial system blackout or system split and desynchronise of any part of the State Grid. All Users shall coordinate and furnish the data pertaining to the system disturbance to enable the SLDC to analyse the system disturbance and furnish a report to NRLDC in accordance with the provisions of the CERC (Indian Electricity Grid Code) Regulations, 2023.

- (11) PCC shall also review the data collected and analyse the failure of protection system either of IaSTS or any User and recommend modification and/or improvement in the protection system or relay setting schemes and, if necessary, of the islanding and restoration scheme of IaSTS, to be carried out by the Grid Users.

50. **Real Time Operation.**- (1) System State- Power system shall be categorized under normal, alert, emergency, extreme emergency and restoration state depending on the type of contingencies and value of operational parameters of the power system by the SLDC as follows:-

- (A) Normal state-Power system shall be categorized under normal state when the power system is operating with operational parameters within their respective operational limits and equipment are within their respective loading limits. Under normal state, the power system is secure and capable of maintaining stability under contingencies defined in the CEA Transmission Planning Criteria.
- (B) Alert state- Power system shall be categorized under alert State when the power system is operating with operational parameters within their respective operational limits, but a single contingency ('N-1') leads to a violation of security criteria. The power system remains intact under such alert state. However, whenever the power system is under alert State, the system operator shall take corrective measures to bring it back to a normal state.
- (C) Emergency State- Power system shall be categorized under emergency state when the power system is operating with operational parameters

outside their respective operational limits or equipment are above their respective loading limits. Emergency state can arise out of multiple contingencies or any major grid disturbance in the system. The power system remains intact under such emergency State. However, whenever the power system is under emergency State, the system operator, to bring back the power system to alert/normal state shall take corrective measures such as:-

- (i) extreme measures, such as load shedding, generation unit tripping, line tripping or closing,
- (ii) emergency control action, such as HVDC Control, Excitation Control, HP-LP Bypass, tie line flow rescheduling on critical lines, and
- (iii) automated action, such as system protection scheme, load curtailment scheme and generation run-back scheme.

(D) Extreme Emergency State-Power system shall be categorized under extreme emergency state if the control actions taken during the emergency state are not able to bring the system either to an alert state or a normal state and operational parameters are outside their respective operational limits or equipment's are critically loaded. Extreme emergency state may arise due to high impact low frequency events like natural disasters. The power system may or may not remain intact (splitting may occur) and extreme events like generation plant tripping, bulk load shedding, under frequency load shedding (UFLS) and under voltage load shedding (UVLS) operation may occur.

(E) Restorative State- (1) Power system shall be categorized under restorative state when control action is being taken to reconnect the system elements and restore system load. The power system transits from a restorative state to either an alert state or a normal state, depending on the system conditions.

(2) The SLDC, in consultation with NRLDC, shall carry out the study for the state and based on historical data and grid incidences evolve detailed

criteria to categorize the power system in terms of the above states. The detailed criteria shall be included in the Detailed Operating Procedure to be issued by SLDC and NRLDC.

- (3) The SLDC shall maintain the grid in the normal state by taking suitable measures. In case the power system moves away from the normal state, appropriate measures shall be taken to bring the system back to the normal state. In case the power system has moved to an extreme emergency SLDC shall take emergency action and initiate restorative measures immediately.
- (4) Procedure to be followed during an event- (a) in the case of an event on the intra-State transmission system that may significantly impact the inter-State transmission system, SLDC shall immediately inform the NRLDC;
 - (b) Immediately following an event on the state grid, the SLDC shall inform the concerned Users of the necessary action to be taken; and
 - (c) Any warning in respect of system security issued by the SLDC shall be taken note of immediately by the concerned Users who shall take the necessary action to withstand the said event or to minimize its effect.
- (5) Operational coordination- (a) For operational coordination, each Intra-State transmission licensee, generating station, QCA and distribution licensee shall have a control center or coordination center for round the clock coordination as specified in sub-regulations (5) and (6) of Regulation 43 of these Regulations ; and
 - (b) Any planned operation activity in the IaSTS system, such as generating unit synchronization or de-synchronization, transmission element opening or closing (including breakers), protection system outage, SPS outage and testing etc. shall be done by taking operational code (prior consent) from the SLDC. The operational code (prior consent) shall have validity period of sixty (60) minutes from the time of issue. In case such operation activity

does not take place within the validity period of the said code, the entity shall obtain a fresh operational code (prior consent) from the SLDC.

51. Demand and Load Management.- (1) The demand and load shall be managed for ensuring grid security. The SLDC, in coordination with STU and Distribution Licensee (s), shall develop Automatic Demand Management scheme with emergency controls at SLDC.

(2) Buyers including distribution licensees and Users shall endeavour to restrict their actual drawal, from IaSTS, of its control area within the respective drawal schedules:

Provided that if automatic demand management scheme is not available, the manual load curtailment shall occur to ensure that there is no overdrawal.

(3) The measures taken by the buyers including distribution licensee or User shall not be withdrawn as long as the frequency remains at a level lower than the limits specified or congestion continues unless specifically permitted by the SLDC.

(4) Whenever the power system is in an alert state or emergency state as assessed by the SLDC or advised by NRLDC-

(a) the respective distribution licensee under state control area shall abide by the directions of the SLDC to secure the system, and extreme measures like load shedding may be carried out as a last resort;

(b) the SLDC or NRLDC through the SLDC may direct distribution licensees or bulk consumers directly connected to STU, to restrict drawal from the grid or curtail load to ensure the stability of the grid:

Provided that load shedding shall be resorted to after the demand response option has been exhausted; and

(c) the load disconnected, if any, shall be restored as soon as possible on clearance from the SLDC, in coordination with NRLDC if required, after the system has been normalized.

(5) The SLDC for the safety of IaSTS may direct the Users to curtail their drawal from the IaSTS. Such directions shall include the time period or the system conditions until which the issued directions shall be applicable:

Provided that any non-compliance of such direction shall be dealt with as per the provisions of the Electricity Act, 2003.

52. **Load Crash.**- In the event of load crash due to weather disturbance or any other reasons, the SLDC shall control the situation by getting the following methods implemented from Distribution Licensee(s) and other Users in descending priorities:-

- (a) Lifting of the load restrictions, if any;
- (b) Exporting the power to neighboring regions/states; and
- (c) Closing/Backing down of hydropower units (subject to non-spilling of water and effect on irrigation) keeping in view the inflow of water into canals and safety of canals/hydel channels:

Provided that any other instruction issued by NRLDC shall assume priority over such methods:

Provided further that such methods shall be reviewed from time to time by OCC and PCC.

53. **Congestion Management.**- (1) The STU, in consultation with SLDC, shall develop a procedure for relieving congestion in the IaSTS within a period of six months from the date of notification of these Regulations:

Provided that till the time such procedures are developed, Congestion Management in real-time system shall be dealt with as per the Central Commission's relevant Regulations as amended from time to time:

Provided further that such procedure shall be reviewed by OCC and shall be provided to all the Users and shall be kept on the website of SLDC as well as STU.

Provided also that congestion charges shall be applicable if determined by the Commission from time to time.

(2) Inter User Boundary Safety.- (1) STU shall maintain an updated list of designated officers (names, designations, and telephone numbers) to all Users who have a direct inter User boundary with STU or other Users on its website. Similarly, all Users with a direct inter User boundary with STU or other User

system shall maintain a similar updated list of their designated officers on their website.

- (ii) The STU, in coordination with PCC, shall prepare a detailed procedure for any work to be carried out across an inter-User boundary within six (6) months from the date of notification of these Regulations and submit to the PCC for approval. The procedure approved by PCC shall be available on the STU's website. STU shall review the procedure for inter-User boundary work at least once in twelve (12) months and submit to the Grid Code Review Committee for approval.
- (2) For the inter-User boundary between STU and other User's circuits, all Users shall comply with the agreed safety rules, which must be in accordance with CEA Safety Regulations or any other rules and Regulations framed under the Act.

54. Post Despatch Analysis.- (1) Operational analysis-

(A) The SLDC shall analyze the following:

- (i) Pattern of demand met, under draws and over draws, frequency profile, voltage and tie-line flows, angular spread, area control error, reserve margin, load and RE forecast errors, ancillary services despatched, transmission congestion and (n-1) violations;
- (ii) Generation mix in terms of source and station wise generation:
Provided that ALDC shall provide the generation mix in terms of source and station wise generation data having PPA with distribution licensee to SLDC;
- (iii) Irregular pattern in any of the system parameters mentioned in sub-clauses (A)(i) and (A)(ii) of this clause and reasons thereof; and
- (iv) Extreme weather events or any other event affecting grid security;

(B) Such analysis shall be disclosed on its website in formats issued by the NLDC;

(C) The SLDC shall prepare a quarterly report that shall bring out the system constraints, reasons for not meeting the requirements, if any, of security standards and quality of service, along with details of actions taken, including by those responsible for causing disturbances in the system parameters;

(D) The SLDC shall also provide such a report to the OCC; and

(E) For the purpose of analysis and reporting, telemetered data shall be archived

with a granularity of not more than five (5) minutes and higher granularity for special events. Such data shall be stored by the SLDC for at least fifteen (15) years and reports shall be stored for twenty-five (25) years for operational analysis.

(2) Event reporting - Event reporting shall make available adequate data to facilitate event analysis-

- (A) Immediately following an event (grid disturbance or grid incidence as defined in the CEA Grid Standards) in the system, the concerned User or STU or distribution licensee shall inform the SLDC through voice message;
- (B) Written flash report shall be submitted to the SLDC by the concerned User/STU/distribution licensee within the time line specified in Table 8 below;
- (C) Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within the time line specified in Table 8 below:-

TABLE 8: Report Submission Timeline

Sr. No.	Grid Event* (Classification)	Flash report submission deadline (Users/STU/Distribution licensee)	Disturbance record and station event log submission deadline (SLDC)	Detailed report and data submission deadline (Users/STU/ Distribution licensee)	Draft report submission deadline (SLDC)	Discussion in protection committee meeting and final report submission deadline(NRPC)
1	GI-1/GI-2	8hours	24hours	+7days	+7days	+60days
2	Near-miss event	8hours	24hours	+7days	+7days	+60days
3	GD-1	8hours	24hours	+7days	+7days	+60days
4	GD2/GD-3	8hours	24hours	+7days	+21days	+60days
5	GD4/GD-5	8hours	24hours	+7days	+30 days	+60days

* The classification of Grid Disturbance (GD)/Grid Incident (GI) shall be as per the CEA Grid Standards.

- (D) The SLDC shall report the event (grid disturbance or grid incidence) to NRLDC, OCC, NRPC and all entities within twenty-four (24) hours of receipt of the flash report;
- (E) After a complete analysis of the event, the User/STU/Distribution licensee shall submit a detailed report in the case of grid disturbance or grid incidence within one (1) week of the occurrence of event to the SLDC;
- (F) The SLDC (for events involving more than one states) shall prepare a draft report of each grid disturbance or grid incidence including

simulation results and analysis which shall be discussed and finalized at the Protection sub-committee of NRPC as per the timeline specified in Table-8 above;

- (G) The implementation of the recommendations of the final report shall be monitored by the protection sub-committee of the NRPC and PCC. The SLDC shall disseminate the lessons learnt from each event to all entities;
- (H) Any additional data such as Single Line Diagram (SLD) of the station, protection relay settings, switchyard equipment and any other relevant station data required for carrying out analysis of an event by the SLDC shall be furnished by the Users, within forty-eight (48) hours of the request. All Users shall also furnish high-resolution analog data from various instruments including power electronic devices like FACTS, renewable generation (inverter level or WTG level) on the request of the SLDC;
- (I) Triggering of STATCOM, TCSC, generating station power system stabilizer and any other controller system during any event in the grid shall be reported to the SLDC if connected to an intra-state system. The transient fault records and event logger data shall be submitted to the SLDC within 24 hours of the occurrence of the incident. Generating stations shall submit one (1) second resolution active power and reactive power data recorded during oscillations to the SLDC within 24 hours of the occurrence of the oscillations; and
- (J) A monthly report on events of unintended operation or non-operation of the protection system shall be prepared and submitted by each User/owner of important elements as identified under sub-regulation (5) of Regulation 44 of these Regulations to the SLDC within the first week of the subsequent month.

55. Periodic Reports.- (1) Daily and monthly reports covering the performance of the State grid shall be prepared by the SLDC based on the inputs received from STU, Distribution licensee and Users. The reports shall, inter-alia, contain the following:-

- (i) Frequency profile;
- (ii) Source wise generation in the State;
- (iii) Drawal from the grid and area control error;
- (iv) Demand met (peak, off-peak and average);
- (v) Demand/Energy unserved in MW and MWh;
- (vi) Instances and quantum of curtailment of renewable energy;
- (vii) Voltage profile of important Sub-stations and Sub-stations

- normally having low or high voltage;
- (viii) Major generation and transmission outages;
- (ix) Constraints and instances of congestion in the transmission system;
- (x) Instances of persistent/significant non-compliance with the Grid Code; and
- (xi) Status of reservoirs.

(2) The SLDC shall prepare a quarterly report which shall bring out the system constraints, reasons for not meeting the requirements, if any, of security standards alongwith the details of various actions taken by different Users/Transmission Licensees, and highlighting such entities responsible for causing the constraints. The SLDC shall also provide information/report to the NRLDC as per the provisions of IEGC in the interest of smooth operation of IaSTS.

(3) The SLDC shall provide the operational feedback for grid planning and re optimization to the STU with a copy to the Commission, once in every three months with regard to overloading of various transmission elements and may suggest suitable remedial measures to be taken and upload the same on its website.

56. Reactive Power Management.- (1) Reactive power compensation and/or other facilities shall be provided by the STU/Users, as far as possible to avoid the need for exchange of Reactive Power to/from the IaSTS and to maintain the IaSTS voltage within the specified range at all the times for healthiness of the system as per real time requirement.

(2) All generating stations shall be capable of supplying reactive power support so as to maintain power factor at the point of interconnection within the limits of 0.95 lagging to 0.95 leading as per the CEA Connectivity Standard Regulations.

(3) Switchable Line Reactors may be provided to control temporary overvoltage within the limits set out in connection agreements.

(4) The additional reactive compensation to be provided by the User shall be

indicated by the STU in the Connection Agreement for implementation.

- (5) Switching in/out of all 400 kV bus and line Reactors throughout the grid shall be carried out as per the instructions of the SLDC. Tap changing on all 400/220/132 KV Interconnecting Transformers shall also be done as per the instructions of the SLDC in concurrence with NRLDC. The Users already connected to the grid shall provide additional reactive compensation as per the quantum and time decided by the SLDC:

Provided that, for the purpose of tap changing, voltage of local bus shall be considered as reference voltage.

- (6) Notwithstanding anything above, the SLDC may direct the User to curtail its VAR drawal/ injection in case the security of the Grid or safety of any equipment is endangered.
- (7) All generating stations connected to the grid shall generate or absorb reactive power as per instructions of the SLDC, as the case may be, within the capability limits of the respective generating units, where capability limits shall be as specified by the OEM.
- (8) All Users and STUs shall provide adequate voltage control as specified by OCC or operational committee thereunder, to prevent voltage collapse and shall ensure its effective application to prevent voltage collapse/ cascade tripping. Voltage fluctuation limits and voltage wave-form quality shall be maintained as specified by the Authority. STU may carry out voltage stability studies for sensitive nodes having low voltages and lesser fault level and ensure that voltages at these nodes are much above knee point.
- (9) All Users except generating stations shall provide local VAR compensation/generation to maintain the voltage within the specified limits:

Provided that there shall not be any drawal of VARs from the EHV grid under low-voltage condition.

- (10) Notwithstanding the above, the SLDC may direct all Users except

Generating Stations to curtail its VAR drawal/injection in case the security of IaSTS is endangered.

- (11) Reactive power facilities connected to IaSTS shall be in operation at all times and shall not be taken out without the permission of the SLDC.
- (12) Periodic/seasonal tap changing of inter-connecting transformers and generator transformers shall be carried out to optimize the voltages and if required other options such as tap staggering may be carried out in the network.
- (13) The reactive interchange of the Users shall be measured and monitored by the SLDC and the NRLDC.
- (14) The SLDCs may direct the Users about reactive power set-points, voltage set-points and power factor control to maintain the voltage at interconnection points.
- (15) The SLDCs shall assess the dynamic reactive power reserve available at various substations or generating stations under any credible contingency on a regular basis based on technical details and data provided by the Users, as per the procedure specified by NLDC.
- (16) STU and/or SLDC shall carry out load flow studies to predict where voltage problems may be encountered based on the operational data and identify appropriate measures to ensure that voltages remain within the defined limits. On the basis of these studies, the SLDC may issue specific instructions to Users to maintain voltage level at interconnecting points within permissible limits.
- (17) The SLDC shall take appropriate measures to control IaSTS voltages, which may include but not limited to power transformer tap changing, capacitor/reactor switching by the distribution licensee(s) at 66 kV and 33 kV Sub-stations, operation of hydro unit as synchronous condenser and use of Megavolt-Ampere Reactive (MVAR) reserves with generating stations within the technical limits agreed to between the STU and generators:

Provided that generators shall inform SLDC of their reactive reserve capability promptly on request:

Provided further that the generating station shall inject/ absorb the reactive energy into/from the IaSTS on the basis of their Unit capability as per the directions of the SLDC.

(18) The SLDC shall take appropriate measures to maintain the voltage within limits, inter-alia, using the following facilities, and the facility owner shall abide by the instructions of the SLDC:-

- (i) shunt reactors,
- (ii) shunt capacitors (excluding HVDC automatic control),
- (iii) TCSC,
- (iv) synchronous/non-synchronous generator voltage control including inverter based reactive power support,
- (v) Synchronous condenser,
- (vi) Static VAR compensators (SVC), STATCOM and other FACTS devices; and
- (vii) Transformer tap change: generator transformer and inter-connecting transformer.

(19) Hydro units shall operate in synchronous condenser mode operation as per instructions of the SLDC. Standalone synchronous condenser units shall operate as per the instructions of the SLDC. The compensation for such synchronous condenser mode operation shall be included in the procedure to be submitted by the SLDC and approved by the Commission.

(20) Any commercial settlement for reactive power shall be governed as per the regulatory framework specified in Appendix-“C” or State specific Ancillary Service Regulations as notified by the Commission.

(21) If voltages are outside the limit as specified in sub-regulation (21) of Regulation 44 of these Regulations and the means of voltage control set out in sub-regulation (18) of this Regulation are exhausted, the SLDC shall take all reasonable actions necessary to restore the voltages so as to be within the relevant limits including switching ON or OFF of lines considering the security of the system.

(22) Wind generating stations and solar generating stations shall have fault

ride through the capability of not less than 300 milliseconds so that the grid is not destabilized due to sudden outage of generation in the event of grid disturbance. The provisions of the CEA's Regulations for Low Voltage Ride through (LVRT) and High Voltage Ride through (HVRT) shall be applicable to the Wind and Solar Generators as amended from time to time.

- (23) Wind and Solar generators shall control the harmonics level, at all connection points of a User on the transmission system, in accordance with that prescribed by the IEEE STD 519-1992, namely "IEEE recommended practices and requirements for harmonic control in the electrical power systems".

57. Periodic Testing.- (1) There shall be periodic tests, as required under clause (c) of sub-regulation (2) of this Regulation, carried out on power system elements for ascertaining the correctness of mathematical models used for simulation studies as well as ensuring desired performance during an event in the system.

- (2) General provisions- (a) The owner of the power system element shall be responsible for carrying out tests as specified in these Regulations and for submitting reports to the SLDC, STU, CEA and CTU for all Intra state element elements;
- (b) All equipment owners shall submit a testing plan for the next year to the concerned NRPC by 31st October to ensure proper coordination during testing as per the schedule. In case of any change in the schedule, the owners shall inform the concerned NRPC in advance.
- (c) The tests shall be performed once every five (5) years or whenever major retrofitting is done. If any adverse performance is observed during any grid event, then the tests shall be carried out even earlier, if so advised by the SLDC; and
- (d) The owners of the power system elements shall implement the recommendations, if any, suggested in the test reports in consultation

with the SLDC, STU, CEA, NRPC and CTU.

(3) Testing requirements.- The following tests shall be carried out on the respective power system elements:-

**TABLE 9 :
TESTS REQUIRED FOR POWER SYSTEM ELEMENTS**

Power System Elements	Tests	Applicability
Synchronous Generator	Real and Reactive Power Capability assessment. Assessment of Reactive Power Control Capability as per CEA Technical Standards for Connectivity Model Validation and verification test for the complete Generator and Excitation System model including PSS. Model Validation and verification of Turbine/ Governor and Load Control or Active Power/ Frequency Control Functions. Testing of Governor performance and Automatic Generation Control.	Individual Unit of rating 100MW and above for Coal/ lignite, 50MW and above gas turbine and 25MW and above for Hydro.
Non synchronous Generator (Solar/Wind)	Real and Reactive Power Capability for Generator Power Plant Controller Function Test Frequency Response Test Active Power Set Point change test. Reactive Power (Voltage/Power Factor / Q) Set Point change test	Applicable as per CEA Technical Standards for Connectivity.
HVDC/FACTS Devices	Reactive Power Controller (NRPC) Capability for HVDC/FACTS Filter bank adequacy assessment based on present grid condition, in consultation with NLDC. Validation of response by FACTS devices as per settings.	To all I aSTS HVDC as well as Intra-State HVDC/FACTS, As applicable

58. Capacity Building And Certification.- Capacity building, skill upgradation, and certification of the personnel deployed in load despatch centres shall be done periodically under an institutional framework through accredited certifying agency (ies).

CHAPTER 8
SCHEDULING AND DESPATCH CODE

59. **Introduction.**- This chapter deals with the procedure for scheduling injection and drawal of power by the State entities and the modalities for exchange of information, including scheduling for intra-state & transacting power through Inter-State Transmission System. This chapter also covers provisions with respect to control area jurisdiction.

60. **Control Area Jurisdiction of State Load Despatch Center (SLDC).**- (1)

The national grid shall be demarcated into Regional and State control areas and each control area shall be under the jurisdiction of NRLDC or SLDC, as the case may be.

(2) The SLDC shall be responsible for optimum scheduling and despatch of electricity, monitoring of real time grid operations and management of the reserves including energy storage systems and demand response within State control area, supervision and control over the intra-State transmission system, processing of interface energy meter data and coordinating the accounting and the settlement of State pool account, as may be specified by the Commission.

(3) The Discom shall be responsible for optimum scheduling and despatch of electricity, monitoring of real time grid operations and management of the reserves including energy storage systems and demand response within its control area, supervision and control over the distribution network in its control area and provide the interface energy meter data of all the boundary points under its control area.

(4) The entities connected to the intra-State transmission systems shall be under the control area jurisdiction of the SLDC for scheduling and despatch of electricity:

Provided that the entities connected to intra-State transmission system having PPA with distribution licensee (excluding GoHP free power & LADF), shall be under the control area jurisdiction of Discom for scheduling and despatch of electricity in its control area:

Provided further that any instructions issued to these entities by the SLDC directly or through Discom shall be adhered by these entities.

- (5) Entities connected to both inter-State transmission systems and intra-State transmission systems shall be under the control area jurisdiction of NRLDC, if more than or equal to 50% of the quantum of connectivity is with IaSTS, and if more than 50% of the quantum of connectivity is with intra-State transmission system, it shall be under the control area jurisdiction of the SLDC.
- (6) In case an entity is connected to both inter-State transmission systems and intra-State transmission systems, the load despatch centre responsible for scheduling such entities shall coordinate with the NRLDC or SLDC, as the case may be, for ensuring grid security.

61. Responsibilities of State Load Despatch Centre (SLDC) and Discom.- (1)

The State Load Despatch Centre in discharge of its functions under the Act and for stable, smooth and secure operation of the integrated grid, shall be responsible for the following in its control area:-

- (a) Forecasting demand for its control area under sub-regulation (2) of Regulations 46 of these Regulations for each time block on day-ahead and intra-day basis;
- (b) Forecasting of generation from wind and solar generating stations under its jurisdiction for each time block on day-ahead and intra-day basis:

Provided that such forecasts may be used by the wind and solar generating stations at their own risk and discretion alongwith all commercial liabilities arising out of it;
- (c) Scheduling and despatch for the entities in the State control area in accordance with contracts;
- (d) Balancing demand and supply to minimize Area Control Error (ACE) for the State;
- (e) Maintaining and despatching reserves; and
- (f) Declaring Total Transfer Capability and Available Transfer Capability in respect of import and export of electricity of its control area with inter-State transmission systems in coordination with the Central Transmission Utility, State Transmission Utility, and NRLDC and

revising the same from time to time based on grid conditions. Assessment of TTC and ATC shall be done on a continuous basis at least three (3) months in advance and revised based on contingencies from time to time.

(2) The Discom for stable, smooth and secure operation of the integrated grid, shall be responsible for the following in its control area:-

(a) Forecasting demand for its control area submit it to the SLDC latest as per the Table-10 given below: -

Table-10

Timeline for Forecasted Demand Submission

Daily demand estimation	08:00 hours of previous day
Weekly demand estimation	First working day of previous week
Monthly demand estimation	Fourth day of previous month
Yearly demand estimation	29th September of the previous year;

(b) Forecasting of generation from wind and solar generating stations under its control area and submit it to the SLDC as per the provisions of sub-regulation (9) of Regulation 62 of these Regulations;

(c) Balancing demand and supply under its control area to minimize Area Control Error (ACE) for the State; and

(d) Maintaining reserves.

62. **General Provisions.-** (1) Details of State entity generating stations to be published by the SLDC:-

(a) The SLDC shall publish a list of all State entity generating stations within its control area, which shall be updated quarterly on their website alongwith details such as station capacity, free power share to GoHP and LADF (%);

(b) The SLDC shall also publish details, as applicable, for state entity generating stations other than renewable generating stations, as submitted by such generating stations in accordance with Regulation 33 of these Regulations; and

(c) The SLDC shall publish the details, as applicable, for all state entity renewable generating stations as submitted by such generating stations in accordance with Appendix-“D”.

(2)Details of entity generating stations to be published by Discom.-

Discom shall publish a list of all generating stations under its control area having PPAs with Discom, which shall be updated quarterly on their

website alongwith details such as station capacity, free power share to GoHP and LADF (%).

(3) Requirement for Commencement of Scheduling.- (1) The following documents shall be submitted to the SLDC by the seller or the buyer, as the case may be, before commencement of the scheduling of transactions under STOA or LTA & MTOA, as the case may be:-

(i) Document in support of the grant of connectivity, by the sellers and the buyers, as applicable, as per HPERC (Grant of Connectivity, Long-Term and Medium-Term Open Access and Related Matters) Regulations, 2010;

(ii) Document in support of the effective date of LTA & MTOA by the sellers and the buyers as per HPERC (Grant of Connectivity, Long-Term and Medium-Term Open Access and Related Matters) Regulations, 2010; and

(iii) Documents in support of STOA as per HPERC (Short Term Open Access) Regulations, 2010;

(4) Adherence to Schedule.- Each state entity shall regulate its generation or demand or both, as the case may be, so as to adhere to the schedule of net injection into or net drawal from the inter-State transmission system for inter-State power transactions and from intra-State transmission system for intra-State transactions.

(5) Area Control Error.- The drawee state entities shall keep their Area Control Error close to zero (0) by rescheduling, deploying reserves and automatic demand management scheme.

(6) Declaration of Declared Capacity by State generating stations.- (a) The State entity generating station other than the WS seller shall declare exbus Declared Capacity limited to 100% MCR less auxiliary power consumption, on day ahead basis as per the provisions of sub-regulation (7) of this Regulations:

Provided that the hydro generating stations may declare exbus Declared Capacity more than 100% MCR less auxiliary power consumption limited to overload capability in terms of sub-regulation (8) of this Regulation during high inflow periods:

Provide further that a high inflow period for this purpose shall be notified by the NRPC;

(b) State entity WS Seller shall declare the available capacity on day ahead basis, as per the provisions of Regulations 63 of these Regulations. The

State entity with generating stations other than WS sellers may be required to demonstrate the declared capacity of their generating stations as and when directed by the concerned SLDC. For this purpose, the SLDC, in coordination with beneficiaries, shall schedule the State entity generating station up to its declared capacity as declared on day ahead basis.

- (c) The schedule issued by the SLDC shall be binding on the beneficiaries for such testing of the declared capacity of the State entity generating station. In case the generating station fails to demonstrate the declared capacity, it shall be treated as a mis-declaration for which charges shall be levied on the generating station by NRPC as follows:-

The charges for the first mis-declaration for a block or multiple blocks in a day shall be the charges corresponding to two days' fixed charges at normative availability. For the second mis-declaration, the charges shall correspond to four days' fixed charges at normative availability, and for subsequent mis-declarations, the charges shall increase in a geometric progression over a period of a month.

- (7) Ramping Rate to be Declared for Scheduling.- The State entity generating station shall declare the ramping rate along with the declaration of day-ahead declared capacity in the following manner, which shall be accounted for in the preparation of generation schedules:-

- (i) Hydro power plants shall declare a ramp up or ramp down rate of not less than 10% of ex-bus capacity corresponding to MCR on bar per minute; and
- (ii) Renewable Energy generating stations shall declare a ramp up or ramp down rate as per CEA Connectivity Standards.

- (8) Optimum Utilization of Hydro Energy.- (a) During high inflow and water spillage conditions, for Storage type generating station and Run-of-River Generating Stations with or without Pondage, the declared capacity for the day may be up to the installed capacity plus overload capability (up to 10% or such other limit as certified by the OEM and approved by CEA & DoE, GoHP) minus auxiliary consumption, corrected for the reservoir

level. In case, the overload capability of such a station is more than 10% as approved, such a station shall declare the overload capability in advance; and

- (b) During high inflow and water spillage conditions, the SLDC shall allow scheduling of power from hydro generating stations for overload capability up to 10% of Installed Capacity or any other limit as per clause (a) of this sub-regulation without the requirement of additional LTA & MTOA for such overload capacity, subject to the consent of STU and/or Discom regarding the availability of margins in the transmission system.
- (9) Scheduling of WS seller and ESS by QCA.- (a) The State renewable energy generating station(s) or Projects based on energy storage system(s) connected at a particular IaSTS sub-station or at multiple IaSTS sub-stations may appoint a QCA on their behalf to co-ordinate and facilitate scheduling for such generating stations or energy storage system(s). The responsibility of QCA is listed at Annexure-II of Appendix-“D” to these Regulations;
- (b) The SLDC shall submit a procedure for aggregation of pooling stations for the purpose of combined scheduling and deviation settlement for wind or solar or renewable hybrid generating stations that are State entities, within six (6) months of notification of these Regulations for approval of the Commission;
 - (c) The QCA shall be registered with the SLDC;
 - (d) The QCA registered with the SLDC shall, on behalf of wind, solar or renewable hybrid generating stations or Energy Storage System shall-
 - (i) Coordinate and facilitate scheduling of power with the SLDC;
 - (ii) Undertake commercial settlement of deviations with the SLDC in accordance with the DSM Regulations;
 - (iii) Submit a copy of the consent to the SLDC certifying that QCA shall undertake all operational and commercial responsibilities on behalf of generating stations as per the relevant HPERC Regulations;
 - (e) The concerned wind, solar or renewable hybrid generating stations including energy storage systems shall indemnify the SLDC for any act of

commission or omission on the part of QCA including compliance with the Grid Code and settlement of its financial liability in the pooled account; and

(f) Contract between the generating stations and QCA shall invariably contain provisions for internal dispute resolution, and any disputes arising between the generating stations and QCA shall be settled in accordance with the said mechanism.

(10) A generating station or ESS or a drawee entity shall be allowed to schedule injection or drawal only up to its effective LTA & MTOA quantum and STOA quantum, as applicable, in accordance with the HPERC (Grant of Connectivity, Long-Term and Medium-Term Open Access and Related Matters) Regulations, 2010 and HPERC (Short Term Open Access) Regulations, 2010.

(11) For meeting its power requirements during non-generation hours, whether before or after COD, a generating station, including renewable energy generating station, shall enter into a valid contract with a seller or distribution licensee or through power exchange:

Provided that where the generating station including a renewable energy generating station is unable to enter into a contract for the drawal of power during non-generation hours, it may draw power from IaSTS on payment of deviation charges as per the DSM Regulations.

63. Procedure for Scheduling and Despatch for Intra-State Transactions.- (1) The following scheduling related activities shall be carried out daily for state entities, on day ahead basis, 'D-1' day, for supply of power on 'D' day, as follows:-

(A) Declaration of Declared Capacity by generating stations-

(I) The generating station based on hydro energy shall submit the following information for 0000 hours to 2400 hours of the 'D' day, by 5 AM on 'D-1' day:

- (a) Time block-wise ex-bus declared capacity;
- (b) MWh capability for the day;
- (c) Ex-bus peaking capability in MW and MWh;
- (d) Time block-wise Ramp up rate (MW/min) for on-bar capacity;
- (e) Time block-wise Ramp down rate (MW/min) for on-bar capacity;
- (f) Unit-wise forbidden zones in MW and percentage (%) of ex-bus installed capacity;

- (g) Minimum MW and duration corresponding to requirement of water release for irrigation, drinking water and other considerations;
- (h) Unit wise maximum MW along with probable combination of unit maximum in case adequate water is not available.

(II) The State entities shall submit aggregate available capacity of the generation under its control area and aggregate schedule along with contract wise breakup for each time block for 0000 hours to 2400 hours of the 'D' day, by 5 AM on 'D-1' day. The source wise breakup of aggregate available capacity of the generation under its control area shall also be furnished.

(III) The State entity renewable energy generating station, individually or represented by a lead generator or QCA, shall submit aggregate available capacity of the pooled generation and aggregate schedule along with contract wise breakup for each time block for 0000 hours to 2400 hours of the 'D' day, by 5 AM on 'D-1' day. The source wise breakup of aggregate available capacity of the pooled generation shall also be furnished.

(IV) ESS including pumped storage plant, individually or represented by the lead ESS or QCA on their behalf, shall submit aggregate available capacity of the pooled generation and aggregate schedule along with contract-wise breakup for each time-block for 00.00 hours to 24.00 hours of the 'D' day, by 5 AM on 'D-1' day.

(V) The availability declaration by state entity generating station shall have a resolution of two decimal (0.01) MW and three decimal (0.001) MWh.

(B) Entitlement of each beneficiary or buyer.- (I) For generating station, where the Central Government has allocated power, the State shall be entitled to a MW despatch up to the State's Share in the station's declared capacity (including On-bar Declared Capacity and Off-bar Declared Capacity) for the day. Accordingly, based on declared capacity of such generating station, NRLDC shall declare entitled share of each beneficiary or buyer of the State for 00.00 hours to 24.00 hours of the 'D' day, by 7 AM on 'D-1' day. The same shall also be available to each state entity in the SLDC website.

(II) The generating station other than those having allocation of power by the Central Government shall indicate the declared capacity along with share of the State beneficiary(ies) or buyers in accordance with the contracts entered

with them. Based on the declared capacity of such generating station and share of the beneficiaries or buyers as indicated by such generating station, NRLDC shall declare share of each beneficiary or buyer for 00.00 hours to 24.00 hours of the 'D' day, by 7 AM on 'D-1' day. The same shall also be available in the SLDC website. The same shall also be available to each state entity in the SLDC website.

(C) The mutually agreed requisition for scheduling of intra-State entities shall be as submitted by the regional entity buyers or regional entity sellers in accordance with the contracts entered between them by 7 AM on 'D-1' day.

(D) Every State Generating Station who has entered into contract with NLDC to provide the SRAS and TRAS shall intimate the quantum of secondary and tertiary reserves for the 'D' day by 7 AM of 'D-1' day.

(E) Requisition of schedule by the buyers which are GNA grantees for inter-State transactions and LTA & MTOA for intra-State transactions:

(I) Based on the entitlement declared in accordance with this Regulation, distribution licensee or any buyer which are drawee GNA grantees for inter-State transactions, shall furnish time block-wise requisition for drawal to the SLDC in accordance with the contracts, by 7.00 AM of 'D-1' day.

(II) The SLDC while furnishing time block-wise requisition on behalf of the intra-State entities which are drawee GNA grantees and before submit to NRLDC shall subject to technical constraints, duly factor in merit order of the generating stations with which it has entered into contract(s):

Provided that the renewable energy generating stations shall not be subjected to merit order despatch, and subject to technical constraints shall be requisitioned first followed by requisition from other generating stations in merit order.

(III) Buyers other than distribution licensee which have LTA & MTOA for intra-State transactions, shall furnish the time block-wise requisition to the SLDC in accordance with the contracts, by 7 AM of 'D-1' day.

(F) Allocation of corridors by NRLDC for GNA grantees.-

(I) NRLDC shall check if drawal schedules as requisitioned by drawee GNA grantees can be allowed based on available transmission capability:

Provided that in case of constraint in transmission system, the available transmission corridor shall be allocated to the drawee GNA grantees in proportion to their GNA within the region or from outside

region, depending upon the transmission constraint, whether it is within the region or from outside the region, as the case may be. The same shall be intimated to drawee GNA grantees by 8.15 AM on 'D-1' day.

- (II) The SLDC shall intimate the constraint in transmission system as intimated by NRLDC to the respective drawee GNA grantees by 8.15 AM on 'D-1' day.
 - (III) The concerned Drawee GNA grantees shall revise their requisition for drawl schedule based on availability of transmission corridors for such grantee by 8.25 AM on 'D-1' day.
 - (IV) The SLDC shall furnish the revised drawl schedule as received from concerned drawee GNA grantee based on the availability of transmission corridors and submit it to NRLDC by 08.30 AM on 'D-1' day.
 - (V) NRLDC shall issue final drawl schedules and injection schedules for drawee and injecting GNA grantees by 9 AM on 'D-1' day.
 - (VI) The SLDC shall issue final GNA, LTA & MTOA drawl schedules and injection schedules for each State entity in HP Control Area by 9 AM on 'D-1' day.
- (G) Requisition of schedule by T-GNA grantees.--
- (I) Based on the entitlement or otherwise, intra-state entities which are T-GNA grantees, shall furnish time block-wise requisition for drawl to the SLDC with contract by 08:30 AM of 'D-1' day.
 - (II) The SLDC on behalf of intra-State entities which are T-GNA grantees, shall furnish time block-wise requisition for drawl, to the NRLDC in accordance with contracts by 9.15 AM of 'D-1' day.
 - (III) Allocation of corridors by NRLDC for T-GNA grantees: NRLDC shall check if drawl schedules as requisitioned by T-GNA grantees can be granted based on available transmission capability after allocating corridors to the GNA grantees:
Provided that in case of constraint in transmission system, the available transmission corridor shall be allocated to the T-GNA grantees in proportion to their T-GNA.
 - (IV) NRLDC shall issue final drawl schedules for T-GNA grantees by 9.45 AM of 'D-1' day.
 - (V) The SLDC shall issue final drawl schedules of T-GNA & intra-State STOA for each State entity in HP Control Area by 09.45 AM of 'D-1' day.
- (H) Scheduling of collective transactions.-
- (I) The power exchange shall submit the final trade schedules to the SLDC

for intra-State entities by 1.00 PM of 'D-1' day.

(II) The SLDC shall compile the same in the schedule of HP Control Area and make it available to each State entity. By 01.00 PM of 'D-1' day.

(I) Procedure for scheduling of transaction in Real-time market (RTM).-

(I) Power Exchange(s) shall submit the trade schedule to the SLDC for intra-State entities by 23:30 hrs of 'D-1' day.

(II) The SLDC shall compile the same in the schedule of HP Control Area and make it available to each state entities by 23:30 hrs. of 'D-1' day.

(J) NRLDC shall publish the final schedules for dispatch by 23.35 hrs. of 'D-1' day.

(K) The SLDC shall publish the final schedules for dispatch for each state entity by 23.40 hrs. of 'D-1' day.

(L) TRAS shall be procured in accordance with Ancillary services Regulations along with bidding for collective transactions, RTM or any other mechanism as per Ancillary services Regulations.

(M) Issuance of day-ahead schedule.-

(I) NRLDC shall convey the "net drawal schedule" for HP State Control Area in MW for each time block, along with break-up of (a) schedule from each of the sellers, (b) schedule of injection to IaSTS and (c) injection or drawal schedule under collective transaction.

(II) All requisitions and schedules shall be rounded off to the nearest two decimals for each of the transaction and shall have a resolution of 0.01 MW.

(III) The SLDC shall take into account the schedule released by the NRLDC for their intra-State entities and finalize the intra-State schedule.

(2) Power to revise schedules.- (A) Curtailment of scheduled transactions for grid security,-

When for the reason of transmission constraints or in the interest of grid security, it becomes inevitable to curtail power flow on a transmission corridor, the transactions already scheduled may be curtailed with immediate effect by the SLDC (keeping in view the transaction which is likely to relieve the threat to grid security) as follows:-

(i) Transactions under STOA shall be curtailed first followed by transactions under MTOA and then LTA;

(ii) Transactions under STOA shall be curtailed in the following order:-

(a) Within transactions under STOA, Intra-bilateral transactions shall be curtailed first followed by Inter-State Bilateral Transaction followed by collective transactions under day

ahead market followed by collective transactions under real time market after making request to NRLDC to curtail inter-State (Bilateral/ Collective) Transaction;

- (b) The curtailment shall be done on pro rata basis as per their STOA quantum;
 - (iii) Transactions under MTOA shall be curtailed on pro rata basis as per their MTOA quantum;
 - (iv) Transactions under LTA shall be curtailed in on pro rata basis on their LTA quantum;
 - (v) The SLDC shall publish a report of such incidents on its website.
- (B) In the event of bottleneck in evacuation of power due to outage, failure or limitation in the transmission system or any other constraint necessitating reduction in generation, the SLDC shall revise the schedules for intra-State transactions and shall request NRLDC to revise the schedule for inter-State transactions:
- Provided that generation and drawal schedules revised by the SLDC shall become effective from 7th block or 8th block depending on time block in which schedule has been revised as first time block for intra-State transaction:
- Provided further that generation and drawal schedules revised by the NRLDC shall become effective from 7th block or 8th block depending on time block in which schedule has been revised as first time block for inter-State transaction.
- (C) In case of contingencies such as critical loading of lines, transformers, abnormal voltages or threat to system security, the following steps as considered necessary, may be taken by the SLDC:-
- (i) Issue directions to concerned entities to adhere to the schedules;
 - (ii) Deployment of ancillary services, if available;
 - (iii) Switching on/off pump storage plants operating in pumping mode;
 - (iv) Despatching emergency demand response measures;
 - (v) Direct the State entities to increase or decrease their drawal or injection by revising their schedules and such directions shall be immediately acted upon.
- (D) Whenever the SLDC revises final schedules due to reasons of grid security or contingency, brief reasons shall be informed immediately to the State entity followed by a detailed explanation to be posted on SLDC website within 24 hours.

(E) Any verbal directions by the SLDC shall be confirmed in writing as soon as possible latest within twenty four hours.

(3) Revision of schedules on request of buyers which are GNA grantees for inter-State transaction and LTA & MTOA customer for intra-State transaction:-

(a) The Discom or Buyers shall request the SLDC to revise their schedule under LTA & MTOA for intra-State transaction as per clauses (d) (i) of this sub-regulation in accordance with their respective contracts:

Provided that scheduled transactions under STOA for intra-State transaction once scheduled cannot be revised other than in case of forced outage as per sub-regulation (5) of this Regulation.

(b) The Discom or Buyers shall request the SLDC to revise their schedule under GNA for inter-State transaction as per clauses (d) (ii) to (d) (v) of this sub-regulation in accordance with their respective contracts:

Provided that scheduled transactions under T-GNA for inter-State transaction once scheduled cannot be revised other than in case of forced outage as per sub-regulation (5) of this Regulation.

(c) The SLDC on behalf of intra-state entities shall request NRLDC to revise the concerned State Entity schedules under GNA as per clauses (d) (ii) to (d) (v) of this sub-regulation in accordance with their respective contracts.

(d) The request for revision of scheduled transaction for 'D' day, shall be allowed subject to the following:

(i) Based on the request for revision in schedule made as per clause (a) of this sub-regulation, any revision in schedule made in odd time blocks shall become effective from 7th time block and any revision in schedule made in even time blocks shall become effective from 8th time block, counting the time block in which the request for revision has been received by the SLDC to be the first one;

(ii) Request made by the SLDC on behalf intra-State entities to NRLDC for upward revision of schedule from the generating station whose tariff is determined under Section 62 of the Act shall be allowed starting 2.00 PM on 'D-1' day, only in respect of the remaining available quantum of un-requisitioned surplus in such generating stations, after finalization of schedules under day ahead market;

(iii) Request made by the SLDC on behalf intra-State entities to NRLDC for downward revision of schedule from the generating

stations, whose tariff is determined under section 62 of the Act shall be allowed in any time block subject to the provision relating to Security Constrained Unit Commitment (SCUC in short) under Regulation 46 of CERC (Indian Electricity Grid Code) Regulations, 2023;

- (iv) Request made by the SLDC on behalf intra-State entities for upward or downward revision of schedule in respect of the generating stations other than those whose tariff is determined under Section 62 of the Act, shall be allowed in terms of provisions of the respective contracts between the generating stations and beneficiaries or buyers.
 - (v) Based on the request for revision in schedule made as per clauses, any revision in schedule made in odd time blocks shall become effective from 7th time block and any revision in schedule made in even time blocks shall become effective from 8th time block, counting the time block in which the request for revision has been received by the NRLDC to be the first one;
- (e) While finalizing the drawal and despatch schedules, in case any congestion is foreseen in the inter-State transmission system or technical constraints of a generating station, the NRLDC shall moderate the schedules as required, under intimation to the concerned regional entities; and
- (f) After finalization of drawal and despatch schedules by NRLDC, the SLDC shall make available to the drawal and injection schedule to the concerned State entities.
- (4) The generation schedules and drawl schedules shall be accessible to each State entities by the SLDC on its web-site after the operating day is over at 24.00 hrs. These schedules shall be the basis for commercial accounting.
- (5) Revision of Declared Capacity and schedule, shall be allowed on account of forced outage of a unit of a generating station or ESS (as an injecting entity) only in case of bilateral transactions and not in case of collective transaction. Such generating station or ESS (as injecting entity) or the electricity trader or any other agency selling power from the unit of the generating station or ESS shall immediately intimate the outage of the unit along with the requisition for revision of Declared Capacity and schedule and the estimated time of restoration of the unit, to SLDC, as the case may be. The schedule of beneficiaries, sellers and buyers of power from this generating unit shall be revised on pro-rata basis for all bilateral

transactions. The revised Declared Capacity and schedules shall become effective from the time block and in the manner as specified in sub-regulation (3) of this Regulation:

Provided that the generating station or ESS (as injecting entity) or trading licensee or any other agency selling power from a generating station or unit(s) thereof or ESS may revise its estimated restoration time once in a day and the revised schedule shall become effective from the 7th block or 8th block as per sub-regulation (3) of this Regulation, counting the time block in which the revision is informed by the generator or ESS to be the first one:

Provided further that the SLDC shall inform the revised schedule to the seller and the buyer. The original schedule shall become effective from the estimated time of restoration of the unit.

- (6) Revision of Declared Capacity and schedule of a generating station or ESS (as an injecting entity) shall be allowed only in case of bilateral transactions and not in case of collective transaction as per following details:-

(a) The generating station (other than lignite, gas based thermal generating station, and hydro generating station) or ESS (as an injecting entity) shall be allowed a maximum of 4 (four) revisions of Declared Capacity and schedule in a day subject to a maximum of 60 (sixty) revisions during a month, due to reasons such as a partial outage of the unit or variation of fuel quality or any other technical reason to be recorded in writing:

Provided that the SLDC may allow upward revision of DC beyond the above limit keeping in view grid requirements; and

(b) The generating station based on lignite, gas, or hydro generating station shall be allowed 6(six) revisions of Declared Capacity and schedule in a day subject to a maximum of 120 (One hundred twenty) revisions during a month, due to reasons such as a partial outage of the unit or water availability for hydro generating stations or fuel quality or variations in the supply of gas for gas generating stations or any other technical reason to be recorded in writing:

Provided that the SLDC may allow upward revision of DC beyond the above limit keeping in view grid requirements.

- (7) In case of requirement of revision of schedule due to forecasting error, a WS seller may revise its schedule only in case of bilateral transactions and not in case of collective transaction. Such revision of schedule shall

become effective from the time block and in the manner as specified in clause (d)(i) of sub-regulation (3) of this Regulation for intra-State transactions and clause (d)(v) of sub-regulation (3) of this Regulation for inter-State transactions.

- (8) In case of requirement of revision of Declared Capacity due to forecasting error, a RoR generating station may request for revision of its Declared Capacity and schedule only in case of bilateral transactions and not in case of collective transaction. Such revision shall become effective from the time block and in the manner as specified in clause (d)(i) of sub-regulation (3) of this Regulation for intra-State transactions and clause (d)(v) of sub-regulation (3) of this Regulation for inter-State transactions.
- (9) In the event of forced outage of a generating station or unit thereof, the generating company owning the generating station or unit thereof shall fulfill its supply obligation to the beneficiaries which made requisition from such generating station or unit thereof, (i) by entering into contract(s) covered under Power Market Regulations or (ii) by arranging supply from any other generating station or unit thereof owned by such generating company subject to honoring of rights of the original beneficiaries of the said generating station or unit thereof from which the supply is arranged or (iii) through SCED, as applicable.
- (10) Discrepancy in schedule.-
 - (a) All State entities, open access customers, injecting entities and drawee consumers shall closely check their transaction Schedule and point out errors, if any, to the SLDC; and
 - (b) The final schedules issued by the SLDC shall be open to all state entities and other State open access entities for any checking and verification, for a period of 4 days. In case any mistake or omission is detected, the SLDC shall make a complete check and rectify the same for intra-State transaction and the SLDC shall request the NRLDC to check and rectify the same for inter-State transaction.
- (11) Energy Metering and Accounting.-
 - (a) The STU shall be responsible for procurement and installation of Interface Energy Meters (IEMs), at the cost of respective entity, at all the IaSTS interface points, points of connections between the IaSTS and IaSTS and other identified points for recording of actual active and reactive energy interchanged in each time-block through those points, and its operation and periodic calibration shall be done by the respective entity. STU shall be responsible for replacement of faulty meters;

- (b) The installation, operation, calibration and maintenance of Interface Energy Meters (IEMs) with automatic remote meter reading (AMR) facility shall be in accordance with the CEA Metering Regulations 2006;
 - (c) The installation, operation, and maintenance of additional communication links, if any, required for the purpose of AMR facility shall be in accordance with CEA Communications Regulations;
 - (d) Access to such metering data to the SLDC shall be in accordance with the CEA Metering Regulations 2006;
 - (e) Entities in whose premises the IEMs are installed shall be responsible for
 - (i) monitoring the healthiness of the CT and PT inputs to the meters, (ii) taking weekly meter readings for the seven day period ending on the preceding Sunday 2400 hrs and transmitting them to the SLDC by Monday noon, in case such readings have not been transmitted through automatic remote meter reading (AMR) facility (iii) monitoring and ensuring that the time drift of IEM is within the limits as specified in CEA Metering Regulations 2006 and (iv) promptly intimating the changes in CT and PT ratio to SLDC;
 - (f) The SLDC shall, based on the IEM readings, compute time block wise actual net injection and drawal of State entities in HP control area:
 - Provided that the computations done by the SLDC shall be open to all State entities for a period of twelve (12) days for checking and verification; and
 - (g) In case any error or omission is detected by self-analysis or brought to notice by an entity, the SLDC shall make a complete check and rectify the error within a period of a month from date of such detection or SLDC shall request the NRLDC for the same.
- (12) Inspection of Records.- The operational logs and records of the State entity generating stations and intra-State transmission licensees shall be available for inspection and review by the SLDC.
- (13) Oversight of Injection and Drawal.- The SLDC shall periodically review the over drawal from or under injection into the grid. In case of persistent over drawal or under injection, the matter shall be reported to the Commission for necessary action.

CHAPTER 9 CYBER SECURITY

64. **General.**- (1) This chapter deals with measures to be taken to safeguard the national grid from spyware, malware, cyber-attacks, network hacking, procedure for security audit from time to time, upgradation of system requirements and keeping abreast of latest developments in the area of cyber-attacks and cyber security requirements.

(2) All Users, SLDC and STU shall have in place, a cyber security framework in accordance with Information Technology Act, 2000, CEA (Technical Standards for Connectivity) Regulations, 2007; CEA (Cyber Security in Power Sector) Guidelines, 2021 and any such Regulations issued from time to time, by an appropriate authority to identify the critical cyber assets and protect them so as to support reliable operation of the grid.

65. **Cyber Security Audit.**-All Users, SLDC and STUs, shall conduct Cyber Security Audit STU, Discom, GENCO, Open Access Entities and all Independent Power Producers having PPA with Discom shall conduct Cyber Security Audit of Operational Technology (OT) & Information Technology (IT) system as per the guidelines mentioned in the CEA (Cyber Security in Power Sector) Guidelines, 2021 and any other guidelines issued by an appropriate Authority. The Audit report shall be supplied to the SLDC after conducting every audit.

66. **Mechanism of Reporting.**-All entities shall immediately report to the appropriate government agencies in accordance with the Information Technology Act, 2000 and CEA (Cyber Security in Power Sector) Guidelines, 2021, in case of any cyber-attack. The SLDC and the Commission shall also be informed by such entities in case of any instance of cyber attack.

67. **Cyber Security Coordination Forum.**- (1) The sectoral CERT (Computer Emergency Response Team) for wings of power sector, as notified by Government of India, from time to time, shall form a Cyber Security Coordination Forum with members from all concerned utilities and other statutory agencies to coordinate and deliberate on the cyber security challenges and gaps at appropriate level. A sub-committee of the same shall be formed at the regional level.

(2) The sectoral CERT shall lay down rules of procedure for carrying out their activities.

CHAPTER 10
MONITORING AND COMPLIANCE CODE

68. **Monitoring of Compliance.**- (1) State Transmission Utility and State Load Despatch Centre shall be responsible for monitoring the compliance of Users and State Transmission Licensees with the provisions, contained in HPEGC and with the procedures developed under such provisions:

Provided that the State Transmission Utility and/or State Load Despatch Centre shall not unduly discriminate against or unduly prefer any User or Transmission Licensee.

- (2) If any User fails to comply with any of the provision(s) of the HPEGC, it shall be required to inform STU without any delay, the reason for its non-compliance and shall remove its non-compliance promptly.
- (3) Wrong declaration of capacity, non-compliance of the SLDC's instructions, non-compliance of the SLDC's instructions for backing down without adequate reasons, non-furnishing data etc. shall constitute non-compliance of HPEGC and shall be subject to financial penalty as may be decided by the Commission.
- (4) In case of persistent non-compliance of the provisions of the HPEGC and/or with the procedures developed under such provisions, such matter shall be reported to the Commission by the SLDC. Consistent failure to comply with the Grid Code may lead to disconnection of the User's plant and/or facilities.
- (5) The State Load Despatch Centre may give such directions and exercise such supervision and control as may be required for ensuring the integrated grid operations and for achieving the maximum economy and efficiency in the operation of power system in the State.
- (6) Every Transmission Licensee and User connected with the operation of the power system including QCA shall comply with the directions issued by the State Load Despatch Centre.
- (7) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the State grid or in relation to any direction given under the provisions of HPEGC, it shall be referred to the Commission by the SLDC for decision:

Provided that till the time the decision of the Commission is pending, the direction of the State Load Despatch Centre shall be complied with by the Transmission Licensee or User.

- (8) Save as provided in the Act, if any Transmission Licensee or any User fails to comply with the directions issued under these Regulation, he shall be liable to a penalty not exceeding Rs. five (5) Lakh.
- (9) The Commission may order independent third-party compliance audit for any User, as deemed necessary based on the facts brought to the knowledge of the Commission.

CHAPTER 11
MISCELLANEOUS

69. **Power to Relax.**-The Commission, for reasons to be recorded in writing, may relax any of the provisions of these Regulations on its own motion or on an application made before it by an affected person to remove the hardship arising out of the operation of any of these regulations, applicable to a class of persons.
70. **Power to Remove Difficulty.**- (1) If any difficulty arises in giving effect to the provisions of these regulations, the Commission may, on its own motion or on an application made before it by the Nodal Agency, by order, make such provisions not inconsistent with the provisions of the Act or provisions of other Regulations specified by the Commission, as may appear to be necessary for removing the difficulty in giving effect to the objectives of these Regulations.
- (2) If any difficulty arises due to non-availability of provisions in these Regulations and the same is available/defined in other HPERC Regulations and CERC (Indian Electricity Grid Code) Regulations, 2023, then same shall be applicable to HP Control Area.
- 71 . **Repeal and Savings.**- (1) Save as otherwise provided in these regulations, the HPERC (Himachal Pradesh Electricity Grid Code) Regulations, 2008 and all subsequent amendments thereof shall stand repealed from the date of commencement of these Regulations.
- (2) Notwithstanding such repeal, anything done or any action taken or purported to have been done or taken including any procedure, minutes reports, confirmation or declaration of any instrument executed under the repealed Regulations shall be deemed to have been done or taken under the relevant provisions of these Regulations.
72. **Issue of Suo Moto Orders and Directions.**-The Commission may, from time to time, issue suo-motu orders and practice directions with regard to implementation of these Regulations.
73. **Treatment of these Regulations in Contract.**-The provisions of these Regulations or any amendments thereof shall not be treated under 'Change in law' in any of the agreements entered into by any of the Users covered under these Regulations.

By the order of the Commission

(Sunil Verma), HPAS
Secretary

STANDARD PLANNING DATA

Standard planning Data consist of details, which are expected to be normally sufficient for STU to investigate the impact on the State Transmission System due to User Development.

1. Hydro Electric Plant:-

1.1 General:

Site	Give location map to scale showing roads, railway lines, and transmission lines.
Site Map	Showing proposed canal, reservoir area, water conductor system, fore-bay, power house etc.
Submerged Area	Give information on area submerged, villages submerged, submerged forest land, agricultural land etc.
(i) Whether Storage Type or run of river type (ii) Whether catchment receiving discharge from other reservoir or power plant (iii) Full reservoir level (iv) Minimum draw down level (iv) Tail race level Design Head; (v) Design Head; (vi) Reservoir level v/s emerge potential curve; (vii) Restraint, if any, in water discharges; (viii) Approximate period of construction	

1.2 Connection:

i	Interconnection/ Point of Connection	Give single line diagram proposal connection with the Transmission system
ii	Step up voltage for Connection (kV)	

1.3 Station Capacity:

i	Total Power Station capacity (MW)	State whether development is carried out in phases and if so furnish details
ii	No. Of units & unit size (MW)	

1.4 Generating Unit Data:

i	Operating Head (in meters)	a. Maximum b. Minimum c. Average
	Hydro unit	Capability to operate as synchronous condenser water head versus discharge curve (a full and part load) Power requirement or water discharge while operating as synchronous conductor.

ii	Turbine	State Type and capacity
iii	Generator	Type Rating (MVA) Speed (RPM) Terminal voltage (kV) Rated Power Factor Reactive Power Capability (MVA) in the range 0.95 of leading and 0.85 of lagging MW & MVA capability curve of generating unit Short Circuit Ratio Direct axis transient (saturated) reactance (% on rated MVA) Direct axis sub-transient (saturated) reactance (% on rated MVA) Auxiliary Power Requirement (MW)
iv	Generator - Transformer	a. Type b. Rated Capacity (MVA) c. Voltage Ratio HV/LV d. Tap change Range(+% to-%) e. Percentage Impedance (Positive Sequence at full load).

2. **Transmission:-**

The STU shall make arrangements for getting the required data from different entities other transmission licensee (if any) to update its Standard Planning Data in the format given below:

i	Name of line (Indicating Power Stations and sub-stations to be connected)
ii	Voltage of line (kV)
iii	No. of circuits
iv	Route length (km.)
v	Conductor sizes
vi	Line parameters (PU values) a. Resistance/km. b. Inductance/km c. Susceptance/km(3/2)
vii	Approximate power flow expected-MW & MVA
viii	Terrain of the route-Give information regarding nature of terrain i.e. forest land, fallow land, agricultural and river basin, hill slope etc.
ix	Route Map (to scale) – Furnish topographical map showing the proposed route showing existing power lines and telecommunication lines.
x	Purpose of Connection –Reference to Scheme, wheeling to other States etc.
xi	Approximate period of Construction

3. **Distribution:-**

3.1 **General:**

i	Area Map (to scale)	Marking the area in the map of Himachal Pradesh for which Distribution Licensee is applied
ii	Consumer Data	Furnish categories of consumers, their numbers and connected loads
iii	Furnish categories of consumers their numbers and connected loads	

3.2 Connection:-

i	Points of Connection	Furnish single line diagram showing points of connection
ii	Voltage of supply at points of Connection	
iii	Names of Grid Sub-stations feeling the points of connections	

3.3 Lines and Sub-Stations:-

i	Line Data	Furnish lengths of line and voltages within the Area.
ii	Sub-station Data	Furnish details of 33/11 kV sub-station, 11/0.4 kV Sub-stations, capacitor installations or higher voltage level.

3.4 Loads:

i	Loads drawn at points of Connection
ii	Details of loads fed at EHV, if any, Give name of consumer, voltage of supply, contract demand and name of Grid Sub-station from which line is drawn, length of EHV line from Grid Sub-station to consumer's premises.
iii	Reactive power compensation installed

3.5 Demand Data (for all loads 1 MW and above)

i	Type of load	State whether furnace loads, rolling mills, traction loads, other industrial loads, pumping loads etc.
ii	Rated voltage and phase	
iii	Electrical loading of equipment	State number and size of motors, types of drive and control arrangements.
iv	Power Factor	
v	Sensitivity of load to voltage and frequency of supply	
vi	Maximum Harmonic content of load	
vii	Average and maximum phase unbalance of load	
viii	Nearest sub-station from which load is to be fed	
ix	Location map to scale	Showing location of load with reference to lines and sub-stations in the vicinity

3.6 Load Forecast Data:

Peak load and energy forecast for each category of loads for each of the succeeding 5 years. Details of methodology and assumptions on which forecasts are based.

If supply is received from more than one sub-station, the sub-station wise break up of peak load and energy projections for each category of loads for each of the succeeding 5 years alongwith estimated daily load curve.

Details of loads 1 MW and above.

Name of prospective consumer.
Location and nature of load/complex
Sub-station from which to be fed
Voltage of supply.
Phasing of load

DETAILED PLANNING DATA (GENERATION)**1 Hydro Electric Stations:-****1.1 General:**

i	Name of Power Station
ii	No and capacity of units (MVA)
iii	Ratings of all major equipment (i) Turbine (HP) (ii) Generators(MVA) (iii) Generator Transformers (MVA) (iv) Auxiliary Transformers (MVA)
iv	Single line diagram of Power Station and switchyard
v	Relaying and metering diagram
vi	Neutral grounding of generator
vii	Excitement control
viii	Earthing arrangements with earth resistance values
ix	Reservoir Data a) Salient Features b) Type of reservoir c) Multipurpose d) For Power e) Operating Table with f) Area capacity curves and g) Unit capability at different net heads

1.2. Protection:

i	Full description including settings for all relays and protections systems installed on the Generating Unit, Generator transformer, auxiliary transformer and electrical motor of major equipment included, but not limited to those listed under Sec. 3 (General).
ii	Full description including settings for all relays and protections systems installed on all outgoing feeders from Power Stations switchyard , tiebreakers, and incoming breakers.
iii	Full description of inter-tripping of breakers at the point or points of connection with Transmission system
iv	Most Probable fault clearance time for electrical faults on the User's system

1.3 Switchyard:-**(a) Interconnecting transformers:**

i	Rated MVA
ii	Voltage Ratio
iii	Vector Group
iv	Positive sequence reactance for maximum, minimum and normal Tap(% on MVA)
v	Positive sequence resistance for maximum, minimum and normal Tap(% on MVA)
vi	Zero sequence reactance(% MVA)
vii	Tap changer range (+% to-%) and steps
viii	Type of tap changer (off/on loads)
ix	Neutral grounding details.

(b) Switchgear (including circuit breakers, isolators on all circuits connected to the points of connection:-

i	Rated Voltage (kV)
ii	Type of Breaker (MOCB/ABCB/SF6)
iii	Rated short circuit breaking current (kA) 3 phase
iv	Rated short circuit breaking current (kA) 1 phase
v	Rated short circuit making current (kA) 3 phase
vi	Rated short circuit making current (kA) 1 phase
vii	Provisions of auto reclosing with details

(c) Lighting Arresters

Technical data

(d) Communications

Details of Communications equipments installed at points of connections

Basic Insulation level (kV)

i	Bus bar
ii	Switchgear
iii	Transformer Bushings
iv	Transformer windings

1.4 Generating Units:-

(a) Parameters of Generator

i	Rated terminal Voltage (kV)
ii	Rated (MVA)
iii	Rated MW
iv	Speed (rpm) or number of poles
v	Inertia constant H (MW sec./MVA)
vi	Short circuit ratio
vii	Direct axis synchronous reactance X_d (% on MVA)
viii	Direct axis (saturated) transient reactance (% on MVA X'_d)
ix	Direct axis (saturated) sub-transient reactance (% on MVA X''_d)
x	Quadrature axis synchronous reactance (% on MVA) X_q
xi	Quadrature axis (saturated) reactance (% on MVA) X'_q
xii	Quadrature axis (saturated) sub-transient reactance (% on MVA X''_d)
xiii	Direct axis transient open circuit time constant (sec) T'_{do}
xiv	Direct axis sub-transient open circuit time constant (sec) T''_{do}
xv	Quadrature axis transient open circuit time constant (sec) T'_{qo}
xvii	Quadrature axis transient open circuit time constant (sec) T''_{qo}
xviii	Stator Resistance (Ohm) R_a .
xix	Stator leakage reactance (Ohm) X_l
xx	Stator time constant (Sec.)
xxi	Rated field current (A)
xxii	Neutral grounding details.
xxiii	Open Circuit saturation characteristics of the Generator for various terminal voltages giving the compounding current to achieve this
xxiv	Type of Turbine
xxv	Operating Head (Meters)
xxvi	Discharge with full gate opening (cumecs)
xxvii	Speed Rise on total Load throw off (%)
xxviii	MW and MVA capability curve

(b)

Parameters of excitation control system	As applicable to thermal Power Stations
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(c) Parameters of governor	As applicable to thermal Power Stations
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(d) Operational Parameter:

i	Minimum notice required to Synchronise a Generating Unit from de-synchronisation
ii	Minimum time between Synchronising different Generating Units in a Power Station
iii	Minimum block load requirement on Synchronising

1.5 General Status:-

i	Detail Project Report
ii	Status Report (a) Topographical survey (b) Geological survey (c) Land (d) Environmental Clearances (e) Rehabilitation of displaced persons
iii	Techno-economic approval by Central Electricity Authority
iv	Approval of State Government / Government of India
v	Financial Tie-up

1.6 Connection:-

i Reports of Studies for parallel operation with the State Transmission system

(a)	Short Circuit Studies
(b)	Stability Studies
(c)	Load Flow Studies

ii. Proposed Connection with the State Transmission system

(a)	Voltage
(b)	No. of Circuits
(c)	Point of Connection

1.7 Reservoir Data:-

- (a) Dead Capacity
- (b) Live Capacity

3. Transmission:-

STU and Transmission Licensees

3.1 General:

i. Single line diagram of the Transmission System down to 33 kV Bus at Grid Sub-station detailing:

(a)	Name of Sub-station
(b)	Power Station connected
(c)	Number and length of circuits
(d)	Interconnecting transformers
(e)	Sub-station bus layouts
(f)	Power transformers
(g)	Reactive compensation equipment

ii Sub-station layout diagram showing:

(a)	Bus bar layouts
(b)	Electrical circuitry, lines, cables, transformers, switchgear etc.
(c)	Phasing arrangements

(d)	Earthing arrangements
(e)	Switching facilities and inter locking arrangements
(f)	Operating voltages
(g)	Numbering and nomenclature
	(i) Transformers
	(ii) Circuits
	(iii) Circuit breakers
	(iv) Isolating switches

3.2 Line Parameters (for all circuits):-

(a)	Designation of Line
(b)	Length of line (km)
(c)	Number of Circuits
(d)	Pet Circuit values
	(a) Operating Voltage (kV)
	(b) Positive Phase sequence reactance (pu on 100 MVA)XI
	(c) Positive Phase sequence reactance (pu on 100 MVA)RI
	(d) Positive Phase sequence reactance (pu on 100 MVA)BI
	(e) Zero Phase sequence reactance (pu on 100 MVA)X0
	(f) Zero Phase sequence resistance (pu on 100 MVA) R0
	(g) Zero Phase sequence susceptance (pu on 100 MVA)B0

2.3 Transformer Parameters (for all transformers):-

i	Rated (MVA)
ii	Voltage Ratio
iii	Vector Group
iv	Positive sequence reactance, maximum, minimum, and normal (pu on 100 MVA)XI
v	Positive sequence resistance, maximum, minimum, and normal (pu on 100 MVA)RI
vi	Zero sequence reactance (pu on 100 MVA)
vii	Tap change range (+% to-%) and steps
viii	Detail of Tap changer(off/on load)

2.4 Equipment Details (for all sub-stations):-

i	Circuit Breakers
ii	Isolating switches
iii	Current Transformers
iv	Potential Transformers

2.5 Relaying and Metering:-

i	Relay protection installed for all transformers and feeders along with their settings and level of co-ordination with other Users.
ii	Metering Details

2.6 System Studies:-

i	Load Flow studies (Peak and lean load for maximum hydro and maximum thermal generation).
ii	Transient stability studies for three-phase fault in critical lines.

iii	Dynamic Stability Studies
iv	Short circuit studies (three-phase and single phase to earth)
v	Transmission and Distribution Losses in the Transmission System(MVA)

2.7 Demand Data (for all sub-stations):-

i	Demand Profile (Peak and lean load)
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2.8 Reactive Compensation Equipment:-

i	Type of equipment (fixed or variable).
ii	Capacities and/or Inductive rating or its operating range in MVar.
iii	Details of control.
iv	Point of Connection to the System.

4. Distribution:-

4.1 General:

i	Distribution map (to scale) showing all line upto 11 kV and sub-stations belonging to the supplier
ii	Single line diagram of distribution System (showing distribution lines from points of Connection with the Transmission System 33/11 kV Sub-stations, 11/0.4 kV Sub-station, consumer bus if fed directly from the Transmission System)
iii	Numbering and nomenclature of lines and stations (identified with feeding Grid Sub-stations of the Transmission and concerned 33/11kV Sub-station of supplier).

4.2 Connection:-

i	Points of Connection (Furnish details of existing arrangement of Connection)
ii	Details of metering at points of Connection.

4.3 Load:-

i	Connected load- Active and Reactive Load, Furnish consumer details, Number of Consumers category wise, details of loads 1 MW and above, power factor.
ii	Information on diversity of load and coincidence factor.
iii	Daily demand profile (current and forecast) on each 33/11kV sub-station.
iv	Cumulative demand profile of Distribution System (current & forecast).

Appendix-“C”

Reactive Power and Voltage Control

(1) Reactive power compensation should ideally be provided locally, by generating reactive power as close to the reactive power consumption as possible. The STU/Users are, therefore, expected to provide local VAR compensation/ generation such that they do not draw VARs from the EHV grid, particularly under low-voltage condition. To discourage VAR drawals by STU/Users, VAR exchanges with IaSTS shall be priced as follows:-

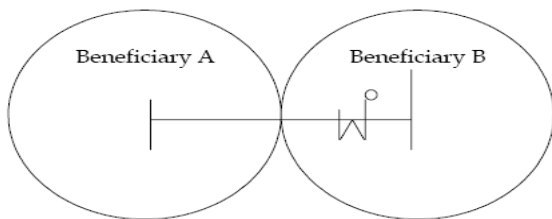
- (i) The STU/Users pays for VAR drawal when voltage at the metering point is below 97%
- (ii) The STU/Users gets paid for VAR return when voltage is below 97%.
- (iii) The STU/Users gets paid for VAR drawal when voltage is above 103%.
- (iv) The STU/Users pays for VAR return when voltage is above 103%.

Provided that there shall be no change/payment for VAR drawal/ return by a Beneficiary on its own line emanating directly from an IaSGS.

- (2) The charge for VARh and annual escalation shall be as specified by the Commission separately.
- (3) Notwithstanding the above, SLDC may direct a STU/Users to curtail its VAR drawal/injection in case the security of grid or safety of any equipment is endangered.
- (4) VAR exchange directly between two Users, STU and Users on the interconnecting lines owned by them (singly or jointly) generally address or cause a local voltage problem, and generally do not have an impact on the voltage profile of the State Grid. Accordingly, the management/control and commercial handling of the VAR exchanges on such lines shall be as per following provisions, on case-by-case basis:-
 - (a) The two Users, STU and Users may mutually agree not to have any charge/payment for VAR exchanges between them on an interconnecting line.
 - (b) The two Users, STU and Users may mutually agree to adopt a payment rate/scheme for VAR exchanges between them identical to or at variance from that specified by the Commission for VAR exchanges with IaSTS. If the agreed scheme requires any additional metering, the same shall be arranged by the Users/STU.
 - (c) In case of a disagreement between the Users/STU (e.g. one party wanting to have the charge/payment for VAR exchanges, and the other party refusing to have the scheme), the scheme as specified in annexure to this Appendix shall be applied. The per kVARh rate shall be as specified by the Commission for VAR exchanges with IaSTS.
 - (d) The computation and payments for such VAR exchanges shall be effected as mutually agreed between the two Users, STU and Users.

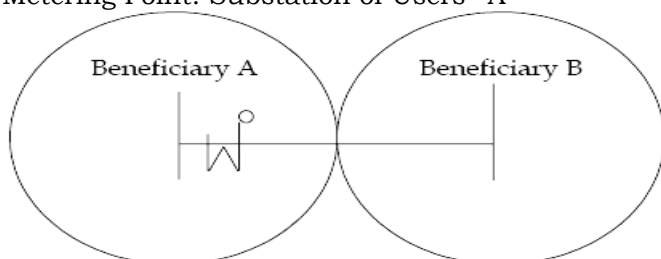
Case-1:

Interconnecting line owned by Users-A
Metering Point: Sub-station of Users -B



Case-2:

Interconnecting line owned by Users -B
Metering Point: Substation of Users -A



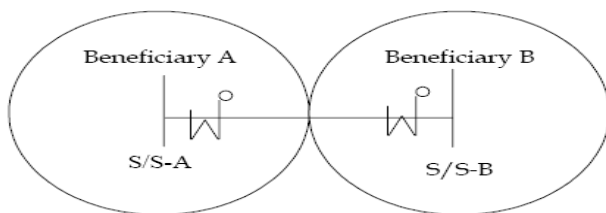
Beneficiary-B pays to Beneficiary-A for

- (i) Net VARh received from Beneficiary-A while voltage is below 97%, and
- (ii) Net VARh supplied to Beneficiary -A while voltage is above 103%

Note: Net VARh and payment may be positive or negative

Case-3:

Interconnecting line is jointly owned by Beneficiary-A and Beneficiary -B
Metering points: Substations of Beneficiary-A and Beneficiary-B



Net VARh exported from S/S-A, while voltage <97% =X1
Net VARh exported from S/S-A, while voltage > 103%=X2
Net VARh imported at S/S-B, while voltage < 97% = X3
Net VARh imported at S/S-B, while voltage > 103% = X4

- (i) Beneficiary-B pays to Beneficiary-A for X1 or X3, whichever is smaller in magnitude, and
- (ii) Beneficiary -A pays to Beneficiary-B for X2 or X4, whichever is smaller in magnitude.

Note: (i) Net VARh and net payment may be positive or negative.
(ii) In case X1 is positive and X3 is negative, or vice-versa, there would be no payment under (i) above.
(iii) In case X2 is positive and X4 is negative, or vice-versa, there would be no payment under (ii) above.

Appendix-“D”

Procedure Specifying Data, Forecasting and Scheduling for Renewable Energy Generating Stations (REGS) at Intra-State Level

1. Introduction.-

- (a) This Procedure contains requirements of data submission by Renewable Energy Generating Station or QCA on behalf of Renewable Energy Generating Station(s), prior to COD and real time and scheduling methodology to be followed for multiple renewable energy generating station(s) connected at a pooling station.
- (b) The responsibility to provide forecast and other data and to coordinate with SLDC under this Procedure shall be that of Qualified Coordinating Agency on behalf of all generating stations it is representing:
Provided that where Qualified Coordinating Agency is not identified, individual renewable energy generating station or lead generator, as the case may be, shall be responsible for the same.

2. Role of Entities.-

2.1 QCA or Renewable Energy Generating Station or Lead Generator

- (a) The individual generating station or Lead Generator shall submit one time details to concerned SLDC as per **Annexure of this Appendix**. Further, if there is any change in the information furnished, then the updated information shall be shared with the concerned SLDC not later than seven (7) working days of such change.
- (b) QCA (for the REGSs it is representing) or REGS (who are not represented through QCA) or Lead Generator shall undertake the following activities:
 - (i) QCA or Lead Generator (for generating stations it is representing) shall undertake technical coordination amongst the generators it is representing, connected at a pooling station.
 - (ii) Provide Available Capacity, Day ahead forecast (based on their own forecast or on the forecast done by SLDC) and Schedule as per **Annexure of this Appendix**, through web based application maintained by SLDC.
 - (iii) Provide real time data at turbine/inverter level and generation data at pooling station level as per **Annexure of this Appendix**.
 - (iv) Provide monthly data:
 - (a) For wind plants- average wind speed, average power generation for 15-min time block for each turbine
 - (b) For solar plants - average solar irradiation, average power generation at 15-min time block level for all inverters* ≥ 1 MW

* if a solar plant uses only smaller string inverters, then data may be provided at the plant level
 - (v) Be responsible for metering and data collection, transmission and co-ordination with NRLDC, SLDC, NRPC, CTU and other agencies as per IEGC, HPEGC and to the extant relevant CERC & applicable HPERC DSM Regulations.

- (vi) Undertake commercial settlement for deviation as per applicable HPERC DSM Regulations.
- (vii) Submit a copy of the consent to the SLDC wherein it is mentioned that QCA shall undertake all operational and commercial responsibilities on behalf of generating stations as per the applicable HPERC Regulations.
- (viii) Use Automatic meter reading technologies for transfer, analysis and processing of interface meter data.
- (ix) Shall furnish the contract rate(s) along with a copy of the contract(s), for the purpose of Deviation charge account preparation, to SLDC.
- (x) Shall comply the instruction of SLDC in normal operation as well as emergency condition.
- (xi) Shall establish protocol for communication with individual generators to implement the instructions of SLDC effectively.
- (xii) Shall maintain records and accounts of the time-block wise Schedules, the Actual generation injected and the deviation, for the polling station and individual generator(s) separately.
- (xiii) Shall ensure availability of data telemetry at the turbine/ inverter level to the SLDC and shall ensure the correctness of the real-time data and undertake the corrective actions, if required. The suggested data telemetry requirement is enclosed at Appendix-III to this Annexure.
- (xiv) Keep the SLDC indemnified at all times and shall undertake to indemnify, defend and save the SLDC/ NRLDC harmless from any and all damages, losses including commercial losses due to forecasting error, claims and actions including those relating to injury to or death of any person or damage to property, demands, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the transactions undertaken by the Generators.

2.2 **SLDC:-**

- (a) The SLDC shall be responsible for scheduling, communication, coordination with QCA or generating station or Lead Generator.
- (b) The SLDC will be responsible for processing the interface meter data and computing the net injections at pooling station represented by each QCA or REGS or Lead Generator, as the case may be, as specified in **Annexure of this Appendix**.

2.3 **Forecasting:-**

- (1) QCA or generating station or Lead Generator shall provide the forecast to the SLDC which may be based on their own forecast or SLDC's forecast as per **Annexure of this Appendix**.
- (2) QCA or generating station or Lead Generator may prepare their schedule based on the forecast done by the SLDC or their own forecast. Any commercial impact on account of deviation from schedule based on the forecast chosen by the QCA shall be borne by the QCA.

2.4 Scheduling and Despatch:-

(1) Following alternatives exist for Scheduling and Despatch for Generators within Solar/Wind/Hybrid Power parks due to multiple generation developers within the Park injecting at various points within the park and ultimately injecting at interface with IaSTS:

- (a) Case-1 QCA has been identified for all generating stations connected at a pooling station.
- (b) Case-2 Where QCA at a pooling station is identified for some of the generating stations but not all of generating stations at such pooling station
- (c) Case-3 Where QCA at a pooling station is not identified following situations may arise

Case-A: The SLDC shall be responsible for the scheduling, communication, coordination with RE Generators of 5 MW and above and connected to Intra State Transmission System (IaSTS).

Case-B: Lead generator shall be responsible for the coordination and communication with the SLDC and other agencies for scheduling of RE Generators individually having less than 5 MW, but collectively having an aggregate installed capacity of 5 MW and above and connected within the solar park.

- (2) For Case-1, QCA shall be responsible for doing de-pooling of DSM charges as per the mutual agreement between generators and QCA.
- (3) For Case- 2 and Case- 3, where scheduling and accounting is to be coordinated by SLDC, a representative sketch showing the scheduling is at **Annexure of this Appendix**.
- (4) The change of QCA would need a notice period of fifteen (15) days and the changeover shall take place with effect from 0000 hours of a Monday, the first day of weekly settlement cycle.
- (5) In case of any payment default by the QCA, the generators shall be liable to pay the DSM charges in proportion to their MW capacity.

Annexure-1

Details to be submitted by the Wind/Solar generating stations which are regional entities/ lead generator, principal generator	
Type: Wind/Solar Generator	
Individual / on Behalf of Group of generators	
If on Behalf of Group of generators group of then details of agreement to be attached	

Total Installed Capacity of Generating Station	
Total Number of Units with details	
Physical Address of the RE Generating Station	
Whether any PPA has been signed: (Y/N)	If yes ,then attach details
Connectivity Details	Location/Voltage Level
Metering Details	Meter No. 1. Main 2. Check
Connectivity Diagram	(Please Enclose)
Static data	As per attached sheet
Contact Details of the Nodal Person	Name : Designation : Number: Landline Number, Mobile Number, Fax Number
Contact Details of the Alternate Nodal Person	Name : Designation : Number: Landline Number, Mobile Number, Fax Number

Data to be submitted by the RE Generator / lead generator, principal generator for Wind turbine generating plants

Sr. No.	Particulars
1	Type
2	Manufacturer
3	Make /Model
4	Capacity
5	COD
6	Hub height
7	Total height
8	RPM range
9	Rated wind speed
Performance Parameters	
11	Rated electrical power at rated wind speed
12	Cut in speed
13	Cut out speed
14	Survival speed (Max wind speed)
15	Ambient temperature for out of operation
16	Ambient temperature for in operation
17	Survival temperature

18	Low Voltage Ride Through (LVRT) setting
19	High Voltage Ride Through (HVRT) setting
20	Lightning strength (KA & in coulombs)
21	Noise power level (db)
22	Rotor
23	Hub type
24	Rotor diameter
25	Number of blades
26	Area swept by blades
27	Rated rotational speed
28	Rotational Direction
29	Coning angle
30	Tilting angle
31	Design tip speed ratio
Blade	
32	Length
33	Diameter
34	Material
35	Twist angle
Generator	
36	Generator Type
37	Generator no of poles
38	Generator speed
39	Winding type
40	Rated Gen.Voltage
41	Rated Gen. frequency
42	Generator current
43	Rated Temperature of generator
44	Generator cooling
45	Generator power factor
46	KW/MW @ Rated Wind speed
47	KW/MW @ peak continuous
48	Frequency Converter
49	Filter generator side
50	Filter grid side
Transformer	
51	Transformer capacity
52	Transformer cooling type
53	Voltage
54	Winding configuration
Weight	
55	Rotor weight
56	Nacelle weight
57	Tower weight
58	Over speed Protection
59	Design Life

60	Design Standard
61	Latitude
62	Longitude
63	COD Details
64	Past Generation History from the COD to the date on which DAS facility provided at NRLDC, if applicable
65	Distance above mean sea level

For Solar generating Plants: Static data points:

1. Latitude
2. Longitude
3. Power Curve
4. Elevation and orientation angles of arrays or concentrators
5. The generation capacity of the Generating Facility
6. Distance above mean sea level etc.
7. COD details
8. Rated voltage
9. Details of Type of Mounting: (Tracking Technology If used, single axis or dual axis, auto or manual)
10. Manufacturer and Model (of Important Components, Such as Concentrators, Inverter, Cable, PV Module, Transformer, Cables)
11. DC installed Capacity
12. Module Cell Technology
13. I-V Characteristic of the Module
14. Inverter Rating at different temperature
15. Inverter Efficiency Curve
16. Transformer Capacity & Rating, evacuation voltage, distance form injection point

Annexure-II

Forecast and Schedule Data to be submitted by QCA, generator-wise

FORMAT: A (to be submitted a day in advance)

15 Min time block (96 Block in a day)	TIME	Available Capacity (MW) - Day Ahead	Day Ahead Forecast (MW)	Day Ahead Schedule (MW)
1	00:00-00:15			
2	00:15-00:30			
3	00:30-00:45			
4	00:45-01:00			
94				
95				
96				

Note: The forecast should ideally factor forecasting errors. As such schedule should ordinarily be same as forecast.

FORMAT: B (to be submitted on the day of actual generation, revision of availability and schedule, if any, shall be done as per this Grid Code.

15 Min time block (96 Block in a day)	TIME	Day ahead schedule(MW)	Current Available Capacity (MW)	Revised Schedule (MW)
1	00:00-00:15			
2	00:15-00:30			
3	00:30-00:45			
4	00:45-01:00			
.				
94				
95				
96				

Annexure – III

Real-time Data Telemetry requirement (Suggested List)

Wind turbine generating plants

1. Turbine Generation (MW/MVAR)
2. Wind Speed(meter/second)
3. Generator Status (on/off-line)- this is required for calculation of availability of the WTG
4. Wind Direction (degrees from true north)
5. Voltage (Volt)
6. Ambient air temperature (°C)
7. Barometric pressure (Pascal)
8. Relative humidity (in percent)
9. Air Density (kg/m³)

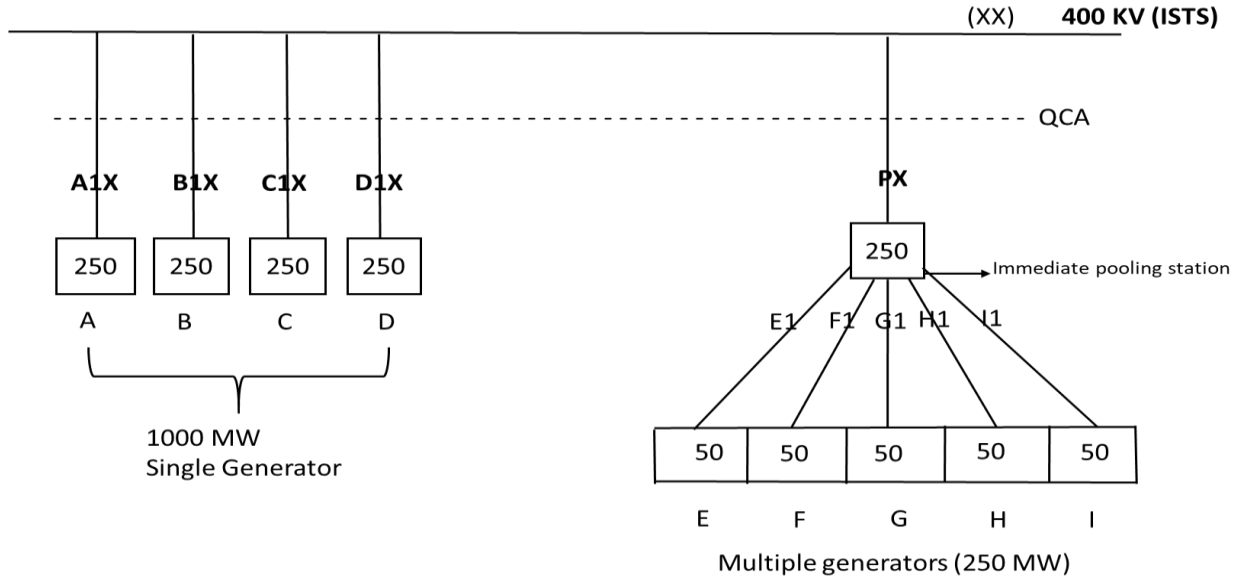
For Solar generating Plants

1. Solar Generation unit/ Inverter-wise (MW and MVAR)
2. Voltage at interconnection point (Volt)
3. Generator/Inverter Status (on/off-line)
4. Global horizontal irradiance (GHI)- Watt per meter square
5. Ambient temperature (°C)
6. Diffuse Irradiance- Watt per meter square
7. Direct Irradiance- Watt per meter square
8. Sun-rise and sunset timings
9. Cloud cover-(Okta)
10. Rainfall (mm)
11. Relative humidity (%)
12. Performance Ratio

Annexure – IV

Block Diagram showing the case wise Scheduling and Forecasting considering a sample case

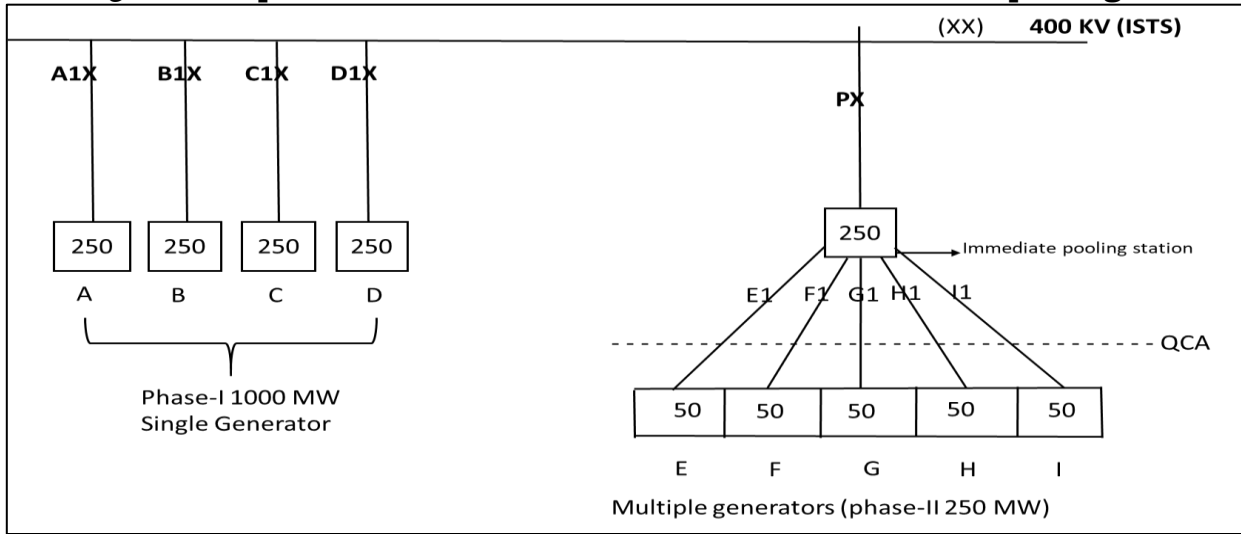
Case-I (QCA responsible for all generators):



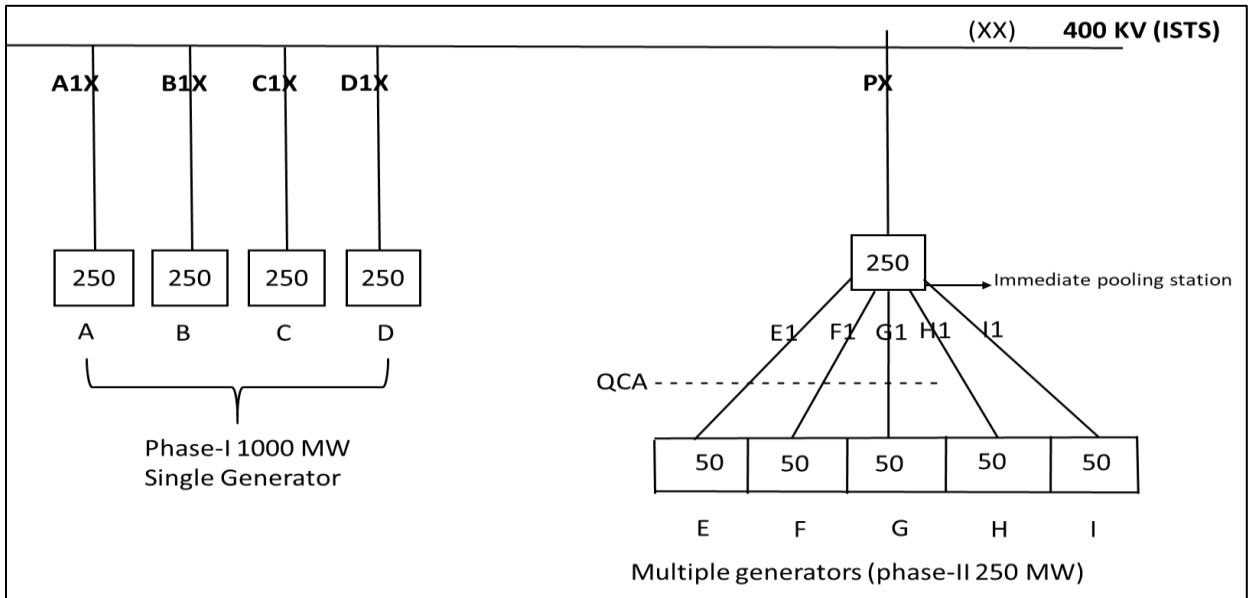
- (a) Suppose an REGS of 1000 MW capacity is developed in four blocks namely A,B,C & D of 250 MW capacity each and is directly connected to point A1,B1,C1& D1 respectively at IaSTS. Let REGSs of 50 MW each aggregating to 250 MW (5 Nos. namely E, F, G, H & I) be connected to intermediate pooling station. REGSs are connected to interface point E1, F1, G1, H1& I1 and thereby connected to IaSTS at XX point.
- (b) Suppose all the REGSs have mutually agreed to appoint a QCA for all scheduling and forecasting activities, such QCA, shall be responsible for carrying out activities as assigned under this Code.

Case-2 (QCA responsible for some of the generators):

A. QCA is responsible for all REGS connected at Intermediate pooling station

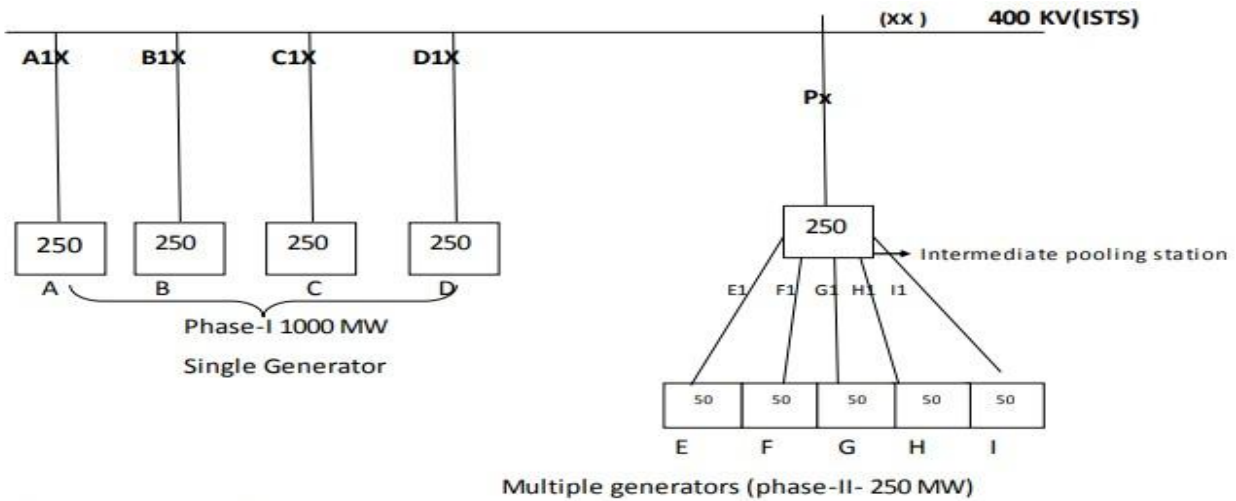


B. QCA responsible for some REGS connected at Intermediate pooling



In each of the above scenarios, the QCA shall be responsible for coordination of scheduling and de-pooling of DSM charges for all those REGS that mutually agreed to appoint a QCA. The other REGS shall be required to submit their schedule as well as be liable to pay their DSM charges.

Case-3: 50 MW and above (Phase-I &II)



Phase-I – 1000 MW,

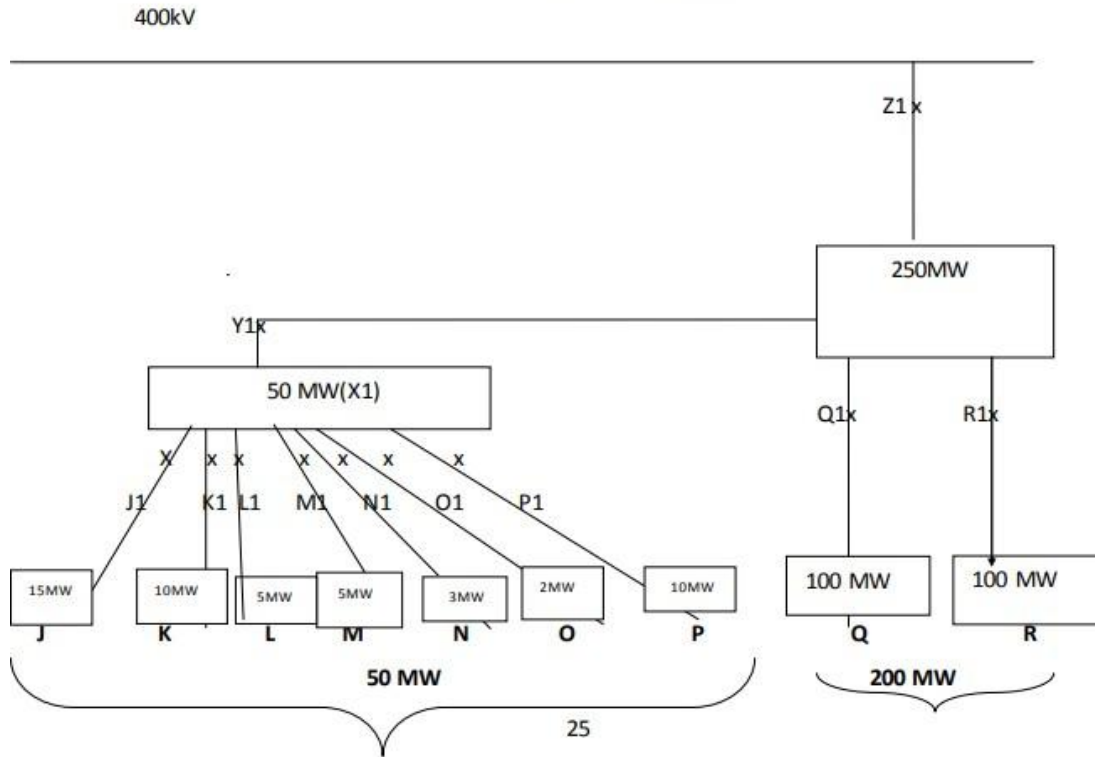
A single generator of 1000 MW capacity is developing the generating station in phase-1 in four blocks namely A,B,C & D of 250 MW capacity each and is directly connected to point A1,B1,C1& D1 respectively at IaSTS. At the interface point scheduling and forecasting shall be done by SLDC.

Phase-II- 500 MW (Separate Generator/Entities)

- (a) Let multiple REGS of 50 MW each aggregating to 250 MW (5 Nos. Multiple Generator of 50 MW each (as separate entities), be connected to intermediate pooling stations
- (b) REGS namely E, F, G, H & I each having the capacity of 50 MW each are connected to interface point E1, F1, G1, H1& I1 and thereby connected to IaSTS at XX point.
- (c) In such a case, scheduling, accounting, forecasting for these generators needs to be segregated at point E1, F1,G1, H1, I1. Scheduling shall be done at point P and shall be segregated at E1,F1,G1,H1,I1 by SLDC.
- (d) Further there may be case where multiple generators less than 50MW (<50MW) capacity are connected to the intermediate pooling station are stated as under: -

Case-II Below 50 MW

Phase-II(250 MW)



- (e) Let us consider, multiple REGS (namely J,K,L,M,N,O&P) collectively having an aggregate installed capacity of 50 MW or more and are represented through a Lead Generator. Further REGS Q & R each of 100 MW are connected at Q1 & R1. All these REGS are connected to IaSTS at point Z1.
- (f) Scheduling and forecasting for the REGSs J,K,L,M,N,O& P shall be done at Point Z1, but need to segregated at Point J1, K1,L1, M1, N1,O1& P1 and for REGSs Q & R needs to be segregated at Q1 and R1. In this case, the SLDC shall schedule at point Z1 and segregate at Y1,Q1& R1. The lead generator shall provide aggregated schedule to the SLDC at Y1. Further the lead generator shall do segregation of schedules and other operational & commercial activities for generators J,K,L,M,N,O,P at points J1, K1,L1, M1, N1,O1& P1.

ABBERRATIONS	
STU	State Transmission Utility
IASTS	Intra State Transmission System
IEGC	Indian Electricity Grid Code
SLDC	State Load Dispatch Centre
CEA	Central Electricity Authority
CERC	Central Regulatory Commission
EHV	Extra High Voltage
COD	Date Of Commercial Operation
HPEGC	Himachal Pradesh Electricity Grid Code
OCC	Operation And Co-ordination Committee
PCC	Protection Co-ordination Committee
SCADA	Supervisory Control And Data Acquisition
ADMS	Advance Distribution Management System
ISTS	Inter State Transmission System
NRLDC	Northern Region Load Dispatch Centre
NRPC	Northern Regional Power Committee
SVC	Static Volt Ampere Reactive Compensator
SVG	Static Volt Ampere Reactive Generator
FACTS	Flexible Alternating Current Transmission System
SSGS	State Sector Generating Station
PPA	Power Purchase Agreement
ISGS	Inter State Generating System
IPPs	Independent Power Producers
REGS	Renewable Energy Generating Stations
GNA	General Network Access
SPC	State Power Committee
PLCC	Power Line Carrier Communications
ESS	Energy Storage System
PSP	Pumped Storage Plant
MCR	Maximum Continuous Rating
AC	Alternating Current
DC	Direct Current
LVRT	Low Voltage Ride-Through
HVRT	High Voltage Ride-Through
RLDC	Regional Load Dispatch Centre
ATS	Associated Transmission System
RPC	Regional Power Committee
AVR	Automatic Voltage Regulator
PSS	Power System Stabilizers
PPC	Power Plant Controller
UFR	Under Frequency Relays
HVDC	High Voltage Direct Current

VSC	Voltage Source Converter
PRAS	Primary Reserve Ancillary Services
UFLS	Under Frequency Load Shedding
FRC	Frequency Response Characteristics
ACE	Area Control Error
SRAS	Secondary Reserve Ancillary Services
ALDC	Area Load Dispatch Centre
LGBR	Load Generation Balance Report
EMS	Energy Management System
UVLS	Under Voltage Load Shedding
QCA	Qualified Co-coordinating Agency
DR	Disturbance Recorder
EL	Event Logger
DAS	Data Acquisition System
GD	Grid Disturbance
GI	Grid Incident
SLD	Single Line Diagram
TCSC	Thyristor Controlled Series Capacitor
WTG	Wind Turbine Generator
STATCOM	Static Synchronous Compensator
OEM	Original Equipment Manufacturer
TTC	Total Transformer Capacity
LADF	Load Area Development Fund
STOA	Short Term Open Access
LTA	Long Term Access
MTOA	Medium Term Open Access
AMR	Automatic Remote Meter Reading
OT	Operational Technology
IT	Information Technology
CERT	Cyber Emergency Response Team