

UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION

LUCKNOW

DRAFT UTTAR PRADESH ELECTRICITY GRID CODE REGULATIONS, 2026

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	Uttar Pradesh Electricity Regulatory Commission Vidyut Niyamak Bhawan, Vibhuti Khand, Gomti Nagar Lucknow-226010
Phone 0522-2720426 Fax 0522-2720423 E-mail secretary@uperc.org, www.uperc.org	
Ref: UPERC/D(T&S)JD(T)/209/491	Dated: July 23, 2026
<u>PUBLIC NOTICE</u> The Commission has framed draft Uttar Pradesh Electricity Regulatory Commission (Uttar Pradesh Electricity Grid Code) Regulations, 2026 along with its Explanatory Memorandum, which is available on the Commission's website www.uperc.org. The Commission hereby invites written suggestions and/or objection from all stakeholder/public on draft Uttar Pradesh Electricity Regulatory Commission (Uttar Pradesh Electricity Grid Code) Regulations, 2026, which may be sent to the Secretary, Uttar Pradesh Electricity Regulatory Commission formally by post along with soft copies of the same be sent on e-mail at secretary@uperc.org on or before 21.08.2026. The Commission shall hold "Public Hearing" on 01.09.2026 at 11:00 Hrs. in the office of the Commission. All the suggestions and/or objections received on or before 21.08.2026 shall be considered by the Commission.  Secretary	

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Phone 0522-2720426 Fax 0522-2720423 E-mail secretary@uperc.org, www.uperc.org	
Ref: UPERC/D(T&S)JD(T)/209/558	Dated: August 10, 2026
<u>PUBLIC NOTICE</u> In continuation of Public Notice No. UPERC/D(T&S)JD(T)/209/491, dated 23.07.2026, whereby it was informed that the public hearing on Draft Uttar Pradesh Electricity Regulatory Commission (U.P. Electricity Grid Code Regulation), 2026 was scheduled to be held on 01.09.2026, it is hereby notified that, due to administrative reasons, the said public hearing has been rescheduled. Accordingly, the public hearing shall now be held on 02.09.2026 at 11:00 hours in the Office of the Commission. Rest of the contents of Public Notice No. UPERC/D(T&S)JD(T)/209/491, dated 23.07.2026 shall remain unchanged.  Secretary	

**UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION
LUCKNOW**

No. UPERC/Secy/Regulation/2026/017

Lucknow Dated 23 JULY 2026

DRAFT NOTIFICATION

In exercise of powers conferred under clause (h) of sub-section (1) of Section 86 read with Section 181 of the Electricity Act, 2003 (36 of 2003), and all other powers enabling it in this behalf, and after previous publication, the Uttar Pradesh Electricity Regulatory Commission hereby specifies the Uttar Pradesh Electricity Grid Code (UPEGC), as under:

CHAPTER 1

PRELIMINARY

1. Short Title, Extent and Commencement

- (1) These regulations may be called the Uttar Pradesh Electricity Regulatory Commission (Uttar Pradesh Electricity Grid Code) Regulations, 2026.
- (2) These regulations shall come into force from the date of their publication in the Official Gazette;
Provided that different date may be appointed for commencement of tertiary reserves in the state control area, as may be notified by the Commission separately;

Provided further that different date may be appointed for commencement of security constrained economic despatch in the state control area, as may be notified by the Commission separately.

2. Scope and Extent of Application

- (1) These regulations shall apply to: State Transmission Utility, State Load Despatch Centre, all users including generating companies, captive generating plants, energy storage systems and licensees connected with and/or utilizing the intra-State transmission system, State Power Committee, State Renewable Energy Management Centre, Renewable Power Park Developers, Lead Generators, Lead ESSs and Qualified Coordinating Agencies to the extent applicable.
- (2) UPEGC shall apply for the intra-State transmission of electricity whereas IEGC shall apply for the inter-State transmission of electricity.
- (3) UPEGC shall not affect the obligations of State Transmission Utility, State Load Despatch Centre and users and other stakeholders as laid down under IEGC notified by CERC, and/or the Electricity Act, 2003 and rules and regulations made thereunder.

3. Definitions

(1) In these regulations, unless the context otherwise requires:

Sr.No.	Particulars	Definition
1	“Act”	means the Electricity Act, 2003 (36 of 2003);
2	“Alert State”	means the state in which the operational parameters of the power system are within their respective operational limits, but a single N-1 contingency leads to violation of system security;
3	“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 (PRAS), Secondary Reserve Ancillary Service (SRAS), Tertiary Reserve Ancillary Service (TRAS), active power support for load following, reactive power support, black start and such other services as defined in IEGC;
4	“Ancillary Services Regulations” or “AS Regulations”	means the Central Electricity Regulatory Commission (Ancillary Services) Regulations, 2022 specifying therein norms and framework for ancillary services, shall be applicable to the intra-State transmission of electricity till appropriate regulations on Ancillary Services is framed by the Uttar Pradesh Electricity Regulatory Commission;
5	“Appropriate Load Despatch Centre”	means National Load Despatch Centre (NLDC) or Regional Load Despatch Centre (RLDC) or State Load Despatch Centre (SLDC) or Area Load Despatch Centre (ALDC), as the case may be;
6	“Appropriate Transmission Utility”	means Central Transmission Utility (CTU) or State Transmission Utility (STU), as the case may be;
7	“Area Control Error” or “ACE”	means the instantaneous difference between a control area's net actual interchange and net scheduled interchange, taking into account the effects of frequency bias and correction of measurement errors, as specified under IEGC;

8	“Area Load Despatch Centre” or “ALDC”	means the centre as established by distribution licensee for load despatch and controlling power system operation within his area of supply, carrying out the directions of SLDC and performing such duties as specified in these regulations;
9	“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;
10	“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;
11	“Auxiliary Energy Consumption” or “AUX”	shall have the same meaning as defined in the applicable UPERC Regulations;
12	“Available Capacity”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2018;
13	“Available Transfer Capability” or “ATC”	means available power transfer capability across control areas or between InSTS and distribution licensee network declared by SLDC for scheduling transactions in a specific direction with due consideration for the network security. Mathematically, ATC is the Total Transfer Capability (TTC) less Transmission Reliability Margin (TRM);
14	“Base Load Operation”	means operation at maximum continuous rating or its high fraction;
15	“Beneficiary”	means a person who has a share in an InSGS in terms of sub-clause (143) of this clause;
16	“Bilateral Transaction”	means a transaction for exchange of power between a specified buyer and a specified seller directly or through a trading licensee;

17	“Blackout State”	means a condition at a specific time where a part or all the operations of the power system have got suspended;
18	“Black Start”	means the startup of a generating unit or gas turbine or internal combustion engine based generating set without use of external power following a partial or a total blackout in the State;
19	“Black Start Procedure”	means the procedure necessary to recover from a partial or a total blackout in the State;
20	“Bulk Consumer”	shall have the same meaning as defined in CEA Technical Standards for Connectivity Regulations;
21	“Bulk Power Transmission Agreement” or “BPTA”	means the agreement signed between STU / any other intra-State transmission licensee and long-term / medium-term open access customer (including distribution licensee), for availing transmission services under Section 62 of the Act;
22	“Buyer”	means a person, including distribution licensee purchasing electricity through a transaction scheduled through intra-State transmission system in accordance with these regulations;
23	“Captive Generating Plant” or “CGP”	shall have the same meaning as defined in sub-section (8) of Section 2 of the Act;
24	“Central Commission”	means the Central Electricity Regulatory Commission (CERC) referred to in sub-section (1) of Section 76;
25	“Central Electricity Authority” or “CEA”	means the Central Electricity Authority referred to in sub-section (1) of Section 70;
26	“CEA Grid Standards Regulations”	means the Central Electricity Authority (Grid Standards) Regulations, 2010;
27	“CEA Transmission Planning Criteria”	means the CEA Manual on Transmission Planning Criteria, 2023 issued by the Central Electricity Authority for transmission system planning;

28	“CEA Metering Regulations”	means the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006;
29	“CEA Safety Regulations”	means the Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023;
30	“CEA Technical Standards for Communication Regulations”	means the Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020;
31	“CEA Technical Standards for Connectivity Regulations”	means the Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007;
32	“CEA Technical Standards for Construction Regulations”	means the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022;
33	“Central Generating Station” or “CGS”	means the generating station owned by a company owned or controlled by the Central Government;
34	“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;
35	“CERC Communication System Regulations”	means the Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017;
36	“CERC DSM Regulations”	means the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024;
37	“Cold Start”	in relation to steam turbine means start up after a shutdown period exceeding 72 hours (turbine metal temperatures below approximately 40% of their full load values);

38	“Commission”	means the Uttar Pradesh Electricity Regulatory Commission (UPERC) constituted under sub-section (1) of Section 82 of the Act;
39	“Committed Transmission Line”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
40	“Communication System”	means a collection of individual communication networks, communication media, relaying stations, tributary stations, terminal equipment usually capable of interconnection and inter-operation to form an integrated communication for power sector including existing communication system of intra-State transmission system or inter-State transmission system, satellite, cellular, optical fiber and radio communication system and their auxiliary power supply system used for regulation of intra-State and inter-State transmission of electricity;
41	“Congestion”	means a situation where the demand for transmission capacity or power flow on any transmission corridor exceeds its Available Transfer Capability (ATC);
42	“Connection Agreement”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
43	“Connectivity”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
44	“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;
45	“Control Centre”	means National Load Despatch Centre (NLDC) or Regional Load Despatch Centre (RLDC) or State Load Despatch Centre (SLDC) or State Renewable Energy Management Centre

		(SREMC) or Area Load Despatch Centre (ALDC) including main and backup as applicable;
46	“Control Load”	in relation to coal or lignite based thermal generating units, means the lowest load at which the rated steam temperature can be maintained under auto control system;
47	“Cyber Security”	means protecting information, equipment, devices, computer, computer resource, communication device and information stored therein from unauthorised access, use, disclosure, disruption, modification or destruction as defined in clause (nb) of sub-section (1) of section 2 of the Information Technology Act, 2000 (21 of 2000);
48	“Data”	means a set of values of analogue or digital signal including a text, voice, video, tele-protection, alarm, control signal, phasor, weather parameter, parameter of a machine or power system;
49	“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;
50	“Date of Commercial Operation” or “COD”	shall have the same meaning as specified under these regulations;
51	“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 IEGC or whole of the day, duly taking into account the availability of fuel or water, and subject to further qualification as per provisions of Scheduling and Despatch Code of these regulations;
52	“Demand”	means the demand of active power in MW and reactive power in MVA _r ;
53	“Demand Response”	means variation in electricity usage by the open access consumer / captive user or by the distribution licensee or by a control area manually or automatically, on standalone or

		aggregated basis, in response to the system requirements as identified by the concerned Load Despatch Centre;
54	“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 and accordingly the expression “Scheduled Generation” or “Scheduled Injection” for a time block or any period means the schedule of generation or injection in MW or MWh ex-bus, including the schedule for Ancillary Services given by State Load Despatch Centre;
55	“Deviation”	in a time block for a seller of electricity means its total actual injection minus its total scheduled generation, and for a buyer of electricity means its total actual drawal minus its total scheduled drawal;
56	“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;
57	“Drawal Schedule”	means the summation of the station-wise ex-power plant drawal schedules from all ISGS / InSGS and drawal from or injection to State grid under open access transactions and accordingly the expression “Scheduled Drawal” for a time block or any period means the schedule of drawal in MW or MWh ex-bus, including the schedule for Ancillary Services given by State Load Despatch Centre;
58	“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;
59	“Energy Account”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
60	“Energy Accounting and Audit Meter”	shall have the same meaning as defined in the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006;

61	“Energy Charge”	means the energy charge for the generating stations whose tariffs are determined or adopted or approved by the Commission under Section 62 or Section 63 or Section 86(1)(b) of the Act.
62	“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;
63	“Event”	means an unscheduled or unplanned occurrence in the grid including faults, incidents and breakdowns;
64	“Event Logging Facilities”	means a device for recording the chronological sequence of operations, of the relays and other equipment;
65	“Ex-Power Plant”	means net MW or MWh output of a generating station, after deducting auxiliary consumption and transformation losses;
66	“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;
67	“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;
68	“Flat Tie-line Control”	means a mechanism for correcting ACE by factoring in only the deviation of net actual interchange from net scheduled interchange, and ignoring frequency deviation;
69	“Flexible Alternating Current Transmission System” or “FACTS”	means a power electronics based system and other static equipment that provide control of one or more AC transmission system parameters to improve power system stability, enhance controllability and increase power transfer capability of transmission systems;
70	“Flow-gate”	means a group of parallel transmission line(s), outage of which may lead to cascade tripping or separation of systems or loss of generation complex or loss of load centre;

71	“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;
72	“Free Governor Mode of Operation” or “FGMO”	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. The amount of loading or unloading is proportional to the governor droop.
73	“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 $\text{FRC} = \text{Change in Power } (\Delta P) / \text{Change in Frequency } (\Delta f);$
74	“Frequency Response Obligation” or “FRO”	means the minimum frequency response a control area has to provide in the event of any frequency deviation;
75	“Frequency Response Performance” or “FRP”	means the ratio of actual frequency response with frequency response obligation;
76	“Frequency Stability”	means the ability of the transmission system to maintain stable frequency in the normal state and after being subjected to a disturbance;
77	“Generating Company”	shall have the same meaning as defined in sub-section (28) of Section 2 of the Act;
78	“Generating Station”	shall have the same meaning as defined in sub-section (30) of Section 2 of the Act;
79	“Generating Unit”	means a) a 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 Renewable Hybrid Generating Station (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;
80	“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;
81	“Green Energy” / “Renewable Energy”	means the electrical energy from renewable sources of energy including hydro and storage (if the storage uses renewable energy) or any other technology / sources as may be notified by the Government of India from time to time and shall also include any mechanism that utilises green energy to replace fossil fuels including production of green hydrogen or green ammonia;
82	“Green Energy Open Access” or “GEOA”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
83	“Grid Disturbance”	shall have the same meaning as defined in the Central Electricity Authority (Grid Standards) Regulations, 2010;
84	“Grid Incident”	shall have the same meaning as defined in the Central Electricity Authority (Grid Standards) Regulations, 2010;
85	“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;

86	‘Hot Start’	in relation to steam turbine, means the start up after a shutdown period of less than 10 hours (turbine metal temperatures below approximately 80% of their full load values);
87	“House Load”	means the unit is operating in isolation to the grid and generating electric power to cater to its own auxiliaries;
88	“Indian Electricity Grid Code” or “IEGC”	means the Grid Code specified by the Central Commission under clause (h) of sub-section (1) of Section 79 of the Act;
89	“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;
90	“Infirm Power”	means the electricity injected into the grid prior to the date of commercial operation of a unit of the generating station;
91	“Interconnection Point” or “Point of Connectivity”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
92	“Interface Meter”	shall have the same meaning as defined in the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006;
93	“Intermediary Procurer”	shall have the same meaning as defined in the Electricity (Amendment) Rules, 2022;
94	“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;
95	“Inter-State Transmission System” or “ISTS”	shall have the same meaning as defined in sub-section (36) of Section 2 of the Act;

96	“Intra-State Entity”	means the entity which is in SLDC control area and whose metering and energy accounting is done at the State level;
97	“Intra-State Generating Station” or “InSGS”	means a state generating station or any other generating station having a scheme for generation and sale / captive use of electricity in the State only;
98	“Intra-State Transmission System” or “InSTS”	shall have the same meaning as defined in sub-section (37) of Section 2 of the Act
99	“Lead ESS”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
100	“Lead Generator”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
101	“Lead GEOA Consumer”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
102	“Load”	means the active, reactive or apparent power consumed by a utility / installation of consumer;
103	“Long-term Open Access”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
104	“Maximum Continuous Rating” or “MCR”	means the maximum continuous output in MW at the generator terminals guaranteed by the manufacturer at rated parameters;
105	“Medium-term Open Access”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;

106	“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;
107	“Meter”	shall have the same meaning as defined in the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006;
108	“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;
109	“Nadir Frequency”	means minimum frequency after a contingency in case of generation loss and maximum frequency after a contingency in case of load loss;
110	“National Load Despatch Centre” or “NLDC”	means the centre established under sub-section (1) of Section 26 of the Act;
111	“Near Miss Event”	means an incident of multiple failures that has the potential to cause a grid disturbance, power failure or partial collapse but does not result in a grid disturbance;
112	“Net Drawal Schedule”	means the drawal schedule of an intra-State entity which is the algebraic sum of all its transactions through the intra-State transmission system at InSTS periphery i.e. interface points (transmission - distribution and transmission / distribution - open access consumer) after deducting the transmission and/or wheeling losses;
113	“Net Injection Schedule”	means the injection schedule of an intra-State entity which is the algebraic sum of all its transactions through the inter-State transmission system at InSTS periphery i.e. interface points (i.e. generation – transmission / distribution);
114	“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;

115	“Off-Bar Declared Capability”	means the difference between Declared Capacity and On-Bar Declared Capacity in MW;
116	“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;
117	“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. In case of a combined cycle module of a gas or liquid fuel-based stations, the installed capacity of steam turbine shall be in proportion to the on-bar capacity of gas turbines of the module;
118	“Open Access Consumer”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
119	“Open Access Customer”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
120	“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;
121	“Pooling Station”	shall have the same meaning as defined in the UPERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2018;
122	“Power System”	shall have the same meaning as defined in sub-section (50) of Section 2 of the Act;
123	“Primary Reserve”	means the maximum quantum of power which will immediately come into service through governor action of the generator or

		frequency controller or through any other resource in the event of sudden change in frequency as specified in these regulations;
124	“Qualified Coordinating Agency” or “QCA”	shall have the same meaning as defined in the UPERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2018;
125	“Ramp Rate”	means rate of change of a generating station output expressed in MW per minute;
126	“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;
127	“Real Time Operation”	shall have the same meaning as defined in sub-section (54) of Section 2 of the Act;
128	“Reference Contingency”	means the maximum positive power deviation occurring instantaneously between generation and demand and considered for estimation of reserves;
129	“Regional Load Despatch Centre” or “RLDC”	means the Centre established under sub-section (1) of Section 27 of the Act;
130	“Renewable Energy Generating Station” or “REGS”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
131	“Renewable Hybrid Generating Station” or “RHGS”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
132	“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;
133	“Resource Adequacy Framework”	means resource adequacy framework as specified in the Uttar Pradesh Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations;
134	“Restorative State”	means a condition in which control action is being taken to reconnect the system elements and to restore system load;
135	“Security Constrained Economic Despatch” or “SCED”	means optimised despatch of generating units subject to operational and technical limits of generation and transmission facilities as specified in these regulations;
136	“SCED Account”	means a bank account from where all payments to and from the generating station(s) on account of SCED schedules flows.
137	“SCED Compensation Charge”	means the charge declared by a generating station other than the generating station whose tariff is determined by the Commission under Section 62 of the Act, for participation in SCED;
138	“Secondary Reserve”	means the maximum quantum of power which can be activated through secondary control signal by which injection or drawal or consumption of an SRAS provider is adjusted in accordance with Ancillary Service Regulations;
139	“Secondary Reserve Ancillary Service” or “SRAS”	means the Ancillary Service comprising SRAS-Up and SRAS-Down, which is activated and deployed through secondary control signals;
140	“Secondary Reserve Ancillary Service Provider” or “SRAS Provider”	means an entity which provides SRAS-Up or SRAS-Down service in accordance with Ancillary Service Regulations;

141	“Security Constrained Unit Commitment” or “SCUC”	means committing generating units while respecting limitations of the transmission system and unit operating characteristics as specified in these regulations;
142	“Seller”	means a person, including a generating station, supplying electricity through a transaction scheduled in accordance with these regulations;
143	“Share”	means percentage or MW entitlement of a beneficiary in an InSGS either notified by State Government or agreed between the generating company and beneficiary through contracts and implemented through open access, as the case may be;
144	“Short-term Open Access”	shall have the same meaning as defined in the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
145	“State”	means the State of Uttar Pradesh;
146	“State Deviation and Ancillary Service Pool Account”	means State Deviation and Ancillary Service Pool Account, maintained and operated by State Load Despatch Centre, where deviation and ancillary services transactions shall be accounted as per CERC DSM Regulations together with State Pool Account as defined under UPERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2018;
147	“State Generating Station” or “SGS”	means the generating station owned by a company owned or controlled by the State Government;
148	“State Load Despatch Centre” or “SLDC”	means the Centre established by the State Government under sub-section (1) of Section 31 of the Act;
149	‘State Power Committee’ or ‘SPC’	means a Committee constituted under the provisions of the Uttar Pradesh Electricity Grid Code;
150	“State Operation Co-ordination	means a sub-committee of SPC which deliberates and decides the operational aspects of the State grid;

	Sub-Committee” or “State OCC”	
151	“State Protection Co-ordination Sub-Committee” or “State PCC”	means a sub-committee of SPC with members from all the intra-State entities which decides on the protection aspects of the State grid;
152	“State Renewable Energy Management Centre” or “SREMC”	means the centre being established in the State and managed by State Load Despatch Centre to enable forecasting, scheduling and monitoring of renewable energy generation;
153	“State Technical Co-ordination Committee” or “State TCC”	means the sub-committee set up by the SPC to coordinate the technical and commercial aspects of the operation of the State grid;
154	“State Reactive Energy Charges Account”	means State Reactive Energy Charges Account, maintained and operated by State Load Despatch Centre, where reactive energy exchanges transactions shall be accounted as per these regulations;
155	“State Transmission Utility” or “STU”	means the Board or the Government company specified as such by the State Government under sub-section (1) of section 39 of the Act;
156	“STU Transmission Plan”	means an updated five-year rolling Intra-State Transmission System Plan for the State as prepared and issued every year by STU as per these regulations;
157	“Supervisory Control and Data Acquisition System” or “SCADA”	means a system that acquires data from remote locations over communication system and processes it at centralised control location for monitoring, supervision, control as well as decision support;
158	“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;

159	“System Operation Function”	includes monitoring of grid operations, supervision and control over the intra-State transmission system, real time operations for grid control and dispatch, system restoration following grid disturbances, compiling and furnishing data pertaining to system operation, congestion management, black start coordination and any other function(s) assigned to SLDC under the Act or any regulations and orders of the Commission;
160	“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;
161	“Tariff Regulations”	means the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions of Generation Tariff) Regulations, 2024;
162	“Tertiary Reserve”	means the quantum of power which can be activated in order to take care of contingencies and to cater to the need for replacing secondary reserves;
163	“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;
164	“Time Block”	means block of duration as specified by the Central 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;
165	“Total Transfer Capability” or “TTC”	means the amount of electric power that can be transferred reliably over the inter-control area system under a given set of operating conditions considering the effect of occurrence of the worst credible contingency;
166	“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;

167	“Trial Operation” or “Trial Run”	shall have the same meaning as specified in Commissioning and Commercial Operation Code of these regulations, as applicable;
168	“Un-Requisitioned Surplus” or “URS”	means the capacity in a generating station that has not been requisitioned and is available for despatch, and is computed as the difference between the declared capacity or maximum possible generation (Pmax), as the case may be, of the generating station and its total schedule;
169	“User”	means and includes generating company, captive generating plant, energy storage system, intra-State transmission licensee (other than State Transmission Utility), distribution licensee, solar park developer, wind park developer, wind-solar photo voltaic hybrid system, or captive user, open access consumer, whose generating plant / electrical plant and / or electric line is connected to the intra-State transmission system at voltage 33 kV or 132 kV and above, as the case may be, as per the Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
170	“Utility”	means the electric lines or electrical plant, and includes all lands, buildings, works and materials attached thereto belonging to any person acting as a generating company or licensee under the provisions of this Act;
171	“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;
172	“Warm Start”	means the start up after a shutdown period between 10 hours and 72 hours (turbine metal temperatures between approximately 40% to 80% of their full load values) in relation to steam turbine;
173	“WS Seller”	shall have the same meaning as defined in the CERC DSM Regulations;

- (2) Words and expressions used in these regulations that are not defined herein but defined in the Act or other regulations of the Central Electricity Authority or Commission shall have the meaning as assigned to them under the Act or the said regulations of the Central Electricity Authority or Commission.
- (3) Reference to any Acts, Rules and Regulations shall include amendments or consolidation or re-enactment thereof.

CHAPTER 2

PART-A: RESOURCE PLANNING CODE

4. General

- (1) This chapter covers the integrated resource planning including demand forecasting, generation resource adequacy planning and transmission resource adequacy assessment and planning, required for secure grid operation.
- (2) The planning of generation and transmission resources shall be to meet the projected demand in compliance with specified reliability standards for serving the load with optimum generation mix with a focus on integration of environmentally 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.

5. Integrated Resource Planning

- (1) The integrated resource planning shall include:
 - (a) Demand forecasting;
 - (b) Generation resource adequacy planning; and
 - (c) Transmission resource adequacy assessment and planning.

- (2) Demand Forecasting:

The demand estimation and forecasting and related matters shall be in accordance with Uttar Pradesh Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations read with Guidelines for Resource Adequacy Planning Framework for India 2022 published by CEA as amended from time to time:

Provided that in the absence of Uttar Pradesh Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, the provisions as specified under clause (2) of Regulation 5 of IEGC shall be adopted with State specific changes under these regulations.

- (3) Generation Resource Adequacy Planning:

The generation resource adequacy planning including power procurement planning, monitoring and compliance and related matters shall be in accordance with Uttar Pradesh Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations read with Guidelines for Resource Adequacy Planning Framework for India 2022 published by CEA as amended from time to time:

Provided that in the absence of Uttar Pradesh Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, the provisions as specified under clause (3) of Regulation 5 of IEGC shall be adopted with State specific changes under these regulations.

(4) Transmission Resource Adequacy Assessment and Planning

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:

- (i) import and export capability across ISTS and STU interface; and
- (ii) adequate power transfer capability across InSTS.

PART-B: PLANNING CODE FOR INTRA-STATE TRANSMISSION

This Part comprises various aspects of planning and development relating to Intra-State Transmission Systems.

6. Introduction

- (1) The Planning Code specifies the procedure to be applied by STU in planning and development of intra-State transmission system and also specifies the method for data submissions by SLDC, users and other stakeholders to STU for development of intra-State transmission system. The provisions of the Planning Code are intended to enable STU to prepare a transmission plan in consultation with SLDC, users and other stakeholders and to provide an efficient, coordinated, secure and economical intra-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 co-ordination relating to intra-State transmission system in coordination with CTU, State Governments, generating companies, Regional Power Committees, State Power Committee, CEA, licensees and any other person notified by the State Government in this behalf.
- (3) In accordance with Section 39(2)(d) 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 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, on payment of transmission charges and a surcharge thereon, as may be specified by the State Commission.
- (4) In accordance with Section 40 of the Act, transmission licensee shall inter-alia provide non-discriminatory open access to its transmission system for use by-

- (a) any licensee or generating company on payment of 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, on payment of transmission charges and a surcharge thereon, as may be specified by the State Commission.
- (5) CEA is mandated under Section 73(a) of the Act to formulate short-term and perspective plans for development of the electricity system and co-ordinate the activities of planning agencies for optimal utilization of resources to sub-serve the interests of the national economy and to provide reliable and affordable electricity for all consumers.

7. Objective

- (1) The standards and methodology / procedures within the Planning Code are intended to enable STU, SLDC, users and other stakeholders to jointly evolve an efficient, co-coordinated, secure and economical intra-State transmission system satisfying the requirements of evacuation of power from generating stations to load centres to meet the future demand with sufficient redundancies to tackle the contingencies.
- (2) The objectives of Planning Code are as follows:
 - (a) Specifies the philosophy, criteria, planning and design standards and procedures to be applied in planning and development of the InSTS.
 - (b) Details the information required by STU from SLDC, users and other stakeholders to enable STU to plan the development of the InSTS.
 - (c) Provide methodology and co-ordination / information exchange requirement amongst users, STU, SLDC, SPC, CTU, NLDC, RLDCs, RPCs and CEA in planning and development of the InSTS.
- (3) The Planning Code also defines the procedure for exchange of information between STU and users in respect of any proposed modification on the user's system. It details the information which STU shall make available to users in order to facilitate the identification and evaluation of opportunities for use or connection to InSTS.
- (4) The development of the intra-State transmission system must be planned with sufficient lead-time to allow time for any necessary statutory consents / right-of-way permission to be obtained and detailed engineering design / construction work to be completed. This Planning Code therefore imposes timelines for the exchange of necessary information between SLDC, STU and users connected to and/or utilizing the InSTS.

8. Planning Philosophy

- (1) CEA is responsible for preparation of perspective generation and transmission plans and for coordinating the activities of planning agencies as envisaged under Section 73(a) of the Act. CTU and STU are responsible for development of an efficient and coordinated ISTS and InSTS respectively. ISTS and InSTS are interconnected and together constitute the electricity grid. It is therefore imperative that there should be a uniform approach to transmission planning for developing a reliable transmission system.
- (2) CEA would formulate perspective transmission plans for inter-State transmission system as well as intra-State transmission system. These perspective transmission plans would be continuously updated to take care of the revisions in load projections and generation scenarios considering the seasonal and time of day variations. In formulating perspective transmission plans the transmission requirement for evacuating power from renewable energy sources shall also be taken care of.
- (3) STU shall carry out planning process as per the requirement for identification of intra-State transmission system including transmission system associated with generation projects, augmentation / system strengthening schemes which shall fit in with the perspective plan developed by CEA, as applicable. While planning schemes, the following among others shall be considered in addition to the data of authenticated nature collected from and in consultation with SLDC, users and other stakeholders by STU:
 - (i) Perspective plan formulated by CEA
 - (ii) Electric Power Survey of India Report published by the CEA
 - (iii) Transmission Planning Criteria and Guidelines issued by the CEA
 - (iv) National Electricity Policy issued by the Government of India to the extent applicable to the development of intra-State transmission system
 - (v) Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010 and amendments thereof read with Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019 and amendments thereof
 - (vi) Renewable capacity addition plan furnished by New & Renewable Energy Development Agency (UPNEDA), Govt of Uttar Pradesh
 - (vii) Recommendations / operational feedback from NLDC, RLDCs, SLDC and RPCs, SPC

- (4) In addition to the new intra-State transmission system i.e. new transmission lines and substations, STU shall plan augmentation / system strengthening schemes, need of which may arise to overcome the constraints in power transfer and to improve the overall performance of the grid. These intra-State transmission schemes identified on the basis of planning studies based on inputs received from various stakeholders, would be finalized by STU.
- (5) As voltage management plays an important role in intra-State transmission of electricity, the reactive power planning exercise shall be carried out by STU in consultation with NLDC, RLDCs, RPCs, SLDC, SPC, distribution licensees and other users for installation of reactive compensation equipment. Special attention shall be accorded by STU towards for planning of capacitors, reactors, Static Volt Ampere Reactive Compensator (SVC), Static Volt Ampere Reactive Generator (SVG) and Flexible Alternating Current Transmission Systems (FACTS) etc. to optimize the utilisation of the integrated transmission network. STU shall carry out planning studies for reactive power compensation of InSTS including reactive power compensation requirement at the generator's / open access consumer's switchyard and for connectivity of new generator / open access consumer to the InSTS.
- (6) All, SLDC, SPC, users and other stakeholders will supply to STU, the desired planning data from time to time to enable to formulate and finalize its transmission plan.
- (7) Based on plans prepared by CTU, STU shall have to plan their systems to further absorb / evacuate / interchange power from / through the ISTS and to optimize the use of integrated transmission network. STU shall augment the intra-state transmission system in a reasonable time to facilitate the interchange of such power.
- (8) The inter-State transmission system and associated intra-State transmission system and vice versa are complementary and inter-dependent and planning of one affects the other's planning and performance. Therefore, associated intra-State transmission system shall also be discussed and reviewed during the discussion for finalizing ISTS proposal at CTU / CEA level. STU shall accordingly plan the development of associated intra-State transmission system in line with the development of inter-State transmission system.

9. Planning Criteria

- (1) The planning criteria shall be in accordance with Transmission Planning Criteria and Guidelines issued by CEA covering planning philosophy, information required from various entities, permissible limits, reliability criteria, broad scope of system studies, modelling and analysis, and prescribes guidelines for transmission planning.

- (2) STU shall use load flow, short circuit and transient stability study, reactive power study, relay coordination study and other techniques for transmission system planning. STU shall simulate the contingency and system constraint conditions for the system for transmission system planning. The InSTS shall be planned by STU based on one or more of the following power system studies, as per requirements:

- (i) Power flow studies
- (ii) Short circuit studies
- (iii) Stability studies
- (iv) Total Transfer Capability (TTC) / Available Transfer Capability (ATC) calculations

Additional studies as given below may be carried out at appropriate time as per requirement:

- (i) EMT studies
- (ii) Inertia studies

10. Planning Responsibility

- (1) STU shall be responsible for planning of intra-State transmission system and shall prepare an updated five-year Transmission System Plan for the State by 28th February on rolling basis every year. SLDC, other transmission licensees, distribution licensees, generating companies and other users and stakeholders shall coordinate InSTS planning activities with STU.
- (2) The primary responsibility of demand estimation and forecasting within distribution licensees' area of supply including the demand of open access consumers and factoring in captive generating plants, distributed generation, energy efficiency measures, demand response, in different time horizons, namely long-term, medium term and short-term, rests with distribution licensees.

Each distribution licensee within the State shall develop and prepare demand assessment and forecasts (MW and MWh) on rolling basis for each of the next five (5) years in accordance with the provisions outlined under Uttar Pradesh Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations read with Guidelines for Resource Adequacy Planning Framework for India 2022 published by CEA as amended from time to time, and submit the same by 31st October of each year to STU along with among others details of the demand estimation and forecasting, generation resource adequacy planning, data, methodology and assumptions on which the forecasts are based along with their proposals for transmission system augmentation / system strengthening..

- (3) Distribution licensees, generating companies and other open access customers / intra-State entities shall provide details of demand and energy requirement with a mix of long-term, medium-term and short-term contracts, including power exchanges for the next five (5) years to STU by 31st October of each year.
- (4) Generating companies shall provide their generation capacity to STU / SLDC for power evacuation from their power stations for each of the next five (5) years along with their proposals for transmission system augmentation / strengthening and submit the same by 31st October of each year to STU.
- (5) STU shall obtain renewable capacity addition plan from New & Renewable Energy Development Agency (UPNEDA), Govt of Uttar Pradesh.
- (6) The planning for strengthening the InSTS for evacuation of power from generating stations outside the State shall be initiated by STU.

11. Planning Data

- (1) To enable STU to discharge its responsibilities to conduct interconnection studies and system studies and prepare transmission system plan, users and other stakeholders shall furnish the necessary data related to their new / modified electrical system including electricity demand, transmission capacity and generation availability to STU. All such users / stakeholders shall provide the required planning data / information in the formats as may be devised by STU. However, STU, for its own convenience, may adopt the formats as already specified in Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010 and amendments thereof read with Procedure made thereunder and Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019 and amendments thereof.
- (2) The initial planning data shall be submitted by all users to STU within three (3) months from the date of notification of this Grid Code. All users thereafter shall furnish to STU, the desired planning data for the next five (5) years by 31st October of each year to enable STU to formulate and finalise the transmission plan by 28th February of the same financial year for the next five (5) years.

Provided that the above plan shall also include information on progress achieved on the identified intra-State transmission schemes including augmentation / system strengthening schemes.

- (3) STU shall provide the data as may be required by the users for the coordinated planning, design and operation of their plants and systems with the intra-State transmission system.

12. STU Transmission Plan

- (1) STU shall prepare an updated five-year Transmission System Plan for the State (identifying specific transmission projects which are required to be taken up along with others (a) Brief Scope of Work; (b) Estimated Cost; (c) Estimated COD / implementation timelines) for approval of the Commission by 28th February on rolling basis every year in accordance with UPEGC read with Indian Electricity Grid Code and other guidelines / regulations of Central Electricity Authority. STU Transmission Plan alongwith updations, if any for InSTS, will be hosted on the website of STU by 31st March or immediately after approval of the Commission, whichever is later.
- (2) STU Transmission Plan shall include transmission schemes / projects for new lines and substations, strengthening and upgradation of the existing lines and substations and provision for VAR compensation needed in the intra-State transmission system. Such Plan shall clearly identify the scope of the project, broad parameters such as design specifications including voltage level, line configuration i.e. S/C or D/C or M/C, functional specifications of conductor etc., length of transmission line and probable location of substation.
- (3) STU Transmission Plan shall fit in with the perspective plan developed by CEA for inter-State transmission system as well as intra-State transmission systems and the five (5) year plan prepared by CTU for inter-State transmission system.
- (4) All intra-State transmission projects shall be consistent with the STU Transmission Plan. No intra-State transmission project shall be considered for implementation, unless the project is a part of the STU Transmission Plan and has been duly approved by the Commission.

13. Implementation of Transmission Plan

The transmission schemes are implemented either through Tariff Based Competitive Bidding (TBCB) route or Regulated Tariff Mechanism (RTM), in accordance with provisions of Uttar Pradesh Electricity Regulatory Commission (Modalities of Tariff Determination) Regulations, 2023.

CHAPTER 3

CONNECTION CODE

14. General

- (1) This chapter covers the procedure for grant of connectivity, technical and design criteria for connectivity, procedure and requirements for physical connection and integration of grid elements, which must be complied with by users connected to / applicant seeking connectivity to the InSTS.
- (2) The Connection Code shall apply to the application made for grant of connectivity to the InSTS and other connectivity related matters, to Nodal Agency i.e. STU. The connectivity to the InSTS shall be granted by STU in accordance with UPEGC and Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010 and amendments thereof read with the procedure prepared by STU and approved by the Commission thereunder and Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007.
- (3) This Connection Code specifies the requirements to be fulfilled and procedure to be followed by the applicant prior to obtaining the permission of SLDC for first time energizing of a new or modified power system element. In addition to above, this Connection Code also specifies the technical requirements to be complied with by an intra-State transmission licensee prior to being allowed by SLDC to energize a new or modified power system element.
- (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.

15. Compliance with Existing Rules and Regulations

- (1) STU, other intra-State transmission licensees and all users connected to or seeking connection to the InSTS shall comply with all the applicable regulations as enacted or amended from time to time, such as:
 - (a) Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022;
 - (b) Central Electricity Authority (Safety Requirements for Construction, Operation and Maintenance of Electrical Plants and Electric Lines) Regulations, 2011;
 - (c) Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023;
 - (d) Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007;

- (e) Central Electricity Authority (Grid Standards) Regulations, 2010;
- (f) Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006;
- (g) Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020;
- (h) Central Electricity Authority (Cyber Security in Power Sector) Guidelines, 2021;
- (i) Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010;
- (j) Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019;
- (k) Uttar Pradesh Electricity Regulatory Commission (Fees & Charges of State Load Despatch Centre and other related matters) Regulations, 2020;
- (l) Any other regulation and standard as specified from time to time.

16. Procedure for Connectivity

- (1) The grant of connectivity to the InSTS by STU shall be governed by Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to intra-State Transmission System) Regulations, 2010 read with procedure made thereunder.
- (2) The procedure covers among others procedure for grant of connectivity, execution of connection agreement, modalities for first time energization and integration of new or modified power system element. The procedure shall specify requirements for integration with the grid such as protection, telemetry and communication systems; metering; statutory clearances; modelling data requirements for interconnection studies and system studies and timeline for submission of data for such studies.
- (3) Post completion of all physical arrangements of connectivity and necessary site tests, the concerned applicant / user shall request SLDC for permission of first time energization in the specified format as per protocol published by SLDC.
- (4) SLDC shall prepare protocol for first time energization and integration of new or modified power system elements to intra-State transmission system. In the absence of such protocol, SLDC shall adopt NLDC procedure as per IEGC with State specific changes.

17. Connection Agreement

- (1) Connection agreement shall be signed between STU, intra-State transmission licensee (other than STU if any) and any applicant / user setting out the terms relating to connectivity to the intra-State

transmission system in accordance with Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to intra-State Transmission System) Regulations, 2010 read with procedure made thereunder.

- (2) Connection agreement shall include, but not limited to, general conditions of connectivity, technical requirements, responsibilities of operational safety, single line diagrams, site common drawings, general philosophy / guidelines on protection and telemetry etc., time schedule for completion of works, site responsibility schedule including the responsibility for operation & protection coordination and data sharing among SLDC, STU / any other intra-State transmission licensee and applicant / user. The connection agreement will also indicate any procedure necessary for site access, site operational activities and maintenance standard for equipment of STU / intra-State transmission licensees at user's premises.

18. Technical Requirements

- (1) SLDC in consultation with STU 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, STU and SLDC shall identify measures for facilitating the integration of the element, subject to grid security. The user and intra-State transmission licensee shall furnish all technical data including that of its embedded generators and other elements to STU and SLDC for necessary technical studies.
- (2) The applicant / user shall give STU, SLDC and other concerned persons (including intra-State transmission licensee) at least sixty (60) days advance preliminary written notice and at least thirty (30) days advance final written notice, of the date on which it intends to synchronise its generating plant and/or electrical plant and/or electric line to the InSTS.
- (3) Special focus shall be made on technical requirements for connectivity to the grid, i.e., voice and data communication facilities, system recording instruments, reactive power compensation, protection, responsibilities for safety, cyber security, integration of data with SLDC and STU, SCADA and other provisions.

19. Data and Communication Facilities

- (1) Reliable speech and data communication systems shall be provided in accordance with this Grid Code and Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020 by all the users to facilitate necessary communication, data exchange, supervision and control of the grid by NLDC, RLDC and SLDC.

- (2) All users and intra-State transmission licensees shall provide data / parameter such as power flow, voltage, status of breakers / isolators / transformer taps, etc, in line with interface requirements and other guidelines made available by SLDC / NRLDC.
- (3) The associated communication system to facilitate data flow up to appropriate data collection point on STU / intra-State transmission licensee system including inter-operability requirements shall also be established by the concerned user as specified by STU in the connection agreement.
- (4) All users shall provide, in coordination with STU and SLDC, the required facilities at their respective ends as specified in the connection agreement. The communication system along with data links provided for speech and real time data communication shall be monitored in real time by all users, STU and SLDC to ensure high reliability of the communication links.

20. System Recording Instruments

Recording instruments such as data acquisition systems / disturbance recorder / event logging facilities / fault locator / wide area management system / phasor measurement unit (including time synchronization equipment) shall be provided and shall always be kept in working condition in the InSTS for recording of dynamic performance of the system. All users and STU shall provide all the requisite recording instruments information to SLDC.

21. Reactive Power Compensation

- (1) Reactive power compensation and/or other facilities shall be provided by STU and users connected to InSTS including the distribution licensee as far as possible thereby avoiding the need for exchange of reactive power to/from InSTS and to maintain voltage within the specified range.
- (2) The person already connected to the grid shall also provide additional reactive compensation as per the quantum and time frame decided by SLDC in consultation with SPC. Users and STU / intra-State transmission licensees shall provide information to SLDC and SPC regarding the installation and healthiness of the reactive compensation equipment on regular basis. SPC shall regularly monitor the status in this regard.

22. Responsibilities for Safety

STU and the concerned users shall be responsible for safety in accordance with among others Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007, Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to intra-State Transmission System) Regulations, 2010 and Central Electricity Authority (Safety Requirements for Construction, Operation and Maintenance of Electrical Plants and Electric Lines) Regulations, 2011.

23. Cyber Security

All utilities shall have in place, a cyber security framework to identify the critical cyber assets and protect them so as to support reliable operation of the grid.

24. Schedule of Assets of Intra-State Transmission System

STU shall maintain a schedule of transmission assets, which constitute the InSTS as on 31st March, updated annually, indicating ownership on which SLDC has operational control and responsibility and submit the same to the Commission by 31st October each year.

CHAPTER 4

PROTECTION CODE

25. General

- (1) This protection code covers the protection protocol, protection settings, protection system management and performance monitoring of the protection systems including protection audit of electrical systems, which shall be specified in consistent with IEGC.
- (2) There shall be a uniform protection protocol for STU and the users of the State grid:
 - (a) for proper co-ordination of protection system in order to protect the equipment / system from abnormal operating conditions, isolate the faulty equipment and avoid unintended operation of protection system;
 - (b) to have a repository of protection system, settings and events at State level;
 - (c) specifying timelines for submission of data;
 - (d) to ensure healthiness of recording equipment including triggering criteria and time synchronization; and
 - (e) to provide for periodic audit of protection system.
- (3) SPC shall be responsible for all the protection related coordination, development and implementation functions of the State grid. The functioning of the protection activities in this regard shall be undertaken in line with that of the concerned body of NRPC.

26. Protection Protocol

- (1) STU and all users connected to the integrated State grid shall provide and maintain effective protection system having reliability, selectivity, speed and sensitivity to isolate faulty section and protect element(s) as per CEA Technical Standards for Construction Regulations, CEA Technical Standards for Connectivity Regulations, CEA Grid Standards Regulations, CEA Technical Standards for Communication Regulations, CEA Safety Regulations and any other applicable CEA standards specified from time to time.
- (2) Back-up protection system shall be provided to protect an element in the event of failure of the primary protection system.
- (3) SPC shall develop the uniform protection protocol covering all the protection aspects of the grid elements, in line with the protection protocol adopted by NRPC / NRLDC, and revise the same, after review from time to time and at least once in a year, in consultation with the stakeholders, and in

doing so shall be guided by the principle that minimum electrical protection functions for equipment connected with the grid shall be provided as per CEA Regulations / Standards specified from time to time.

- (4) The uniform protection protocol shall contain among others general philosophy of protection system, protection schemes, protection settings & coordination, disturbance monitoring, analysis & reporting, protection audit plan, performance monitoring of the protection systems, compliance monitoring.
- (5) The protection protocol in a particular system may vary depending upon operational experience. Changes in protection protocol, as and when required, shall be carried out after deliberation and approval of SPC.
- (6) SPC shall be guided by the advice / protection philosophy of NRPC / NRLDC for the planning of islanding schemes, for upgrading and strengthening protection system based on analysis of grid disturbance and partial / total blackout in the InSTS.
- (7) Review of the protection protocol shall cover among others the important developments / events at national / regional / state level, need for periodic review due to upgradation of technical standards for power system, technological innovations, use of AI / IT tool / practices, training, and capacity building requirements. Based on the review, SPC shall recommend suitable modifications / amendments to protection protocol which shall be duly incorporated in timebound manner upon following due stakeholders' consultation process.
- (8) Violation of the protection protocol of the State shall be brought to the notice of SPC by SLDC.

27. Protection Settings

- (1) SPC shall undertake review of the protection settings, assess the requirement of revisions in protection settings and revise protection settings in consultation with SLDC and the stakeholders of the State, from time to time and at least once in a year. The necessary studies in this regard shall be carried out by SPC. The data including base case (peak and off-peak cases) files for carrying out studies shall be provided by SLDC and STU to SPC.
- (2) SLDC shall ensure implementation of protection schemes / protection settings in accordance with the provisions of the regulations specified by CEA and in coordination with SPC.
- (3) STU and all users connected to the State grid shall:
 - (a) ensure correct and appropriate settings of protection as specified by SPC.
 - (b) furnish the protection settings implemented for each element to SLDC and SPC in a format as published by SPC in line with RPC;

- (c) obtain approval of SLDC / SPC for (i) any revision in settings, and (ii) implementation of new protection system;
 - (d) update the protection system, if SLDC / SPC confirms that the protection system does not comply with the minimum requirement as stipulated in this code;
 - (e) intimate to SLDC and SPC about the changes in the network and changes implemented in protection system or protection settings within a fortnight of such changes;
 - (f) ensure proper coordinated protection settings, calibration and testing of protection system;
 - (g) make available the operation logs and records of the power system elements connected to the InSTS for inspection and review by SLDC / SPC.
- (4) SPC shall:
- (a) maintain a centralized database and update the same on periodic basis in respect of the State containing details of relay settings for grid elements connected to the State grid. SLDC shall also maintain such database.
 - (b) carry out detailed system studies, once a year, for protection settings and advise modifications / changes, if any, to STU and to all users. The data required to carry out such studies shall be provided by SLDC, STU and users, as the case may be.
 - (c) provide the database access to SLDC, STU and to all users of the State. The database shall have different access rights for different users.
- (5) On the direction of SLDC / SPC, STU shall investigate into any malfunctioning of protection or other unsatisfactory protection issues. The concerned users / intra-State transmission licensees shall take prompt action to correct such malfunction or issues.

28. Protection Audit Plan

- (1) STU and all users shall conduct internal audit of their protection systems annually, and any shortcomings identified shall be rectified and informed to SLDC and SPC. The internal protection audit report along with action plan for rectification of deficiencies detected, if any, shall be shared with SLDC and SPC:

Provided that if any adverse performance is observed during any grid event, then the internal protection audit shall be carried out even earlier, if so, advised by SLDC / SPC.

- (2) STU and all users shall also conduct third party protection audit of their protection systems once in five years or earlier as advised by SPC.

- (3) After analysis of any event, SPC shall identify a list of substations / generating stations where third-party protection audit is required to be carried out and accordingly direct STU / respective users to complete third party audit within three (3) months.
- (4) The third-party protection audit report shall contain information sought in the format enclosed as Annexure-1. The third-party protection audit reports, along with action plan for rectification of deficiencies detected, if any, shall be submitted to SLDC and SPC, within a month of submission of third party audit report. The necessary compliance to such protection audit report shall be followed up regularly in SPC.
- (5) STU and the users shall submit annual internal protection audit plan for the next financial year to SLDC and SPC by 31st October to ensure proper coordination during protection audit as per the schedule. STU / users shall adhere to the annual internal protection audit plan and report compliance of the same to SLDC and SPC. In case of any change in the schedule, the owner of the power system element shall inform accordingly in advance.
- (6) STU and users shall submit the following protection performance indices to SLDC and SPC on monthly basis, which shall be reviewed by SPC:
 - (a) The Dependability Index defined as $D = N_c / (N_c + N_f)$
 Where,
 N_c is the number of correct operations at internal power system faults and
 N_f is the number of failures to operate at internal power system faults.
 - (b) The Security Index defined as $S = N_c / (N_c + N_u)$
 Where,
 N_c is the number of correct operations at internal power system faults
 N_u is the number of unwanted operations.
 - (c) The Reliability Index defined as $R = N_c / (N_c + N_i)$
 Where,
 N_c is the number of correct operations at internal power system faults
 N_i is the number of incorrect operations and is the sum of N_f and N_u
- (7) STU / respective user shall also submit the reasons for performance indices less than unity or behind the fall in performance indices of individual element wise protection system and action plan for corrective measures to SLDC and SPC. The action plan will be followed up regularly in SPC.

- (8) In case any user fails to comply with the protection protocol or fails to undertake remedial action identified by SLDC / SPC within the specified timelines, SLDC may approach the Commission, along with recommendation of SPC, with all relevant details for suitable directions.

29. System Protection Scheme (SPS)

- (1) SPC may frame system protection scheme(s) for InSTS in consultation with CEA / CTU / RLDC / NRPC if required in addition to special protection scheme formulated by NRPC.
- (2) SPS for identified system shall have redundancies in measurement of input signals and communication paths involved up to the last mile to ensure security and dependability.
- (3) For the operational SPS, SLDC in consultation with SPC shall perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year. SLDC shall share the report of such studies and mock testing including any short comings to SPC. The data for such studies shall be provided by STU and concerned users to SLDC.
- (4) STU / users shall report about the operation of SPS immediately to SLDC, and thereafter within two (2) days of SPS operation detailed report shall be submitted to SLDC and SPC in the format published by SPC.
- (5) The performance of SPS shall be assessed as per the protection performance indices specified in these Regulations. In case, the SPS fails to operate, STU / concerned user shall take corrective actions and submit a detailed report on the corrective actions taken to SLDC and SPC within a fortnight.

30. Recording Instruments

- (1) STU and all users shall keep the recording instruments (disturbance recorder and event logger) in proper working condition.
- (2) The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals which shall be included in the guidelines issued by SPC.
- (3) The time synchronization of the disturbance recorders shall be corroborated with the PMU data or SCADA event loggers by SLDC. Disturbance recorders which are non-compliant shall be listed out for discussion at SPC.

31. Capacity Building and Certification

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

- (2) SPC shall coordinate and formulate a forum of technical experts from industry and academia for continuous improvement in the knowledge of protection system, preventive measures, monitoring and reporting of best practices. SPC shall share the best practices of protection system among the stakeholders.

CHAPTER 5

COMMUNICATION CODE

32. General

- (1) This Communication Code provides for planning, implementation, operation and maintenance and up-gradation of reliable communication system for all communication requirements including exchange of data for integrated operation of the State Grid.
- (2) The Communication Code shall apply to the communication infrastructure to be used for reliable data and voice communication and tele-protection for the power system at the intra-State level.
- (3) All users / intra-State entities, STU, SLDC, SREMC, ALDCs and SPC shall abide by the principles and procedure as applicable to them in accordance with these regulations read with CEA Technical Standards for Communication Regulations.

33. Nodal Agency

- (1) STU shall be the nodal agency for planning, and coordination for development of communication system for intra-State transmission system (InSTS) user.
- (2) SLDC shall be the nodal agency for ensuring integration of communication system at intra-State level with supervisory control and data acquisition system (SCADA), wide area measurement system (WAMS), video conferencing system (VCS), automatic meter reading (AMR), electronic private automatic branch exchange (EPABX), voice over internet protocol (VoIP) and Tele-protection system (Teleport) for InSTS sub-stations, InSGS, distribution licensees, other users / intra-State entities etc.

34. Role and Responsibilities of Various Organizations and their Linkages

(1) Role of Various Organizations under CERC Communication Regulations

The planning, implementation, operation and maintenance and up-gradation of reliable communication system for all communication requirements including exchange of data for integrated operation of National Grid shall be in accordance with CERC Communication Regulations, wherein Regulation 7 specify role and responsibilities of various organization i.e. CEA (Regulation 7.1), CTU (Regulation 7.2), NPC & RPC (Regulation 7.3), NLDC (Regulation 7.4) / RLDC (Regulation 7.5) along with SLDC (Regulation 7.6), STU (Regulation 7.7) and users (Regulation 7.8).

(2) Role of State Transmission Utility (STU)

- (a) STU shall in due consideration of the planning criteria and guidelines formulated by CEA and in coordination with CTU, be responsible for planning, coordination and development of reliable

communication system for data communication at intra-State level including appropriate protection path among SLDC, SREMC including main and backup as applicable along with InSTS sub-stations, InSGS, distribution licensees, other users / intra-State entities. The communication system shall be designed to ensure adequate redundancy. While carrying out planning process from time to time, STU shall in addition to the data collected from and in consultation with the users / intra-State entities consider operational feedback from RLDC, NRPC, SLDC and SPC.

- (b) STU shall integrate communication planning with transmission and generation projects planning in the State in a comprehensive manner.
- (c) STU shall also plan redundant communication system up to the nearest ISTS wideband communication node for integration with the inter-State communication system at appropriate nodes.
- (d) STU shall carry out the integrated planning for development of backbone intra-State communication systems providing interfaces to wideband communication network of InSTS sub-stations, InSGS, distribution licensees, other users / intra-State entities at interface nodes.
- (e) STU shall discharge the above functions related to the State backbone communication system in consultation with CEA, CTU, NLDC / NRLDC / NRPC, State Government, SPC, SLDC, intra-State transmission licensees, InSGS, distribution licensees and other users / intra-State entities etc. in the State.
- (f) STU shall provide access to its communication node to interface the wideband network being implemented by users / intra-State entities including InSGS, intra-State transmission licensees, distribution licensees etc. to have a single interconnected network and shall coordinate with such utilities for the interface requirement.
- (g) STU shall provide access to its wideband Network for grid management and asset management by all users.
- (h) STU shall extend the required support to Control Centres for integration of communication system at respective ends.
- (i) STU shall be the nodal agency for supervision of communication system in respect of intra-State communication system and will implement centralized supervision for quick fault detection and restoration. STU shall prepare procedure for the same in line with CTU procedure issued as per IEGC with State specific changes and submit to the Commission for approval within sixty

(60) days of notification of these regulations. Till the issuance of such procedure, STU shall adopt CTU procedure as per IEGC with State specific changes.

(3) Role of State Power Committee (SPC)

- (a) SPC shall be responsible for issuance of the guidelines on “Availability of Communication System” in respect of intra-State communication system in line with CTU guidelines issued as per IEGC with State specific changes. SPC shall prepare the same and submit to the Commission for approval within sixty (60) days of notification of these regulations. Till the issuance of such guidelines, SPC shall adopt CTU guidelines as per IEGC with State specific changes.
- (b) SPC Secretariat shall certify the availability of communication equipment for Control Centres, STU and users / intra-State entities including InSGS, intra-State transmission licensees, distribution licensees etc. based on the data furnished by SLDC.
- (c) SPC Secretariat shall be responsible for outage planning for communication system in the State and shall process outage planning such that uninterrupted communication system is ensured.
- (d) SPC Secretariat shall monitor instances of non-compliance of these regulations and make endeavour to sort out the issues in the State in such a way that cases of non-compliance are prevented in future. Unresolved issues and non-compliance of any of the provisions of these regulations shall be reported by the Member Secretary of SPC to the Commission.

(4) Role of State Load Despatch Centre (SLDC)

- (a) SLDC shall be responsible for preparation and issuance of guidelines on the “Interfacing Requirements” in respect of terminal equipment, Remote Terminal Units (RTUs), SCADA, Phasor Measurement Units (PMUs), AGC, AMR, AMI, etc. and for data communication from the user's end to the respective Control Centre(s) based on technical standards issued by CEA and in line with CTU guidelines issued as per IEGC with State specific changes and submit to the Commission for approval within sixty (60) days of notification of these regulations. Till the issuance of such guidelines, SLDC shall adopt CTU guidelines as per IEGC with State specific changes.
- (b) SLDC shall be nodal agency for integration of communication system in the intra-State network, at SLDC end for monitoring, supervision and control of power system and adequate data availability in real time.
- (c) SLDC shall collect and furnish data related to communication system of various users / intra-State entities, STU and Control Centres to SPC.

- (d) SLDC shall provide operational feedback to CTU and STU.

(5) Role of Users

- (a) Users shall be responsible for planning, design, implementation, secured operation and maintenance of their own communication infrastructure to be interfaced with the communication system. Users shall be capable of transmitting all operational data as required by appropriate control centre.
- (b) Users, whose system are proposed to be interfaced with the communication system, shall furnish the requisite interface information to the appropriate control centre as specified by them.
- (c) Users shall be responsible for provision of compatible equipment along with appropriate interface for uninterrupted communication with the concerned control centres and shall be responsible for successful integration with the communication system provided by STU for data communication as per guidelines issued by SLDC.
- (d) Users may utilize the available transmission infrastructure for establishing communication up to nearest wideband node for meeting communication requirements from their stations to concerned control centres.
- (e) Users shall also be responsible for expansion / up-gradation as well as operation and maintenance of communication equipment owned by them.
- (f) Users shall ensure centralised monitoring or management of their communication network and shall provide necessary facilities for configuration, identification of fault and generation of various reports on availability of the communication system.

35. Boundary of the Intra-State Communication System

- (i) Control Centres
- (ii) SLDC (State inter-connection)
- (iii) STU (InSTS network)
- (iv) InSTS sub-stations of STU and intra-State transmission licensees
- (v) InSGS
- (vi) Buyers including distribution licensees of the State

36. Periodic Testing of the Intra-State Communication System

- (1) All users / intra-State communication system owners / STU providing communication systems shall facilitate for periodic testing of the communication system in accordance with procedure for

maintenance and testing to be prepared by STU in line with CTU procedure issued as per IEGC with State specific changes and submit to the Commission for approval within 60 days of notification of these regulations. Till the issuance of such procedure, STU shall adopt CTU procedure as per IEGC with State specific changes.

- (2) Testing process for communication network security should also be included even for third party system if exists in accordance with procedure for maintenance and testing to be prepared by STU and approved by Commission.

37. Periodic Auditing of Intra-State Communication System

The SPC Secretariat shall conduct performance audit of communication system annually as per the procedure finalised in NRPC. Based on the audit report, SPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the SPC Secretariat. The audit report along with action plan for rectification of deficiencies detected, if any, shall be shared with STU, SLDC and SPC.

38. Fault Reporting

- (1) SLDC in case of outage of telemeter data, or communication failure shall inform the respective user / STU so that the user / STU shall ensure healthiness of its communication infrastructure / system. In case outage pertains to fault in communication infrastructure / system of other user, the user shall lodge complaints for failure of the communication to the communication system owner for quick restoration of the same.
- (2) The communication provider shall explore the possibility for route diversion on the existing facility in close co-ordination with concerned provider in case the fault restoration is prolonged. No separate charges shall be paid for such route diversion or channel re-allocation. However, such rerouting shall be discontinued once the original channel is restored.

39. Communication System Availability and Backup

All users of InSTS, STU, SLDC shall maintain the communication channel availability at 99.9% annually:

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

40. Guidelines or Procedures to be issued by different Entities

- (1) The following entities shall be responsible for preparation and issuance of the Guideline(s) / Procedure(s) in respect of intra-State communication system required under these regulations which

shall be in line with the guidelines / procedures issued as per IEGC with State specific changes and submit to the Commission for approval within sixty (60) days of notification of these regulations:

- (a) SLDC shall prepare Guidelines on "Interfacing Requirements" in terms of Regulation 34(4)(a) of these regulations.
- (b) STU shall prepare Procedure(s) on "Centralized Supervision for Quick Fault Detection and Restoration of Communication System" in terms of Regulation 34(2)(i) and on "Maintenance and Testing of Communication System" in terms of Regulation 36(1) of these regulations.
- (c) SPC shall prepare Guidelines on "Availability of Communication System" in terms of Regulation 34(3)(a) of these regulations.

CHAPTER 6

COMMISSIONING AND COMMERCIAL OPERATION CODE

41. 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.

42. Drawal of Start Up Power and Injection of Infirm Power

- (1) A unit of a generating station including unit of a captive generating plant or ESS that has been granted connectivity to the intra-State transmission system and for which connection agreement has been signed in accordance with Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010 shall be allowed to inter-change power with the grid during the commissioning period, including testing and trial run before the COD, after obtaining prior permission of SLDC:

Provided that SLDC while granting such permission shall keep grid security in view.

- (2) The period for which such inter-change shall be allowed shall be as follows:
 - (a) Drawal of start-up power shall not exceed fifteen (15) months prior to the expected date of first synchronization and one (1) year after the date of first synchronization;
 - (b) Injection of infirm power shall not exceed one (1) year from the date of first synchronization for generating station other than REGS and ESS (except Hydro PSP ESS);
 - (c) Injection of infirm power shall not exceed forty five (45) days from the date of first time charging / energization (FTC) and integration approval for REGS and ESS (except Hydro PSP ESS).
- (3) Notwithstanding the provisions of sub-clause (a) and sub-clause (b) of clause (2) of this Regulation, the Commission may allow extension of the period for inter-change of power beyond the stipulated period on an appropriate petition made by the generating station at least three (3) months in advance of the completion of the stipulated period:

Provided that for REGS and ESS (except Hydro PSP ESS), extension of the period for injection of infirm power beyond the stipulated period may be allowed (a) for a period up to three (3) months by SLDC on an application made by such generating station or ESS (except Hydro PSP ESS) to SLDC along with detailed reasons, at least fifteen (15) days in advance of the completion of the stipulated period, (b) for a period beyond three (3) months, by the Commission on an appropriate petition made

by such generating station or ESS (except Hydro PSP ESS) along with detailed reasons, at least thirty (30) days in advance of the completion of the stipulated period.

- (4) Drawal of start-up power shall be subject to payment of transmission charges as per relevant Regulations of the Commission.
- (5) The drawal of start-up power by the generating station whose tariff is determined under Section 62 of the Act shall be billed as per the provisions of Tariff Regulations. Whereas, charges for drawal of start-up power by the generating station whose tariff is adopted under Section 63 of the Act shall be as per the provisions of the contract entered into by such generating station with the beneficiaries or buyers, or in the absence of such provision in the contract, the charges for deviation for drawal of start-up power shall be as per CERC DSM Regulations.
- (6) The charges for deviation for injection of infirm power shall be as per CERC DSM Regulations. However, in case of a renewable energy generating station, whose tariff is determined by the Commission under Section 62 of the Act, the injection of infirm power shall be treated as per Uttar Pradesh Electricity Regulatory Commission (Captive and Renewable Energy Generating Plants) Regulations, 2024.
- (7) Start-up power shall not be used for construction activities.
- (8) 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 SLDC shall seek such information on each occasion of the interchange of power before COD. For this, the generating station shall furnish to SLDC relevant details, such as those relating to the specific commissioning activity, testing, and trial run, 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 SLDC.
- (9) In the case of multiple generating units of the same generating station or multiple generating stations owned by different entities connected at a single inter-connection 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.
- (10) 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 for construction activity;
 - (b) In the case of default in payment of transmission charges, SLDC fee and charges, deviation charges, as applicable.

- (11) The provisions related to drawal of start-up power and injection of infirm power for REGS specified in this Regulation shall mutatis mutandis be applicable for inter-change of power with the grid from the unit of ESS during the commissioning period.

43. Data to be Furnished Prior to Notice of Trial Run

- (1) The following details, as applicable, shall be furnished by each intra-State entity generating station to SLDC, STU, SPC and beneficiaries of the generating station, wherever identified, prior to notice of trial run:

Table 1: Details to be Furnished by Generating Entity Prior to Trial Run

Description	Units
Installed capacity of generating station	MW
Installed capacity of generating station	MVA
MCR	MW
Number x unit size (stage / phase wise)	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	MW/minute
Ramping down capability	MW/minute
Minimum turndown level	% of MCR
Minimum turndown level	MW (ex-bus)
Inverter Loading Ratio (DC/AC capacity)	
Name of QCA (where applicable)	
Full reservoir level (FRL)	Metre
Design Head	Metre
Minimum draw down level (MDDL)	Metre
Water released at Design Head	M ³ / MW
Unit-wise forbidden zones	MW

- (2) The connection agreement shall be furnished by generating company / ESS or transmission licensee or open access consumer / captive user, as the case may be, to SLDC, prior to notice of trial run.

44. Notice of Trial Run

- (1) The generating company proposing its generating station or a unit thereof or the ESS for trial run or repeat of trial run shall give a notice of not less than seven (7) days to SLDC, STU, any other transmission licensee (in case connectivity is granted to the InSTS of a transmission licensee other than STU) and beneficiaries of the generating station or the ESS, including intermediary procurers, wherever identified, and SPC.
- (2) The transmission licensee proposing its transmission system or an element thereof for trial run or repeat of trial run shall give a notice of not less than seven (7) days to SLDC, STU, any other transmission licensee (in case connectivity is granted to the InSTS of a transmission licensee other than STU), distribution licensees of the State and SPC.
- (3) The open access consumer or the captive user proposing its committed transmission line, that has been granted connectivity to the intra-State transmission system and for which connection agreement has been signed in accordance with Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010, for trial run or repeat of trial run shall give a notice of not less than seven (7) days to SLDC, STU, any other transmission licensee (in case connectivity is granted to the InSTS of a transmission licensee other than STU), distribution licensee of the area and SPC.
- (4) SLDC shall allow 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 date and time as decided and informed by SLDC:

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. However, intimation to the concerned stakeholders is necessary for the same.

- (5) A generating station shall be required to undergo a trial run in accordance with Regulation 45 of these regulations after completion of renovation and modernization for extension of the useful life of the project as per the Tariff Regulations.

45. Trial Run of Generating Unit

- (1) Trial Run of Thermal Generating Unit shall be carried out in accordance with the following provisions:

- (a) A thermal generating unit shall be in continuous operation at MCR or Installed Capacity for seventy-two (72) hours on designated fuel with the requisite metering system, power plant controller, telemetry and protection system and any other requirements in service:

Provided that:

- (i) short interruption or load reduction shall be permissible with the 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 the trial run shall not be less than MCR, excluding the 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.

Provided that thermal generating unit shall also demonstrate capability to raise load up to 105% of MCR or Installed Capacity.

- (b) Where, on the basis of the trial run, a thermal generating unit fails to demonstrate the unit capacity corresponding to MCR, the generating company shall have the option to either de-rate the capacity of the generating unit or to 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 95% of the demonstrated capacity, to cater for primary response.

- (2) Trial Run of Hydro Generating Unit shall be carried out in accordance with the following provisions:

- (a) A hydro generating unit shall be in continuous operation at MCR or Installed Capacity for twelve (12) hours with the requisite metering system, power plant controller, telemetry and protection system and any other requirements in service:

Provided that:

- (i) short interruption or load reduction shall be permissible with the 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 the trial run shall not be less than MCR, excluding the 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;

Provided that hydro generating unit shall also demonstrate capability to raise load up to 110% of MCR or Installed Capacity.

- (iv) if it is not possible to demonstrate the MCR due to insufficient reservoir or pond level or insufficient inflow, deemed COD may be declared subject to the condition that the same shall be demonstrated immediately when sufficient water is available, within one (1) year from the date of such deemed COD:

Provided 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 sub-clause (b) of this clause, and such de-rating shall be retrospectively effective from the date of deemed 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 of the hydro generating unit or to 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 Solar / Wind / ESS / Hybrid Generating Station

- (a) Trial run of the solar inverter unit(s) shall be performed for a minimum capacity aggregating to 10% of the project (the first minimum being 5 MW):

Provided that in the case of a project having a capacity of more than 5 MW, the trial run for the balance capacity shall be performed in a maximum of four instalments with a minimum capacity of 1 MW:

Provided further that the generating station will get maximum four attempts for each instalment of trial run, including retrials, if any:

Provided also that each successive trial run shall be demonstrated for cumulative capacity including the capacity for which COD has already been declared:

Provided also that the trial run for solar inverter unit(s) aggregating to less than 5 MW for entity covered under sub-clause b(iv) of Regulation 2.1 of Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010, shall be allowed for the capacity for which connectivity has been granted to such entity.

- (b) The generating company shall record the output of the unit(s) during the trial run of a solar inverter unit(s) covered under sub-clause (a) of this clause. A trial run will be considered as successful if the generating station demonstrates maintenance of peak generation, corresponding to the capacity for which the trial run is sought, and communication signal over one time block of 15 minutes for at least any three (3) days within a continuous period of two

(2) weeks with the requisite metering system, power plant controller, telemetry and protection system and any other requirements in service:

Provided that:

- (i) If the output is below the desired peak, the generating station shall corroborate the performance level with the temperature and solar irradiation recorded at the site during the day and plant design parameters to establish that the peak has been deemed to be achieved. In such a case deemed COD may be declared subject to the condition that the same shall be demonstrated immediately when sufficient solar irradiation is available within one (1) year from the date of such deemed COD. For this purpose, generating station will be required to submit data regarding its actual generation demonstrating peak capacity based on which SLDC will certify that actual generation as per COD has been achieved and inform concerned stakeholders. A fresh trial run will not be required for this purpose.
 - (ii) If such a generating station is not able to demonstrate the rated capacity when sufficient solar radiation is available within one (1) year of such deemed COD, the generating company shall derate the capacity as per actual maximum capacity achieved and certified by SLDC. Such de-rating shall be retrospectively effective from the date of deemed COD.
- (c) Trial run of the wind turbine(s) shall be performed for a minimum capacity aggregating to 10% of the project (the first minimum being 5 MW):

Provided that in the case of a project having a capacity of more than 5 MW, the trial run for the balance capacity shall be performed in a maximum of four instalments with a minimum batch size of 1 MW:

Provided further that the generating station will get maximum four attempts for each instalment of trial run, including retrials, if any:

Provided also that each successive trial run shall be demonstrated for cumulative capacity including the capacity for which COD has already been declared:

Provided also that the trial run for wind turbine(s) aggregating to less than 5 MW for entity covered under sub-clause b(iv) of Regulation 2.1 of Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010, shall be allowed for the capacity for which connectivity has been granted to such an entity.

- (d) The generating company shall record the output of the unit(s) during the trial run of a wind turbine(s) covered under sub-clause (c) of this clause. A trial run will be considered as

successful if the generating station demonstrates maintenance of peak generation, corresponding to the capacity for which the trial run is sought, and communication signal over one time block of 15 minutes for at least any three (3) days within a continuous period of two (2) weeks with the requisite metering system, power plant controller, telemetry and protection system and any other requirements in service:

Provided that:

- (iii) If the output is below the desired peak, the generating station shall corroborate the performance level with the wind speed recorded at the site during the day and plant design parameters to establish that the peak has been deemed to be achieved. In such a case deemed COD may be declared subject to the condition that the same shall be demonstrated immediately when sufficient wind velocity is available within one (1) year from the date of such deemed COD. For this purpose, generating station will be required to submit data regarding its actual generation demonstrating peak capacity based on which SLDC will certify that actual generation as per COD has been achieved and inform concerned stakeholders. A fresh trial run will not be required for this purpose.
- (iv) If such a generating station is not able to demonstrate the rated capacity when sufficient wind velocity is available within one (1) year of such deemed COD, the generating company shall derate the capacity as per actual maximum capacity achieved and certified by SLDC. Such de-rating shall be retrospectively effective from the date of deemed COD.
- (e) Successful trial run of a standalone Energy Storage System (ESS) shall mean one (1) cycle of charging and discharging of energy as per the design capabilities with the requisite metering, telemetry and protection system and any other requirements being in service.
- (f) Successful trial run of a pumped storage plant (PSP) unit shall mean one (1) cycle of turbo-generator and pumping motor mode as per the design capabilities up to the rated water drawing levels with the requisite metering, telemetry and protection system and any other requirements 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, deemed 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, within one (1) year from the date of such deemed COD:

Provided further that if such a PSP unit is not able to demonstrate the design capabilities when sufficient water is available, the PSP unit shall have the option to either go for a repeat trial run or de-rate the capacity. If the PSP unit decides to de-rate the unit capacity, such de-rating shall be retrospectively effective from the date of deemed 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. The generating company shall demonstrate rated capacity of the plant(s) on the basis of combined capacity trial of hybrid system.
- (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 subject to a minimum aggregated de-rated capacity of 5 MW:

Provided that minimum aggregated de-rated capacity shall be 1 MW in terms of sub-clause b(iv) of Regulation 2.1 of Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010.

- (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 entered with distribution licensee.

46. Trial Run of Intra-State Transmission System

Trial run of a transmission system or an element thereof shall mean successful energisation 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 etc.:

Provided that under exceptional circumstances and with the prior approval of CEA on the recommendation of SLDC and STU, a transmission element can be energized at lower nominal system voltage level:

Provided further that SLDC in consultation with STU may allow anti-theft charging where the transmission line is not carrying any power.

47. Trial Run of Dedicated Transmission Line of Generating Station

Trial run of a dedicated transmission line (which is owned and to be operated by generating station) shall mean successful energisation of such line 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 etc..

48. Trial Run of Committed Transmission Line

Trial run of a committed transmission line in terms of clause (3) of Regulation 44 of these regulations shall mean successful energisation of the said committed transmission line at its nominal system voltage through interconnection with the intra-State transmission system for a continuous twenty-four (24) hours flow of power and communication signal with the among others requisite metering system, telemetry and protection system.

49. Documents and Tests Prior to Declaration of Commercial Operation

- (1) Notwithstanding the requirements in other standards, codes and contracts, for ensuring grid security, the tests as specified in the following clauses shall be scheduled and carried out in coordination with SLDC and STU by the generating company or ESS or the transmission licensee or the open access consumer / the captive user, as the case may be, and relevant reports and other documents as specified shall be submitted to SLDC and STU before a certificate of successful trial run is issued to such a generating company or ESS or the transmission licensee or the open access consumer / the captive user, as the case may be.
- (2) All thermal generating stations having a capacity of more than 200 MW and hydro generating stations having a capacity of more than 25 MW shall submit documents confirming the enablement of automatic operation of the plant from SLDC by integrating the controls and tele-metering features of their system into the automatic generation control in accordance with CEA Technical Standards for Construction Regulations and CEA Technical Standards for Connectivity Regulations.
- (3) Documents and Tests Required for Thermal (coal / lignite) Generating Stations:
 - (a) The generating company shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (1) of Regulation 51 of these regulations.
 - (b) The generating company shall submit the following OEM documents, namely (i) startup curve for boiler and turbine including starting time of unit in cold, warm and hot conditions, (ii) capability curve of generator, (iii) design ramp rate of boiler and turbine.
 - (c) The following tests shall be performed:

- (i) Operation at a load of fifty five (55) percent of MCR as per CEA Technical Standards for Construction Regulations for a sustained period of four (4) hours.
 - (ii) Ramp-up from fifty five (55) percent of MCR to MCR at a ramp rate of at least one (1) percent of MCR per minute, in one step or two steps (with stabilization period of 30 minutes between two steps), and sustained operation at MCR for one (1) hour.
 - (iii) Demonstrate overload capability with the valve wide open as per CEA Technical Standards for Construction Regulations and sustained operation at that level for at least five (5) minutes.
 - (iv) Ramp-down from MCR to fifty five (55) percent of MCR at a ramp rate of at least one (1) percent of MCR per minute, in one or two steps (with stabilization period of 30 minutes between two steps).
 - (v) Primary response through injecting a frequency test signal with a step change of ± 0.1 Hz at 55%, 60%, 75% and 100% load.
 - (vi) Reactive power capability as per the generator capability curve as provided by OEM considering over-excitation and under-excitation limiter settings and prevailing grid condition.
- (4) Documents and Tests Required for Hydro Generating Stations including Pumped Storage Hydro Generating Station:
- (a) The generating company shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (2) of Regulation 51 of these regulations.
 - (b) The generating company shall submit OEM documents for the turbine characteristics 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).
 - (c) 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.
 - (iv) Operation in synchronous condenser mode wherever designed.

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

- (a) The generating company shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (1) of Regulation 51 of these regulations.
- (b) The generating company shall submit OEM documents for (i) starting time of the unit in cold, warm and hot conditions (ii) design ramp rate.
- (c) The following tests shall be performed:
 - (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 up to 100 MW capacity, wherever feasible.
 - (iv) Operation in synchronous condenser mode wherever designed.

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

- (a) The generating company shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (4) of Regulation 51 of these regulations.
- (b) Type test report for Fault Ride through Test (LVRT and HVRT) for units commissioned after the specified date as per CEA Technical Standards for Connectivity Regulations 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 as per CEA Technical Standards for Connectivity Regulations.
 - (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 (1) 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 CEA Regulations in accordance with clause (4) of Regulation 51 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.
 - (iii) Ramping capability as per design.
- (8) Documents and Tests Required for AC Transmission System:
 - (a) The transmission licensee shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (3) of Regulation 51 of these regulations.
 - (b) The transmission licensee shall submit technical details and perform site tests in compliance of standards / guidelines / regulations of CEA, as applicable.
- (9) Documents and Tests Required for HVDC Transmission System:
 - (a) The transmission licensee shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (3) of Regulation 51 of these regulations.
 - (b) The transmission licensee shall submit technical details including operating guidelines such as filter bank requirements at various operating loads and monopolar / or bipolar configuration, reactive power controller, run-back features, frequency controller, reduced voltage mode of operation, circuit design parameters and power oscillation damping, as applicable.
 - (c) The following tests shall be performed:
 - (i) Minimum load operation.
 - (ii) Ramp rate.
 - (iii) Overload capability, subject to grid condition.
 - (iv) Black start capability in the case of Voltage Source Converter (VSC) HVDC wherever feasible.
 - (v) Dynamic Reactive Power Support (in the case of VSC based HVDC)
- (10) Documents and Tests Required for Static Volt Ampere Reactive Compensator (SVC) or Static Synchronous Compensator (STATCOM):
 - (a) The transmission licensee shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (3) of Regulation 51 of these regulations.
 - (b) The transmission licensee shall submit technical particulars including a single line diagram, V/I characteristics, the rating of coupling transformer, the rating of each Voltage Source Converter

(VSC), Mechanically Switched Reactor (MSR) and Mechanically Switched Capacitor (MSC) branch, different operating modes, the IEEE standard Model, Power Oscillation Damping (POD) enabled and tuned (if not, then reasons for the same) and the results of an offline simulation-based study to validate the performance of POD.

- (c) The following tests shall be performed to validate the full reactive power capability of Static VAR compensators (SVC) and Static Synchronous Compensator (STATCOM) in both directions i.e. absorption as well as injection mode:

- (i) POD performance test.
- (ii) dynamic performance testing:

Provided that the transmission licensee may submit offline simulation studies for the specified tests, in case the conduct of tests is not feasible before COD, subject to the condition that tests shall be performed within a period of one (1) year from the date of achieving COD.

(11) Documents and Tests Required for Committed Transmission Line:

- (a) The open access consumer / captive user shall submit a certificate confirming compliance with CEA Regulations in accordance with clause (5) of Regulation 51 of these regulations.
- (b) The open access consumer / captive user shall submit technical details and perform site tests in compliance of standards / guidelines / regulations of CEA, as applicable.

50. Certificate of Successful Trial Run

- (1) In case any objection is raised by a beneficiary in writing to SLDC with a copy to all concerned regarding the trial run within two (2) days of completion of such trial run, SLDC shall, within five (5) days of receipt of such objection, in coordination with concerned entity and 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 49 of these regulations, SLDC shall issue a certificate to that effect to the concerned generating station or ESS or transmission licensee or open access consumer / captive user, as the case may be, with a copy to their respective beneficiary(ies), STU, any other transmission licensee (in case connectivity is granted to the InSTS of a transmission licensee other than STU) and SPC, within three (3) days.

51. Declaration by Generating Company / Transmission Licensee

- (1) Thermal Generating Station

- (a) The generating company shall certify that:
 - (i) The generating station or unit thereof along with its dedicated transmission line. If any, meets the relevant requirements and provisions of CEA Technical Standards for Construction Regulations, CEA Technical Standards for Connectivity Regulations, CEA Metering Regulations, CEA Technical Standards for Communication Regulations, CEA Safety Regulations and these regulations, as applicable.
 - (ii) The main plant equipment and auxiliary systems including the balance of the plant such as the fuel oil system, coal handling plant, DM plant, pre-treatment plant, fire-fighting system, ash disposal system and any other site specific system have been commissioned and are capable of full load operation of the units of the generating station on a sustained basis.
 - (iii) Permanent electric supply system including emergency supplies and all necessary instrumentation, control and protection systems and auto loops for full load operation of the unit have been put into service.
- (b) The certificates required under sub-clause (a) of this clause shall be signed by the authorized signatory not below the rank of Director of the generating company subsequent to its approval by the Board of Directors and shall be submitted to SLDC, STU and SPC before the declaration of COD.

(2) Hydro Generating Station

- (a) The generating company shall certify that:
 - (i) The generating station or unit thereof along with its dedicated transmission line meets the requirement and relevant provisions of CEA Technical Standards for Construction Regulations, CEA Technical Standards for Connectivity Regulations, CEA Metering Regulations, CEA Technical Standards for Communication Regulations, CEA Safety Regulations 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 firefighting system have been commissioned and are capable of full load operation of units on a sustained basis.
 - (iii) Permanent electric supply systems including emergency supplies and all necessary instrumentations control and protection systems and auto loops for full load operation of the unit are put into service.

- (b) The certificates required under sub-clause (a) of this clause shall be signed by the authorized signatory not below the rank of Director of the generating company subsequent to its approval by the Board of Directors and shall be submitted to SLDC, STU and SPC before the declaration of COD.

(3) Transmission System

The transmission licensee shall submit a certificate signed by the authorized signatory not below the rank of Director of the company subsequent to its approval by the Board of Directors to SLDC, STU and SPC before declaration of COD that the transmission line, sub-station and communication system conform to CEA Technical Standards for Construction Regulations, CEA Technical Standards for Connectivity Regulations, CEA Metering Regulations, CEA Technical Standards for Communication Regulations, CEA Safety Regulations and these regulations and are capable of operation to their full capacity.

(4) Solar, Wind, Storage, and Hybrid Generating Station

The generating station based on solar and wind resources, ESS and hybrid generating station shall submit a certificate signed by the authorized signatory not below the rank of Director subsequent to its approval by the Board of Directors to SLDC, STU and SPC before declaration of COD, that the said generating station or the ESS as the case may be, including main plant equipment such as solar inverters or wind turbines or auxiliary systems, as the case may be, has complied with all relevant provisions of CEA Technical Standards for Connectivity Regulations, CEA Metering Regulations, CEA Technical Standards for Communication Regulations, CEA Safety Regulations and these regulations.

(5) Committed Transmission Line

The open access consumer / captive user shall submit a certificate signed by the authorized signatory not below the rank of Director subsequent to its approval by the Board of Directors to SLDC, STU and SPC before declaration of COD that the committed transmission line and communication system conform to CEA Technical Standards for Construction Regulations, CEA Technical Standards for Connectivity Regulations, CEA Technical Standards for Communication Regulations, CEA Safety Regulations and these regulations and are capable of operation to their full capacity.

52. Declaration Of Commercial Operation / Commercial Operation Date (COD)

- (1) On receipt of the certificate of successful trial run from SLDC, a generating station or unit thereof or a transmission system or an element thereof or ESS or committed transmission line, as applicable,

may declare commercial operation as follows and inform SLDC, STU, SPC and its beneficiaries and CEA (required for generating stations / transmission system):

(a) Thermal Generating Station or a Unit thereof

- (i) The commercial operation date in the case of a unit of the thermal generation station shall be the date declared by the generating company after a successful trial run at MCR or de-rated capacity as per sub-clause (b) of clause (1) of Regulation 45 of these regulations, as the case may be, and submission of a declaration as per clause (1) of Regulation 51 of these regulations.
- (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.

(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 successful trial run at MCR or de-rated capacity as per sub-clause (b) of clause (2) of Regulation 45 of these regulations, as the case may be, and submission of a declaration as per clause (2) of Regulation 51 of these regulations.
- (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 0000 hours after successful trial operation for transmitting electricity and communication signals from the sending end to the receiving end as per Regulation 46 and submission of a declaration as per clause (3) of Regulation 51 of these regulations.
- (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 Service Agreement:

(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 0000 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 respective control centres as certified by SLDC.

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

- (i) The commercial operation date in the case of units of a renewable generating station aggregating to 5 MW and above or such other limit as specified in clause (3) of Regulation 45 of these regulations, shall mean the date declared by the generating station after undergoing a successful trial run as per clause (3) of Regulation 45 of these regulations, submission of declaration as per clause (4) of Regulation 51 of these regulations, and subject to fulfilment of other conditions, if any, as per power purchase agreement.
- (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.

(f) Committed Transmission Line

The commercial operation date in the case of a committed transmission line in terms of clause (3) of Regulation 44 of these regulations shall be the date declared by the open access consumer / captive user on which the said committed transmission line is in regular service at 0000 hours after successful trial operation for transmitting electricity and communication signals including transfer of voice and data to the respective control centres as certified by SLDC and submission of a declaration as per clause (5) of Regulation 51 of these regulations.

- (2) On declaration of commercial operation date, scheduling of the generating station or unit thereof, shall start from 0000 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 later.

CHAPTER 7

OPERATING CODE

53. General

- (1) This operating code covers the operating philosophy, system security, operational planning, operational planning study, outage planning, system restoration, real time operation, demand and load management, post despatch analysis, periodic reports, reactive power management, periodic testing and capacity building and certification, required at intra-State level for integrated operation of the State grid, specified in consistent with the operating code of IEGC of the Central Commission with State specific changes.
- (2) SLDC and SPC shall carry out such functions as specified in these regulations in co-ordination with NLDC, NRLDC, NRPC, CTU, STU, SPC and concerned users, as applicable. SPC / SLDC within sixty (60) days from the date of notification of these regulations shall issue the plans, procedures, mechanism and formats, consistent with the plans, procedures, mechanism and formats stipulated by NLDC or NRPC or NRLDC as the case may be under IEGC with State specific changes and any other procedure or format considered appropriate by SPC / SLDC, in consultation with concerned stakeholders, for performing such duties as specified in these regulations:

Provided that in the absence of such plans, procedures, mechanism and formats of SPC / SLDC, the plans, procedures, mechanism and formats as issued by NLDC or NRPC or NRLDC, as the case may be, under IEGC shall be adopted with State specific changes by SLDC or SPC, as the case may be.

54. Operating Philosophy

- (1) All entities, such as NLDC, NRLDC, NRPC, CTU, SLDC, SPC, STU, licensees, generating stations, SREMC, QCAs, and other grid connected entities / users 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 spread over the geographical area of the State.
- (2) Operation of the northern regional grid and of the national grid shall be monitored by NRLDC and by NLDC respectively in accordance with IEGC. Detailed Operating Procedures for the national grid shall be developed, maintained and updated by NLDC in consultation with RLDCs and relevant stakeholders and shall be kept posted on NLDC's website, whereas Detailed Operating Procedures for northern regional grid shall be developed, maintained and updated by NRLDC in consultation with NLDC, NRPC and regional entities and shall be kept posted on NRLDC's website.
- (3) Operation of the State grid shall be monitored and controlled by SLDC.

- (4) SLDC within sixty (60) days from the date of notification of these regulations shall develop the Detailed Operating Procedures for the State grid, consistent with the Detailed Operating Procedures of NRLDC issued under IEGC with State specific changes in consultation with concerned stakeholders. These procedures shall be maintained and updated by SLDC, and shall be kept posted on SLDC's website.

Provided that in the absence of such Detailed Operating Procedures of SLDC, the Detailed Operating Procedures as issued by NRLDC under IEGC shall be adopted with State specific changes by SLDC under intimation to SPC.

- (5) SLDC shall have qualified operating personnel manning the control room round the clock.
- (6) Every generating station, and transmission substation of 132 kV and above shall have a control room manned by qualified operating personnel round the clock and equipped to carry out the directions / operations as directed by SLDC. 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/or information flow:

Provided that a transmission licensee owning a transmission line but not owning the connected substation, shall have a coordination centre functioning round the clock, manned by qualified personnel for operational coordination with SLDC and equipped to carry out the directions / operations as directed by SLDC.

- (7) QCA shall have coordination centres functioning round the clock, manned by qualified personnel for operational coordination with SLDC and renewable energy generating stations. ESS and open access consumer / captive user, which are intra-state users / entities shall have coordination centres functioning round the clock and manned by qualified personnel for operational coordination with SLDC.
- (8) Every distribution licensee shall have a control room manned by qualified operating personnel round the clock, equipped for scheduling and load despatch and controlling power system operation within his area of supply including load management, power management and real time revisions in schedule, demand curtailment etc, carrying out the directions / operations as directed by SLDC and performing such duties as specified in these regulations. Distribution licensee shall be responsible for operational coordination with SLDC, of its bulk consumer (other than open access consumer / captive user) that are directly connected to InSTS.
- (9) The distribution licensee within ninety (90) days from the date of notification of these regulations shall develop online tracking and monitoring system for distributed generation resources feeding

electricity into the electricity system at voltage level of below 33 kV within its licence area for among others facilitating decisions of revision of drawal schedule during intra-day operation.

55. System Security

- (1) STU and all users shall operate their respective power systems in an integrated manner at all times in coordination with SLDC. All licensees, generating companies and other users connected to the grid shall comply with the directions issued by SLDC.
- (2) Isolation, Taking out of service and Switching off an element(s) of the State grid:
 - (a) No element(s) of the grid shall be isolated from the grid, except:
 - (i) during an emergency as per the Detailed Operating Procedure(s) of RLDC or SLDC, as the case may be, where such isolation would prevent a total grid collapse and/or would enable early restoration of power supply;
 - (ii) for the safety of human life;
 - (iii) when serious damage to a critical equipment is imminent and such isolation would prevent it; and
 - (iv) when such isolation is specifically instructed by SLDC / NRLDC.

Any such isolation shall be reported to SLDC within the next fifteen (15) minutes.
 - (b) SLDC, in consultation with NRLDC / NRPC, SPC, STU, users, shall prepare a list of important elements in the State grid that are critical for grid operation and shall make the said list available to all concerned. The said list shall be reviewed at least in every three (3) months or earlier as advised by SPC.
 - (c) An important element of the State grid as listed at sub-clause (b) of this clause can be taken out of service only after prior clearance of SLDC, except in emergencies as per the Detailed Operating Procedure(s) of RLDC or SLDC, as the case may be. SLDC shall inform the opening or removal of any such important element(s) of the State grid to NRLDC, SPC, STU and the concerned intra-State users / entities who are likely to be affected, as specified in the Detailed Operating Procedure(s) of NRLDC or SLDC.
 - (d) In case of switching off or tripping of any of the important elements of the State grid under emergency conditions or otherwise, it shall be intimated immediately by STU / concerned users with available details to SLDC, who in turn shall intimate NRLDC wherever applicable. The reasons for such switching off or tripping to the extent determined and the likely time of

restoration shall also be intimated within half an hour. SLDC and STU / users shall ensure restoration of such elements within the estimated time of restoration, as intimated.

- (e) 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 SLDC, in coordination with NRLDC wherever applicable, in accordance with the system restoration procedures of NRLDC or SLDC.
- (3) Maintenance of grid elements shall be carried out by STU and respective users in accordance with the provisions of CEA Grid Standards Regulations. Outage of an element that is causing or likely to cause danger to the grid or sub-optimal operation of the grid shall be monitored by SLDC. SLDC shall report such outages to SPC and NRLDC wherever applicable. SLDC shall issue suitable instructions to restore such elements in a specified time period.
- (4) 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 100 MW without prior permission of SLDC.
- (5) 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 100 MW without the prior permission of SLDC.
- (6) All generating units shall have their automatic voltage regulators (AVRs), power system stabilizers (PSSs), voltage (reactive power) controllers (Power Plant Controller) and any other requirements in operation, as per CEA Technical Standards for Connectivity Regulations. If a generating unit with a capacity higher than 100 MW is required to be operated without its AVR or voltage controller in service, the generating station shall immediately inform SLDC of the reasons thereof and the likely duration of such operation and obtain its permission.
- (7) The tuning of Automatic Voltage Regulator (AVR), Power System Stabiliser (PSS), Voltage Controllers (PPC) including for low and high voltage ride through capability of solar and wind generators or any other requirement as per CEA Technical Standards for Connectivity Regulations shall be carried out by the respective generating station:
 - at least once every five (5) years;
 - based on operational feedback provided by SLDC after analysis of a grid event or disturbance;
 - in case of major network changes or fault level changes near the generating station as reported by SLDC.

– in case of a major change in the excitation system of the generating station.

- (8) PSSs, AVR of generating units and reactive power controllers shall be properly tuned by the generating station as per the plan and the procedure prepared by SPC, within sixty (60) days from the date of notification of these regulations. In case the tuning is not complied with as per the plan and procedure, SLDC shall issue notice to the defaulting generating station to complete the tuning within a specified time, failing which SLDC may approach the Commission under Section 33 of the Act.

Provided that in the absence of such plan and procedure of SPC, the plan and procedure as prepared by NRPC under IEGC shall be adopted with State specific changes by SPC under intimation to SLDC.

- (9) Provisions of protection and relay settings shall be coordinated periodically throughout the State grid, as per the plan finalized by SPC in accordance with the Protection Code of these regulations.
- (10) The communication infrastructure for reliable data and voice communication and tele-protection for the power system at the intra-State level shall be in accordance with the Communication Code of these regulations. STU / users shall be responsible for planning, design, implementation, operation, maintenance and upgradation of their own communication infrastructure to be interfaced with the communication system at the intra-State level.
- (11) SPC shall prepare the islanding schemes in accordance with CEA Grid Standards Regulations for identified generating stations, cities and locations and ensure their implementation. The islanding schemes shall be reviewed and updated depending on the assessment of critical loads at least once a year or earlier, if required. SPC shall be guided by the advice / protection philosophy of NRPC / NRLDC for the planning of islanding schemes.
- (12) Mock drill of the islanding schemes shall be carried out annually by SLDC in coordination with NRLDC, STU and other users involved in the islanding schemes. 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 SLDC.
- (13) STU / intra-State transmission licensees, all distribution licensees and bulk consumers, open access consumers / captive users as applicable shall provide automatic under-frequency relays (UFR) and df/dt relays for load shedding in their respective systems to arrest frequency decline that could result in grid failure as per the plan given by SPC or NRPC as applicable from time to time. The default UFR settings shall be as specified in clause (12) of Regulation 29 of IEGC as amended from time to

time. The load shedding for each stage of UFR operation, in percentage of demand or MW shall be as finalised by SPC or NRPC as applicable.

- (14) The following shall be factored in while designing and implementing the UFR and df/dt relay schemes:
- (a) The under-frequency and df/dt load shedding relays are always functional.
 - (b) Demand disconnection shall not be set with any time delay in addition to the operating time of the relays and circuit breakers.
 - (c) There shall be a uniform spatial spread of feeders selected for UFR and df/dt disconnection.
 - (d) STU / users shall be capable of transmitting all operational data as required by SLDC.
 - (e) SLDC shall ensure that telemetered data of feeders (MW power flow in real time and circuit breaker status) on which UFR and df/dt relays are installed is available at its control centre. SLDC shall monitor the combined load in MW of these feeders at all times. SLDC shall share the above data with NRLDC in real time and submit a monthly exception report to NRPC and SPC. NRLDC shall inform SLDC as well as NRPC on a 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 NRPC or SPC as applicable. SLDC shall take corrective measures through STU / concerned users within a reasonable period and inform NRLDC, NRPC and SPC, failing which suitable action may be initiated by NRPC / SPC.
 - (f) NRPC / SPC shall undertake a monthly review of the UFR and df/dt scheme and also carry out random inspection of the under-frequency relays. NRPC / SPC shall publish such a monthly review along with an exception report on its website.
 - (g) SLDC shall report the actual operation of UFR and df/dt schemes and load relief to NRLDC, NRPC and SPC and publish the monthly report on its website.
 - (h) SLDC shall maintain the operation details of UFR and/or df/dt relay and shall also keep comparative data of expected load relief and actual load relief obtained in real-time system operation.
- (15) SLDC, STU or users may identify the requirement of System Protection Schemes (SPS) (including inter-tripping and run-back) in the power system to operate the transmission system within operating limits and to protect against situations such as voltage collapse, cascade tripping and tripping of important corridors / flow-gates. Any such SPS at the intra-State level shall be finalized by SPC in consultation with NRPC / NRLDC. SPS shall be installed and commissioned by STU / concerned

users. SPS shall always be kept in service. If any SPS at the intra-State level is to be taken out of service, the permission of SLDC shall be obtained indicating the reasons and period of the anticipated outage from service and the same shall be informed to NRLDC, wherever applicable.

- (16) SLDC shall make all efforts to evacuate the available solar and wind power and treat these plants as must-run power plants. However, SLDC may instruct solar / wind generating station to back down generation in case grid security or safety of any equipment or personnel is likely to be endangered and such solar / wind generating station shall comply with the same. Data Acquisition System facility shall be provided by the generating station for transfer of information to SLDC. Solar / wind curtailment procedure shall be prepared by SPC in consultation with SLDC and same shall be implemented with due intimation to the Commission. All the entities concerned shall follow the detailed procedure for management of solar / wind curtailment for wind and solar generation issued by the SPC in consultation with SLDC.
- (17) SLDC, STU and users shall operate in a manner to ensure that the steady state grid voltage as per CEA Grid Standards Regulations remains within the following operating range:

Table 2: Voltage Range

Voltage (kV rms)		
Nominal	Maximum	Minimum
765	800	728
400	420	380
220	245	198
132	145	122
66	72	60
33	36	30

- (18) SLDC shall take appropriate measures to control the voltage as per their operating procedures.
- (19) STU and concerned users shall implement defence mechanisms as finalized by SPC to prevent voltage collapse and cascade tripping:

Provided that in the absence of such defence mechanisms of SPC, the defence mechanisms as prepared by NRPC under IEGC shall be adopted with State specific changes by SPC under intimation to SLDC.

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

56. Operational Planning

(1) Time Horizon

- (a) Operational planning shall be carried out in advance by SLDC within its control area with monthly and yearly time horizons in co-ordination with NRLDC / NRPC, CTU, STU and SPC.
- (b) Operational planning shall be carried out in advance by SLDC within its control area on intra-day, day ahead, weekly time horizons.
- (c) SLDC in consultation with NRLDC shall issue procedures and formats for data collection, within sixty (60) days from the date of notification of these regulations, to carry out:
 - (i) Operational planning analysis,
 - (ii) Real-time monitoring,
 - (iii) Real-time assessments.

Provided that in the absence of such procedures and formats of SLDC, the procedures and formats as issued by NRLDC under IEGC shall be adopted with State specific changes by SLDC under intimation to SPC.

(2) Demand Estimation

- (a) All buyers including distribution licensees shall be responsible for the estimation of their own demands. The demand estimation shall cover the different time horizons, namely short term, medium term, and long term as applicable. These buyers shall submit their demand estimation to SLDC for carry out demand estimation of the State. All buyers shall also maintain historical database for demand estimation including the data of forecast error.
- (b) Distribution licensee shall develop methodology for daily (intra-day / day ahead) / weekly / monthly / yearly demand estimation in MW and MWh for operational purposes.
- (c) SLDC shall carry out demand estimation of the State as part of operational planning after duly factoring in demand estimation of buyers submitted under sub-clause (a) of this clause along with the demand estimation done as part of resource adequacy planning referred to in Chapter 2 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 / captive

users and other open access consumers / bulk consumers embedded within the State. SLDC within sixty (60) days from the date of notification of these regulations shall provide formats as well as timelines to be followed for exchange of information between the concerned entities for arriving at demand estimation of the State.

- (d) SLDC within sixty (60) days from the date of notification of these regulations shall develop methodology for daily (intra-day, day ahead), weekly, monthly, yearly demand estimation in MW and MWh for operational analysis. 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 estimation.
- (e) The demand estimation by 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 revise the demand estimate for demand estimate correction.
- (f) SLDC shall estimate node-wise morning peak, evening peak, day shoulder and night off-peak estimated demand in MW and MVA on a monthly and quarterly basis for the nodes 132 kV and above for the preparation of scenarios for computation of TTC and ATC by NRLDC and NLDC.
- (g) 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.
- (h) The northern regional demand estimate and the national demand estimate shall be prepared by NRLDC and NLDC respectively as per IEGC. Timeline for submission of demand estimate data by SLDC or other entities directly connected to ISTS, as applicable, to NRLDC and NRPC shall be in accordance with IEGC.
- (i) Timeline for submission of demand estimate data by buyers including distribution licensees and other entities directly connected to InSTS, as applicable, to SLDC and SPC shall be as follows:

Table 3: Timeline for Demand Estimation

Daily demand estimation	9:00 hours of previous day
Weekly demand estimation	9:00 hours of First working day of previous week

Monthly demand estimation	Fourth day of previous month
Yearly demand estimation	15th September of the previous year

- (j) SLDC shall compute forecasting error for intra-day, day-ahead, weekly, monthly and yearly forecasts and analyse the same in order to reduce forecasting error in the future. The computed forecasting errors shall be made available by SLDC on its website.

(3) Generation Estimation

- (a) The modalities of generation estimation by entities shall be as per the procedure referred to in sub-clause (c) of clause (1) of Regulation 56 of these regulations.
- (b) SLDC shall forecast generation from solar, wind, ESS and other renewable energy based generating station that are intra-state entities, for different time horizons as referred to in clause (1) of Regulation 56 of these regulations for the purpose of operational planning.

(4) Adequacy of Resources

- (a) 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 2 of these regulations.
- (b) SLDC shall furnish time block-wise information for the following day in respect of all intra-state entities to NRLDC who shall validate the adequacy of resources for the control area of SLDC, as per sub-clause (b) of clause (4) of Regulation 31 of IEGC, 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 stations;
 - (iv) Requisition from regional entity generating stations;
 - (v) Secondary and planned procurement through tertiary reserve requirement;
 - (vi) Planned procurement of power through other bilateral or collective transactions, if any.
- (5) SPC in consultation with SLDC shall periodically review the performance of the State grid for the past period and plan stable operation of the grid for the future, considering various parameters and occurrences such as frequency profile, voltage profile, line loading, grid incident, grid disturbance, performance of system protection schemes and protection coordination.

57. Operational Planning Study

- (1) Based on the operational planning analysis data, operational planning study shall be carried out by SLDC for time horizons in line with IEGC, reproduced as under:

Table 4: Time Horizon for Operational Planning Study

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

- (2) SLDC shall utilize network estimation tool integrated in its Energy Management System (EMS) and SCADA systems for the real time operational planning study. STU and 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 SLDC, along with a firm timeline for restoration. The performance of online network estimation tools at SLDC shall be reviewed in the monthly operational meeting of SPC. Any telemetry related issues impacting the online network estimation tool shall be monitored by SPC for their early resolution.
- (3) SLDC shall perform day-ahead, weekly, monthly and yearly operational studies for the State for:
- assessment and declaration of total transfer capability (TTC) and available transfer capability (ATC) for the import or export of electricity by the State and between InSTS & distribution licensee(s) network within the State, eleven (11) months in advance for each month on a rolling basis. 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 SLDC website with all the assumptions and limiting constraints;
 - planned outage assessment;
 - special scenario assessment;
 - system protection scheme assessment;
 - natural disaster assessment; and

- (f) any other study relevant in operational scenario.
- (4) 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 SPC and significant deviations shall be monitored by SPC for early resolution.
- (5) 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.
- (6) 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 STU and users in advance so that they can take corrective measures and the same shall be furnished to SPC. In case any user / STU is unable to adhere to such an operating plan, it shall inform SLDC in advance with detailed reasons and explanations for the non-adherence. These detailed reasons and explanations shall be discussed in the monthly operation sub-committee of SPC and a quarterly report shall be submitted to NRLDC / NRPC and CEA.
- (7) 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.
- (8) 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 CEA, NRPC, CTU and STU for immediate and long-term mitigation measures.
- (9) 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 / STU or SLDC and shall be deployed as finalized by SPC.

58. Outage Planning

- (1) Outage planning shall be prepared for the grid elements in a coordinated and optimal manner, keeping in view the system operating conditions and grid security. The coordinated generation and transmission outage plan for the State grid shall take into consideration all the available generation resources, demand estimates, transmission constraints, and factor in water for irrigation requirements, if any. To optimize the transmission outages of the State grid, to avoid grid operation getting adversely affected and to maintain system security standards, the outage plan shall also take into account the generation outage schedule and the transmission outage schedule.

(2) Annual Outage Plan shall be prepared as follows:

- (a) Annual outage plan of grid elements under the State control area and identified elements of State control area under sub-clause (b) of clause (2) of Regulation 55 of these regulations, shall be prepared in advance for the financial year by SPC in consultation with the users, STU, SLDC, NRLDC / NRPC and reviewed before every month and every quarter and adjustments shall be made wherever necessary.

Provided that scheduled outage of generating stations and transmission elements (like 400 kV transmission elements and 220 kV / 220 kV inter-State lines) affecting regional power system shall be considered only with the approval of RLDC / NRPC in coordination with SLDC.

- (b) Annual outage plan shall be prepared in such a manner as to minimize the overall downtime, particularly where multiple entities are involved in the outage of any grid element(s).
- (c) The outage plan of hydro generation plants, REGS and ESS and its associated evacuation network shall be prepared with a view to extracting maximum generation from these sources.

Example: Outage of wind generator may be planned during lean wind season. Outage of solar generator, if required, may be planned during the rainy season or during night, if possible. Outage of hydro generator may be planned during the lean water season.

- (d) Protection relays related outages, auto-re-closure outages and SPS testing outages shall be planned on a quarterly basis with the prior permission of SPC, which shall consult SLDC and NRLDC / NRPC.

(3) Outage Planning Process shall be as follows:

- (a) STU, intra-State transmission licensees, generating stations and other users / entities directly connected to the InSTS shall provide their proposed outage plan(s) for ensuing financial year in respect of grid elements of the State grid to SPC. The proposed outage plan(s) of generating stations and STU / intra-State transmission licensees shall contain details like identification of unit or lines / sub-stations, reason for outage, generation or power supply availability affected due to such outage, outage start date and duration of outage.
- (b) SLDC shall submit Load Generation Balance Report (LGBR) for its control area to SPC for the next financial year. SPC shall finalize LGBR of the State for the next financial year based on LGBR submitted by SLDC and the data submitted by STU, intra-State transmission licensees, generating stations and other users / entities directly connected to InSTS in such format as may be issued by SPC.

Provided that in the absence of such format of SPC, the format as issued by NRPC under IEGC shall be adopted with State specific changes by SPC under intimation to SLDC.

- (c) SPC shall prepare annual outage plan for generating units and transmission elements after carrying out necessary system studies in order to ensure system security and resource adequacy. SPC shall finalize the annual outage plan for the next financial year in respect of grid elements of the State grid in consultation with SLDC and NRLDC / NRPC.
- (d) The final annual outage plan and the final LGBR shall be intimated to SLDC, NRLDC, NRPC, CTU, STU, the generating stations / users connected to the InSTS. The final outage plan and the final LGBR shall be made available on the websites of the respective users, STU, SLDC and SPC.
- (e) The timeline for Outage Planning Process shall be as follows:

Table 5: Timeline for Outage Planning Process

Activity	Agency	Cut-off date
Submission of proposed outage plan for the next financial year to SPC	STU, transmission licensees, generating stations and other entities directly connected to InSTS	31st August
Submission of LGBR of the control area to SPC for both peak and off-peak scenarios	SLDC	30th September
Publishing draft LGBR and draft annual outage plan of State grid for next financial year on SPC's website for inviting suggestions, comments, objections of stakeholders	SPC	31st October
Publishing final LGBR and final annual outage plan of State grid for next financial year on SPC's website	SPC	30th November

- (f) The annual outage plan shall be reviewed by SPC on a monthly and quarterly basis in coordination with all the parties concerned, and adjustments or additions of new outages shall be made wherever necessary.
- (g) All users, STU, licensees shall follow the annual outage plan. If any deviation is required, the same shall be allowed only with the prior permission of SPC, which shall consult SLDC and NRLDC / NRPC wherever applicable. SLDC shall upload summary of the monthly, quarterly, half-yearly, yearly outage reports on its website.
- (h) STU / user shall inform SLDC about the planned outage and obtain the final clearance from SLDC, at least seventy two (72) hours prior to the planned outage of any grid element. All deviations from the outage plan shall be uploaded on the websites of SPC and SLDC.
- (i) In case of grid disturbances, system isolation, partial black-out in a State or any other event in the system that may have an adverse impact on the system security due to a proposed planned outage,
 - (i) SLDC shall have the authority to defer the planned outage clearly stating the reasons thereof;
 - (ii) SLDC before giving clearance of the planned outage may conduct studies again.

Provided that the revised date in such case would be finalized by SLDC in consultation with STU or concerned user, as soon as possible and the same shall be deemed to be included in outage plan.

- (4) To facilitate coordinated planned outages of grid elements, a common outage planning procedure shall be formulated by SPC in consultation with SLDC, STU and concerned users.

Provided that in the absence of such common outage planning procedure of SPC, the common outage planning procedure as formulated by NRPC under IEGC shall be adopted with State specific changes by SPC under intimation to SLDC.

59. System Restoration

- (1) Based on the template issued by NLDC, SLDC shall prepare restoration procedures for the grid for its control area, which shall be updated every year by SLDC taking into account changes in the configuration of its power systems.
- (2) SLDC, within sixty (60) days from the date of notification of these regulations, shall issue the detailed procedures for restoration of the State grid under partial and total blackouts, consistent with that of

NRLDC stipulated under IEGC with State specific changes in consultation with SPC and the same shall be reviewed and updated annually by SLDC:

Provided that in the absence of such procedures of SLDC, the procedures as issued by NRLDC under IEGC shall be adopted with State specific changes by SLDC under intimation to SPC.

- (3) Detailed procedures for restoration post partial and total blackout of each user / STU system within the State control area shall be prepared by STU and concerned user in coordination with SLDC. STU and concerned user shall review the procedure every year and update the same. STU and user shall carry out a mock trial run of the procedure for different sub-systems including black-start of generating units along with grid forming capability of inverter based generating station and VSC based HVDC black-start support at least once a year under intimation to SLDC and NRLDC. 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 SLDC and NRLDC on a quarterly basis. STU / user shall promptly inform SLDC in advance wherever they have difficulty in complying with the procedures.
- (4) Simulation studies shall be carried out by each user and STU in coordination with 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;
 - (f) Protection settings under restoration condition.
- (5) The thermal generating stations shall prepare themselves for house load operation as per design. The concerned user and SLDC shall report the performance of house load operation of a generating station in the event where such operation was required.
- (6) SLDC shall identify the generating stations with black start facility, grid forming capability of inverter based generating stations, house load operation facility, intra-State ties, synchronizing points and essential loads to be restored on priority. The list shall be reviewed and confirmed by SPC.
- (7) During the restoration process following a blackout, 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,

defence schemes, reduced governor droop setting as necessary, in order to achieve the fastest possible recovery of the grid.

- (8) All communication channels required for restoration process shall be used for the operational communication only, till the grid normalcy is restored.
- (9) Any entity extending black start support by way of injection of power as identified in clause (6) of this Regulation shall be paid for actual injection @ 110 % of the normal rate of charges for deviation in accordance with CERC DSM Regulations for the last block in which the grid was available. The procedure in this regard shall be prepared by SLDC, within sixty (60) days from the date of notification of these regulations, consistent with that of NLDC stipulated under IEGC with State specific changes in consultation with SPC:

Provided that in the absence of such procedure of SLDC, the procedures as issued by NLDC under IEGC shall be adopted with State specific changes by SLDC under intimation to SPC.

- (10) The restoration process shall among others take into account the generator capabilities and the operational constraints of regional and state transmission system with the object of achieving normalcy in the shortest possible time. STU and all users must be aware of the steps to be taken during system restoration process of the State grid under partial and total blackouts. These steps shall be followed by STU and all the users to ensure constraints, reliable and quick restoration.
- (11) STU and 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 STU and 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.
- (12) SLDC shall carry out the post-disturbance analysis of all grid disturbances and grid incidences resulting into total or partial system blackout or system split and desynchronization of any part of the State Grid. STU and all users shall coordinate and furnish the data pertaining to such system disturbance to enable SLDC to analyze the system disturbance and furnish a report to SPC and RLDC in accordance with the provisions of IEGC, as amended from time to time.
- (13) SPC shall also review the data collected and analyze the failure of protection system either of InSTS or any user / STU and recommend modification and/or improvement in the protection system or relay setting schemes and, if necessary, of the islanding and restoration scheme of the State grid, to be carried out by STU / users.

- (14) Distribution licensees or other users with essential loads shall separately identify non-essential components of such loads and submit the same to SLDC, which may be kept off during system contingencies. Distribution licensees shall draw up an appropriate schedule with corresponding load blocks in each case and assign relative priority in the restoration of essential loads. The non-essential loads shall be put on only when system normalcy is restored, as advised by SLDC.

60. 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 NLDC, NRLDC or SLDC, as the case may be.

(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 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, system operator, to bring back the power system to alert / normal state shall take corrective measures such as:

- extreme measures such as load shedding, generation unit tripping, line tripping or closing,
- emergency control action such as HVDC Control, Excitation Control, HP-LP Bypass, tie line flow rescheduling on critical lines, and

–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 equipments 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

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) SLDC in consultation with STU, concerned users and NRLDC if required shall carry out the study for the State control area and based on historical data and grid incidences evolve detailed criteria to categorise the power system in terms of the above states. The detailed criteria shall be included in Detailed Operating Procedure to be issued by SLDC, within sixty (60) days from the date of notification of these regulations, consistent with that of NRLDC stipulated under IEGC with State specific changes in consultation with SPC.

Provided that in the absence of such procedure of SLDC, the procedure as issued by NRLDC under IEGC shall be adopted with State specific changes by SLDC under intimation to SPC.

- (3) 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 state, SLDC shall take emergency action and initiate restorative measures immediately.
- (4) Procedure to be followed during an event
- (a) STU / user shall, immediately following an event on its system, inform SLDC along with details associated with such event. The necessary action shall be taken by STU / the concerned user in coordination with SLDC.

- (b) 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 NRLDC;
 - (c) any warning in respect of system security issued by SLDC shall be taken note of immediately by STU / 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, ESS, distribution licensee and open access consumer / captive user shall have a control room or coordination centre for round the clock coordination as specified in clauses (6), (7) and (8) of Regulation 54 of these regulations.
 - (b) All operational instructions given by SLDC shall have unique codes which shall be recorded and maintained by the concerned entities as specified in CEA Grid Standards Regulations. No element shall be taken into service or isolating from the State grid without obtaining unique code from SLDC.
 - (c) Any planned operation activity in the InSTS 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 from SLDC. The operational code 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 code, the entity shall obtain a fresh operational code from SLDC.
 - (d) Forced outage of important network elements in the State grid shall be closely monitored by SLDC and necessary actions / restorations instructions will be issued by SLDC to STU / users. STU / the concerned user shall send a weekly report of prolonged outage of generating units or transmission elements to SLDC.
 - (e) Any operation in the State grid having an impact on other state(s) / region(s) shall be intimated by SLDC to respective state / RLDC.

61. Demand and Load Management

- (1) The demand and load shall be managed for ensuring grid security. Each intra-State entity including generating station and distribution licensee 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 State grid.

- (2) Each intra-State entity / buyer including distribution licensee shall formulate contingency procedures and make arrangements that will enable load management / drawal restriction or demand curtailment / managing load crash due to weather disturbance or any other reasons, as instructed by SLDC, under normal and/or contingent conditions:

Provided that SLDC may direct to modify such procedures or arrangement, if required, in the interest of grid security and concerned entities shall abide by these directions.

- (3) SLDC shall be responsible for restriction of drawal or curtailment of demand in the event of insufficient generating capacity, inadequate inter-State transfers to meet demand, or in the event of breakdown or congestion in InSTS or ISTS or other operating problems (such as frequency, ACE, voltage levels beyond normal operating limit, or thermal overloads of the equipment and lines, etc.) or over drawal of power vis-à-vis that of intra-State entities beyond the volume limits specified in CERC DSM Regulations.

- (4) SLDC shall devise standard, instantaneous, message formats to give directions in case of contingencies and/or threat to the system security to reduce over drawal by any buyer / distribution licensee at different over drawal conditions depending upon the severity of the over drawal:

Provided further that any non-compliance with such directions shall be dealt with as per the provisions of these regulations.

- (5) SLDC, in coordination with STU and distribution licensee(s), within sixty (60) days from the date of notification of these regulations, shall develop Automatic Demand Management Scheme (ADMS) which shall be implemented through distribution licensee(s), with emergency controls at SLDC.

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

(a) the respective distribution licensee or bulk consumer or open access consumer / captive user under the state control area shall abide by the directions of SLDC to secure the system, and extreme measures like load shedding may be carried out as a last resort.

(b) SLDC may direct distribution licensees or bulk consumers or open access consumer / captive user directly connected to InSTS, to restrict drawal from the grid or curtail load to ensure the stability of the grid. Such directions shall include the time period or the system conditions until which the issued directions shall be applicable:

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

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

62. Post Despatch Analysis

(1) Operational analysis

- (a) SLDC shall analyse 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;
 - (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 websites in formats issued by SLDC, in consistent with that of NLDC issued under IEGC with State specific changes in consultation with SPC.
- (c) 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) SLDC shall also provide such a report to SPC.
- (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 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 CEA Grid Standards Regulations) in the system, STU / the concerned user shall inform SLDC through voice message. SLDC shall report the occurrence of such event to NRLDC immediately for information and may seek directions, if necessary.

- (b) Written flash report shall be submitted to SLDC by STU / the concerned user within the time line specified in Table 6 below.
- (c) Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within the time line specified in Table 6 below.
- (d) SLDC shall report the event (grid disturbance or grid incidence) to CEA, NRLDC, NRPC, SPC and all intra-State entities within twenty-four (24) hours of receipt of the flash report.
- (e) After a complete analysis of the event, STU / the concerned user shall submit a detailed report in the case of grid disturbance or grid incidence within seven (7) days of the occurrence of event to SLDC and SPC.
- (f) SLDC 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 SPC as per the timeline specified in Table 6 below:

Table 6: Report Submission Timeline

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

[^]The classification of Grid Disturbance (GD) / Grid Incident (GI) shall be as per CEA Grid Standards Regulations.

- (g) The implementation of the recommendations of the final report shall be monitored by the protection sub-committee of SPC. SLDC shall disseminate the lessons learnt from each event to SPC for necessary action in the State control area.
- (h) Any additional data such as single line diagram (SLD) of the station, protection relay settings, HVDC transient fault record, switchyard equipment and any other relevant station data required for carrying out analysis of an event by SPC and SLDC, shall be furnished by STU / the users, within forty-eight (48) hours of the request. STU / all users shall also furnish high-resolution analog data from various instruments including power electronic devices like HVDC, FACTS, renewable generation (inverter level or WTG level) on the request of SPC or SLDC.
- (i) Triggering of Static Synchronous Compensator (STATCOM), Thyristor Controlled Series Capacitor (TCSC), HVDC run-back, HVDC power oscillation damping, generating station power system stabilizer and any other controller system during any event in the grid shall be reported to SLDC. The transient fault records and event logger data shall be submitted to SLDC within twenty four (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 SLDC within twenty four (24) hours of the occurrence of the oscillations.
- (j) A monthly report on events of unintended operation or non-operation of the protection system shall be prepared and submitted by STU / each user (owner of important elements as identified at sub-clause (b) of clause (2) of Regulation 55 of these regulations) to SPC and SLDC within the first week of the subsequent month.

63. Periodic Reports

- (1) Daily and monthly reports covering the performance of the State grid shall be prepared by SLDC based on the inputs received in the formats issued by SLDC, from STU and users. Such reports shall be available on the SLDC's website.
- (2) The reports shall, inter-alia, contain the following:
 - (i) Frequency profile including maximum and minimum frequency recorded daily and daily frequency variation index (FVI);
 - (ii) Source wise generation for each control area;
 - (iii) ISTS 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) Solar and wind power generation and injection into the Grid;
 - (vii) Instances and quantum of curtailment of renewable energy;
 - (viii) Status of reservoirs.
 - (ix) Voltage profile of important substations and sub-stations normally having low or high voltages;
 - (x) Lines / Substations operating above 80% of thermal rating or rated capacity.
 - (xi) Major generation and transmission outages;
 - (xii) Instances of inordinate delays in restoration of transmission elements and generating units;
 - (xiii) Instances of transmission constraints and congestion in the intra-State transmission system;
 - (xiv) Instances of persistent / significant non-compliance of instructions of SLDC or with the State Grid Code;
 - (xv) Any other report as stipulated by the Commission from time to time.
- (3) SLDC shall prepare a quarterly report which shall bring out the system constraints, reasons for not meeting the requirements, if any, of security standards and quality of service, along with the details of various actions taken by different users / transmission licensees, and the users / transmission licensees responsible for causing the constraints.
 - (4) SLDC shall also provide information / report to NRLDC and NRPC as per the provisions of IEGC in the interest of smooth operation of ISTS.
 - (5) Reporting of accidents and related matters shall be in accordance with the Section 161 of the Electricity Act, 2003 and the Rules prescribed thereunder.

64. Reactive Power Management

- (1) STU and all users / intra-State entities shall endeavour to maintain the voltage at the interconnection point in the range specified in the State Grid Code.
- (2) SLDC shall carry out operational load flow studies to identify voltage problems 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, SLDC may issue specific instructions to STU / users to maintain voltage level at interconnecting points within permissible limits.

- (3) Users / intra-State entities shall endeavour to minimize the reactive power drawal at an interchange point when the voltage at that point is below 97% of rated voltage and shall not inject reactive power when the voltage is above 103% of rated voltage.
- (4) All generating stations shall be capable of supplying dynamically varying 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 CEA Connectivity Standard Regulations.
- (5) All generating stations connected to the grid shall generate or absorb reactive power as per the grid requirement and instructions of SLDC, within the capability limits of the respective generating units, where capability limits shall be as specified by the OEM.
- (6) The reactive interchange of STU and the users shall be measured and monitored by SLDC.
- (7) SLDC may direct STU and the users about reactive power set-points, voltage set-points and power factor control to maintain the voltage at interconnection points.
- (8) SLDC 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 STU and the users, as per the procedure specified by NLDC under IEGC.
- (9) 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 SLDC:
 - (i) shunt reactors,
 - (ii) shunt capacitors (excluding HVDC automatic control),
 - (iii) thyristor controlled series capacitor (TCSC),
 - (iv) voltage source convertor (VSC) based HVDC,
 - (v) synchronous / non-synchronous generator voltage control including inverter based reactive power support,
 - (vi) synchronous condenser,
 - (vii) static VAR compensators (SVC), STATCOM and other FACTS devices,
 - (viii) HVDC power order or HVDC controller selection to optimise filter bank.
 - (ix) transformer tap change: generator transformer and inter-connecting transformer,
- (10) Reactive power facility specified under sub clause (9) of this Regulation shall be in operation at all times and shall not be taken out without the permission of SLDC.

- (11) Periodic or seasonal tap changing of inter-connecting transformers and generator transformers shall be carried out to optimize the voltages, subject to technical feasibility, and where ever necessary, other options such as tap staggering may be carried out in the network.
- (12) Hydro and gas generating units having this capability shall operate in synchronous condenser mode operation as per instructions of SLDC. Standalone synchronous condenser units shall operate as per the instructions of SLDC, as per the control area. The compensation for such synchronous condenser mode operation shall be included in the procedure specified by NLDC under IEGC.
- (13) Any commercial settlement for reactive power shall be governed as per the regulatory framework specified in Annexure-2 until the same is separately notified as part of CERC Ancillary Services Regulations.
- (14) If voltages are outside the limit as specified in clause (15) of Regulation 55 of these regulations and the means of voltage control set out in clause (7) of this Regulation are exhausted, 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.

65. Periodic Testing

- (1) There shall be periodic tests, as required under clause (3) 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 STU and SLDC.
 - (b) All equipment owners shall submit a testing plan for the next year to SPC 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 SPC 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 SLDC or SPC or RPC.
 - (d) The owners of the power system elements shall implement the recommendations, if any, suggested in the test reports in consultation with CEA, SPC and STU.
- (3) Testing requirements

The following tests shall be carried out on the respective power system elements:

Table 7: Tests Required for Power System Elements

Power System Elements	Tests	Applicability
Synchronous Generator	(1) Real and Reactive Power Capability assessment (2) Assessment of Reactive Power Control Capability as per CEA Technical Standards for Connectivity Regulations (3) Model Validation and verification test for the complete Generator and Excitation System model including PSS (4) Model Validation and verification of Turbine / Governor and Load Control or Active Power / Frequency Control Functions. (5) Testing of Governor performance and Automatic Generation Control	Individual Unit of rating 100 MW and above for Coal / lignite, 50 MW and above gas turbine and 25 MW and above for Hydro
Non synchronous Generator (Solar / Wind)	(1) Real and Reactive Power Capability for Generator (2) Power Plant Controller Function Test (3) Frequency Response Test (4) Active Power Set Point change test (5) Reactive Power (Voltage / Power Factor / Q) Set Point change test	Applicable as per CEA Technical Standards for Connectivity Regulations
HVDC / FACTS Devices	(1) Reactive Power Controller (RPC) Capability for HVDC / FACTS (2) Filter bank adequacy assessment based on present grid condition, in consultation with NLDC (3) Validation of response by FACTS devices as per settings	To all Intra-State HVDC / FACTS

66. 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) as mandated in CEA Regulations / Guidelines.

CHAPTER 8

FREQUENCY CONTROL AND RESERVES CODE

67. General

- (1) While it is desirable in the interest of reliability, safety and security of the grid that adequate reserves are maintained locally at the State level for each state control area as per IEGC or the State Grid Code as the case may be, these regulations aim to provide regulatory mechanisms for ancillary services at the state level for maintaining the grid frequency close to 50.000 Hz, and restoring the grid frequency within the allowable band as specified in IEGC and for relieving congestion in the transmission network, to ensure smooth operation of the power system, and safety and security of the grid. This chapter covers the frequency control and reserves required at intra-State level, specified in consistent with the Regulation 30 of IEGC of the Central Commission with State specific changes.
- (2) SLDC shall carry out such functions as specified in this chapter in co-ordination with NLDC, NRLDC, NRPC, CTU, STU, SPC and concerned users, as applicable. SLDC within sixty (60) days from the date of notification of these regulations shall issue the detailed procedure, consistent with the detailed procedure stipulated by NLDC or NRLDC as the case may be under IEGC with State specific changes and any other procedure or format considered appropriate by SLDC, in consultation with concerned stakeholders, for performing such duties as specified in these regulations and submit the same for information to the Commission:

Provided that in the absence of detailed procedure of SLDC, the detailed procedure as issued by NLDC or NRLDC, as the case may be, under IEGC shall be adopted with State specific changes in consultation with SPC.

68. 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 in line with IEGC or specified by the Central Commission from time to time. The frequency shall be measured with a resolution of ± 0.001 Hz by SLDC and such frequency data measured every second shall be archived by SLDC.
- (2) SLDC shall endeavour that the grid frequency remains close to 50.000 Hz and in case frequency goes outside the allowable band, ensure that the frequency is restored within the allowable band as specified in clause (1) of this regulation at the earliest in consultation with NRLDC and NLDC, if required.

- (3) All intra-State entities / 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 SLDC so that the grid frequency is maintained and remains within the allowable band.

Reserves

- (4) Under the framework of reserves, the All India reserve requirement has been divided into reserves to be maintained at the State level by SLDC and those to be maintained at regional level by RLDC / NLDC, so that overall the reserve requirement on an All India basis is met.

There shall be reserves as under:

(a) Primary, Secondary and Tertiary reserves:

- (i) Primary, Secondary and Tertiary reserves shall be deployed for the purpose of frequency control, reducing area control error and relieving congestion.
- (ii) The response under Primary reserve shall be provided as per these regulations.
- (iii) Secondary reserves including automatic generation control and demand response shall be deployed in the state control area as per these regulations read with IEGC or the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission, as the case may be.
- (iv) Tertiary reserves shall be deployed in the state control area as per these regulations read with IEGC or the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission, as the case may be.

Provided that different date may be appointed for commencement of tertiary reserves in the state control area, as may be notified by the Commission separately.

(b) Black Start reserves:

Generating stations having black start capability, ESS and HVDC Station based on Voltage Source Converter (VSC) shall be identified by SLDC at the State level, to act as black start reserves.

(c) Voltage Control reserves:

Voltage Control reserves shall be deployed for controlling the voltage at a bus or sub-system through reactive power injection or drawl.

- (5) The reserves shall be operated as Ancillary Services, namely
 - (a) Primary Reserve Ancillary Service (PRAS);
 - (b) Secondary Reserve Ancillary Service (SRAS);
 - (c) Tertiary Reserve Ancillary Service (TRAS);
 - (d) Black Start Ancillary Services; and
 - (e) Voltage Control Ancillary Services.
- (6) The mechanism of procurement, deployment and payment of PRAS, including for resources such as energy storage and demand response, and in sub-clause (d) and sub-clause (e) of clause (5) of this Regulation, shall be as specified in these regulations read with IEGC or in the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission, as the case may be.
- (7) The mechanism of selection, procurement, deployment, accounting, payment and settlement and other related & incidental matters of SRAS and TRAS shall be as specified in the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission.
- (8) The primary response of the generating units shall be verified by SLDC during grid events. The concerned generating station shall furnish the requisite data to SLDC within two days of notification of reportable event.

Control Hierarchy

- (9) Inertia:

This clause shall be in line with or as specified in clause (9) of Regulation 30 of IEGC.

The power system shall be operated at all times with a minimum inertia to be stipulated by NLDC so that the minimum nadir frequency post reference contingency stays above the threshold set for under frequency load shedding (UFLS). To maintain the minimum inertia, SLDC may, if required, bring quick start synchronous generation on bar and reschedule generation including curtailment of solar, wind and solar-wind hybrid generation, in coordination with NRLDC and NLDC, if required. The compensation for such quick start synchronous generation shall be included in the procedure to be prepared by SLDC in line to NLDC procedure issued under IEGC.

Provided that in the absence of such procedure of SLDC, the procedure as issued by NLDC under IEGC shall be adopted with State specific changes by SLDC under intimation to SPC.

(10) Primary Control:

The primary control in state control area shall be in line with or as specified in clause (10) of Regulation 30 of IEGC.

- (a) Primary control is local automatic control in a generating unit or energy storage system or demand side resource for the purpose of adjusting its active power output or consumption, as the case may be, in response to frequency excursion. Primary control is the immediate automatic control implemented through turbine speed governors or frequency controllers.
- (b) Primary control shall be provided by PRAS.
- (c) As per IRGC, the minimum quantum of PRAS required for reference contingency shall be declared by NLDC at the start of each financial year.
- (d) The generating stations and units thereof shall have electronically controlled governing systems or frequency controllers in accordance with CEA Technical Standards for Connectivity Regulations and are mandated to provide PRAS. The generating stations and units thereof with governors shall be under Free Governor Mode of Operation (FGMO).
- (e) NLDC may also identify other resources such as ESS and demand resource to provide PRAS for which PRAS Providers shall be compensated in accordance with the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission.
- (f) The minimum All India target frequency response characteristics (FRC) shall be estimated and based on such target FRC, the frequency response obligation of each control area including the state control area of SLDC shall be assessed by NLDC as per IEGC (in consultation with SLDC, if required), giving due consideration to generation and load within each control area and details as given in Table 8 under sub-clause(h) of this clause. The same shall be informed to all control areas including the state control area of SLDC by 15th of March every year for the next financial year.
- (g) All the generating units shall have their governors or frequency controllers in operation all the time with droop settings of 3 to 6 % (for thermal generating units) or 0-10% (for hydro generating units) as specified in CEA Technical Standards for Connectivity Regulations.
- (h) The primary response requirement of various types of generating units shall be as per IEGC as mentioned in Table 8.

Table 8: Primary Response of Various Types of Generating Units

Fuel / Source	Minimum unit size / Capacity	Up to
Coal / Lignite Based	200 MW and above	±5% of MCR
Hydro	25 MW and above	±10% of MCR
Gas based	Gas Turbine above 50 MW	±5% of MCR (corrected for ambience temperature)
WS Seller (commissioned after the date as specified in CEA Technical Standards for Connectivity Regulations)	Capacity of generating station more than 10 MW and connected at 33 kV and above	As per CEA Technical Standards for Connectivity Regulations
Provided that: 1. WS Sellers commissioned after the date as specified in CEA Technical Standards for Connectivity Regulations, shall have the option to provide primary response individually through ESS or through a common ESS installed at its pooling station. 2. Hydro generating stations (with pondage up to 3 hours or Run of the river projects) shall be exempt from mandatory primary response. They may provide the primary response to the extent possible, considering the safety and security of machines and humans.		

- (i) All generating stations mentioned in Table 8 above shall have the capability of instantaneously picking up to a minimum of 105% of their operating level and up to 105% or 110% of their MCR, as the case may be, when the frequency falls suddenly and thus providing primary response whenever conditions arise.

Any generating station not complying with the above requirements shall be kept in operation (synchronized with the State grid) only after obtaining the permission of SLDC.

- (j) All generating stations mentioned in Table 8 above shall have the capability of reducing output at least by 5% or 10%, as applicable, of their operating level and up to 5% or 10% of their MCR, as applicable, limited to the minimum turndown level when the frequency rises above the reference frequency and thus, providing primary response, whenever condition arise. Any

generating station not complying with the above requirements shall be kept in operation (synchronized with the State grid) only after obtaining permission from SLDC.

- (k) The normal governor action shall not be suppressed in any manner through load limiter, Automatic Turbine Run-up System (ATRS), turbine supervisory control or coordinated control system and no time delays shall be deliberately introduced. In the case of a renewable energy generating unit, a reactive power limiter or power factor controller or voltage limiter shall not suppress the primary frequency response within its capabilities. The inherent dead band of a generating unit or frequency controller shall not exceed ± 0.03 Hz.

The governor shall be set with respect to a reference frequency of 50.000 Hz and response outside the dead band shall be with respect to a total change in frequency.

- (l) The thermal and hydro generating units shall not resort to Valve Wide Open (VWO) operation to make available margin for providing governor action.
- (m) PRAS shall start immediately when the frequency deviates beyond the dead band as specified in sub-clause (k) of this clause and shall be capable of providing its full PRAS capacity obligation within forty five (45) seconds and sustaining at least for the next five (5) minutes.
- (n) SLDC shall assess frequency response characteristics for its state control area and share the assessment with NRLDC along with high resolution data of at least one (1) second for generating stations and energy storage systems and ten (10) seconds for the state control area. For this purpose, higher resolution data shall be furnished by generating stations and energy storage systems to SLDC within the state control area as per procedure and formats formulated by NLDC under IEGC.
- (o) All intra-State generating stations and users, as applicable, connected to intra-State transmission system shall submit their frequency response characteristics to SLDC to corroborate their self-certification regarding the compliance to governor mode of operation.
- (p) NRLDC shall calculate actual frequency response characteristics of all the control areas within its region. The performance of each control area including the state control area of SLDC in providing frequency response characteristics shall be calculated for each reportable event as per IEGC.
- (q) As stated in IEGC, NLDC in consultation with RLDCs / SLDCs shall calculate the actual frequency response characteristics at national level by factoring in the FRC of all regions and shall also calculate the FRC for cross border control areas.

- (r) SLDC shall grade the median Frequency Response Performance annually, considering at least 10 reportable events. In case the median Frequency Response Performance is less than 0.75 as calculated as per the procedure of IEGC, SLDC after analyzing the FRP shall direct the concerned entities to take corrective action. All such cases shall be reported to NRPC and SPC for its review. Non-performance should be resolved at SPC level after analysing the reasons for non-performance.

(11) Secondary Control:

The secondary control in state control area shall be in line with or as specified in clause (11) of Regulation 30 of IEGC.

- (a) Secondary control is a centralized automatic function to regulate the generation or load in a control area to restore the grid frequency within the allowable band or replenish deployed primary reserves.
- (b) Secondary control shall be provided by a generating station or an entity having energy storage resource or an entity capable of providing demand response, on a standalone or aggregated basis, connected to an intra-State transmission system, as a Secondary Reserve Ancillary Service (SRAS) Provider, as specified in the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission.
- (c) SRAS Provider is eligible to provide SRAS if it is AGC-enabled (in case of a generating station) and can provide minimum response of 1 MW. SRAS Provider shall have a bi-directional communication system along with metering and SCADA telemetry in place with SLDC, for monitoring and measurement of energy delivered under SRAS, as per the requirements stipulated in the detailed procedure issued by SLDC.
- (d) Secondary control signals shall be automatically generated from SLDC and shall be transmitted to SRAS Providers for desired automated response when the Area Control Error (ACE) for the state control area goes beyond the minimum threshold limit of ± 100 MW or such other limit as may be notified by the appropriate Commission based on review of performance of SRAS from time to time:

Provided that SRAS shall also be activated and deployed by SLDC on account of such other events as specified in IEGC / UPEGC.

- (e) ACE of the state control area, shall be auto calculated at the control centre of SLDC based on telemetered values, and external inputs, namely, the Frequency Bias Coefficient and Offset referred to in sub-clauses (f) and (g) respectively of this clause as per the following formula:

$$ACE = (I_a - I_s) - 10 * B_f * (F_a - F_s) + \text{Offset}$$

Where,

I_a = Actual net interchange in MW (positive value for export)

I_s = Scheduled net interchange in MW (positive value for export)

B_f = Frequency Bias Coefficient in MW / 0.1 Hz (negative value)

F_a = Actual system frequency in Hz

F_s = Schedule system frequency in Hz

Offset = Provision for compensating measurement error

- (f) Frequency Bias Coefficient (B_f) shall be assessed and declared by SLDC for the state control area in consultation with NLDC & NRLDC and as per the detailed procedure. Frequency Bias Coefficient shall normally be based on the median Frequency Response Characteristics (FRC) observed during the previous financial year of the state control area and refined from time to time.
- (g) Offset shall be used to account for measurement errors and shall be decided by SLDC for its control area.
- (h) Secondary control may be operated under in any of the three control modes namely, tie-line bias control, flat frequency control or flat tie-line control mode depending on grid requirements: Provided that secondary control may be suspended due to system maintenance or grid security or for any other reasons to be recorded in writing:
- Provided further that SLDC shall adopt the NLDC's Detailed operating procedure, the conditions during which a particular mode shall be chosen and shall document the reasons for operating in a particular mode:
- Provided also that the coordinated operation of AGC by the nested control areas shall be adopted based on mutually agreed protocols.
- (i) Schedule system frequency (F_s) shall be a reference frequency of 50 Hz unless otherwise specified by NLDC under certain conditions to be recorded in writing.

- (j) NRLDC / SLDC as applicable shall compute the ACE of the state control area in real time based on telemetered data. ACE data shall be archived at an interval of ten (10) seconds or less. SLDC shall share the data with NRLDC and NLDC.
- (k) SRAS Providers shall start responding to SRAS signals within thirty (30) seconds of receipt of the signal and shall be capable of providing the entire SRAS capacity obligation within fifteen (15) minutes and sustaining it at least for the next thirty (30) minutes. The secondary reserves shall be gradually replaced by tertiary reserves within thirty (30) minutes.
- (l) With due regard to the requirement of planning reserve margin and resource adequacy referred to in Chapter 2 of these regulations and based on the following methodologies, the secondary reserve capacity requirements shall be estimated by SLDC for state control area:

The positive and negative secondary reserve capacity requirements for a calendar year shall be equal to the 99 percentile of positive and negative ACE respectively of the state control area during the previous financial year as per detailed procedure specified under IEGC,

OR

The secondary reserve capacity requirement shall be equal to the 110 % of the largest unit size in the state control area plus load forecast error plus solar forecast error plus wind forecast error during the previous calendar year.

OR

Such other methodology as may be stipulated by NLDC as per IEGC.

- (m) The reserve capacity requirement as per the methodology mentioned in sub-clauses (l) of this clause shall be estimated by SLDC by 15th January every year for the next financial year and submitted to NLDC.
- (n) As per IEGC, All India secondary reserve capacity requirement for the regional control area and the State control area including the state control area of SLDC shall be estimated by NLDC based on reference contingency and other factors such as forecast errors.
- (o) NLDC shall allocate such All India secondary reserves capacity, to be maintained at regional control area and at State control area including the state control area of SLDC, based on the estimated reserves as per sub-clauses (l) of this clause and publish the information on its website by 25th January every year.

- (p) NLDC through NRLDC shall re-assess the quantum of requirement of secondary reserves required at the state control area three (3) days before the day of scheduling and communicate the same to SLDC.
- (q) SLDC shall ensure the availability of the quantum of secondary reserve at the state control area with due regard to the secondary reserves estimated and allocated for the State as published by NLDC in terms of sub-clauses (o) and (p) of this clause, and inform the same to NRLDC and NLDC two (2) days before the day of scheduling. The modalities for information exchange and timelines in this respect shall be as per the detailed procedure issued by NLDC under IEGC.
- (r) NLDC through RLDCs shall re-assess the quantum of the requirement for secondary reserves at the regional level with due regard inter alia to the secondary reserves maintained at State control area and the need to replenish primary reserves two (2) days before the day of scheduling inter alia to identify reserves to be brought on bar under SCUC (as referred to in Chapter 9 of these regulations).
- (s) As specified in the CERC Ancillary Services Regulations, NLDC through RLDCs shall further re-assess the quantum of the requirement for secondary reserve at the regional level on day ahead basis and also on a real time basis.
- (t) SLDC shall indicate the shortfall in secondary reserves, if any, and announce emergency alerts for such periods.
- (u) Secondary reserves shall be procured on state control area basis by SLDC from a generating station or an entity having energy storage resources or an entity capable of providing demand response, on a standalone or aggregated basis, connected to an intra-State transmission system in accordance with the Ancillary Services regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission.
- (v) All thermal generating stations having a capacity of more than 200 MW and hydro generating stations having a capacity of more than 25 MW shall make arrangements to enable automatic operation of the plant from SLDC, by integrating the controls and telemetering features of their system into the automatic generation control in accordance with CEA Technical Standards for Construction Regulations and CEA Technical Standards for Connectivity Regulations. The communication system shall be established in accordance with CEA Communication Regulations.

- (w) All renewable energy generating stations and ESS shall be equipped with the facility to control active power injection in accordance with CEA Connectivity Standards Regulations and the communication system shall be established in accordance with CEA Technical Standards for Communication Regulations.

(12) Tertiary Control:

The tertiary control in state control area shall be in line with or as specified in clause (12) of Regulation 30 of IEGC.

- (a) As per IEGC, Tertiary reserve requirement for the regional control area and the state control area including the state control area of SLDC, shall be estimated by NLDC with due regard inter alia to the requirement of planning reserve margin and resource adequacy as referred to in Chapter 2 of IEGC, so as to take care of contingencies and to cater to the need for replacing secondary reserves estimated as per clause (11) of this Regulation by 25th January every year, which will be implemented for the next financial year from 1st April onwards by the respective control areas including the state control area of SLDC.
- (b) NLDC shall allocate such tertiary reserve capacity, to be maintained at regional control areas and state control areas including the state control area of SLDC, based on the estimated reserves as per these regulations and publish the information on its website by 25th January every year.
- (c) NLDC through NRLDC shall re-assess the quantum of requirements for tertiary reserves required at the state control area three (3) days before the day of scheduling and communicate the same to SLDC.
- (d) SLDC shall ensure the availability of the quantum of tertiary reserve at the state control area with due regard to the tertiary reserves estimated and allocated for the State as published by NLDC in terms of sub-clauses (b) and (c) of this clause, and inform the same to NRLDC and NLDC two (2) days before the day of scheduling. The modalities for information exchange and timelines in this respect shall be as per the detailed procedure to be issued by NLDC under IEGC.
- (e) SLDC shall ensure availability of the quantum of tertiary reserve at the state control area on day ahead basis with due regard to the tertiary reserves estimated and allocated for the State by NLDC in terms of sub-clause (b) and (c) of this clause, and inform the same to NRLDC and NLDC.

- (f) NLDC through RLDCs shall re-assess the quantum of requirements for tertiary reserve at the regional level with due regard to the estimation inter alia of tertiary reserves maintained at state control area and the need to replace secondary reserves, three (3) days before the day of scheduling inter alia to identify reserves to be brought on bar under SCUC (as referred to in Chapter 9 of these regulations).
 - (g) As specified under the Ancillary Services Regulations, NLDC through RLDCs shall further re-assess the quantum of the requirement for tertiary reserve at regional level on day ahead basis and also on a real time basis.
 - (h) Tertiary reserves shall be procured on state control area basis by SLDC from a generating station or an entity having energy storage resourced or an entity capable of providing demand response, on a standalone or aggregated basis, connected to an intra-State transmission system in accordance with Ancillary Services regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission.
 - (i) Tertiary reserves to be provided by TRAS Provider shall be capable of varying its active power output or drawl or consumption, as the case may be, on receipt of despatch instructions from SLDC and of providing TRAS within fifteen (15) minutes of despatch instructions from SLDC, and shall be capable of sustaining the service for at least the next sixty (60) minutes. TRAS shall be activated and deployed by SLDC on account of the following events:
 - i. To replenish the secondary reserve, in case the secondary reserve has been deployed continuously in one direction for fifteen (15) minutes for more than 100 MW or such other volume limit as may be specified by the Commission based on review of performance of TRAS from time to time;
 - ii. Generation unit or transmission line outages;
 - iii. Any such other event affecting the grid security.
 - (j) The quantum of reserves procured by State control area shall be communicated to NRLDC.
 - (k) The modalities for information exchange and timelines in respect of tertiary reserves shall be as per detailed procedure prepared by NLDC.
- (13) The control area wise performance of SRAS, TRAS providers shall be evaluated in accordance with the Detailed Procedure prepared by NLDC under IEGC.

CHAPTER 9

SCHEDULING AND DESPATCH CODE

69. General

This chapter deals with the procedure for scheduling injection and drawal of power by the intra-State entities and the modalities for exchange of information, including scheduling for intra-State entities which are GNA grantees or T-GNA grantees transacting power through the inter-State transmission system. This chapter also covers provisions with respect to control area jurisdiction in line with IEGC.

70. Control Area Jurisdiction of Load Despatch Center

- (1) The national grid shall be demarcated into Regional and State control areas and each control area shall be under the jurisdiction of RLDC or SLDC, as the case may be, in accordance with IEGC.
- (2) 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 its State control area, supervision and control over the intra-State transmission system, processing of interface energy meter data and undertaking the energy accounting and the settlement of State Deviation and Ancillary Services Pool Account.
- (3) The entities connected exclusively to the intra-State transmission system shall be under the control area jurisdiction of SLDC for scheduling and despatch of electricity.
- (4) Entities connected to both inter-State transmission system and intra-State transmission system shall be under the control area jurisdiction of RLDC, if more than or equal to 50% of the quantum of connectivity is with ISTS, and if more than 50% of the quantum of connectivity is with InSTS, it shall be under the control area jurisdiction of SLDC.
- (5) In case an entity is connected to both inter-State transmission system and intra-State transmission system, the load despatch centre responsible for scheduling such entities shall coordinate with the concerned RLDC or SLDC, as the case may be, for ensuring grid security.
- (6) Unless otherwise decided by the Central Commission in case of a change in the control area jurisdiction of an entity, the entities that have already declared COD as on the date of coming into force of IEGC, shall continue to remain under the control area of SLDC or RLDC, as the case may be, as existing before the date of coming into force of IEGC:

Provided that clauses (4) to (6) of this regulation shall be subject to the provisions of IEGC.

71. Responsibilities of State Load Despatch Centre

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 clause (2) of Regulation 56 of these regulations for each time block on day-ahead and intra-day basis;
- (b) Forecasting of generation from solar and wind 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 solar and wind generating stations at their own risk and discretion along with 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 in accordance with these regulations and the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission;
- (f) Declaring Total Transfer Capability (TTC) and Available Transfer Capability (ATC) in respect of import and export of electricity of its control area with inter-State transmission system in coordination with CTU, STU, 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 in line with IEGC or as specified by the Central Commission from time to time and revised based on contingencies from time to time;
- (g) Preparing energy account(s) and shall include the DSM account(s), Reactive Energy Charges Account(s) and any other accounts as may be specified by the Commission, as applicable;
- (h) Operation and maintenance of State Deviation and Ancillary Services Pool Account, State Reactive Energy Charges Account and such other pool accounts as may be specified by the Commission from time to time;
- (i) Any other function as specified by the Commission from time to time.

72. General Provisions

- (1) Details of intra-State generating stations to be published by SLDC:

- (a) SLDC shall publish a list of all intra-State generating stations within State control area, which shall be updated quarterly on SLDC website along with details such as station capacity, allocated share of beneficiaries, contracted quantum by buyers, and balance available capacity.
 - (b) SLDC shall also publish details, as applicable, for intra-State generating stations other than renewable generating stations, as submitted by such generating stations in accordance with Regulation 43 of these regulations.
 - (c) SLDC shall publish the details, as applicable, for all intra-State renewable generating stations as submitted by such generating stations in accordance with Annexure-3.
- (2) The intra-State generating stations and the entities participating in Ancillary Services must be capable of receiving the load set point signals from RLDCs or NLDC or SLDC as per CEA Technical Standards for Connectivity, or in terms of Ancillary Service Regulations, as applicable.
- (3) List of Drawee Intra-State Entities:
- SLDC shall update on a quarterly basis the list of all drawee intra-State entities within State control area and post the same on SLDC website along with the allocated or contracted quantum from all entities.
- (4) Entitlement of a buyer and beneficiary:
- (a) In cases of allocation of power from a central generating station by the Central Government, each beneficiary shall be entitled to MW despatch out of the declared capacity of such a generating station, in proportion to its share allocation, in accordance with IEGC.
 - (b) For all other cases not covered under sub-clause (a) of this Clause, the buyer and beneficiary shall be entitled to MW despatch out of the declared capacity of generating station as per its contracts.
 - (c) The entitlement from intra-State generating station shall be rounded off up to two (2) decimal points in line with IEGC or as specified by the Central Commission from time to time, for the purposes of scheduling and accounting.
- (5) Requirement for Commencement of Scheduling:
- (a) The following documents shall be submitted to SLDC by the sellers or the buyers, as the case may be, before commencement of the scheduling of transactions under intra-State open access, including scheduling for intra-State entities which are GNA grantees or T-GNA grantees, as the case may be:

- (i) Document in support of the grant of intra-State open access (LTOA / MTOA / STOA) / GNA or T-GNA or Connectivity, by the sellers and the buyers, as applicable;
 - (ii) Document in support of the effective date of intra-State open access (LTOA / MTOA / STOA) / GNA or T-GNA, by the sellers and the buyers, as applicable;
 - (iii) Copies of the valid contracts signed by the sellers and the buyers, for transactions other than collective transactions.
- (b) In case of allocation of power from the central generating stations by the Central Government, SLDC shall obtain the share allocation of each beneficiary issued by RPC / RLDC.
- (c) The copy of contracts once submitted by sellers and buyers need not be submitted again before every scheduling request and the copy of the contract can be linked with a unique ID by SLDC for reference before scheduling request:

Provided that in case of any change in terms of the contract or termination of contract, the seller as well as the buyer shall inform the same, along with a copy of the modified contract, as applicable, within a day, to SLDC.

(6) Adherence to Schedule:

Each intra-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 intra-State transmission system.

(7) Area Control Error:

SLDC, in coordination with generating stations, distribution licensees and other injecting and drawee intra-State entities, shall keep Area Control Error close to zero (0) by rescheduling, deploying reserves and automatic demand management scheme, as applicable.

(8) Declaration of Declared Capacity by Intra-State generating station:

- (a) The intra-State generating station other than the WS seller shall declare ex-bus declared capacity limited to 100% MCR less auxiliary power consumption, on day ahead basis:

Provided that the hydro generating station may declare ex-bus declared capacity more than 100% MCR less auxiliary power consumption limited to overload capability in terms of sub-clause (a) of clause (10) of this Regulation during high inflow periods:

Provide further that a high inflow period for this purpose shall be notified by SLDC.

- (b) Intra-State WS Seller shall declare the available capacity on day ahead basis.

- (c) SLDC shall periodically check that the intra-State generating station is not manipulating the declaration of the declared capacity with the intent of making undue money through fixed charges or DSM or making any other undue benefit.
- (d) The intra-State generating station other than WS seller shall be required to demonstrate the declared capacity of its generating station as and when directed by SLDC. For this purpose, SLDC, in coordination with the beneficiaries, shall schedule the intra-State generating station up to its declared capacity as declared on day ahead basis.
- (e) The schedule issued by SLDC shall be binding on the beneficiaries for such testing of the declared capacity of the intra-State 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 SLDC 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 (2) days' fixed charges at normative availability. For the second mis-declaration, the charges shall correspond to four (4) 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.

(9) Ramping Rate to be Declared for Scheduling:

- (a) The intra-State generating station shall declare the ramping rate along with the declaration of day-ahead declared capacity in line with IEGC in the following manner, which shall be accounted for in the preparation of generation schedules:
 - (i) Coal or lignite fired plant shall declare a ramp up or ramp down rate of not less than 1% of ex-bus capacity corresponding to MCR on bar per minute;
 - (ii) Gas power plant shall declare a ramp up or ramp down rate of not less than 3% of ex-bus capacity corresponding to MCR on bar per minute;
 - (iii) Hydro power plant 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;
 - (iv) Renewable energy generating station shall declare a ramp up or ramp down rate as per CEA Technical Standards for Connectivity Regulations.

(10) Optimum Utilization of Hydro Energy:

- (a) During high inflow and water spillage conditions, for storage type generating station and run-of-river generating station 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) 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.

- (b) During high inflow and water spillage conditions, SLDC shall allow scheduling of power from hydro generating station for overload capability up to 10% of installed capacity or any other limit as per sub-clause (a) of this clause without the requirement of additional open access / GNA for such overload capacity, subject to the availability of margins in the intra-State transmission system.

(11) Scheduling of WS seller and ESS by QCA:

- (a) The intra-State renewable energy generating station(s) or Projects based on energy storage system(s) connected at a particular InSTS substation or at multiple InSTS substations located in a State may appoint a QCA on their behalf to coordinate and facilitate scheduling for such generating station(s) or energy storage system(s). The responsibility of QCA is listed at Annexure-3 to these regulations.
- (b) SLDC shall issue a procedure for aggregation of pooling stations for the purpose of combined scheduling and deviation settlement for solar or wind or renewable hybrid generating stations that are intra-State entities in line with the procedure of NLDC issued under IEGC with State specific changes, within sixty (60) days from the date of notification of these regulations.
- (c) QCA shall be registered with SLDC.
- (d) QCA registered with SLDC shall, on behalf of solar, wind or renewable hybrid generating stations or Energy Storage System shall:
 - (i) Coordinate and facilitate scheduling of power with SLDC;
 - (ii) Undertake commercial settlement of deviations with SLDC.
 - (iii) Submit a copy of the consent to SLDC certifying that QCA shall undertake all operational and commercial responsibilities on behalf of generating stations as per these regulations.
- (e) The concerned solar, wind or renewable hybrid generating stations including energy storage systems shall indemnify SLDC for any act of commission or omission on the part of QCA including compliance with these regulations and settlement of its financial liability in the pooled account.

- (f) Contract between the generating stations and QCA shall 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.

(12) Minimum turndown level for intra-State thermal generating station:

The minimum turndown level for operation in respect of a unit of an intra-State thermal generating station shall be 55% of the MCR of the said unit:

Provided that the Commission may fix through an order a different minimum turndown level of operation in respect of specific unit(s) of an intra-State thermal generating station:

Provided further that the intra-State thermal generating stations whose tariffs are adopted under Section 63 of the Act, shall be compensated for part load operation, i.e., for generation below the normative level of operation, in terms of the provisions of the contract entered into by such generating stations with the beneficiaries or buyers, or in the absence of such provision in the contract, as per the applicable CERC Regulations for part load operation below technical minimum level as per the provisions of these regulations which have been framed with state specific changes unless separate notification or order is issued by the Commission:

Provided further that the thermal generating stations whose tariffs are determined under Section 62 of the Act by the Commission, shall be compensated as per applicable CERC Regulations for part load operation below technical minimum level as per the provisions of these regulations which have been framed with state specific changes unless separate notification or order is issued by the Commission.

- (13) A generating station or ESS or an injecting / drawee entity shall be allowed to schedule injection or drawal only up to its effective open access (LTOA / MTOA / STOA) quantum / GNA quantum and T-GNA quantum, as applicable, in accordance with the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019 or CERC GNA Regulations, as applicable.
- (14) 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.
- (15) The drawee entities of electricity shall bear apportioned losses in the transmission system.

73. Security Constrained Unit Commitment (SCUC)

- (1) The objective of Security Constrained Unit Commitment (SCUC) is to commit a generating station or unit thereof, for the maximisation of reserves in the interest of grid security, without altering the entitlements and schedule of the buyers of the said generating station in the day ahead time horizon.
- (2) Reserves shall be procured and deployed in accordance with the Ancillary Services Regulations of the Central Commission with State specific changes as per these regulations till appropriate regulations on Ancillary Services is framed by the Commission, and SCUC shall supplement such procurement of reserves under certain conditions, as specified in this Regulation or IEGC, as applicable.
- (3) SCUC shall be undertaken if SLDC, in coordination with NLDC / NRLDC and based on an assessment of the power system condition, anticipates that there is likely to be a shortage of reserves despite efforts made to procure such reserves in accordance with the Ancillary Services Regulations.
- (4) SCUC may be undertaken on day ahead basis, in respect of the intra-State generating stations or units thereof, for which tariffs are determined under Section 62 of the Act, as per the following process:
 - (a) By 14:00 Hours of D-1 day, 'D' being the day of delivery, SLDC in coordination with intra-State generating stations shall publish a tentative list of generating stations or units thereof, which are likely to be scheduled below the minimum turndown level of the respective stations for some or all the time blocks of the D day, based on beneficiary requisitions and initial unconstrained bid results of DAM in the power exchanges, received till 13:00 Hrs of the D-1 day.
 - (b) Beneficiaries of such stations, whose units are likely to be scheduled below minimum turndown level for some or all time blocks of the D day, shall be permitted to revise their requisitions from such stations by 14:30 Hours of D-1 day, in order to enable such units to be on bar. The revised requisition from the said generating stations, once confirmed by the beneficiaries by 14:30 Hours of D-1 day, shall be final and binding after 14:30 Hours of D-1 day and further reduction in drawal schedule shall not be allowed from such stations except in cases when the generating stations remain above minimum turn-down level.
 - (c) After 14:30 Hours, SLDC shall prepare the final list of such generating units that are likely to go below their minimum turndown level and such generating units shall be stacked as per merit order, i.e., in the order of the lowest energy charge to the highest energy charge. The generating units so identified shall be considered for undertaking SCUC.

- (d) If SLDC in coordination with the NRLDC, after considering the bid results as finalized and available from DAM-AS, anticipates shortfall of reserves in D day due to (i) extreme variation in weather conditions; (ii) high load forecast; (iii) the requirement of maintaining reserves on State basis for grid security; (iv) network congestion, SLDC may schedule incremental energy from the generating units in the list referred to in sub-clause (c) of this clause, so as to bring such units to their minimum turndown level in order to maximize availability of on-bar units, by 15:00 Hours of D-1 day and update the list on SLDC website:

Provided that in respect of such generating station or unit thereof which has been brought to its minimum turndown level by SLDC under this clause, downward revision by the beneficiary shall not be allowed.

- (e) SLDC shall indicate the quantum of URS power to be kept as reserves, in the generation station or unit thereof brought under SCUC, and such quantum of power identified as reserves shall not be available for scheduling by the beneficiary or for sale by the generating station through the energy market. The quantum of power over and above the identified quantum of reserves may be rescheduled by the beneficiary(ies) or scheduled by way of selling in the market.
- (f) In order to maintain load generation balance consequent to scheduling of incremental generation as per sub-clause (d) of this clause, SLDC in coordination with NRLDC, shall make commensurate reduction in generation from the on-bar generating station(s), subject to technical constraints, starting with the highest energy charge and SCED compensation charge in the stack of generating stations maintained for the purpose of SCED in accordance with these regulations.
- (g) The generating station from which incremental energy has been scheduled as per sub-clause (d) of this clause shall be paid from the State Deviation and Ancillary Services Pool Account, for the energy charge equivalent to the incremental energy scheduled, and the generating station from which reduction in generation has been directed as per sub-clause (f) of this clause shall pay back to the State Deviation and Ancillary Services Pool Account, the energy charge equivalent to the decremental energy. Compensation for part load operation of a generating station or unit thereof brought on bar under SCUC shall be paid from the State Deviation and Ancillary Services Pool Account.
- (h) The URS power over and above the minimum turn down level, available after declaration of RTM results, in the generating station or unit thereof, brought on-bar under sub-clause (d) of this clause shall be deemed to be available for use as SRAS or TRAS or both, as applicable, in terms of the Ancillary Services Regulations.

- (i) All the generating stations identified under SCUC shall be available on bar, and in the event of such stations or units thereof being on Unit Shut Down (USD), the time to start a unit under different conditions such as HOT, WARM and COLD and minimum time for which it shall be brought on bar, shall be as per the Detailed Procedure issued by NLDC under IEGC in this regard.
 - (j) The generating stations other than those whose tariffs are determined under Section 62 of the Act may opt to participate in SCUC as per the Detailed Procedure issued by NLDC under IEGC in this regard.
 - (k) SLDC and other intra-State entities shall carry out necessary activities in line with the Detailed Procedure specified by the NLDC or NRLDC, as the case may be.
- (5) SCUC three (3) days in advance under certain circumstances:
- (a) In case SLDC anticipates based on assessment that adequate reserves may not be available on D-1 Day or D-day either under day ahead SCUC or under Ancillary Services Regulations, it may also carry out SCUC three (3) days in advance of the actual day of scheduling for the intra-State generating stations. SLDC shall advise the intra-State generating station or unit(s) thereof to commit the unit by 10:00 Hours of D-2 day under cold start condition. The criteria for assessment of adequacy or inadequacy of reserves and identification of the generating stations or units thereof for SCUC three (3) days in advance, shall be as stipulated in the Detailed Procedure by NLDC.
 - (b) SLDC shall announce the requirement of SCUC three (3) days in advance on its website by specified time on "D-3" day as per the Detailed Procedure.
 - (c) All intra-State generating stations shall declare DC for 'D' day within two (2) hours of announcement by SLDC, for consideration under three-day ahead SCUC.
 - (d) The results of SCUC along with time to commit unit(s) on bar shall be informed by SLDC to the generating stations. SLDC shall ensure that intimation is sent to the generating station sufficiently in advance keeping in view its start-up time.
 - (e) The generating stations shall bring unit (s) accordingly.
 - (f) The generating stations or units committed through such SCUC shall be provided the schedule above or up to minimum turn down level. Corresponding schedule for drawal shall be adjusted against requisition from the beneficiaries and the balance through security constrained economic dispatch (SCED) on the 'D' day.

- (g) The provisions of sub-clauses (e) to (k) of clause (4) of this Regulation shall also apply for the generating stations or units thereof committed under SCUC three (3) days in advance.

74. Unit Shut Down (USD)

- (1) The generating station or units thereof, identified by SLDC, as per sub-clause (c) of clause (4) of Regulation 73 of these regulations, cannot be kept on bar / brought on bar under SCUC, shall have the option to operate at a level below the minimum turn down level or to go under Unit Shut Down (USD).
- (2) In case a generating station, or unit thereof, opts to go under unit shut down, the generating company owning such generating station or unit thereof shall fulfil its obligation to supply electricity to its beneficiaries who had made requisition from the said generating station prior to it going under USD, by arranging supply either (a) by entering into a contract(s) covered under the Power Market Regulation of the Central Commission; or (b) by arranging supply from any other generating station or unit thereof owned by such generating company subject to honouring of rights of the original beneficiaries of the said generating station or unit thereof from which supply is arranged; or (c) through SCED.
- (3) In case of emergency conditions, for reasons of grid security, a generating station or unit thereof, which is under USD may be directed by SLDC to come on bar, and in such event the generating station or unit thereof shall come on bar under hot, warm and cold conditions as per the time period stipulated in the Detailed Procedure issued by NLDC under IEGC in this regard.
- (4) Once a generating station is brought on bar as per clause (3) of this Regulation, it shall be treated as a unit under SCUC and scheduled and compensated as per IEGC.

75. Scheduling from Alternate Source of Power by a Generating Station

- (1) A generating station may supply power from alternate source in case of (i) USD or (ii) forced outage of unit(s) or (iii) a generating station other than REGS replacing its scheduled generation by power supplied from REGS irrespective of whether such identified sources are located within or outside the premises of the generating station or at a different location.
- (2) The methodology for scheduling of power from alternate sources covered under sub-clauses (i) and (ii) of clause (1) of this regulation shall be as per the following steps:
 - (a) The generating station may enter into contract with alternate supplier under bilateral transaction or collective transaction.

- (b) In case of bilateral transaction, the generating station shall request SLDC to schedule power from such alternate supplier to its beneficiaries which shall become effective from 3rd time block in terms of clause (4) of Regulation 76 of these regulations, counting the time block in which the request for revision has been received by SLDC to be the first one.
 - (c) The power scheduled from alternate supplier shall be reduced from the schedule of the generating station.
 - (d) In case of alternate supply is arranged through collective transactions, the transacted quantum shall be reduced from the scheduled generation of the generating station.
 - (e) The generating station may also request SLDC to arrange alternate supply through SCED, in accordance with provisions contained under sub-clause (a)(vi) of clause (2) of Regulation 76 of these regulations.
- (3) The methodology for scheduling of power from alternate sources covered under sub-clause (iii) of clause (1) of this regulation, shall be as per the following steps:
- (a) The generating station shall enter into contract with REGS for supply of power from alternate sources.
 - (b) The generating station shall request SLDC to schedule power from such alternate source to its beneficiaries which shall become effective from 3rd time block in terms of clause (4) of Regulation 76 of these regulations, counting the time block in which the request for revision has been received by SLDC to be the first one.
 - (c) The power scheduled from alternate source shall be reduced from the schedule of the generating station.
 - (d) In case of a generating station whose tariff is determined by the Commission under Section 62 of the Act, supply of power by such generating station to its buyer from an alternate source, in terms of sub-clauses (a) to (d) of this clause, shall be subject to sharing of net savings as specified in the Tariff Regulations:

Provided that until a provision is made in the Tariff Regulations, sharing of net savings shall be in accordance with the detailed procedure issued by NLDC under IEGC in this regard.
 - (e) In case of a generating station other than whose tariff is determined by the Commission under Section 62 of the Act, supply of power by such generating station to its buyer from an alternate source in terms of sub-clauses (a) to (d) of this clause shall be in accordance with the contract

with the buyer and in the absence of a specific provision in the contract, in terms of mutual consent including on sharing of net savings between the generating station and the buyer.

76. Procedure for Scheduling and Despatch for Intra-State Transactions

- (1) The following scheduling related activities (to be read with provisions of Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019) shall be carried out daily for intra-State entities in line with IEGC, on day ahead basis, 'D-1' day, for supply of power on 'D' day, on 15-minute time block, as follows:
 - (a) Declaration of Declared Capacity by generating stations to SLDC:
 - (i) The generating station based on coal and lignite shall submit the following information for 00:00 Hours to 24:00 Hours of the 'D' day, by 06:00 Hours on 'D-1' day:
 - (a) Time block-wise On-bar Declared Capacity (MW) for on-bar units;
 - (b) Time block-wise Off-bar Declared Capacity (MW) for off-bar units;
 - (c) Time block-wise Ramp up rate (MW/min) for on-bar capacity;
 - (d) Time block-wise Ramp down rate (MW/min) for on-bar capacity;
 - (e) MWh capability for the day;
 - (f) Minimum turndown level (MW) and in percentage (%) of ex-bus capacity on-bar;
 - (ii) The generating station based on hydro energy shall submit the following information for 00:00 Hours to 24:00 Hours of the 'D' day, by 06:00 Hours 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.

- (iii) The generating station based on gas or combined cycle generating station shall submit the following for 00:00 Hours to 24:00 Hours of the 'D' day, by 06:00 Hours on 'D-1' day:
 - (a) Time block-wise On-bar Declared Capacity (DC) for the station in MW separately for each fuel such as domestic gas, RLNG or liquid fuel and On-bar units;
 - (b) Time block wise Off-bar Declared Capacity (MW) and off-bar units;
 - (c) MWh capability (fuel-wise) for the next day;
 - (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) Minimum turndown level (MW) and in percentage (%) of ex-bus capacity on-bar.
 - (iv) The intra-State 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 00:00 Hours to 24:00 Hours of the 'D' day, by 06:00 Hours on 'D-1' day. The source wise breakup of aggregate available capacity of the pooled generation shall also be furnished.
 - (v) 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 06:00 Hours on 'D-1' day.
 - (vi) The availability declaration by intra-state generating station shall have a resolution of two decimal (0.01) MW and three decimal (0.001) MWh in line with IEGC or as specified by the Central Commission from time to time.
- (b) Entitlement of each beneficiary or buyer:
- (i) The entitlement of each beneficiary or buyer, from ISGS, shall be in accordance with Regulation 49.1(b) of Indian Electricity Grid Code. NRLDC shall declare entitled share of each beneficiary or buyer for 00:00 Hours to 24:00 Hours of the 'D' day, by 07:00 Hours on 'D-1' day as per IEGC.
 - (ii) The intra-State generating station shall indicate the declared capacity along with respective share of the beneficiary(s) or buyer(s) in accordance with the contracts entered with them. Based on the declared capacity of such generating station and share of the beneficiary(s) or buyer(s) as indicated by such generating station, SLDC shall declare

share of each beneficiary or buyer for 00:00 Hours to 24:00Hours of the 'D' day, by 07:00 Hours on 'D-1' day.

- (c) The mutually agreed requisition for scheduling of intra-State entities shall be as submitted by intra-State entity buyers or intra-State entity sellers in accordance with the contracts entered between them by 07:00 Hours on 'D-1' day.
- (d) SLDC shall compile the above information of the foreseen capabilities of the ISGS and InSGS / other contracts and the corresponding MW and MWh entitlements of each beneficiary or buyer, and furnish the same to all beneficiaries or buyers for 00:00 Hours to 24:00 Hours of the 'D' day, by 07:15 Hours on 'D-1' day.
- (e) The beneficiary or buyer shall furnish time block-wise requisition for drawal to SLDC in each ISGS and InSGS / other contracts for 00:00 Hours to 24:00 Hours of the D' day, by 07:45 Hours of 'D-1' day.
- (f) SLDC shall intimate the quantum of secondary and tertiary reserves in the State control area for the 'D' day by 08:00 Hours of 'D-1' day as per IEGC.
- (g) Based on the entitlement declared in accordance with sub-clause (b)(i) of clause (1) of this Regulation, SLDC on behalf of the intra-State entities which are drawee GNA grantees, shall furnish time block-wise requisition for drawal to NRLDC in accordance with the contracts, by 08:00 Hours of 'D-1' day as per IEGC.
- (h) SLDC, while furnishing or finalising time block-wise requisition or schedule, shall subject to technical constraints, duly factor in merit order of the generating stations with which beneficiary(s) or buyer(s) has entered into contract(s) in accordance with Uttar Pradesh Electricity Regulatory Commission (Merit Order Despatch and Optimization of Power Purchase) Regulations, 2021.
- (i) Allocation of corridors under Intra-State LTOA / MTOA or GNA:
 - (i) Allocation of ISTS corridors for GNA grantees shall be as per Indian Electricity Grid Code.
 - (ii) In case of intra-State LTOA and MTOA transactions, SLDC shall check if injection and drawl schedules as requisitioned by injecting and drawee intra-State entities can be allowed based on available transmission capability. SLDC shall have to ensure that the resulting power flows do not give rise to any transmission constraint:

Provided that in case of constraint in transmission system, available InSTS capability shall be used for LTOA and MTOA including intra-State entities those are drawee GNA grantees

in accordance with these regulations read with Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019.

- (iii) NRLDC shall issue final drawl schedules and injection schedules for drawee and injecting GNA grantees by 09:00 Hours on 'D-1' day as per IEGC.
- (iv) SLDC shall issue final injection schedules and drawl schedules for injecting and drawee intra-State entities (Intra-State LTOA and MTOA / GNA grantees) by 09:15 Hours on 'D-1' day under SLDC purview.
- (j) In case a generating station other than REGS intends to replace its schedule by power supplied from REGS, it shall intimate the quantum and source of power by which it intends to replace the power already scheduled under this Regulation by 9:30 Hours on 'D-1' day.
- (k) SLDC shall incorporate by 09:45 Hours of 'D-1' day, the request from such generating station, in the injection schedule of the REGS and the said generating station, and the drawal schedule of the buyer or beneficiary.
- (l) Based on the entitlement or otherwise, SLDC on behalf of intra-State entities which are T-GNA grantees, shall furnish time block-wise requisition for drawl, to NRLDC in accordance with contracts by 09:15 Hours of 'D-1' day as per IEGC.
- (m) Allocation of corridors under Intra-State STOA or T-GNA:
 - (i) Allocation of ISTS corridors for T-GNA grantees shall be as per Indian Electricity Grid Code.
 - (ii) In case of intra-State STOA transactions, SLDC shall check (after allocation of corridors to intra-State LTOA and MTOA transactions or GNA grantees, as the case may be), if injection and drawl schedules as requisitioned by injecting and drawee intra-State entities can be allowed based on available transmission capability. SLDC shall have to ensure that the resulting power flows do not give rise to any transmission constraint:

Provided that in case of constraint in transmission system, available InSTS capability shall be used for STOA including intra-State entities those are drawee T-GNA grantees in accordance with these regulations read with Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019.
 - (iii) NRLDC shall issue final drawl schedules for T-GNA grantees by 09:45 Hours of 'D-1' day as per IEGC.

- (iv) SLDC shall issue final injection schedules and drawl schedules for injecting and drawee intra-State entities (Intra-State STOA / T-GNA grantees), by 10:00 Hours of 'D-1' day under SLDC purview.
- (n) NRLDC shall release the balance corridors after finalisation of schedules for GNA and T-GNA grantees for day ahead collective transactions as per IEGC.
- (o) SLDC shall update the availability of balance InSTS capability after finalisation of schedules for intra-State transactions (LTOA / MTOA / STOA and GNA / T-GNA), for day ahead collective transactions on its website.
- (p) The generating station whose tariff is determined under Section 62 of the Act, may sell its un-requisitioned surplus as available at 10:00 Hours in the day ahead market unless the consent is withheld by the beneficiary(ies) or buyer(s) in writing. The sharing of net savings shall be as per provisions of Tariff Regulations and until a provision is made in the Tariff Regulations, in accordance with the detailed procedure issued by NLDC under IEGC in this regard.
- (q) Scheduling of collective transactions:
 - (i) Scheduling of day ahead collective transactions and TRAS, as applicable, shall be carried out as per Indian Electricity Grid Code.
 - (ii) The power exchange shall submit the final trade schedules to SLDC for intra-State entities by 13:00 Hours of 'D-1' day in line with IEGC or as specified by the Central Commission from time to time.
- (r) SLDC shall update the availability of balance InSTS capability after finalisation of schedules under day ahead collective transactions by 13:00 Hours of 'D-1' day on its website.
- (s) SLDC shall process exigency applications received till 13:00 Hours of 'D-1' day for the 'D' day by 14:00 Hours of 'D-1' day.
- (t) SLDC shall update the availability of balance InSTS capability, if any, after finalisation of schedules for exigency applications by 14:00 Hours of 'D-1' day on its website.
- (u) SLDC shall issue dispatch schedules and drawl schedules for intra-State entities at 22:45 Hours on D-1 day as final revision before real-time market operation.
- (v) Procedure for scheduling of transaction in Real-time market (RTM):

Scheduling of transactions in real-time market including TRAS, as applicable, shall be carried out as per Indian Electricity Grid Code.

- (w) NLDC shall finalise schedules under RTM, SCED and Ancillary Services by 23:30 Hours of 'D-1' day and NRLDC shall publish the final schedules for dispatch by 23:35 hrs. of 'D-1' day as per IEGC and subsequently, if there are any changes, SLDC shall incorporate the same on its final injection schedules and drawl schedules for intra-State entities under SLDC purview, by 23:45 Hours of 'D-1' day.

- (x) Issuance of day-ahead schedule by SLDC:

SLDC shall convey the following (including the information received from NRLDC for GNA grantees and T-GNA grantees) for the next day to all intra-State entities and other entities involved in intra-State transactions, after each step of finalisation of schedules for entities involved in LTOA, MTOA & STOA and GNA grantees & T-GNA grantees:

- (i) The ex-power plant schedule to each of the intra-State entity generating station, in MW for different time blocks along with breakup of schedule for each beneficiary or buyer.
- (ii) The "net drawal schedule" for each intra-State entity in MW for each time block, along with break-up of (a) schedule from each of the sellers, (b) schedule of injection to InSTS and (c) injection or drawal schedule under collective transaction.
- (iii) All requisitions and schedules shall be rounded off to the nearest two decimals at each control area boundary for each of the transaction and shall have a resolution of 0.01 MW in line with IEGC or as specified by the Central Commission from time to time.

In addition to the above-

- (i) SLDC shall take into account the schedule released by NRLDC for their intra-State entities and finalise the intra-State schedule.
- (ii) Power Exchange(s) shall furnish the detailed break up of each point of injection and each point of drawal within State to SLDC after receipt of acceptance from NLDC. Power Exchange(s) shall ensure necessary coordination with SLDC for scheduling of the transactions.

- (2) Additional factors to be considered while finalising schedule

(a) **Security Constrained Economic Despatch (SCED)**

- (i) The objective of Security Constrained Economic Despatch (SCED) is to optimise generation despatch after gate closure in the real time market and after finalisation of schedules under RTM, by incrementing generation from the generating stations with cheaper charge and decrementing commensurate generation from the generating station

with higher charge, after considering the operational and technical constraints of generation and transmission facilities.

- (ii) SLDC shall be the nodal agency for implementing SCED for the generating stations connected to intra-State transmission system which are willing to participate under SCED.
- (iii) The generating stations which are willing to participate in SCED shall declare the energy charge, or the SCED Compensation Charge (after factoring in the likely changes in fuel cost and part load compensation, if any), as applicable, to SLDC on weekly basis.
- (iv) SLDC shall prepare a consolidated stack of URS available in such generating stations from the lowest energy charge and SCED Compensation Charge to the highest energy charge and SCED Compensation Charge in each time block. After gate closure in the real time market, the generating stations so identified shall be instructed and despatched for SCED Up in the order of the lowest charge and to the highest charge, after taking into account ramp up or ramp down rate, response time, transmission congestion and such other parameters as stipulated in the Detailed Procedure. Corresponding to the incremental generation under SCED Up, instruction and despatch for SCED Down shall be given to the generating stations in the order of the highest charge to the lowest charge, subject to ramp up or ramp down rate, response time, transmission congestion and such other parameters as stipulated in the Detailed Procedure.
- (v) Part load compensation for reduction in schedule on account of SCED, in respect of a generating station or unit thereof whose tariff is determined under Section 62 of the Act shall be paid from the savings in the SCED Account. Part load compensation for reduction in schedule of a generating station or unit thereof other than those whose tariffs are determined under Section 62 of the Act shall be factored in by such generating station while declaring the SCED Compensation Charge and shall not be paid separately.
- (vi) In case an intra-State generating station, whose tariff is determined under Section 62 of the Act, gets a schedule below minimum turndown level for Off-Peak hours of the day, however, gets a schedule above minimum turndown level for Peak hours of the day, where Peak hours and Off-Peak hours shall be as declared by SLDC under the Tariff Regulations, the schedule below the minimum turndown level may, on the request by such generating station to SLDC shall be adjusted as follows:
 - (a) the schedule below the minimum turndown level shall be adjusted under SCED such that the schedule in all time blocks of the day is at least at the minimum turndown level. The schedule of the marginal generating station (s) ('A'), i.e., the generating

station with the highest energy charge in the stack prepared under and after completion of step at sub-clause (iv) of this clause, shall be reduced, subject to ramp up or ramp down rate, response time, transmission congestion and such other parameters as stipulated in the Detailed Procedure.

- (b) In case the SCED energy charge or SCED Compensation Charge, as applicable, of such generating station ('A'), which was required to be issued SCED down, is lower than the energy charge of the generating station ('B') whose schedule was increased up to the minimum turndown level, the difference between the SCED energy charge or the SCED Compensation Charge (for 'A') and the energy charge (for 'B') shall be payable by the entity which has caused the schedule of the generating station or unit thereof below minimum turndown level.
- (c) In case the SCED energy charge or SCED Compensation Charge, as applicable, of such generating station ('A') which was required to be issued SCED down, is higher than the energy charge of the generating station ('B') whose schedule was increased up to the minimum turndown level, the difference between the SCED energy charge or SCED Compensation Charge (for 'A') and the energy charge (for 'B') shall be adjusted in accordance with subclauses (ix) to (xi) of this clause.
- (d) The above steps shall be carried out only after the generating station furnishes to the SLDC the efforts made by such generating station to achieve a schedule of Minimum turndown level through the sale of power in the Power market (under bilateral or collective transactions).
- (e) SLDC shall issue a detailed Procedure including the modalities of payment of charges as per sub-clause (b) of Regulation 76(2)(a)(vi) in line with NLDC Procedure, within sixty (60) days from the date of notification of these regulations.
- (vii) Arrangement of power by an intra-State entity generating station participating in SCED to meet schedules below minimum turndown level:
 - (a) In case an intra-State entity generating station gets schedule below minimum turndown level and wishes to arrange power scheduled by its buyers through SCED, it shall submit consent to SLDC before gate closure for arranging the scheduled power for such generating station through SCED.
 - (b) SLDC shall consider the drawal schedules in respect of such generating station, under SCED subject to availability of scope of optimisation, i.e., if the energy charge

or SCED Compensation Charge, as applicable, of such generating station is higher than that of the marginal generating station in the stack prepared under and after completion of step at sub-clause (iv) of this clause.

- (c) The settlement of energy charge and SCED Compensation Charges shall be in accordance with sub-clauses (ix) to (xi) of this clause.
- (viii) The deviation in respect of such generating stations shall be settled with reference to their revised schedule. The increment or decrement of generation under SCED shall not form part of schedule considered under ancillary services for such generating stations.
- (ix) The schedule of beneficiaries shall not be changed on account of SCED. Buyers or beneficiaries shall continue to pay the charges for the scheduled energy directly to the generating station(s) participating in the SCED.
- (x) SLDC shall open a separate bank account called 'SCED Account'. All payments to and from the generating station(s) on account of SCED schedules shall flow from and to the said 'SCED Account'.
- (xi) For any increment in the generation schedule on account of SCED, the participating generator shall be paid from the 'SCED Account' at the rate of its energy charge or SCED Compensation Charge declared upfront by the generator. For any decrement in the generation schedule on account of SCED, the participating generator shall pay to the 'SCED Account' at the rate of energy charge or SCED Compensation Charge, as applicable.

The net saving to the generating stations shall be shared between the beneficiaries or buyers and the generating stations as per the detailed Procedure to be prepared by SLDC within sixty (60) days from the date of notification of these regulations in line with NLDC Procedure under IEGC.

- (xii) In case of reduction in generation under SCED on account of SCUC as per Regulation 73 of these regulations, the generating station from which reduction in generation has been directed shall pay back to the Deviation and Ancillary Services Pool Account at the energy charge or SCED Compensation Charge, as the case may be, equivalent to the decremented energy due to SCUC. The compensation for such case for a generating station whose tariff is determined under Section 62 of the Act, shall also be adjusted from Deviation and Ancillary Services Pool Account.

(xiii) Different date may be appointed for commencement of SCED in the state control area, as may be notified by the Commission separately.

(b) Margins for primary response:

For the purpose of ensuring primary response, SLDC shall not schedule the generating station or unit(s) thereof beyond ex-bus generation corresponding to 100% of the Installed capacity of the generating station or unit(s) thereof. The generating station shall not resort to Valve Wide Open (VWO) operation of units, whether running on full load or part load, and shall ensure that there is margin available for providing governor action as primary response.

In case of gas or liquid fuel-based units, suitable adjustment in Installed Capacity shall be made by SLDC for scheduling in due consideration the prevailing ambient conditions of temperature and pressure vis-à-vis site ambient conditions on which installed capacity of the generating station or unit(s) thereof have been specified:

Provided that the hydro generating stations shall be permitted to schedule ex-bus generation corresponding to 110% of the installed capacity or any other overload capability as allowed under sub-clause (a) of clause (10) of Regulation 72 of these regulations, during high inflow periods to avoid spillage:

(3) Power to revise schedules, in conformity with IEGC:

(a) Curtailment of scheduled transactions for grid security:

(A) 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 SLDC (keeping in view the transaction which is likely to relieve the threat to grid security) in line with IEGC read with Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019, as follows:

(i) Transactions under STOA / T-GNA shall be curtailed first followed by transactions under MTOA followed by transactions under LTOA / GNA,

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

(I) Within transactions under STOA / T-GNA, bilateral transactions shall be curtailed first followed by collective transactions under day ahead market followed by collective transactions under real time market.

- (II) Within bilateral transactions under STOA / T-GNA, curtailment shall be done first from generation sources other than solar, wind, solar-wind hybrid and run of the river hydro plants with up to three hours pondage (in case of excess water leading to spillage), pro rata based on their STOA / T-GNA quantum.
 - (III) The generation from solar, wind, solar-wind hybrid and run of the river hydro plants with up to three hours pondage (in case of excess water leading to spillage) shall be curtailed pro rata based on STOA / T-GNA, after curtailment of generation from other sources, within STOA / T-GNA.
 - (IV) Collective transactions under day ahead market shall be curtailed after curtailment of bilateral transactions under STOA / T-GNA.
 - (V) Collective transactions under real time market shall be curtailed after curtailment of collective transactions under day ahead market.
- (iii) Transactions under MTOA shall be curtailed in the following order:
- (I) Within transactions under MTOA, curtailment shall be done first from generation sources other than solar, wind, solar-wind hybrid and run of the river hydro plants with up to three hours pondage (in case of excess water leading to spillage), on pro rata basis based on their MTOA quantum.
 - (II) The generation from solar, wind, solar-wind hybrid and run of the river hydro plants with up to three hours pondage (in case of excess water leading to spillage) shall be curtailed pro rata based on their MTOA quantum, after curtailment of generation from other sources, within MTOA.
- (iv) Transactions under LTOA / GNA shall be curtailed in line with IEGC in the following order:
- (I) Within transactions under LTOA / GNA, curtailment shall be done first from generation sources other than solar, wind, solar-wind hybrid and run of the river hydro plants with up to three hours pondage (in case of excess water leading to spillage), on pro rata basis based on their LTOA / GNA quantum.
 - (II) The generation from solar, wind, solar-wind hybrid and run of the river hydro plants with up to three hours pondage (in case of excess water leading to spillage) shall be curtailed pro rata based on their LTOA / GNA quantum, after curtailment of generation from other sources, within LTOA / GNA.
- (v) SLDC shall publish a report of such incidents on its website.

(B) SLDC shall publish, from time to time on its website, the operational limits of parameters for maintenance of grid security for the information and compliance of users of the grid. The curtailment of schedule shall be carried out only in case violation of the operational limits.

- (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, SLDC shall revise the schedules:

Provided that generation and drawal schedules revised by SLDC shall become effective from 3rd time block depending on time block in which schedule has been revised as first time block.

- (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 SLDC:
- (i) Issue directions to concerned entities to adhere to the schedules;
 - (ii) Deployment of ancillary services in coordination with NLDC / NRLDC, as applicable;
 - (iii) Switching on/off pump storage plants operating in pumping mode;
 - (iv) Despatching emergency demand response measures;
 - (v) Direct intra-State entities to increase or decrease their drawal or injection by revising their schedules and such directions shall be immediately acted upon.
- (d) Whenever SLDC revises final schedules due to reasons of grid security or contingency, brief reasons shall be informed immediately to the concerned entity followed by a detailed explanation to be posted on SLDC website within twenty four (24) hours.
- (e) Any verbal directions by SLDC shall be confirmed in writing as soon as possible latest within twenty four (24) hours.
- (4) Revision of schedules on request of beneficiaries or buyers intra-State entities (Intra-State LTOA and MTOA / buyers which are GNA grantees), in line with IEGC
- (a) Beneficiaries or buyers may revise their schedules under intra-State LTOA and MTOA / GNA as per sub-clauses (b) and (c) of this clause in accordance with their respective contracts:
- Provided that scheduled transactions under STOA / T-GNA once scheduled cannot be revised other than in case of forced outage as per clause (7) of this Regulation {or partial outage as per clause (8) of this Regulation.
- (b) The request for revision of scheduled transaction for 'D' day, shall be allowed subject to the following:

- (i) Request of beneficiaries or buyers for upward revision of schedule from the generating station whose tariff is determined under Section 62 of the Act shall be allowed starting 14:00 Hours 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.
 - (ii) Request of beneficiaries or buyers 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 SCUC under Regulation 73 of these regulations:

Provided that downward revision of schedules by the beneficiaries or buyers for 'D' day, after 14:30 Hours on 'D-1' day in the generating station is permissible only for beneficiaries or buyers which have scheduled above their respective share of minimum turndown level in the generating station:

Provided also that downward revision by such beneficiaries or buyers, which have scheduled above their respective share of minimum turndown level in the generating station, shall be permissible limited to a quantum such that overall schedule of the generating station is at least at Minimum turndown level. The downward revision of schedules by such beneficiaries or buyers for 'D' day, after 14:30 Hours on 'D-1' day shall be permissible on a pro-rata basis of the power scheduled above the minimum turndown level of their share at 14:30 Hours of 'D-1' day.
 - (iii) Request of buyers or beneficiaries 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.
 - (c) Based on the request for revision in schedule made as per sub-clauses (a) and (b) of this clause, any revision in schedule shall become effective from 3rd time block, counting the time block in which the request for revision has been received by SLDC to be the first one.
 - (d) While finalizing the drawal and despatch schedules, in case any congestion is foreseen in the intra-State transmission system or technical constraints of a generating station, SLDC shall moderate the schedules as required, under intimation to the concerned intra-State entities.
- (5) Grid disturbance of category GD-5:

- (a) GD-5 occurs when forty per cent or more of the antecedent generation or load in the State grid is lost as defined in the CEA Grid Standards.
- (b) Certification of such grid disturbance and its duration shall be done by SLDC.
- (c) Scheduled generation of all the affected intra-State generating stations supplying power under bilateral transactions shall be deemed to have been revised to be equal to their actual generation for all the time blocks affected by the grid disturbance. Such intra-State generating station shall pay back the energy charges received by it for the scheduled generation revised as actual generation to the State Deviation and Ancillary Services Pool Account:

Provided that, in case the beneficiaries or buyers of such intra-State generating station are also affected by such grid disturbance, the scheduled drawals of such beneficiaries or buyers shall be deemed to have been revised to corresponding actual generation schedule of intra-State generating stations:

Provided further that in case the beneficiaries or buyers of such intra-State generating station are not affected by such grid disturbance and they continue to draw power, the scheduled drawals of such beneficiaries or buyers shall not be revised.

- (d) The scheduled generation of all the affected intra-State generating stations supplying power under collective transactions shall be deemed to have been revised to be equal to their actual generation. Such intra-State generating stations shall refund the charges received towards such scheduled energy to the State Deviation and Ancillary Services Pool Account.
 - (e) The declaration of grid disturbance shall be done by SLDC at the earliest. A notice to this effect shall be posted at its website by SLDC which shall be considered as declaration of the grid disturbance by SLDC. SLDC shall take action for restoration of the grid to normalcy, in coordination with NRLDC. All intra-State entities shall take note of the grid disturbance and take appropriate action at their end.
 - (f) Energy and deviation settlement for the period of such grid disturbance causing disruption in injection or drawal of power shall be done by SLDC:
- Provided that generation and drawal schedules revised by SLDC shall become effective from 3rd time block depending on block in which schedule has been revised as first block.
- (6) The generation schedules and drawl schedules shall be accessible to the intra-State entities through user credentials controlled access. After the operating day is over at 24:00 Hours, the schedule finally implemented during the day (taking into account all before-the-fact changes in despatch

schedule and drawal schedule of the intra-State entities) shall be issued by SLDC. These schedules shall be the basis for commercial accounting.

- (7) 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. 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 clause (4) 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 3rd time block as per clause (4) 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 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.

- (8) 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 four (4) revisions of declared capacity and schedule in a day subject to a maximum of eighty (80) 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 SLDC may allow upward revision of DC beyond the above limit keeping in view grid requirements.

- (b) The generating station based on lignite, gas, or hydro generating station shall be allowed six (6) revisions of declared capacity and schedule in a day subject to a maximum of One hundred twenty (120) 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 SLDC may allow upward revision of DC beyond the above limit keeping in view grid requirements.

- (9) 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 sub-clause (c) of clause (4) of this Regulation.
- (10) 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 sub-clause (c) of clause (4) of this Regulation.
- (11) In the event of forced outage of a generating station or unit thereof, the generating company owning the generating station or unit thereof shall fulfil 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 of the Central Commission or (ii) by arranging supply from any other generating station or unit thereof owned by such generating company subject to honouring 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.
- (12) Discrepancy in schedule
 - (a) All intra-State entities shall closely check their transaction Schedule and point out errors, if any, to SLDC.
 - (b) The final schedules issued by SLDC shall be open to all intra-State entities and other concerned entities for any checking and verification, for a period of five (5) days. In case any mistake or omission is detected, SLDC shall make a complete check and rectify the same.
- (13) Energy Metering and Accounting:
 - (a) STU shall be responsible for procurement and installation of Interface Energy Meters (IEMs), at the cost of respective entity, at all the InSTS interface points, points of connections between the intra-State entities, and other identified points for recording of actual active and reactive energy interchanged in each time-block through those points.

- (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.
- (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 SLDC shall be in accordance with the CEA Metering Regulations.
- (e) Intra-State entities (other than open access consumer / captive user) 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 (7) day period ending on the preceding Sunday 24:00 Hours and transmitting them to SLDC by Tuesday 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 and (iv) promptly intimating the changes in CT and PT ratio to SLDC:

Provided that installation, operation, calibration and maintenance of Interface Energy Meters (IEMs) with automatic remote meter reading (AMR) facility at open access consumer end / captive user end shall be in accordance with CEA Metering Regulations read with Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010 and Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019 read with the CEA Metering Regulations 2006.

- (f) SLDC shall, based on the IEM readings, compute time block wise actual net injection and drawal of intra-State entities within its control area:

Provided that the computations done by SLDC shall be open to all intra-State entities for a period of fifteen (15) days for checking and verification.

- (g) In case any error or omission is detected by self-analysis or brought to notice by an entity, SLDC shall make a complete check and rectify the error within a period of a month from date of such detection.
- (h) SLDC shall consider the implemented schedule and the IEM readings received on a weekly basis by each Thursday for the preceding seven (7) days period ending on the preceding Sunday mid-night, to prepare and issue the various accounts such as Deviation Settlement Mechanism (DSM), reactive charges, ancillary services, SCED, heat rate compensation

charges, in accordance with relevant regulations and as stipulated at Annexure-4 of these regulations.

- (i) SLDC, STU, other intra-State transmission licensees and all users / intra-State entities shall comply with Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010 and Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulations, 2019.

(14) Inspection of Records:

The operational logs and records of the intra-State generating stations and intra-State transmission licensees shall be available for inspection and review by SLDC and SPC.

(15) Oversight of Injection and Drawal:

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 SPC. If this still persists after being taken up at SPC, it shall be reported to the Commission along with recommendation for necessary action by SPC.

CHAPTER 10

CYBER SECURITY

77. General

- (1) This chapter deals with measures to be taken to safeguard the state 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, specified in consistent with the Chapter 8 of IEGC of the Central Commission with State specific changes.
- (2) All users, STU, QCAs and SLDC shall have in place, a cyber security framework in accordance with Information Technology Act, 2000; CEA Technical Standards for Connectivity Regulations; CEA Cyber Security Guidelines and any such regulations / guidelines issued from time to time, by an appropriate authority, so as to support reliable operation of the grid.

78. Cyber Security Audit

All users, STU, QCAs and SLDC shall conduct Cyber Security Audit as per the guidelines mentioned in CEA Cyber Security Guidelines and any other regulations / guidelines issued by an appropriate authority, at regular interval through Indian Computer Emergency Response Team (CERT-In) empanelled auditors so as to identify gaps and appropriate corrective actions to be taken in cyber security practices. Such entities must submit reports of Cyber Audit of cyber security controls, architecture, vulnerability management, network security and periodic cyber security drills to sectoral CERT, CERT-In and SPC.

79. Mechanism of Reporting

- (1) All applicable entities shall immediately report to the appropriate government agencies in accordance with the Information Technology Act, 2000, as amended from time to time, and CEA Cyber Security Guidelines and any other regulations / guidelines issued by an appropriate authority, in case of any cyber-attack.
- (2) SLDC, SPC and the Commission shall also be informed by such entities in case of any instance of cyber-attack.

80. 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 as per IEGC.

- (2) Sectoral CERT shall prepare its sub-sector specific model Cyber Crisis Management Plan (C-CMP) for countering cyber-attacks and cyber terrorism and shall be circulated for preparation and implementation of organization specific C-CMP by each of its constituent entities. All such entities shall be equally responsible for ensuring cyber security of the Indian Power Supply System. They shall act timely upon each threat intelligence, advisories and other inputs received from authenticated sources, for continuous improvement in their cyber security posture.
- (3) The sectoral CERT shall lay down rules of procedure for carrying out their activities.
- (4) An Intra-State Cyber Security Committee (InS-CSC) shall be constituted under SPC to oversee and ensure compliance by the applicable entities as per the provisions in these regulations. SPC in consultation with SLDC shall formulate the working modalities of the Committee, for information of the Commission.
- (5) SLDC in coordination with SPC on regular basis also conducts workshops and training programs to enhance cyber awareness of all stakeholders.

CHAPTER 11

MONITORING AND COMPLIANCE CODE

81. General

This chapter deals with (a) monitoring of compliance of these regulations by various entities in the grid by SLDC, SPC or any other person, (b) manner of reporting the instances of violations of these regulations and (c) taking remedial steps or initiating appropriate action.

82. Assessment of Compliances

The performance of all users / intra-State entities, STU, SLDC, SPC, QCAs with respect to compliance of these regulations shall be assessed periodically.

83. Monitoring of Compliance

(1) In order to ensure compliance, two methodologies shall be followed:

- (a) Self-Audit
- (b) Compliance Audit

(2) Self-Audit:

- (a) All users / intra-State entities, STU, SLDC, SPC, QCAs shall conduct annual self-audits to review compliance of these regulations and submit the reports by 31st July of every year.
- (b) The self-audit report shall inter alia contain the following information with respect to non-compliance:
 - (i) Sufficient information to understand how and why the non-compliance occurred;
 - (ii) Extent of damage caused by such non-compliance;
 - (iii) Steps and timeline planned to rectify the same;
 - (iv) Steps taken to mitigate any future recurrence;
- (c) The self-audit reports by users / intra-State entities, QCAs shall be submitted to SLDC.
- (d) The self-audit reports of SLDC, STU and SPC shall be submitted to the Commission.
- (e) The deficiencies shall be rectified in a time bound manner within a reasonable time.
- (f) The monitoring agency for users / intra-State entities and QCAs shall be SLDC. The monitoring agency shall track the progress of compliances of users / intra-State entities and QCAs, and exceptional reporting for non-compliance shall be submitted to the Commission.

- (g) The monitoring agency for SLDC, STU and SPC shall be the Commission.
- (h) State Power Committee (SPC) shall also continuously monitor the instances of non-compliance of the provisions of these regulations and endeavour to sort out all operational issues and deliberate on the ways in which such cases of non-compliance shall be prevented in future. SPC may also report any unresolved issues to the Commission.
- (i) The Commission may initiate appropriate proceedings upon receipt of report under above sub-clauses of this clause.
- (j) In case of non-compliance of any provisions of these regulations by SLDC, SPC and any other person, the matter may be reported by any person to the Commission through filing of a petition.
- (k) Notwithstanding anything contained in these regulations, the Commission, if satisfied, may also take suo-moto action against any person, in case of non-compliance of any of the provisions of these regulations comes to its notice.

(3) Independent Third-Party Compliance Audit:

The Commission may order independent third-party compliance audit for any user / intra-State entities, QCA, STU, SLDC and SPC as deemed necessary based on the facts brought to the knowledge of the Commission.

84. State Power Committee (SPC)

- (1) The State Power Committee has been constituted for facilitating the integrated operation of the power system in the State. SPC may, from time to time, agree on matters concerning the stability and smooth operation of the integrated grid and economy and efficiency in the operation of the power system in the State.
- (2) Head of SLDC shall be the Chairman of the State Power Committee and it shall comprise of the following other members as recommended by the heads of the respective organizations:
 - (i) One member from State Transmission Utility;
 - (ii) One member representing state-owned generating companies;
 - (iii) One member from each generating company (other than state-owned generating company) having installed capacity of 660 MW and more;
 - (iv) One member representing all co-generation plants, captive generating plants and IPPs having installed capacity of less than 660 MW as may be nominated by the Commission on rotation basis for every one (1) year;

- (v) One member from each solar and wind generating company having installed capacity of 100 MW and more;
- (vi) One member representing all solar and wind generating plants having installed capacity of less than 100 MW as may be nominated by the Commission on rotation basis for every one (1) year;
- (vii) One member representing all ESS as may be nominated by the Commission on rotation basis for every one (1) year;
- (viii) One member representing all transmission licensees in the State (other than State Transmission Utility) as may be nominated by the Commission on rotation basis for every one (1) year;
- (ix) One member from each distribution licensee in the State;
- (x) One member from the Indian Railways in the State;
- (xi) Member Secretary, senior officer not below the rank of Chief Engineer from State Load Dispatch Centre as may be nominated by the Chairman, State Power Committee - Convener
- (xi) Such other persons as may be nominated by the Commission.

One representative each from NRPC and/or from NRLDC may participate in the Committee as a special invitee(s). In addition, the Committee may invite any stakeholder, expert, professional from academic or research institution as special invitee on case-to-case basis for the specific meeting.

- (3) The Committee shall have a secretariat of its own which will be headed by the Member Secretary of the Committee. Other staff for the secretariat shall be provided by SLDC.
- (4) The Headquarter of the Committee will be located at Lucknow.
- (5) Operationalization of the Committee:
 - (a) A State Power Committee shall be re-constituted within sixty (60) days from the date of notification of these regulations. The Chairman, State Power Committee shall invite nominations from various organizations / Commission and shall ensure that the nominations referred to in sub-clauses (ii) to (xii) of Clause (2) of this regulation are received within thirty (30) days of notification of these regulations.

Provided that the State Power Committee constituted under Clause 2.14 of UPEGC, 2007 shall continue to function in accordance with prevailing rules of business for the conduct till a new State Power Committee is constituted under these regulations.

- (b) The Committee will frame its own rules of business for the conduct of its meeting and other related matters.
 - (c) The tenure of the members shall be co-terminus with their association with the respective organization. However, any organization / group may suitably re-nominate some other person for representation in the State Power Committee. In such a case, earlier nominated person shall cease to be a member of the State Power Committee.
 - (d) Members nominated by each of the organisation shall be persons holding senior position in their respective organization.
- (6) The Committee shall discharge following functions:
- (a) Undertaking state level operation analysis for improving grid performance.
 - (b) Facilitating intra-State transfer of power.
 - (c) Facilitating all functions of planning relating to intra-State transmission system with STU and review of progress of crucial transmission projects.
 - (d) Coordinating planning of maintenance of generating machines of various generating companies of the State on annual basis and also to undertake review of maintenance programme on monthly basis.
 - (e) Undertaking planning of outage of transmission system.
 - (f) Undertaking operational planning studies including protection studies for stable operation of the grid.
 - (g) Undertaking planning for maintaining proper voltages through review of reactive power compensation requirement and monitoring of installed capacitors.
 - (h) Evolve consensus on all issues relating to economy and efficiency in the operation of power system in the state.
 - (i) Facilitating the implementation of these regulations and the plans, procedures and mechanism developed thereunder.
 - (j) Assessing and recommending the remedial measures for issues that might arise during the implementation of provisions of these regulations, and the plans, procedures and mechanism developed thereunder.
 - (k) Any other function as specified under these regulations and such other matters as may be directed by the Commission from time to time.

- (7) The Committee may constitute its sub-committees, task forces, adhoc committees and standing committees, as envisaged under these regulations or otherwise considered necessary for efficient functioning in line with NRPC. It may also set up, if required, groups / committees of eminent experts to advise it on issues of specific nature. The level of the representative to the sub committees etc would depend on the nature of the issue concerned.
- (8) The decisions of Committee arrived at by consensus regarding operation of the state power grid and scheduling and dispatch of electricity will be followed by SLDC subject to directions of the Commission, if any.
- (9) The Committee shall meet at least once in a quarter and at such other time as may be considered necessary.
- (10) All complaints regarding unfair practices, delays, discrimination, lack of information, supply of wrong information or any other matter related to open access in intra-State transmission shall be directed to the Member Secretary, State Power Committee. In case SPC is unable to resolve the matter, it shall be reported to the Commission for a decision.

CHAPTER 12

MISCELLANEOUS

85. 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.

86. Power to Remove Difficulty

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, as may appear to be necessary for removing the difficulty in giving effect to the objectives of these regulations.

87. Repeal and Savings

- (1) Save as otherwise provided in these regulations, the U. P. Electricity Grid Code, 2007 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 UPEGC 2007 shall be deemed to have been done or taken under the relevant provisions of these regulations.

88. 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 and matters incidental or ancillary thereto, as the case may be.

89. Compatibility with Indian Electricity Grid Code

These regulations are consistent / compatible with the IEGC. However, in matters relating to inter-State transmission, if any provision of these regulations is inconsistent with the provisions of the IEGC, then the provisions of IEGC as notified by CERC shall prevail.

By Order of the Commission

Secretary

Annexure-1

THIRD PARTY PROTECTION SYSTEM CHECKING & VALIDATION
TEMPLATE FOR A SUBSTATION

1. Introduction

- (1) The audit reports, along with action plan for rectification of deficiencies found, if any, shall be submitted to SLDC and SPC within a month of submission of report by auditor.
- (2) The third-party protection system checking shall be carried at site by the designated agency. The agency shall furnish two reports:
 - (a) Preliminary Report: This report shall be prepared on the site and shall be signed by all the parties present.
 - (b) Detailed Report: This report shall be furnished by agency within one month after carrying out detailed analysis.

2. Checklist

- (1) The protection system checklist shall contain information as per this Regulation.
 - (a) General Information (to be provided prior to the checking as well as to be included in final report):
 - (i) Substation name
 - (ii) Name of owner utility
 - (iii) Voltage level(s) or highest voltage level
 - (iv) Short circuit current rating of all equipment (for all voltage level)
 - (v) Date of commissioning of the substation
 - (vi) Checking and validation date
 - (vii) Record of previous tripping's (in last one year) and details of protection operation
 - (viii) Previous relay test reports
 - (ix) Overall single line diagram (SLD)
 - (x) AC aux SLD
 - (xi) DC aux SLD
 - (xii) SAS architecture diagram

(xiii) SPS scheme implemented (if any)

(b) The preliminary report shall inter-alia contain the following:

Table A: Format of Preliminary Report

S. No.	Issues	Remarks
1	Recommendation of last protection checking and validation	Status of works and pending issues if any
2	Review of existing settings at substation	Recommended Action
3	Disturbance Recorder out available for last 6 tripping's (Y/N)	Recommended Action
4	Chronic reason of tripping, if any	Recommended Action
5	Major non-conformity / deficiency observed	Recommended Action

(c) The relay configuration checklist for available power system elements at station:

- (i) Transmission line
- (ii) Bus reactor / Line reactor
- (iii) Inter-connecting Transformer
- (iv) Busbar protection relay
- (v) AC auxiliary system
- (vi) DC auxiliary system
- (vii) Communication system
- (viii) Circuit Breaker details
- (ix) Current Transformer details
- (x) Capacitive Voltage Transformers details
- (xi) Any other equipment / system relevant for protection system operation

(d) The minimum set of points on which checking and validation shall be carried out is covered in this clause. The detailed list shall be prepared by checking and validation team in consultation with concerned entity, SLDC and SPC.

- (i) Transmission Line Distance Protection / Differential Protection
 - a. Name and length of line

- b. Whether series compensated or not
- c. Mode of communication used (PLCC / OPGW)
- d. Relay make and model for Main-I and Main-II
- e. List of all active protections & settings
- f. Carrier aided scheme if any
- g. Status of Power Swing / Out of Step / SOTF / Breaker Failure / Broken Conductor / STUB / Fault Locator / DR / VT Fuse Fail / Overvoltage Protection / Trip Circuit Supervision / Auto-reclose / Load encroachment etc.
- h. Relay connected to Trip Coil-1 or 2 or both
- i. CT ratio and PT ratio
- j. Feed from DC supply-1 or 2
- k. Connected to dedicated CT core (mention name)
- l. Other requirements for protection checking and validation
- (ii) Shunt Reactor & Inter-connecting Transformer Protection
 - a. Whether two groups of protections used (Group A and Group B)
 - b. Do the groups have separate DC sources
 - c. Relay make and model
 - d. List of all active protections along with settings
 - e. Status of Differential Protection / Restricted Earth Fault Protection / Back-up Directional Overcurrent / Backup Earth fault / Breaker Failure
 - f. Status of Oil Temperature Indicator / Winding Temperature Indicator / Buchholz / Pressure Release Device etc.
 - g. Relay connected to Trip Coil-1 or 2 or both
 - h. CT ratio and PT ratio
 - i. Feed from DC supply-1 or 2
 - j. Connected to dedicated CT core (mention name)
 - k. Other requirements for protection checking and validation
- (iii) Busbar Protection Relay

- a. Busbar and redundant relay make and model
- b. Type of busbar arrangement
- c. Zones
- d. Dedicated CT core for each busbar protection (Yes/No)
- e. Breaker Failure relay included (Yes/No), if additional then furnish make and model
- f. Trip issued to both busbar protection in case of enabling
- g. Isolator indication and check relays
- h. Other requirements for protection checking and validation
- (iv) AC auxiliary system
 - a. Source of AC auxiliary system
 - b. Supply changeover between sources (Auto / Manual)
 - c. Diesel generator (DG) details
 - d. Maintenance plan and supply changeover periodicity in DG
 - e. Single Line Diagram
 - f. Other requirements for protection checking and validation
- (v) DC auxiliary system
 - a. Type of batteries (make, vintage, model)
 - b. Status of battery charger
 - c. Measured voltage (positive to earth and negative to earth)
 - d. Availability of ground fault detectors
 - e. Protection relays and trip circuits with independent DC sources
 - f. Other requirements for protection checking and validation
 - g. Communication system
 - i. Mode of communication for Main-1 and Main-2 protection
 - ii. Mode of communication for data and speech communication
 - iii. Status of PLCC channels
 - iv. Time synchronization equipment details

- v. 7OPGW on geographically diversified paths for Main-1 and Main-2 relay
- vi. Other requirements for protection checking and validation

(vi) Circuit Breaker Details

- a. Details and status
- b. Healthiness of tripping coil and trip circuit supervision relay
- c. Single pole / Multi pole operation
- d. Pole discrepancy relay available (Y/N)
- e. Monitoring devices for checking the dielectric medium
- f. Other requirements for protection checking and validation

(vii) Current Transformer (CT) / Capacitive Voltage Transformer (CVT) Details

- a. CT / CVT ID name and voltage level
- b. CT / CVT core connection details
- c. Accuracy Class
- d. Whether Protection / Metering
- e. CT / CVT ratio available and ratio adopted
- f. Details of last checking and validation of CT / CVT healthiness
- g. Other requirements for protection checking and validation
- h. Other protections: direction earth fault, negative sequence, over current, over voltage, over frequency, under voltage, under frequency, forward power, reverse power, out of step / power swing, HVDC protection etc.

3. Summary of Checking

The summary shall specifically mention minimum following points:

- (1) The settings and scheme adopted are in line with agreed protection philosophy or any accepted guidelines (e.g. Ramakrishna guidelines or CBIP manual based).
- (2) The deviations from the RPC / SPC protection philosophy, if any and reasons for taking the deviations shall be recorded.
- (3) All the major general deficiency shall be listed in detail along with remedial recommendations.

- (4) The relay settings to be adopted shall be validated with simulation based or EMTP studies and details shall be enclosed in report.
- (5) The cases of protection maloperation shall be analysed from protection indices report furnished by concerned utility, the causes of failure along with corrective actions and recommendations based on the findings shall be noted in the report.

Annexure-2**1. Reactive Power Compensation**

(a) Reactive power compensation should ideally be provided locally, by generating reactive power as close to the reactive power consumption as possible. The intra-State entities are therefore expected to provide local VAr compensation or generation such that they do not draw VARs from the State grid, particularly under low-voltage condition. To discourage VAr drawals by intra-State entities, VAr exchanges with InSTS shall be priced as follows:

- (a) The intra-State entity pays for VAr drawal when voltage is below 97%
- (b) The intra-State entity gets paid for VAr return when voltage is below 97%.
- (c) The intra-State entity gets paid for VAr drawal when voltage is above 103%.
- (d) The intra-State entity pays for VAr return when voltage is above 103%.

Where all voltage measurements are at the interface point with InSTS.

- (b) The charge for VARh shall be at the rate as specified under IEGC together with annual escalation as specified therein.
- (c) All the Inverter Based Resources (IBRs) covering solar, wind and energy storage shall ensure that they have the necessary capability, as per CEA Connectivity Standards Regulations, all the time including non-operating hours and night hours for solar. The active power consumed by these devices for purpose of providing reactive power support, when operating under synchronous condenser / night-mode, shall not be charged under deviations and shall be treated as transmission losses in the InSTS.
- (d) For IBRs of capacity below 5 MW not coming directly to the point of interconnection but through the pooling at the Renewable Power Park Developer end, the Renewable Power Park Developer shall act as aggregator for the Reactive Energy Charges for payments to and from State Reactive Energy Charges Account at SLDC level for the individual generating station. The de-pooling of Reactive Energy charges amongst the individual solar and wind shall be done by the Renewable Power Park Developer.
- (e) For any interconnecting line between two states, owned by the States, the interface points shall be treated in terms of this Regulation for the purpose of reactive power charges.

2. Accounting And Payment for Reactive Energy Exchanges

- (a) SLDC shall issue the weekly statement for VAR charges, to all intra-State entities.

- (b) The concerned intra-State entities shall pay the amounts into State Reactive Energy Charges Account operated by SLDC within 10 (ten) days of issue of statement.
- (c) The intra-State entities who have to receive the money on account of VAR charges would then be paid out from State Reactive Energy Charges Account, within two (2) working days from the receipt of payment in State Reactive Energy Charges Account.
- (d) If payments against the above VAR charges are delayed by more than two (2) days, i.e., beyond twelve (12) days from issue of the statement by SLDC, the defaulting intra-State entity shall pay simple interest @ 0.04% for each day of delay. The interest so collected shall be paid to the intra-State entities who had to receive the amount, payment of which got delayed.
- (e) Persistent payment defaults, if any, shall be reported by SLDC to SPC, for initiating remedial action.

Annexure-3

**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**(1) QCA or Renewable Energy Generating Station or Lead Generator**

- (a) The individual generating station or Lead Generator shall submit one-time details to SLDC in line with Appendix-I to Annexure-6 of IEGC. Further, if there is any change in the information furnished, then the updated information shall be shared with 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 in line with Appendix-II to Annexure-6 of IEGC, through web-based application maintained by SLDC.
 - (iii) Provide real time data at turbine / inverter level and generation data at pooling station level in line with Appendix-III to Annexure-6 of IEGC.
 - (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 SLDC, SPC, STU and other agencies as per these regulations and extant UPERC Regulations.
- (vi) Undertake commercial settlement for deviation as per applicable UPERC Regulations.
- (vii) Submit a copy of the consent to SLDC wherein it is mentioned that QCA shall undertake all operational and commercial responsibilities on behalf of generating stations as per the UPERC 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), 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 SLDC and shall ensure the correctness of the real-time data and undertake the corrective actions, if required. The suggested data telemetry requirement is in line with Appendix-III to Annexure-6 of IEGC.
- (xiv) Keep SLDC indemnified at all times and shall undertake to indemnify, defend and save SLDC 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) SLDC

- (a) SLDC shall be responsible for scheduling, communication, coordination with QCA or generating station or Lead Generator.
- (b) 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, in line with Appendix- IV to Annexure-6 of IEGC.

3. Forecasting

- (1) QCA or generating station or Lead Generator shall provide the forecast to SLDC which may be based on their own forecast or SLDC's forecast in line with Appendix-II to Annexure-6 of IEGC.
- (2) QCA or generating station or Lead Generator may prepare their schedule based on the forecast done by 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 respective QCA.

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 with in the park and ultimately injecting at interface with InSTS:

Case-1 QCA has been identified for all generating stations connected at a pooling station.

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

Case-3 Where QCA at a pooling station is not identified following situations may arise

Case-A: SLDC shall be responsible for the scheduling, communication, coordination with RE Generators of 5 MW and above and connected to intra-State transmission system.

Case-B: Lead Generator shall be responsible for the coordination and communication with SLDC, SPC 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 similar to the stipulation provided in Appendix-IV (5 MW in place of 50 MW) to Annexure-6 of IEGC.
- (4) The change of QCA would need a notice period of fifteen (15) days and the changeover shall take place with effect from 00:00 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 installed MW capacity.

Annexure-4**ACCOUNTING AND POOL SETTLEMENT SYSTEM****1. Metering, Accounting and Settlement System**

- (a) At the intra-State transmission system (InSTS) level, the basic principle followed is that all settlements for the energy scheduled before the fact are done directly between the sellers and the buyers, with SLDC issuing the Accounts specifying the quantum of energy scheduled. All deviations from the schedule are settled through a regulatory Pool Account maintained by SLDC where only the deviation payments are handled.
- (b) The settlement system shall be transparent, robust, scale-able (multi buyer / seller, inter connection with upper pool systems) and dispute-free with integrity and probity and usage of state of the art techniques. The settlement computation details, applicable charges and operation of different regulatory Pool Accounts shall be in accordance with various regulations of the Commission. SLDC shall standardise the formats of various accounts.
- (c) The Implemented Schedule incorporating all before-the-fact changes in schedule shall be used as a reference for energy accounting.
- (d) Energy Accounts inter-alia shall indicate declared capability of generating stations, entitlements, requisitions, scheduled loss, scheduled transactions Open Access (LTOA / MTOA / STOA) and GNA and T-GNA and actual interchange, reactive energy charges account, SCED scheduled energy and any other accounts to be issued under UPERC Regulations.
- (e) Assumptions, if any, in the accounts shall be clearly stated in Notes to the Accounts
- (f) Each intra-State entity (whether generator, RE Generator, QCA (on behalf of generators), captive power plant, distribution licensees, open access consumers connected at InSTS) in the State shall be a member of the State pool and separately accountable for deviations.

By the order of the Commission

Sd/-
(Sumeet Kumar Agarwal)
Secretary

Explanatory Memorandum

1. General

- (1) The Central Commission has been vested with the functions under clause (h) of sub-section (1) of Section 79 of the Electricity Act, 2003 (the Act) to specify the Grid Code having regard to the Grid Standards. Further, clause (i) of sub-section (1) of Section 79 of the Act enjoins upon the Central Commission to specify and enforce the standards with respect to the quality, continuity and reliability of services by the licensees, who have been granted License under section 79(1) (f).
- (2) The State Commission has been vested with the functions under sub-section (1) of Section 86 of the Act among others to (i) facilitate intra-State transmission and wheeling of electricity; (ii) specify State Grid Code consistent with the Grid Code specified under clause (h) of sub-section (1) of Section 79; (iii) specify or enforce standards with respect to quality, continuity and reliability of service by licensees.
- (3) In view of above, under clause (h) of sub-section (1) of Section 79 of the Act the Central Electricity Regulatory Commission had notified the Indian Electricity Grid Code 2023 duly repealing its earlier Regulations i.e. the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 and all subsequent amendments thereof. The Indian Electricity Grid Code contains the provisions regarding the roles, functions and responsibilities of the concerned statutory bodies, generating companies, licensees, and any other person connected with the operation of the power systems within the statutory framework envisaged in the Act and the Rules and Notifications issued by the Central Government.
- (4) Under clause (h) of sub-section (1) of Section 86 of the Electricity Act 2003, the Commission had published the U.P. Electricity Grid Code, 2007 vide Notification No. UPERC/Secy/Regulation/07-432 on dated 18.04.2007, which was framed in accordance with the provisions of the Electricity Act, 2003 and the then prevailing Indian Electricity Grid Code (IEGC), providing among others the various aspects of planning and development relating to intra-State transmission system, specifying procedure for connection to intra-State transmission system alongwith minimum technical and design criteria to be complied with by various users, operation planning and system security code and scheduling and despatch of electricity.
- (5) Since 2007, power sector in India and primarily transmission sector has undergone significant, technological and regulatory changes, including large-scale integration of renewable energy, development of energy storage systems, market-based power transactions, ancillary services, integrated resource adequacy planning, advanced metering and communication requirements,

cyber security requirements and modern system operation practices. The increasing penetration of variable renewable energy sources, changing load characteristics and the growing complexity of grid operation have necessitated the provision of adequate reserves and ancillary services to maintain frequency, voltage and overall system security, reliability and resilience under both normal and contingency conditions. Further, various regulatory and sectoral developments have taken place at national level as well as state level, which have necessitated issuance of draft State Grid Code.

- (6) Accordingly, draft of the Uttar Pradesh Electricity Regulatory Commission (Uttar Pradesh Electricity Grid Code) Regulations, 2026 (draft UPEGC 2026) is hereby issued in exercise of the powers conferred under clause (h) of sub-section (1) of Section 86 of the Act (Central Act 36 of 2003) and all other powers enabling it in this behalf, which is broadly or substantially consistent with the Indian Electricity Grid Code 2023 notified by the Central Electricity Regulatory Commission, when finalised would repeal U.P. Electricity Grid Code 2007.
- (7) The Draft State Grid Code introduces, for the first time at the State level, an enabling regulatory framework for deployment of various reserves viz primary, secondary and tertiary, black start and voltage control reserves, thereby equipping the State Load Despatch Centre with the necessary operational tools for maintaining secure and reliable grid operation. It also incorporates the concepts and provisions relating to security constrained unit commitment and security constrained economic dispatch, in line with the IEGC, 2023, to facilitate optimal commitment and economic dispatch of generating resources while ensuring compliance with transmission security constraints. These provisions will enable State Load Despatch Centre to progressively implement advanced system operation practices as and when required for efficient, secure and economical operation of the State power system. Further, integrated resource planning code, new communication code and cyber security code have also been introduced.

However, some State specific changes wherein minimum turn down level be kept as 55% of the MCR for thermal generating station, existing provisions for successful trial run for declaration of COD of Solar / Wind and startup / infirm power of generating stations have been kept as per applicable UPERC Tariff Regulations.

- (8) Therefore, the Draft State Grid Code, provides a contemporary, comprehensive and future-ready regulatory framework for secure, reliable, resilient, efficient and economical planning, operation and development of the State Power System while ensuring consistency / alignment with the national regulatory and operational framework.

2. Objectives of the draft UPEGC 2026

- (1) Keeping in view the mandate and statutory framework as envisaged in the Act for stable, reliable and secure grid operation in order to achieve maximum economy and efficiency of the power system, the draft State Grid Code apart from providing the provisions relating to the role of various statutory bodies and organizations and functional linkages among them, contains extensive provisions pertaining to (i) reliability and adequacy of resources; (ii) technical and design criteria for connectivity to the grid including integration of new elements, trial operation and declaration of commercial operation of generating stations and intra-State transmission systems; (iii) integration of renewables; (iv) protection setting and performance monitoring of the protection systems including protection audit; (v) planning, implementation, operation and maintenance and up-gradation of reliable communication system; (vi) operational requirements and technical capabilities for secure and reliable grid operation including load generation balance, outage planning and system operation; (vii) ancillary services and reserves; (viii) unit commitment, scheduling and despatch criteria for physical delivery of electricity; and (ix) cyber security etc. The draft State Grid Code lays down the provisions to plan, develop, maintain and operate the power system in the State, in the most secure, reliable, economic and efficient manner, so as to meet the requirements of integrated operation with the inter-State transmission system of the Northern Regional grid / National grid as per the provisions of the Indian Electricity Grid Code.
- (2) State Grid Code shall apply to: State Transmission Utility, State Load Despatch Centre, all users including generating companies, captive generating plants, energy storage systems and licensees connected with and/or utilizing the intra-State transmission system, State Power Committee, State Renewable Energy Management Centre, Renewable Power Park Developers, Lead Generators, Lead ESSs and Qualified Coordinating Agencies to the extent applicable.

3. Structure of the draft UPEGC 2026

The salient features of different codes of the draft State Grid Code are as follows:

- (a) **Preliminary:** This code specifies the scope, application and definitions of these regulations.
- (b) **Resource Planning Code:** This code covers the integrated resource planning including demand forecasting, generation resource adequacy planning and transmission resource adequacy assessment and planning, required for secure grid operation.

The planning of generation and transmission resources shall be done to meet the projected demand in compliance with specified reliability standards for serving the load with optimum generation mix with a focus on integration of environment 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.

Further, this code also comprises various aspects of planning and development relating to Intra-State Transmission Systems.

- (c) **Connection Code:** This code covers the procedure for grant of connectivity, technical and design criteria for connectivity, procedure and requirements for physical connection and integration of grid elements, which must be complied with by users connected to / applicant seeking connectivity to the intra-State transmission system.

Connection Code shall apply to applications made to the Nodal Agency, i.e., the State Transmission Utility, for the grant of connectivity to the intra-State transmission system and to all matters connected therewith. The connectivity to the intra-State transmission system shall be granted by State Transmission Utility in accordance with the State Grid Code and Uttar Pradesh Electricity Regulatory Commission (Grant of Connectivity to Intra-State Transmission System) Regulations, 2010 and amendments thereof read with the procedure prepared by State Transmission Utility and approved by the Commission thereunder and Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007.

This connection code specifies the requirements to be fulfilled and procedure to be followed by the applicant prior to obtaining the permission of State Load Despatch Centre for first time energizing of a new or modified power system element. In addition to above, this code also specifies the technical requirements to be complied with by an intra-State transmission licensee prior to being allowed by State Load Despatch Centre to energize a new or modified power system element.

- (d) **Protection Code:** This protection code covers the protection protocol, protection settings, protection system management and performance monitoring of the protection systems including protection audit of electrical systems, which shall be specified in consonance with Indian Electricity Grid Code.

This code has proposed a uniform protection protocol for State Transmission Utility and the users of the State grid (a) for proper co-ordination of protection system in order to protect the

equipment / system from abnormal operating conditions, isolate the faulty equipment and avoid unintended operation of protection system; (b) to have a repository of protection system, settings and events at State level; (c) specifying timelines for submission of data; (d) to ensure healthiness of recording equipment including triggering criteria and timely synchronization; and (e) to provide for periodic audit of protection system.

State Power Committee shall be responsible for all the protection related coordination, development and implementation functions of the State grid. The functioning of the protection activities in this regard shall be undertaken in line with that of the concerned body of Northern Regional Power Committee.

- (e) **Communication Code:** Considering the importance of reliable communication system for integrated operation of the State grid, a new code has been introduced in the draft State Grid Code covering planning, implementation, operation and maintenance and up-gradation of reliable communication system for all communication requirements including exchange of data for integrated operation of the State grid. The code shall apply to the communication infrastructure to be used for reliable data and voice communication and tele-protection for the power system at the intra-State level.

All users / intra-State entities, State Transmission Utility, State Load Despatch Centre, State Renewable Energy Management Centre, Area Load Despatch Centres and State Power Committee shall abide by the principles and procedure as applicable to them in accordance with the State Grid Code read with Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020. The functioning of the communication activities in this regard shall be undertaken in line with that of the concerned body of Northern Regional Power Committee.

- (f) **Commissioning and Commercial Operation Code:** In addition to provisions related to trial run operation and declaration of commercial operation for thermal generating stations, hydro generating stations, transmission system and communication system, provisions related to trial run and declaration of commercial operation of solar, wind, hybrid, pumped storage and ESS stations have been proposed in the draft State Grid Code. Further specific test reports and documents have been specified which shall be submitted prior to declaration of commercial operation by generating stations and transmission licensee. This chapter also covers aspects related to drawl of startup power from and injection of infirm power into the grid during the commissioning period.

- (g) **Operating Code:** Integrated operation of the intra-State transmission system to ensure integrity, stability and resilience of the grid is to enhance the overall operational economy and reliability of the entire network spread over the State control area. The operating code covers the operating philosophy, system security, operational planning, operational planning study, outage planning, system restoration, real time operation, demand and load management, post-despatch analysis, periodic reports, reactive power management, periodic testing and capacity building & certification, required at intra-State level for integrated operation of the State grid, specified in consonance with the operating code of Indian Electricity Grid Code of the Central Commission with State specific changes.

State Load Despatch Centre and State Power Committee shall carry out such functions as specified in the State Grid Code in co-ordination with National Load Despatch Centre, Northern Regional Load Despatch Centre, Northern Regional Power Committee, Central Transmission Utility, State Transmission Utility and concerned users, as applicable. For this, State Load Despatch Centre / State Power Committee shall issue the plans, procedures, mechanism and formats, consistent with the plans, procedures, mechanism and formats stipulated by National Load Despatch Centre or Northern Regional Load Despatch Centre or Northern Regional Power Committee, as the case may be under Indian Electricity Grid Code with State specific changes, for performing such duties as specified in draft State Grid Code.

- (h) **Frequency Control and Reserves Code:** While it is desirable in the interest of reliability, safety and security of the grid that adequate reserves are maintained locally at the State level as per Indian Electricity Grid Code or the State Grid Code as the case may be, the draft State Grid Code aims to provide regulatory mechanisms for ancillary services at the state level for maintaining the grid frequency close to 50.000 Hz, and restoring the grid frequency within the allowable band as specified in Indian Electricity Grid Code and for relieving congestion in the transmission network, to ensure smooth operation of the power system, safety and security of the grid. The framework for reserves comprises of primary, secondary and tertiary reserves, voltage control reserves and black start reserves. This chapter covers the frequency control and reserves required at intra-State level, specified in consonance with the Regulation 30 of Indian Electricity Grid Code of the Central Commission with State specific changes. However, draft State Grid Code has proposed that different date may be appointed for commencement of tertiary reserves in the state control area, as may be notified by the Commission separately, as deemed fit.

State Load Despatch Centre shall carry out such functions as specified in this chapter in co-ordination with National Load Despatch Centre, Northern Regional Load Despatch Centre, Northern Regional Power Committee, Central Transmission Utility, State Transmission Utility, State Power Committee and concerned users, as applicable. For this, State Load Despatch Centre shall issue the detailed procedure, consistent with the detailed procedure stipulated by National Load Despatch Centre or Northern Regional Load Despatch Centre as the case may be under Indian Electricity Grid Code with State specific changes, for performing such duties as specified in draft State Grid Code.

- (i) **Scheduling and Despatch Code:** This chapter deals with the procedure for scheduling injection and drawal of power by the intra-State entities and the modalities for exchange of information, including scheduling for intra-State entities which are GNA grantees or T-GNA grantees transacting power through the inter-State transmission system and providing assistance in scheduling of inter-State transactions through Northern Regional Load Despatch Centre as per Indian Electricity Grid Code. This chapter also covers provisions with respect to control area jurisdiction in line with Indian Electricity Grid Code. The mechanism for security constrained economic despatch has also been proposed to optimise generation despatch, however draft State Grid Code has proposed that different date may be appointed for commencement of security constrained economic despatch in the state control area, as may be notified by the Commission separately.
- (j) **Cyber Security Code:** A new code has been proposed which deals with measures to be taken to safeguard the state 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, specified in consonance with the Chapter 8 of Indian Electricity Grid Code of the Central Commission with State specific changes.

All users, State Transmission Utility, Qualified Coordinating Agencies and State Load Despatch Centre shall have in place, cyber security frameworks in accordance with Information Technology Act, 2000; Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007; Central Electricity Authority (Cyber Security in Power Sector) Guidelines, 2021 and any such regulations / guidelines issued from time to time, by an appropriate authority, so as to support reliable operation of the grid. They shall conduct cyber security audit as per the guidelines mentioned in the Central Electricity Authority (Cyber

Security in Power Sector) Guidelines, 2021 and any such regulations issued by an appropriate authority, so as to support reliable operation of the grid.

- (k) **Monitoring and Compliance Code:** This chapter deals with (i) monitoring of compliance of the State Grid Code by State Load Despatch Centre, State Power Committee, State Transmission Utility or any other person, (ii) manner of reporting the instances of violations of the State Grid Code and (iii) taking remedial steps or initiating appropriate action. Two methodologies have been followed to ensure compliance: self-audit and compliance audit.
- (l) **Miscellaneous:** This code specifies miscellaneous aspects such as the power to relax, power to remove difficulties, issue of suo moto orders and directions etc., and other miscellaneous provisions.