# U.P. Electricity Grid Code


## U.P. Electricity Regulatory Commission

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# Uttar Pradesh Electricity Regulatory Commission
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**No. UPERC/Secy/Regulation/07-432**
**Lucknow: 18TH April 2007**

**Notification**

The Electricity Act, 2003 under section 86(1)(h) requires the State Commission to specify a State Grid Code consistent with the Indian Electricity Grid Code specified by the Central Commission. The Commission therefore, in exercise of powers conferred under the above section of the Electricity Act, 2003 specifies this new Grid Code which shall be called UP Electricity Grid Code, 2007 (hereinafter referred to as "UPEGC" or "Grid Code"). This "U.P. Electricity Grid Code, 2007" shall come into force from the date of its publication in the official Gazette of the Government of U.P and the existing U.P. Electricity Grid Code, 2000 shall stand repealed thereafter.

## CHAPTER- 1
## GENERAL

### 1.1 Introduction

Generating Station, Transmission Lines and Distribution System form the main components of any electric power system. For efficient, reliable, economical and secure operation of power system, the three components should function in a coordinated and synchronized manner. The U.P. Electricity Grid Code (UPEGC) accordingly lays down the rules, procedures and standards to be followed by the various Users and participants in the system to jointly plan, develop, maintain and operate the power system, in the most efficient, reliable, economic and secure manner.

### 1.2 Objective

The Grid Code is designed to facilitate the development, operation and maintenance of an efficient, coordinated, secure and economical State Power Grid. It accordingly provides the following:

a) Relationship between the various Users of the Intra-State Transmission System (STS).

b) Technical Standards, Rules and Procedures (technical, operational and for information sharing) to be adopted by SLDC, STU and Users connected to the State Power Grid.

c) Common basis of operation of the Power System to facilitate Open Access and trading of electricity.

## 1.3 Scope and extent of Application

a.) This code shall apply to STU, SLDC and all Users connected with and/or utilizing the Intra-State Transmission System.

b.) STU, SLDC and all Users shall abide by this code to the extent it applies to them.

c.) This Grid Code shall apply for the Intra-State transmission of electricity and for Inter-State transmission of electricity; the Indian Electricity Grid Code (IEGC) shall apply.

d.) This Grid Code shall not affect the obligations of the STU, SLDC and Users as laid down under the Indian Electricity Grid Code notified by CERC, and/or the Electricity Act, 2003 and rules and regulations made thereunder.

## 1.4 Structure of UP Electricity Grid Code, 2006

1.41 The provisions of UPEGC relating to planning, operational and procedural matters are contained in Chapter 3 to Chapter 8. The broad contents of different chapters are however, as follows:

i) **Chapter-1: General**

ii) **Chapter-2: Role of various Organizations and their linkages**
This chapter defines the functions of the various organizations as are relevant to UPEGC.

iii) **Chapter-3: System Planning Code**

This chapter provides the policy and procedures to be adopted in the planning and development of bulk power transfer and associated STS. The Planning Code lays down the detailed information exchange required between the STU, SLDC, Users and the various participants of the power system for load forecasting, generation availability, and overall power system planning etc. The Planning Code stipulates the various criteria to be adopted during the planning process.

iv) **Chapter-4: Connectivity Conditions Code**

This chapter specifies minimum technical and design criteria to be complied with by various Users connected to or seeking connection to the STS, to maintain uniformity and quality across the system. This includes:

a) Procedure for connection to the STS
b) Site responsibility schedule

v) **Chapter-5: Operation Planning and System Security Code**

This Chapter describes the operational philosophy to maintain efficient, secure, economic and reliable grid operation. This chapter covers the requirement for the exchange of information in relation to security aspects, demand estimation, demand management, outage planning, operational liasioning, and events occurring in the State Power System and the Northern Grid, which have had or may have an effect on the Regional Grid and/or on the State Power Grid and/or on a Users' System connected to State Power Grid. This Chapter also formulates the recovery and normalization of power supply process to be followed by all the Users connected to the State Power Grid in the event of the failure of State Power Grid and/or the Northern Grid (total or partial collapse) causing blackouts.

vi) **Chapter-6: Scheduling & Despatch Code**

This chapter deals with the procedure to be adopted for scheduling and despatch of generation of the Generating Stations including complementary commercial mechanisms, on a daily basis with the

modality of the flow of information interalia between the Generating Stations, State Load Despatch Centres (SLDCs), all Users connected to State Power Grid.

vii) **Chapter-7: Management of UPEGC**

This Chapter specifies the procedure for management of the UPEGC and also its modification/amendment.

## 1.5 Non-compliance

In case of a persistent non-compliance of any of the stipulations of the UPEGC by any user, the matter shall be reported by any user/SLDC to the Member Secretary, SPC. The Member Secretary, SPC, shall verify and take up the matter with the defaulting agency for expeditious termination of the noncompliance. In case of inadequate response to the efforts made by the Member Secretary, SPC, the non-compliance shall be reported to UPERC. UPERC, in turn after due process, may order the defaulting user for compliance, failing which; the UPERC may take appropriate action. SPC shall maintain appropriate records of such violations. In case of a non-compliance of any of the stipulations of the UPEGC by SLDC or SPC, the matter shall be reported to the UPERC.

## 1.6 Free Governor Mode of Operation

(i) All thermal and hydro (except those with zero pondage) generating units shall operate under free governor mode of operation with effect from the date to be separately notified by the Commission.

(ii) Any exemption from the above may be granted only by the Commission for which the concerned agency shall file a petition in advance.

(iii) The Gas turbine/Combined Cycle Power Plants and Nuclear Power Stations shall be exempted from Sections 5.8.3, 5.8.4, 6.6.5, 6.6.6, 6.6.7 and 6.6.8 till the Commission reviews the situation and provides otherwise.

## 1.7 Charge/Payment for Reactive Energy Exchanges

The rate for charge/payment of reactive energy exchanges (according to the scheme specified in section 6.6 shall be 5.0 paise/kVArh for financial year 2006-07, and shall be escalated at 0.25 paise/kVArh per year thereafter, or as revised by CERC from time to time.

## 1.8 Exemptions

Any exemption from the provisions of UPEGC shall be allowed by the Commission only on receipt of a petition from the concerned user giving reasons/ justification for exemption sought therein. The Commission may invite comments from various stakeholders before allowing any such exemption.

## 1.9 Definitions and Interpretations

### (a) Definitions

In the UPEGC, the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the following meaning:

| ITEM | DEFINITION |
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| Act | The Electricity Act, 2003 (36 of 2003). |
| Agency | A term used in various sections of UPEGC to refer to SSGS/Licensee that utilize the STS |
| Authority | Central Electricity Authority referred to in sub-section (1) of Section 70 of the Act. |
| Automatic Voltage Regulator (AVR) | A continuously acting automatic excitation control system to control the voltage of a Generating Unit measured at the generator terminals. |
| Availability | 'Availability' in relation to a thermal generating station for any period shall mean the average of the daily average declared capacities (DCs) for all the days during that period expressed as a percentage of the installed capacity of the generating station minus normative |

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| | auxiliary consumption in MW. Availability in case of generating stations shall be computed in accordance with the formula specified UPERC (Terms and Conditions of Generation Tariff) Regulations, 2004 as amended from time to time.<br>'Availability' in relation to a transmission system for a given period shall mean the time in hours during that period the transmission system is capable to transmit electricity at its rated voltage and shall be expressed as percentage of total hours in the given period and it shall be calculated as per procedure specified in UPERC (Terms and Conditions for Determination of Transmission Tariff) Regulations, 2006 as amended from time to time. |
| Backing down | Reduction of Generation by a Generating Unit on instructions from SLDC under abnormal conditions such as high frequency, low system demand or network constraints. |
| Black Start Procedure | The procedure necessary to recover from a partial or a total blackout. |
| Beneficiary | A person who has a share in an ISGS/SSGS. |
| BIS | The Bureau of Indian Standards. |
| Bulk Power Transmission Agreement (BPTA) | The commercial agreement signed between the transmission licensee and a long-term/short term customer (including Distribution Licensees), for availing transmission services. |
| Captive Generating Plant (CGP) | Captive Generating Plant means a captive power plant as defined in the Electricity Rules, 2005, notified by the Ministry of Power. |
| Capacitor | An electrical gadget provided for generation of reactive power. |
| CEA | The Central Electricity Authority |
| CERC | The Central Electricity Regulatory Commission |

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| | referred to in subsection (1) of Section 76 of the Electricity Act, 2003. |
| Central Transmission Utility (CTU) | Central Transmission Utility means any Government company, which the Central Government may notify under sub-section (1) of Section 38 of the Act. |
| Connection Agreement | An Agreement between the STU and a user setting out the terms relating to a connection to and/or use of the Intra State Transmission System. |
| Connection Point | A point at which any user's plant and/or apparatus connects to the Intra-state Transmission System/Inter-state Transmission System. |
| Demand | The demand of Active Power in MW and Reactive Power in MVAR of electricity, unless provided otherwise. |
| Despatch Schedule | The ex-power plant net MW and MWH output of a generating station, scheduled to be exported/despatched to the Grid from time to time. |
| Disturbance Recorder (DR) | A device provided to record the behaviour of the pre-selected digital and analog values of the system parameters during an Event. |
| Data Acquisition System (DAS) | A device provided to record the sequence of operations in time, of the relays/equipments/system parameters at a location. |
| Drawal Schedule | The, ex-power plant, MW that a beneficiary is scheduled to receive from a SSGS/ISGS, including bilateral exchanges from time to time. |
| Entitlement | Share of a beneficiary (in MW or MVA) in the installed capacity/output capability of an SSGS/ISGS. |
| Event | An unscheduled or unplanned occurrence in the Grid including faults, incidents and |

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| | breakdowns. |
| Event Logger (EL) | A device provided to record the sequence of operation in time, of the relays/equipments at a location during occurrence of an Event. |
| Ex-Power Plant MW/MWH | Net MW/MWH output of a generating station, after deducting auxiliary consumption and transformation losses. |
| Extra High Voltage (EHV) | Where the voltage exceeds 33,000 volts under normal conditions, subject, however, to the percentage variation allowed by the Authority. |
| Fault Locator (FL) | A device provided at the end of a transmission line to measure/indicate the distance at which a line fault may have occurred. |
| Flexible Alternating Current Transmission (FACT) | A.C Transmission Systems/Lines utilizing static devices for regulating and controlling power flows/line loading, loop flows and also for providing reactive compensation for voltage management. |
| Forced Outage | An outage of a Generating Unit or a transmission facility due to a fault or other reasons that has not been planned. |
| Generating Company | Generating Company means any company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person, which owns or operates or maintains a generating station. |
| Generating Unit | An electrical Generating Unit coupled to a turbine within a Power Station together with all Plant and Apparatus at that Power Station (up to the Connection Point) which relates exclusively to the operation of that turbo-generator. |
| Good Utility Practices | Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period which could have been expected to accomplish the desired |

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| | results at a reasonable cost consistent with good business practices, reliably, safely and with expedition. |
| Governor Droop | In relation to the operation of the governor of a Generating Unit, the percentage drop in system frequency which would cause the Generating Unit under free governor action to change its output from zero to full load. |
| Grid Code | Grid Code means the Uttar Pradesh Electricity Grid Code, 2007 notified by the Commission under section 86(1)(h) of Electricity Act' 2003. |
| Grid Standards | Grid Standards specified by the Authority under clause (d) of the Section 73 of the Act. |
| IEC | The International Electro Technical Commission. |
| Independent Power Producers (IPP) | A generating company not owned/controlled by the Central/State Government. |
| Indian Electricity Grid Code (IEGC) | A document describing the philosophy and the responsibilities for planning and operation of Indian power system specified by CERC in accordance with sub section 1(h) of Section 79 of the Act. |
| Inter State Generating Station (ISGS) | A Central/other generating station in which two or more states have shares and whose scheduling is to be coordinated by the RLDC. |
| Inter State Transmission System (ISTS) | Inter-State Transmission System includes:<br>i) any system for the conveyance of electricity by means of a main transmission line from the territory of one State to another State<br>ii) The conveyance of energy across the territory of an intervening State as well as conveyance within the State which is incidental to such Inter-State transmission of energy<br>iii) The transmission of electricity |

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| | within the territory of State on a system built, owned, operated, maintained or controlled by CTU. |
| Intra State Transmission System | Intra-State Transmission System shall include the entire Transmission network within the State excluding the Inter-State Transmission System. Intra-State Transmission System for the purposes of this Grid Code has been abbreviated as STS. |
| Licensee | Licensee means a person who has been granted a licence under Section 14 of the Electricity Act, 2003. |
| Load | The MW/MWH consumed by a utility/ installation. |
| Long-term open access customer | A long-term open access customer as defined under UPERC (Terms and Condition for Open Access) Regulations as amended from time to time. |
| Maximum Continuous Rating (MCR) | The normal rated full load MW output capacity of a Generating Unit which can be sustained on a continuous basis under specified conditions. |
| National Grid | The entire inter-connected electric power network of the country, which would evolve after inter-connection of Regional grids. |
| Non-Conventional Energy Sources (NCES) | NCES shall mean generating plants based on non-conventional energy sources e.g. solar, wind, bagasse, bio-mass, bio-gas, industrial waste, municipal waste and small hydro generating Stations. |
| Net Drawal Schedule | The drawal schedule of a beneficiary after deducting the apportioned transmission losses (estimated). |
| Operation | A scheduled or planned action relating to the operation of a System. |
| Operating range | The operating range of frequency and voltage as specified under the operating code |

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| Person | Person shall include any company or body corporate or association of body of individuals, whether incorporated or not, or artificial juridical person. |
| Pool Account | Regional/State account for<br>(i) payments regarding unscheduled - interchanges (UI Account) or<br>(ii) reactive energy exchanges (Reactive Energy Account), as the case may be |
| Power System | Power System means all aspects of generation, transmission, distribution and supply of electricity and includes one or more of the following, namely:<br>a) generating stations;<br>b) transmission or main transmission lines;<br>c) sub-stations;<br>d) tie-lines;<br>e) load despatch activities;<br>f) mains or distribution mains;<br>g) electric supply lines;<br>h) overhead lines;<br>i) service lines;<br>j) works. |
| Reactor | An electrical plant specifically designed to absorb Reactive Power. |
| Regional Power Committee (RPC) | "Regional Power Committee" means a Committee established by resolution by the Central Government for a specific region for facilitating the integrated operation of the power systems in that region. |
| Regional/State Energy Account | A Regional/State energy account, for the billing and settlement of 'Capacity Charge', 'Energy Charge', 'UI Charge' and 'Reactive Charge'. |
| Regional Grid | The entire synchronously connected electric power network of the concerned Region, |

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| | comprising of STS, ISGS and Intra-State systems. |
| Regional Load Despatch Centre (RLDC) | 'Regional Load Despatch Centre' means the Centre established under sub-section (1) of Section 27 of the Act. |
| Share | Percentage share of a beneficiary in an SSGS/ISGS notified by Government of India/ Government of U.P. or as agreed to in the agreement between SSGS/ISGS and its beneficiaries. |
| Short Term Open Access Customer | A short-term open access customer as defined under UPERC (Terms and Condition for Open Access) Regulations as amended from time to time. |
| Single Line Diagram (SLD) | Diagrams which are a schematic representation of the HV/EHV apparatus and the connections to all external circuits at a Connection Point incorporating its numbering nomenclature and labeling. |
| Site Common Drawing | Drawings prepared for each Connection Point, which incorporates layout drawings, electrical layout drawings, common protection/control drawings and common service drawings. |
| Spinning Reserve Generating Stations | Part loaded generating capacity with some reserve margin that is synchronized to the system and is ready to provide increased generation at short notice pursuant to despatch instruction or instantaneously in response to a frequency drop. |
| State Load Despatch Centre (SLDC) | 'State Load Despatch Centre' means a Centre established by the State Government under subsection (1) of Section 31 of the Act. |
| State Transmission Utility (STU) | 'State Transmission Utility' means the Government Company specified as such by the State Government under sub-section (1) of Section 39 of the Act. |
| State Sector Generating | SSGS shall mean Generating Stations |

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| Stations (SSGS) | connected with the State Transmission System including IPP, Captive Generating Plant, Co-Gen and NCES |
| State Power Committee (SPC) | A Committee constituted under the provisions of section 2.14, of this Grid Code |
| State Power Grid | The high voltage backbone system of interconnected transmission lines, sub-stations and generating plants within the State. |
| State Power System | State Power System includes the entire distribution system within the State in addition to high voltage backbone system covered in the State Power Grid. |
| Static VAR Compensator (SVC) | An electrical facility designed for the purpose of generating or absorbing Reactive Power. |
| Time Block | Block of 15 minutes each for which special energy Meters record specified electrical parameters and quantities with first time block starting from 00.00 Hrs. |
| Transmission License | A Licence granted under Section 14 of the Act to transmit electricity. |
| Transmission Planning Criteria | The policy, standards and guidelines issued by the CEA for the planning and design of the Transmission system. |
| UPERC | Uttar Pradesh Electricity Regulatory Commission |
| User | A term used in various sections of the UPEGC to refer to the persons/agencies using the STS, as more particularly identified in each section of UPEGC. |

Words and expressions used and not defined in this Code but defined in the Act shall have the meanings assigned to them in the said Act. Expressions used herein but not specifically defined in this Code or in the said Act but defined under any law passed by a competent legislature and applicable to the electricity industry in the state shall have the meaning assigned to them in such law. Subject to the above, expressions used herein but not specifically

defined in this Code or in the Acts or any law passed by a competent legislature shall have the meaning as is generally assigned in the electricity industry.

**(b) Interpretation**

In the interpretation of this Code, unless the context otherwise requires:

a) words in the singular or plural term, as the case may be, shall also be deemed to include the plural or the singular term, respectively;

b) the headings are inserted for convenience and may not be taken into account for the purpose of interpretation of this Grid Code;

c) references to the statutes, regulations or guidelines shall be construed as including all statutory provisions consolidating, amending or replacing such statutes, regulations or guidelines, as the case may be.

d) in case of dispute in interpretation between English and Hindi version of this Grid Code, English version shall prevail.

# CHAPTER-2
# ROLE OF VARIOUS ORGANIZATIONS & THEIR LINKAGES

## 2.1 Introduction

2.1.1 In the light of the provisions of the Electricity Act, 2003, it has become necessary to specify the role of the State Load Despatch Centre (SLDC), State Transmission Utility (STU), Regional Load Despatch Centre (RLDC), Regional Power Committees (RPC), the Central Electricity Authority (CEA), the State Co-ordination Forum, the Central Transmission Utility (CTU) etc. and their organizational linkages so as to facilitate development and smooth operation of State Power Grid and the Regional Grid. This chapter defines the functions of the various organizations connected with the functioning and operations of the State Power Grid, as envisaged in the Electricity Act, 2003 and rules and regulations made thereunder.

## 2.2 Regional Load Despatch Centre

2.2.1 The RLDC is the apex body to ensure integrated operation of the power system within the concerned regional Grid. In respect of Wheeling, optimum scheduling and despatch of electricity through Inter State Transmission Lines, the RLDC shall comply with the principles, guidelines and methodology as specified by the CERC in the Indian Electricity Grid Code or otherwise. The RLDC may give such directions and exercise such supervision and control as may be required for ensuring integrated Grid operations and for achieving the economy and efficiency in the operation of the power system in the region under its control. All licensees, generating companies, and any other person connected with and or utilizing the ISTS shall comply with the directions issued by the RLDC.

## 2.3 Regional Power Committee (RPC)

2.3.1 RPCs have been constituted by resolution dated 25.5.2005 of Central Government for all the five regions for facilitating the integrated operation of the power system in each region. Regional power

committee, established by the Government of India for the region may, from time to time, issue guidelines on matters concerning the stability and smooth operation of the grid and economy and efficiency in the operation of the power system in that region. Such directions shall be binding on all the entities covered by this code to the extent they are applicable to the State Power Grid and applies to them.

2.3.2 RPC would perform the following functions to facilitate the stability and smooth operation of the integrated grid:

a.) To undertake Regional Level operation analysis for improving grid performance.

b.) To facilitate Inter-State/inter-regional transfer of power.

c.) To facilitate all functions of planning relating to Inter-State/Intra-State transmission system with CTU/STU.

d.) To coordinate planning of maintenance of generating machines of various generating companies of the region including those of interstate generating companies supplying electricity to the Region on annual basis and also to undertake review of maintenance programmed on monthly basis.

e.) To undertake planning of outage of transmission system on monthly basis.

f.) To undertake operational planning studies including protection studies for stable operation of the grid.

g.) To undertake planning for maintaining proper voltages through review of reactive compensation requirement through system study committee and monitoring of installed capacitors.

h.) To evolve consensus on all issues relating to economy and efficiency in the operation of power system in the region.

## 2.4 Central Transmission Utility

2.4.1 Power Grid Corporation of India Limited (PGCIL) is the central transmission utility as notified by the Government of India. CTU is responsible for the entire inter State transmission and in that context, the relevance of this Code shall be limited to the connectivity between the intra State Transmission System and inter State Transmission System.

## 2.5 Central Electricity Authority

2.5.1 The Central Electricity Authority, established under section 3 of the Electricity (Supply) Act, 1948, continues to operate as the Central Electricity Authority under the provisions of section 70(2) of the EA 2003.

2.5.2 Under Section 3 (4) of the Act, CEA would prepare and notify once in five years a National Electricity Plan in accordance with the National Electricity Policy notified by the Central Government.

2.5.3 Central Electricity Authority in accordance with the provisions of section 177 of the Act may make regulations, which may provide for the following matters.

a.) Grid Standards as stipulated in section 34 of the Act.

b.) Measures relating to safety of Electricity Supply as stipulated in section 53 of the Act.

c.) Installation and operation of meters as stipulated in section 55 of the Act.

d.) Technical standards for the constructions of electrical plants, Electric lines and connectivity to the Grid and all other matters as stipulated in section 73 of the Act.

e.) The form and manner in which and the time at which the State Government and licensees shall furnish statistics, returns or other information under section 74 of the Act.

f.) Any other matter as may be specified under the Act.

2.5.4 Irrespective of whether the provisions under the regulations stated above have been explicitly provided for or not in this Grid code they shall apply to all the entities covered by this code to the extent it applies to them.

## 2.6 State Load Despatch Centre (SLDC)

2.6.1 The State Government shall establish a centre to be known as the State Load Despatch Centre for the purpose of exercising the powers and discharging the function under sub section (1) of section 32 of the

Act. This State Load Despatch Centre shall be operated by a Government company, or any authority or Corporation established by the State Government, until such company or authority or corporation is notified by the State Government, the State Transmission Utility shall operate the State Load Despatch Centre. SLDC shall be the apex body to ensure integrated operation of the power system in the State. SLDC shall be responsible for:

a. Optimum scheduling and despatch of electricity within the State, in accordance with the contracts entered into with the licensees or the generating companies operating in the State.
b. Monitoring of Grid Operations.
c. Keeping accounts of electricity transmitted through the State Power Grid.
d. Supervision and control over the intra State transmission system.
e. Carrying out real time operations for the Grid control and despatch of electricity within the State through secure and economic operation of the State Power Grid in accordance with the Grid Standards and the Grid Code.

2.6.2 In addition to above functions under the Act SLDC shall also discharge the following function as per the provisions of this Grid Code:

a. System operation and control covering contingency analysis and operational planning on real time basis;
b. Re-scheduling of despatch and drawal schedules as per system conditions and request of Generating Stations and Distribution Licensees;
c. System restoration following grid disturbances;
d. Specifying metering points and data collection;
e. Compiling and furnishing data pertaining to system operation;
f. Operation of State UI pool account and State reactive energy account.
g. In case of open access in Intra-state Transmission, the SLDC shall be the nodal agency for the short-term open access. The procedure and modalities in regard to short-term Open Access

shall be as per the UPERC (Terms and Conditions for Open Access) Regulations, 2004 as amended from time to time.

2.6.3 SLDC may give such direction and exercise such supervision and control as may be required for ensuring the integrated grid operation and for achieving the maximum economy and efficiency in the operation of the State Power System. All Users shall comply with the directions issued by the SLDC.

2.6.4 The SLDC shall ensure compliance of the directions of the Regional Load Despatch Centre by issuing suitable directions to the Users.

2.6.5 If any dispute arises with reference to the quality of electricity or, safe, secure and integrated operation of the State Power Grid or in relation to any direction given by the SLDC, it shall be referred to the Commission for decision. Pending the decision of the Commission, the Licensee or Generating Company shall comply with the directions of the SLDC.

**2.6.6** If any licensee, generating company or any other person fails to comply with the directions issued by SLDC, he shall be liable to a penalty, as per the provisions of the Act.

## 2.7 State Transmission Utility (STU)

2.7.1 "State Transmission Utility" means the Government Company notified by the State Government under sub-section (1) of section 39 of the Electricity Act, 2003. UPPCL, which was declared as STU, vide U.P. Government Gazette No.151/P-1/2000-24 dated January 14, 2000, under sub-section (1) of Section 27-B of the Indian Electricity Act 1910 (act No. 9 of 1910), continues to be the State Transmission Utility by virtue of section 172(b) of the Act. STU is also a deemed transmission licensee under section 14 of the Electricity Act, 2003.

2.7.2 As per the ACT, STU shall be responsible for -

(a) Transmission of electricity through intra State Transmission system; and

(b) Discharging all functions of planning and coordination relating to Intra-State Transmission system with

i. Central Transmission utility,
ii. State Government,
iii. Generating Companies,
iv. Regional Power Committee,
v. Central Electricity Authority,
vi. All licensees,
vii. Any other person notified by the State Government in this behalf.

(c) Ensuring development of an efficient, coordinated and economical system of intra State Transmission Lines for smooth flow of electricity from a generating station to the load centres.

(d) Providing non-discriminatory open access to its transmission system for use by:

i. Any licensee or generating company on payment of the transmission charges or,
ii. Any customer, as and when open access is provided by the Commission under subsection (2) of section 42 of the Act, on payment of the transmission charges and a surcharges thereon as may be specified by the Commission.

2.7.3 STU, in discharge of its functions under the Act and this Code, shall take into consideration recommendations, if any, of the State Co-ordination Forum.

2.7.4 STU shall act as nodal agency for all long-term open access customers.

## 2.8 Transmission Licensee

2.8.1 Every Transmission licensee shall comply with technical standards of construction of Electrical plants, Electric lines and connectivity with the grid and safety requirements as specified by the CEA, and follow the principles and procedures as specified in this code and/or Indian Electricity Grid Code as applicable to the intra State Transmission system.

2.8.2 It shall be the duty of the Transmission licensee to:

a.) build, maintain and operate an efficient, co-ordinated and economical intra State transmission system and comply with the direction of RLDC and SLDC as the case may be.

b.) provide non-discriminatory open access to its transmission system for use by any licensee or generating company or any other consumer on payment of charges as determined by the Commission.

## 2.9 Generating Company

2.9.1 Any generating company may establish, operate and maintain a generating station without obtaining a licence under the Act if it complies with the technical standards relating to connectivity with the grid referred to in clause (b) of section 73 of the Act.

2.9.2 As per the provisions of Section 10 of the Act, the duties of a generating company shall be:

i. to establish, operate and maintain generating stations, tie-lines, sub-stations and dedicated transmission lines connected therewith in accordance with the provisions of the Act or the rules or regulations made thereunder;

ii. to supply electricity to any licensee in accordance with the Act and the rules and regulations made thereunder and may,

subject to the regulations made under sub-section (2) of section 42, supply electricity to any consumer;

iii. to submit technical details regarding its generating stations to the Appropriate Commission and the Authority;

iv. to co-ordinate with the Central Transmission Utility or the State Transmission Utility, as the case may be, for transmission of the electricity generated by it.

## 2.10 Distribution Licensee

2.10.1 Any person granted licence under section 14 of Act for distribution of Electricity in a particular area should develop and maintain an efficient, co-ordinated and economical distribution system for supplying electricity to the consumers in his area of supply in accordance with the provisions the Act.

2.10.2 It shall also be the duty of the distribution licensee:

a.) to provide open access to the consumers in its area of supply in such phases as may be specified by the Commission on payment of wheeling charge, surcharge and additional surcharge as may be determined by the Commission.

b.) to give supply of electricity, on an application by the owner or occupier of any premises, within a period of one month after receipt of the application requiring such supply:

Provided that where such supply requires extension of distribution mains, or commissioning of new sub-stations, the distribution licensee shall supply the electricity to such premises immediately after such extension or commissioning or within such period as may be specified by the Commission.

## 2.11 State Co-ordination Forum

2.11.1 As per section 166 (4) of the Act, Government of Uttar Pradesh has constituted a State Co-ordination Forum for smooth and coordinated development of the power system in the State. State Co-ordination Forum may give its recommendations on matters related to overall planning and development of the State Power System.

## 2.12 U.P. Electricity Regulatory Commission

2.12.1 The functions of UPERC relevant to UPEGC are:

a. To determine the rate, charges and terms for the use of the transmission facilities of licensees.
b. To specify the fees and charges payable to SLDC.
c. To resolve any dispute that has arisen with reference to the quality of electricity or, safe, secure and integrated operation of the State Power Grid or in relation to any direction given by the SLDC.
d. To issue transmission/distribution licenses.
e. To issue amendments to the UPEGC as and when required.

## 2.13 Government of Uttar Pradesh

2.13.1 The Government may issue directions to SLDC; to take measures as may be necessary for maintaining smooth and stable transmission and supply of electricity in the State. SLDC shall abide by such direction if they are not inconsistent with the provisions of the Act and this code.

## 2.14 State Power Committee (SPC)

2.14.1 Head of SLDC shall be the Chairman of the State Power Committee and it shall comprise of the following other members:

(a) One member from State Transmission Utility;
(b) One representative representing State-owned Generating Station;
(c) One representative representing all Co-generation Plants, NCE Plants, Captive Generating Plants & IPPs having installed

capacity of less than 300MW as may be nominated by the Commission;

(d) One representative from each IPP having installed capacity of more than 300MW;

(e) One member from each Transmission Licensee in the State, other than the State Transmission Utility;

(f) One member from each Distribution Licensee in the State;

(g) One member from each Electricity Trader in the State;

(h) Member Secretary, senior officer from State Load Dispatch Centre as may be nominated by the Chairman, State Power Committee - Convener

(i) Such other persons as may be nominated by the Commission.

2.14.2 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 the SLDC.

2.14.3 The Headquarters of the Committee will be located at Lucknow.

**2.14.4 Operationalization of the Committee**

i) The Chairman, State Power Committee, shall invite nominations from various organizations/ Commission and shall ensure that the nominations referred to in clauses (b) to (i) of Regulation 2.14.1 are received within thirty (30) days of notification of these Regulations and that the Committee becomes functional within sixty (60) days from the date of notification of these Regulations.

ii) The Committee will frame its own rules of business for the conduct of its meeting and other related matters.

iii) 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.

iv) Members nominated by each of the organisation shall be persons holding senior position in their respective organization.

2.14.5 The Committee shall discharge following functions:

i) To undertake State Level operation analysis for improving grid performance.
ii) To facilitate intra-State transfer of power.
iii) To facilitate all functions of planning relating to intra-state transmission system with STU and review of progress of crucial transmission projects.
iv) To coordinate 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.
v) To undertake planning of outage of transmission system on monthly basis.
vi) To undertake operational planning studies including protection studies for stable operation of the grid.
vii) To undertake planning for maintaining proper voltages through review of reactive power compensation requirement and monitoring of installed capacitors.
viii) To evolve consensus on all issues relating to economy and efficiency in the operation of power system in the state.

2.14.6 The Committee may constitute its Sub-committees, Task Forces, Ad hoc Committees and Standing Committees, as envisaged under the Grid Code or otherwise considered necessary for efficient functioning. 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.

2.14.7 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 State Regulatory Commission, if any.

2.14.8 The Committee shall meet at least once in a quarter and at such other time as may be considered necessary.

2.14.9 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. The Member Secretary, SPC shall investigate and endeavour to resolve the grievance as an arbitrator appointed by the Commission. The Member Secretary, SPC shall forward a copy of its final order to the Commission for issuance of a formal order by the Commission. In case the Member Secretary, SPC is unable to resolve the matter, it shall be reported to the Commission for a decision.

2.14.10 Member Secretary, SPC shall, for the purpose of payment of transmission charges/ capacity charges and incentives, certify:

i) Availability of Intra-State AC and HVDC transmission system
ii) Availability and Plant Load Factor for SSGS (Thermal)
iii) Capacity Index for SSGS (Hydro)

**NOTE:**

The role & functions of different Users/Organizations as described above shall be read with the provisions of the Act and different regulations of the Central and the State Electricity Regulatory Commission notified under the Act.

# CHAPTER- 3
# PLANNING FOR INTRA STATE TRANSMISSION

This chapter comprises various aspects of planning and development relating to State Power System including Intra State Transmission Systems.

## 3.1 Introduction

3.1.1 In accordance with Section 39(2)(b) of Electricity Act, 2003, the State Transmission Utility (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.

3.1.2 In accordance with Section 3 (4) of Electricity Act, 2003, CEA shall prepare a National Electricity Plan in accordance with the National Electricity Policy and notify such plan once in five (5) years. As per Section 3 (5) of Electricity Act, 2003, CEA may review or revise the National Electricity Plan in accordance with the National Electricity Policy. The Generating Companies and the licensees shall consider the National Electricity Plan prepared by CEA in developing their system.

3.1.3 Requirement for reinforcement / extension / new transmission line may arise for a number of reasons including, but not limited to:

a. Development on the system of any user already connected to the State Transmission System.
b. Introduction of a new Connection point between a user's system and the State Transmission System.
c. Need to increase system capacity, to remove operational constraints and to maintain standards of security to accommodate a general increase in the demand.
d. For evacuation of power from generating stations within and out side the State.

e. Reactive power compensation.
f. In order to accommodate electricity trading and Open Access requirements
g. Transient and steady state stability considerations;
h. The cumulative effects of combination of any of a. to g. above.

3.1.4 Accordingly, the reinforcement or extension of the State Transmission System may involve work at the interconnection points of a generator or entry point of other licensees to the State Transmission system.

3.1.5 The development of the State Transmission System must therefore 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 System Planning Code therefore imposes timelines for the exchange of information between SLDC, STU and Users connected to and/or utilizing the State Power Grid, subject to all parties having regard, where appropriate, to the confidentiality of such information.

## 3.2 Objective

3.2.1 The standards and procedures within the System Planning Code are intended to enable STU, SLDC and other users 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. The objective of System Planning Code therefore is:

a) To specify the principles, procedures and criteria to be applied in the planning and development of the STS.
b) To promote co-ordination amongst all users in any proposed development of the STS.
c) To provide methodology and information exchange requirement amongst SLDC, STU and Users in the planning and development of the STS.

## 3.3 Scope

This Planning Code shall apply to SLDC, STU, other licensees, State Sector Generating Stations (SSGS), connected to and/or using and/or involved in developing the STS.

## 3.4 Planning Policy

3.4.1 The STU shall prepare and submit to the Commission a long-term Transmission System Plan (time span 5 years) for the expansion of State Power Grid to meet the future demand within three months from the date of notification of this grid code. In preparing the above plan STU should take into consideration the following:

- Perspective plan for development of the electricity system as prepared by CEA under section 73 (1) of the EA-2003.
- Electric Power Survey of India published by CEA
- Transmission Planning Criteria and guidelines issued by CEA.
- National Electricity Policy issued by the Government of India to the extent applicable to the development of Intra-State Transmission System.

3.4.2 The STU shall submit to the Commission an updated long-term Transmission System Plan by 28$^{th}$ February every year taking care of the revisions in the electricity load projection and additions in the generation capacity.

3.4.3 The primary responsibility of load forecasting of a particular supply area shall be that of respective Distribution Licensee. Distribution Licensee shall forecast the peak load and energy requirement of their areas for each category of loads for the succeeding 5 years and submit the same annually by 31st December to STU along with forecast methodology, assumptions and daily load curve on which the forecasts are based. These forecasts shall be reviewed annually or whenever major changes are made in the existing system and updated accordingly. While indicating requirements of single consumer with large demand (one MW or higher) the Distribution licensee shall satisfy

itself, as to the degree of certainty of the demand materializing. STU shall apply appropriate diversity factor, and satisfy itself regarding probability of materialization of bulk loads of consumers with demands above 1MW in consultation with concerned Distribution Licensee. Distribution licensees shall also submit the data regarding voltage wise distribution losses to the STU.

3.4.4 STU in consultation with SLDC and the concerned Distribution Licensee, may review the methodology and assumptions, used in making the load forecast and shall further re-work:

(a) Projected loads and losses of the system, the net energy requirement and peak load requirement at generation end. The installed capacity, peak availability, surplus and deficit both in generation and demand shall also be worked out by STU.

(b) Additional generating capacity required after taking into account, the existing capacity, projects under construction, proposed projects, availability from captive power plants, co-generators NCES, bilateral trades and also share of the State from Central sector Power Projects both within and outside the State. STU shall also examine the economic, technical and environmental aspects of all the available alternatives.

3.4.5 Besides addition to the Intra-State transmission system, the STU shall plan, from time to time, system-strengthening schemes, need of which may arise to overcome the constraints in power transfer and to improve the overall performance of the grid. The Intra-State transmission proposals including system strengthening scheme identified on the basis of the planning studies would be finalised by STU based on inputs received from various stakeholders i.e. Generating companies and Distribution licensees, SLDC and any committee created for the transmission planning purposes by the Commission.

3.4.6 The Nodal Agency for providing long term Open Access in all cases shall be the STU, whether its system is used or not and for that

purpose, a distribution licensee and/or a transmission licensee, whose system gets associated with such long term open access, shall be responsible to co-ordinate with STU and provide all relevant information required for finalizing a decision on providing open access.

Similarly, the Nodal Agency for providing short-term open access shall be the State Load Despatch Centre and in such cases, Users shall be responsible for co-ordination with SLDC. Users shall provide all relevant information to SLDC in taking a decision regarding providing short term open access.

3.4.7 In case long-term open access cannot be allowed due to system constraints, the prospective open access customer may request STU to carry out system studies to identify system strengthening requirements and cost estimates. In case of Long Term Open Access applications requiring any strengthening in the Inter-State transmission system to absorb/evacuate power beyond STS, the applicant shall also co-ordinate with CTU.

3.4.8 All the users shall supply the desired planning data to STU by 31st December every year to enable STU to review and revise the Long Term Transmission System Plan.

3.4.9 The Long Term Transmission System Plan prepared by STU shall contain a chapter on additional transmission requirement, which may include not only Intra State Transmission Lines, but also additional equipment requirement such as Transformers, Capacitors, and Reactors etc.

3.4.10 The Long Term Transmission System Plan shall also indicate the action taken to fulfill the additional requirement and actual progress made on new schemes. The planning report and power map shall be made available to any party interested in making investments decision/connection decisions to the STS.

3.4.11 As voltage management plays an important role in intra-state transmission of energy, special attention shall be accorded to planning

of capacitors, reactors, SVC and Flexible Alternating Current Transmission Systems (FACTS), etc.

3.4.12 Based on Plan prepared by the STU, other Transmission Licensees/Distribution licensees shall plan their systems to further evacuate power from the STS.

3.4.13 The Inter-State Transmission System and associated Intra-State transmission system are complementary and inter-dependent therefore planning of one affects the planning and performance of the other. The STU shall accordingly plan the development of associated Intra-State transmission system in line with the development of Inter-State Transmission System.

3.4.14 STU should maintain a historical database based on operational data supplied by SLDC and use advance software tools for demand forecasting.

3.4.15 STU's planning department shall use load flow, short circuit, transient stability study, relay coordination study and other techniques for Transmission System Planning.

3.4.16 STU's planning department shall simulate the contingency and system constraint conditions for the State Transmission System and incorporate the results in the Long Term Transmission System Plan.

3.4.17 STU shall extend full support to CTU in the regional transmission system planning. The STU shall help the CTU in identification of Inter-State Transmission projects including inter-regional schemes, which shall fit in with the long-term plan developed by CEA.

3.4.18 STU shall furnish the requisite planning data to CTU as required by it from time to time.

## 3.5 Planning Criterion

3.5.1 The planning criteria are based on the security philosophy on which the STS has been planned. The security philosophy may be as per the Transmission Planning Criteria and other guidelines as given by CEA. The general criteria shall be as detailed below:

a.) As a general rule, the State Transmission System shall be capable of withstanding and be secured against the following contingency outages without necessitating load shedding or rescheduling of generation during Steady State Operation:

- Outage of a 132 kV D/C line or,
- Outage of a 220 kV D/C line or,
- Outage of a 400 kV S/C line or,
- Outage of single Interconnecting Transformer.
- Outage of 765 kV S/C Line

b.) The above contingencies shall be considered assuming a pre contingency system depletion (Planned outage) of another 220 kV D/C line or 400 kV S/C line in another corridor and not emanating from the same substation. All the Generating Units may operate within their reactive capability curves and the network voltage profile shall also be maintained within voltage limits specified.

3.5.2 The State Transmission System shall be capable of withstanding the loss of most severe single system in feed without loss of stability.

3.5.3 Any one of these events defined above shall not cause:

i) Loss of supply
ii) Prolonged operation of the system frequency below and above specified limits.
iii) Unacceptable high or low voltage
iv) System instability
v) Unacceptable overloading of STS elements.

3.5.4 The Transmission System should therefore have sufficient additional capacities and redundancies to cater to above needs.

3.5.5 STU shall carry out planning studies for Reactive Power compensation of STS including reactive power compensation requirement at the SSGS's Switchyard.

## 3.6 Planning Data

3.6.1 To enable the STU to discharge its responsibilities to conduct system studies and prepare long term transmission system plan, Users shall furnish the necessary data related to the electricity demand, transmission capacity and generation availability to the STU. All users shall provide the required planning data/information in the formats as may be devised by STU. However, the STU, for its own convenience, may adopt the formats as already specified in the earlier UPEGC, 2000

3.6.2 The one time data shall be submitted by all the Users to STU within 6 months from the date of notification of this Grid Code. Users shall thereafter submit yearly data to STU latest by 31$^{st}$ December for the ensuing year.

3.6.3 STU shall supply the data as may be required by the Users for the co-ordinated planning, design and operation of their plants and systems with the transmission system.

## 3.7 Implementation of Transmission Plan

3.7.1 The actual program of implementation of transmission lines, Inter-connecting Transformers, reactors/capacitors and other transmission elements will be determined by STU in consultation with the concerned User. The completion of these works, in the required time frame, shall be ensured by STU.

# CHAPTER-4
# CONNECTION CONDITIONS

## 4.1 Introduction

The Connectivity Conditions Code specify the minimum technical and design criteria that shall be complied with by STU/Transmission Licensee and all Users connected to or seeking connection to the State Transmission System. This chapter also sets out the procedures by which STU shall ensure compliance by all Users with the above criteria as a pre-requisite for the establishment of an agreed connection.

## 4.2 Objective

The Connection Conditions are designed to ensure that:

a) The basic rules for connections are complied with and all Users are treated in a non-discriminatory manner.

b) Any new or modified connections, when established, shall neither impose any adverse effect on existing Users nor shall new connection suffer adversely due to existing Users.

c) The ownership and responsibility for all the equipments are clearly specified in a schedule (Site Responsibility Schedule) for every site, where a connection is made.

## 4.3 Scope

This Connectivity Conditions Code shall apply to SLDC and all Users connected to and/or involved in developing the State Power Grid and includes Generating Companies/Transmission Licensee/Distribution Licensee which are engaged in or are intending to engage in generation/transmission/distribution of power through the State Power System.

## 4.4 Procedure for connection

4.4.1 Prior to a being connected to the STS, User shall ensure that all the necessary conditions outlined in the UPEGC in addition to mutually

agreed requirements, have been complied by it. Any User seeking to establish new or modified arrangements of connection to or use of assets of the Intra-State transmission system shall submit an application on standard format alongwith the following details:

(i) Report stating the purpose of the proposed connection and/or modification, transmission licensee in whose network the connection is proposed, Connection site, description of apparatus to be connected or modification to the apparatus already connected and beneficiaries of the proposed connection.

(ii) Undertaking that the prospective installation shall comply with the provisions of this Grid Code, IE Rules 1956 made under section-37 of the Indian Electricity Act 1910 which are in force for the time being and there after with regulations specified by CEA under section-53 of the Act, and various standards such as Grid Standards and Technical Standards for Construction of Electrical Plants and Electrical Lines and Connectivity to the Grid specified by the CEA.

(iii) Construction Schedule and target completion date.

(iv) For special loads like arc furnaces, rolling mills etc., Real and Reactive Power values of the Load with time and harmonic level.

4.4.2 On receipt of an application for new connection/ modification of existing connection, complete in all respect, STU/Transmission Licensee shall make a formal offer to the User within 30 days from the date of receipt of all details. The formal offer by the STU / Transmission Licensee shall contain all the above information along with any such information as may be necessary. In the event of User requesting for any specific information / study / data from STU / Transmission Licensee for the purposes of Grid Connectivity, the STU / Transmission Licensee shall make the same available to the User. The offer made shall be subject to obtaining the required consents, approvals, and permissions for right of way or any other requirements as per the provisions of this Grid Code, Electricity Act 2003 and rules and regulations made thereunder.

4.4.3 A User whose development/connection requires the STU/Transmission Licensee to obtain any consents, approvals, permissions, and right of ways or compliance with any other requirements mentioned in this Grid Code shall:

- Provide necessary assistance, supporting information or evidence; and
- Ensure attendance by such witnesses as the STU/Transmission Licensee may reasonably request.

4.4.4 The offer shall specify, and take in to account, any works required for the extension or reinforcement of existing Transmission System and/or Supply System as necessitated by the applicant's proposal.

4.4.5 The estimated time schedule for completion of works should also be specified in the offer, taking into account the time required to obtain statutory clearances etc., wherever necessary. In respect of offers for modifications to the existing Connections, the offers shall also take into account the terms of the existing Connection Agreement, if any.

4.4.6 If the nature of complexity of the proposed development is such that the prescribed time limit for making the offer is not considered adequate, the STU/Transmission Licensee shall make a preliminary offer within the prescribed time limit indicating the extent of further time required for more detailed analysis of the issues.

a.) On receipt of the preliminary offer, the User shall indicate whether Licensee should proceed further to make a final offer within the extended time limit.

b.) STU/Transmission Licensee may require the User to furnish some or all of the Planning Data at this stage i.e. in advance of the normal time limit.

4.4.7 All offers (other than the preliminary offers) including revised offers shall remain valid for 120 (one hundred and twenty) days from the date of issue of the offer. The Transmission Licensee shall make a revised offer, upon request by a User, if necessitated by changes in data furnished earlier by the User.

4.4.8 STU/Transmission Licensee shall forward a copy of the connection agreement entered into with the User to the STU, SLDC and the Commission.

4.4.9 In the event of an offer becoming invalid or rejected by an applicant, STU/Transmission Licensee shall not be required to consider any further application from the same User within twelve months from the date of the offer letter unless the new application is substantially different from the original application with regard to system changes.

4.4.10 The User shall furnish the relevant Planning Data to the STU/ Transmission Licensee within thirty days of acceptances of an offer or such longer period as the STU/Transmission Licensee may agree in a particular case.

4.4.11 STU/Transmission Licensee may reject an application for connection to /or use of Transmission System on the following conditions.

a) If such proposed connection is likely to cause breach of any of the provisions of Transmission Licence/Grid Code/ IEGC/Grid Standards and Technical Standards setout by CEA/Electricity Act, 2003, UP Electricity Reforms Act, 1999 to the extent not inconsistent with Electricity Act, 2003, or any provision of planning criteria/ any covenants/deeds/regulations by which the STU/Transmission licensee is bound, or

b) If the applicant fails to give the undertakings as per clause 5.4.1 above.

4.4.12 In the event of any dispute with regard to rejection of application by the STU/Transmission Licensee, the User/Transmission Licensee may approach the Commission.

## 4.5 Connection Agreements

4.5.1 All Users connected to or seeking connection to the STS shall enter into a connection agreement with the STU/Transmission Licensee. However, in respect of existing connections a relaxation of one year is allowed so that present arrangement may continue in the interim. The process of re-negotiation of the connection conditions shall be completed within this period of one year. In case it is determined that the compliance of connection conditions would be delayed further, the Commission may consider further relaxation for which a petition will have to be filed by the concerned User along with STU's recommendation/comments. The cost of modification, if any, shall be borne by the concerned user.

4.5.2 A connection Agreement shall include (but not limited to), as appropriate within its terms and conditions, the following:

a) A condition requiring both parties to comply with the provisions of the Grid Code.
b) Details of connection, technical requirements and commercial arrangements.
c) Details of any capital expenditure arising from necessary reinforcement of extension of the system, data communication, RTU etc. and demarcation of the same between the concerned parties.
d) Details of equipment and plant to be connected.
e) General philosophy, guidelines etc, on protection and telemetry.
f) A 'Site Responsibility Schedule' detailing the division of responsibility at Connection Sites in relation to ownership, control, operation and maintenance of plant & apparatus and to safety of persons.

Note: CERC shall be specifying a model connection agreement in due course of time. STU may adopt the same with State specific changes or propose a different connection agreement format consistent with this code for the approval of the Commission.

## 4.6 STS Parameter Variations

### (a) General

Within the power system, instantaneous values of system frequency and voltage are subject to variation from their nominal value. All users shall ensure that Plant and Apparatus requiring service from/to the STS is of such design and construction that satisfactory operation is not hampered by such variation.

### (b) Frequency Variations

Rated frequency of the system shall be 50.0 Hz and shall normally be controlled within the limits as per regulations/standards framed by the Authority.

### (c) Voltage Variations

i) The variation of voltage may not be more than the voltage range specified in the regulations/standards framed by the Authority.

ii) The agencies engaged in sub-transmission and distribution shall not depend upon the STS for reactive energy compensation when connected. The agencies shall estimate and provide the required reactive energy compensation in its transmission and distribution network to meet its full Reactive Power requirement.

## 4.7 Equipment at Connection Points

### (a) Sub-station Equipment

i) All EHV sub-station equipments shall comply with Bureau of Indian Standards (BIS)/IEC/ prevailing Code of practice.

ii) All equipment shall be designed, manufactured and tested and certified in accordance with the quality requirements as per IEC/BIS standards.

iii) Each connection between the User and the STS shall be controlled by a circuit breaker capable of interrupting, at the connection point, the short circuit current as advised by STU in the specific Connection Agreement.

**(b) Fault Clearance Times**

i) The primary protection system shall be such that the fault clearance time of all equipments/lines connected to the STS whether of Users or of STU / Transmission Licensee, shall not be more than:

(a) 100 milli seconds (ms) for 800 kV & 400 kV
(b) 160 milli seconds (ms) for 220 kV & 132 kV

ii) Back-up protection shall be provided for required isolation/protection in the event of failure of the primary protection systems to isolate the faulty element within the above fault clearance time requirements. If a Generating Unit is connected directly to the STS, it shall have the capability to withstand disturbances, until clearing of the fault by back-up protection on the STS side.

**(c) Protection Planning**

i) Protection systems are required to be provided by all Users in coordination with STU. In case of installation of any device, which necessitates modification/ replacement of existing protection relays/ scheme in the network, owner of respective part of network shall carry out such modification/ replacement.

ii) Protection systems are required to isolate the faulty equipments and protect the other components of the system against all types of faults, internal/ external to them, within the specified fault clearance time with reliability, selectivity and sensitivity.

iii) All users connected to the STS shall provide protection systems as specified in the connection agreement.

iv) Relay setting coordination shall be done at regional level by RPC. The RPCs would also identify critical locations where bus bar protection needs to be provided, if not available.

## 4.8 Generating Units and Power Stations

4.8.1 A Generating Unit shall be capable of continuously supplying its normal rated active/reactive output within the system frequency and voltage variation range indicated in clause 4.6 above, subject to the design limitations specified by the manufacturer.

4.8.2 Generating units shall be provided with AVR and protective & safety devices, as set out in connection agreements.

4.8.3 Each Generating Unit shall be fitted with a turbine speed governor having an overall droop characteristic within the range of 3% to 6%, which shall always be in service.

4.8.4 Each Generating Unit shall be capable of instantaneously increasing output by 5% when the frequency falls, limited to 105% MCR. Ramping back to the previous MW level (in case the increased output level can not be sustained) shall not be faster than 1% per minute.

4.8.5 No generating units shall be synchronized with the State Power Grid without the necessary instructions from SLDC.

## 4.9 Reactive Power Compensation

4.9.1 Reactive Power compensation and/or other facilities should be provided by Transmission Licensee/Distribution licensees as far as possible close to the load points thereby avoiding the need for exchange of Reactive Power to/from STS and to maintain STS voltage within the specified range.

4.9.2 Line Reactors may be provided to control temporary over voltage within the limits as set out in connection agreements.

4.9.3 The additional reactive compensation to be provided by a User shall be indicated by STU in the Connection Agreement for implementation.

## 4.10 Data and Communication Facilities

4.10.1 Reliable and efficient speech and data communication systems shall be provided to facilitate necessary communication and data exchange, and supervision/control of the grid by the SLDC, under normal and abnormal conditions. All Users shall provide systems to telemeter power system parameter such as power flow, voltage and status of switches/ transformer taps etc. in line with interface requirements and other guideline made available to SLDC/RLDC. The associated communication system to facilitate data flow up to SLDC/RLDC, as the case may be shall also be established by the concerned user as specified by STU in connection agreement. All users in coordination with STU shall provide the required facilities at their respective ends and SLDC as specified in the connection agreement.

## 4.11 System Recording Instruments

4.11.1 Recording instruments such as Data Acquisition Systems/Disturbance Recorder/Event Logger/Fault Locator (including time synchronization equipment) shall be provided in the STS for recording of dynamic performance of the system. Users shall provide all the requisite recording instruments as specified in the connection agreement according to the agreed time schedule.

## 4.12 Responsibilities for operational safety

STU/Transmission licensee and the concerned User shall be responsible for safety as indicated in Site Responsibility Schedules for each connection point.

(a) **Site Responsibility Schedule**

i) A Site Responsibility Schedule shall be produced by the STU/ transmission license and User detailing the ownership responsibilities of each, before execution of the project or connection including safety responsibilities.

For connection to the STS, a schedule shall be prepared by STU/transmission licensee pursuant to the relevant Connection Agreement, which shall state for each item of plant and apparatus at the connection point the following:

- Ownership of the Plant/apparatus;
- Responsibility for control of the Plant/Apparatus
- Responsibility for operation of the Plant/Apparatus;
- Responsibility for maintenance of the Plant/Apparatus; and
- Responsibility for all matters relating to the safety of any person at the connectivity Point.

ii) All users connected to or planning to connect to STS would ensure providing of RTU and other communication equipment, as specified by SLDC, for sending real-time data to SLDC at least before date of commercial operation of the generating stations or sub-stations or lines being connected to STS.

iii) The formats, principles and basic procedure to be used in the preparation of the Site Responsibility Schedules shall be formulated by STU and shall be provided to each User seeking connection or modification of existing connection to the STS.

iv) STU/Transmission Licensee and Users should be responsible for safety as indicated in the site responsibility schedule for each connection point.

**(b) Single Line Diagrams**

i) Single Line Diagram shall be furnished to SLDC for each Connection Point by the Users connected /STU. These diagrams shall include all HV connected equipment and the connections to all external circuits and incorporate numbering, nomenclature and labeling, etc. The diagram is intended to provide an accurate record of the layout and

circuit connections, rating, numbering and nomenclature of HV apparatus and related plant.

ii) Whenever any equipment is proposed to be changed, then concerned user shall intimate the necessary changes to STU and to all concerned. When the changes are implemented, revised Single Line Diagram shall be circulated by the user to SLDC/STU.

**(c) Site Common Drawings**

i) Site Common Drawing will be prepared by STU for each Connection Point and will include site layout, electrical layout, details of protection and common services drawings. Users shall provide the necessary details to STU.

ii) The detailed drawings for the portion of the User and STU/ transmission licensee at each Connection Point shall be prepared individually and copies shall be handed over to other party.

iii) If any change in the drawing is found necessary, the details will be furnished to other party as soon as possible.

## 4.13 Procedure for Site Access, Site operational activities and Maintenance Standards

4.13.1 The Connection Agreement will also indicate any procedure necessary for Site access, Site operational activities and maintenance standards for equipment of the STU/ transmission licensee at STU/User's premises and vice versa.

## 4.14 Schedule of assets of State Power Grid

4.14.1 STU shall submit annually to UPERC by 30$^{th}$ September each year a schedule of transmission assets, which constitute the State Power Grid

as on 31st March of that year indicating ownership on which SLDC has operational control and responsibility.

# CHAPTER -5
# OPERATING CODE FOR STATE GRID

## 5.1 Operating Policy

(a) The primary objective of integrated operation of the State Power Grid is to enhance the overall operational economy and reliability of the entire electric power network spread over the geographical area of the State. Participant utilities shall therefore co-operate with each other and adopt Good Utility Practice at all times for satisfactory and beneficial operation of the State Power Grid.

(b) Overall operation of the State Power Grid shall be supervised by the State Load Despatch Centre (SLDC). All Users are accordingly required to comply with the directions given by the SLDC.

(c) All Users shall comply with this operation planning and system security code, for deriving maximum benefits from the integrated operation and for equitable sharing of obligations.

(d) A set of detailed internal operating procedures for State Power Grid shall be developed by SLDC in consultation with all Users which shall be consistent with the provisions of UPEGC and IEGC to enable compliance with the requirement of the Grid Code and IEGC.

(e) For efficient and secure operation of the State Power Grid the control rooms of the SLDC, power generating plants, substation of 132 kV and above, and any other control centres established by the Transmission Licensee/Users shall be manned round the clock by qualified and adequately trained personnel.

## 5.2 System Security Aspects

5.2.1 All Users shall endeavor to operate their respective power systems and power generating stations in synchronism with each other at all times, such that the entire power system within the State operates as one synchronized system.

5.2.2 No part of the State Power Grid shall be deliberately isolated from the rest of the State Power Grid, except (i) under an emergency, and conditions in which such isolation would prevent a total grid collapse and/or would enable early restoration of power supply, (ii) when serious damage to a costly equipment is imminent and such isolation would prevent it, (iii) when such isolation is specifically instructed by SLDC. Complete synchronization of grid shall be restored as soon as the conditions again permit it. The restoration process shall be supervised by SLDC, as per operating procedures separately formulated by it.

5.2.3 No important element of the State Power Grid shall be deliberately opened or removed from service at any time, except when specifically instructed by SLDC or with specific and prior clearance of SLDC. The list of such important grid elements on which the above stipulations apply shall be prepared by the SLDC in consultation with the STU and Users, and shall be available with SLDC, STU and the Users. In case of opening/removal of any important element of the State Power Grid under an emergency situation, the same shall be communicated to SLDC at the earliest possible time after the event.

5.2.4 Any tripping, whether manual or automatic, of any of the above elements of State Power Grid shall be precisely intimated by the concerned agency to SLDC as soon as possible say within ten minutes of the event. The reason (to the extent determined) and the likely time of restoration shall also be intimated. All reasonable attempts shall be made for the elements' restoration as soon as possible.

5.2.5 All generating units, which are synchronized with the grid, irrespective of their ownership, type and size, shall have their governors in normal

operation at all times. If any generating unit of over fifty (50) MW size is required to be operated without its governor in normal operation, the SLDC shall be immediately informed about the reason and duration of such operation. All governors shall have a droop of between 3% and 6%.

5.2.6 Facilities available with/in load limiters, Automatic Turbine Run-up System (ATRS), Turbine supervisory control, coordinated control system, etc., shall not be used to suppress the normal governor action in any manner. No dead bands and/or time delays shall be deliberately introduced.

5.2.7 All Generating Units, operating at or up to 100% of their Maximum Continuous Rating (MCR) shall normally be capable of (and shall not in any way be prevented from) instantaneously picking up five per cent (5%) extra load when frequency falls due to a system contingency. The generating units operating at above 100% of their MCR shall be capable of (and shall not be prevented from) going at least up to 105% of their MCR when frequency falls suddenly. After an increase in generation as above, a generating unit may ramp back to the original level at a rate of about one percent (1%) per minute, in case continued operation at the increased level is not sustainable. Any generating unit of over fifty (50) MW size not complying with the above requirements shall be kept in operation (synchronized with the State Power Grid) only after obtaining the permission of SLDC.

5.2.8 The recommended rate for changing the governor setting, i.e., supplementary control for increasing or decreasing the output (generation level) for all generating units, irrespective of their type and size, would be one (1.0) per cent per minute or as per manufacturer's limits. However, if frequency falls below 49.5 Hz, all partly loaded generating units shall pick up additional load at a faster rate, according to their capability.

5.2.9 Except under an emergency, or to prevent an imminent damage to costly equipment, no SSGS shall suddenly reduce his generating unit output by more than one hundred (100) MW without prior intimation to

and consent of the SLDC, particularly when frequency is falling or is below 49.0Hz. Similarly, no Users shall cause a sudden increase in its load by more than one hundred MW(100 MW) without prior intimation to and consent of the SLDC.

5.2.10 All generating units shall normally have their automatic voltage regulators (AVRs) in operation, with appropriate settings. In particular, if a generating unit of over fifty (50) MW size is required to be operated without its AVR in service, the SLDC shall be immediately intimated about the reason and duration, and its permission obtained. Power System Stabilizers (PSS) in AVRs of generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the STU from time to time. STU will be allowed to carry out checking of PSS and further tuning it, wherever considered necessary.

5.2.11 Provision of protections and relay settings shall be coordinated periodically throughout the State Power grid, as per a plan to be separately finalized by SPC.

5.2.12 All users shall make all possible efforts to ensure that the grid frequency always remains within the 49.0 – 50.5 Hz band, the frequency range within which steam turbines conforming to the IEC specifications can safely operate continuously.

5.2.13 Distribution licensees and bulk consumers shall provide automatic under-frequency and df/dt load shedding in their respective systems, to arrest frequency decline that could result in a collapse/disintegration of the grid, as per the plan separately finalized the SPC, and shall ensure its effective application to prevent cascade tripping of generating units in case of any contingency. All Users shall ensure that the above under-frequency and df/dt load shedding/islanding schemes are always functional. However, in case of extreme contingencies, these relays may be temporarily kept out of service with prior consent of SLDC.

SLDC shall inform SPC Secretariat about instances when the desired load relief is not obtained through these relays in real time operation. SLDC shall carry out periodic inspection of the under frequency relays and maintain proper records of the inspection.

5.2.14 All Users shall also facilitate identification, installation and commissioning of System Protection Schemes (including inter-tripping and run-back) in the power system to protect against situations such as voltage collapse and cascading. Such schemes would be finalized by SPC, and shall be kept in service. SLDC shall be promptly informed in case any of these are taken out of service.

5.2.15 Procedures shall be developed to recover from partial/total collapse of the grid and periodically updated in accordance with the requirements given under section 5.8. These procedures shall be followed by all Users to ensure consistent, reliable and quick restoration.

5.2.16 Each User shall provide adequate and reliable communication facility internally and also with SLDC/other Users to ensure exchange of data/information necessary to maintain reliability and security of the grid. Wherever possible, redundancy and alternate path shall be maintained for communication along important routes.

5.2.17 All Users shall send information/data including disturbance recorder/sequential event recorder output etc., to SLDC for purpose of analysis of any grid disturbance/event. No User shall block any data/information required by the SLDC for maintaining reliability and security of the grid and for analysis of an event.

5.2.18 All Users shall make all possible efforts to ensure that the grid voltage always remains within the following operating range.

| VOLTAGE – (KV rms) | | |
|---|---|---|
| **Nominal** | **Maximum** | **Minimum** |
| 400 | 420 | 360 |
| 220 | 245 | 200 |

| | | |
|---|---|---|
| 132 | 145 | 120 |

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## 5.3 Demand Estimation for Operational Purposes

### 5.3.1 Introduction

(a) This section describes the procedures/responsibilities of the SLDC, STU and other users for demand estimation for both Active Power and Reactive Power.

(b) The demand estimation is to be done on daily/weekly/monthly basis for current year.

(c) Each distribution licensee shall carry out its own demand estimation from the historical data and weather forecast data from time to time.

(d) While the demand estimation for operational purposes is to be done on a daily/weekly/monthly basis initially, mechanisms and facilities at SLDC shall be created at the earliest to facilitate on-line estimation of demand for daily operational use.

### 5.3.2 Objective

(a) The objective of this procedure is to enable the SLDC to estimate the demand over a particular period.

(b) The demand estimates are to enable the SLDC to conduct system studies for operational planning purposes.

### 5.3.3 Procedure

Each Distribution Licensee shall develop methodologies/mechanisms for daily/ weekly/monthly/yearly demand estimation (MW, MVAr and MWh) for operational purposes. The data for the estimation shall also include load shedding, power cuts, etc. Licensees shall also maintain historical database for demand estimation.

The Distribution Licensee shall submit the updated long-term energy and demand forecast on annual basis based on the actual data to SLDC latest by 30$^{th}$ November every year. In projecting the above demand,

the distribution licensee shall first of all review the status of loads materialised as per the previous load forecast. Distribution licensee shall further take the base data (i.e. actual energy and demand requirement of the previous financial year) and relate it to past trend.

## 5.4 Demand Management

### 5.4.1 Introduction

This section is concerned with the provisions to be made by SLDC to effect a reduction of demand in the event of insufficient generating capacity, and energy transfers from external interconnections being not available to meet demand, or in the event of breakdown or operating problems (such as frequency, voltage levels or thermal overloads) on any part of the grid.

### 5.4.2 Demand Management Process

(a) As mentioned earlier, all the Users shall endeavour to restrict their net electricity drawal from the grid to within their respective drawal schedules whenever the system frequency is below 49.5 Hz. When the frequency falls below 49.02 Hz, requisite load shedding shall immediately be carried out in the State.

(b) For effective and automatic demand control under frequency relays shall be installed at the Substations of the STU/Transmission Licensee. The number and size of the discrete blocks, which shall get isolated at a particular frequency, shall be determined on rotational basis in consultation with every Distribution Licensee.

(c) SLDC shall issue instructions for manual disconnection of loads whenever demand control, for effective grid management, is not possible through under frequency relays, within a reasonable time and there is danger of grid collapse. The Distribution Licensees shall immediately disconnect the quantum of load as instructed by SLDC.

(d) Further, in case of certain contingencies and/or threat to system security, SLDC shall issue necessary directions to distribution

licensees; open access customer to decrease their drawal by a certain quantum. Such direction shall immediately be acted upon.

(e) All users shall make such arrangements that enable manual demand disconnection to take place, as instructed by the SLDC, under normal and/or contingent conditions.

(f) The Distribution Licensees shall provide in advance to SLDC, estimates of loads that may be shed on the instructions of SLDC, when required, in discrete blocks, with details of arrangements of such load shedding.

(g) Planned manual Disconnection shall be implemented by the SLDC whenever there is a shortfall in generation, or constraints in Transmission System, or reduction of imports through external connection or any other reason, requiring demand control over prolonged period. However, in such cases SLDC shall adopt a rotational load-shedding scheme to ensure equitable treatment to all consumers as far as practicable.

(h) Emergency Manual Disconnection to deal with unacceptable voltage and frequency levels etc may be implemented by the SLDC only when there is major loss of generation resulting into mismatch of generation and drawal or there are constraints in the Transmission System. SLDC may also direct manual disconnection in cases of persistent over-drawal from the grid in excess of respective drawal schedule affecting the frequency of the State/Regional grid to fall below 49.02 Hz.

(i) The measures taken to reduce the users' drawal from the grid shall not be withdrawn as long as the frequency/voltage remains at a low level, unless specifically permitted by the SLDC.

## 5.5 Periodic Reports

5.5.1 A weekly report shall be issued by SLDC to all the Users and SPC Secretariat, which shall cover the performance of the State Power Grid for the previous week. Such weekly report shall also be available on the website of the SLDC for at least 12 weeks. The weekly report shall essentially contain the following:-

(a) Frequency profile

(b) Voltage profile of selected substations

(c) Major Generation and Transmission Outages
(d) Transmission Constraints
(e) Instances of persistent/significant non-compliance of UPEGC.

### 5.5.2 Other Reports

(a) The SLDC shall prepare a quarterly report, which shall bring out the system constraints, reasons for not meeting the requirements, if any, of security standards and quality of service, along with details of various actions taken by different Users, and the User(s) responsible for causing the constraints.

(b) The SLDC shall also provide information/report, as desired by SPC in the interest of smooth operation of State Power Grid.

## 5.6 Operation Liasion

### 5.6.1 Introduction

(a) This chapter covers the requirement for the exchange of information in relation to operations and/or events on the Northern Grid including the State Power Grid which have had or may have an effect on:

1. The Regional Grid,
2. The State Power Grid,
3. A User System,

(b) The Operational liaison function is a mandatory built-in hierarchical function of the SLDC and State users, to facilitate quick transfer of information to operational staff. It will correlate the required inputs for optimization of decision making and actions.

### 5.6.2 Procedure for Operational Liaison

(a) Operations and events in the State Power Grid

- Before any Operation is carried out on State Power Grid, the SLDC will inform all Users, whose system may, or will, experience an operational effect, and give details of the operation to be carried out. The SLDC shall also inform the RLDC in case such an operation impacts the Regional Grid.

- Immediately following an event on State Power Grid, the SLDC will inform all Users, whose system may, or will, experience an operational effect following the event, and give details of what has happened in the event but not the reasons why. The SLDC shall also inform the RLDC in case such an event impacts the Regional Grid.

(b) Operations and events on a User system.

- Before any operation is carried out on a User's system, the User shall inform the SLDC, in case the State Power Grid may, or will, experience an Operational effect. User shall also give details of the operation to be carried out. The SLDC shall further inform the RLDC in case such an operation impacts the Regional Grid.

- Immediately following an event on a User's system, the User will inform the SLDC, in case the State Power Grid may, or will, experience an operational effect following the event, and give details of what has happened in the event. The SLDC shall further inform the RLDC in case such an event impacts the Regional Grid.

## 5.7 Outage Planning

### 5.7.1 Introduction

(a) The section sets out the procedure for preparation of outage schedules for the elements of the State Power Grid in a coordinated and optimal manner keeping in view the State power system operating conditions and the balance of generation and demand. (List of elements of the grid covered

under these stipulations shall be prepared by SLDC in consultation with the STU and all other users).

(b) The generation capacity and transmission system should be adequate after taking into account the outages to achieve the security standards.

(c) The State's annual outage plan shall be prepared in advance for the financial year by the SPC and reviewed during the year on quarterly and monthly basis.

### 5.7.2 Objective

(a) To produce a coordinated generation outage programme for the State Power Grid, considering all the available resources and taking into account transmission constraints, as well as, irrigational requirements.

(b) To minimize surplus or deficits, if any, in the system requirement of electricity demand and energy and help operate system within Security Standards.

(c) For optimum management of transmission outages without adversely affecting the grid operation but taking into account the generation outage schedules, outages of distribution system and transmission systems and maintaining system security standards.

### 5.7.3 Scope

This section is applicable to all users including SLDC, STU, SSGS and all other users connected to the state power grid.

### 5.7.4 Outage Planning Process

(a) The SPC shall be responsible for analyzing the outage schedule given by all the users, preparing a draft annual outage schedule and finalization of the annual outage plan, which shall be in line

with the Regional annual outage plan finalized by RPC for the following financial year by 15th February of each year.

(b) All Generating Companies and Licensees including STU shall furnish their proposed scheduled outage program indicating the Units/Lines/Sub-stations/ICTs etc, date of start of outage and duration of outage in writing to the SPC Secretariat for the ensuing financial year by 15th of October each year. Distribution Licensees are however not required to intimate outages, which might induce load loss of less than 20 MW demand in their area of supply.

(c) The SPC shall prepare an optimum draft outage plan minimizing interruption to the consumers on the basis of data submitted by the Generating Companies and the Licensees. SPC shall make available the draft Scheduled Outage Plan to RPC by 30th November each year.

(d) Based on refinement by the RPC secretariat in the draft inter-State outage Plan, the SPC shall also review and revise the State's Scheduled Outage Plan and intimate all Users and SLDC, the final Scheduled Outage Plan for implementation latest by 15th February each year.

(e) The SLDC is authorized to defer the planned outage in case of any of the following, taking into account the statutory requirements:

i. Major grid disturbances (Total black out in the State/Region).
ii. System isolation
iii. Partial Black out in the State
iv. Any other event in the system that may have an adverse impact on the system security by the proposed outage.

(f) Generating Companies and Licensees shall plan their activities as per the latest annual scheduled outage plan finalized by the SPC (with all adjustments made to date).

(g) All Users shall obtain the prior approval from SLDC for availing an outage.

## 5.8 Recovery Procedures

(a) Detailed plans and procedures for restoration of the state power grid under partial/total blackout shall be developed by SLDC in consultation with all users/SPC Secretariat and shall be reviewed / updated annually.

(b) Detailed plans and procedures for restoration after partial/total blackout of each Users' system within the state, will be finalized by the concerned user in coordination with the SLDC. The procedure will be reviewed, confirmed and/or revised once every subsequent year. Mock trial runs of the procedure for different sub-systems shall be carried out by the users at least once every six months under intimation to the SLDC.

(c) List of generating stations with black start facility, inter-State/inter regional ties, synchronizing points and essential loads to be restored on priority, shall be prepared by SLDCs and shall remain always available with it.

(d) The SLDC is authorized during the restoration process following a black out, to operate with reduced security standards for voltage and frequency as necessary in order to achieve the fastest possible recovery of the grid.

(e) All communication channels required for restoration process shall be used for operational communication only, till grid normalcy is restored.

## 5.9 Event Information

### 5.9.1 Introduction

This section deals with reporting procedures in writing of reportable events in the system to all State users, SPC Secretariat and SLDC.

### 5.9.2 Objective

The objective of this section is to define the incidents to be reported, the reporting route to be followed and information to be supplied to ensure consistent approach to the reporting of incidents/events.

### 5.9.3 Scope

This section covers all users, SPC Secretariat, and SLDC.

### 5.9.4 Responsibility

a) The SLDC shall be responsible for reporting events to the State users/RLDC/SPC/RPC Secretariat.

b) All State users shall be responsible for collection and reporting of all necessary data to SLDC and SPC Secretariat for monitoring, reporting and event analysis.

### 5.9.5 Reportable Events

Any of the following events require reporting by SLDC/STU/User:

- Violation of security standards.
- Grid indiscipline.
- Non-compliance of SLDC's instructions.
- System islanding/system split
- State black out/partial system black out
- Protection failure on any element of STS.
- Power system instability
- Tripping of any element of the State Power Grid.

### 5.9.6 Reporting Procedure

(a) All reportable incidents occurring in the systems of Users shall be intimated orally to the SLDC as early as possible, say within a period of ten minutes. A report in writing shall also be submitted to SLDC within one hour of the oral communication. If the reporting incident is of major nature, the initial written report may be submitted within two hours duly followed by a comprehensive report within 48 hours of the

submission of the initial written report. In other cases, the reporting User shall submit a report within five working days to SLDC.

(b) If the event is likely to impact the operation of the regional grid the SLDC shall report the event orally and as soon as possible in writing to the RLDC. Wherever it is required to bring the matter to the knowledge of the RPC, SLDC may while making a written report to RLDC request RLDC for the same.

(c) Following detail for example shall form part of the written report :

- Time and date of event
- Location
- Plant and/or Equipment directly involved
- Description and cause of event
- Antecedent conditions
- Demand and/or Generation (in MW) interrupted and duration of interruption
- All Relevant system data including copies of records of all recording instruments including Disturbance Recorder, Event Logger, DAS etc.
- Sequence of trippings with time.
- Details of Relay Flags.
- Remedial measures.
- Estimated time of return to service,
- Any other relevant information,
- Name and designation of reporting officer.

# CHAPTER-6
# SCHEDULING AND DESPATCH CODE

## 6.1 Introduction

6.1.1 This Chapter sets out

(a) Demarcation of responsibilities between various Users and SLDC in scheduling and despatch.
(b) The procedure for scheduling and despatch.
(c) The reactive power and voltage control mechanism
(d) Complementary commercial mechanisms (in the Annexure– 1).

6.1.2 Under the ABT regime, certain procedures are to be adopted while scheduling generation of State Sector Generating Stations (SSGS), share from ISGS and bi-lateral trade and drawal by the beneficiaries in the State on a daily basis. The procedure for submission of generation capability by each ISGS/SSGS and submission of drawal schedule by each beneficiary in the State is intended to enable SLDC to prepare the generation and drawal schedule in accordance with the contracts entered into between the parties. It also provides methodology for issuing real time dispatch / drawal instructions and rescheduling, if required, along with the commercial arrangement for the deviations from schedules.

## 6.2 Objective

The objective of this Code is to specify the procedures to be adopted for scheduling of dispatches from the SSGS and imports from Inter-State Generating Stations or any other person and net drawals by the beneficiaries on daily basis and also the modality of the flow of information between SLDC, RLDC, SSGS and the beneficiaries. The procedure for submission of capability declaration by each SSGS and submission of drawal schedule by each beneficiary is intended to enable SLDC to prepare the despatch schedule for each Intra-State Generating Stations and drawal schedule for each beneficiary. The

provisions contained in this chapter are without prejudice to the powers conferred on SLDC under section 31 and 32 of the Electricity Act, 2003.

## 6.3 Scope

This Code shall be applicable to SLDC, STU and Users of the State Power Grid.

## 6.4 Demarcation of responsibilities

6.4.1 SLDC shall have the total responsibility for:

a.) Scheduling/ despatching the generation of all SSGS connected to the State Power Grid.

b.) Scheduling drawals by beneficiaries from the SSGS and Central Generating Stations (within their share in the respective plant's expected capability)

c.) Regulating the demand of the Distribution licensees and other beneficiaries in the state,

d.) Arranging bilateral interchanges,

e.) Rescheduling of dispatch / drawal schedules as per intimation received from RLDC and on the request of SSGS and or beneficiaries as well as those resulting from Transmission system failure/constraints.

f.) Implementation of ABT procedures and free governor operation at power stations wherever possible.

6.4.2 Beneficiaries shall always endeavor to restrict their net drawal from CSGS/SSGS and bilateral trades within their respective drawal schedules under the guidelines of ABT. The beneficiaries may, at their discretion, deviate from the drawal schedule, as long as such

deviations do not cause system parameters to deteriorate beyond permissible limits and/or do not lead to unacceptable line loadings. Deviations from net drawal schedule shall however be appropriately priced through the unscheduled inter change (UI) mechanism as specified by CERC/UPERC and amended from time to time.

Provided that SLDCs, shall always exercise control to restrict the net drawal of the beneficiaries in the State from the State Power Grid to within their respective drawal schedules, whenever the system frequency is below 49.5 Hz. Whenever frequency falls below 49.0 Hz, SLDC shall direct the beneficiaries to carry out the requisite load shedding for frequency correction and restricting over drawals if any. However it shall be obligatory on the part of the beneficiaries to act on their own and to curtail their demand in the event of frequency falling below 49.5 Hz.

6.4.3 The SLDC in consultation with STU shall regularly carry out the necessary exercises regarding short-term and long-term demand estimation for the State, to enable it to plan in advance as to how it would meet the total demand without overdrawing from the grid.

6.4.4 The SSGS shall be responsible for power generation generally according to the daily schedules advised to them by the SLDC on the basis of the requisitions received from the Distribution Licensees & Open Access Consumers and for proper operation and maintenance of their generating stations, such that these stations achieve the best possible long-term availability and economy.

6.4.5 While the State Generating Stations shall be responsible for power generation generally according to the daily schedule advised to them by the SLDC, on the basis of the drawal schedules received from the beneficiaries and having accounted for the imports from the ISGS and bilateral trades, if any, however, in line with the flexibility allowed to the beneficiaries, the State Generating Stations may also deviate from the given schedules depending on the plant and system conditions. In particular, they would be allowed / encouraged to generate beyond the

given schedule under power deficit (low system frequency) conditions. Deviations from the ex-power plant generation schedules shall be appropriately priced through the UI mechanism.

Provided that when, the frequency is higher than 50.5 Hz, the actual net injection shall not exceed the scheduled despatch for that period. Also while the frequency is above 50.5 Hz, the generating stations may (at their discretion) back down without waiting for an advice from SLDC. When the frequency falls below 49.5 Hz*,* the generation at all SSGS (except those on peaking duty) shall be maximized, at least up to the level, which can be sustained, without waiting for the advice from SLDC. In such situations unscheduled inter change accounting shall be subject to provisions under UPERC (Terms and Conditions of Generation Tariff) Regulations as amended by the Commission from time to time.

6.4.6 Notwithstanding the above, the SLDC may direct the generating stations / beneficiaries to increase /decrease their generation/drawals in case of contingencies e.g. overloading of lines / transformers, abnormal voltages, threat to system security. Such directions shall be immediately acted upon. In case the situation does not call for urgent action, and SLDC has some time for analysis, it shall check whether the situation has arisen due to deviations from schedules or due to any power flows pursuant to short-term open access. In case of curtailment of load, guide lines as specified in the UPERC (Terms and Conditions for Open Access) Regulations as amended time to time shall be followed.

6.4.7 For all outages of generation and transmission system, which may have an effect on the State Power Grid, all Users shall co-operate with each other and co-ordinate their actions as per the procedures laid down by SLDC or as per the advice of SLDC in absence of such procedure. In particular, outages, which may cause restriction of generation that a beneficiary could receive (and which may have a commercial implication), shall be planned carefully to achieve the best optimization.

6.4.8 The beneficiaries of the SSGSs shall enter into separate joint/bilateral agreement(s) to identify their shares in SSGS projects (based on the allocations by the Govt. of Uttar Pradesh, where applicable), scheduled drawal pattern, tariffs, payment terms etc. A copy of such agreements shall be submitted to the SLDC for being considered in scheduling and state energy accounting. Any bilateral agreements between beneficiaries for scheduled interchanges on long-term/short-term basis shall also specify the interchange schedule, which shall be submitted in advance to SLDC.

6.4.9 All Users covered under ABT scheme are required to abide by the concept of frequency linked load despatch and pricing of deviations from schedule i.e. unscheduled interchanges as and when intra State ABT becomes operational within the State as per the orders of the Commission. All SSGS shall normally be operated according to the frequency linked load dispatch guidelines issued by the SLDC (in line with the ABT order/regulations issued by the Commission) to the extent possible.

6.4.10 It shall be incumbent upon the SSGS to declare the plant capabilities faithfully, i.e., according to their best assessment. In case, it is suspected that they have deliberately over/under declared the plant capability contemplating to deviate from the schedules given on the basis of their capability declarations (and thus make money either as undue capacity charge or as the charge for deviations from schedule), the SLDC may ask the SSGS to explain the situation with necessary backup data.

6.4.11 It shall be the responsibility of the STU to install special energy meters on all connection points for recording of actual net MWh interchanges and MVArh drawals. The type of meters to be installed, metering scheme, metering capability, testing and calibration requirements and the scheme for collection and dissemination of metered data are detailed in the enclosed Annexure-2. All concerned entities (in whose premises the special energy meters are installed) shall fully cooperate with the SLDC and extend the necessary assistance by taking weekly meter readings and transmitting them to the SLDC.

6.4.12 The SLDC shall be responsible for computation of actual net MWh injection by SSGS and through bilateral trade and actual net drawal of each beneficiary, 15-minute time block wise, based on the above meter readings. The SLDC shall further be responsible for preparing Intra-State Energy Accounts as per the provisions of CERC'/UPERC ABT scheme. All computations carried out by SLDC shall be open to all users for checking/verifications for a period of 15 days. In case any mistake/omission is detected, the STU/SLDC shall forthwith make a complete check and rectify the same.

6.4.13 SLDC shall periodically review the actual deviation from the despatch and net drawal schedules being issued, to check whether any of the beneficiaries/SSGS are indulging in unfair gaming or collusion. In case any such practice is detected, then matter shall be reported to the Commission.

## 6.5 Scheduling and Despatch procedure

[to be read with UPERC (Terms and Conditions of Generation Tariff) Regulation as amended from time to time]

6.5.1 Each day, starting from 00.00 hours to 24.00 hours, shall be divided into 96 time blocks of 15 minutes intervals for the purposes of scheduling and despatch and energy accounting.

6.5.2 By 9.00 a.m. every day all SSGS shall advise the SLDC, the station wise ex-power plant MW and MWh capability as foreseen for each time block of the next day i.e. from 00.00 hours to 24.00 hours of the following day.

6.5.3 The SLDC shall also receive information from RLDC regarding the MW and MWh entitlements for the State beneficiaries from Central Sector Generating stations for each 15 minute time blocks for the next day by 10.00 AM.

6.5.4 SLDC shall compile the above information, taking in to account bilateral exchanges, if any, and apportion it for the next day based on the

entitlements of the beneficiaries in the State Sector Generating Stations, Inter-State Generating Stations and bilateral exchanges and communicate the same to all the beneficiaries by 11.00 AM.

6.5.5 The beneficiaries shall prepare the drawal schedule according to their foreseen load pattern and there own generating capability (if any, from generating plants such as that owned by the beneficiary itself, Captive Plants and NCES based plants connected to their distribution system), and advise the SLDC by 1.00 PM. their drawal schedule for each of the SSGS and ISGS and long term, short term bilateral trades in which they have shares.

6.5.6 SLDC shall compile the drawal schedules received from beneficiaries and convey by 3.00 PM. the drawal schedule for each of ISGS to RLDC and to SSGS in which the beneficiaries have shares, long term bilateral interchanges and approved short-term bilateral interchanges.

6.5.7 The SLDC may give standing instruction to RLDC such that RLDC itself may decide the drawal schedules for the State.

6.5.8 By 5.00 PM each day, the SLDC shall receive the "net drawal schedule" for the State in MW from RLDC for each 15 minute time block, for the next day.

6.5.9 SLDC shall apportion the net drawal schedule for the State received from RLDC among the beneficiaries based on their entitlements as approved by GOUP in the ISGS and bilateral trades. SLDC shall also revise the despatch schedule of each of the SSGS (if necessary) in the light of net drawal schedule communicated by RLDC. SLDC shall convey by 6.00 PM. each day the following:

i. The ex-power plant "despatch schedule" to each SSGS in MW for each 15-minute time block, for the next day.
ii. The "net drawal schedule" from ISGS, SSGS and bilateral trades to each of the beneficiary in MW for each 15-minute time block, for the next day.

6.5.10 While finalizing the drawal and despatch schedules as above, the SLDC shall ensure that the same are operationally reasonable, particularly in terms of ramping up and ramping down rates and ratio between minimum and maximum generation. SLDC shall also check that the resulting power flows do not give rise to any transmission constraints. In case of any foreseen generation/transmission constraints, the SLDC shall moderate the schedules to the required extent, under intimation to the concerned beneficiaries/SSGS.

6.5.11 The summation of the station-wise ex-power plant generation schedules for all the SSGS/ISGS, along with bilateral exchanges, if any, after deducting the apportioned transmission losses (estimated), shall constitute the beneficiaries net drawal schedule.

6.5.12 The Beneficiaries, may inform SLDC about any modification / changes to be made in the drawal schedule and bilateral inter changes, if any, to SLDC by 9.00 PM. Similarly, State Sector Generating Companies, may inform SLDC about any modification / changes in the foreseen despatch capabilities, if any, to SLDC by 9.00 PM.

6.5.13 The SLDC shall inform any modification / changes to be made in the station wise drawal schedule of ISGS and bilateral inter changes, if any, to RLDC by 10.00 PM.

6.5.14 The SLDC shall receive from RLDC the final 'drawal schedule' against Central allocation along with bilateral exchanges of power, if any, by 11.00 PM.

6.5.15 The SLDC shall review and revise the despatch schedules of the SSGS and drawal schedules of the beneficiaries in the light of final drawal schedule received from RLDC and convey by 11.30 PM:

i. The final ex-power plant "despatch schedule" to each SSGS in MW for each 15-minute time block, for the next day.
ii. The final "net drawal schedule" from ISGS, SSGS and bilateral trades to each of the beneficiary in MW for each 15-minute time block, for the next day.

6.5.16 In case of forced outage of a SSGS unit, SLDC shall revise the schedules on the basis of revised declared capability by the SSGS**.** The revised declared capability and revised schedules shall become effective from the 4th time block, counting the time block in which the revision is advised by the SSGS to be the first one.

In case of forced outage of an ISGS unit, SLDC shall receive revised schedule from RLDC drawn on the basis of revised declared capability by the ISGS**.** The revised declared capability and revised schedules shall become effective from the 4th time block, counting the time block in which the revision is advised by the ISGS to be the first one.

6.5.17 In the event of bottleneck in evacuation of power due to any constraint, outage, failure or limitation in the intra- State Transmission System, associated switchyard and sub- stations owned by the State Transmission Utility or any other transmission licensee involved in intrastate transmission (as certified by the SLDC) necessitating reduction in generation, the SLDC shall revise the schedules which shall become effective from the 4th time block, counting the time block in which the bottleneck in evacuation of power has taken place to be the first one. During the first, second and third time blocks of such an event, the scheduled generation of the SSGS shall be deemed to have been revised to be equal to actual generation, and the scheduled drawals of the beneficiaries shall be deemed to have been revised to be equal to their actual drawals.

In the event of bottleneck in evacuation of power due to any constraint, outage, failure or limitation in the Inter- State Transmission System, necessitating reduction in generation of ISGS, the SLDC shall receive revised schedules from RLDC which shall become effective from the 4th time block, counting the time block in which the bottleneck in evacuation of power has taken place to be the first one.

6.5.18 In case of any grid disturbance, scheduled generation of all the SSGS and scheduled drawal of all the beneficiaries shall be deemed to have been revised to be equal to their actual generation/drawal for all the

time blocks affected by the grid disturbance. Certification of grid disturbance and its duration shall be done by the RLDC/SLDC.

6.5.19 Revision of declared capability by the SSGS and drawal requisition by beneficiary (ies) during any time block shall also be permitted based on advance notice. Revised schedules/declared capability in such cases shall become effective from the 6th time block, counting the time block in which the request for revision has been received in the SLDC to be the first one.

6.5.20 In case of revision of declared capability by the ISGS and requisition by beneficiary (ies) during any time block shall also be permitted on intimation from RLDC. Revised schedules/declared capability in such cases shall become effective from the 6th time block, counting the time block in which the request for revision has been received in the RLDC to be the first one. SLDC shall intimate all the State beneficiaries about such modifications in the drawal/despatch schedules and advise them to effect corresponding change in their drawal schedules.

6.5.21 If, at any point of time, the SLDC observes that there is need for revision of the schedules in the interest of better system operation, it may do so on its own, and in such cases, the revised schedules shall become effective from the 4th time block, counting the time block in which the revised schedule is issued by the SLDC to be the first one.

If, at any point of time, the RLDC observes that there is need for revision of the schedules in the interest of better system operation, it may do so on its own, and in such cases, the revised schedules shall become effective from the 4th time block, counting the time block in which the revised schedule is issued by the RLDC to be the first one. On intimation of such revision by RLDC, SLDC shall intimate all the State beneficiaries about such modifications in the drawal/despatch schedules and advise them to effect corresponding change in their drawal schedules.

6.5.22 To discourage frivolous revisions, the SLDC may, at its sole discretion, refuse to accept schedule/capability changes of less than two (2) percent of the previous schedule/capability.

6.5.23 After the operating day is over at 2400 hours, the schedule finally implemented during the day (taking into account all before-the-fact changes in despatch schedule of generating stations and drawal schedule of the Users) shall be issued by SLDC. These schedules shall be the datum for commercial accounting. The average ex-bus capability for each of the generating stations shall also be worked out based on all before-the-fact advise to SLDC.

6.5.24 SLDC shall properly document all above information i.e. station-wise foreseen ex-power plant capabilities advised by the generating stations, the drawal schedules advised by beneficiaries, all schedules issued by the SLDC, and all revisions/updating of the above.

6.5.25 The procedure for scheduling and the final schedules issued by SLDC, shall be open to all users for any checking/verification, for a period of 5 days. In case any mistake/omission is detected, the SLDC shall forthwith make a complete check and rectify the same.

6.5.26 A procedure for recording the communication regarding changes to schedules duly taking into account the time factor shall be evolved by SLDC in consultation with STU and Users.

6.5.27 SLDC shall assign suitable functions to the ALDCs (established across the State) to help it in discharge of its different functions under section-32 of the EA-2003 including scheduling and despatch.

6.5.28 While availability declaration by SSGS may have a resolution of one (1) MW and one (1) MWh, all entitlements, requisitions and schedules shall be rounded off to the nearest decimal, to have a resolution of 0.1 MW.

Note: Any change in the schedule by SLDC shall be intimated to all the Beneficiaries, SSGS and RLDC as may be necessary.

## 6.6 Reactive Power and Voltage Control

6.6.1 Reactive power compensation should ideally be provided locally, by generating reactive power as close to the reactive power consumption as possible. The beneficiaries are therefore expected to provide local reactive power compensation/generation such that they do not draw reactive power from the EHV grid, particularly under low-voltage condition. However, considering the present limitations, this is not being insisted upon. Instead, to discourage reactive power drawals by Beneficiaries connected to the State Power Grid, reactive power exchanges among beneficiaries shall be priced as follows:

- The Beneficiary pays for reactive power drawal when voltage at the metering point is below 97%
- The Beneficiary gets paid for reactive power return when voltage is below 97%
- The Beneficiary gets paid for reactive power drawal when voltage is above 103%
- The Beneficiary pays for reactive power return when voltage is above 103%.

Provided that there shall be no charge/payment for reactive power drawal/return by a Beneficiary on its own line emanating directly from a generating station.

6.6.2 The charge/payment for reactive power, shall be at a nominal paise/kVArh rate as may be specified by CERC from time to time, and will be between the Beneficiary and the State Reactive Pool Account operated by SLDC for reactive power interchanges.

6.6.3 Notwithstanding the above, SLDC may direct a beneficiary to curtail its reactive power drawal/injection in case the security of grid or safety of any equipment is endangered.

6.6.4 In general, the Beneficiaries shall endeavour to minimize the reactive power drawal at an interchange point when the voltage at that point is below 95% of rated, and shall not inject reactive power when the

voltage is above 105%. ICT taps at the respective drawal points may be changed to control the reactive power interchange as per a Beneficiary's request to the SLDC, but only at reasonable intervals.

6.6.5 Switching in/out of all 400 kV bus and line Reactors throughout the State Power Grid shall be carried out as per instructions of SLDC. Tap changing on all 400/220 kV ICTs shall also be done as per SLDCs instructions only.

6.6.6 The SSGS shall generate/absorb reactive power as per instructions of SLDC, within capability limits of the respective generating units, that is without sacrificing on the active generation required at that time. No payments shall be made to the generating companies for such reactive power generation/absorption.

6.6.7 Reactive power exchange directly between two Beneficiaries on the interconnecting lines owned by them (singly or jointly) generally address or cause a local voltage problem, and generally do not have an impact on the voltage profile of the regional grid. Accordingly, the management/control and commercial handling of the reactive power exchanges on such lines shall be as per following provisions, on case-by-case basis:

i) The two concerned Beneficiaries may mutually agree not to have any charge/payment for VAr exchanges between them on an interconnecting line.

ii) The two concerned Beneficiaries may mutually agree to adopt a payment rate/scheme for VAr exchanges between them identical to or at variance from that specified by CERC for VAr exchanges on Inter State Transmission System. If the agreed scheme requires any additional metering, the same shall be arranged by the concerned Beneficiaries.

iii) In case of a disagreement between the concerned Beneficiaries (e.g. one party wanting to have the charge/payment for VAr exchanges, and the other party refusing to have the scheme), the scheme as specified in Annexure-3 shall be applied. Per kVArh rate shall be as specified by CERC for VAr exchanges on Inter State Transmission System.

iv) The computation and payments for such VAr exchanges shall be effected as mutually agreed between the two Beneficiaries.

## Annexure-1
## COMPLEMENTARY COMMERCIAL MECHANISMS
## (Refer Section .....6.1)

1. The beneficiaries shall pay to the respective SSGS, Capacity charges corresponding to plant availability and Energy charges for the scheduled despatch, as per the relevant notifications and orders of UPERC. The respective Generating Stations shall issue the bills for these charges to each beneficiary on monthly basis.

2. The sum of the above two charges from all beneficiaries shall fully reimburse the SSGS for generation according to the given despatch schedule. In case of a deviation from the despatch schedule, the concerned SSGS shall be additionally paid for excess generation through the UI mechanism approved by UPERC. In case of actual generation being below the given despatch schedule, the concerned SSGS shall pay back to the concerned beneficiary through the UI mechanism for the shortfall in generation.

3. The summation of station-wise ex-power plant despatch schedules from each generating station and any bilaterally agreed interchanges of each beneficiary shall be adjusted for transmission losses, and the net drawal schedule so calculated shall be compared with the actual net drawal of the beneficiary. In case of excess drawal, the beneficiary shall be required to pay through the UI mechanism for the excess drawal of energy. In case of underdrawal, the beneficiary shall be paid back through the UI mechanism, for the energy not drawn.

4. When requested by a beneficiary, SLDC shall assist the beneficiary in locating a buyer/seller and arranging a scheduled interchange within or outside the state boundary. The SLDC shall act only as a facilitator (not a trader / broker), and shall assume no liabilities under the agreement between the two

parties, except - **(i)** ascertaining that no component of the power system of any other user shall be overstressed by such interchange/trade, and (ii) incorporating the agreed interchange/trade in the net interchange schedules for the concerned Beneficiary.

5. State Energy Accounts and the statement of UI charges shall be prepared by the SLDC on a weekly basis and these shall be issued to all the Beneficiaries by Saturday for the seven-day period ending on the previous Sunday mid-night. Payment of UI charges shall have a high priority and the concerned Beneficiaries shall pay the indicated amounts within 10 (ten) days of the statement issue into a state UI pool account operated by the SLDC. The Beneficiaries who have to receive the money on account of UI charges would then be paid out from the State UI pool account, within three (3) working days.

6. The UI charges billed on the State Transmission Utility by RLDC under section 6.1(d) of IEGC shall be allocated to the beneficiaries based on the State Energy Account prepared by SLDC within two working days from the receipt of the Weekly Bill. The State Transmission Utility/ concerned beneficiary shall settle the bill within seven days from the date of issue of the Bill.

7. The SLDC shall also issue the weekly statement for VAr charges, to all Beneficiaries who have a net drawal/injection of reactive energy under low/high voltage conditions. These payments shall also have a high priority and the concerned Beneficiaries shall pay the indicated amounts into State Reactive Account operated by the SLDC within 10 (ten) days of issue of statement. The Beneficiaries who have to receive the money on account of VAr charges would then be paid out from the State Reactive Pool Account, within three (3) working days. SLDC shall also make/receive payments from the regional reactive account for reactive VArs drawn/supplied for inter-regional transfer of power.

8. If payments against the above UI and VAr charges are delayed by more than two days, i.e., beyond twelve (12) days from statement issue, the defaulting beneficiary shall have to pay simple interest @ 0.04% for each day of delay. The interest so collected shall be paid to the beneficiaries who had to receive the amount, payment of which got delayed.

9. The money remaining in the state reactive account after pay-out of all VAr charges upto 31st March of every year shall be utilized for training of the SLDC operators, and other similar purposes which would help in improving/streamlining the operation of the respective State Power Grid.

10. In case the voltage profile of a State Power Grid improves to an extent that the total pay-out from the regional VAr charges account for a week exceeds the total amount being paid-in for that week, and if the State reactive account has no balance to meet the deficit, the pay-outs to the beneficiaries shall be proportionately reduced according to the total money available in the above account.

11. The SLDC shall table the complete statement of State UI account and the State Reactive Energy account before the SPC, on a quarterly basis.

12. All 15-minute energy figures (net scheduled, actually metered and UI) shall be rounded off to the nearest 0.01 MWh.

## Annexure-2
## REQUIREMENTS OF SPECIAL ENERGY METERS

1. Special energy meters of a uniform technical specification shall be provided at all connection points and interface point including Generating Stations, Switching Stations, Sub-Stations and Cross Boundary Locations, to determine its actual net interchange with the State Power Grid. Each interconnection shall have one main meter and one Standby/check meters so that correct computation of net interchange at all connection points / interface points is possible even when a Main meter, a CT or a VT has a problem.

2. The Special energy meters shall be static type, composite meters, installed circuit-wise, as self-contained devices for measurement of active and reactive energy, and certain other parameters as described in the following paragraphs. The meters shall be suitable for being connected directly to voltage transformers (VTs) having a rated secondary line-to-line voltage of 110 V, and to current transformers (CTs) having a rated secondary current of 1A (model-A) or 5A (model-B). The reference frequency shall be 50 Hz.

3. The meters shall have a non-volatile memory in which the following shall be automatically stored:
   i) Average frequency for each successive 15-minute block, as a two digit code (00 to 99 for frequency from 49.0 to 51.0 Hz).
   ii) Net Wh transmittal during each successive 15-minute block, upto second decimal, with plus/minus sign.
   iii) Cumulative Wh transmittal at each midnight, in six digits including one decimal.
   iv) Cumulative VArh transmittal for voltage high condition, at each midnight, in six digits including one decimal.
   v) Cumulative VArh transmittal for voltage low condition, at each midnight, in six digits including one decimal.

vi) Date and time blocks of failure of VT supply on any phase, as a star (*) mark.

4. The meters shall store all the above listed data in their memories for a period of ten (10) days. The data older than (10) days shall get erased automatically. Each meter shall have an optical port on its front for tapping all data stored in its memory using a hand held data collection device.

5. The active energy (Wh) measurement shall be carried out on 3-phase, 4-wire principle, with accuracy as per class 0.2 S of IEC-687/IEC-62053-22. In model-A, the energy shall be computed directly in CT and VT secondary quantities, and indicated in watt-hours. In model-B, the energy display and recording shall be one fifth of the Wh computed in CT and VT secondary quantities.

6. The reactive energy measurement shall also be on 3-phase, 4-wire principle, with accuracy as per class 2 of IEC-62053-23 or better. In model-A, the VAr and VArh computation shall be directly in CT and VT secondary qualities. In model-B, these shall be displayed and recorded as one-fifth of those in CT and VT secondary quantities. There shall be two reactive energy registers, one for the period when average RMS voltage is above 103% and the other for the period the voltage is below 97%.

7. The 15-minute Wh shall have a +ve sign when there is a net Wh export from substation busbars, and a -ve sign when there is a net Wh import. The integrating (cumulative) registers for Wh and VArh shall move forward when there is Wh/VArh export from substation busbars, and backward when there is an import.

8. The meters shall also display (on demand), by turn, the following parameters:
   i) Unique identification number of the meter
   ii) Date and Time
   iii) Cumulative Wh register reading

iv) Average frequency of the previous 15-minute block
v) Net Wh transmittal in the previous 15-minute block, with +/- sign
vi) Average percentage voltage
vii) Reactive power, with +/- sign
viii) Voltage-high and Voltage-low VArh register reading

9. The three phase line-to-neutral voltages shall be continuously monitored, and in case any of these falls below 70%, the condition shall be suitably indicated and recorded. The meters shall operate with the power drawn from the VT secondary circuits, without the need for any auxiliary power supply. Each meter shall have a built-in calendar and clock, having an accuracy of 30 seconds per month or better.

10. The meters shall be totally sealed and tamper-proof, with no possibility of any adjustment at site, except for a restricted clock correction. The harmonics shall preferably be filtered out while measuring Wh, VAr and VArh, and only fundamental frequency quantities shall be measured/computed.

11. All metering equipment shall be of proven quality, fully type-tested, individually tested and accepted by the STU before despatch from manufacturer's work.

12. On-site functional checking and rough testing of accuracy shall be carried out for all meters once a year by the STU, with portable test equipment complying with IEC-60736, for type and acceptance testing of energy meters of 1.0 class.

13. Full testing for accuracy for every meter shall be carried out by the STU at an accredited laboratory, once every five (5) years.

14. The current and voltage transformers to which the above special energy meters are connected shall have a measurement accuracy class of 0.5 or better. Main and Standby/check meters

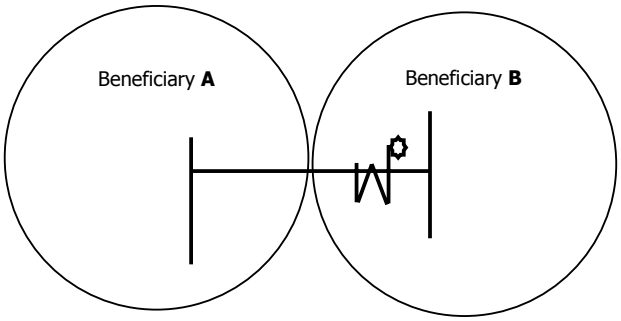
shall be connected to different sets of CTs and VTs, wherever available.

15. Only functional requirements from regulatory perspective are given in this code. Detailed specifications for the meters, their accessories and testing, and procedures for collecting their weekly readings shall be finalized by the STU.

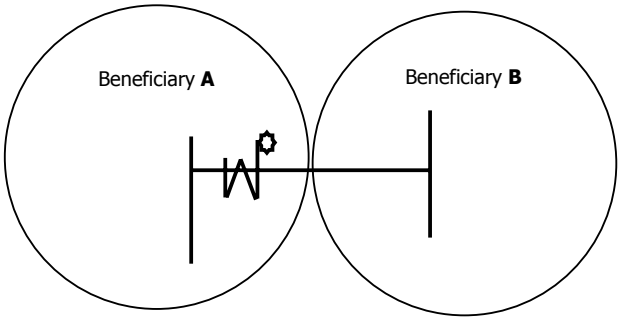
**Annexure-3**

**PAYMENT FOR REACTIVE ENERGY EXCHANGES ON LINES OWNED BY BENEFICIARIES (refer section 6.6.7(iii))**

**Case – 1:** Interconnecting line owned by Beneficiary-A
Metering Point : Substation of Beneficiary -B




Case – 2: Interconnecting line owned by Beneficiary -B
Metering point : Substation of Beneficiary -A



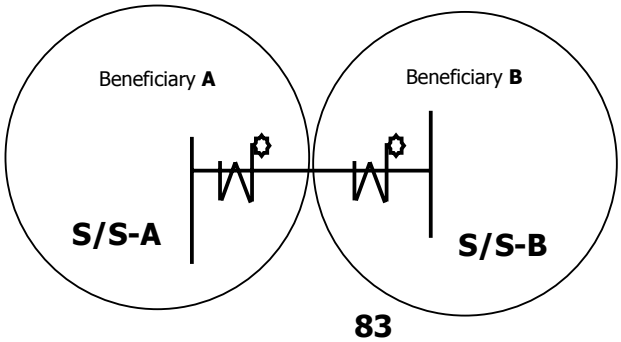

Beneficiary -B pays to Beneficiary -A for

(i) Net VArh received from Beneficiary -A while voltage is below 97%, and

(ii) Net VArh supplied to Beneficiary -A while voltage is above 103%

**Note: Net VArh and net payment may be positive or negative**

Case – 3: Interconnecting line is jointly owned by Beneficiary -A and –B.
Metering points : Substations of Beneficiary -A and Beneficiary -B



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

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

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

Note:

i. Net VArh and net payment may be positive or negative.

ii. In case X1 is positive and X3 is negative, or vice-versa, there would be no payment under (i) above.

iii. In case X2 is positive and X4 is negative, or vice-versa, there would be no payment under (ii) above.

## CHAPTER -7
## MANAGEMENT OF U.P. ELECTRICITY GRID CODE

7.1 The U. P. Electricity Grid Code (UPEGC) shall be specified by the Uttar Pradesh Electricity Regulatory Commission (UPERC) as per section 86 (1) (h) of the Electricity Act, 2003. Any amendments to UPEGC shall also be specified by UPERC only.

7.2 The UPEGC and its amendments shall be finalized and notified adopting the prescribed procedure followed for regulations issued by UPERC.

7.3 Any User can propose an amendment/modification in the Grid Code. However, the procedure to be followed for seeking amendment/modification to the UPEGC shall be as follows:

i) All requests for amendments to / modifications in the UPEGC and for removal of difficulties shall be routed through the State Power Committee (SPC) and shall be addressed to Secretary, State Power Committee. The SPC shall discuss and deliberate on the issue in its quarterly meetings or adhoc meeting called for the specific purpose wherein it shall endeavor to evolve consensus on the matter among members. Based on such consensus decision, the SPC shall forward the request for amendment in UPEGC to the Commission alongwith its recommendation and a certified copy of the minutes of the meeting in which the proposed modification/amendment was discussed.

ii) Notwithstanding the provisions of Para 7.3 (i) above, in case of divergence of views at SPC or otherwise, a User may file a petition before the Commission seeking amendments to / modifications in the UPEGC. In such cases, UPERC may seek views from State Power Committee on the proposed amendment/modification.

iii) The Commission shall take a final view on the proposed amendment after considering the recommendations/views of State Power Committee. The recommendation of the State Power Committee shall however not be binding on the Commission.

iv) Further, any dispute or query regarding interpretation of UPEGC may be addressed to Secretary, UPERC and clarification issued by the UPERC shall be taken as final and binding on all concerned.

## BACKGROUND NOTE

1. The existing U.P. Electricity Grid Code, 2000 was prepared by Uttar Pradesh Power Corporation Limited (State Transmission Utility), and approved by the Commission vide its order dated 8th Aug 2000. However, section 86 (1) (h) of the Electricity Act 2003 requires the State Commission to specify a State Grid Code consistent with the Indian Electricity Grid Code specified by the Central Commission. This implies that the State Grid Code has to be a document prepared by the State Commission.

2. The Commission, therefore, in exercise of powers conferred under section 86 (1)(h) of the Electricity Act, 2003, specifies this new Grid Code. This shall be called UP Electricity Grid Code, 2006 (referred to as "UPEGC" or "Grid Code"). The existing U.P. Electricity Grid Code, 2000 shall stand repealed from the date of notification of this Grid Code in the official gazette of Government of U.P.

3. The Grid Code 2000 provided for a Grid Code Review Panel, with its Chairman and Member Secretary nominated by the STU, and other members from different utilities connected with the State Power Grid. Changes in the earlier Grid Code were made on the recommendations of the Review Panel and approval of the Commission. Since, under the provisions of EA 2003, the responsibility of specifying the State Grid Code has been directly vested with the Commission, the Grid Code Review Panel is no longer necessary. The issues related to management of Grid Code have accordingly been dealt in Chapter-7 without the provision of Grid Code Review Panel.

4. As per Section 73(d) of the Act, the "Grid Standards for operation and maintenance of transmission lines" are to be specified by Central Electricity Authority (CEA). As and when Grid Standards are specified by CEA, and the IEGC is amended, Grid Code 2006 will also be amended.

5. As per section 32 (2) (c) of the Electricity Act, 2003, the State Load Despatch Centres (SLDC) shall "keep accounts of quantity of electricity

transmitted through the State grid". The responsibility of preparation of State Energy Accounts hitherto with the REB Secretariat, shall accordingly stand transferred to the SLDC from the date of notification of this Grid Code.

6. Under the provisions of EA 2003, the Regional Electricity Boards (REBs) have been replaced by Regional Power Committees (RPC). The Central Government vide its principal resolution dated 25.05.2005 have notified establishment of RPCs. The IEGC has accordingly been revised by CERC. In order to provide better co-ordination between the State, the regional constituents and the RPC and also to give more focus to State specific issues related to operations, management and planning of the State Power Grid the Commission has constituted a committee called State Power Committee in this Grid Code for carrying out functions similar to RPC at the State level. The above committee shall also give its recommendations on any proposal for amendments/modifications in the Grid Code to UPERC.

7. The earlier UPEGC was silent regarding the payment for reactive energy exchanges amongst Users. However, under the revised scheme of things rates and procedures as specified by the CERC for reactive power exchange have been recommended for all the Users connected to the State Power Grid.