

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

No. L-1/220/2017-CERC

Dated 26.4.2017

**PREAMBLE**

The manual on transmission planning criteria published by CEA covers the planning philosophy, the information required from various entities, permissible limits, reliability criteria, broad scope of system studies, modelling and analysis, and gives guidelines for transmission planning. Since, the transmission charges for inter-State Transmission System (ISTS) to be executed on the basis of transmission planning have to be recovered from the users in accordance the Sharing Regulations of this Commission, a need has been felt to specify regulations on transmission planning to ensure that planning is carried out in consultation with all concerned agencies and stakeholders in a transparent manner. The Regulations on Transmission Planning shall cover the governance aspects of transmission planning. The regulatory provisions would be enforceable through the powers of the Commission specified in the Electricity Act 2003.

**NOTIFICATION (DRAFT)**

In exercise of powers conferred under clause (c) of sub-section (1) of Section 79 read with sub-section (1) and clause (ze) of sub-section (2) of Section 178 of the Electricity Act, 2003 (36 of 2003), and all other powers enabling it in this behalf, and after previous publication, the Central Electricity Regulatory Commission hereby makes the following regulations, namely:

**1. Short title, extent and commencement**

- (1) These regulations may be called the Draft Central Electricity Regulatory Commission (Transmission Planning and other related matters) Regulations, 2017.
- (2) These regulations shall come into force from date of its publication in gazette.

**2. Scope of Regulations:**

- 2.1. To govern planning and development of an efficient, reliable and economical system of ISTS and associated intra-State Systems.

2.2. These Regulations shall be applicable to CEA, CTU, Inter State Transmission Licensees, SEBs/STUs, SLDC, RLDCs, NLDC, RPCs, NPC, DICs and other utilities involved in the transmission planning process.

### **3. Definitions:**

3.1. **Central Repository of Generators:** A database maintained by CEA where every generator shall have to mandatorily register prior to applying for Connectivity to ISTS or Intra-State Transmission System.

3.2. **Central Study Committee:** A standing Committee constituted by CEA comprising of members from CEA in the lead role, CTU, Member Secretary of State Power Committees, NLDC, RPCs as its members and shall be responsible for compiling data and studies received from Regional study Committees and conduct studies at National level for discussion in Standing Committee. Till such time a State Power Committee is formed, STUs shall be member of this Committee.

3.3. **General Network Access** means the non-discriminatory access to ISTS granted by the CTU to a State or a generating company or other entities for an anticipated maximum injection/ drawal for a specified period and from a specified date. General Network Access shall be applicable after the same is made effective by the Commission through appropriate regulations.

3.4. **Regional Study Committee:** A standing Committee constituted under RPC comprising of members from CEA, STUs in the region, RLDC, SLDCs, DISCOMs in the region, RPC, as its members and CTU as coordinator. One of the STUs on rotational basis shall take the lead role among STUs and represent in the Central Study Committee and shall be responsible for collecting data (as defined in Detailed Procedure) and conducting studies at regional level for recommending to Central Study Committee.

3.5. **State Power Committee:** means a committee established by resolution by the State Government for a specified State for facilitating the integrated operation of the power systems in that state;

3.6. The other terms used in this Regulation shall have meaning as defined in the Act or other concerned CERC Regulations.

### **4. Objective**

- 4.1. The objectives of these regulations is to lay down the broad principles, procedures, methodology and timelines in the process of planning and developing an efficient, reliable and economical system of ISTS and associated intra-State Transmission System and inter-alia provide for following:
- (a) To specify the broad principles and procedures to be used for planning and development of inter-State Transmission System (ISTS) and associated intra-State Transmission Systems.
  - (b) To provide methodology for information exchange amongst generators connected with ISTS, STU, SLDC, CTU, RLDC, RPC, NLDC and CEA for coordinated planning and development of the ISTS.
  - (c) Identifying roles and responsibilities for various organisations in line with the Act.
  - (d) To provide for transparency in the Planning Process.

## **5. Roles and responsibilities of various Organization**

- 5.1. The Electricity Act, 2003 recognizes that transmission planning process is a coordinated activity whereby CEA shall co-ordinate the activities of the planning agencies for the optimal utilization of resources to subserve the interests of the national economy and to provide reliable and affordable electricity for all consumers. The CTU and STUs are also obligated to plan ISTS and intra-State transmission system respectively and they need to coordinate among themselves in addition to coordination with Central Electricity Authority, Licensees, Generating Companies, Regional Power Committees and Central & State Governments. Under the Act, the generating companies are also required to coordinate with CTU or the STU, as the case may be, for transmission of electricity generated by them.
- 5.2. This Part identifies roles of various organizations involved in Power System Planning and their organizational linkages so as to facilitate planning and development of ISTS and associated upstream and downstream intra-state system.

5.3. The roles of entities wherever defined in the Act shall be read in conjunction with the Act as amended from time to time.

## **6. Role and Responsibility of CEA:**

The Central Electricity Authority in line with the responsibility as per the Act shall be responsible for:

- (1) To maintain Central Repository of generators as per functions outlined in these Regulations.
- (2) To lead Central and Regional Study Committees.
- (3) To conduct Standing Committee Meetings as per the timeline specified herein.
- (4) To specify Transmission Planning Criteria from time to time.

## **7. Role and Responsibility of CTU**

### **7.1 The role of CTU as defined in the Act is reproduced below:**

The Central Transmission Utility shall be responsible for

- (a) Discharging all functions of planning and co-ordination relating to ISTS with:
  - (i) State Transmission Utilities;
  - (ii) Central Government;
  - (iii) State Governments;
  - (iv) Generating companies;
  - (v) Regional Power Committees;
  - (vi) Central Electricity Authority;
  - (vii) Transmission Licensees;
  - (viii) Any other person notified by the Central Government in this behalf;

- (b) Ensuring development of an efficient, co-ordinated and economical system of ISTS for smooth flow of electricity from generating stations to the load centres.

**7.2 In the context of implementation of these regulations, CTU shall perform the following functions:**

- (a) To conduct regular meetings based on the transmission access applications.
- (b) To seek status of generation projects from the project developers and CEA on quarterly basis.
- (c) To provide information to the Central Study Committee on the basis of transmission access applications and associated studies.
- (d) To carry out studies for evolving transmission system by the Central Study Committee and share the base case file with Regional Study Committee.

**8. Role and Responsibility of STU:**

**8.1 The role of STU as defined in the Act is reproduced below:**

The functions of the State Transmission Utility shall be

- (a) To discharge all functions of planning and co-ordination relating to intra-State transmission system with –
  - (i) Central Transmission Utility;
  - (ii) State Governments;
  - (iii) Generating companies;
  - (iv) Regional Power Committees;
  - (v) Authority;
  - (vi) licensees;
  - (vii) Any other person notified by the State Government in this behalf;

- (b) To ensure development of an efficient, co-ordinated and economical system of intra-State transmission lines for smooth flow of electricity from a generating station to the load centres.

**8.2 In the context of implementation of these regulations, STU shall perform the following functions:**

- (a) Preparation of base case of the state for Transmission Plan;
- (b) To bring operational issues in the State, in consultation with SLDC based on the operational feedback given by the SLDC, to the Regional Study Committee;
- (c) Coordinated planning of intra state network matching with inter-state network;
- (d) To furnish drawal GNA to CTU from time to time.

**9. Role of National Load Despatch Centre:**

- (1) National Load Despatch Centre (NLDC) shall be responsible for providing periodic operational statistics and feedback to CTU and CEA for factoring in planning of ISTS and associated intra-state transmission system.
- (2) To refer the operational issues to the Central Study Committee.

**10. Role of Regional Load Despatch Centres (RLDCs):**

To refer the operational issues to the Central Study Committee and also share operational study files with the Central Study Committee.

**11. Role of SLDCs:**

- (1) State Load Despatch Centres shall be responsible for providing operational statistics and feedback to STU for factoring in the planning of intra-State Transmission System.
- (2) To refer the operational issues to the Regional Study Committee and also to share operational study files with the Regional Study Committee.

**12. Role of Generators:**

- (1) Generating station connected/likely to be connected to ISTS or intra-state transmission system at 132 kV and above shall be responsible for providing technical data as per the format specified by Central and Regional Study Committees. At the planning stage, the Generators seeking connectivity shall submit the requisite details including injection LTA/GNA granted by CTU for consideration in simulation studies.
- (2) Generating company shall furnish status of their projects to CTU/ CEA from time to time including the technical details of the generating station after its commercial operation.

**13. Role of DISCOMs / Bulk Consumers/ Transmission Licensees:**

DISCOMs / Bulk Consumers/ Transmission Licensees shall be responsible for providing data as per format specified by Central and Regional Study Committees.

**14. Role of the Standing Committee(s) for Power System Planning (SCPSP):**

The SCPSP constituted by CEA firms up and reviews the transmission plans based on the proposals received from CTU, STUs, constraints in the system and growth in power system.

**15. Role of Central Study Committee:**

- (a) To prepare a detailed procedure covering detailed time-line of activities, studies to be carried out based on laid down standards/criteria, outputs to be declared, etc., for planning of transmission system.
- (b) To prepare format for the data base to be filled up and updated by the Regional Study Committee (for Intra-state system) and CTU (open access data) every year.
- (c) To prepare year-wise/quarter-wise data base and corresponding system studies files.
- (d) Validation of the data including drawal LTA/GNA of states, Studies and Proposal of New Transmission Plan submitted by Regional Study Committee,

conducting meetings between the Central and Regional Study Committee for discussion on the New Transmission System.

- (e) To discuss results of the studies carried out by CTU and recommend the decision of the Central Study Committee to CEA for discussion in the Standing Committee.

**16. Role of Regional Study Committee:**

- (a) To coordinate with the STUs in the region in preparation of their data base and system study files in each region. STUs to finalise drawal LTA/GNA data and submit to Central study Committee.
- (b) To prepare transmission planning alternatives and refer the same to the Central Study Committee.
- (c) CTU will provide the data and alternatives along with recommended alternative concluded in Regional Study Committee to Central Study Committee.
- (d) Monitor implementation of matching intra-state system periodically with period to be specified by CEA in the separate procedure to be notified under these Regulations.

**17. Central Repository of Generator:**

- (a) Central Repository of Generators shall be created in CEA where any generation project developer proposing to set up a new generation plant must register itself.
- (b) Such a repository should contain information in regard to the likely generation additions in the country including Renewable Energy projects interconnected to ISTS as well as Intra-State Transmission System, starting from inception of the Generating Station till its commercial operation with periodic update of their status.
- (c) Periodicity of update regarding specified milestones and other details should be specified in the Detailed Procedure to be prepared by CEA.
- (d) The frequency of updating of status may be monthly for the units to be commissioned during the ensuing year and quarterly for other units.



- (e) Generator should also indicate status of signing of PPA in its periodic update to Central Repository.

## **18. Transparency in the planning process:**

18.1. For the sake of transparency following is required to be ensured by the CEA, CTU & STU while carrying out planning of transmission system in the Country:

- (a) Transmission planning meetings must be open to all affected parties including, but not limited to, all transmission and interconnection customers and other stakeholders.
- (b) To disclose to all customers and other stakeholders the basic criteria, assumptions, and data that underlie their transmission system plans.
- (c) To provide in writing and make available the basic methodology, criteria, and processes they use to develop their transmission plans.
- (d) The stakeholders themselves or through their an independent third party can replicate the results of transmission planning studies and discrepancies/comments can be furnished to Central Study Committee, Regional Study Committee or CTU or STU.
- (e) Disclosure of critical infrastructure information and commercially sensitive data with regard to transmission planning shall be governed by the provisions of Section 8 of the Right to Information Act, 2005.

## **19. Broad Principles of Transmission Planning:**

19.1. The broad principles of transmission planning shall be as under:

- (a) To plan transmission system for optimal utilization of resources to subserve the interests of the national economy with due consideration to power market.
- (b) Likely closing of old/inefficient plants.
- (c) Facilitate realization of the policy objectives for RES.
- (d) Duly considering adequacy of system from the perspective of black start/start-up supply.
- (e) Requirement of Reactive Power
- (f) R-O-W Limitations

- (g) New and Emerging Technologies
- (h) Cost-benefit analysis
- (i) Upgradation of existing System
- (j) Other considerations like public policy, cross border interconnection, etc.
- (k) Any other criteria considered necessary by CEA for efficient and economic planning of the ISTS.

19.2. Planning of Transmission System shall be done in due consideration of the following as amended/specified from time to time:

- (a) National Electricity Policy, 2005 and Tariff Policy, 2016;
- (b) Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-state Transmission and related matters) Regulations, 2009;
- (c) Central Electricity Authority (Technical Standards for Connectivity to the Grid), Regulations, 2007;
- (d) Load forecasts issued by CEA and nodal forecasts provided by STUs, special economic zones;
- (e) Any other relevant regulations issued by the CERC or CEA

## **20. Transmission Planning Criteria:**

20.1. Under the Act, CEA is responsible to specify Transmission Planning Criteria and review/amend it from time to time.

20.2. While specifying the Planning Criteria, CEA shall also consider the following broad principles:

- (a) The Dynamic Stability Studies of heavily loaded transmission system with High Gain Static Excitation system along with PSS and Limiters in action should be carried out.
- (b) Voltage Stability Studies including development of VQ curves under the worst contingency.

- (c) Evaluate the impact of SCR and Inertia Constants of large size generators in the Public and Private Sectors on load-ability of lines.
- (d) Application of reactive sources on the lines in the form of shunt reactors, passive and dynamic compensation and in special cases use of Phase Angle Regulators at strategic nodes to control the loop power flows and optimize the loadings on lines shall be done.
- (e) Besides the passive shunt reactors provided in the system, dynamic support in the form of SVC or STATCOM should be provided to take care of post-fault developments. The quantum of dynamic resources in the form of SVC and STATCOM would be over and above the quantum of passive compensation provided and as a thumb rule it could be around 50 % of passive capacitive resources.

## **21. Standing Committee for Transmission Planning**

- 21.1. National Standing Committee on Transmission Planning under the CEA shall be responsible for taking all decision with regard to the planning of ISTS after considering the inputs received from Central Study Committee and Regional Study Committee in accordance with the timelines specified in Regulations 26 of these Regulations.
- 21.2. The National Standing Committee on Transmission Planning shall be guided by the Rules of Procedure as may be decided by CEA with regard to the manner of conducting the proceedings, quorum, consultation with stakeholders and basis for decisions.

## **22. Classification of Transmission Plans:**

The transmission plans shall be classified under following categories:

- (a) Reliability Upgrade: These are the transmission plans which shall make the system compliant to transmission planning criteria. This shall be done for older systems. New systems shall be planned as per Transmission planning criterion.
- (b) Economic Upgrade: These are the transmission plans which shall relieve congestion to avoid market splitting in power exchanges or decrease transmission losses.

- (c) Interconnection Upgrade: These are the transmission plans which shall be planned to interconnect new generating station with the grid. The new connection should not adversely affect the existing grid.
- (d) International Interconnections: These are the transmission plans which shall be planned for international interconnections.
- (e) Public policy Upgrade: These are the transmission plans which are planned as public policy assets.

The priority of implementation may be decided depending on type of upgrade.

- 22.2. CEA will compile the data as well as alternatives as received from Regional Study Committees for study at national level and prepare regional and national transmission plans.
- 22.3. CEA, while proposing plans in Central Study Committee may go for alternatives recommended by Regional Study Committee or may choose another alternative as per the results of studies at national level.
- 22.4. The last base case file shall be circulated to all Regional study Committees. All regions will do the study and Central Study Committee will combine the studies at national level.

### **23. Procedure for Transmission Planning:**

- 23.1. The following procedure shall be complied with all entities involved in the transmission planning of ISTS:
  - (a) The inputs regarding the generating stations which are likely to come up would become available to the transmission planners from the Central Repository of generation projects, applications for GNA and STUs.
  - (b) The demand projections by the STUs estimated by them in coordination with the DISCOMs should form the baseline for transmission planning.
  - (c) In case the projected import/export requirement is not provided by STU, CTU should, in consultation with CEA and POSOCO, assess the import /export requirement of the State for the purpose of transmission planning and upload the same on CTU's website for comments from stakeholders. The same shall be discussed at Regional study Committee level. In the absence of any response to the same from STU, the projected

import/export requirement assessed by CTU should be taken for transmission planning.

- (d) Bulk Consumers directly connected to ISTS need to provide their drawal requirements from the ISTS.
- (e) The Central Study Committee shall validate the projected import/export requirement from ISTS provided by STUs / assessed by CTU considering the comments received from stakeholders on the uploaded data. The Central Study Committee shall finally approve the projected import/export requirement for each State which shall be uploaded on website of CEA and CTU and shall be used for planning.
- (f) The import/export requirement assessment shall be an Annual rolling exercise to be completed by 31st March of each year.
- (g) Transmission planning may be carried out under the aegis of Standing Committee on Transmission planning with a suitable margin above Withdrawal GNA sought / assessed for each State which may be finalized by CEA in the separate procedure to be notified under these Regulations.
- (h) System studies should be carried out for various generation and load scenarios during peak, off-peak and other than peak/off-peak hours for different seasons considering low, moderate and high renewable capacity addition, scheduling of various generating stations which do not have any PPAs based on the relative merit order and GNA applied by the Generating Companies and the load projections of the States. The objective shall be to minimize the variable cost of generation. However, balance should be struck between minimizing the variable cost of energy and the requirement of transmission system.
- (i) The variable cost of existing generating stations as available with CEA/Regulatory Commissions shall be considered. CERC would notify escalation indices for pit head and non-pit head plants to be considered for estimating the variable cost for planning period. The variable cost of new generating stations should be estimated by CTU in consultation with CEA and the generating stations based on likely source of fuel, normative heat rate as per CERC Regulations, variable charges of existing generating stations in a state based on pit head/load center based stations. In case of non-availability of data from CEA, variable charges may be considered by

CTU based on similar sized units and norms for heat rate/ specific oil consumption, etc., as per CERC Regulations.

- (j) Probabilistic scenarios shall be developed by CTU considering varying import/export requirement of each state, which would depend on generation dispatches and probabilities of load forecasts.
- (k) These scenarios be declared upfront and options in various scenarios should be put up on website of CTU for comments/suggestions of stakeholders.
- (l) In case Injection GNA happens to be more than Withdrawal GNA, planning of ISTS should be done for various scenarios of dispatch limited to Withdrawal GNA duly factoring known firm tie-ups of power.
- (m) ISTS will be planned based on import / export requirement for approval/concurrence of Standing Committee on Transmission Planning.
- (n) While planning the transmission system, options of upgrading the existing ISTS in place of building new transmission lines such as increasing line loading through use of compensation, reconductoring, etc. for optimally utilizing the existing assets, should also be considered.
- (o) Based on progress of implementation of generating stations, mid-course correction for transmission system to the extent possible should be made in terms of (i) Re-configuration of planned transmission system (ii) Phasing of transmission elements (iii) Delay/Deferment of some of the transmission elements.
- (p) **Transmission Planning for Renewable Energy Sources:** Transmission system may be planned by CTU/CEA based on estimated capacity additions in perspective plan and RPO of each State and approach CERC for regulatory approval for the same. In addition, the Standing Committee on Transmission Planning may consider margins to cater to renewable capacity additions. Sensitivity analysis may be carried out for low, moderate and high renewable capacity addition. MNRE may suggest likely location of renewable generating stations 4-5 years in advance to facilitate transmission planning.

## 24. Regulatory approval of transmission System:

24.1. CTU would be required to approach the Commission for approval of new transmission assets in respect of ISTS within a month of its approval by Standing Committee. Commission may dispose of such petition within 3 months of its filing after considering the objections/ suggestions from the stakeholders.

24.2. Based on the above, the ISTS should be undertaken for implementation either through TBCB or Cost-Plus route as decided by the Empowered Committee.

**25. Review of Transmission Planning:**

25.1. Transmission Planning and its implementation shall be reviewed/updated keeping in view of inputs regarding generation such as deviation/departure from commissioning schedule, shifting of target region, retirement of units, operational feedback provided by RLDCs and SLDCs, exit from LTA, system constraints, market conditions, etc. CEA and CTU shall devise a methodology for review of transmission plan in detailed procedure to be formulated by CTU and CEA.

**26. Information Exchange timeline:**

26.1. The timeline for exchange of information and other activities involved in the transmission planning shall be on yearly basis. The indicative timeline is given below:

	<b>Activity</b>	<b>Entity Responsible</b>	<b>Suggested Timeline</b>
1	Period for consideration of injection GNA application filed by DICs	DICs	Received upto 31 <sup>st</sup> March
2	Data to be submitted by Regional Study Committee to CTU to be shared with Central Study Committee	Regional Study Committee	30 <sup>th</sup> April
	Operational issue to be submitted by NLDC/RLDC to Central Study Committee	NLDC/RLDC	
3	Validation of data including meeting between Regional Study Committee and Central Study Committee	Central Study Committee	15th May
4	Study and proposal of new transmission Plan including uploading of options on CTU Website seeking comments of stakeholders	Central Study Committee	5th June
5	Recommendation of new transmission plan to be included in Agenda of Standing Committee Meeting	Central Study Committee	30 <sup>th</sup> June

6	Issue of Agenda of Standing Committee Meeting	CEA	15th July
7	Standing Committee Meeting	CEA	1st August
8	Approval of transmission Plan	CEA	30 <sup>th</sup> August
9	Approval of CERC	CERC	15th December

Note:

- (i) The study files of final accepted network configuration in Standing Committee along with assumption files shall be retained at CEA for next 10 years.
- (ii) In case data is not provided by STU by the specified timeline, CTU/CEA may approach CERC for enforcing non- compliance of Regulations.

## 27. Manpower Deployment in Transmission Planning

Proper and adequate manpower for conducting transmission planning exercise shall be ensured by CTU and STUs. CTU in consultation with STUs shall prepare a scheme for certification of personnel involved in planning at CTU and STU level similar to the system in place for System Operators.

Sd/-  
(Sanoj Kumar Jha)  
Secretary