Report of Task Force for giving input for Draft Regulations on Transmission Planning

February, 2016

Members of the Task Force

S1.	Name of the Member	Name of	Designation
1		Organisation	
1.	Shri A.K. Saxena	CERC	Chief (Engg.), Chairperson
2.	Mr. Karuna Sarma	AEGCL	AGM (E)
3.	Ms. Arundhati Ghosh	WBSETCL	Chief Engineer, CPD
4.	Mr. Rajiv Porwal	POSOCO	AGM (System Operation)
	Mr. Vivek Pandey (Alternate Member)	POSOCO	Chief Manager (System Operation)
5.	Mr. Ashok Pal	POWERGRID	AGM (CTU)
6.	Mr. Suman Guchh	UPPTCL	CE, Transmission Planning & Power System Studies
7.	Mr. Pardeep Jindal	CEA	Director (SP & PA)
8.	Mr. Omprakash k Yempal	MSETCL	Director (Operation/Projects)
9.	Mr. Ch. V. Subba Rao	APTRANSCO	Superintending Engineer/Power Systems
	Mr. A. Satyanarayana	APTRANSCO	Superintending Engineer/Planning
10.	Ms. Shilpa Agarwal	CERC	Dy. Chief (Engg.), Member Convenor

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Report of Task Force for giving input for Draft Regulations on Transmission Planning

1. Constitution of the Task Force

- 1.1. The Task Force for giving input for forming of Draft Regulations on Transmission Planning was formed vide CERC's Office Order dated 20.2.2015. Vide the said order the Commission contemplated framing of separate Regulation on Transmission Planning detailing the roles and responsibilities of various organizations / information requirements, their timelines etc.
- 1.2. The Task Force was formed with following composition:
 - (1) Shri A.K. Saxena, Chief (Engg.), CERC
 - (2) Mr. Karuna Sarma, AGM (E), AEGCL
 - (3) Ms. Arundhati Ghosh, Chief Engineer, CPD, WBSETCL
 - (4) Mr. Rajiv Porwal, AGM (System Operation), POSOCO
 - (5) Mr. Vivek Pandey (Alternate Member), Chief Manager (System Operation), POSOCO
 - (6) Mr. Ashok Pal, AGM (CTU), POWERGRID
 - (7) Mr. Suman Guchh, CE, Transmission Planning & Power System Studies, UPPTCL
 - (8) Mr. Pardeep Jindal, Director (SP & PA), CEA
 - (9) Mr. Omprakash k Yempal, Director (Operation/Projects), MSETCL
 - (10) Mr. Ch. V. Subba Rao, Superintending Engineer/Power Systems, APTRANSCO
 - (11) Mr. A. Satyanarayana, Superintending Engineer/Planning, APTRANSCO
 - (12) Ms. Shilpa Agarwal, Dy. Chief (Engg.), Member Convenor, CERC

One copy of the aforesaid CERC Office Order is at Appendix-I.

1.3. The Terms of Reference of the Task Force are:

- (a) To specify the principles, procedures and criteria which shall be used for planning and development of Inter State Transmission System (ISTS) in different time horizons and associated Intra-State Systems;
- (b) To promote co-ordination amongst all Users, STUs, SLDCs and CTU, RLDCs, NLDC, RPCs and CEA in any proposed development of the ISTS;
- (c) To provide methodology and information exchange amongst Users, STU/SLDC and CTU/RLDC, RPC, NLDC and CEA in the planning and development of the ISTS.
- 1.4. One copy each of the minutes of meetings were held from during July-December, 2015 is enclosed as *Appendix-II*. The discussions which took place in the meetings were on the following aspects:
 - (a) Need for separate Regulations on transmission planning
 - (b) The prevailing methodology of transmission planning and difficulties faced
 - (c) Need for development of matching intra-state transmission system with ISTS and need of similar Regulations at State level.
 - (d) The principles, procedures and criteria for transmission planning
 - (e) Need of a mechanism to Review the plan
 - (f) Timelines for information / data required by the stakeholders so as to make effective transmission plan.
- 1.5. The following part of report briefly covers above aspects.

2. Need for separate Transmission Planning Regulations

2.1.During the first meeting of the Task Force, Chairman of the Task Force apprised the members about formation of the Task Force in the backdrop of the need being felt in transmission planning to explicitly define roles and responsibilities of various entities so as to facilitate and strengthen transmission planning process. He stated that separate Regulations on transmission planning are being framed and the Planning Code defined in the CERC (Indian Electricity Grid Code) Regulations, 2010 would be taken out. He further made a mention of Regulation 3.7 of the Indian Electricity Grid Code (IEGC) which provides connection between transmission planning and its actual implementation whereby it is provided that the actual program of implementation of transmission lines, interconnecting transformers, reactors/capacitors and other transmission elements will be in accordance with the Detailed Procedure under Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-state Transmission and related matters) Regulations, 2009. Regulation 3.7 of IEGC is extracted herewith for ready reference.

"3.7 Implementation of Transmission Plan

The actual program of implementation of transmission lines, Interconnecting Transformers, reactors/capacitors and other transmission elements will be in accordance with the detailed procedures mentioned in the Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) Regulations, 2009."

2.2. The representative of CEA mentioned that as per Section 73 (a) of the Electricity Act, 2003, CEA is obligated to formulate short-term and perspective plans for development of the electricity system and co-ordinate the activity of the planning agencies for optimal utilization of

resources. He submitted that in order to fulfill this function, CEA has constituted Regional Standing Committees for Power System Planning (SCPSP) to firm up transmission addition proposals. The Commission should consider statutory duties of CEA defined in the Act while framing Regulations on transmission planning, especially in respect of preparation of National Electricity Plan under Section 3 of the Act and also functions of CERC under Section 79(4) of the Act.

- 2.3 All the members agreed that the Regulations on transmission planning would facilitate transmission planning process.
- 2.4. The aspects as stated by CEA have been duly taken care of while framing the draft Regulations.

3. The current methodology of transmission planning and difficulties faced

- 3.1. Representative of CEA gave a detailed presentation during the first meeting held on 29.7.2015 on the current methodology of transmission planning. He also mentioned following:
 - (a) Presently transmission planning in India is done on the basis of Long Term requirement and not for medium term or short term. Loadgeneration balance is being done on the basis of Electric Power Survey published by CEA.
 - (b) It is required to get real data/information of existing system to streamline the process of planning and to make load forecasting as close to real load.
 - (c) In some of the developed countries Regulatory body provides a Statement of Opportunities (SOO) on the basis of which planning to transmission system is done. In India, transmission planner takes data from Planning Commission, Electric Power Survey Reports, etc., which generally projects growth more than the actual one.

- (d) Seasonal load-generation data are considered but should be updated on regular basis in view of changing climatic scenario.
- (e) Transmission planning should be guided by the Electricity Act, 2003, National Electricity Policy, National Electricity Plan, Grid Standards, Transmission Planning Criteria, Design Codes, and Transmission Access Regulations.
- (f) Presently planning for development of transmission system in the country is done keeping in view 6 scenarios i.e. peak and off-peak requirement of three seasons. It can also be done for 8 scenarios i.e. peak and off-peak requirement quarter wise.
- (g) He gave example of growth of electricity sector in some European countries and India and showed that rate growth of in India is very high and development of transmission system should match that growth. He stressed on the need of regional and state level planning in view of difference in growth and demand in different regions and states which will finally result in development of an efficient ISTS. The present method of Top-to-Bottom approach should now be accompanied with detailing of 220 kV and below transmission network. For this, States should provide characteristics of their load centres like MW load, power factor, growth rate, etc.
- 3.2. The representative of POWERGRID mentioned that at present planning of transmission system is done by CEA and CTU on the basis of long term requirements (LTA) of the customers. He further added that transmission is a licensed activity while generation has been delicensed which is posing great challenge for transmission planners. He stressed the need for certified data from State Utilities and their involvement in the system studies for planning for inter-State as well as intra-State transmission system.

4. Participation of States in transmission planning:

- 4.1. The representatives of CEA and CTU submitted that involvement of different stakeholders including distribution companies with defined roles and responsibilities along with time frame for completion of activities should also be included in transmission planning Regulations. CEA further mentioned that States are not informing properly the load that would be incident on 220 kV system in the next five years.
- 4.2. The representative of WBSETCL stated that transmission planning should start from DISCOM level. DISCOMs should provide data to STU regarding area wise load by 15th January every year so that STU can plan system properly and provide proper data to CTU.
- 4.3. The representative of Maharashtra State Electricity Transmission Company (MSETCL) mentioned that distribution companies should provide requirements of power for different types of consumers in their respective areas for the next five years to the concerned STU and CEA. He also stated that actual variation from EPS is to the tune of 2-3%. He stated that a timeframe must be suggested by which states should also come out with similar Regulations for intra-state transmission system.
- 4.4. Representative of Assam Electricity Grid Corporation Limited (AEGCL) mentioned that the distribution companies are not giving proper feedback in regard to load growth in their respective areas and are also not providing inputs for transmission planning. He submitted that planning for the development of transmission system should be done for the next 10 to 15 years and DISCOMS. He added that construction of transmission system in Assam takes more than 4 years due to forest issues.
- 4.5. Representative of UP Power Transmission Corporation Limited (UPPTCL) stated that there is a need to involve DISCOMS in planning process and the Regulations should provide for submission of accurate data by DISCOMs.

- **5.** Other issues highlighted by CEA:
- 5.1. Other issues highlighted by CEA which were affecting the transmission planning are as under:
 - (i) Inadequacy of present load forecasting methods
 - (ii) Land Acquisition
 - (iii) Fuel linkages for coal based power plants
 - (iv) Beneficiaries of most of IPPs not firmed up
 - (v) Uncertainty in Hydro-electric Generation Projects
 - a) Difficulty in Environment clearance
 - b) Longer Gestation Period
 - c) Geological surprise
 - d) Local issues
 - e) Basin wise development
 - (vi) Open Access in Transmission and Power Exchange
 - a) Market driven exchanges influence pattern of power flow
 - b) Increasing share of sale under STOA and MTOA
 - (vii) Issues in Implementation of Transmission Projects
 - a) Environment/forest/RoW
 - b) Contractual delays
 - c) Issues in TBCB: Representative of CEA raised issue regarding monitoring execution of transmission lines under TBCB. He also stated that even the lines awarded to POWERGRID under "compressed time schedule" need to be monitored for timely completion.
 - d) Need for periodic review of plan
 - (viii) Manpower requirement for transmission planning with respect to quantity and quality.
 - (ix) How much congestion as a percentage can be allowed
- 5.2. Few aspects as stated by CEA, CTU, WBSETCL, MSETCL, AEGCL have been incorporated in draft Regulations in the form of a Regional Study team which would comprise of members from DISCOMs, STUs,

SLDCs in addition to CEA, CTU and RLDCs which would be responsible for collecting data from states and conducting studies at regional level.

- 5.3. Other aspects raised by CEA need to be taken care of in the detailed procedure to be prepared by CEA under these Regulations.
- 5.4. Representative of MSETCL stated that farmers should be kept in loop and there should be one window system to observe forest clearance. Chief (Engg.), CERC suggested that there could be quarterly or biannual meeting of stakeholders and State Governments to resolve the issue of ROW.

6. Matching intra-state system with ISTS and need of similar Regulations at State level.

- 6.1. Representative of CEA stated that few states are not completing downstream system matching with ISTS which causes non utilization of assets developed for states and stranding of huge capital assets. Also there is no financial implication for STUs for non-completion of downstream system.
- 6.2. Representative of UPPTCL stated that there should be coordination between central transmission system and state transmission system to fix time frame for execution of downstream system and use of redundant capacity in ISTS. He mentioned that CTU should also submit data to concerned STUs.
- 6.3. Representative of MSETCL stated that States like Andhra Pradesh and Kerala have taken proactive steps in development of state transmission network by forming committee similar to Standing Committee for Power System Planning of CEA where all stakeholders including distribution companies, RPC, SLDC, STU, generators, etc., are invited to discuss and resolve different issues faced by them for

early decision making. Maharashtra already has a Standing Committee at state level.

6.4. The Task Force felt that it is necessary that ISTS and associated intrastate system come in same timeframe to avoid assets being remaining unutilised. Chairman of the Taskforce stated that the Commission had initiated a Suo-motu petition no. 11/SM/2014 in view of the mismatch between ISTS and associated downstream intra-State system in a few states and the Commission has vide order dated 5.8.2015 opined that ISTS transmission licensees and STUs should also sign Implementation Agreement for development of ISTS and downstream system in coordinated way to avoid any mismatch. It was felt that the Regulations for transmission planning at State level may also be framed by State Regulatory Commissions. The secretariat of Forum of Regulators may take up the matter so that the SERCs also frame regulations pertaining to transmission planning for intra-state transmission of electricity.

7. The Principles, Procedures and Criteria for transmission planning:7.1. Principles:

- (a) The representative of CEA stated that principles of transmission planning may be specified which may include base assumptions about generation and demand scenarios, procurement strategy of States, economic analysis including production cost analysis and regulatory tests for selection of transmission plan.
- (b) Representative of CEA stated that it should be left to the discretion of the planners to choose types of studies to be conducted by them and assumptions to be considered for transmission planning. Accordingly the studies required while doing the planning were taken out of the draft Regulations for the time being.
- (c) Joint Chief (Engg.), CERC stated that the objective function like loss of load expectation, congestion hour target, average POC target and

average transmission loss target should be put in SOR or detailed procedure to the transmission planning Regulations as future goal.

(d) The principles as suggested by CEA have been included in the Regulations.

7.2. Procedure

- (a) The representative of CTU and CEA prepared the outline of Transmission Planning procedure for deliberation by the members of the Task Force. As per their proposal, there will be two study teams, namely, Central Study Team and Regional Study Team. The Central Team will comprise of CEA, CTU, one STU from each region, NLDC and RPCs. The Regional study Team will comprise of STUs in the region (one of the STUs on rotational basis to take the lead role and represent in the Central Study Team), RLDC and SLDCs.
- (b) CTU stated that formation of such a Regional study Team will facilitate data collection and planning.
- (c) The representative of APTRANSCO stated that the transmission planning is done by CEA and CTU/STU and those plans are discussed at Standing Committee. He stated that Standing Committee does not conduct any study. Therefore, there is a need for Regional Study Team to conduct various studies at regional level. Representative of West Bengal also agreed to the requirement of Regional Study team.
- (d) Representative of UPPTCL stated that Standing Committee Meetings (SCMS) should be conducted at least 4 times in a year as States may face some issues which require urgent discussion in SCM. Hence there should be a provision that in case agenda requiring immediate attention is there, standing committee may be held in a shorter time span.
- (e) Representative of CTU and CEA were of the view that keeping in view the time required for various activities as detailed in the input for framing draft Regulations, holding Standing Committee meeting more than twice a year may be difficult.

(f) Representative of CERC mentioned that in the order dated 16.2.2014 in Petition No.92/MP/2014, the Commission has directed as follows:

"122.....In our view, there is requirement to undertake studies for system augmentation within a period of 3 months from the last date of the month in which applications were received and intimate about the identified system strengthening within a period of next 3 months so that the applications are disposed of within a period of 180 days as required under Regulation 7 of the Connectivity Regulations. This should require amendment of third proviso to Regulation 10 of the Connectivity Regulations to provide that the application shall be considered as on 31st March, 30th June, 30th September and 31st December of the year for the purpose of studies to decide on the system strengthening for grant of long term access in line with the coordinated transmission plan. We direct the staff of the *Commission to initiate the process for amendment of the Connectivity* Regulations and CTU to propose the amendment to the Detailed *Procedure in this regard. As the Connectivity Regulations and Detailed* Procedure stand today, the LTA applications requiring system strengthening will have to be clubbed as on 30th June and 31st December and after carrying out the system studies the LTA shall be intimated about the additional applicants system strengthening by 31st December of the same year and 30th June of the following year respectively.

.....

141. Staff of the Commission is directed to examine the issues as detailed in the order and submit them for consideration of the Commission.

.....(e) To examine whether LTA applications requiring system augmentation can be considered on quarterly basis."

Thus, staff of the Commission may take the issue of timeline of processing of LTA Application further.

(g) The Task Force felt that CTU should process immediate request from states by circulation of agenda rather than waiting for a Standing Committee meeting in 6 months.

7.3. Criteria

(a) It was decided that Technical criteria shall be as per CEA Transmission Planning Criteria.

8. Need of a mechanism to Review the plan

- 8.1. Representative of POSOCO stated that there should be a timeframe for execution of scheme and the scheme need to be monitored. In case of specific problem, scheme may be reviewed.
- 8.2. Representative of UPPTCL raised a concern regarding non execution of ISTS system on time and due to which state was compelled to plan its own transmission system leading to an underutilised ISTS system. He stated that there should be a mechanism through which if ISTS system is not coming up till a particular timeframe, the STUs should be allowed to reject such a system. He also stated that in case CTU has planned a system for some generators who are not coming up and State asks a connection to such system, its request may be considered by CTU.
- 8.3. The representative of POWERGRID suggested that the implementation of ISTS and associated Intra-State Scheme need to be closely monitored during Standing Committee meeting for timely completion as well as proper utilization of the same.
- 8.4. On the issue of monitoring of execution of generation / transmission systems, representative of CEA stated that the monitoring report of CEA should be taken as final and the same should be used as input by all agencies. However, the representative of CTU stated that status

of projects may be taken by CTU from projects independently also as being done currently.

- 8.5. The need for retaining the system study files by CTU/CEA was discussed. Representative of POSOCO mentioned that study files may be required for some course correction. For example, if it was expected that flow will be from WR to NR but in actual time frame it happens to be from NR to WR, course correction can be planned. Accordingly it has been specified that study files of final accepted network configuration in Standing Committee along with assumption files shall be retained at CEA for next 10 years.
- 8.6. A mechanism to review transmission plan has also been put in the input for framing draft Regulations.

9. Timeline for information/data exchange

The representative of CTU and CEA suggested the timelines for various steps of transmission planning. The timeline for various activities has been included in the draft Regulations. They also suggested that how the exchange of information shall take place among the different stakeholders and constituents.

10. Conclusions

The inputs for framing draft regulations based on the discussions during the four meetings are enclosed as **Appendix-III**. The inputs for framing draft Regulations cover principles, procedure and criteria to be used for transmission planning, roles of various entities and the for information exchange by entities timelines to facilitate transmission planning. These Regulations will help in streamlining the procedure for transmission planning, collection of data at State level and aim to align the transmission planning with changing scenario in power sector such as development of power market, integration of renewable and increase in congestion.

MOST IMMEDIATE By e-mail/Post/FAX

Central Electricity Regulatory Commission 3rd & 4th Floor, Chanderlok Buildign 36, Janpath, New Delhi -110001 (Tele No. 23353503/ Fax No. 23753923)

CERC/Engg/Trans/Transmission Planning/2015

Date 20.2.2015

OFFICE ORDER

Sub: Task Force for giving input for forming of Draft Regulations on "Transmission Planning".

CERC (Indian Electricity Grid Code) Regulations, 2010 inter-alia specifies Planning Code for ISTS. The Commission contemplates framing of a separate Regulation on Transmission Planning detailing the roles and responsibilities of various organisations/information requirements, time lines, etc.

2. Accordingly, it has been decided to form a Task Force headed by Chief (Engineering), CERC with following composition to give input for forming of Draft Regulations on Transmission Planning:

- (1) Representative of CEA
- (2) Representative of CTU
- (3) Representative of POSOCO
- (4) Representative of Uttar Pradesh Power Transmission Corporation Limited
- (5) Representative of Maharashtra State Electricity Transmission Coorporation Limited
- (6) Representative of Tamil Nadu Transmission Corporation Limited
- (7) Representative of West Bengal State Electricity Transmission Corporation Limited
- (8) Representative of Assam Electricity Grid Corporation Limited
- (9) Representative of CERC- Convenor

The Terms of Reference of Task Force are given below

- I. To specify the principles, procedures and criteria which shall be used for planning and development of Inter State Transmission System (ISTS) in different time horizons and associated Intra-State Systems.
- II. To promote co-ordination amongst all Users, STUs, SLDCs and CTU, RLDCs, NLDC, RPCs and CEA in any proposed development of the ISTS.
- III. To provide methodology and information exchange amongst Users, STU/SLDC and CTU/RLDC, RPC, NLDC and CEA in the planning and development of the ISTS.

3. Task Force may complete the work and submit input within 6 weeks from the date of issue of this office order.

(Shubha Sarma) Secretary Cpoy to:

- 1. Chairperson, CEA
- 2. C.O.O., CTU
- 3. C.E.O., POSOCO
- 4. Chairman, UPPTCL
- 5. Chairman, WBSETCL
- 6. CMD, APTRANSCO
- 7. Chairman, MAHATRANSCO
- 8. MD, AEGCL

With a request to nominate a person and provide his contact details including e-mail address within one week.

Central Electricity Regulatory Commission 3rd & 4th floors, Chanderlok Building, 36, Janpath, New Delhi-11001 Telephone: 011-23753917

No: CERC/Engg/Trans/Transmission Planning/2015 30th January, 2016

То

The Members of the Task Force (As per List Enclosed)

Subject: Minutes of the 1st Meeting of the Task Force for giving inputs for framing of Draft Regulation on Transmission Planning.

Madam/Sir,

Please find enclosed herewith minutes of the 1st Meeting of the "Task Force for giving inputs for framing of Draft Regulation on Transmission Planning" held in CERC on 29.7.2015.

Encl.: As above

Yours faithfully,

Sd/-

(Shilpa Agarwal) Dy. Chief (Engineering) (Convenor of Task Force)

Members of the Task Force

S1.	Name of the Member	Name of	Designation
1.	Shri A.K. Saxena	CERC	Chief (Engg.), Chairperson
2.	Mr. Karuna Sarma	AEGCL	AGM (E)
3.	Ms. Arundhati Ghosh	WBSETCL	Chief Engineer, CPD
4.	Mr. Rajiv Porwal	POSOCO	AGM (System Operation)
	Mr. Vivek Pandey (Alternate Member)	POSOCO	Chief Manager (System Operation)
5.	Mr. Ashok Pal	POWERGRID	AGM (CTU)
6.	Mr. Suman Guchh	UPPTCL	CE, Transmission Planning & Power System Studies
7.	Mr. Pardeep Jindal	CEA	Director (SP & PA)
8.	Mr. Omprakash k Yempal	MSETCL	Director (Operation/Projects)
9.	Mr. Ch. V. Subba Rao	APTRANSCO	Superintending Engineer/Power Systems
	Mr. A. Satyanarayana	APTRANSCO	Superintending Engineer/Planning
10.	Ms. Shilpa Agarwal	CERC	Dy. Chief (Engg.), Member Convenor

Minutes of the 1st meeting of the Task Force on Transmission Planning held on 29th July, 2015 at CERC, New Delhi

List of participants is enclosed at Annexure-I and the presentation given by CEA is attached at Annexure-II. Views of POSOCO is attached at Annexure-III.

- 1. Shri A.K. Saxena, Chief (Engg.), CERC welcomed the participants and briefed them regarding formation of the Task Force in the backdrop of the need being felt in transmission planning to explicitly define roles and responsibilities of various entities so as to facilitate transmission planning. He also stated that a proper backing is required to facilitate and strengthen transmission planning. We intend to complete the exercise in 4-5 months.
- 2. During the course of discussion, members of the Task Force presented their views on various issues presently being faced by planners. Their views have been consolidated under various heads as detailed in succeeding paragraphs.

3. Necessity of regulation on transmission planning:

- 3.1. The representative of CEA mentioned that as per Section 73 (a) of the Electricity Act, 2003, it is the duty of CEA to formulate short-term and perspective plans for development of the electricity system and coordinate the activity of the planning agencies for optimal utilization of resources. He submitted that CEA in order to fulfill its duties has constituted Regional Standing Committees for Power System Planning (SCPSP) to firm up transmission addition proposals. The Commission should consider statutory functions of CEA defined in the Act while framing regulations on transmission planning, especially in respect of preparation of National Electricity Plan under Section 3 of the Act and also functions of CERC under Section 79(4) of the Act.
- 3.2. The representative of POWERGRID also mentioned that need for regulation on transmission planning should be discussed before framing regulation on transmission planning. The present regulation is applicable only for ISTS which is only one part of the entire power system. He further submitted that we need to have effective participation from all stakeholders so as to make the planning exercise fruitful. He added that discussions on General Access Network (GNA) are under-way wherein we are including commitment from the user end as well. Further, CERC Regulations on Connectivity and long term access are available where planning is carried out based on the LTA requirement of the applicants. He submitted that various aspects

Minutes of the 1st meeting held on 29.7.2015

including timeline involved in connectivity/open access Regulations need to be kept in mind while framing new regulations on transmission planning.

- 3.3. Representative of AEGCL further submitted that CTU has taken responsibility of undertaking development of important inter-regional links which are crucial for transmission system in NER and Assam.
- 3.4. All the participants agreed that the Regulations on transmission planning would facilitate transmission planning process.

4. Who all should be part of transmission planning process?

4.1. Representative of CEA stated that as per Section 3, Section 38, Section 39 and Section 73 of the Act, it is the duty of CEA, CTU and STU to plan transmission system. However, other stakeholders which include transmission licensees, DISCOMs, traders, Governments, RPCs, Generators and public at large need to be consulted and coordinated with. Accordingly, the proposed Regulations may define this process.

5. Methodology of transmission planning presently being followed & suggestion for its improvement

- 5.1. Representative of CEA stated that following aspects of transmission planning are important and needs considerations:
 - (a) Timeframe of planning
 - (b) Planning on anticipation basis or as per applications
 - (c) Perspective planning
 - (d) Integrated resource planning
 - (e) Planning needs to be made more objective than subjective.
- 5.2. Representative of CEA mentioned that presently planning in India is done on the basis of Long Term requirement not for medium term or short term. Load-Generation balance is being done on the basis of Electric Power Survey published by CEA. He submitted that it is required to get real information of existing system and to streamline the process of planning to make load forecasting as close to real load. He also gave example of some developed countries where Regulator provides a Statement of Opportunities (SOO) on the basis of which planning to transmission system is done. In India, transmission planner takes data from Planning Commission, Electric Power Survey Reports, etc. which generally projects growth more than the actual one. He further submitted that seasonal load-generation data are considered but should be updated on regular basis in view of changing climatic scenario.
- 5.3. The representative of CEA further submitted that the transmission planning should be guided by the Electricity Act, 2003, National

Minutes of the 1st meeting held on 29.7.2015

Electricity Policy, National Electricity Plan, Grid Standards, Transmission Planning Criteria, Design Codes, and Transmission Access Regulations. He further gave example of growth of electricity sector in some European countries and India and showed that growth in India is very high and development of transmission system should match that growth. He stressed on the need of regional and state level planning in view of difference in growth and demand in different regions and states which will finally result in development of an efficient ISTS. The present method of Top-Bottom approach should now be accompanied with detailing of 220 kV and below transmission network. For this States should provide characteristics of their load centres like MW load, power factor, growth rate, etc.

- 5.4. The representative of CEA also mentioned that presently planning for development of transmission system is done keeping in view 6 scenarios i.e. peak and off-peak requirement of three seasons. It can also be done for 8 scenarios i.e. peak and off-peak requirement quarter wise.
- 5.5. The representative of POWERGRID mentioned that at present planning of transmission system is done by CEA and CTU on the basis of long term requirements of the customers. He further added that transmission is a licensed activity while generation has been delicensed which is posing great challenge for transmission planners. He stressed the need of certified data from State Utilities and their involvement in the system studies towards planning for both inter-State and intra-State transmission system.
- 5.6. Chief (Engg.), CERC stated that ISTS and associated intra-state system should come in same timeframe to avoid assets remaining unutilised/ under-utilized.
- 5.7. The representative of CEA stated that principles of transmission planning may be specified which may include base assumptions about generation and demand scenarios, procurement strategy of States, economic analysis including Production Cost Analysis and Regulatory Investment Tests for selection of transmission plan.

6. General Access Network (GNA)

6.1. The representative of POWERGRID mentioned CEA has brought out concept of General Access Network (GNA) for transmission planning which is under discussion at various levels.

- 6.2. The representative of CEA mentioned that GNA has been discussed widely with different states but till date CERC has not been involved in discussion.
- 6.3. It was decided that a separate meeting to discuss GNA in detail shall be organised at CERC

7. Utility of Perspective Planning:

7.1. The representative of CEA mentioned that with the rate (approximately 8%) at which demand of electricity may be growing in India, the demand would get doubled in about 10 years. In developed countries like France, Britain, etc., growth in demand is very less and it will take almost 35 to 40 years for the demand to get doubled. He stated that growth rate for Great Britain is 2% and they have a 10 year plan and with a growth rate of 8% in India, 20 year plan loses its significance. Therefore, developed countries can plan for transmission system for next 20 to 30 years. However, in India, the planning horizon should be about 5-7 years.

8. Need for Requirement of data from DISCOMs

- 8.1. The representative of WBSETCL stated that planning should start from DISCOM level. DISCOM should provide data to STU regarding area wise load by 15th January every year so that STU can plan system properly and provide proper data to CTU.
- 8.2. The representative of MSETCL mentioned that distribution companies should provide requirements of power for different types of consumers in their respective areas for the next five years to the concerned STU and CEA. He also stated that actual variation from EPS is to the tune of 2-3%. He stated that a timeframe must be suggested by which states should also come out with similar regulations for transmission system in the States.
- 8.3. Representative of AEGCL mentioned that the distribution companies are not giving proper feedback in regard to load growth in their respective areas. He submitted that planning for the development of transmission system should be done for the next 10 to 15 years and DISCOMS are not providing inputs for planning. In their state, construction takes more than 4 years due to forest issues.
- 8.4. Representative of APTRANSCO mentioned that planning should be done proactively than reactive planning. He stated that proper load forecasting is not happening in the distribution areas. APTRANSCO is doing proactive planning for transmission system development. He further submitted that generation planning should also be done along with transmission planning as generators are also facing many

Minutes of the 1^{st} meeting held on 29.7.2015

uncertainties like coal shortage, unavailability of gas, environment and forest clearances, etc.

- 8.5. Representative of POSOCO mentioned that IEGC provides SLDC shall carry out its own demand estimation from the historical data and weather forecast data from time to time and all distribution licensees and other concerned persons shall provide relevant data and other information as required by SLDC for demand estimate which is presently not being followed by state utilities.
- 8.6. Representative of CEA stated that they need substation-wise data at 220kV level for transmission planning and do not require data at 11kV/33 kV but STU requires the same. He mentioned that forecasting of load by distribution companies is therefore very important. However, distribution companies are not providing sub-station wise load growth in their areas. He emphasized that distribution companies should forecast load up to 11 kV and 33 kV which should be mapped to STU level planning.

9. **Participation of States in transmission planning:**

- 9.1. The representatives of CEA and CTU mentioned that States are not informing properly the load that would be incident on 220 kV system in the next five years. They are also not completing downstream system matching with ISTS which causes non utilization of assets developed for states and stranding of huge capital assets. Also there is no financial implication for non-completion of downstream system. They further mentioned that involvement of various stakeholders including STU and distribution companies with defined roles and responsibilities as per the Act along with time frame for completion of activities may also be included in Transmission Planning Regulations.
- 9.2. Representative of MSETCL mentioned that strengthening only ISTS network would not serve the goal of development of electricity sector in India. He submitted that State transmission network must also be matched with ISTS for efficient development. He further, pointed out that States like Andhra Pradesh and Kerala have taken proactive steps in development of state network by forming committee similar to Standing Committee for Power System Planning of CEA where all stakeholders including distribution companies, RPC, SLDC, STU, generators, etc., are invited to discuss and resolve different issues faced by them for early decision making. Maharashtra already has a Standing Committee at state level.

10. **Renewable Integration:**

10.1. The representative of CEA mentioned that Central Government is putting a lot of emphasis on generation of energy based on renewable

sources especially on solar based energy generation. Since, generation of energy based on renewable sources is of intermittent nature and gestation period for the same is relatively less, planning of transmission system for evacuation of energy generation based on renewable sources is very necessary. Therefore, integration of power generation based on renewable sources should also figure in transmission planning. He mentioned that developers are not approaching CTU for considering evacuation system at the time of inception. It is not possible for planners to develop efficient transmission system if they are not informed about the location and quantum of power to be evacuated well in time. He suggested that developers of generation of energy based on renewable sources should be asked to apply for evacuation system at the time of generation planning itself. Representative of CEA stated that states should allow only the quantum of renewable for which it can do balancing

- 11. Other issues highlighted by CEA in the transmission planning are as under:
 - (i) Adequacy of present load forecasting methods
 - (ii) Land Acquisition
 - (iii) Fuel linkages for coal based power plants
 - (iv) Beneficiaries of most of IPPs not firmed up
 - (v) <u>Uncertainty in Hydro-electric Generation Projects</u>
 - a) Difficulty in Environment clearance
 - b) Longer Gestation Period
 - c) Geological surprise
 - d) Local issues
 - e) Basin wise development
 - (vi) Open Access in Transmission and Power Exchange
 - a) Market driven exchanges influence pattern of power flow
 - b) Increasing share of sale under STOA and MTOA
 - (vii) Issues in Implementation of Transmission Projects
 - a) Environment/forest/RoW
 - b) Contractual delays
 - c) Issues in TBCB: Representative of CEA raised issue regarding monitoring execution of transmission lines under TBCB. He also stated that even the lines awarded to POWERGRID under "compressed time schedule" need to be monitored whether they are being executed at required pace or not.
 - d) Need for periodic review of plan
 - (viii) Manpower requirement in planning with respect to quantity and quality.
 - (ix) How much congestion as a percentage can be allowed

Minutes of the 1^{st} meeting held on 29.7.2015

12. Members of the Task Force were requested to provide their suggestions by 6th August, 2015.

Minutes of the 1st meeting held on 29.7.2015

1st meeting of Task Force for giving input for framing of Draft Regulation on "Transmission Planning" on 29.7.2015 at 10.30 a.m.

List of Participants:

S1 .	Name	Designation and	E-mail
No		Organization	
1.	Shri A.K. Saxena	Chief (Engg.)/CERC	
2.	Shri Karuna Sarma	AGM(E), AEGCL	<u>karunasarma@gmail.com</u>
3.	Shri Kelkar S.G.	CE, STU, MSEPCL	cestu@mahatransco.in
4.	Shri L. Parda	ADE/Powergrid	cepowersystem@rediffmail.com
	Sarathi		
5.	Shri Akhil Kr.	Joint Chief (E)/CERC	akhilkg@cercind.gov.in
	Gupta		
6.	Shri Vikram Singh	Dy. Chief (E)/CERC	vikramsinghfms@gmail.com
7.	Ms. Shilpa Agarwal	Dy. Chief (Eng)/CERC	shilpadec@yahoo.com
8.	Ms. Arundhati	C.E(CPD), WBSETCL	Arundhati.ghosh@wbsetcl.in
	Ghosh		
9.	Shri Vivek Pandey	General Manager,	Vpandey76@gmail.com
		POSOCO	
10.	Shri Rajiv Porwal	AGM,NRLDC,	rajivporwal@gmail.com
		POSOCO	
11.	Ms. Savitri Singh	AC(E)/CERC	savitri.cerc@gmail.com
12.	Ms. Jyoti Prasad	AGM, POWERGRID	nishantjyoti@yahoo.com
13.	Shri Ashok Pal	AGM, POWERGRID	ashok@powergridindia.com
14.	Shri Pardeep Jindal	Director, CEA	jindal_pardeep@yahoo.co.in
15.	Shri R. Gali	AC(E)/CERC	ramcerc@gmail.com
16.	Agam Kumar	Tech. Officer	Agamkumar115@gmail.com



















Challenges in Transmission Planning	
Uncertainty in Load Growth	
Seasonal , and Long term	
Substation-wise ?,	
 Are thes present forecast adequate ? <u>Uncertainty in Generation</u> 	
De-licensing of Thermal Generation	
Acquisition of Land, Fuel linkage	
Beneficiaries of IPPs projects not firmed up	
 Uncertainty in Hydro-electric Generation Projects Difficulty in Environment clearance Longer Gestation Period Geological surprise Local issues Basin wise development 	Cont
	<u>Cont</u>






Macro Picture					
	<u>Load,</u> (GW)	<u>Gen. I/C</u> (GW)	<u>Tr.Lines</u> (Tckm)	<u>S/s</u> (GVA)	
11 th Plan	130	200	257	410	
Existing (Nov 2014)	148	255	306	571	
12 th Plan (as per NEP)	199	320	365	692	
13 th Plan (2021-22)	283	?	?	?	
20-year ahead (2033-34)	? 616	?	?	?	
I/C –incl. RES, Lines and S/S – 220kV and above Loads - based on 18 th EPS 14					

Installed Capacity during 12th and 13th Plans (in MW)						
Plan-Wise Generation Addition (Region - Wise)						
Up to July Balance in Addition in Total (End of 2014 XII Plan XIII Plan XIII Plan) (Actual) (B) (C) (D = A+B+C) (A)						
NR	64387	20929	16890	102206		
WR	91847	36709	20262	148818		
SR	57232	38650	23076	118958		
ER	33881	12738	31195	77813		
NER	2910	3511	8202	14623		
Bhutan	1416	3066	2120	6602		
Total	251673	115603	101745	469020		
MW capacity under construction, and about 33000 MW of renewable capacity 15						

Installed Capacity fuel-wise by end of 13th Plan (in MW)							
	Fuel Mix of Generation (Region Wise) (end of XIII Plan)					Deman d	
	Coal	Nuclea r	Gas	Hydr o	RES	Total	86461
NR	51238	4420	6714	2665 6	1317 8	102206	86054 82199
WR	10647 8	3940	1180 4	7879	1871 7	148818	35928 4056
SR	59520	4820	9673	1276 5	3218 0	118958	1000
ER	68617	0 Huuith diwor	207	8572	417	77813	0#
NER	810	[#] with aiver 0	1803	1135	651	14623	16

Views of POSOCO in the first meeting on Regulation for Transmission Planning

POSOCO welcomes the initiative taken by CERC towards framing separate regulations for Transmission Planning. During the first meeting held on 24 July 2015, there was a discussion regarding the need for separate regulation for transmission planning. In this regard, the views of POSOCO are as under:

- 1. The regulatory provisions related to grid connectivity/Access and transmission cost allocation are covered in separate CERC Regulations viz. Connectivity, Long term and Medium term Regulations, Short term Open Access Regulations and Sharing of Transmission Charges Regulation. These cover the administration of transmission capacity in the grid. The CEA Standards, Manual on Transmission Planning Criteria specifies the technical criteria used by CEA/CTU/STU/NLDC/RLDCs/SLDCs in the planning and operating horizon. The IEGC contains a separate chapter titled 'Planning Code for Inter State Transmission'. It provides the guidelines to be adopted in the planning and development of bulk power transfer and associated ISTS. The Planning Code lays out the detailed information exchange required between the planning agencies and the various participants of the power system for load forecasting, generation availability, and power system planning etc. for the future years under study. The Planning Code stipulates the various criteria to be adopted during the planning process. However in view of the significant changes that have occurred in the last few vears the Planning Code in IEGC could be substituted with a full-fledged Regulation. The regulations on transmission planning notified by CERC, would serve as a model for similar regulation at the State level.
- 2. The challenges associated with transmission planning in India are unique in view of the decentralized and federal framework of governance. Further, the synchronous interconnection of the regional grids and the open access framework has created avenues for utilities to optimize cost of power procurement in different time horizons. Thus, transmission system now plays a decisive role on the power/energy portfolio of a control area. There is a general expectation that apart from the long-term players, the transmission plans should have margins to accommodate the requirements of the short-term players. These aspirations of the market players who are the new stakeholders in the sector need to be suitably accommodated by realigning the transmission planning process and making it more participative without compromising the classical constraints of grid security and economy of investment. The regulations of transmission planning would lay down the rules, guidelines and standards to be followed in order to devise transmission plans to ensure the efficient and comprehensive development of Indian power system while keeping in mind the objectives laid down in the National Electricity Policy.

- 3. Transmission projects have enormous techno-socio-economic impact in a country. The transmission projects could be evaluated from different perspectives viz. power system reliability, system resilience, market economy, market efficiency, competition, promotion of green energy, protection of environment, wildlife and ecology, minimizing carbon footprints, reduction of transmission losses, optimization of transmission charges, congestion alleviation, reduction of market power, strategic interstate/international collaboration etc. The regulations on transmission planning that would be notified by Hon'ble CERC after exhaustive public consultation would provide an acceptable framework for assessment and evaluation of the transmission plans.
- 4. With the deployment of advanced technology in power system there is a need for exhaustive system modeling and simulation to understand the behavior of the power system under various controls, perturbations and interventions. However getting input data from the utilities is often a major constraint in this endeavor. The CERC Regulations could mandate submission of validated model for simulating the dynamic modeling of various control systems deployed in the generating stations/sub-stations.
- 5. In a nutshell separate regulations covering the governance aspects of transmission planning is desirable in a multi-stakeholder environment for coordinated progress of the transmission sector:
 - a. To define the regulatory objectives of transmission planning from the perspective of reliability, economy and efficiency of power system as well as from the perspective of protecting consumer interest
 - b. To lay down the procedure and methodology for transmission planning to achieve the stated regulatory objectives
 - c. To define the role and responsibilities of different stakeholders in transmission planning in the restructured environment to promote cooperation amongst Users, STU/SLDC and CTU/RLDC/NLDC, RPC, CEA, stakeholders and bring in accountability at all levels.
 - d. To facilitate information exchange amongst Users, STU/SLDC and CTU/RLDC/NLDC, RPC and CEA in the planning and development of the transmission system. This shall enhance transparency in the planning process and avoid information asymmetry for the competing market players and transmission licensees.
 - e. To lay down the mechanism for effective coordination for execution, monitoring and revision of the Master Transmission Plan.
 - f. To lay down the framework and methodology for evaluation of transmission plans from reliability and economic perspective
 - g. To lay down mechanism for dispute resolution in transmission planning and project execution
- 6. POSOCO would like to submit views on other aspects in due course.

Central Electricity Regulatory Commission 3rd & 4th floors, Chanderlok Building, 36, Janpath, New Delhi-11001 Telephone: 011-23753917

No: CERC/Engg/Trans/Transmission Planning/2015 30th January, 2016

То

The Members of the Task Force (As per List Enclosed)

Subject: Minutes of the 2nd Meeting of the Task Force for giving inputs for framing of Draft Regulation on Transmission Planning.

Madam/Sir,

Please find enclosed herewith minutes of the 2nd Meeting of the "Task Force for giving inputs for framing of Draft Regulation on Transmission Planning" held in CERC on 21.8.2015.

Encl.: As above

Yours faithfully,

Sd/-

(Shilpa Agarwal) Dy. Chief (Engineering) (Convenor of Task Force)

Minutes of the 2^{nd} Meeting held on 21.8.2015

Members of the Task Force

S1.	Name of the Member	Name of	Designation
1.	Shri A.K. Saxena	CERC	Chief (Engg.), Chairperson
	0 0	02110	
2.	Mr. Karuna Sarma	AEGCL	AGM (E)
3.	Ms. Arundhati Ghosh	WBSETCL	Chief Engineer, CPD
4.	Mr. Rajiv Porwal	POSOCO	AGM (System Operation)
	Mr. Vivek Pandey (Alternate Member)	POSOCO	Chief Manager (System Operation)
5.	Mr. Ashok Pal	POWERGRID	AGM (CTU)
6.	Mr. Suman Guchh	UPPTCL	CE, Transmission Planning & Power System Studies
7.	Mr. Pardeep Jindal	CEA	Director (SP & PA)
8.	Mr. Omprakash k Yempal	MSETCL	Director (Operation/Projects)
9.	Mr. Ch. V. Subba Rao	APTRANSCO	Superintending Engineer/Power Systems
	Mr. A. Satyanarayana	APTRANSCO	Superintending Engineer/Planning
10.	Ms. Shilpa Agarwal	CERC	Dy. Chief (Engg.), Member Convenor

Minutes of the 2nd meeting of the Task Force on Transmission Planning held on 21st August, 2015 at CERC, New Delhi

List of participants is enclosed at Annexure-I.

- 1. Shri A.K. Saxena, Chief (Engg.), CERC welcomed the participants and recapitulated the main points discussed during 1st meeting on 29th July, 2015. He stated that separate Regulations on transmission planning are being framed and the Planning Code defined in the CERC (Indian Electricity Grid Code) Regulations, 2010 would be taken out. The principles and procedures of transmission planning along with roles, responsibilities and timelines are proposed to be specified in the Regulations. He further made a mention of Regulation 3.7 of the IEGC which provides connection between transmission planning and its actual implementation whereby it is provided that the actual program of implementation of transmission lines, interconnecting transformers, reactors/capacitors and other transmission elements will be in accordance with the Detailed Procedure under Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-state Transmission and related matters) Regulations, 2009.
- 2. The representative of POWERGRID stated that regulations framed by the Commission on connectivity and Long Term Access involve transmission planning based on long term requirement. However, planning exercise also involves plan for system strengthening based mainly on operational feedback as well as needs expressed by various STUs. Therefore, there is a requirement of Regulations on Transmission Planning. He further submitted that Regulations on Transmission Planning need to be formulated keeping in view various aspects including existing planning practice, existing Regulations, General Access Network (GNA), etc.
- 3. The representative of CEA stated that the planning for transmission system is done when a generator places a request for Connectivity & LTA. But optimal transmission planning cannot be done only on generators' request as it requires buyer's information/needs also. He stated that inflow of data from STUs is necessary as transmission planning cannot be done in the absence of requisite data. He further stated that it should be left to the discretion of the planners to choose types of studies to be conducted by them and assumptions to be considered for transmission planning. He further stated that currently there was no punitive action for non-compliance of CEA Regulations/

Minutes of the 2nd Meeting held on 21.8.2015

Standards, which must be there. Even in FERC, there are departments which monitor compliances to various regulations made by them.

- 4. The representative of UPPTCL stated that they were planning transmission system as per requirement of DISCOMS but DISCOMS donot feel real depth. They are providing redundant data. Hence, there is a need to involve DISCOMS in planning process and the regulations should provide for submission of accurate data by DISCOMs. He stated that planning with about five years lag in execution is also to be taken note of as transmission system planned for execution in 11th Plan is being executed in 12th Plan. He stated that there should be coordination between central system and state system to fix time frame for execution of downstream system and use of redundant capacity in ISTS. He submitted that CTU should also submit data to concerned STU. He also raised a concern regarding non execution of ISTS system on time and due to which state was compelled to plan its own system leading to an underutilised ISTS system. He stated that there should be a mechanism through which if ISTS system is not coming up till a particular timeframe, the STUs should be allowed to reject such a system. He also stated that in case CTU has planned a system for some generators who are not coming up and State asks a connection to such system, its request may be considered by CTU. He also stressed the need for confidentiality of data.
- 5. The representative of POWERGRID suggested that the implementation of ISTS and associated Intra-State Scheme need to be closely monitored during Standing Committee meeting for timely completion as well as proper utilization of the same. Regarding submission of data by STUs with involvement of DISCOMs, he suggested that States may consider forming a validation committee at State level to validate the accuracy of data submitted by DISCOMs Electricity and State Regulatory Commission may issue necessary direction for submission of data by DISCOMs. Regarding submission of data by CTU to STUs as stated by the representative of UP, he submitted that STUs may ask CTU/ CEA to provide necessary data as per their requirements regarding ISTS system for an overview of the whole system.
- 6. Representative of POSOCO stated that there should be a timeframe for execution of scheme and to monitor which scheme is at what stage. In case of specific problem, scheme may be reviewed.

Minutes of the 2nd Meeting held on 21.8.2015

- 7. Representative of CEA stated that methodology for transmission planning may be so that States and Generators provide input to CTU who should build scenarios and consider LTA data and provide same to CEA who will in turn make a report and circulate for discussion in Standing Committee. Standing Committee shall validate data under the guidance of CEA.
- 8. Chief (Engg.), CERC stated that the Commission had initiated a Suomotu petition no. 11/SM/2014 in view of the mismatch between ISTS and associated downstream intra-State system. The Commission has vide order dated 5.8.2015 in 11/SM/2014 opined that ISTS transmission licensees and STUs should also sign Implementation Agreement for development of ISTS and downstream system in coordinated way to avoid any mismatch. Regarding submission of data by DISCOMs, he stated that this has to be addressed by SERCs. He added that framing of Transmission Planning Regulations at the State level would not only enable submission of requisite data by DISCOMs to STUs but would also make the transmission planning of ISTS and intra-State Transmission System effective. He further added that the outcome of deliberations of the Task Force will be submitted in the form of input for framing of Draft Regulations and Report of the Task Force. The Report of the Task Force will contain all the issues highlighted by members of the Task Force and will be taken up with FOR Secretariat for bringing up before the FOR.

Minutes of the 2^{nd} Meeting held on 21.8.2015

2nd meeting of Task Force for giving input for framing of Draft Regulation on "Transmission Planning" on 21.8.2015 at 10.30 a.m.

List of Participants:

S1.	Name	Designation and	E-mail
No		Organization	
1.	Shri A. K. Saxena	Chief (Engg.), CERC	
2.	Shri Akhil Kr.	Joint Chief (Engg.),	akhilkg@cercind.gov.in
	Gupta	CERC	
3.	Shri Vikram Singh	Dy. Chief (Engg.), CERC	vikramsinghfms@gmail.com
4.	Ms. Arundhati	C.E (CPD), WBSETCL	Arundhati.ghosh@wbsetcl.in
	Ghosh		
5.	Shri Rajiv Porwal	AGM,NRLDC, POSOCO	rajivporwal@gmail.com
6.	Shri Ashok Pal	AGM, POWERGRID	ashok@powergridindia.com
7.	Shri Pardeep Jindal	Director, CEA	jindal_pardeep@yahoo.co.in
8.	Ms. Shilpa Ararwal	Dy. Chief (Engg.), CERC	
9.	Shri Suman Ghosh	C.E (Trans. Planning),	setppss@gmail.com
		UPPTCL	
10.	Ms. Jyoti Prasad	AGM, POWERGRID	nishantjyoti@yahoo.com
11.	Shri R. Gali	AC(Engg.),CERC	ramcerc@gmail.com
12.	Agam Kumar	Tech. Officer, CERC	Agamkumar115@gmail.com

Central Electricity Regulatory Commission 3rd & 4th floors, Chanderlok Building, 36, Janpath, New Delhi-11001 Telephone: 011-23753917

No: CERC/Engg/Trans/Transmission Planning/2015 19th November, 2015

То

The Members of the Task Force (As per List Enclosed)

Subject: Minutes of the 3rd Meeting of the Task Force for giving inputs for framing of Draft Regulation on Transmission Planning.

Madam/Sir,

Please find enclosed herewith minutes of the 3rd Meeting of the "Task Force for giving inputs for framing of Draft Regulation on Transmission Planning" held in CERC on 10.10.2015.

Encl.: As above

Yours faithfully,

SD/-

(Shilpa Agarwal) Dy. Chief (Engineering) (Convenor of Task Force)

Members of the Task Force

S1.	Name of the Member	Name of	Designation
No.		Organisation	
1.	Shri A.K. Saxena	CERC	Chief (Engg.)
2.	Mr. Karuna Sarma	AEGCL	AGM (E)
3.	Ms. Arundhati Ghosh	WBSETCL	Chief Engineer, CPD
4.	Mr. Rajiv Porwal	POSOCO	AGM (System Operation)
	Mr. Vivek Pandey (Alternate Member)	POSOCO	Chief Manager (System Operation)
5.	Mr. Ashok Pal	POWERGRID	AGM (CTU)
6.	Mr. Suman Guchh	UPPTCL	CE, Transmission Planning & Power System Studies
7.	Mr. Pardeep Jindal	CEA	Director (SP & PA)
8.	Mr. Omprakash k Yempal	MSETCL	Director (Operation/Projects)
9.	Mr. Ch. V. Subba Rao	APTRANSCO	Superintending Engineer/Power Systems
	Mr. A. Satyanarayana	APTRANSCO	Superintending Engineer/Planning
10.	Ms. Shilpa Agarwal	CERC	Dy. Chief (Engg.)

Minutes of 3rd Meeting of the Task Force for giving inputs for forming of Draft Regulations on Transmission Planning held on 10.10.2015 at CERC, New Delhi

List of participants is enclosed at **Annexure-I**.

- 1. The representative of POWERGRID stated that they have in consultation with CEA prepared the outline of Transmission Planning Process for deliberation by the members of the Task Force. He stated that as per the outline, there will be two study teams, namely, Central Study Team and Regional Study Team. The Central Team will comprise of CEA (in lead role), CTU, one STU from each region NLDC and RPCs. The Regional Study Team will comprise of STUs in the region (one of the STUs on rotational basis to take the lead role and represent in the Central Study Team), RLDC and SLDCs.
- 2. It was discussed that representative of CEA should also be a member in Regional Study Team. It was decided that CEA would be present as Coordinator of Regional Study Team. In addition to CEA, representative of DISCOMS, CTU and RPC would also be a member of this team.
- 3. Dy. Chief (Engg.), CERC enquired about role of Regional Study Team. CTU clarified that Regional team will be responsible for collection of data for their regional constituents and prepare transmission planning alternatives. Formation of such a Regional team will facilitate data collection and planning. CTU shall provide indicative list of data to be collected by Regional team, definition of database in the procedure to be framed under this Regulation. It was decided that system study files will be frozen by CTU and circulated to Regional Study Team.
- 4. The representative of AEGCL stated that they have already submitted their views. The views of AEGCL are attached at *Annexure-II*.
- 5. The representative of CEA stated that earlier CEA was responsible for integrated planning in respect of development of thermal power stations and hydro power stations. However, after delicencing of generation, all decisions are taken based on commercial considerations. He stated that POSOCO grants STOA on the margins available in the transmission system which is similar to the grant of MTOA by CTU. He further added that the Electric Power Survey should be taken as base for projecting load growth in the State. However, STUs can predict load growth on their own based on the past load-generation data but the projection must be supported by data. The representative of CEA stated that DISCOMs are an integral part of transmission planning and therefore, they should also be invited to provide comments. On the issue of monitoring of execution of generation / transmission systems, he stated that report of monitoring of by the identified agencies should be taken as final by CEA and the same report should be used as input by all the agencies.

- 6. The representative of UPPTCL stated that presently Standing Committee meetings are conducted region wise once or twice in a year. He stated that Standing Committee Meetings should be conducted at least four (4) times in a year as States may face some issues which require immediate discussion in SCM. Hence there should be provision that in case agenda requiring immediate attention is there, Standing Committee meeting may be held in a shorter time span. He also stated that planning should be optimal considering both state and central needs. He further added that optimal utilization of transmission system i.e. 20% to 30% of transmission capacity should be ensured. He gave examples of Fatehpur-Agra in which flow is just 34 MW when line is for 3400 MW.He also stated that generating company should take a feedback from transmission planner whether transmission evacuation is possible or not if he plans to install a generating plant at a particular location. He also stated that all assumptions while planning transmission system should be listed. In case a generator is not coming, transmission corridor should not be built.
- 7. The representative of CEA clarified that earlier only a generator more than 200 MW capacity and transmission system 220 kV and above of state was being considered in Standing Committee meetings. However during 36th SCM of Southern Region it was decided to consider intra-state system keeping in view meshed nature of transmission system.
- 8. The representative of CTU proposed that window to apply LTA/ Connectivity to ISTS shall be open for 2 months twice in a year as per the proposed timeline. The representative of CERC stated that there should be a continuous window to apply for LTA/ Connectivity. In case system has margins, the same may be permitted as per procedure framed uner connectivity Regulations. In case new lines have to be built, the same may be clubbed together as per the Regulations.
- 9. Representative of West Bengal stated that Discoms should also be included in Transmission planning process.
- 10. It was decided that representative of SLDC should be included in the Regional Study Team. Representative of POSOCO stated that Regional Study Team should carry out the studies and provide options to Central team. Other comments furnished by POSOCO in track change mode are attached at *Annexure-III*.
- 11. Representative of CEA stated that cost- benefit analysis should be done before implementing transmission system. He also suggested 3 methodologies for calculation of benefit as follows
 - a. Loss of load probability
 - b. Social benefit i.e. decrease in carbon footprint
 - c. Based on loss factor. System with total expenditure including losses to be compared with total installed capacity which can be saved.

Minutes of the 3rd Meeting held on 10.10.2015

- 12. Representative of CTU stated that cost benefit analysis may not be accurate since future requirement of lines are seen while planning. Few higher voltage lines are charged on lower voltage initially which may not provide adequate benefit as compared to cost initially.
- 13. It was decided that PMU related installation in planning stage shall also be considered under role of STU.
- 14. It was decided that Role of Power Exchange as proposed by POSOCO will not be considered under the proposed Regulations. The planning period shall be considered as per Government of India Niti Ayog plan.
- 15. The outline of transmission planning process was deliberated in detail during the meeting by the members of the Task Force wherein some corrections were suggested by the members which were incorporated in the document submitted by POWERGRID. The outline of transmission planning process as discussed and modified during the meeting is attached at **Annexure-IV**. Further, the draft Regulations were also discussed and modified. A copy of draft regulations is attached at **Annexure-V**.

3rd meeting of Task Force for giving input for framing of Draft Regulation on "Transmission Planning" on 10.10.2015 at 10.30 a.m.

List of participants:

S1 .	Name	Designation and	E-mail
No		Organisatoin	
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Views of AEGCL:

- 1.0 The ISTS are to be planned in such a way that it can handle 50% of Peak demand of the Region. For example, let us consider the case of NER:
 - (a) NER is connected with the other Region through the Chicken Neck (Limitations on RoW).
 - (b) The present TTC declared is about 1500MW against NER total demand of approx. 2500MW. As the NER is mostly dependent on hydro power only, during high hydro season, the system designed so far is OK, but during lean hydro, the NER is primarily dependent on other Region, where again NER has to face severe crisis because of ATC constraints.
 - (c) Cross Country corridor is the only solution to eliminate the transmission constraints, envisaged in up-coming plan period.
- 2.0 In the proposed Regulation, connectivity to NER may be treated as National Transmission Highway and to relieve the NER from PoC mechanism and introduction of Cross Country Transmission Corridor.
- 3.0 Signing of TSA for lines under ISTS for projects under TBCB shall be the responsibilities of CTU, since the PoC mechanism is well accepted.
- 4.0 NER states are unable to execute it's planned projects because of following regions even after preparing short, medium and long term perspective plan:
 - (a) Geographically as well as demographically NER states differs to other states of our country.
 - (b) Development of NER states are mostly dependant on it's politicoeconomy. For instance, in Assam, no single transmission element was added during the period from 1985 to 2005.
 - (c) Because of economical backwardness, the STUs of NER are dependent mostly on grant from Central Government. In spite of introduction of different developmental agency for development of NER, procedural delays take lots of time and thus sufferit's Plan.

Suitable Regulation may be introduced separately on *Review Mechanism* on planned projects for NER.

5.0 Regulatory compliance may be introduced against DISCOMs regarding submission of data on load growth by the end of each calendar year, so that STU may prepare year wise rolling plan.

Views of POSOCO:

Central Electricity Regulatory Commission New Delhi

Task Force for framing input for Draft (Transmission Planning and other related matters) Regulations, 2015

The Terms of Reference of Task Force are

- a) To specify the principles, procedures and criteria which shall be used for planning and development of Inter State Transmission System (ISTS) in different time horizons and associated Intra-State Systems;
- b) To promote co-ordination amongst all Users, STUs, SLDCs and CTU, RLDCs, NLDC, RPCs and CEA in any proposed development of the ISTS;
- c) To provide methodology and information exchange amongst Users, STU/SLDC and CTU/RLDC, RPC, NLDC and CEA in the planning and development of the ISTS.

<u>Note covering inputs available from various sources so as to have</u> <u>deliberations</u>

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, modeling and analysis, and gives guidelines for transmission planning. The Regulations on Transmission Planning shall cover the governance aspects of transmission planning. The regulatory provisions would be enforceable through the powers of the Commissions specified in the Electricity Act 2003.

1. Objective:

The objectives of these regulations are as follows:

- a) To plan and develop an efficient, reliable and economical system of ISTS and associated intra-State Systems.
- b) To specify the principles and procedures to be used for planning and development of inter-State Transmission System (ISTS) and associated intra-State Systems.
- c) 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.
- **2.** The regulations of Transmission Planning specify the following:
 - (a) Objectives and principles to be adopted for plan and developing an efficient, reliable and economical system of ISRS and associated intra-state systems;
 - (b) Responsibilities of all the agencies involved in the planning process;

- (c) Degree and process of stakeholder involvement;
- (d) Information to be exchanged between Users and the planners and the mechanisms thereof;
- (e) Protocol to be adopted for Transmission Planning and revision in plans;
- (f) Indices for reliability and economic evaluation of transmission projects;
- (g) Information to be shared in public domain by Nodal agencies for planning to ensure transparency in decision making;
- (h) Methodology for execution of transmission plans and monitoring its progress;
- (i) Dispute resolution protocol

3. Scope:

This Regulation 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

4. Nodal Agency:

The nodal agency for the Central Electricity Regulatory Commission (Transmission Planning and other related matters) Regulations, 2015 shall be the CEA / Central Transmission Utility (CTU) for ISTS and respective STU for intra-state transmission system.

5. Roles and responsibilities of various organisations:

The Electricity Act, 2003 recognizes that transmission planning process is a coordinated activity in which CTU and STUs need to coordinate among themselves in addition to coordination with Central Electricity Authority, Licensees, Generating companies, Regional Power Committees, 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.

This Part defines the role of the various organizations involved in the field of Power System Planning and their organizational linkages so as to facilitate planning and development of ISTS and associated upstream and downstream intra-state systems.

5.1. Role of CEA:

The Central Electricity Authority shall be responsible for

- a) Formulation of perspective plans as per functions specified under Section 73 of Electricity Act 2003.
- b) Coordinating & conducting Standing Committee Meetings for Transmission planning.

5.2. Role of CTU in planning of ISTS:

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.
- (c) Preparation of the Active and Reactive Power Balance (based on the inputs received from the Users) to be considered for Transmission Planning
- (d) Preparation of Master Transmission Plan (to be defined under this Regulation) in accordance with the guidelines mentioned in these Regulations.
- (e) To specify the format and input data to be furnished by the ISTS Users for planning ISTS and associated intra state system
- (f) To provide data to STU with every addition.

5.3. Role of STU:

STU shall be responsible for

- (a) Preparation of base case of the state for Master Transmission Plan;
- (b) Providing inputs to SLDCs for preparation of state base case which is further used for preparation of operational plans;
- (c) Coordinated planning of intra state network along with inter-state network. Match with state transmission plan.

5.4. Role of NLDC:

National Load Despatch Centre shall be responsible for providing periodic Operational statistics and feedback as per section 4(j) of NLDC Rules, 2005.

5.5. Role of SLDCs:

State Load Despatch Centre shall be responsible for providing operational statistics and feedback to STU for factoring in the planning of intra-State Transmission System.

5.6. Role of Generators

Generators connected/likely to be connected to ISTS shall be responsible for providing technical data as provided under CERC Connectivity Regulations and LTA/GNA

5.7. Role of Users:

To submit data as specified by the CTU. In the planning stage the Generators seeking connectivity shall submit models specified by CTU for consideration in simulation studies. After commissioning of unit the validated model shall be re-submitted to CTU.

5.8. Role of RPC:

Monitoring of progress, giving feedback on prolonged generation/transmission outage

5.9. Role of PX:

Submit trajectory of Congestion as a feedback to the CTU/CEA

5.10. Role of the Standing Committee for Transmission Planning:

The Standing Committee for Transmission Planning shall comprise of representatives from CEA, CTU, SEBs/STUs, SLDCs, RLDCs, NLDC, RPCs, and invited experts from the industry and research organizations.

Role of standing committee should also be to monitor progress of transmission system execution and delay/early commissioning etc and changes in the overall master plan accordingly.

6. Considerations in Transmission Planning:

- (a) Planning Period
- (b) Load Forecast and transmission usage projection
- (c) Generation Resources (location, type, etc.)
- (d) Different alternatives
- (e) Economic and Financial Constraints
- (f) R-O-W Limitations
- (g) New and Emerging Technology
- (h) Various Uncertainties and Risks
- (i) Service Reliability and Cost Considerations

7. Principles of planning

Principles for transmission planning to be proposed by CEA & CTU in a procedure shall form a part of this Regulation.

- (a) Generation and Transmission expansion shall be co-optimized
- (b) Planning shall focus on cost economics and should be market driven.
- (c) Transmission System shall be planned to enable closing down of inefficient power plants from the perspective of safeguarding the environment
- (d) Transmission shall be adequate to facilitate realization of the policy objectives for RES and clean energy
- (e) Apart from the credible contingency, identified rare contingencies and natural calamities shall be duly considered in the transmission plan
- (f) Lag in planning and lag in implementation shall be considered
- (g) Resilience of the system and adequacy of system from the perspective of black start /start-up supply shall be envisaged at the planning stage itself.

- (h) LOLP /Loss of Load Expectation
- (i) Average ISTS Transmission loss target
- (j) Average PoC target
- (k) Congestion hours target
- (l) Control Area adequacy Indices: STOA as % of Own Generation or STOA as % of (LTA+MTOA)

8. Proposed Approaches to Transmission Planning:

CEA and CTU may give a presentation in regard to present and proposed approaches. Some of the approaches as available from a few sources is given at Annexure-I.

9. Planning of Transmission System:

- **9.1.** Planning of Transmission System shall be done in following time horizons:
 - a) CEA would formulate perspective transmission plan for inter-State transmission system as well as intra-State transmission system for 20 years' time horizon.
 - b) CTU would formulate "Master Transmission Plan" for inter-state transmission system of 5 year time horizon on an annual rolling basis in coordination with STUs.
- **9.2.** Planning of Transmission System shall be done by CTU/CEA/STU in accordance with:
- 9.2.1. Existing Documents
 - a) National Electricity Policy, 2005 and Tariff Policy, 2006;
 - b) Central Electricity Regulatory Commission (Grant of Connectivity, Longterm 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) CEA Transmission Planning Standards
 - f) Any other relevant regulations issued by the CERC/CEA.
 - g) Policies with respect to emissions, renewable energy, energy conservation, etc, issued by the Government of India from time to time.
 - h) New roles expected from the planning agencies:
 - The Central and State transmission utilities need to be aware about power market condition like availability of cheaper source of power, elasticity of demand of different consumers, system constraints and renewable penetration, etc. and based on system configuration, and usage pattern CEA/ CTU may suggest transmission as a replacement of new generating capacity. It requires integrated system planning study based on anticipated price of electricity generation in various areas/zones in addition to conventional inputs like fuels and plant locations.

9.2.2. Documents proposed and to be prepared by CEA/CTU

- a) Network Modelling Guidelines developed separately by CEA;
- b) Zone-wise Reliability Indices, Value of Lost Load (VOLL), etc. defined from time to time.

10. Perspective Transmission Plan:

- (1) The perspective transmission plan shall include the following:
 - a) State wise / Fuel wise / River Basin wise Generation addition plans;
 - b) Yearly anticipated load of each state;
 - c) Broad requirement of transmission system;
- (2) The perspective transmission plan shall be released by CEA in the public domain latest by 31st March of the year preceding start year of the five year and updated every five years similarly

11. Master Transmission Plan

11.1. 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.
- **11.2.** The Master Plan shall include the details of the intra State system whose execution that needs to be to facilitate realization of the benefits of the proposed ISTS9.
- **11.3.** Import and Export Transfer Capability along with the top five limiting constraints of the each Injection and Withdrawal Zone for every plan.
- **11.4.** Anticipated Point of Connection charges and losses of each Injection and Withdrawal Zone for every plan
- **11.5.** Evaluation of options: Execution schedule along with the major implementation risks. The milestones for realizing the benefits of the proposed transmission project may be stated. This may include identify the process by which the CTU will monitor and determine whether the milestones identified above are met.

12. <u>Procedure for Transmission Planning</u>

12.1. Preparation of Master Transmission Plan:

- (a) Rolling Master Transmission Plan shall be formulated by CTU biannually based on the following inputs:
 - i. Perspective plan formulated by CEA;
 - ii. Electric Power Survey of India published by CEA;
 - iii. Renewable capacity addition plan issued by Ministry of New and Renewable Energy Sources (MNRE), Govt. of India;
 - iv. Anticipated Commissioning of new Generating Stations and requests for granting Long Term Access;
 - v. Operational feedback prepared by NLDC/RLDC/SLDC;
 - vi. Pattern of prices discovered in power exchanges during the preceding year;
 - vii. Load forecasts issued by CEA and nodal forecasts provided by STUs, special economic zones;
 - viii. Policies with respect to emissions, renewable energy, energy conservation etc. issued by the Government from time to time.
 - ix. Zone-wise Reliability Indices, Value of Lost Load (VOLL) etc. defined from time to time.
 - x. Any other information, report or publication as may be available on the said subject matter.
- (b) Each STU shall submit to the CTU/CEA the load-generation disposition node wise, transmission elements, etc, in the form of a base case for 5 year ahead scenario biannually. This base case shall also include new state generating stations and planned intra state transmission system. This shall be based on maximum injection / withdrawal. Necessary format for providing the information shall be developed by CTU in consultation with CEA. There shall be five year rolling master transmission plan. All the entities seeking connectivity to ISTS and Intra-State Transmission System shall be required to submit information to CTU & STUs respectively by January/August every year and this will be considered as final for next six months i.e. no new request for connectivity or Access shall be entertained during the ensuing six months.
- (c) For example: In year 2013-2014, STUs shall submit the base case of 2014-15, 2015-16, 2016-17, 2017-18 and 2018-2019 which will be rolled biannually with updation as required.
- (d) The base case prepared by STUs shall include all transmission elements up to 132kV level including generators connected at 110 kV level.
- (e) The Planning agencies shall inform the Commission, in case information is not filed by concerned STU so that necessary action for non compliance of Commission's Regulation may be taken.
- (f) A study Committee comprising representatives of CTU, STU, RLDC, SLDCs, generator, RPC under leadership of CEA to validate data.
- (g) A validation committee comprising representative from CEA, CTU, POSOCO, STUs and RPCs shall be incorporated in the Grid Code for this purpose
- (h) The validation committee shall take into consideration the data submitted by STUs. The committee shall take trend of injection and drawal from the ISTS

from the implementing agency in respect of Point of Connection Charges for last three years. Based on this, a profile of ISTS injection and drawal for next five years shall be prepared every year in the month of March. The validation committee shall finalise this transmission system requirement profile which shall be published on the web site of CTU for comments of stakeholders. The approved transmission system requirement profile shall be published.

- (i) Final document shall form the basis of transmission planning in the country. The Standing Committee for Transmission Planning in each Region while formulating or modifying a transmission scheme shall take this document as reference.
- (j) Apart from injection and drawal data, complete data about network along with planned addition of generation and load within the STU area shall be given by all users/entities to STU in January every year. STU may in consultation with their SERC formulate penalties to handle deviation beyond a specified percentage/quantum of estimated generation and demand in their area. STUs need to submit consolidated data within their area to CTU to enable it to do optimum planning.
- (k) It is proposed to devise regulatory compliance of data submission for transmission planning in line with FERC Form No. 715 1 - Annual Transmission Planning and Evaluation Report. The format shall be finalised by CEA and CTU in consultation with the stakeholders. Commission will issue necessary order for its implementation.
- (l) For each of the proposed upgrade, CTU shall prepare at least 3 alternatives. These options shall be evaluated by CTU based on techno-economic analysis.
- (m) All the proposed transmission plans must satisfy the criteria laid down in the documents mentioned in these Regulations.
- (n) All the proposed transmission plans shall be accompanied with the following studies results:
 - i. Steady State Power Flow Study
 - ii. Interconnection Study
 - iii. Short Circuit Study
 - iv. EMTP Studies
 - v. Point of Connection Charges Study
 - vi. Studies for special cases such as Sub-synchronous Resonance (SSR)
 - vii. Dynamic Power Flow Study;
 - viii. All other studies specified in the CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007
- **12.2.** <u>Consultation Process for finalisation of Master Transmission Plan</u>:

A three tier consultation process would be followed for transmission planning and investment thereof:

(a) At the first level of consultation, the proposed transmission plans shall be published by CTU on the public domain for comments of all stakeholders.

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The feedback received from the stakeholders along with the analysis of the feedback by CTU shall be uploaded on the website of CTU. It shall elaborate the manner in which the views of the stakeholders were being considered in the plan. The rationale for rejecting any view shall also be duly explained.

- (b) After considering the comments of the stakeholders, the CTU shall submit the revised plan, if any, before the Standing Committee on Transmission Planning which would be the second level of consultation. The proposed transmission plans shall be discussed in the standing committee meeting of the concerned region. In case of inter-regional transmission system, the transmission plan shall be discussed in standing committee meeting of the concerned regions.
- (c) The Standing Committee shall comprise of representatives from CEA, CTU, STUs, RPC Secretariats, SLDCs, RLDCs and NLDC and invited experts from the industry or academia. The CEA would prepare a Conduct of Business Rules for the proceedings of the Standing Committee on Transmission Planning covering the quorum, submission of comments, basis of decisions, etc.
- (d) The meeting of the standing committee shall be held bi-annually preferably in August and February.
- (e) The proposed transmission plan shall form the agenda of the standing committee meeting and following key deliverables shall also be made available by CTU for each transmission plan:
 - i. Category of transmission plan
 - ii. Details of Transmission Elements along with dedicated lines, reactive compensation (Static, Dynamic) if any
 - iii. Basic Network / Snapshot pertaining to the proposed transmission plan
 - iv. Assumptions, if any
 - v. Request for LTA associated with the transmission plan, if any. Whether Transmission Planning shall be based on GNA or LTA. Issues at Annexure-II.
 - vi. Timeline for execution of the proposal alongwith key milestones and implementation risks (such as RoW, resource etc.)
 - vii. Prerequisite coordination or priority for commissioning of transmission elements within any transmission plan
 - viii. Inter-Regional Transfer Capability
 - ix. Estimated Cost of the Planned Transmission System and its impact on uniform PoC rate
 - x. Results for various contingencies studied taking intermittency of renewable generation into consideration
 - xi. Environmental Issues, if any
- (f) The proposed transmission plans shall be evaluated based on technoeconomic analysis. Each option shall be evaluated with respect to reliability standards and the planning criteria used for the assessment of transmission system capability

- (g) The transmission plan thus prepared shall be submitted by CTU to the Authority for approval which would be the third stage of consultation.
- (h) The final transmission plan approved by CEA shall be published on the website of CTU and CEA along with the response of CTU on each comment received.
- (i) Similar process would be followed when the plan is reviewed and updated.
- **13.** <u>Execution of the transmission projects</u>: The selection of Transmission Service Provider for execution of transmission projects shall be through TBCB or through nomination basis or as specified by appropriate govt from time to time.
- **14.** <u>Review of Transmission Plan:</u>

Transmission Plan needs to be reviewed/updated keeping in view of inputs regarding generation such as deviation from commissioning schedule, shifting of target region, retirement of units, operational feedback provided by RLDCs and SLDCs, exit from LTA/GNA, system constraints, market conditions, etc.

A balanced view needs to be taken in regard to liability of generators, avoidance of building underutilized assets and protecting consumer interest for the period during which asset is underutilized. For this, there is a need to formulate commitment mechanism for both generator and drawee entity.

10. Information Exchange timeline:

The timeline for exchange of information and other activities involved in the transmission planning shall be as follows:

Activity	Responsibility	Suggested Timeline				
Standing Committee Meeting in August						
Submission of anticipated network	STU	15 th April				
scenario in the form of a base case						
Preparation of All India Network	CTU	15 th May				
Scenario						
Publishing transmission plans for	CTU	1 st week of June				
public comments						
Comments of Stakeholders	Stakeholders	1 st week of July				
Issue of agenda of standing	CEA	1 st week of July				
committee						
Standing Committee Meeting	CEA	1 st week of August				
Approval of Transmission Plan	Authority	1 st Week of September				
Final approved transmission plans	CTU	1 st week of October				
Standing Committee Meeting in Feb	oruary					
Submission of anticipated network	STU	15 th October				
scenario in the form of base case						
Preparation of All India Network	CTU	15 th November				
Scenario						

Publishing finalised transmission	CTU	1 st week of December	
plans for public comments			
Comments of Stakeholders	Stakeholders	1 st week of January	
Issue of agenda of standing	CTU	1 st week of January	
committee			
Standing Committee Meeting	CEA	1 st week of February	
Approval of Transmission Plan	Authority	1 st Week of September	
Final approved transmission plans	CTU	1 st week of April	

- **15.** Software Applications to be used in transmission planning: Nodal agency may deploy appropriate software for simulating the behaviors of the power system under different operating conditions during transient and steady state. It may also deploy software for co-optimization of generation resources and transmission system for 8760 hours for the planning year.
- 16. Manpower Deployment in Transmission Planning: Proper and adequate manpower for conducting planning exercise in the utilities shall be ensured. CTU/STU must demonstrate that they have adequate manpower for planning. CEA / CTU may prepare scheme for certification of personnel involved in planning at STU/CTU similar to the system in place for System Operators
- **17.** Monitoring and execution coordination of Transmission Plan
- **18.** Dispute resolution

Approaches to Transmission Planning:

a) Scenario Approach to Address Uncertainties:

• The scenarios may be based on a set of likely possibilities or selected on the basis of reasonable extremes like competition, load growth, upcoming IPPs, ROW, fuel resources, environmental issues, renewable integration, etc.

b) Horizon Year & Staging Approach:

- Cost optimised transmission plan for the horizon year (20th year in a 20 year planning study) is developed;
- Once an optimized horizon year plan is available, several transmission staging plans may be developed for the planning period:
 - The staging intervals may be different from one stage to the next.
 - Staging at every 5 years is usually considered appropriate.
 - In a high growth system, staging at say 3 or annual plans may be required.
- Keeps in focus the long-term needs of the system in proper perspective;
- Once the staging plans are complete, the present worth or other types of analysis may be performed for different horizon year and corresponding staging year plans;
- The selection of the most suitable plan among the low cost plans may be accomplished, via the alternative approach.

c) Trade off and Risk Analysis Approach:

- Perform trade-off and risk analysis for each future plants and find a global set;
- Measure the robustness of each plan in the global decision set;
- If no plan is completely robust, reasonable compromises may be applied. The planners need to eliminate unacceptable or inferior plans, based on multiple objectives and focus on a small set of plans.

Issues to be addressed in GNA

- (1) <u>Injection GNA more than demand GNA</u>: In the event of injection (Generation) GNA being more than Demand GNA, the transmission system will be developed as per injection GNA or it will be downsized to match with demand GNA.
- (2) Methodology for planning when Generators shall not have to declare target beneficiaries.
- (3) <u>Handling difference in planning scenario and operational scenario</u>: How to take care of the situation arising in the operational timeframe because the projection or assumptions which were made at the planning stage did not materialize.
- (4) <u>Price for flexibility</u>: It has been proposed that the Generators shall have access to ISTS grid with flexibility for point of drawal subject to conditions laid down at the time of grant of GNA. This issue continues to leave stranded assets. In real option economic theory, every flexibility has a price and whether generators are ready to pay sufficient price for this flexibility or the consequences of flexibility are falling on other consumers. This issue needs to be addressed.
- (5) <u>Determining stranded capacity in a meshed network:</u> How the concept of GNA would take care of issue of relinquishment charges especially in view of the fact that CTU has been expressing difficulty in stranded assets in the event of generators for whom the transmission system has already been developed or it

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is under execution, either downsizing, rescheduling or simply quitting and seeking relinquishment of their LTA. CTU is taking a stand that it is difficult for them to determine stranded capacity in a meshed network.

- (6) <u>Planning input from Drawee entities</u>: The mismatch in transmission planning is due to the fact that generator wants transmission system to be developed without identifying customers and customers who will ultimately draw power from ISTS are not coming out with their future requirement. GNA is trying to force a commitment from drawee entity based on a fixed figure to be given four years in advance. With unbundling and open access it may practically be very difficult for state agencies to firm up their transmission requirement. This issue remains unanswered in GNA and it is presumed that correct input would come from state utilities as liability is pre-decided and power drawal more than GNA would (be priced higher) not be allowed. This may not come true and it may only increase the tendency to under-declare transmission requirement. The integrated resource planning with collaborative efforts in forecasting demand and supply scenario in which cost of power is going to play a major role in deciding to opt for importing power from outside against costly generation inside the generation will ultimately decide real time system operation. So system should be flexible to accommodate all type of access and as experience shows that drawee entities are ready to bear for slightly higher transmission charges to avail the benefit of flexibility. How to incentivize or penalise states to declare their correct GNA requirement?
- (7) Connectivity as separate product: GNA does not propose connectivity as a separate product. However grant of Connectivity not only helped the Generator in financial closure but it also benefitted the generator & the grid through improved reliability. The existing provision of Connectivity is an important product for generator for its financial closure. For this either investment is to be made by generator or CTU in which case there are certain lock-ins like availability of land / issue of EPC contract (which is 10% of project value) to provide sufficient safety. Regulation also prohibits any injection in absence of any type of access even if connectivity is granted. So generator is taking the risk of bottling up his power if he did not seek full LTA. The process of payment based on LTA further discourages him declaring his actual requirement because till he finds a customer, payment of transmission charge is his responsibility. Such type of generator can inject only under STOA and STOA is given based on available margins. This type of product is available in US power market also. However as discussed in the Central Advisory Committee (CAC) meeting, this connectivity may be given with a charge like upfront payment of capital cost of connectivity line or an exclusive liability to pay for the tariff of connectivity line.
- (8) <u>Options & Scenario based Planning</u>: GNA based planning is capital intensive where for each generator, request equivalent transmission investment needs to be made, optimum planning take advantage of seasonal and diurnal diversity of demand and some margins available in transmission system are utilized for short term transactions. It should be kept in mind that with POWERGRID in its dual role of planner (CTU) and executer of transmission projects should not

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over plan the system. Therefore, there is a need on check and balance in transmission planning process where all stakeholders participate and it is done, not only on a fixed figure of GNA but it is to be done on options and scenario based analysis where all alternatives including non transmission based solutions like Demand Side Management, Special Protection Schemes, etc., are also need to be taken into consideration.

(9) Planning for Renewable: The existing system and the GNA based system are not very conducive for development of transmission system for Renewable Generation which is a public policy investment. Due to their location away from load centres, low utilization factor and lack of identified beneficiaries in the regime of RPO and REC mechanism, either of the system if applied as it is, will hamper growth of Renewable.

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Outline of Transmission Planning Process to be covered under Planning Regulations

1. Central Study Team

- 1.1. <u>Constitution of Central Study Team</u>
 - (1) CEA (Lead role)
 - (2) CTU
 - (3) One STU from each region
 - (4) NLDC
 - (5) RPCs

1.2. Role of Central Study Team

- (1) 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.
- (2) To prepare format for the data base to be filled up and updated by the Regional Study Team (for Intra-state system) and CTU (open access data) in every year.
- (3) To prepare year-wise/quarter-wise data base and corresponding system studies files.
- (4) Validation of the data submitted by Regional Study Team, Study and Proposal of New Transmission Plan, conducting meetings between the Central and Regional Study Team for discussion on the New Transmission System

2. Regional Study Team

- 2.1. <u>Constitution of Regional Study Team</u>
 - (1) CEA as coordinator
 - (2) STUs in the region (One of the STUs on rotational basis to take the lead role and represent in the Central Study Team)
 - (3) RLDC
 - (4) SLDCs
 - (5) DISCOMs
 - (6) CTU
 - (7) RPC
- 2.2. Role of Regional Study Team
 - (1) To coordinate with the STUs in the region in preparation of their data base and system study files in each region.
 - (2) To prepare transmission planning alternatives and refer the same to the Central Study Team.

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3. Role of Central Electricity Authority

- (1) To prepare National Electricity Plan (NEP) every 5 years and an intermediate updation of the same.
- (2) To conduct Standing Committee Meetings as per the timeline.

4. Role of CTU

- (1) To conduct regular meeting as and when needed based on the transmission access application.
- (2) To provide information based to the Central Study Team on the basis of transmission access applications.

5. Role of NLDC/ RLDC / SLDC

(1) To refer the operational issues to the Central Study Team.

6. Time-line of Activities:

	Activity	Responsibility	Suggested Timeline
Α	Standing Committee Meeting in August		l
1	• Last date for consideration of LTA application filed by DICs/Prospective DICs for first block of year.	DICs	Received up to 31 st March
2	 Data base to be submitted by the Regional Study Team to Central Study Team for this block of the year Operational Jacuas if any to be 	Regional Study Team	15 th May
	submitted by NLDC/ RLDC to Central	NLDC/RLDC	
	 Data received from DICs for long term transmission requirement to by submitted to Central Study Team 	CTU	
3	Validation of data	Central Study Team	30 th May
4	Study and Proposal of New Transmission Plan	Central Study Team	15 th July
5	Meeting between the Central and Regional Study Team for discussion on the New Transmission Plan	Central Study Team	30 th July
6	Recommendation of the New Transmission System to be taken up in the standing committee Agenda	Central Study Team	15 th Aug
7	Issue of agenda for the meeting of standing committee	CEA	30 th Aug
8	Standing Committee Meeting	CEA	15 th Sept
9	Approval of Transmission Plan	CEA	30 th Sept

В	Standing Committee Meeting in Februar	У	
1	• Last date for consideration of LTA application filed by DICs/Prospective DICs for second block of year.	DICs	30 th Oct.
2	 Data base to be submitted by the Regional Study Team to Central Team Operational Issues to be submitted by NLDC/ RLDC to Central Team Data received from DICs for long term 	Regional Study Team NLDC/RLDC	15 th Nov
	submitted to Central Team	CTU	
2	Validation of the data	Central Study Team	30 th Nov
3	Study and Proposal of New Transmission Plan	Central Study Team	15 th Jan
4	Meeting between the Central and Regional Study Team for discussion on the New Transmission System	Central Study Team	30 th Jan
5	Recommendation of the New Transmission System to be taken up in the standing committee Agenda	Central Study Team	15th Feb
6	Issue of agenda of standing committee	CEA	28 th Feb
7	Standing Committee Meeting	CEA	15 th March
8	Approval of Transmission Plan	CEA	31stMarh

Annexure-V

Central Electricity Regulatory Commission New Delhi

Task Force for framing input for Draft (Transmission Planning and other related matters) Regulations, 2015

The Terms of Reference of Task Force are

- a) To specify the principles, procedures and criteria which shall be used for planning and development of Inter State Transmission System (ISTS) in different time horizons and associated Intra-State Systems;
- b) To promote co-ordination amongst all Users, STUs, SLDCs and CTU, RLDCs, NLDC, RPCs and CEA in any proposed development of the ISTS;
- c) To provide methodology and information exchange amongst Users, STU/SLDC and CTU/RLDC, RPC, NLDC and CEA in the planning and development of the ISTS.

Note covering inputs available from various sources for deliberations

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, modeling and analysis, and gives guidelines for transmission planning. 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.

1. Objective:

1.1. The objectives of these regulations are as follows:

- a) To plan and develop an efficient, reliable and economical system of ISTS and associated intra-State Systems.
- b) To specify the principles and procedures to be used for planning and development of inter-State Transmission System (ISTS) and associated intra-State Systems.
- c) 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.
- **1.2.** The regulations of Transmission Planning specify the following:
 - a) Objectives and principles to be adopted for planning and developing an efficient, reliable and economical system of ISTS and associated intra-state systems;
 - b) Responsibilities of all the agencies involved in the planning process;
 - c) Degree and process of stakeholders involvement;
 - d) Information to be exchanged between Users and the planners and the mechanisms thereof;
 - e) Protocol to be adopted for Transmission Planning and revision in plans;
 - f) Indices for reliability and economic evaluation of transmission projects;

- g) Information to be shared in public domain by Nodal agencies for planning to ensure transparency in decision making;
- h) Methodology for implementation of transmission plans and monitoring its progress;
- i) Dispute resolution protocol

2. Scope:

This Regulation 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. Nodal Agency:

The nodal agency for the Central Electricity Regulatory Commission (Transmission Planning and other related matters) Regulations, 2015 shall be the CEA/ Central Transmission Utility (CTU) for ISTS and respective STU for intra-state transmission system.

4. Roles and responsibilities of various organizations:

The Electricity Act, 2003 recognizes that transmission planning process is an coordinated activity in which CTU and STUs need to coordinate among themselves in addition to coordination with Central Electricity Authority, Licensees, Generating Companies, Regional Power Committees, 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.

This Part defines role 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 systems.

4.1. Role of CEA:

The Central Electricity Authority shall be responsible for

- a) Formulation of perspective plans as per functions specified under Section 73 of Electricity Act 2003.
- b) Coordinating & conducting Standing Committee meetings for Transmission Planning.

4.2. Role of CTU in Planning of ISTS:

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.
- (c) Preparation of the Active and Reactive Power Balance (based on the inputs received from the Users) to be considered for Transmission Planning
- (d) Preparation of Master Transmission Plan (to be defined under this Regulation) in accordance with the guidelines mentioned in these Regulations.
- (e) To specify input data to be furnished by the ISTS Users for planning ISTS and associated intra state system
- (f) To provide data to STU with every addition and the format for the same.

4.3. Role of STU:

STU shall be responsible for

- (a) Preparation of base case of the state for Master Transmission Plan;
- (b) Providing inputs to SLDCs for preparation of state base case which is further used for preparation of operational plans;
- (c) Coordinated planning of intra state network along with inter-state network. Match with state transmission plan.

4.4. Role of NLDC:

National Load Despatch Centre shall be responsible for providing periodic Operational statistics and feedback as per section 4(j) of NLDC Rules, 2005.

4.5. Role of SLDCs:

State Load Despatch Centre shall be responsible for providing operational statistics and feedback to STU for factoring in the planning of intra-State Transmission System.

4.6. Role of Generators

Generators connected/likely to be connected to ISTS shall be responsible for providing technical data as provided under CERC Connectivity Regulations and LTA/GNA

4.7. Role of Users:

To submit data as specified by the CTU. In the planning stage the Generators seeking connectivity shall submit models specified by CTU for consideration in simulation studies. After commissioning of unit the validated model shall be re-submitted to CTU.

4.8. Role of RPC:

Monitoring of progress, giving feedback on prolonged generation/transmission outage.

4.9. Role of the Standing Committee for Transmission Planning:

The Standing Committee for Transmission Planning shall comprise of representatives from CEA, CTU, SEBs/STUs, SLDCs, RLDCs, NLDC, RPCs, and invited experts from the industry and research organizations. Role of standing committee should also be to monitor progress of transmission system execution and delay/early commissioning etc and changes in the overall master plan accordingly.

5. Considerations in Transmission Planning:

- (a) Planning Period
- (b) Load Forecast and transmission usage projection
- (c) Generation Resources (location, type, etc.)
- (d) Different alternatives
- (e) Economic and Financial Constraints
- (f) R-O-W Limitations
- (g) New and Emerging Technology
- (h) Various Uncertainties and Risks
- (i) Service Reliability and Cost Considerations

6. Principles of planning

- (a) Principles for transmission planning to be proposed by CEA & CTU in a procedure shall form a part of this Regulation.
- (b) Generation and Transmission expansion shall be co-optimized
- (c) Planning shall focus on cost economics and should be market driven.
- (d) Transmission System shall be planned to enable closing down of inefficient power plants from the perspective of safeguarding the environment
- (e) Transmission shall be adequate to facilitate realization of the policy objectives for RES and clean energy
- (f) Apart from the credible contingency, identified rare contingencies and natural calamities shall be duly considered in the transmission plan
- (g) Lag in planning and lag in implementation shall be considered
- (h) Resilience of the system and adequacy of system from the perspective of black start / start-up supply shall be envisaged at the planning stage itself.
- (i) LOLP/Loss of Load Expectation
- (j) Average ISTS Transmission loss target
- (k) Average PoC target
- (l) Congestion hours target
- (m) Control Area adequacy Indices: STOA as % of Own Generation or STOA as % of (LTA+MTOA)

7. Proposed Approaches to Transmission Planning:

CEA and CTU may give a presentation in regard to present and proposed approaches.

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8. Planning of Transmission System:

- **8.1.** Planning of Transmission System shall be done in following time horizons:
 - a) CEA would formulate perspective transmission plan for inter-State transmission system as well as intra-State transmission system for 20 years' time horizon.
 - b) CTU would formulate "Master Transmission Plan" for inter-state transmission system of 5 year time horizon on an annual rolling basis in coordination with STUs.
- **8.2.** Planning of Transmission System shall be done by CTU/CEA/STU in accordance with:
- 8.2.1. Existing Documents
 - a) National Electricity Policy, 2005 and Tariff Policy, 2006;
 - b) Central Electricity Regulatory Commission (Grant of Connectivity, Longterm 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) CEA Transmission Planning Standards
 - f) Any other relevant regulations issued by the CERC/CEA.
 - g) Policies with respect to emissions, renewable energy, energy conservation, etc, issued by the Government of India from time to time.
 - h) New roles expected from the planning agencies:

The Central and State transmission utilities need to be aware about power market condition like availability of cheaper source of power, elasticity of demand of different consumers, system constraints and renewable penetration, etc. and based on system configuration, and usage pattern CEA/ CTU may suggest transmission as a replacement of new generating capacity. It requires integrated system planning study based on anticipated price of electricity generation in various areas/zones in addition to conventional inputs like fuels and plant locations.

- 8.2.2. Documents proposed and to be prepared by CEA/CTU
 - a) Network Modelling Guidelines developed separately by CEA;
 - b) Zone-wise Reliability Indices, Value of Lost Load (VOLL), etc. defined from time to time.

9. Perspective Transmission Plan:

- (1) The perspective transmission plan shall include the following:
 - a) State wise / Fuel wise / River Basin wise Generation addition plans;
 - b) Yearly anticipated load of each state;
 - c) Broad requirement of transmission system;

(2) The perspective transmission plan shall be released by CEA in the public domain latest by 31st March of the year preceding start year of the five year and updated every five years similarly.

10. Master Transmission Plan

- **10.1.** 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.
- **10.2.** The Master Plan shall include the details of the intra State system whose execution that needs to be to facilitate realization of the benefits of the proposed ISTS9.3 Import and Export Transfer Capability along with the top five limiting constraints of the each Injection and Withdrawal Zone for every plan.
- **10.3.** Anticipated Point of Connection charges and losses of each Injection and Withdrawal Zone for every plan
- **10.4.** Evaluation of options
- **10.5.** Execution schedule along with the major implementation risks: The milestones for realizing the benefits of the proposed transmission project may be stated. This may include identify the process by which the CTU will monitor and determine whether the milestones identified above are met

11. <u>Procedure for Transmission Planning</u>

- **11.1.** Preparation of Master Transmission Plan:
 - (a) Rolling Master Transmission Plan shall be formulated by CTU biannually based on the following inputs:
 - i. Perspective plan formulated by CEA;
 - ii. Electric Power Survey of India published by CEA;
 - iii. Renewable capacity addition plan issued by Ministry of New and Renewable Energy Sources (MNRE), Govt. of India;
 - iv. Anticipated Commissioning of new Generating Stations and requests for granting Long Term Access;
 - v. Operational feedback prepared by NLDC/RLDC/SLDC;

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- vi. Pattern of prices discovered in power exchanges during the preceding year;
- vii. Load forecasts issued by CEA and nodal forecasts provided by STUs, special economic zones;
- viii. Policies with respect to emissions, renewable energy, energy conservation etc. issued by the Government from time to time.
- ix. Zone-wise Reliability Indices, Value of Lost Load (VOLL) etc. defined from time to time.
- x. Any other information, report or publication as may be available on the said subject matter.
- (b) Each STU shall submit to the CTU/CEA the load-generation disposition node wise, transmission elements, etc, in the form of a base case for 5 year ahead scenario biannually. This base case shall also include new state generating stations and planned intra state transmission system. This shall be based on maximum injection / withdrawal. Necessary format for providing the information shall be developed by CTU in consultation with CEA. There shall be five year rolling master transmission plan. All the entities seeking connectivity to ISTS and Intra-State Transmission System shall be required to submit information to CTU &STUs respectively by January/August every year and this will be considered as final for next six months i.e. no new request for connectivity or Access shall be entertained during the ensuing six months.

For example: In year 2013-2014, STUs shall submit the base case of 2014-15, 2015-16, 2016-17, 2017-18 and 2018-2019 which will be rolled biannually with updation as required.

- (c) The base case prepared by STUs shall include all transmission elements up to 132kV level including generators connected at 110 kV level.
- (d) The Planning agencies shall inform the Commission, in case information is not filed by concerned STU so that necessary action for non compliance of Commission's Regulation may be taken.
- (e) A study Committee comprising representatives of CTU, STU, RLDC, SLDCs, generator, RPC under leadership of CEA to validate data
- (f) A validation committee comprising representative from CEA, CTU, POSOCO, STUs and RPCs shall be incorporated in the Grid Code for this purpose
- (g) The validation committee shall take into consideration the data submitted by STUs. The committee shall take trend of injection and drawal from the ISTS from the implementing agency in respect of Point of Connection Charges for last three years. Based on this, a profile of ISTS injection and drawal for next five years shall be prepared every year in the month of March. The validation committee shall finalise this transmission system requirement profile which shall be published on the web site of CTU for comments of stakeholders. The approved transmission system requirement profile shall be published.
- (h) Final document shall form the basis of transmission planning in the country. The Standing Committee for Transmission Planning in each Region while

formulating or modifying a transmission scheme shall take this document as reference.

- (i) Apart from injection and drawal data, complete data about network along with planned addition of generation and load within the STU area shall be given by all users/entities to STU in January every year.STU may in consultation with their SERC formulate penalties to handle deviation beyond a specified percentage/quantum of estimated generation and demand in their area. STUs need to submit consolidated data within their area to CTU to enable it to do optimum planning.
- (j) It is proposed to devise regulatory compliance of data submission for transmission planning in line with FERC Form No. 715 2 Annual Transmission Planning and Evaluation Report. The format shall be finalised by CEA and CTU in consultation with the stakeholders. Commission will issue necessary order for its implementation.
- (k) For each of the proposed upgrade, CTU shall prepare at least 3 alternatives. These options shall be evaluated by CTU based on techno-economic analysis.
- (l) All the proposed transmission plans must satisfy the criteria laid down in the documents mentioned in these Regulations.
- (m)All the proposed transmission plans shall be accompanied with the following studies results:
 - (i) Steady State Power Flow Study
 - (ii) Interconnection Study
 - (iii) Short Circuit Study
 - (iv) EMTP Studies
 - (v) Point of Connection Charges Study
 - (vi) Studies for special cases such as Sub-synchronous Resonance (SSR)
 - (vii) Dynamic Power Flow Study
 - (viii) All other studies specified in the CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007

11.2. <u>Consultation Process for finalisation of Master Transmission Plan</u>:

A three tier consultation process would be followed for transmission planning and investment thereof:

- (a) At the first level of consultation, the proposed transmission plans shall be published by CTU on the public domain for comments of all stakeholders. The feedback received from the stakeholders along with the analysis of the feedback by CTU shall be uploaded on the website of CTU.It shall elaborate the manner in which the views of the stakeholders were being considered in the plan. The rationale for rejecting any view shall also be duly explained.
- (b) After considering the comments of the stakeholders, the CTU shall submit the revised plan, if any, before the Standing Committee on

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Transmission Planning which would be the second level of consultation. The proposed transmission plans shall be discussed in the standing committee meeting of the concerned region. In case of inter-regional transmission system, the transmission plan shall be discussed in standing committee meeting of the concerned regions.

- (c) The Standing Committee shall comprise of representatives from CEA, CTU, STUs, RPC Secretariats, SLDCs, RLDCs and NLDC and invited experts from the industry or academia. The CEA would prepare a Conduct of Business Rules for the proceedings of the Standing Committee on Transmission Planning covering the quorum, submission of comments, basis of decisions, etc.
- (d) The meeting of the standing committee shall be held bi-annually preferably in August and February.
- (e) The proposed transmission plan shall form the agenda of the standing committee meeting and following key deliverables shall also be made available by CTU for each transmission plan:
 - (i) Category of transmission plan
 - (ii) Details of Transmission Elements along with dedicated lines, reactive compensation (Static, Dynamic) if any
 - (iii) Basic Network / Snapshot pertaining to the proposed transmission plan
 - (iv) Assumptions, if any
 - (v) Request for LTA associated with the transmission plan, if any.
 - (vi) Timeline for execution of the proposal along with key milestones and implementation risks (such as RoW, resource etc.)
 - (vii) Prerequisite coordination or priority for commissioning of transmission elements within any transmission plan
 - (viii) Inter-Regional Transfer Capability
 - (ix) Estimated Cost of the Planned Transmission System and its impact on uniform PoC rate
 - (x) Results for various contingencies studied taking intermittency of renewable generation into consideration
 - (xi) Environmental Issues, if any
- (f) The proposed transmission plans shall be evaluated based on technoeconomic analysis.Each option shall be evaluated with respect to reliability standards and the planning criteria used for the assessment of transmission system capability
- (g) The transmission plan thus prepared shall be submitted by CTU to the Authority for approval which would be the third stage of consultation.
- (h) The final transmission plan approved by CEA shall be published on the website of CTU and CEA along with the response of CTU on each comment received.
- (i) Similar process would be followed when the plan is reviewed and updated.

- **12.** <u>Execution of the transmission projects:</u> The selection of Transmission Service Provider for execution of transmission projects shall be through TBCB or through nomination basis or as specified by appropriate govt. from time to time
- **13.** <u>Review of Transmission Plan:</u>

Transmission Plan needs to be reviewed/updated keeping in view of inputs regarding generation such as deviation from commissioning schedule, shifting of target region, retirement of units, operational feedback provided by RLDCs and SLDCs, exit from LTA/GNA, system constraints, market conditions, etc.

A balanced view needs to be taken in regard to liability of generators, avoidance of building underutilized assets and protecting consumer interest for the period during which asset is underutilized. For this, there is a need to formulate commitment mechanism for both generator and drawee entity.

10. <u>Information Exchange timeline:</u> The timeline for exchange of information and other activities involved in the transmission planning shall be as follows:

Activity	Responsibility	Suggested Timeline	
Standing Committee Meeting in August			
Submission of anticipated network	STU	15 th April	
scenario in the form of a base case			
Preparation of All India Network	CTU	15 th May	
Scenario			
Publishing transmission plans for	CTU	First week of June	
public comments			
Comments of Stakeholders	Stakeholders	First week of July	
Issue of agenda of standing	CEA	First week of July	
committee			
Standing Committee Meeting	CEA	First week of August	
Approval of Transmission Plan	Authority	First Week of September	
Final approved transmission plans	CTU	First week of October	
Standing Committee Meeting in February			
Submission of anticipated network	STU	15 th October	
scenario in the form of base case			
Preparation of All India Network	CTU	15 th November	
Scenario			
Publishing finalised transmission	CTU	First week of December	
plans for public comments			
Comments of Stakeholders	Stakeholders	First week of January	
Issue of agenda of standing	CTU	First week of January	
committee			
Standing Committee Meeting	CEA	First week of February	
Approval of Transmission Plan	Authority	First Week of September	
Final approved transmission plans	CTU	First week of April	

- **14. Software Applications to be used in transmission planning**: Nodal agency may deploy appropriate software for simulating the behaviors of the power system under different operating conditions during transient and steady state. It may also deploy software for co-optimization of generation resources and transmission system for 8760 hours for the planning year.
- **15. Manpower Deployment in Transmission Planning**: Proper and adequate manpower for conducting planning exercise in the utilities shall be ensured. CTU/STU must demonstrate that they have adequate manpower for planning. CEA / CTU may prepare scheme for certification of personnel involved in planning at STU/CTU similar to the system in place for System Operators
- **16.** Monitoring and execution coordination of Transmission Plan
- **17.** Dispute resolution

Approaches to Transmission Planning:

a) Scenario Approach to Address Uncertainties:

• The scenarios may be based on a set of likely possibilities or selected on the basis of reasonable extremes like competition, load growth, upcoming IPPs, ROW, fuel resources, environmental issues, renewable integration, etc.

b) Horizon Year & Staging Approach:

- Cost optimized transmission plan for the horizon year (20thyear in a 20 year planning study) is developed;
- Once an optimized horizon year plan is available, several transmission staging plans may be developed for the planning period:
 - The staging intervals may be different from one stage to the next.
 - $\circ~$ Staging at every 5 years is usually considered appropriate.
 - \circ In a high growth system, staging at say 3 or annual plans may be required.
- Keeps in focus the long-term needs of the system in proper perspective;
- Once the staging plans are complete, the present worth or other types of analysis may be performed for different horizon year and corresponding staging year plans;
- The selection of the most suitable plan among the low cost plans may be accomplished, via the alternative approach.

c) Trade off and Risk Analysis Approach:

- Perform trade-off and risk analysis for each future plants and find a global set;
- Measure the robustness of each plan in the global decision set;
- If no plan is completely robust, reasonable compromises may be applied. The planners need to eliminate unacceptable or inferior plans, based on multiple objectives and focus on a small set of plans.

Issues to be addressed in GNA

- (1) <u>Injection GNA more than demand GNA</u>: In the event of injection (Generation) GNA being more than Demand GNA, the transmission system will be developed as per injection GNA or it will be downsized to match with demand GNA.
- (2) Methodology for planning when Generators shall not have to declare target beneficiaries.
- (3) <u>Handling difference in planning scenario and operational scenario</u>: How to take care of the situation arising in the operational timeframe because the projection or assumptions which were made at the planning stage did not materialize.
- (4) <u>Price for flexibility</u>: It has been proposed that the Generators shall have access to ISTS grid with flexibility for point of drawal subject to conditions laid down at the time of grant of GNA. This issue continues to leave stranded assets. In real option economic theory, every flexibility has a price and whether generators are ready to pay sufficient price for this flexibility or the consequences of flexibility are falling on other consumers. This issue needs to be addressed.

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- (5) <u>Determining stranded capacity in a meshed network:</u> How the concept of GNA would take care of issue of relinquishment charges especially in view of the fact that CTU has been expressing difficulty in stranded assets in the event of generators for whom the transmission system has already been developed or it is under execution, either downsizing, rescheduling or simply quitting and seeking relinquishment of their LTA. CTU is taking a stand that it is difficult for them to determine stranded capacity in a meshed network.
- Planning input from Drawee entities: The mismatch in transmission planning (6) is due to the fact that generator wants transmission system to be developed without identifying customers and customers who will ultimately draw power from ISTS are not coming out with their future requirement. GNA is trying to force a commitment from drawee entity based on a fixed figure to be given four years in advance. With unbundling and open access it may practically be very difficult for state agencies to firm up their transmission requirement. This issue remains unanswered in GNA and it is presumed that correct input would come from state utilities as liability is pre-decided and power drawal more than GNA would (be priced higher) not be allowed. This may not come true and it may only increase the tendency to under-declare transmission requirement. The integrated resource planning with collaborative efforts in forecasting demand and supply scenario in which cost of power is going to play a major role in deciding to opt for importing power from outside against costly generation inside the generation will ultimately decide real time system operation. So system should be flexible to accommodate all type of access and as experience shows that drawee entities are ready to bear for slightly higher transmission charges to avail the benefit of flexibility. How to incentivize or penalize states to declare their correct GNA requirement?
- Connectivity as separate product: GNA does not propose connectivity as a (7)separate product. However grant of Connectivity not only helped the Generator in financial closure but it also benefitted the generator & the grid through improved reliability. The existing provision of Connectivity is an important product for generator for its financial closure. For this either investment is to be made by generator or CTU in which case there are certain lock-ins like availability of land / issue of EPC contract (which is 10% of project value) to provide sufficient safety. Regulation also prohibits any injection in absence of any type of access even if connectivity is granted. So generator is taking the risk of bottling up his power if he did not seek full LTA. The process of payment based on LTA further discourages him declaring his actual requirement because till he finds a customer, payment of transmission charge is his responsibility. Such type of generator can inject only under STOA and STOA is given based on available margins. This type of product is available in US power market also. However as discussed in the Central Advisory Committee (CAC) meeting, this connectivity may be given with a charge like upfront payment of capital cost of connectivity line or an exclusive liability to pay for the tariff of connectivity line.
- (8) <u>Options & Scenario based Planning</u>: GNA based planning is capital intensive where for each generator, request equivalent transmission investment needs

Minutes of the 3rd Meeting held on 10.10.2015

to be made, optimum planning take advantage of seasonal and diurnal diversity of demand and some margins available in transmission system are utilised for short term transactions. It should be kept in mind that with POWERGRID in its dual role of planner (CTU) and executer of transmission projects should not over plan the system. Therefore, there is a need on check and balance in transmission planning process where all stakeholders participate and it is done, not only on a fixed figure of GNA but it is to be done on options and scenario based analysis where all alternatives including non transmission based solutions like Demand Side Management, Special Protection Schemes, etc., are also need to be taken into consideration.

(9) <u>Planning for Renewable</u>: The existing system and the GNA based system are not very conducive for development of transmission system for Renewable Generation which is a public policy investment. Due to their location away from load centres, low utilization factor and lack of identified beneficiaries in the regime of RPO and REC mechanism, either of the system if applied as it is, will hamper growth of Renewable.

Central Electricity Regulatory Commission 3rd & 4th floors, Chanderlok Building, 36, Janpath, New Delhi-11001 Telephone: 011-23753917

No: CERC/Engg/Trans/Transmission Planning/2015

21st Dec., 2015

То

The Members of the Task Force (As per List Enclosed)

Subject: Minutes of the 4th Meeting of the Task Force for giving inputs for framing of Draft Regulation on Transmission Planning.

Madam/Sir,

Please find enclosed herewith minutes of the 4th Meeting of the "Task Force for giving inputs for framing of Draft Regulation on Transmission Planning" held in CERC on 16.12.2015.

Encl.: As above

Yours faithfully,

Sd/-

(Shilpa Agarwal) Dy. Chief (Engineering) (Convenor of Task Force)

Members of the Task Force

S1.	Name of the Member	Name of	Designation
No.		Organisation	
1.	Shri A.K. Saxena	CERC	Chief (Engg.), Chairperson
2.	Mr. Karuna Sarma	AEGCL	AGM (E)
3.	Ms. Arundhati Ghosh	WBSETCL	Chief Engineer, CPD
4.	Mr. Rajiv Porwal	POSOCO	AGM (System Operation)
	Mr. Vivek Pandey (Alternate Member)	POSOCO	Chief Manager (System Operation)
5.	Mr. Ashok Pal	POWERGRID	AGM (CTU)
6.	Mr. Suman Guchh	UPPTCL	CE, Transmission Planning & Power System Studies
7.	Mr. Pardeep Jindal	CEA	Director (SP & PA)
8.	Mr. Omprakash k Yempal	MSETCL	Director (Operation/Projects)
9.	Mr. Ch. V. Subba Rao	APTRANSCO	Superintending Engineer/Power Systems
	Mr. A. Satyanarayana	APTRANSCO	Superintending Engineer/Planning
10.	Ms. Shilpa Agarwal	CERC	Dy. Chief (Engg.), Member Convenor

Minutes of 4th Meeting of the Task Force for giving inputs for forming of Draft Regulations on Transmission Planning held on 16.12.2015 at CERC, New Delhi

List of participants is enclosed at **Annexure-I**.

- 1. Shri A.K. Saxena, Chief (Engg.), CERC welcomed the participants and recapitulated the discussion held during the last meeting held on 10.10.2015. He stated that CTU and CEA had, during the last meeting, proposed a Regional Study Team in each region and a Central Study Team. He asked the participants from Andhra Pradesh and West Bengal to give their views on Regional Study team and Central Study team i.e. whether the Regional Standing Committee on Transmission Planning, the forum as it exists today, will be able to meet the requirements of study teams as proposed by CEA and CTU or should the study teams be incorporated in the draft regulations on transmission planning? He further clarified that it members of the task force agree not to incorporate the study teams in the draft regulations, we need not to discuss this.
- 2. Shri Akhil kumar Gupta, Joint Chief (Engg.) stated that both CEA and CTU had, during the 3rd meeting, proposed that there should be two study teams, one at the regional level and other at centre level. He stated that as discussed during the 3rd meeting, the purpose of regional teams would be to collect data required for transmission planning purpose from different STUs and prepare regional level planning. All the study done and regional plans prepared by different regional study teams would be submitted to central study team which in turn shall prepare national level plan for deliberation in Standing Committees on Transmission Planning.
- 3. The representative of APTRANSCO stated that the transmission planning is done by CEA and CTU/STU and those plans are discussed at Standing Committee. He stated that Standing Committee does not conduct any study. Therefore, there is a need for Regional Study Team to conduct various studies at regional level. Representative of West Bengal also agreed to the requirement of Regional Study team.
- 4. Shri A.K. Saxena, Chief (Engg.), CERC enquired representatives of West Bengal and AP to clarify whether CEA and CTU bring study done by them in respect of transmission planning to Standing Committee. On receiving affirmative reply from the representative of AP, he further asked members to deliberate whether we need to formalize the process of conducting study by involving regional level stakeholders like STUs, RLDCs, SLDCs, etc.
- 5. Ms. Shilpa Agarwal, Deputy Chief (Engg.) stated that CEA and CTU had proposed formation of Regional Study Teams with main objective to get data from regional stakeholders. She stated that the main purpose of regional study

Minutes of the 4th Meeting held on 16.12.2015

team is to smoothen the flow of data required for transmission planning which, as stated by CTU, is not made available to CTU on time.

- 6. The representative of POSOCO stated that since a regulation on transmission planning is going to be formalized, the entities which are supposed to provide data for planning will be bound by regulation to provide data on time and non-submission of data shall be non-compliance of regulation.
- 7. Ms. Shilpa Agarwal stated that extra activities of Regional Study team and Central Study team should be seen with the perspective that timeline for these activities shouldnot hamper transmission planning. Any customer who has sought LTA should be clear on 6 months if segmentation of transmission is required. She added that CEA will take a lead role in the central study team which comprises of CTU, NLDC, RPCs and one STU and there will be a combined effort from stakeholders for studies. Therefore, there is a need for Regional Study team and Central Study team.
- 8. Representative of CTU stated that the timeline of activities as given by CEA and CTU also specifies time for conducting LTA meeting as and when LTA application are received. Presently CTU is conducting this activity and this shall be continued in future. However, the studies to be conducted regional and central study teams are broad based studies which are required for transmission planning.
- 9. Shri A.K. Saxena, Chief (Engg.), CERC stated that if the studies to be conducted by study teams become an extra activity and require extra efforts then timeline required for developing transmission plan/system would shift as CEA is required to prepare perspective plan for 5 years in advance and CTU is required to come up with short term plan for the intervening period based on the LTA requirements. He stated that since the studies become an extra activity, it would be difficult to adhere to the timeline specified by the Commission vide order dated 16.2.2015 in petition no. 92/MP/2014 wherein the Commission has directed CTU to publish results of system studies with 6 months periodicity so that the LTA applicants are aware about the requirement of transmission system and timeline of grant of LTA in advance. Further, the study to be done by regional team and central team is a sequential activity. The central team will be able to make national level transmission plan for deliberation in standing committee only after submission of result of studies conducted by regional team is submitted on time.
- 10. The representative of POSOCO stated that generally transmission plans proposed by CTU is discussed at the Standing Committee forum but the discussions do not cover all the technical studies and related issues. Therefore, during the last meeting it was proposed to have regional study team for conducting various studies involving all the regional stakeholders.

Minutes of the 4th Meeting held on 16.12.2015

- 11. Shri A.K. Saxena, Chief (Engg.), CERC enquired the representatives of West Bengal and Andhra Pradesh, since they participate in Standing Committee Meeting, to elaborate how decisions in respect of transmission system are taken in Standing Committee Meetings if all technical studies and related issues are not deliberated in details as stated by the representative of POSOCO. Whether studies conducted by CTU are presented/discussed in the Standing Committee Meeting?
- 12. The representative of WBSETCL submitted that system studies are done by CTU and only viable system is presented before Standing Committee Meeting for deliberation.
- 13. The representative of APTRANSCO submitted that non-submission of data is the weakness in studies conducted by CTU.
- 14. Shri A.K. Saxena, Chief (Engg.), CERC stated that if non-submission of data is the weakness then we should strengthen the process of timely submission of data by making it a part of the transmission planning regulations. He stated that even after incorporating it in the regulations, if stakeholders are not submitting data, the non-submission can be reported to the Commission and the Commission shall take necessary actions.
- 15. The representative of CEA opined that in case data is not made available by the regional stakeholders, the planning shall be done based on the previous year data available with CEA.
- 16. The role of Regional Study Team and the Central Study Team was deliberated in detail during the meeting by the members of the Task Force wherein some corrections were suggested by the members which were incorporated in the document submitted by POWERGRID. CEA and POWERGRID suggested that the name of regional team should be Regional Coordination Team which was agreed to by the members of the Task Force. The outline of transmission planning process as discussed and modified during the meeting is attached at **Annexure-II**.
- 17. During the discussions on the draft regulations, POSOCO was asked to clarify inclusion of credible contingency, identified rare contingency in the principles of transmission planning. The representative of POSOCO stated that although transmission planning is done for N-1 contingency but the system should be ready for certain contingencies which may occur like if NTPC plant at Dadri trips, whether the transmission system is ready to handle such situation. He also stated that there may be some other similar cases like outage of Agra-Gwalior line, tripping of Mundra generating station, etc.
- 18. Shri Akhil Kumar Gupta, Joint Chief (Engg.), CERC opined that the contingency is already covered in the CEA "Manual on Transmission Planning

Criteria" and it should not be made part of the transmission planning regulations.

- 19. Ms. Shilpa Agarwal, Deputy Chief (Engg.), CERC stated that we need to define the identified contingency in the procedure to be formulated under the transmission planning regulations. Representative of CEA stated that system cannot be planned for rare contingencies as suggested by POSOCO other than specified in CEA transmission planning criteria.
- 20. Representative of POSOCO explained an example of "Resilience" as that Sasan is connected only through 765 kV lines. In case of complete outage it would be difficult to provide black start to this station. The system should be planned to take care of such happenings.
- 21. Regarding loss of load expectation, congestion hour target, average POC target and average transmission loss target, Shri Akhil Kumar Gupta, Joint Chief (Engg.), CERC stated that these are objective function of optimising problem. He stated that if all these cannot be put into the regulations, it will be difficult for the transmission planner to achieve all the objectives as for reducing congestion, new transmission lines may be required which may lead to increase in PoC charges. To this representative of POSOCO clarified that each of these need not be minimised but plan should take care of these aspects.
- 22. Ms. Shilpa Agarwal, Deputy Chief (Engg.), CERC stated that the objective function like loss of load expectation, congestion hour target, average POC target and average transmission loss target should be put in SOR or detailed procedure to the transmission planning regulations as future goal.
- 23. Shri A.K. Saxena, Chief (Engg.), CERC stated that although it is good to say the impact of new transmission system on average POC rates but average POC target should not be included in the regulations. He further stated that it is very difficult to state that whether transmission losses would come down or not with addition of new transmission system.
- 24. The representative of WBSETCL also stated that it is not possible to state that addition of new transmission system would bring down transmission losses.
- 25. CTU enquired the need to retain the study files as indicated in draft Regulations. Representative of POSOCO clarified that study files may be required for some course correction. For example, if it was expected that flow will be from WR to NR but in actual time frame it is NR to WR, course correction can be planned. CEA stated that only final file as finalised at Standing Committee shall be retained along with assumptions.
- 26. Representative of MSETCL provided inputs which were forwarded to the taskforce are attached as *Annexure-III*.

27. Further the draft Regulations were also discussed and modified A copy of draft regulations is attached at *Annexure-IV*.

Minutes of the 4th Meeting held on 16.12.2015

4th meeting of Task Force for giving input for framing of Draft Regulation on "Transmission Planning" on 16.12.2015 at 10.30 a.m.

List of Participant:

S1.	Name	Designation and	E-mail
No.		Organisatoin	
1.	Shri A.K. Saxena	Chief (Engg.), CERC	
2.	Shri Akhil Kr.	Joint Chief (Engg.),	akhilkg@cercind.gov.in
	Gupta	CERC	
3.	Shri Pardeep	Director, CEA	jindal_pardeep@yahoo.co.in
	Jindal		
4.	Shri Vikram Singh	Dy. Chief (Engg.), CERC	vikramsinghfms@gmail.com
5.	Ms. Shilpa	Dy. Chief (Engg.), CERC	shilpadec@yahoo.com
	Agarwal		
6.	Shri Rajiv Porwal	AGM,NRLDC, POSOCO	rajivporwal@gmail.com
7.	Shri L. Parda	ADE, POWERGRID	cepowersystem@rediffmail.com
	Sarathi		
8.	Ms. Arundhati	C.E (CPD), WBSETCL	Arundhati.ghosh@wbsetcl.in
	Ghosh		
9.	Shri Ashok Pal	AGM, POWERGRID	ashok@powergridindia.com
10.	Agam Kumar	Technical Officer, CERC	Agamkumar115@gmail.com

Annexure-II Outline of Transmission Planning Process to be covered under Planning Regulation

1. Central Study Team

- 1.1. Constitution of Central Study Team
 - (1) CEA (Lead role)
 - (2) CTU
 - (3) One STU from each region
 - (4) NLDC
 - (5) RPCs

1.2. <u>Role of Central Study Team</u>

- (1) 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.
- (2) To prepare format for the data base to be filled up and updated by the Regional Study Team (for Intra-state system) and CTU (open access data) in every year.
- (3) To prepare year-wise/quarter-wise data base and corresponding system studies files.
- (4) CEA will compile the data as well as alternatives as received from Regional study teams for study on \national level and prepare transmission plans for regional and national level.
- (5) Validation of the data submitted by Regional Study Team, Study and Proposal of New Transmission Plan, conducting meetings between the Central and Regional Study Team for discussion on the New Transmission System
- (6) CEA while proposing plans in Central Study team may go for recommended alternatives by Regional Study team or may choose another alternative as per the study results at national level.
- (7) The study results needs to be discussed in Central Study team for recommending to Standing Committee.

2. Regional coordination Team

2.1. <u>Constitution of Regional Study Team</u>

- (1) CEA as lead role
- (2) STUs in the region (One of the STUs on rotational basis to take the lead role among STUs and represent in the Central Study Team)
- (3) RLDC
- (4) SLDCs
- (5) DISCOMs in the region
- (6) CTU as coordinator
- (7) RPC

3. <u>Role of Regional Study Team</u>

- (1) To coordinate with the STUs in the region in preparation of their data base and system study files in each region.
- (2) To prepare transmission planning alternatives and refer the same to the Central Study Team.
- (3) CTU will provide the data and alternatives along with recommended alternative concluded in regional study team to central study team.
- (4) The last base case file shall be circulated to all regions. All regions will do the study and Central Study team will combine the studies at National level.

4. Role of Central Electricity Authority

- (1) To prepare National Electricity Plan (NEP) every 5 years and an intermediate updation of the same.
- (2) To conduct Standing Committee Meetings as per the timeline.

5. Role of CTU

- (1) To conduct regular meeting as and when needed based on the transmission access application.—monthly to seek status of projects
- (2) To provide information based to the Central Study Team on the basis of transmission access applications.
- (3) Conducting and sharing studies of various scenarios

6. Role of NLDC/ RLDC / SLDC

(1) To refer the operational issues to the Central Study Team.

Time-line of Activities

	Activity	Responsibility	Suggested Timeline
Α	Standing Committee Meeting in Aug		
1	 Last date for consideration of LTA application filed by DICs/ Prospective DICs for first block of year. 	DICs	Received up to 31st March
2	• Data base to be submitted by the	Regional Study	15^{th}May
	Regional Study Team to Central Study Team for this block of the	Team	
	yearOperational Issues if any, to be	NLDC/RLDC	
	submitted by NLDC/ RLDC to Central Team	CTU	
	• Data received from DICs for long		
	by submitted to Central Study Team		
3	Validation of data	Central Study Team	30 th May

4	Study and Proposal of New Transmission Plan	Central Study Team	15 th July
5	Meeting between the Central and Regional Study Team for discussion on the New Transmission Plan	Central Study Team	30 th July
6	Recommendation of the New Transmission System to be taken up in the standing committee Agenda	Central Study Team	15 th Aug
7	Issue of agenda for the meeting of standing committee	CEA	30 th Aug
8	Standing Committee Meeting	CEA	15 th Sept
9	Approval of Transmission Plan	CEA	30 th Sept
В	Standing Committee Meeting in Febr	uary	
1	 Last date for consideration of LTA application filed by DICs/Prospective DICs for second block of year. 	DICs	30 th Oct.
2	• Data base to be submitted by the Regional Study Team to Central Team	Regional Study Team	15 th Nov
	Operational Issues to be submitted by NLDC/ RLDC to Central Team	NLDC/RLDC	
	 Data received from DICs for long term transmission requirement to by submitted to Central Team 	CTU	
2	Validation of the data	Central Study Team	30 th Nov
3	Study and Proposal of New Transmission Plan	Central Study Team	15 th Jan
4	Meeting between the Central and Regional Study Team for discussion on the New Transmission System	Central Study Team	30 th Jan
5	Recommendation of the New Transmission System to be taken up in the standing committee Agenda	Central Study Team	15th Feb
6	Issue of agenda of standing committee	CEA	28 th Feb
7	Standing Committee Meeting	CEA	15 th March
8	Approval of Transmission Plan	CEA	31 st Marh

MSETCL's views, particularly, for renewable generation planning:

- 1. In our country we have various transmission levels from 66 KV to 765 KV.
- 2. Loads (consumption) at 415 V, 11KV, 33 KV, and EHV consumption at 66 KV, 132 KV, 220 KV levels.
- 3. If we see Annual Energy requirements of country (see CEA data) Total annual energy requirement is @ 10,00,000 Mus. Total annual Agriculture consumption is @ 1.70,000 Mus. Energy consumption at 33 KV and below will be @ 60% and more. Energy consumption at EHV levels (66KV, 132KV, 220 KV) will be @ 30 to 40 %. Maximum Agriculture consumption is at 11 KV and below.
- 4. If we consider our demand is @ 1,50,000 MW meaning 90,000 MW requirement will be at 33 KV and below voltage levels. This is much indicative when we think of renewable Generation.
- 5. Our Agriculture energy consumption is @ 1,70,000 Mus which is about 17% of total energy consumption of the country. We are supplying agriculture power for 8 to 10 hrs for a day in agriculture seasons. if we convert in MW requirement, it will be @ 35,000 MW to 40,000 MW. More importantly this requirement is at 11 KV and below.
- 6. Considering availability of renewable generation particularly solar, it is very suitable for Agriculture load requirement.
- 7. If we plan renewable generation particularly solar is at 11 KV, 33 KV, 66 KV and some strategic locations at 132 KV, 220 KV considering load centres, it will have following advantages.
 - (a) Agriculture energy requirement will be met through solar generation.
 - (b) Considering the variable nature of generation and near the load centre, load generation balance can be done easily.
 - (c) Huge transmission margin will be available in existing infrastructure and future demand can be met with the existing infrastructure.
 - (d) More important this will reduce the transmission and distribution losses to the great extent. More generation is available against these losses to meet future demands.
 - (e) No need of planning high capacity corridors.
 - (f) We can avoid future capex towards transmission infrastructure if we formulate certain transmission planning philosophy for Renewable Generation. Hence it is kindly requested to the members of the task group to consider the above points for discussions and consider in the Regulation for Transmission planning.

Annexure-IV

Central Electricity Regulatory Commission New Delhi

CHAPTER 1: PRELIMINARY

1. Short title, extent and commencement.

- These regulations may be called the Central Electricity Regulatory Commission (Transmission Planning and other related matters) Regulations, 2015
- (2) These regulations shall come into force from date of its publication.

CHAPTER 2: General Provisions

- **2. Scope of Regulations**: To plan and develop an efficient, reliable and economical system of ISTS and associated intra-State Systems.
- 2.1. This Regulation 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. Objective:

The objectives of these regulations are as follows:

- a) To plan and develop an efficient, reliable and economical system of ISTS and associated intra-State Systems.
- b) To specify the principles and procedures to be used for planning and development of inter-State Transmission System (ISTS) and associated intra-State Systems.
- c) 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.

4. Nodal Agency:

The nodal agency for the Central Electricity Regulatory Commission (Transmission Planning and other related matters) Regulations, 2015 shall be the Central Transmission Utility (CTU) for ISTS and respective STU for intrastate transmission system.

5. Roles and responsibilities of various organizations:

The Electricity Act, 2003 recognizes that transmission planning process is a coordinated activity in which CTU and STUs need to coordinate among themselves in addition to coordination with Central Electricity Authority, Licensees, Generating Companies, Regional Power Committees, 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.

This Part defines role 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 systems.

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

5.1. **Role of CEA:**

The Central Electricity Authority shall be responsible for

- a) Formulation of perspective plans as per functions specified under Section 73 of Electricity Act 2003.
- b) Coordinating & conducting Standing Committee meetings for Transmission Planning.

5.2. **Role of CTU**

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.
- (c) Preparation of the Active and Reactive Power Balance (based on the inputs received from the Users) to be considered for Transmission Planning
- (d) Preparation of Transmission Plan (to be defined under this Regulation) in accordance with the guidelines mentioned in these Regulations.
- (e) To specify input data to be furnished by the ISTS Users for planning ISTS and associated intra state system
- (f) To provide data to STU with every addition and the format for the same.

5.3. Role of STU:

STU shall be responsible for

- (a) Preparation of base case of the state for Master Transmission Plan;
- (b) Providing inputs to SLDCs for preparation of state base case which is further used for preparation of operational plans;

(c) Coordinated planning of intra state network along with inter-state network. Match with state transmission plan---put in procedure

5.4. **Role of NLDC:**

National Load Despatch Centre shall be responsible for providing periodic Operational statistics and feedback as per section 4(j) of NLDC Rules, 2005.

5.5. Role of SLDCs:

State Load Despatch Centre shall be responsible for providing operational statistics and feed back to STU for factoring in the planning of intra-State Transmission System.

5.6. Role of Generators

Generators connected/likely to be connected to ISTS shall be responsible for providing technical data as provided under CERC Connectivity Regulations and LTA/GNA

5.7. Role of Users:

To submit data as specified by the CTU. In the planning stage the Generators seeking connectivity shall submit models specified by CTU for consideration in simulation studies. After commissioning of unit the validated model shall be re-submitted to CTU.

5.8. **Role of RPC**:

Monitoring of progress, giving feedback on prolonged generation/transmission outage.

5.9. Role of the Standing Committee for Transmission Planning

The Standing Committee for Transmission Planning shall comprise of representatives from CEA, CTU, SEBs/STUs, SLDCs, RLDCs, NLDC, RPCs, and invited experts from the industry and research organizations. Role of standing committee should also be to monitor progress of transmission system execution and delay/early commissioning etc and changes in the overall master plan accordingly.

6. Principles of planning

- 6.1. Principles for transmission planning to be proposed by CEA & CTU in a procedure shall form a part of this Regulation.
 - Cooptimisation of Generation and Transmission expansion planning Cost economics
 - Due consideration to power market
 - Likely closing of old/inefficient plants.
 - Facilitate realization of the policy objectives for RES and clean energy
 - Apart from the contingencies identified in the CEA Planning Criteria, severe contingencies shall be duly considered in the transmission plan

- Adequacy of system from the perspective of black start /start-up supply shall be envisaged at the planning stage itself.
- Due consideration of Critical locations based on operational feedback provided by POSOCO and inputs from other sources (to be defined in the procedure)

7. Planning Considerations

- 7.1. Technical criteria shall be as per CEA Transmission Planning Criteria
- 7.2. Other Considerations in Transmission Planning shall include the following:
 - (a) Transmission usage projection: Different alternatives will be formulated in due consideration of Economic and Financial Constraints, R-O-W Limitations, New and Emerging Technology, Various Uncertainties and Risks and Cost Considerations

(b)Criteria for cost-benefit analysis to be notified by the Commission

8. Planning of Transmission System:

CEA formulates transmission plan for inter-State transmission system as well as intra-State transmission system and notifies such plan once in five years in accordance with section 3(4) of the Act. The transmission system as planned and agreed through standing committees on power system planning would be firmed up /formulated/intimated by CEA twice in a year.

- 8.1. Planning of Transmission System shall be done by CTU/CEA/STU in due consideration with:
- 8.1.1. Existing Documents
 - a) National Electricity Policy, 2005 and Tariff Policy, 2006;
 - b) Central Electricity Regulatory Commission (Grant of Connectivity, Longterm 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) CEA Transmission Planning Criteria
 - f) Any other relevant regulations issued by the CERC/CEA.
 - g) Policies with respect to emissions, renewable energy, energy conservation, etc, issued by the Government of India from time to time.
- 8.1.2. Documents proposed and to be prepared by CEA
 - a) Network Modelling Guidelines developed separately by CEA;
 - b) Zone-wise Reliability Indices, Value of Lost Load (VOLL), etc. defined from time to time.

9. Perspective Transmission Plan:

- (1) The perspective transmission plan shall include the following:
 - a) State wise / Fuel wise / River Basin wise Generation addition plans;

- b) Yearly anticipated load of each state;
- c) Broad requirement of transmission system;
- (2) The perspective transmission plan shall be released by CEA in the public domain latest by 31st March of the year preceding start year of the five year and updated every five years similarly

10. Master Transmission Plan

- 10.1. Input data considered while preparing the Master Transmission Plan
- 10.2. 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.

Priority can be decided depending on type of upgrade

- 10.3. The Master Plan shall include the details of the intra State system whose execution that needs to be to facilitate realization of the benefits of the proposed ISTS9.3 Import and Export Transfer Capability along with the top five limiting constraints of the each Injection and Withdrawal Zone for every plan.
- 10.4.Anticipated Point of Connection charges and losses of each Injection and Withdrawal Zone for every plan
- 10.5. Evaluation of options
- 10.6.Execution schedule along with the major implementation risks: The milestones for realizing the benefits of the proposed transmission project may be stated. This may include identify the process by which the CTU will monitor and determine whether the milestones identified above are met

11. <u>Procedure for Transmission Planning</u>

- 11.1. Preparation of Master Transmission Plan:
 - (a) Rolling Master Transmission Plan shall be formulated by CTU biannually based on the following inputs:
 - i. Perspective plan formulated by CEA;
 - ii. Electric Power Survey of India published by CEA;

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- iii. Renewable capacity addition plan issued by Ministry of New and Renewable Energy Sources (MNRE), Govt. of India;
- iv. Anticipated Commissioning of new Generating Stations and requests for granting Long Term Access;
- v. Operational feedback prepared by NLDC/RLDC/SLDC;
- vi. Pattern of prices discovered in power exchanges during the preceding year;
- vii. Load forecasts issued by CEA and nodal forecasts provided by STUs, special economic zones;
- viii. Policies with respect to emissions, renewable energy, energy conservation etc. issued by the Government from time to time.
- ix. Zone-wise Reliability Indices, Value of Lost Load (VOLL) etc. defined from time to time.
- x. Any other information, report or publication as may be available on the said subject matter.
- (b) Since Intra-State transmission planning is the responsibility of STU, Each STU shall submit to the CTU/CEA the load-generation disposition node wise, transmission elements, etc, in the form of a base case for 5 year ahead scenario biannually. This base case shall also include new state generating stations and planned intra state transmission system. This shall be based on maximum injection / withdrawal. Necessary format for providing the information shall be developed by CTU in consultation with CEA. There shall be five year rolling master transmission plan. All the entities seeking connectivity to ISTS and Intra-State Transmission System shall be required to submit information to CTU &STUs respectively by January/August every year and this will be considered as final for next six months i.e. no new request for connectivity or Access shall be entertained during the ensuing six months.

For example: In year 2013-2014, STUs shall submit the base case of 2014-15, 2015-16, 2016-17, 2017-18 and 2018-2019 which will be rolled biannually with updation as required.

- (c) The base case prepared by STUs shall include all transmission elements up to 132kV level including generators connected at 110 kV level. It will be discussed in the Standing Committee under RPC consisting of senior level officials of respective planning wings of various STUs of the Region and finalized in this forum before forwarding state requirements to Standing Committee on Central Sectors, convened by CEA/CTU.
- (d) No intra-state transmission network can be taken up by any licensee within the State without the approval of STU.
- (e) CEA/CTU shall finalise the future transmission network plan of the Country with optimal utilisation of transmission network of all licensees.

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- (f) During finalisation of the total transmission network by CEA/CTU, if any gap in intra-state transmission network observed, that shall be indicated to the concerned STU for taking necessary action in this regard.
- (g) The Planning agencies shall inform the Commission, in case information is not filed by concerned STU so that necessary action for non compliance of Commission's Regulation may be taken.(Legal)
- (h) A study Committee comprising representatives of CTU, STU, RLDC, SLDCs, generator, RPC under leadership of CEA to validate data
- (i) A validation committee comprising representative from CEA, CTU, POSOCO, STUs and RPCs shall be incorporated in the Grid Code for this purpose
- (j) The validation committee shall take into consideration the data submitted by STUs. The committee shall take trend of injection and drawal from the ISTS from the implementing agency in respect of Point of Connection Charges for last three years. Based on this, a profile of ISTS injection and drawal for next five years shall be prepared every year in the month of March. The validation committee shall finalise this transmission system requirement profile which shall be published on the web site of CTU for comments of stakeholders. The approved transmission system requirement profile shall be published.
- (k) Final document shall form the basis of transmission planning in the country. The Standing Committee for Transmission Planning in each Region while formulating or modifying a transmission scheme shall take this document as reference.
- (l) Apart from injection and drawal data, complete data about network along with planned addition of generation and load within the STU area shall be given by all users/entities to STU in January every year.STU may in consultation with their SERC formulate penalties to handle deviation beyond a specified percentage/quantum of estimated generation and demand in their area. STUs need to submit consolidated data within their area to CTU to enable it to do optimum planning.
- (m) It is proposed to devise regulatory compliance of data submission for transmission planning in line with FERC Form No. 715 1 - Annual Transmission Planning and Evaluation Report. The format shall be finalised by CEA and CTU in consultation with the stakeholders. Commission will issue necessary order for its implementation.
- (n) For each of the proposed upgrade, CTU shall prepare at least 3 alternatives. These options shall be evaluated by CTU based on techno-economic analysis.
- (o) All the proposed transmission plans must satisfy the criteria laid down in the documents mentioned in these Regulations.
- (p) All the proposed transmission plans shall be accompanied with the following studies results:
 - i. Steady State Power Flow Study
 - ii. Interconnection Study

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- iii. Short Circuit Study
- iv. EMTP Studies
- v. Point of Connection Charges Study
- vi. Studies for special cases such as Sub-synchronous Resonance (SSR)
- vii. Dynamic Power Flow Study
- viii. All other studies specified in the CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007
- (q) Phasing of implementation of various studies shall be as per detailed procedure to be prepared by CEA.

11.2. Consultation Process for finalisation of Master Transmission Plan:

A three tier consultation process would be followed for transmission planning and investment thereof:

- (a) At the first level of consultation, the proposed transmission plans shall be published by CTU on the public domain for comments of all stakeholders. The feedback received from the stakeholders along with the analysis of the feedback by CTU shall be uploaded on the website of CTU.It shall elaborate the manner in which the views of the stakeholders were being considered in the plan. The rationale for rejecting any view shall also be duly explained.
- (b) After considering the comments of the stakeholders, the CTU shall submit the revised plan, if any, before the Standing Committee on Transmission Planning which would be the second level of consultation. The proposed transmission plans shall be discussed in the standing committee meeting of the concerned region. In case of inter-regional transmission system, the transmission plan shall be discussed in standing committee meeting of the concerned regions.
- (c) The Standing Committee shall comprise of representatives from CEA, CTU, STUs, RPC Secretariats, SLDCs, RLDCs and NLDC and invited experts from the industry or academia. The CEA would prepare a Conduct of Business Rules for the proceedings of the Standing Committee on Transmission Planning covering the quorum, submission of comments, basis of decisions, etc.
- (d) The meeting of the standing committee shall be held bi-annually preferably in August and February.
- (e) The proposed transmission plan shall form the agenda of the standing committee meeting and following key deliverables shall also be made available by CTU for each transmission plan:
 - i. Category of transmission plan
 - ii. Details of Transmission Elements along with dedicated lines, reactive compensation (Static, Dynamic) if any
 - iii. Basic Network / Snapshot pertaining to the proposed transmission plan
 - iv. Assumptions, if any
 - v. Request for LTA associated with the transmission plan, if any. Whether Transmission Planning shall be based on GNA or LTA

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Timeline for execution of the proposal along with key milestones and implementation risks (such as RoW, resource etc.)

- vi. Prerequisite coordination or priority for commissioning of transmission elements within any transmission plan
- vii. Inter-Regional Transfer Capability
- viii. Estimated Cost of the Planned Transmission System and its impact on uniform PoC rate
- ix. Results for various contingencies studied taking intermittency of renewable generation into consideration
- x. Environmental Issues, if any
- (f) The proposed transmission plans shall be evaluated based on technoeconomic analysis. Each option shall be evaluated with respect to reliability standards and the planning criteria used for the assessment of transmission system capability
- (g) The transmission plan thus prepared shall be submitted by CTU to the Authority for approval which would be the third stage of consultation.
- (h) The final transmission plan approved by CEA shall be published on the website of CTU and CEA along with the response of CTU on each comment received.
- (i) Similar process would be followed when the plan is reviewed and updated.
- **12. Execution of the transmission projects**: The selection of Transmission Service Provider for execution of transmission projects shall be through TBCB or through nomination basis or as specified by appropriate govt from time to time.

13. Review of Transmission Plan:

Transmission Plan needs to be reviewed/updated keeping in view of inputs regarding generation such as deviation from commissioning schedule, shifting of target region, retirement of units, operational feedback provided by RLDCs and SLDCs, exit from LTA/GNA, system constraints, market conditions, etc.

A balanced view needs to be taken in regard to liability of generators, avoidance of building underutilized assets and protecting consumer interest for the period during which asset is underutilized. For this, there is a need to formulate commitment mechanism for both generator and drawee entity.

14. Information Exchange timeline:

The timeline for exchange of information and other activities involved in the transmission planning shall be as follows:

Activity	Responsibility	Suggested Timeline	
Standing Committee Meeting in August			
Submission of anticipated network	STU	15 th April	
scenario in the form of a base case			
Preparation of All India Network	CTU	15 th May	

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Scenario		
Publishing transmission plans for	CTU	First week of June
public comments		
Comments of Stakeholders	Stakeholders	First week of July
Issue of agenda of standing	CEA	First week of July
committee		
Standing Committee Meeting	CEA	First week of August
Approval of Transmission Plan	Authority	First Week of September
Final approved transmission plans	CTU	First week of October
Standing Committee Meeting in Feb	ruary	
Submission of anticipated network	STU	15 th October
scenario in the form of base case		
Preparation of All India Network	CTU	15 th November
Scenario		
Publishing finalised transmission	CTU	First week of December
plans for public comments		
Comments of Stakeholders	Stakeholders	First week of January
Issue of agenda of standing	CTU	First week of January
committee		
Standing Committee Meeting	CEA	First week of February
Approval of Transmission Plan	Authority	First Week of September
Final approved transmission plans	CTU	First week of April

15. Software Applications to be used in transmission planning

Nodal agency may deploy appropriate software for simulating the behaviors of the power system under different operating conditions during transient and steady state. It may also deploy software for co-optimization of generation resources and transmission system for 8760 hours for the planning year.

16. Manpower Deployment in Transmission Planning

Proper and adequate manpower for conducting planning exercise in the utilities shall be ensured. CTU/STU must demonstrate that they have adequate manpower for planning.

CEA / CTU may prepare scheme for certification of personnel involved in planning at STU/CTU similar to the system in place for System Operators

- **17.** Monitoring and execution coordination of Transmission Plan
- **18.** Dispute resolution

Approaches to Transmission Planning:

a) Scenario Approach to Address Uncertainties:

• The scenarios may be based on a set of likely possibilities or selected on the basis of reasonable extremes like competition, load growth, upcoming IPPs, ROW, fuel resources, environmental issues, renewable integration, etc.

b) Horizon Year & Staging Approach:

- Cost optimized transmission plan for the horizon year (20thyear in a 20 year planning study) is developed;
- Once an optimized horizon year plan is available, several transmission staging plans may be developed for the planning period:
 - The staging intervals may be different from one stage to the next.
 - Staging at every 5 years is usually considered appropriate.
 - In a high growth system, staging at say 3 or annual plans may be required.
- Keeps in focus the long-term needs of the system in proper perspective;
- Once the staging plans are complete, the present worth or other types of analysis may be performed for different horizon year and corresponding staging year plans;
- The selection of the most suitable plan among the low cost plans may be accomplished, via the alternative approach.

c) Trade off and Risk Analysis Approach:

- Perform trade-off and risk analysis for each future plants and find a global set;
- Measure the robustness of each plan in the global decision set;
- If no plan is completely robust, reasonable compromises may be applied. The planners need to eliminate unacceptable or inferior plans, based on multiple objectives and focus on a small set of plans.

Issues to be addressed in GNA

- **1.** <u>Injection GNA more than demand GNA:</u> In the event of injection (Generation) GNA being more than Demand GNA, the transmission system will be developed as per injection GNA or it will be downsized to match with demand GNA.
- **2.** Methodology for planning when Generators shall not have to declare target beneficiaries.
- **3.** <u>Handling difference in planning scenario and operational scenario:</u> How to take care of the situation arising in the operational timeframe because the projection or assumptions which were made at the planning stage did not materialize.
- **4.** <u>Price for flexibility</u>: It has been proposed that the Generators shall have access to ISTS grid with flexibility for point of drawal subject to conditions laid down at the time of grant of GNA. This issue continues to leave stranded assets. In real option economic theory, every flexibility has a price and whether generators are ready to pay sufficient price for this flexibility or the consequences of flexibility are falling on other consumers. This issue needs to be addressed.

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- **5.** Determining stranded capacity in a meshed network: How the concept of GNA would take care of issue of relinquishment charges especially in view of the fact that CTU has been expressing difficulty in stranded assets in the event of generators for whom the transmission system has already been developed or it is under execution, either downsizing, rescheduling or simply quitting and seeking relinquishment of their LTA. CTU is taking a stand that it is difficult for them to determine stranded capacity in a meshed network.
- 6. Planning input from Drawee entities: The mismatch in transmission planning is due to the fact that generator wants transmission system to be developed without identifying customers and customers who will ultimately draw power from ISTS are not coming out with their future requirement. GNA is trying to force a commitment from drawee entity based on a fixed figure to be given four years in advance. With unbundling and open access it may practically be very difficult for state agencies to firm up their transmission requirement. This issue remains unanswered in GNA and it is presumed that correct input would come from state utilities as liability is pre-decided and power drawal more than GNA would (be priced higher) not be allowed. This may not come true and it may only increase the tendency to under-declare transmission requirement. The integrated resource planning with collaborative efforts in forecasting demand and supply scenario in which cost of power is going to play a major role in deciding to opt for importing power from outside against costly generation inside the generation will ultimately decide real time system operation. So system should be flexible to accommodate all type of access and as experience shows that drawee entities are ready to bear for slightly higher transmission charges to avail the benefit of flexibility. How to incentivise or penalise states to declare their correct GNA requirement?
- 7. Connectivity as separate product: GNA does not propose connectivity as a separate product. However grant of Connectivity not only helped the Generator in financial closure but it also benefitted the generator & the grid through improved reliability. The existing provision of Connectivity is an important product for generator for its financial closure. For this either investment is to be made by generator or CTU in which case there are certain lock-ins like availability of land / issue of EPC contract (which is 10% of project value) to provide sufficient safety. Regulation also prohibits any injection in absence of any type of access even if connectivity is granted. So generator is taking the risk of bottling up his power if he did not seek full LTA. The process of payment based on LTA further discourages him declaring his actual requirement because till he finds a customer, payment of transmission charge is his responsibility. Such type of generator can inject only under STOA and STOA is given based on available margins. This type of product is available in US power market also. However as discussed in the Central Advisory Committee (CAC) meeting, this connectivity may be given with a charge like upfront payment of capital cost of connectivity line or an exclusive liability to pay for the tariff of connectivity line.
- **8.** <u>Options & Scenario based Planning</u>: GNA based planning is capital intensive where for each generator, request equivalent transmission investment needs

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to be made, optimum planning take advantage of seasonal and diurnal diversity of demand and some margins available in transmission system are utilised for short term transactions. It should be kept in mind that with POWERGRID in its dual role of planner (CTU) and executer of transmission projects should not over plan the system. Therefore, there is a need on check and balance in transmission planning process where all stakeholders participate and it is done, not only on a fixed figure of GNA but it is to be done on options and scenario based analysis where all alternatives including non transmission based solutions like Demand Side Management, Special Protection Schemes, etc., are also need to be taken into consideration.

9. Planning for Renewables: The existing system and the GNA based system are not very conducive for development of transmission system for Renewable Generation which is a public policy investment. Due to their location away from load centres, low utilization factor and lack of identified beneficiaries in the regime of RPO and REC mechanism, either of the system if applied as it is, will hamper growth of Renewables.

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Draft Central Electricity Regulatory Commission New Delhi

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, modeling and analysis, and gives guidelines for transmission planning. 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.

1. Short title, extent and commencement

- These regulations may be called the Draft Central Electricity Regulatory Commission (Transmission Planning and other related matters) Regulations, 2016.
- 1.2. These regulations shall come into force from date of its publication.

2. Scope of Regulations:

- 2.1. To govern planning and development of an efficient, reliable and economical system of ISTS and associated intra-State Transmission System.
- 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 Study Team:** A team constituted by CEA comprising of members from CEA in the lead role and CTU, one STU from each

region on rotational basis, NLDC, RPCs as its members and shall be responsible for compiling data and studies received form Regional study teams and conduct studies at National level for discussion in Standing Committee.

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

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

4. Objective

The objectives of these regulations are as follows:

- a) To plan and develop an efficient, reliable and economical system of ISTS and associated intra-State Systems.
- b) To specify the principles and procedures to be used for planning and development of inter-State Transmission System (ISTS) and associated intra-State Systems.
- c) 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.

5. Roles and responsibilities of various Organisations:

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 utilisation 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, 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.

This Part defines 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.

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

5.1. **Role of CEA:**

The Central Electricity Authority shall be responsible for

- (1) To lead Central and Regional Study teams.
- (2) To conduct Standing Committee Meetings as per the timeline specified herein.

5.2. **Role of CTU:**

$5.2.1. \$ 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.

5.2.2. 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 Team on the basis of transmission access applications and associated studies.
- (d) To carry out studies for evolving transmission system by the Central Study Team and share the base case file with Regional Study Team.

5.3. **Role of STU**:

$5.3.1. \$ 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;

5.3.2. 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 Team;
- (c) Coordinated planning of intra state network matching with inter-state network.

5.4. Role of National Load Despatch Centre:

- (a) 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.
- (b) To refer the operational issues to the Central Study Team.

5.5. Role of Regional Load Despatch Centres (RLDCs):

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

5.6. Role of State Load Despatch Centres (SLDCs):

(a) 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.

Input for framing Draft Regulations

(b) To refer the operational issues to the Regional Study Team and also to share operational study files with the Regional Study Team.

5.7. Role of Generators:

Generators connected/likely to be connected to ISTS or intrastate transmission system at 132 kV and above shall be responsible for providing technical data as per format specified by Central and Regional Study Teams. At the planning stage, the Generators seeking connectivity shall submit models specified by CTU for consideration in simulation studies. After commissioning of generating unit(s), the validated model shall be re-submitted to CTU.

5.8. 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 Teams.

5.9. 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 and constraints in the system and growth in power system.

6. Principles of planning

- 6.1. The broad principles of transmission planning shall be as under:
 - (a) To plan transmission system for optimal utilisation 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) Other considerations like public policy, cross border interconnection
- 6.2. Principles for transmission planning to be specified by CEA & CTU in a procedure shall form a part of these Regulations.

7. Transmission Planning Criteria:

- 7.1. Technical criteria shall be as per CEA Transmission Planning Criteria as specified/amended from to time.
- 7.2. 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.

8. Procedure for Transmission Planning:

8.1 Transmission planning shall be done by CEA as per decisions arrived at in Standing Committee and inputs from Central Study Team and Regional Study Team as per the activities and timelines specified at Regulation 10 herein. The role of Central Study Team and Regional Study team in transmission planning process shall be as detailed below:

8.2 Role of Central Study Team:

- (1) 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.
- (2) To prepare format for the data base to be filled up and updated by the Regional Study Team (for Intra-state system) and CTU (open access data) every year.
- (3) To prepare year-wise/quarter-wise data base and corresponding system studies files.
- (4) CEA will compile the data as well as alternatives as received from Regional Study Teams for study at national level and prepare regional and national transmission plans.
- (5) Validation of the data, Studies and Proposal of New Transmission Plan submitted by Regional Study Team, conducting meetings between the Central and Regional Study Team for discussion on the New Transmission System
- (6) CEA, while proposing plans in Central Study Team may go for alternatives recommended by Regional Study Team or may choose another alternative as per the results of studies at national level.
- (7) To discuss results of the studies carried out by CTU and recommend the decision of the Central Study Team to CEA for discussion in the Standing Committee.

8.3 Role of Regional Study Team:

- To coordinate with the STUs in the region in preparation of their data base and system study files in each region.
- (2) To prepare transmission planning alternatives and refer the same to the Central Study Team.

- (3) CTU will provide the data and alternatives along with recommended alternative concluded in Regional Study Team to Central Study Team.
- 8.4 The last base case file shall be circulated to all regions. All regions will do the study and Central Study team will combine the studies at national level.

9. Review of Transmission Plan:

9.1 Transmission Plan needs to 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.

10. Information Exchange timeline:

The timeline for exchange of information and other activities involved in the transmission planning shall be as follows:

	Activity	Responsibility	Suggested Timeline		
Α	Standing Committee Meeting in August				
1	Period for consideration of LTA	DICs	Received from 1st		
	application filed by		October to 31st		
	DICs/Prospective DICs for first		March		
	block of year.				
2	• Data base to be submitted by	Regional Study	15 th May		
	the Regional Study Team to	Team			
	Central Study Team for this				
	block of the year				

	• Operational Issues if any, to be submitted by NLDC/ RLDC to Central Team	NLDC/RLDC	
	• Data received from DICs for long term transmission requirement to be submitted to Central Study Team	CTU	
3	Validation of data	Central Study Team	30 th May
4	Study and Proposal of New Transmission Plan	Central Study Team	15 th July
5	Meeting between the Central and Regional Study Team for discussion on the New Transmission Plan	Central Study Team	30 th July
6	Recommendation of the New Transmission System in the Agenda for taking up in the standing committee	Central Study Team	15 th Aug
7	Issue of agenda for the meeting of standing committee	CEA	30 th Aug
8	Standing Committee Meeting	CEA	15 th Sept
9	Approval of Transmission Plan	CEA	30th Sept
В	Standing Committee Meeting in	February	
1	 Period for consideration of LTA application filed by DICs/Prospective DICs for second block of year. 	DICs	Received from 1 st April to 30 th September
2	• Data base to be submitted by the Regional Study Team to Central Study Team for this block of the year	Regional Study Team	15 th Nov
	• Operational Issues if any, to be submitted by NLDC/ RLDC to Central Team	NLDC/RLDC	
	• Data received from DICs for long term transmission requirement to be submitted to Central Study Team	CTU	
3	Validation of the data	Central Study Team	30 th Nov

5	Meeting between the Central and	Central Study	30 th Jan
	Regional Study Team for	Team	
	discussion on the New		
	Transmission System		
6	Recommendation of the New	Central Study	15th Feb
	Transmission System in the	Team	
	Agenda for taking up in the		
	standing committee		
7	Issue of agenda of standing	CEA	28 th Feb
	committee		
8	Standing Committee Meeting	CEA	15 th March
9	Approval of Transmission Plan	CEA	31 st Marh

Note:

1. The study files of final accepted network configuration in Standing Committee along with assumption files shall be retained at CEA for next 10 years

2. In case data is not provided by STU by the specified timeline, CTU/CEA may approach CERC for enforcing non- compliance of Regulations.

11. Manpower Deployment in Transmission Planning

Proper and adequate manpower for conducting transmission planning exercise in the utilities shall be ensured. CTU/STU must demonstrate that they have adequate manpower for planning. CEA in consultation with CTU may prepare scheme for certification of personnel involved in planning at STU/CTU similar to the system in place for System Operators.