

## Executive Summary

### Introduction

Inter-state and intra-state transmission systems are interconnected and together constitute the electricity grid. Power Grid Corporation of India Limited (PGCIL), a Central Public Sector undertaking was established under the administrative control of Ministry of Power (MoP) in 1989 for manning, constructing, operating and maintaining transmission facilities for development of national grid. Subsequently, PGCIL was also notified (December 1998) as Central Transmission Utility (CTU) by GOI and was thereby mandated under section 38 (2) (c) of the Electricity Act, 2003 to discharge all functions of planning and co-ordination relating to inter-state transmission system and to ensure development of an efficient, coordinated and economical system of inter State transmission lines.

This Performance Audit covers all activities from conceptualisation to implementation of selected major transmission projects executed by PGCIL between April 2012 and March 2017 along with the status of augmentation to the transmission network by PGCIL. Major audit findings are summarised below:

### Major Audit Findings:

#### Absence of Network Plan

National Electricity Plan, November 2012 (NEP) required CTU (PGCIL) to coordinate with State Transmission Utilities (STUs) and other stake holders to prepare a well-co-ordinated transmission plan for the country. Guidelines for encouraging competition in development of transmission projects (April 2006) of Ministry of Power enjoined upon CTU the key responsibility of network planning and development based on National Electricity Plan (NEP) in coordination with concerned agencies. As per guidelines, Network Plan was required to include (i) the projects for new transmission lines and substations and (ii) strengthening and up-gradation of the existing lines and was to be updated annually and hosted on the website.

However, CTU failed to discharge its key responsibility of preparing an annual Network Plan based on NEP (November 2012) for transmission capacity addition during 2012-13 to 2016-17.

(Para No.3.2.1)

#### Mismatch between transmission projects and associates

National Electricity Policy, 2005 requires that while planning new generation capacities, requirement of associated transmission capacity would need to be worked out simultaneously in order to avoid mismatch between generation capacity and transmission facilities.

Out of 11 generation linked transmission projects selected in audit, eight projects were completed till July 2018. Out of these eight projects, there was delay in commissioning of six transmission systems associated with generation projects in the States of Chhattisgarh, West Bengal and Odisha due to which there was congestion in evacuation of power.

**(Para No. 3.2.2)**

#### **Insufficient focus on upgradation of existing lines**

Due to absence of Network Plan, a structured mechanism to assess and focus on the requirement for upgradation of the existing lines in advance was not available with PGCIL. NEP 2012 stated that a better alternative to laying out new lines (in many cases) could be to upgrade the existing corridors to higher voltage or to re-conductor the lines to higher capacity. NEP, therefore, emphasised the need to consider the possibility of increasing the transmission capacity of existing lines in the planning stage itself. Audit observed an instance where PGCIL preferred laying a new line instead of pursuing an available option to upgrade the existing line. Audit further noticed that recommendations of CERC committee for improving loadability or re-conductoring of lines also remained substantially unattended to by PGCIL. As a result, high loading in some of the lines (like 400 kV Singrauli – Anpara S/c line, 400 kV Anpara and Obra line, and 400 kV Mohindergarh - Bhiwani line) which were suggested for re-conductoring in January 2015, was observed that was causing transmission congestion in Northern Region.

**(Para No.3.2.4)**

#### **No plan for augmentation of transfer capacity in long term**

Two parameters viz. Transmission Capacity and Transfer Capacity are relevant for assessing the capacity of inter – regional corridors. Transmission capacity of a corridor is arrived at by adding the ratings of all transmission lines connecting two regions. Transfer capacity on the other hand, is the ability of a corridor, as a whole, to reliably move power from one region to another. NEP 2012, stipulates that the transmission capacity being summation of capacities of inter-regional links is a figurative representation of the bonds between the regions and does not indicate actual power transfer capacity across different regions/ states.

Thus, transmission capacity, has no meaningful role in indicating capacity of corridors to handle power flows. However, PGCIL assessed the need for augmentation of capacity of inter-regional corridors based on ‘Transmission Capacity’ only and does not fix targets or monitors augmentation of Total Transfer Capacity (TTC), although as per CERC Regulations declaration of TTC for four years is required to be done by PGCIL on 31 March each year.

Audit, however, observed that PGCIL fixed targets and prepared plans only for the transmission capacity to be augmented over a period but no targets were fixed or declaration made for achieving the transfer capability in long term. In the absence of the declaration of TTC for four years as per the regulatory requirements, there was no benchmark to assess the actual performance of the company in terms of its capability to transfer power.

It was observed that at the end of Twelfth Five Year Plan, TTC of different corridors ranged between 19.97 *per cent* and 83.66 *per cent* of their respective transmission capacity. In the absence of the declaration of TTC for four years as per the regulatory requirements, there was no benchmark to assess the actual performance of the company in terms of its capacity to transfer power.

Audit further observed that in some corridors, despite significant addition to transmission capacity in XII Plan {ER-NR (8900 MW) and WR-SR (10600 MW)}, TTC in terms of percentage to transmission capacity actually decreased from 25.56 *per cent* to 19.97 *per cent* in ER-NR corridor and from 65.79 *per cent* to 40.76 *per cent* in WR-SR corridor.

**(Para No. 3.2.5 and 3.2.6)**

### **Reduced margins for Short and Medium Term Open Access**

Access to transmission system is given to users through Long Term Access (LTA)/ Medium Term Open Access (MTOA)/ Short Term Open Access (STOA). As per NEP 2005, network expansion should be planned and implemented keeping in view the anticipated transmission needs that would be incident upon the system in the open access regime.

However, the transmission planning process was largely driven by the LTA to Inter-state Transmission system (ISTS) and access to short term and medium-term users is being provided from within the margins available in the system. As, some generators take connectivity without LTA and evacuate power through MTOA and STOA for which no augmentation is carried out, this results in congestion in ISTS. It is evident from the information provided by POSOCO that due to inadequate margins available in the transmission system for short term open access there were rejections (3,06,156 MWhr during the year 2017-18) of STOA requests for transfer of power from different regions.

Non-availability of adequate margins for short term transactions resulted in congestion and affected free flow of power from surplus to deficient regions which was also visible as variations in the electricity prices over regions.

**(Para No. 3.2.7)**

### **Issues in obtaining forest clearances**

Works and Procurement Policy of PGCIL (WPPP) required detailed survey of forest stretches and river crossings to be carried out before preparation of Bill of Quantities (BOQ) and Notice Inviting Tender (NIT) cost estimates. However, quantities for the purpose of BOQ and NIT cost estimate were prepared based on forest atlas, toposheet and walkover survey of the area resulting in significant variations in forest areas encountered by various transmission lines. Out of 18 selected projects, variations in forest area in two projects ranged between 20 and 30 *per cent* and in 15 projects, it was more than 30 *per cent* and consequent variation in transmission line length (the variation was less than 10 *per cent* in 31 transmission lines, between 10-20 *per cent* in 15 lines, between 20-30 *per cent* in seven lines and more than 30 *per cent* in 19 lines) resulting in extra cost of ₹118.31 crore on account of quantity variation.

Besides, in three projects, there were instances of delays in submission of proposals for forest clearance from the stipulated time by PGCIL. Various documents which were required to be submitted under Forest (Conservation) Act, 1980 at the time of application for forest proposal were not submitted by PGCIL, which resulted in re-submission of forest proposals and consequent delays.

**(Para No. 4.2.1)**

### **Delay in execution of projects and scope for better monitoring**

Out of the 18 selected projects, only two projects were completed within scheduled time upto December 2018 and 13 projects were completed with delays ranging from 4 to 71 months. Remaining three projects were under execution with anticipated delays ranging from 6 to 109 months in completion. Some of the reasons for delay for e.g. delay in submission of proposals for forest clearance, delay in providing front/site by PGCIL, delay in supply/ issue of material/ quantity clearance by PGCIL, delay in finalising amendment in LOA/ approval of Bill of Material, etc. could have been controlled by better project management. Due to delay in completion of projects within prescribed CERC timelines, PGCIL also lost the opportunity of earning ₹112.48 crore during the project life towards additional Return on Equity as part of tariff.

**(Para 4.3.4 and 4.6)**

### **Absence of mechanism to assess utilisation of completed transmission lines**

The Company had not devised any mechanism or fixed any criteria/ benchmark for assessing the utilisation of the completed and commissioned transmission lines. Audit analysis of the utilisation of 30 completed transmission lines (completed between December 2013 and March 2019) of 18 selected projects based on the power flow data obtained from POSOCO disclosed that peak/ maximum power flows in 18 out of 30 lines (60 *per cent*) remained below 40 *per cent* of their respective maximum

loadability during the period since their inception to March 2019. This underscores the need for PGCIL to set up a system of regular monitoring for line utilisation and to take steps for optimum utilisation of assets.

**(Para No. 4.7.1)**

Monitoring mechanism for implementation of transmission projects, though in place, needed further strengthening as only one to four meetings were held by each Region during 2012-17 against the requirement of holding 30 project review meetings during that period. Thus, in the absence of timely follow up on the progress of work or action taken for timely completion of projects the intended purpose of monitoring was not served.

**(Para 5.2 and 5.3)**

### **Recommendations**

Based on the Audit findings, the following recommendations are made to facilitate improvement in planning and implementation of transmission projects:

1. The existing regulations may be reviewed to assess the need for modification, in order to address the requirements of STOA.
2. CTU may prepare Annual Network Plan based on the NEP plan as per directions given by Ministry.
3. A comprehensive re-optimisation study may be undertaken by an independent group (Internal technical audit team) to improve economy and efficiency in general and reliability, resilience, IR TTCs and ISTS-STU TTCs in particular.
4. CTU may ensure coordinated planning and execution of inter-state transmission system with associated generation projects as well as with intra-state transmission system to avoid mismatch. PGCIL may also put in place an institutional mechanism to review and monitor the status of interconnected transmission schemes and to update transmission data files for planning software.
5. PGCIL may record efforts made to explore the possibilities of upgradation of the existing transmission lines before deciding construction of new line.
6. PGCIL may disclose on its website and monitor the key parameters of TTC over a four-year period as per the CERC regulations.
7. PGCIL may initiate advance action for detailed survey for preparing BOQ and NIT cost estimates and submit forest proposals within the stipulated time to expedite the project execution.
8. PGCIL may take steps to minimise delays in project execution due to factors which are controllable by PGCIL through effective monitoring.

