

Chapter - 1

1.1 Introduction

India's power transmission networks constitute vital arteries of the entire power value chain. It goes without saying that the growth of power sector is contingent to development of a robust and a non-collapsible transmission network. Over the past decades, the total power capacity has witnessed commendable growth, with more than 232 GW of generation capacity currently installed. However, the peak load supply is only 141 GW, and aggravating this situation further is the fact that some of the power surplus regions do not have adequate power evacuation infrastructure which could alleviate the recurring supply shortages in other regions. With a planned generation capacity addition estimated at 88 GW in the Twelfth (12th) Plan along with improved generation and resolution of fuel issues for existing capacity, a corresponding increase in transmission capacity is needed to ensure that power generated reaches the end consumer.

The development and present status of the transmission system (of 220kV and above voltage level) from the 10th Plan (2002-07) to the 12th Plan (2012-17) is indicated in Table 1.1.

Table 1.1

Transmission Lines: (in ckm ¹)	At the end of 10 th plan	At end of 11 th plan	12 th plan targets and achievements		% completion
			Targets	Achievements	
HVDC Bipole line	5,872	9,432	7,440	6124	82.31
765 kV	2,184	5,250	27,000	25990	96.26
400 kV	75,722	1,06,819	38,000	50968	134.13
220 kV	1,14,629	1,35,980	35,000	27288	77.97
Total Transmission Line, ckm	1,98,407	2,57,481	1,07,440	110370	102.73

Source CEA Reports

Transmission planning is a continuous process of identification of transmission systems, addition requirements, need and timeframe of implementation commensurate with generation addition and growth in demand for electricity. It has to be in consonance with the principle of development of power system enshrined in Section 3 of the Electricity Act, 2003, (the Act) i.e. 'for development of the power system based on optimal utilisation of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy'.

Electricity is a concurrent subject under the Constitution of India (Entry No.38 in List III of Seventh Schedule). Hence, both Central and State Governments are responsible for development of electrical energy in the country. Inter-state and intra-state transmission systems are interconnected and together constitute the electricity grid. Assessment of demand is an important pre-requisite for planning

¹ *Circuit Kilometre*

capacity addition. Section 3 (4) of the Act requires the Central Electricity Authority (CEA) to frame a National Electricity Plan once in five years and revise the same from time to time in accordance with the National Electricity Policy. Also, section 73 (a) of the Act provides that formulation of short-term and perspective plans for development of the electricity system and coordinating the activities of various planning agencies for the optimal utilization of resources to subserve the interests of the national economy, shall be one of the functions of the CEA.

The CEA is vested with the responsibility of planning the entire electricity system while the Central Transmission Utility (CTU) is responsible for planning the transmission system in coordination with all stakeholders. Also, prior approval of the appropriate government is required to construct an overhead transmission line as per Section 68 of the Act. Ministry of Power (MoP) grants approval to Power Grid Corporation of India Limited (PGCIL) to take up implementation of transmission projects.

1.2 Profile of Power Grid Corporation of India Limited

PGCIL was established in 1989 to implement the decision (August 1989) of GOI to form a 'National Grid' with the following main responsibilities:

- (i) to plan, promote and build an integrated and efficient power transmission network in all aspects including investigation, planning, engineering and design;
- (ii) to prepare preliminary feasibility and detailed project reports;
- (iii) to construct, own, operate and maintain transmission lines, sub-stations, load despatch and communication facilities and appurtenant work;
- (iv) wheeling of power generated at various power stations in accordance with the policies and objectives laid down by GOI from time to time; and
- (v) keeping abreast of technology development in transmission, load despatch and communication system.

PGCIL took over (April 1991 to August 1993) transmission assets from seven Central Generating Companies² and also took control of existing five³ Regional Load Despatch Centres (RLDC) in the country between 1994 and 1996. National Load Despatch Centre (NLDC) was inaugurated (February 2009) with the responsibility of monitoring operations and grid security of the national grid and to supervise scheduling and despatch of electricity over inter-regional lines in coordination with RLDCs. These functions were transferred (October 2010) to a wholly-owned subsidiary {i.e. Power System Operation Corporation Limited

² *NTPC Ltd., NHPC Ltd., North Eastern Power Corporation Ltd., SJVN Ltd., Neyveli Lignite Corporation Limited, Nuclear Power Corporation Limited and THDC India Limited*

³ *Northern Regional Load Despatch Centre, Southern Regional Load Despatch Centre, Western Regional Load Despatch Centre, Eastern Regional Load Despatch Centre and North Eastern Regional Load Despatch Centre*

(POSOCO)} of PGCIL, which was established in March 2009 (in January 2017, POSOCO was separated from PGCIL and became a separate Company). Over the years, five regional grids were integrated in stages through inter-regional links to finally form a National Grid in December 2013.

PGCIL was notified (December 1998) as the CTU by GOI and is mandated under section 38 (2) (c) of the Act to, *inter-alia* ensure development of an efficient, co-ordinated and economical system of inter-state transmission lines for smooth flow of electricity from generating stations to load centre.

PGCIL was conferred Miniratna⁴ (Category-I) status by GOI in October 1998, Navratna⁵ status in May 2008 and, thereafter, Maharatna⁶ status in October 2019. As on 31 March 2017, the authorised capital and paid up capital were ₹10,000 crore and ₹5,231.59 crore respectively and 57.90 per cent of its equity was held by GOI. Equity shares of PGCIL were listed on National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) in October, 2007.

1.3 Physical performance of PGCIL

The physical performance of PGCIL during last six years ending of 31 March of each financial year of 12th plan is given below in Table 1.2.

Table 1.2⁷

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Length of transmission lines (ckm)	1,00,200	1,06,804	1,15,637	1,29,354	1,39,077	1,48,149
Number of sub-stations	167	184	192	207	219	234
Transformation capacity (in Mega Volt Ampere)	1,64,763	2,05,923	2,31,709	2,54,848	2,89,543	3,31,163
Transmission Network availability (in per cent)	99.90	99.92	99.78	99.72	99.79	99.81

1.4 Role of PGCIL

Transmission system projects are conceived based on requirements assessed by PGCIL in consultation with the CEA, power generators, beneficiaries, regulators and other utilities. PGCIL carries out the work of planning, execution, operation and maintenance of the inter-state transmission system projects for evacuation of power, within and across regions.

⁴ *Miniratna status provides powers to the Board of PGCIL to undertake new projects, modernisation, purchase of equipment, etc. up to ₹300 crore or equal to their net worth whichever is lower without approval of GOI*

⁵ *Navratna status provided powers to the Board of PGCIL to undertake new transmission projects of any amount without approval of GOI*

⁶ *Maharatna status provides powers to the Board of PGCIL to undertake new transmission projects / replacement of any amount without approval of GOI*

⁷ *These figures represent end period status except Transmission network availability, which is during the year*

1.5 Rationale of Performance Audit

A Performance Audit on “Planning and Implementation of Transmission Projects by PGCIL and Grid Management by POSOCO” was conducted by this office in the year 2012-13 covering the period from April 2007 to March 2012. The audit findings were included in the Audit Report No. 18 of 2014 of the Comptroller and Auditor General of India. The Report was tabled in Parliament in August 2014 and was selected for examination by the Committee on Public Undertakings (COPU). COPU tabled its Report containing 13 recommendations in Parliament in February 2016. Action Taken Note (ATN) of the COPU report was submitted by the Ministry in March 2017 and vetting remarks for the same were submitted to COPU by CAG’s Office. On perusal of the ATN and vetting remarks, COPU stated that the Government had accepted 10 recommendations, one recommendation need not be pursued and for two recommendations only interim replies had been furnished by the Government. COPU has noted that the 10 recommendations which had been accepted by the Government needed to be monitored and further details were called for by COPU.

There have been instances of transmission lines being forced to take a different route than planned, resulting in the entire project budget going out of control. Power transmission constraints have also made it difficult to evacuate excess power and channel it to regions that face shortages. Projects have had to purchase power from costlier sources while others remained under - utilised. Hence, there is an urgent need to timely address underlying issues in the transmission sector to ensure that power demand is effectively met in the future.

The present Performance Audit also analysed shortcomings persisting in the system and areas, which need further improvement.