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Planning and Implementation of Transmission Projects by Power Grid Corporation of India Limited and Grid Management by Power System Operation Corporation Limited

[Based on C&AG, Performance Audit Report No. 18 of 2014]

MINISTRY OF POWER

ELEVENTH REPORT

COMMITTEE ON PUBLIC UNDERTAKINGS (2015 - 2016)

(SIXTEENTH LOK SABHA)

LOK SABHA SECRETARIAT

NEW DELHI

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Presented to Lok Sabha on 25.02.2016
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LOK SABHA SECRETARIAT

NEW DELHI

25 February 2016/6 PHALGUNA, SAKA 1937

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22. Shri Ramchandra Prasad Singh

SECRETARIAT

1. Smt. Sudesh Luthra - Joint Secretary
2. Smt. Anita B. Panda - Director
3. Shri Yogendra Singh - Committee Officer

INTRODUCTION

1. I, the Chairperson, Committee on Public Undertakings (2015-16) having been authorized by the Committee to submit the Report on their behalf, present this Eleventh Report on Planning and Implementation of Transmission Projects by Power Grid Corporation of India Limited and Grid Management by Power System Operation Corporation Limited based on Performance Audit Report No. 18 of 2014 of C&AG.

2. The Committee on Public Undertakings (2014-15) had selected the above said subject for detailed examination. However, the examination of the subject could not be completed during the term. The Committee on Public Undertakings (2015-16) reselected the subject to complete the unfinished task.

3. The Committee were briefed about the issues raised in the audit para by the representatives of Office of C&AG on the subject on 8 June, 2015 and subsequently took oral evidence of the representatives of PGCIL and Ministry of Power on 28 September, 2015 and 29 October, 2015 respectively.

4. The Committee considered and adopted the Report at their sitting held on 6 January, 2016.

5. The Committee wish to express their thanks to the representatives of Ministry of Power and PGCIL for tendering evidence before them and furnishing the requisite information in connection with examination of the subject.

6. The Committee would like to place on record their appreciation for the assistance rendered to them in the matter by the Office of Comptroller & Auditor General of India.

7. For facility of reference and convenience, the Observations and Recommendations of the Committee have been printed in bold letters in Part-II of the Report.

New Delhi;
24 February, 2016
05 Phalguna, 1937 (S)

SHANTA KUMAR
Chairperson
Committee on Public Undertakings

PART I

CHAPTER-1

INTRODUCTORY

1.1 As per the Ministry of Power, India is amongst the top five countries (among China, USA, Japan, India and Russia) in terms of installed power capacity, electricity generation and electricity consumption. In terms of grid interconnections within these countries, India is the only country which has developed a single synchronous grid i.e. the entire country's power system operating at a single frequency. United States has three synchronous grids, China and Japan have two each.

1.2 India's power transmission system consists of more than 520,000 circuit kilometer (ckm) of transmission lines (of 66 Kilo Volt (kV) and above), about 320,000 ckm transmission lines of which are at 220kV and above. At these voltage levels (220kV & above), the country's power transformation capacity is 607,080 Mega Volt Ampere (MVA) and 13,500 Mega Watt (MW) High Voltage Direct Current (HVDC). This High voltage transmission system mainly comprises of inter-State transmission system (majority is owned by PGCIL) and intra-State transmission system (which are owned by State Transmission Utilities). Lines built and owned by the private sector are also getting added to the country's transmission system, although at present they do not constitute a significant share. The share of PGCIL in the country's transmission system is about 120,000 ckm of transmission lines (at voltages 132 kV to 765kV including HVDC) and power transformation capacity of 240,954 MVA mainly 400 kV, 765 kV EHVAC &HDVC. PGCIL's transmission network, which is an integral and the most vital part of the Indian power transmission system, is also amongst the largest in the world. As per a World Bank study in 2006, PGCIL was the 3rd largest transmission utility in the world.

1.3 The Indian power transmission system has evolved from a sub-400kV level system to the present day largely 400kV system which is now moving towards a 765kV system comprising of EHV AC and HVDC transmission lines. The country's 400kV & 765kV transmission network is probably amongst the largest in the world in its segment and is bound to grow substantially. In XI Plan, the country added about 3,000 ckm of 765kV lines, whereas in XII Plan, the Indian power system has targeted to add about 27,000 ckm of 765kV lines, of which 15,542ckm have already been added.

1.4 Inter-State and intra-State transmission systems are interconnected and together constitute the electricity grid. In 1963, Indian Power Grid was divided into five regions with a view to integrating State power systems in each region and promoting the concept of regional power development through integrated power systems transcending State boundaries. In 1984, a working group constituted by Government of India (GOI) for development of a National Grid, recommended formation of a separate central sector corporation for manning, constructing, operating and maintaining transmission facilities. A major objective of this decision was to reduce operational and commercial problems which had resulted from ownership of transmission facilities by various central generating

organizations and joint ventures. Another major objective was to achieve improved integrated operation of regional transmission systems.

(i) **Profile of Power Grid Corporation of India Limited(PGCIL)**

1.5 In the above background, the PGCIL was established in October, 1989 under the Companies Act, 1956 to implement the decision (August 1989) of GOI to form a 'National Grid' with the following main responsibilities:

(a) To plan, promote and build an integrated and efficient power transmission network in all aspects including investigation, planning, engineering and design;
(b) To prepare preliminary feasibility and detailed project reports;
(c) To construct, own, operate and maintain transmission lines, sub-stations, load dispatching and communication facilities and appurtenant work;
(d) Wheeling of power generated at various power stations in accordance with the policies and objectives laid down by GOI from time to time; and
(e) Keeping abreast of technology development in transmission, load dispatching and communication system.

1.6 Accordingly, PGCIL took over (April 1991 to August 1993) transmission assets from seven central generating companies and also took control of existing five Regional Load Despatch Centres (RLDC) in the country between 1994 and 1996. PGCIL was notified (December 1998) as the Central Transmission Utility (CTU) by GOI and is mandated under the Electricity Act, 2003 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 centers. PGCIL was conferred Miniratna (Category-I) status by GOI in October 1998 and thereafter Navratna status in May 2008.

(ii) **Profile of Power System Operation Corporation Limited(POSOCO)**

1.7 As envisaged in the Electricity Act, 2003, National Load Despatch Centre (NLDC) was established (February 2009) as an apex body to ensure integrated operation of 'National Grid'. Till 30 September 2010, RLDCs and NLDC were being operated by PGCIL and from 01 October 2010, a separate company named Power System Operation Corporation Limited (POSOCO), incorporated on 20 March 2009 as a wholly owned subsidiary of PGCIL, took over the operations of RLDCs and NLDC.

1.8 POSOCO was to act as the apex organization to ensure integrated operation of power system including owning, operating and maintaining NLDC and RLDCs, as well as optimum scheduling and dispatch of electricity in accordance with the Electricity Act 2003, regulations laid down by Central Electricity Regulatory Commission (CERC) and Indian

Electricity Grid Code. POSOCO is primarily a knowledge based organization. The assets of RLDCs and NLDC comprise of Supervisory Control and Data Acquisition (SCADA) and IT systems for operation of Regional Grids and the National Grid.

(iii) **Roles of PGCIL and POSOCO**

1.9 Transmission system projects are conceived based on requirements assessed by PGCIL in consultation with Central Electricity Authority (CEA), power generators, beneficiaries, regulators and other utilities. PGCIL carries out the work of planning, and execution of operation and maintenance of the PGCIL inter-State transmission system projects for evacuation of Inter-state power, within and across regions. POSOCO manages the grid including supervision and control of inter-State transmission systems for grid control and dispatch of electricity within regions and country through secure and economic operation of regional grids. It also monitors and regulates operation of grids carrying out all such functions required as an interface with power exchanges as may be related to the business of POSOCO.

(iv) **Role of Ministry of Power**

1.10 Power transmission Planning is a collaborative process between several agencies. There are perspective plans made for 15 year period and long term plans for 5 years. The Ministry of Power (MOP) oversees the planning process and intervenes in policy, regulatory and other issues, if any. The Secretary, MOP, during the oral evidence, stated as follows:

> "Basically, the Ministry of Power looks after the National Grid and Power Grid. We oversee the grid operation management and transmission capability, basically it is transmission plan."

As per the Detailed Demand for Grants (2015-16) of Ministry of Power, the Cabinet Committee on Economic Affairs, has, in its meeting held on 10.12.2014, approved the proposal of setting up of POSOCO as an independent Government Company under the Ministry of Power.

1.11 When specifically asked to explain the oversight role of the Ministry of Power to monitor the progress made in the National Grid, the Ministry of Power inter alia stated as follows:

"Apart from the MoU parameters, which also have attributes such as network construction and availability targets, the Ministry of Power undertakes quarterly reviews of PGCIL's performance....."

1.12 In another reply, the Ministry of Power stated in October, 2015:

".....Regarding overall performances it may be mentioned that PGCIL and POSOCO have scored 'Excellent' rating for the last few years based on the MoU parameters. The rating for 2014-15 is under review."

1.13 The MoP also submitted in one of the replies as under:

"The Ministry provides continuous support to PGCIL in all its endeavours towards achieving its targets viz. coordination with various Ministries, facilitating various clearances, coordination with State Governments for land acquisition, Right of Way, law & order support etc....."

(v) **Other Players in the Indian Power Sector**

1.14 Other players in the Country's power sector are the Central Electricity Authority (CEA) for Perspective Planning & National Electricity Plan, Generators i.e. Central/State GENCOs, IPPs, Captive generators, the CTU i.e. PGCIL Inter-State Transmission/Sub-Transmission System, the DISCOMs (Power Distribution Companies) and the Consumers i.e. Industries, Household and Agriculture Sectors.

(vi) **Performance Audit Report No.18 of 2014**

1.15 According to Audit, since transmission facilitates better utilization of available power generation resources therefore inadequacies in transmission network and delay in commissioning of the transmission system may not result in loss of revenue to PGCIL but may also lead to congestion in evacuation of power. Creating lines of higher capacity than required or abnormal redundancies in transmission assets may result in extra financial burden on beneficiaries and public at large. In view the above, a performance audit was taken up by the Audit to assess the effectiveness of planning and implementation of transmission projects executed by PGCIL during 2007-2012. Besides, efficiency and effectiveness of Grid Management by POSOCO/ PGCIL in ensuring uninterrupted power supply, including Grid Security and Grid Monitoring was also assessed in the Performance Audit Report No.18 of 2014 on 'Planning and Implementation of transmission projects by Power Grid Corporation of India Limited and Grid Management by power system operation Corporation Limited' for the year ended March 2013.

1.17 The performance audit examined activities from conceptualization to implementation of selected major transmission projects executed by PGCIL between April 2007 and March 2012 along with the status of augmentation to transmission network made by PGCIL up to March 2013. A sample of 20 transmission projects representing 14 percent in terms of number and 37 percent in terms of value of the projects planned and executed by PGCIL during April 2007 and March 2012 was taken based on materiality and coverage of all Regional Offices of PGCIL. In the wake of the incident of Grid disturbances on 30 and 31 July 2012, the aspect of Grid management by POSOCO, which is mandated with the responsibility to ensure integrated operation of the 'National Grid', was also included in the scope of audit.

1.18 Among major Audit findings were no mechanism put in place by PGCIL for assessing utilization of transmission lines resulting in pockets of congestion. There have been instances of delay in completion of transmission projects, weak monitoring mechanism for implementation of transmission projects, non-declaration of TTC etc. along with reasons for the severe GD of 30 & 31 July, 2012. This audit report was selected by the Committee on Public Undertakings 2014-15 and 2015-16 for detailed examination and report.

CHAPTER-2

INTEGRATION OF REGIONAL POWER TRANSFER CORRIDORS

(i) Formation of National Electricity Grid

2.1 Since development of National Electricity Grid is one of the main objectives of establishing PGCIL, the Committee sought details regarding the strategy/action plan for formation of a robust National Grid and the oversight mechanism to assess the progress of its development. PGCIL, in their reply, stated as follows

> " Looking into the importance of National Grid, strategy / action plan for the same was devised by Central Electricity Authority (CEA) in consultation with PGCIL and constituents State utilities of different regions. The same was well documented in the National Electricity Plan and the perspective plan prepared by CEA. Prior to formation of National grid, there were five independent electrical regions operating in the country. Considering that the Energy resources in the country are unevenly distributed, and to meet the growing demand in the country it was planned to interconnect the regional grids and to develop National Grid, which can facilitate transfer of power across the country. Initially due to the wide variations of operating electrical parameters in various regional grids, the regional grids were connected through HVDC system and thereafter the regions were synchronized with HVAC lines in a phased manner. Synchronous interconnection of all the Regional grids was completed in Dec. 2013, thus achieving the objective of One nation, One grid, One frequency. Development of National Grid is a continuous process and capacity of the same is being augmented as per the load requirement and addition of generation in various areas. The power transfer capacity of National Grid, comprising of all the inter-State and intra-State transmission systems of the country including the inter-regional transmission system, has grown to a great extent in the last two decades and is further getting strengthened in a progressive manner. The total interregional capacity of the National Grid has grown from 29,750 MW by the end of XI plan to 47,450MW at present **(**does not include Inter-Regional capacity of various 132kV lines aggregating to 600MW). This is envisaged to further grow to 72,250 MW by end of 12th plan. With regard to the development, and its monitoring, as per Section 73 of the Electricity Act, one of the functions and duties of CEA is to "formulate short-term and perspective plans for development of the electricity system ….. and to provide reliable and affordable electricity for all consumers". Accordingly, the National Electricity plan in every five years is being prepared by CEA indicating the broad requirement of transmission system in the Indian Power System including the need for inter-regional links leading to development of strong national grid. As per

the present practice, transmission system is planned by CEA in association with Central Transmission Utility(CTU)-(PGCIL) and the same is deliberated and approved by the Standing Committee and Regional Power Committee, where all the beneficiary States are the members. The on-going transmission system is also monitored by CEA at regular interval".

2.2 However, the Audit in the para 3.1.1 of their Report has observed that while the technical process of formation of National Grid can be regarded as complete when viewed in terms of overall inter regional power transfer capability, still the objective of formation of National Grid remains to be achieved. Listing the details of actual power flow and total transfer capability of four inter-regional corridors of National Grid, during 2009-13 (as detailed in Table below) the Audit has observed that capability of these corridors was inadequate to handle the increasing demand of Power exchange among the regions.

Instances of actual power flows in excess of Total Transfer Capability

Corridor	**Month**	**TTC (in MW)**	**Actual Flow (in MW)**
WR-NR	September 2009	1500	1523
	October 2009	1500	1653
	January 2010	1500	1630
	July 2011	1900	2291
	January 2013	1700	2004
WR-SR	April 2011	800	913
	July 2011	800	901
	October 2011	800	911
	July 2012	800	880
	August 2012	800	909
	September 2012	800	881
	October 2012	800	921
	November 2012	800	896
	December 2012	800	814
ER-SR	March 2011	2330	2431
	April 2011	2330	2382
	December 2011	2120	2186
ER-NER	January 2010	200	233
	March 2013	400	422

According to Audit, low level of interregional transfer capability implies limited scope for transfer of power among regions. Hence, the objectives of formation of National Grid i.e. meeting deficit, remained to be achieved, as in April, 2014.

2.3 When PGCIL was asked by the Committee for submitting their comments on the aforesaid observations of Audit, the Committee have been apprised as under:

> "The integration of all five Electrical Regions has been completed. However, augmentation of the grid has to be done continuously as load and generation grow with the time. In fact, the inter-regional capacity at the end of XIth Plan was 27750 MW which has been enhanced to 53150 MW as on date and is planned to be enhanced to 72250 MW by the end of XII Plan (2016-17).As far as meeting inter-regional transmission requirement is concerned, it is to state that presently almost all inter-regional transfer requirements are being met under normal operation. In the year 2014-15, energy that could not be cleared due to congestion is just about 0.3 % of the total energy generated. However, few congestion being encountered in transfer of power towards Southern Region (SR), which would also be removed with the progressive commissioning of inter-regional transmission lines that are already under implementation. Regarding compatibility of achievements with the National Electricity Plan(NEP), it is to mention total inter-regional power transfer capacity, as per NEP, at the end of XIth Plan and XIIth Plan are 27,150MW and 71,950MW respectively and the present interregional power transfer capacity is 53150MW, which is targeted to reach 72,250MW by the end of XIIth Plan".

2.4 With regard to current power demand, both in peak and non-peak seasons as well as the position regarding the targeted MW capacity, the following information was submitted:

> "The All India peak demand met during the current financial year (April to September, 2015) has been 145 GW during peak seasons and approximately 125 GW during off-peak season. The XIIth Plan (2012-17) proposes to add 88,537 MW capacity to the grid. As on 22nd October, 2015, 68,026 MW i.e. 76.8% of the target has been achieved. During 2014-15, the capacity addition was 22,566 MW against the target of 17,830 MW. Thus, there is no shortfall in reaching the targeted capacity."

2.5 When asked if the Ministry was hopeful of achieving the remaining percentage of target, it was stated as follows:

> "Yes, Ministry of Power (MoP) is hopeful of achieving the targets by the end of XIIth Plan. In three and a half years, 68,026 MW i.e. 76.8% of the target has already been achieved. Balance 20,511 MW i.e. 23.2% of target would certainly be achieved in one and a half years. The commissioning activities of these projects are being closely monitored in Ministry of Power at various levels including by Secretary (Power). ''

2.6 With respect to hydro power based capacity of the grid, PGCIL was asked to specify the significance of hydropower to address the peak load in the grid network as well as the extent to which the Hydro-thermal mix can be effectively utilized to ensure continuous and stable supply of power in the grid. PGCIL, in their reply, submitted as follows

> "Hydro power stations can be quickly started and stopped and thus provide flexibility in the system and help during the steep ramp during the morning and evening peak loads. The hydro generating capacity has increased by only 6613 MW from 34654 MW on 31st March 2007 to 41267 MW as on 31st March 2015. In contrast, coal fired stations capacity has increased by 93515 MW during the same period (from 71121 MW to 164636 MW). The peak demand met has increased by 54342 MW during the same period (from 86818 MW to 141160 MW). Average demand has increased by only 46381 MW during the same period. Thus there would be significant backing down of coal fired generation in the grid, particularly during the off-peak hours. Further, significant coal fired capacity, particularly the ones with higher variable cost would have to be closed down. This is evident from the plant load factor which has come down from 76.8 % in 2006-07 to 64.5% in 2014-15".

2.7 The Government of India has initiated Jawaharlal Nehru National Solar Mission(JNNSM) with the objective to establish India as a global leader in solar energy, by creating the policy conditions for its large scale diffusion across the country as quickly as possible. The Mission has set a target, amongst others, for deployment of grid connected solar power capacity of 20,000 MW by 2022. Under Batch-V of Phase II of JNNSM, the CPSUSs and Government of India organizations would set up 1000 MW of Grid connected solar PV power projects under various Central/State Schemes/self-use/3rd party sale, merchant sale with Viability Gap Funding during the period from 2014-15 to 2016-17. In view of this, enhancement of the renewable based capacity of the National Grid is vital in order to facilitate the inclusion of solar and other type of renewable based electricity into the National Grid. While explaining the present status of renewable capacity of the National Electricity Grid, the representatives of the Ministry of Power during their evidence before the Committee on 29 October, 2015 informed that against the total installed capacity of 279 GW, renewable capacity of the Grid is merely 36 GW which includes 23 GW of wind and 4 GW of solar based electricity.

(ii) <u>Transmission Capacity and Total Transfer Capability</u>

2.8 Audit in their Report has given a detailed account of the two parameters relevant for assessment of capacity of interregional corridors *viz*. Transmission Capacity and

Transfer Capability. Transmission capacity of a corridor is arrived at by adding the ratings of all transmission lines connecting two regions. Total Transfer capability (TTC), which is a measure of the ability of a corridor, as a whole, to reliably move power from one region to another, is often less than the transmission capacity due to system limitations. According to the Audit, PGCIL assesses the need for augmentation of capacity of inter-regional corridors based only on 'Transmission capacity' and does not monitor augmentation of total transfer capability (TTC), though TTC is important for better appreciation of the ability of transmission network to transfer power. Audit had also observed that low level of inter-regional transfer capability implies limited scope for transfer of power among regions. Hence, they concluded that the objectives for formation of National Grid i.e. meeting deficit from surplus region and facilitating economic exchanges remained largely unfulfilled. Audit has further observed that the cumulative transmission capacity at the end of XI Plan was 25050 MW against which the cumulative transfer capability was only 11530 MW.

2.9 When asked about the reasons for low level of TTC, PGCIL in their reply has stated that the low level of TTC compared to transmission capacity is due to the following accounts:

- Transmission Capacity is a physical design parameter and usually refers to the thermal limit (highest permissible power flow beyond which the conductor melts or gets damaged) or rating of a particular transmission element or component.

- Transfer Capability in the case of the power system translates to the ability to reliably transfer power between two areas under specified system conditions.

- Thus, transmission capacity is a 'fixed' parameter whereas transfer capability is a 'variable' parameter dependent on the collective behavior of the power system connected through several transmission lines. The transfer capability depends on the flow of parallel paths while transmission capacity is independent of the same.

- Transfer capacity is non-directional and time independent. Transfer capability is directional and dynamic in nature and highly dependent upon the spatial distribution of generation, load and transmission network conditions during the time period being considered.

- The transmission capacity between two regions is the capacity of the immediate interconnecting lines while the transmission capability is obtained through study considering the actually available system condition at that instant between two regions. The delay and

deferment of transmission elements/load/generation greatly affects the value of the transmission capability.

PGCIL further submitted that the Central Advisory Committee (CAC) of CERC in its meeting held on 12th May 2014 had constituted a sub-Committee on transmission congestion headed by Shri R V Shahi, Former Secretary (Power). The sub-Committee after detailed deliberations in over four meetings and after looking at international references has concluded that 'The inter-regional transmission capacity should therefore no longer be a yardstick of inter-regional transfer capability as it does not have relevance in a highly meshed system connecting the regional grids.'

2.10 While making comments on the aforesaid reply of PGCIL, the Audit in their vetted remarks stated as follows:

"While admitting the low level of TTC compared to transmission capacity, PGCIL has brought out the difference between the two terms i.e. TTC and transmission capacity, the reasons cited viz. delay and deferment of transmission elements/load/generation which are too general to identify solutions to the problem of low TTC. The recommendation of Central Advisory Committee (CAC) is noteworthy from the point of view of stipulating proper parameters for assessing inter-regional capacity augmentation. However the question related to low level of TTC needs to be tackled".

2.11 When asked to what extent PGCIL feel that TTC is an important yardstick to assess the adequacy of inter-regional capacity augmentation and whether there is any standard international practice to evaluate the adequacy of inter-regional capacity augmentation, PGCIL in a written reply submitted as follows:

"It is agreed that the inter-regional power transfer capability is an important yardstick to evaluate the achievements of the objectives of National Grid, however it may be mentioned that while the transmission capacity is static, transfer capability is dynamic and at a particular time, transfer of power depends upon various dynamic factors like System condition/Capacity at the point of time to maintain System Reliability, Availability & Location of Generating Station under operation, Capacity & Availability of Downstream Network, System Parameters etc. Augmentation of power transfer capability is however, being done continuously as load and generation grow/varies with the time. Regarding standard international practice to evaluate the adequacy of inter-regional capacity augmentation, it is submitted that PGCIL has not come across any published standards in this regard".

Later, it was informed as under:

> ".…….The Central Electricity Authority (CEA) has, on the directions of CERC, constituted the National Reliability Council for Electricity (NRCE) comprising Members from CEA, STUs, RPCs, CTU, market players and academia. The NRCE would inter alia examine TTC/ATC issues."

(iii) Decline of Total Transfer Capability (TTC)

2.12 Audit's examination revealed that inter-regional TTC increased from 9400 MW in 2008-09 to only 12280 MW in 2010-11. However, TTC showed a decline from 12280 MW in 2010-11 to 11530 MW in 2011-12. In this connection, when asked about the reasons regarding the decline of TTC despite the fact that capacity augmentation was made in the grid, PGCIL in a detailed reply submitted as follows;

> **".....**As regards the specific observation in respect of reduction in 750MW TTC i.e. from 12280MW in 2010-11 to 11530MW in 2011-12, it may be mentioned that this difference is addition of differences occurred at different inter-regional corridors which have been considered over a period of one year. Out of the 6 corridors, for the 5 corridors TTC remained either same or reduced by 100-200 MW only. The TTC for ER-NR and ER-NER was constrained by transmission system within Eastern Region while WR-ER TTC was constrained by transmission system within Western Region. In ER-SR corridor, there has been a decrease of TTC by 350MW. It may be noted here there has been no augmentation in this corridor during this period and with the gradual increase of demand in Odisha, the power transfer from ER to SR via Odisha got affected (as lines within Odisha are catering to the demand of Odisha). Further, the ER-SR TTC was limited by the loading on the 400 kV Vijaywada-Nellore D/C section within Southern Region. The loading on this section depends on the generation within Southern Region upstream of Vijaywada as well as flow from East to South over Gazuwaka HVDC back-to-back station. The generation projects upstream of Vijayawada are located in the Vemagiri complex(gas based) and NTPC Simhadri complex(coal based). In 2011-12, one 500 MW unit at Simhadri Stage-2 was synchronized and declared under commercial operation. Based on the generation level at Vemagiri and Simhadri, less power could be imported over Gazuwaka HVDC back to back station in 2011-12 as compared to 2010-11 leading to reduction in ER-SR TTC by 350 MW. This situation arised as the loading on Vijayawada-Nellore-Sri Perumbudur increased due to increased import requirement of Tamil Nadu state on account of delay of State generation projects of about 7000MW.Efficiency of power transfer from surplus regions to deficit regions depends not only on the robustness of the inter-regional corridors but also on the intra-regional corridors. The strength of

any chain is determined by the weakest link. In case of long distance power transfer between two regions, the weak chain can be either, in any of the region(s) or in the inter-regional corridor...."

2.13 The Audit in their vetted remarks stated as follows:

"PGCIL has furnished reasons for reduction of TTC by 750 MW in 2011-12. Though the reduction in TTC was 100-200 in three corridors (ER-NR, ER-NER and WR-ER), in two of these corridors viz. ER-NER and WR-ER, the TTC itself was only 600 MW and 1200 MW respectively and hence the reduction of TTC even by 100-200 MW reduced transfer capability by 16.67 per cent. Regarding reasons for reduction, as per CERC (Measures to relieve congestion in real time operation) Regulations, 2009, RLDCs may revise TTC due to change in system conditions but the revision should clearly state the reasons thereof.. …".

(iv) Declaration of TTC

2.14 Audit in their Report has found that though National Load Despatch Centers (NDLC) declares TTC in short time horizon (three months and below), such declaration in the long run was not being done by PGCIL though it was required to do so as per 'Procedure for making application for Grant of long term access and medium term open access to Inter-state transmission systems' approved by CERC. Cumulative transmission capacity at the end of XI Plan was 25050 MW against which the cumulative transfer capability was only 11530 MW. In fact, inter-regional TTC showed a decline from 12280 MW in 2010-11 to 11530 MW in 2011-12.

2.15 In view of this, when asked to specify as to why PGCIL is not declaring TTC in the long run and in the absence of monitoring of an important parameter of TTC how PGCIL is able to ensure that the lines built by it actually transfer the intended quantum of power, PGCIL stated as follows:

"TTC calculations are fairly accurate for a shorter time frame and are beneficial for operation of the system where the actual availability of generation and transmission elements are known in advance. The number gets modified on regular basis depending upon the availability viz. addition and outages of various transmission elements. The transmission planning is a longer time frame exercise (at least for 4-5 years) and is associated with the need of transfer of long term committed power, considering availability of present, on-going and future parameters viz. generation, transmission schemes, projected demand etc expected to be in place under the inter-state as well as intra-state

system in the time-frame of the study. In fact, the new transmission elements are planned for enhancement of the TTC for the required power transfer on long term commitment basis as per present regulations. However, the proportional increase of TTC in actual operation may often get delayed due to mismatch in the commissioning of simultaneous projects/demand growth in the inter-state as well as intra-state system. It may be mentioned that the transmission system expansion may not necessary enhance TTC for unforeseen power transactions on 'opportunity basis' as this might indicate requirement of large scale system augmentation leading to sub-optimal development of transmission systems. Nevertheless, CTU is already declaring the TTC as a regular process. At present TTC has been declared upto March 2016. The declared TTC is being revised depending upon the revision of the commissioning schedule of various transmission elements, generation projects, load growth etc. Declaration of TTC would continue for future years as well".

2.16 However, the Audit in their vetting remarks stated as follows:

"PGCIL has clarified that the new transmission elements are planned for enhancement of TTC for long term power transfer but in actual operation, the necessary increase in TTC may not materialize due to mismatch in the commissioning of projects etc. PGCIL has added that TTC may not be available for unforeseen power transactions on 'opportunity basis' as it would involve large scale augmentation leading to sub-optimal development of transmission systems. In this regard, Audit has seen that TTC denotes the capability of the system to transfer power reliably. As such, TTC is required whether the power transfer is with reference to open access requests or on long term basis. It is for this reason that declaration of TTC is important for all time horizons viz. long term, medium term and short term, for the benefit of respective users. PGCIL has stated that it has started declaring TTC regularly and TTC has been declared up to March 2016. Audit found that the declaration is being made for the next one year only i.e. in March 2015 the TTC of all inter-regional corridors for March 2016 has been declared and so on. This is not in accordance with the 'Procedure for making application for Grant of Medium Term Open Access in ISTS' notified by CERC on 31st December 2009, as per which CTU shall notify TTC for four years i.e. on 31st March 2015, TTC shall be declared for period 1st April 2015 to 31st March 2019. Similarly, in respect of long term access, the TTC would be declared for the corresponding time period i.e. 12 to 25 years. This is still not being done by PGCIL. In the absence of such declaration based on system studies, assurance about the capability of the system to transfer power as per LTA/MTOA granted, will be lacking to the users".

2.17 The Audit took the stand that in accordance with the 'Procedure for making application for Grant of Medium Term Open Access in Inter State Transmission System' notified by Central Electricity Regulatory Commission (CERC) on 31st December, 2009, the CTU i.e. PGCIL shall have to notify TTC for four years which means on 31st March 2015, Total Power Transfer Capability (TTC) needs to be declared for the period 1st April, 2015 to 31st March, 2019. However, it was observed from the PGCIL's reply that PGCIL has declared TTC upto March 2016 only. When PGCIL was asked by the Committee to specify reasons for not declaring TTC as per the directions of CERC**,** PGCIL, in their written reply, submitted as follows:

> "For calculation of TTC, firm schedule of upcoming generation projects and various transmission elements is required. In the absence of firm schedules, declaration of TTC with number of uncertainties may send confusing signals to the market. In fact, due to ever changing grid conditions, even the TTC/ATC declared by operators for a shorter time period calls for revision regularly. The difficulty has already been addressed to CERC. Nevertheless, CTU has started declaring the TTC for FY 2015-16 & 2016-17, TTC/ATC has already been declared by CTU. The declared TTC is being revised depending upon the revision of the commissioning schedule of various transmission elements, generation projects, load growth etc".

(v) <u>Open Access to Transmission Network</u>

2.18 As per the provisions of Electricity Act, non discriminatory open access has been incorporated in the inter State transmission system. When asked about the policy of PGCIL to promote open access as envisaged in the Electricity Act, PGCIL in the reply stated that there are three types of open access viz. long term, medium term and short term. PGCIL further stated that new transmission system is built for long term customers only with their commitment to pay for the infrastructure created and the margins that get created in the system due to design and operation consideration are offered under Medium Term Open Access (MOTA) and Short Term Open Access (STOA).

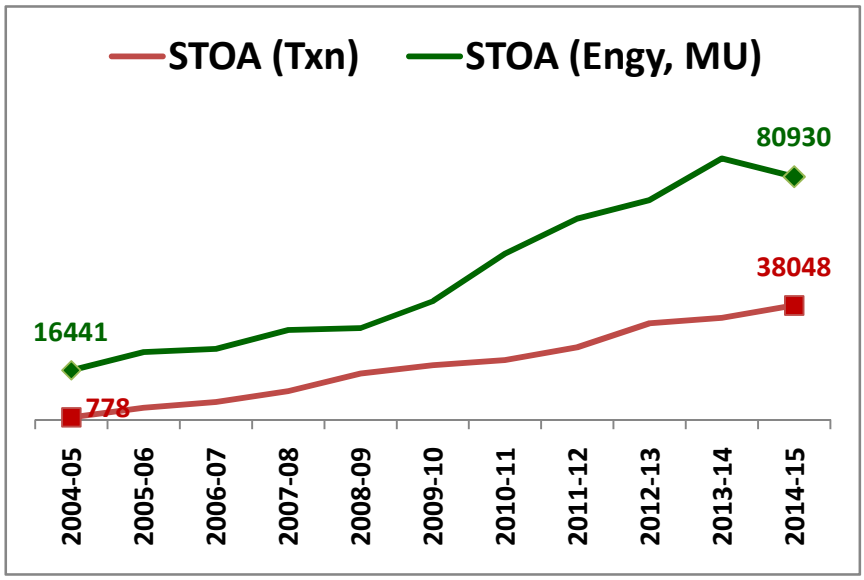
2.19 The Audit observed in their vetted remarks that the aforesaid approach is not in consonance with the National Electricity Policy notified by the Ministry of Power in February 2005 because as per the Policy, prior agreement with the beneficiaries would not be a pre-condition for network expansion and CTU/STU should undertake network expansion after identifying the requirements in consultation with stakeholders.

2.20 When asked to offer comments on aforesaid Audit observation, the PGCIL in their reply submitted as follows:

"The Electricity Act 2003 provides for non discriminatory Open Access to be provided by Central Transmission Utility.To facilitate the same, CERC Regulation on open access, 2004 provides for two types of Open Access i.e. Long Term Open Access and Short Term Open Access, according to which new transmission system could be planned and implemented for Long Term Open Access. However, Short Term Open Access is to be facilitated utilising the margins of the existing systems. During the amendment of the said Regulation in 2009, another product namely Medium Term Open Access (MTOA)was introduced which is to be granted based on the margins available in the existing and planned system and for which no new transmission system is to be implemented. In this regulation, the term Long Term Open Access was changed to Long Term Access (LTA). The same was done to distinguish the LTA, where new system may be planned and STOA and MTOA, where no new system is required to be planned/implemented. However, all the three access that are defined are technical mechanisms to provide non-discriminatory access as per Electricity Act 2003."

2.21 Further elaborating upon the open access policy, PGCIL in their written reply submitted that as per the extant regulations, the long term customers are required to apply well in advance so that the necessary transmission system can be planned, taken up for implementation and commissioned matching with their power transfer requirement.

PGCIL also mentioned in their reply that short term access has grown phenomenally with effect from 2004-05 as is evident from following graph :-



2.22 PGCIL in their reply also submitted that in view of the phenomenal growth of short term open access a new concept is under discussion wherein the development of transmission system shall be based on installed capacity of generators, power drawl requirement from customers and their commitment for payment of transmission charges.

2.23 On being asked as to how this will be different from the current scenario and the possible benefits of this Plan, PGCIL in a written reply submitted as follows:

> "At present the transmission planning for evacuation from generation project is carried out based on identified/target beneficiary. In the new concept, called 'General Network Access (GNA)', transmission system would be planned based on generation/demand quantum and their location without knowing the contracted source of purchase/sale. The generator and the States/Consumer could be given general network access (GNA) to the Inter State transmission system for the agreed quantum of power (MW). This would not only address the uncertainty in generation and demand and optimize the shape and size of the transmission network but would also encourage the increasing market operation by providing flexibility in economic procurement of power".

(vi) Assessment of Efficiency of Network Construction

2.24 Para 3.1.5 of the Audit Report reveals that absence of mechanism to assess efficiency of network construction results in various infirmities in system development in the form of skewed power flow across lines, low line load factor etc. In this connection, referring to the Tariff Policy notified by Ministry of Power in January 2006, Audit has argued, while norms had been laid down for system availability based on which incentives are paid to central (PGCIL) and State Transmission Utilities, norms had not been evolved for assessing efficiency of transmission network and loss reduction.

2.25 When asked as to how optimal or sub-optimal level of transmission investment is determined in the absence of norms for assessing efficiency of network and loss reduction, PGCIL in their reply stated that a transmission system is designed to take care of evacuation of power under various operating conditions like peak load to light load, high hydro to low hydro conditions and for different load - generation scenario and reliability consideration, meaning thereby that loading on any line cannot be constant at all the times and expected to vary, based on various system conditions. However, the transmission line serves its purpose once it is available for the transfer of power as planned.

2.26 The Audit in their vetted remarks stated as follows:

> ‘’The argument that transmission line serves its purpose once it is available for the transfer of power as planned is not in consonance with the Tariff Policy which differentiates between efficiency of network construction and its availability. According to Audit mere availability of a line may not signify that it is efficiently constructed since its engineering may be such that not much power is flowing through it or too much power is flowing through it. For e.g. it has been pointed out in Para 7.4.5(b) of the Audit Report that *Inter-se* distribution of power flow among inter-regional links indicated that power transmission to and from NR depended on two trunk lines *viz*. 400 kV Agra-Gwalior (for WR-NR) and 400 kV Muzaffarpur– Gorakhpur (for ER-NR). Regular heavy power flows during the last three years indicated high-risk of isolation of NR in the event of outage of these lines.”

2.27 On being asked to offer their comment on the aforesaid report, the Ministry of Power, in their written replies submitted as follows:

> "The transmission system is generally planned and constructed for transfer of power during peak load / generation scenario. At other times,

> the power flow on the transmission line shall be less than the maximum and therefore, it may seem that the transmission line is underutilized / less efficient. However power flow on the line is not under the control of Transmission licensee, it depends upon many factors like load demand, generation, capacity and availability of downstream transmission and distribution network from time to time .Therefore, availability rather than actual utilization of the transmission system may be a true indicator of the efficiency of the transmission system".

2.28 PGCIL gets incentives based on availability of the transmission system alone but the Tariff Policy of the Government required inclusion of other parameters like efficiency of network construction and loss reduction also for payment of incentives.

2.29 When asked as to why the provisions of the Tariff policy were not followed, PGCIL in their reply submitted that besides incentive and disincentive linked with availability of transmission system, incentive and penalty, linked with construction of transmission system is already in vogue in the prevalent regulatory mechanism and are being followed. Regarding loss reduction, it may be mentioned that the losses in Inter- State Transmission System are in the range of 3-4 % which are as per global standards. Any further reduction in losses may not be techno-economical.

2.30 On the above issue, the Ministry of Power in the written reply submitted as follows:

> "Regarding incentive on loss reduction, it may be mentioned that Transmission losses are only technical losses and in general remain in the range of 3 - 4% in an integrated transmission system and are at optimum level in line with the international standards. Any plan to reduce the transmission losses would mean implementation of more of HVDC system which has less loss level. However, this is not technically possible to go in for only HVDC line due to high cost and operational requirement. Hence, wherever required such lines are planned and implemented depending upon the cost benefit analysis. Thus, practically there is not much of scope to reduce transmission losses further and link incentive / disincentive based on losses. However, PGCIL get incentive and disincentive linked with construction of transmission system as per prevalent regulatory mechanism".

(vii) <u>Regional Inequality in the prices</u>

2.31 When asked as to how the MOPP/PGCIL plan to reduce the inequalities in electricity prices across the Country due to congestion on account of transmission constraints, PGCIL in their reply stated as follows:

"The transmission system is enabling economic exchange of power across the country. The volume in the market operation is enhancing day by day from just 17 BU in 2004-05 to about 87 BU in 2013-14. This has been possible due to integrated development and operation of Regional Grids. Generation capacity available anywhere could be transmitted to deficit regions. This has facilitated bringing down price of energy in market from Rs. 8-9 pu to Rs. 3-4 pu. Regarding the congestion it may be mentioned that the interregional capacity has been planned based on the long term power requirement. During this process, there are some inherent margins based on operating conditions, which as per regulations are to be used for catering to Open Access Requirement under Medium and Short Term (MTOA, STOA). It may be mentioned that applicant under MTOA and STOA make commitment of payment of transmission charges only for short durations as per regulations (one day to 3 months in case of STOA and more than three months and up to three years in case MTOA), while transmission elements are to be serviced for 35 years in line with the regulation, which is borne by long term commitments. Today, about 8-9% power (240 MU/day) is being traded under short term market. Further, in certain situation, congestion is being observed because the load (demand)- generation variation at particular area is much varied than what was envisaged during planning stage. The load generation variation has taken place on many accounts like delay in generation for example about 10,000 MW (each in ER and SR), high cost load centre based generation projects compared to pit-head based generations, scarcity of fuel etc. In fact, with transmission acting as enabler for transferring power across the country, constituent States are exercising the option for availing power from cheaper sources while surrendering the power from costlier sources, even if these are located near to their load centers. For example, Delhi, Haryana and NTPC jointly established a 1500MW power project at Jhajjar to meet the demand, however due to the high generation tariff, the State(s) are currently resorting to import cheaper power from Chhattisgarh/Odisha projects. Likewise other load based generation projects like CLP Jhajjar (1320 MW), NTPC Dadri (1820 MW), Badarpur TPS (705 MW) , Kayamkulam Gas project in Kerala, Anta, Auraiya Gas projects and various other gas projects are currently idle in the absence of scheduling of their power on price consideration. In fact, this phenomenon is putting extra burden on transmission further leading to congestion. However, in view of the increased market operation, more interregional lines have been planned and are taken up in phased manner to connect the deficit regions like NR and SR to the other part of the National Grid. "

2.32 The Audit in their vetted remarks, stated as follows:

> "The reply that generation capacity available anywhere could be transmitted to deficit regions has a caveat attached to it viz. such transmission is restricted by the transfer capability of the corridor. Though total volume of transactions has increased over the years and the price of energy in the market reduced, the regional inequalities persist. Comparison of Market Clearing Prices (price for cleared transactions in the whole country, if there is no congestion at all) with the Area Clearing Prices in Indian Energy Exchange showed that buyers in S1 and S2 bid areas (States of Tamil Nadu, Kerala, Andhra Pradesh, Karnataka, Goa and Union Territory of Puducherry) paid higher prices during 2011-13 (Rs.5.1 to Rs.7.3 per unit as against Market Clearing Price of Rs.3.5 per unit) to procure power. On the other hand, sellers in W3, E1 and E2 bid areas (Chhattisgarh, Orissa, West Bengal, Sikkim, Bihar and Jharkhand) received lower prices (Rs.2.8-Rs.2.9 per unit as against Market Clearing Price of Rs.3.5 per unit) due to transmission constraints. Thus, there remains a need for strengthening WR-SR and ER-SR links (W3, E1, E2 to S1 and S2 *i.e.* generation surplus to power deficient states) to fully achieve the benefits of a 'National grid'. The Ministry has attributed the price differences to price consideration of States which look for cheaper sources, by even surrendering their shares from costlier sources including NTPC plants. The States cannot be faulted for preferring cheaper power since the National Electricity Policy envisaged competition in electricity prices and prescribed open access to consumers for achieving the same. However transmission constraints brought about the inequalities in prices of electricity traded in power exchanges".

2.33 In view of the above, PGCIL was asked to explain as to what extent inequalities in prices of electricity traded in power exchange can be attributed to the transmission constraints. PGCIL in their reply submitted as follows:

> "At the outset, it is clarified that the prices through the Power Exchange are discovered only for STOA transactions which is a very small percentage of the total energy wheeled through the transmission system. These prices are governed by several factors viz. Cost/location of generation, availability of power, prevailing demand-supply situation and also the margins available in the transmission corridors at the given point of time etc. However, with the availability of more transmission corridors, effect on prices could be visible to the extent they were currently affected due to congestion in the corridor. However, zero congestion for 365 days in a year would have to be examined carefully. It could mean over-investment in transmission. It could also lead to many power stations with higher fuel cost and located downstream for closing down. Since many of these power plants would have long term Power Purchase

Agreements (PPAs) with the DISCOMs, the latter would have to service the fixed costs of these plants for the entire duration of their PPAs. It could therefore be visualized as an objective of minimizing the composite cost of generation and transmission over the entire life cycle".

2.34 When asked about the views of the Ministry of Power on the correlation between inequalities in prices of electricity traded in power exchange and transmission constraints and what role the Ministry can play to improve the prevailing state of affairs, the Ministry in a written reply stated as follows

"..The prices through the Power Exchange are discovered only for STOA transactions which is a very small percentage of the total energy wheeled through the transmission system. These prices are governed by several factor viz. Cost/location of generation, availability of power, prevailing demand-supply situation and also the margins available in the transmission corridors at the given point of time etc. However, with the availability of more transmission corridors, effect on prices could be visible to the extent they were currently affected due to congestion in the corridor. The Ministry of Power, however, closely monitors the situation and the new transmission works, which mitigate congestion, are sought to be expeditiously commissioned. However, it is pertinent to mention that new transmission systems may mitigate recognizable congestion, that too for a brief period, i.e. before merit order dispatch further leads to congestion. For example, after the new transmission capacity gets created in WR – SR corridor, cheaper sources in Chhattisgarh could displace expensive power in Southern Region and may lead to congestion again".

2.35 On being asked whether the regional inequalities in prices of electricity can be addressed by strengthening of WR-SR and ER-SR links and connecting of deficit regions like NR and SR. PGCIL in their reply elaborated as follows:

".....the price discovery of power through power exchange is dependent on many factors viz. Cost of generation, availability of power, prevailing demand-supply situation and also the margins available in the transmission corridors etc. Presently in SR, due to non-materialization of several planned generation projects, power shortage is being faced. Availability of more transmission corridors from WR & ER towards SR (as detailed in Para-4) above, shall facilitate more power flow towards SR. This will help in reducing price inequalities to certain extent. However, other factors such as availability of cheaper power within the region, generation addition in SR, overall demand-supply situation shall also have its impact on the power prices".

2.36 When asked to offer comments on prevailing anomalies in the power sector causing higher prices of electricity for end users, the Secretary, Power in a comprehensive reply stated that at macro level, the average cost of supply of power and the average revenue realization have a gap of 0.73 percent. He informed that all Discoms are not running on loss and those on loss also experience variation in losses. It was further suggested that the efforts of the Ministry is towards reducing the cost of supply of power as well as increasing the revenue realization through proper billing and complete recovery of billed amount. On the variation in cost of power, he stated that it depends on the fact whether the Discom has signed PPA or whether the purchase is through power exchanges. Also the commercial decisions of Discoms impact power prices. The Secretary(Power) further stated that at the Ministry level, Discoms are being counseled on reducing the cost of power and increasing their efficiency but it would take some time to show results.

CHAPTER-3

GRID SECURITY

(i) Grid Disturbances and Grid Management

3.1 The complexity of the Indian power system poses continuous challenges to grid operations in terms of grid availability, reliability and above all security. In para 7.1, 7.2 and 7.3 of their Report, the Audit has analyzed the various aspects of Grid management process and grid disturbances. Succeeding lines of this paragraph present the summary of the aforesaid Audit paras.

3.2 According to Audit, operation of National Grid is a coordinated activity among various agencies with Ministry Of Power at the apex policy level and PGCIL/POSOCO through Load Dispatch Centers (LDCs) at the operational level of the hierarchy. Defining the process of Grid Disturbance (GD), the Audit has stated that Grid Disturbance is a state of the power system under which a set of generating units/transmission elements trip in an abrupt and unplanned manner affecting power supply in a large area causing the system parameters to deviate from normal values in a wider range. According to Audit, as per CEA's Grid Standards, GDs are classified on an ascending scale of one to five[*] depending on the severity of the antecedent generation or load lost. There were 816 instances of GDs between April 2007 and September 2013 out of which GDs of higher category (GD-3 and above) occurred on 69 occasions (8.46 *per cent* of total 816 instances). Number of GDs showed a mixed trend *i.e.* increase in numbers from 2008-09 (83 GDs) to 2009-10 (124 GDs); marginal decrease in 2010-11 (112 GDs); increase in 2011-12 (144 GDs) and decrease in 2012-13 (127 GDs). However, during 2013-14, up to September 2013 itself, number of GDs increased sharply to 176 as against 127 during 2012-13.

3.3 In Para 7.4 of their Report, the Audit has further scrutinized the major GDs of 30 July 2012 and 31 July 2012 resulting in disturbance of Northern, Eastern and North-Eastern Grids. According to Audit, estimated population of 30 crore in eight States and one Union Territory and estimated population of 60 crore in 21 States and one Union

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[*] ***Category GD-1 – When less than 10 per cent of the antecedent generation or load in a regional Grid is lost; GD–2- When 10 per cent to less than 20 per cent of the antecedent generation or load in a regional Grid is lost; GD–3- When 20 per cent to less than 30 per cent of the antecedent generation or load in a regional Grid is lost; GD–4- When 30 per cent to less than 40 per cent of the antecedent generation or load in a regional Grid is lost; GD–5- When 40 per cent or more of the antecedent generation or load in a regional Grid is lost.***

Territory were affected respectively. Total load affected was 36000 MW on 30 July 2012 and 48000 MW on 31 July 2012.

3.4 When asked about the reasons for significant increase in Grid Disturbances (GDs) in 2013-14 and the role played by POSOCO towards reducing GDs, the Committee have been apprised as under:

> "The power system is expanding at a fast pace and a number of new elements are getting added every year. On the other hand many equipment specially in state system are close to reaching their service life and are in the process of being replaced or upgraded. So number of equipment failures would increase given the larger base every year. Further with the passage of time, logging of GDs/GIs has also improved. There were 224 GDs in 2013-14 and 245 GDs in 2014-15. The classification of GDs is as per the CEA Grid Standards. Proper operation of protective systems is a key to ensuring that GDs are minimized. Load Despatch Centres (LDCs) are making conscious efforts to detect such protective system mis-operations. The Phasor Measurement Units (PMUs) provide significant clues in this direction right from real time operation to the post-dispatch analysis phase. The RLDCs are taking up this issue regularly in the Protection sub-Committee meeting of Regional Power Committees (RPCs). The Protection sub-Committees are now meeting on monthly basis instead of quarterly basis earlier. In case of persistent problems, RLDCs have filed petitions before the CERC (8 such petitions have been filed since the July 2012 grid disturbances while SRLDC was a respondent in 4 others). Notwithstanding the above, basically each utility should have a system in place for root cause analysis, identifying and implementing remedial measures to avoid further such failures which would go a long way in minimizing GDs".

3.5 The Audit however in their vetted remarks emphasized that since POSOCO is mandated with the responsibility for safe and secure operation of the national grid, it may have to take a more pro-active role by way of detailed analysis of events, issue of advisories to constituents etc.

(ii) **Deficiencies in planning the shut down of Bina-Gwalior-Agra trunk line**

3.6 In Para 7.4, of their Report, the Audit has observed that the proximate cause for the major GD of 30 July 2012 (involving NR) and 31 July 2012 (involving NR,ER and NER) was the ill-planned shut down of the trunk line (400 kV Bina–Gwalior-Agra line) between WR and NR for four days (26 to 29 July 2012) in peak season for upgrading the line to 765 kV level. Audit also claimed that procedure prescribed in the Indian Electricity Grid Code was not followed while taking decision regarding grid shutdown.

3.7 In view of the above, when asked about the reasons for PGCIL undertaking upgradation of Bina–Gwalior-Agra Trunk line in peak season without following the prescribed procedure, PGCIL in their reply stated as follows:

> "The electricity grids in India are continuously evolving. The WR-NR interregional links have also gradually evolved. The first link was the 765kV Bina-Gwalior-Agra line which was initially charged at 400kV in March 2007. The second circuit of Bina-Gwalior-Agra line (initially charged at 400kV) was commissioned in March 2010. Also the 400 kV Zerda-Kankroli D/C was commissioned in May 2009 and Ckt-II LILO at Bhinmal in Sep.2009. Out of the nine tie lines between WR and NR Grids 72% of power flow during 2011-12 was through the 400 kV Agra-Gwalior double circuit link which also caused congestion in the said link. This was evidenced by the fact that the RLDC/NLDC levied congestion charges on two occasions for the NR-WR corridor and this corroborates the express need for up-gradation of capacity of the Agra-Gwalior double circuit link (part of the WR-NR inter-connection), urgently required for the benefit of the stakeholders in various Regions of the Northern Grid. As per the plan, the WR - NR inter regional capacity enhancement was to be enabled with up-gradation of Bina-Gwalior-Agra link to 765kV. The planned up-gradation of this link from 400kV to 765kV was envisaged in the planning horizon and had to be implemented in the operating horizon.The proposed shut-down of 400kV Bina-Gwalior-Agra ckt-II was for taking up its up-gradation to 765kV voltage class which would augment its Power Transmission Capacity from 1100 MW to 2250 MW. The shut-down work involving construction related activities was a part of the continuous ongoing project work for commissioning of evacuating Transmission system associated with SASAN UMPP (A 4000 MW generation project scheduled for commissioning in December'12). The upgradation of existing 400kV Bina-Gwalior-Agra double circuit Link to 765kV level Scheme was intended to augment the Total Inter-Regional Power Transfer Capacity between WR and NR by additional 2300 MW (1150*2 MW) and benefit all the stakeholders at large thereby ensuring maximum utilisation of National Resources. Such activities are a part of the overall construction phase augmentation. The same was in line with CEA Transmission Planning Criteria Para 3.6.Notwithstanding the above the following may also be noted with regard to planning of the shut-down proposal.
>
> i. As per the Outage Planning Process of Indian Electricity Grid Code it is observed that Outage planning of transmission elements is on annual basis by the respective Regional Power Committees (RPCs) which is being done for maintenance of transmission lines based on Annual Maintenance Plan of each element which is planned by PGCIL well in advance for round the year implementation. However, with respect to outage planning of 400kV Bina-Gwalior-Agra II, part of an Inter-Regional

corridor, for the period 27-07-2012 to 29-07-2012, was for undertaking construction related activities.Due to the inherent uncertainties with such construction related activities involving supply , movement and erection of bulky equipment, resource mobilization, Right-of-way issues, availability of expert manpower, sudden weather changes, the definite time schedule of shut-down could not be planned and discussed in the relevant forums of the respective Regional Power Committees (RPCs) in a month-ahead horizon.

ii. As already mentioned above, the work of upgradation of Bina-Gwalior-Agra was part of continuous construction activity. Postponement of the construction activities for off-peak season would cause de-mobilization of the construction team, idling of large quantity of Tools & Plant items at Bina, Gwalior and Agra and their re-mobilization which would have lead to further delay and uncertainties in meeting completion target for evacuation of Sasan UMPP power generation scheduled from December'12.

iii. However, PGCIL approached the NLDC/RLDCs on a three-day ahead horizon with proposal of shut-down of Bina-Gwalior-Agra link.

The planned outage of 400kV Bina-Gwalior II was approved for three days from 27th July, 2012 to 29th July, 2012 while the 400kV Gwalior-Agra II was approved for only two days from 28th July, 2012 to 29th July, 2012, thus making the task challenging for PGCIL to complete the three days work in only two days time. During this approved period the Grid operation was largely smooth and Grid security was ensured across the NR and WR grids. However, the work could not be completed due to heavy rains in areas around Bina sub-station on 29th July'12. The inclement weather conditions was a force majeure leading to the extension of the upgradation work at Bina, Gwalior and Agra ends.As such the outage of 400kV Bina-Gwalior-Agra ckt-II was planned, operationally viable as evident during the period of its outages as on 27th,28th and 29th July' 2012 and that the onus of extension was a force majeure condition due to heavy rainfall not under the control of PGCIL. In view of the submissions made above, it may be seen that the shut-down was not ill-planned. Notwithstanding the above, now a system has been put in place where-in RLDCs/NLDC are ensuring that all planned outages required on any transmission element has the approval of the respective RPC. The RPC meetings sensitize the member states of the region to an important outage, however, all due diligence still has to be done by RLDCs/NLDC before approving the outage in real time operation".

3.8 However, the audit further commented as under:

> "….The fact that PGCIL proceeded to go ahead with the shutdown of two days, though it needed three days for completion of the work does not seem appropriate…….PGCIL has cited inclement weather as the reason for extension of upgradation work. Heavy rains during Monsoon cannot be cited as force majeure, since these factors including the weather forecast should have been taken into account."

3.9 On being asked whether any institutional mechanism has been established for conducting detailed analysis of GDs and issuing advisories based on lessons learnt, PGCIL in their reply stated as follows:

> "In line with the CEA Grid Standards and the Indian Electricity Grid Code (IEGC) provisions, RLDCs are filing First Information Reports (FIRs) in case of any Grid Disturbance (GD) with the Regional Power Committees (RPCs)/CEA. The RPCs discuss in detail these events through their Protection sub-Committees which have members from all the utilities. In cases where further detailed investigations are required, an expert team pooled from these utilities even visits the site where the problem originated. Based on the collective wisdom of these experts, detailed reports are prepared".

3.10 However, the Audit in their vetted remark has reiterated the need for an independent institutional mechanism at the national level for this purpose since operation of the grid has expanded to the national level.

(iii) <u>Handling of GDs by system operators at NLDC/RLDCs</u>

3.11 In para 7.4.2 of the Audit Report, Audit has pointed out deficiencies on the part of Regional Load Dispatch Centre (RLDCs)/ National Load Dispatch Centre (NLDC) in declaring TTC and scheduling transfer of power during GDs on 30 and 31 July 2012. The Audit explained that a power system can be in any of the 5 states i.e. normal, alert, emergency, in extremis and restorative. The system operators have their best chance of control in the 'normal' and 'alert' states though damage control methods are available for each state. Audit was of the opinion that during the GD of July 2012, the system went through these states but RLDCs/NLD allowed the system to deteriorate to the 'in extremis' (uncontrollable cascade) state. Further, the Audit revealed that as per the report of POSOCO to CERC, the main strategy to control the overloading of WR-NR lines during the GD of July 2012 was to back down generation in WR, reduce under-drawal by WR utilities and reduce overdrawal by NR utilities by doing all three activities simultaneously. However, the transcript of voice recordings of conversations between the control room staff of RLDCs revealed that WRLDC was unwilling to order generators to back down and instead suggested that NLDC should try to reduce overdrawl by NR.

As per the Audit Report, excerpts of the telephonic conversation between NLDC and RLDC staff on 29 July 2012 are tabled as under;

29 July 2012 at 22:43 hrs (Eastern Region Load Dispatch Centre (ERLDC) advising National Load Dispatch Centre (NLDC) to order Western Region Load Dispatch Centre (WRLDC) to back down generation)	
ERLDC	Toh ye paanch line overloaded hai toh agar koi ek trip karega toh kafi musibat ho jayegi.
NLDC	Achha, achha.
ERLDC	Toh aap WR ko thoh ek dam extremely aap ek dam immediately aap boliye ki wo back down kare apna generation.
NLDC	Achha, achha.
ERLDC	Ya nahi to WR apna NR ke through power pass on kare agar kar sakta hai.
NLDC	NR se nahi kar sakta hai, Gwalior-Agra ek out hai.
ERLDC	Ho agar nahi kar sakta toh he has to back down.
NLDC	Achha, achha, theek hai.
ERLDC	Theek hai na.
NLDC	Ok, ok.
ERLDC	Or NR to over drawal band karna hai.
NLDC	Ha, ha theek theek.
ERLDC	Toh ye toh nahi toh bilkul system aaj jayega.
NLDC	Theek, theek sir karte hain.
ERLDC	Toh aap ise seriously lijiye.

29 July 2012 at 23:28 hrs (ERLDC advising NLDC to be firm with WRLDC)	
ERLDC	Janab WR se to humko koi farak nahi, lagta hai ki badh gaya hai unka
NLDC	WR toh…
ERLDC	Aap unke pechhe thoda lagiye ki what are they doing?
NLDC	Aree bada bekar hai sir unko…
ERLDC	Ji sir aap unko bar bar message dijiye, wo aise chhodne se nahi hoga.
NLDC	Theek hai mai bat karta hu.
ERLDC	Nahi nahi bilkul hi bat nahi, aap bar bar unko msg dijiye.
NLDC	Nahi nahi mai de raha hu.
ERLDC	Kahe jaha jaha underdrawal hai usko kam karaye.
NLDC	Nahi, theek hai. Theek hai.
29 July 2012 at 23:31 (NLDC asking WRLDC to reduce under drawal in a rather timid way)	
NLDC	'Ha sir, ye thoda ye apna Sir under drawal control kar sakthe ho Sir Aap'.
WRLDC	Hmm.
NLDC	Kyonki Sir Ye WR-NR ki Sir Vo Gwalior Agra ek shutdown pe hai. Us pe overloading ho rahi hai Sir aur ye ER corridor ki sari lines overload ho rahi hain.
WRLDC	Frequency bhi to kam hai, aapki…
NLDC	Frequency kam hai vo to baat hai lekin thoda system constraint hai na ab kya karain sab ER kee lines
WRLDC	Overdrawl kam karaiye na NR ka
NLDC	NR ka OD, usko bhi msg kiye hain, Sir aap bhi kar sakte hain to aap bhi dekhiye

In this connection when asked to specify as to whether there is an oversight mechanism at National Load Dispatch Centre (NLDC)/ Regional Load Dispatch Centre (RLDCs)/PGCIL for monitoring restoration of important transmission lines under outage, PGCIL in their Reply stated as follows:

> "The restoration of the transmission lines under outage is taken up by RLDCs/NLDC continuously with the agencies involved once time elapses towards the end time of shutdown. In case response is not forthcoming, written messages are issued to the utility concerned. If restoration is further delayed, the matter is escalated at RPC level. As per the IEGC section 5.2 (e), 'Any prolonged outage of power system elements of any user/CTU/STU, which is causing or likely to cause danger to the grid or sub-optimal operation of the grid shall regularly be monitored by RLDC. RLDC shall report such outages to RPC. RPC shall finalise action plan and give instructions to restore such elements in a specified time period.'As per IEGC 5.6.2 (b), 'Forced outages of important network elements in the grid shall be closely monitored at the RPC level. RPC shall send a monthly report of prolonged outage of generators or transmission facilities to the Commission.'As per section 5.7.4 (j) of the IEGC, 'RPCs shall submit quarterly, half-yearly reports to the Commission indicating deviation in outages from the plan along with reasons. These reports shall also be put up on the RPC website".

3.12 However, The Audit in their vetted remarks stated that there were deficiencies on the part of NLDC/RLDCs as they failed to monitor restoration of Agra-Gwalior-Bina line which was under outage and also lack of diligence in scheduling of power accordingly.

3.13 During the evidence of the Ministry of Power on 29 October 2015, the Secretary, Power was asked to clarify as to why even after passing of three years after the Grid failures of July, 2012 accountability of the units/Authorities/entities/individuals has not been fixed and no action has been taken against those who did not follow the relevant provisions of Indian Electricity Code and National Electricity Act. The Secretary, Power stated as under:

> "....the Report has come and based on that Report somebody has to levy a penalty and you levy a penalty once it is very clear. Hence, the regulator is examining that and they have to levy the penalty..".

CHAPTER-4

PERFORMANCE APPRAISAL

(i) Project Implementation

4.1 In para 3.1.4 of the Audit Report, it has been stated that PGCIL did not have a policy to firm up the time for commissioning of generation linked transmission projects. Citing the example of Odisha, Audit has commented that delay on the part of PGCIL to plan the transmission system resulted in congestion in evacuation of power in Odisha from power generating projects. When asked how PGCIL ensures that the transmission system is ready by the time the generating plants commence production in absence of any policy regarding timing for commissioning of generation linked transmission projects, PGCIL in their reply stated as follows:

> " it is submitted that as per the prevalent practice, an Indemnification Agreement was entered between generation project developer for Central PSUs generation project (where power is allocated by MOP) and the transmission utility, agreeing to a particular date (zero date) by which the transmission system and the generation project are to be in place. Any delay beyond that zero date had to be compensated by the delaying side to other side by paying the IDC, maximum for a period six months. Besides, the Indemnification Agreement entered with the Generating station, regular interaction at Director level was held to keep track of the progress of the generation project. The transmission system for the IPPs is planned and evolved only on receipt of LTA (Long Term Power Transmission Agreement), and is not evolved for any MTOA or STOA and the time line for the purpose of indemnification is entered in Bulk Power transfer Agreement/ Long Term Access Agreement. The transmission system construction requires 30 to 40 months. This fact is accepted by CERC and they allow this time for execution of transmission line. Accordingly, the generation project developers are required to approach CTU with their long term evacuation plan/agreement for development of transmission system with the above time line. However, if they do not approach with sufficient time for development of transmission system, then the generation projects are allowed to evacuate the power through the available margins in the existing transmission system under MTOA/STOA, till the transmission system as per their Long Term Agreement is developed. It may also be mentioned here that in certain cases the generation project developers did not specify their Long Term Agreement, until advanced stage of their project development, due to which the power evacuation system for Long Term Agreement could not be in place by the time generation started, in such an event, as per the provisions of the Electricity Act, though they were

granted connectivity to the Grid, their power was evacuated with the MTOA/STOA margins available in the existing transmission system. While, all out efforts are made to make available the transmission system for LTA, by the time generation takes place, however, in any inadvertent situation of completion of transmission line or insufficient time given by Generation project developers, an alternate interim arrangements is made for evacuation of power through the margins available in the existing transmission system.

At times when the generation project is getting delayed the progress of transmission system is also adjusted accordingly. It is mentioned that if the award for transmission system is not placed and the generation project gets delayed, the placement of award is adjusted so as to match the completion of transmission line with the commissioning of generation project. However, once the award is placed then cancelling or delaying the execution of transmission line works becomes difficult, as it involves contractual implication including the risk of litigation etc."

4.2 However, in their vetted remarks the Audit remarked that despite postponing fulfillment of its obligations the developer is able to evacuate power through this interim arrangement.

4.3 In the same para, Audit's examination has revealed that out of the seven power generating projects in Odisha only two projects were commissioned as on June 2014. However, since there was delay in commissioning of transmission system associated with power generated projects, the two commissioned projects were given interim connectivity through Loop in Loop Out (LILO) which has been causing congestion.

4.4 In view of the above, when asked by the Committee to clarify as to under what provisions/technical standards, two Independent Power Producers were allowed 'Loop in loop out' (LILO) arrangements to evacuate power and whether it was cleared by CEA, PGCIL in their reply stated as follows:

"In the referred cases, a comprehensive system was evolved for various generation projects having installed capacity of about 10000MW in Odisha. After receipt of all the applications, the comprehensive transmission system and its time-line was finalized in the standing committee/LTA meeting with all the stakeholders. As some of the generation projects were expected to come up earlier than the planned evacuation system (as it takes about 30-40 months for implementation of transmission system), interim arrangement through LILO of existing lines was studied, planned and agreed by CEA and the constituents/stakeholders in the initial stage itself to facilitate connection of generator to the Grid till final system is available as an

interim arrangement. It may be mentioned that project developers could not complete the dedicated system from the generation projects to the nearest identified pooling sub-stations (under planned transmission system) for a long time even after commissioning of the pooling substation and therefore remained connected to the grid through the interim arrangement of LILO of existing line. It was clarified during the time of approval that with the interim arrangement, power can be transferred only through STOA based on the margin available, and LTOA would be effective only after completion of their dedicated transmission line as well as associated planned evacuation system. It may be mentioned that even today, developer of Sterlite Generation Power Stn. have not completed the dedicated line upto Jharsuguda Pooling Station in their scope and the generation project is still connected to the grid through interim arrangement only. Due to this, the evacuation of power from Sterlite Generation Plant is continuously taking place under STOA, depending upon the available transmission margin. It may be mentioned that the interim arrangement has indeed benefitted the Indian Grid, as considerable quantum of power under short term, which would have otherwise remained stranded, could be transferred and facilitated in meeting the load demand."

4.5 On PGCIL's reply, Audit in their vetted remarks stated as follows:

" PGCIL has clarified that since the project developer could not complete the dedicated system from the generation projects to the nearest identified pooling substations for a long time, they remained connected to the grid through the interim LILO of existing line. The provisions/technical standards under which such dispensation was allowed to the developers (Sterlite and GMR) was not given in the reply. However, PGCIL assured that the developers are transferring power only through STOA based on margin available. Since power was being evacuated through interim arrangement since October 2010 under STOA, PGCIL was losing revenue on account of LTA charges after commissioning the pooling station. PGCIL further justified the interim LILO on the ground that it has actually benefitted the Indian Grid, since considerable quantum of power which could have otherwise remained stranded could be transferred and facilitated in meeting the load demand. It is also a fact that the generators were granted ‘access’ to the Grid, without fulfilling their obligation of building the dedicated line from the plant to the pooling station. Further such evacuation arrangements without ensuring adequacy of transmission system was causing congestion in Chhattisgarh and adjoining areas, as stated in para 3.4.1."

When asked regarding the revenue loss due to postponement of Long Term Power Access Agreements and what steps are being taken up by PGCIL to ensure that

developers fulfill their obligations of signing Long Term Power Access Agreements, PGCIL in their reply clarified as follows :-

> "The Company is not causing any revenue loss due to deferment of dedicated line by Sterlite as the line is under its own scope of work. So far as sharing of revenue for the common scheme for Orissa corridor, of which Sterlite is one of the generation projects, is concerned, it may be mentioned that as the corridor is nearing its completion, letter for payment of transmission charges and payment security mechanism like opening of LC etc has already been forwarded to M/s Sterlite. The matter has also been referred to CERC for cancellation of long term access with applicable relinquishment charges and encashment of construction Bank Guarantee in case the financial obligations are not fulfilled."

(ii) <u>Targets and Achievements</u>

4.6 In para 4.1 of the Audit Report, it has been observed that against the XI Plan target of 17000 MW, PGCIL achieved 13900 MW of inter-regional capacity leaving a shortfall of 3100 MW in achievement. MOP attributed shortfall to delay in forest clearance of Ranchi-WR pooling point 765 kV single circuit line.

4.7 When enquired about the initiatives taken to avoid delays in submission of proposals for forest clearance, PGCIL in their reply, stated as follows:

> "Forest Clearance under the Forest (Conservation) Act, 1980 has always been a lengthy process due to involvement of different positions starting from Range Officer to Secretary (forest) at State level and from Asst. Inspector General (AIG) of Forest to Minister of Environment and Forests at Govt. of India level. As a result of persuasion by PGCIL and intervention by the Ministry of Power(MoP), Ministry of Environment Forest &Climate Change (MoEF&CC) has now simplified / de-centralised the process of forest clearance. Now MoEF&CC has given power to Regional offices of MoEF&CC for processing and approval of forest proposal for transmission line. PGCIL has also initiated many in-house measures to expedite submission of forest proposal to further reduce the time frame such measures are:
>
> 1. Submission of forest clearance schedule with major milestones including detailed survey and submission of proposal made mandatory for investment approval process.
>
> 2. Submission of forest proposal within 6 months from investment approval.

3. Submission of forest proposal within stipulated period made part of internal MOU and linked with performance.

4. Dedicated forest coordinators have been placed in all the regions for monitoring and facilitating early submission, processing and approval of the forest proposals.

Apart from this, PGCIL has taken up forest clearance issues with MoEF&CC through Ministry of Power for relaxation in rules for expediting the forest clearance."

4.8 Taking note of the initiatives taken by PGCIL to expedite the submission of forest proposals, the Audit in their vetted remark further reiterated that there may be a need for PGCIL to monitor the situation closely to assess the effectiveness of the major initiatives in terms of minimizing delays in obtaining forest clearance.

4.9 When asked about the basic issues causing delay in forest clearances to PGCIL's projects and whether the MoEFCC have responded and given any assurance to MOP/PGCIL regarding expediting the forest clearances, the Ministry in their reply stated as follows:

"Forest Clearance under the Forest (Conservation) Act, 1980 has always been a long process due to involvement of different position starting from Range Officer to Secretary (Forest) at State Level and from Asstt. Inspector General (AIG) of Forests to Minister of Environment & Forests at Govt. of India level. Hence in the interest of projects and country to develop National power grid for meeting the ever increasing requirement of electricity, PGCIL has taken up following major issues with MoEFCC through MoP for relaxation/modification:

1. Permission to start work after Stage-I or in-principle approval

The forest clearance under Forest (Conservation) Act, 1980 is accorded by MoEFCC in two stages i.e. Stage-I or in-principle approval and Stage-II or final approval. The Stage-I approval is conditional approval subject to fulfillment of stipulated conditions/requirements. Stage-II or Final approval is accorded after receiving the report from concerned State Government confirming compliance of stipulated conditions by user agency. However, Work in forest area can only be undertaken after obtaining Stage-II or final approval from MoEFCC. PGCIL has taken up the matter with MoEFCC through MoP for granting permission to start work in forest area after Stage-I or in-principle

approval for agencies like PGCIL being a Government entity on the basis of undertaking that it will comply with all stipulated conditions. Such relaxation shall save 4-12 months of time generally required for final clearance. MoEFCC has considered this suggestion and issued guidelines allowing issuance of working permission for linear projects by State Govt after Stage-I approval and deposition of all money as specified in the in-principle approval.

2. Enhancement in delegation of powers of Regional Offices of MoEFCC

Regional offices of MoEFCC (RMoEFCC) were vested with approving power of forest proposals up to 5 ha and processing and approving power for proposals involving more than 5 ha. & up to 40 ha. after approval of Hon'ble MEF. In spite of adopting all possible measures, the involvement of forest area invariably goes beyond 5 ha. because the calculations are done on complete Right of Way (ROW). Moreover, due to location of generating projects most of which are located at pit head basis generally in and around some forest area, for evacuation of power, transmission line has to traverse through forest area. PGCIL had taken up the matter with MoEFCC through MoP for enhancement of processing and approving power of RMoEFCC as it will go a long way in solving the problem of forest clearance and will also be able to reduce considerable amount of time and money. MoEFCC has considered this suggestion and revised rules vide gazette notification dated 10.10.2014 providing absolute powers to RMoEFCC for processing and approval of forest proposals of linear projects including transmission lines irrespective of forest area involvement.

3. Exemption /Relaxation under Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 for transmission Projects

MoEF vide circular dated 03.08.09 made written consent/NOC of Gram Sabha compulsory under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 (FRA, 2006) for all proposals involving diversion of forest land under the Forest (Conservation) Act, 1980.Transmission projects apart from being a linear project are drawn substantially high above the ground avoiding possible encounter with such sensitive areas as well as habitations. The projects are generally running hundreds of km and at times crossing many States. The

number of Gram Sabhas involved in such long lines will also be substantial and obtaining their consent under FRA and linking the same with forest proposal is likely to delay the forest clearance process significantly. PGCIL had taken up the matter with MoEF through MoP for delinking FRA requirement from forest clearance process to smoothen/expediting clearance process to facilitate timely implementation of power transmission projects matching the power generation / requirements as well as considering negligible impact on forest / environment and its habitant including the tribal people by transmission projects. MoEFCC after detailed deliberation including discussion in Forest Advisory Committee (FAC) issued circular dated 05.02.13 exempting linear projects from obtaining consent of Gram Sabha and reiterated it for linear projects vide circular dated 15.1.14. After the above relaxation/change in guidelines and online submission, the process of forest clearance has smoothened a lot. However, in spite of MoEFCC issuing circular exempting linear projects from obtaining such NOC under FRA, 2006. The Ministry of Tribal Affairs (MoTA) vide its letter dt. 07.03.14 contested the relaxation provided to linear projects by MoEF and asked for strict compliance of FRA provisions including Gram Sabha's NOCs citing Supreme Court order. In view of uncertainty and resultant delay, MoP suggested MoEFCC to consider delinking FRA requirement from forest clearance as FRA implementation is the responsibility of Ministry of Tribal Affairs and is being implemented by the State govt. through Sub-divisional and District level committee as provided in the act without any linkage with forest clearance. This is still a major issue which is still taking more time, ranging from 90 to >300 days"

(iii) MOU Targets

4.10 Audit in their examination, observed that targets in Memorandum of Understanding (MOU) for inter-regional capacity augmentation by PGCIL for 2007-12 were fixed at 10100 MW which were short of the corresponding XI plan target by 6900 MW. Further, for two years (2007-08 and 2010-11) MoU targets were fixed at 'Nil'. Audit has also observed the dilution of weightage in respect of important non-financial parameters related to project implementation and network availability during 2011-13 in the MoU signed by PGCIL.

4.11 In view of this, the Ministry was asked to specify as to why they did not align year wise MoU targets with Five Year Plan targets. In response to the query, the Ministry in their reply, stated as follows:

i) "MoU targets are set out on annual basis, just before commencement of a financial year. Department of Public Enterprises (DPE) has constituted Adhoc Task Force (ATF) which comprises experts from domain Industry and Academia and the ATF in consultation with representatives from Ministry of Statistics, Planning & Implementation (MoSPI), Planning Commission set the targets and MoU is signed by the due date, prior to start of the forthcoming financial year.

At the time of setting target for MoU, the inter-regional lines that were to be targeted for commissioning in that particular year, depending upon readiness of the line vis-à-vis of generation project/ system requirement, were kept in the MoU targets and the MoU is generally aligned with the Five Year Plan.
Against the XI Plan target of 17,000 MW, MoU targets sums up to 10,100 MW. The 6,900 MW elements were not included in the annual MoU targets due to below mentioned reasons, although these projects have been under execution by PGCIL during the XI Plan:

(i) Patna-Balia 400 kV D/C (Quad) (800 MW), Biharshariff – Balia 400 kV D/C (Quad) (1600 MW**)** were completed in 2007-08. Since, these lines were targeted for completion by March 2007 (X Plan, in F.Yr. 2006-07), the same were not proposed for inclusion in the 2007-08 MoU target. However, the completion of line was marginally delayed and completed in April 2007 & August 2007 respectively.

(ii) Upgradation of HVDC terminals (1000 MW) - HVDC terminals, Talcher-Kolar bipole and Sasaram additional capacity did not involve any construction of lines, therefore, they were not included in MoUs."

4.12 The Audit in their vetted remarks, stated that since there was a shortfall of 6900 MW in achieving XI plan target for inter-regional capacity addition, aligning XI Plan targets in terms of year-wise MoU targets would have helped PGCIL in ensuring effective monitoring of achievement of XI plan targets.

4.13 Para 4.2(ii) of the Audit Report reveals the dilution of some important non-financial MoU parameters related to project implementation and network availability. When asked as to how MOP plans to ensure that important MOU parameters are not diluted, the Ministry in their reply, stated as follows:

"MoU guidelines of DPE stipulates parameters & range of weightages on financial & non-financial category on yearly basis and

an Adhoc Task Force (ATF) of DPE finalises the allocation of weightages. As per the DPE guidelines 50% weightage has been mandatory for financial parameters and out of balance 50% weightage, it had been required to include mandatory parameters of research & development, corporate social responsibility, sustainable development, corporate governance, human resource management, compliance to DPE guidelines etc. with weightages of upto 5% each.Therefore, in line with the MoU guidelines issued by DPE every year, parameters and weightages were proposed for the MoUs, which are reviewed and deliberated upon at various levels in MoP before being forwarded to DPE. Thereafter, during ATF meetings wherein MoP also joins in MoU finalization process alongwith representatives from Planning Commission, MoSPI, CEA etc.., the projected parameters & weightages are reviewed, deliberated in details and finalized. It may be seen from the above that MoU parameters and the weightages allocation to respective parameter is done in accordance with the DPE guidelines, and these are minutely reviewed and deliberated before finalizing and signing. This leaves no possibility of MoU parameters dilution."

4.14 The Audit in their vetted remarks, however, stated that there was dilution of weightage in respect of the following important non-financial parameters related to project implementation and network availability over the years in the MoU signed by PGCIL as given in Table below: (dilution depicted in bold italics):

Details of MoU parameters where weightage was decreased

Criteria	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**
Customer satisfaction (no. of trippings)	4	4	*2*	*2*	*1*	*0.5*
Availability of transmission system	13	13	*13*	*7*	*6*	*5*
Project implementation	20	20	19	*20*	*10*	*8*

4.15 Audit has noted that Works and Procurement Policy and Procedures of PGCIL (WPPP) limits the exercise of detailed survey of transmission line route to forest stretches only, contrary to advice of Working Group on Power constituted by Planning Commission which suggested that detailed survey should be carried out before start of procurement process. In view of this, PGCIL was asked to clarify as to why WPPP limited the detailed survey of transmission line route to forest stretches only instead of the entire transmission line route. PGCIL in their reply, stated as follows:

"The detailed survey of transmission line route is an activity requiring considerable time which varies depending upon the length of the line. Accordingly, walkover survey is being conducted to identify the BOQ & other details/information for preparation of feasibility report of the project. The detailed survey in forest stretch, if any, is generally taken up as a parallel activity to primarily expedite submission of forest clearance proposal for the project for obtaining timely clearance from concerned authorities. In case, the exercise of detailed survey of the entire transmission line route is taken up before start of procurement process, it shall considerably delay the activities of procurement process which will jeopardise the implementation and result in mismatch with the commissioning schedules. Further, it is to be mentioned that transmission lines traverse through hundreds of kms of geographical stretches across the country (crossing hills, snow bound areas, agricultural plains etc.) and encounter river crossings, road & railway crossings, habited areas near cities & villages, industrial areas etc. The time required for constructing the lines is generally around 24 to 36 months, depending on the line length and voltage level, after placement of Award. During that period, there could be lot of changes due to fast pace of development of infrastructure & other developments which result in changes in the areas from where lines transverse. This necessitates diversion of line route from the original route envisaged. Further, instances of deliberate encroachment upon knowing the transmission line corridor are also witnessed. Therefore, it may be appreciated that in case the award is placed after detailed survey, the time lag between detailed survey and actual execution will further increase and thus may lead to greater probability of RoW problems. Accordingly, it is desirable that the time lag between detailed survey & actual execution is minimized in order to avoid the ROW problem during execution. However, the recommendation of the Audit for conducting detailed survey of forest stretches before investment approval of the project is being explored".

4.16 The Audit in their vetted remarks, stated as follows:

"PGCIL has explained the reasons for not taking up detailed survey before procurement. PGCIL has however agreed to explore the possibility of conducting detailed survey of forest stretches before investment approval of the project. As per para 5.1 of the Audit Report, in test checked 20 projects, actual length of 17 transmission lines in 12 projects had variations as compared to FR line length. In 11 transmission lines, actual length was less while in six transmission lines, the actual executed length was more. The difference in executed length as compared to FR length in four cases was less than 10 *per cent*, in four cases between 10 to 20 *per cent*, in four cases between

20 to 30 *per cent* and in five cases it was more than 30 *per cent*. Hence there is a need for PGCIL to align the practice with the advice of Working Group on Power which suggested that detailed survey should be carried out before start of the procurement process."

(iv) Delay in Commissioning of Projects

4.17 As per para 6.3 of the Audit Report, the Ministry have claimed that there has been no incidence of bottling up of generation due to delay in transmission projects for transfer of power under long term access. When asked as to how PGCIL justifies its claims in this regard, PGCIL in their reply, stated that the specific transmission system is planned for generation projects who apply for long term access taking into consideration the extent planning criteria in consultation and agreement in standing committee meetings with CEA and state utilities. The system so planned is then taken up for implementation under Tariff based competitive bidding as per time line specified in CERC regulation. Therefore when transmission system is developed for the specific generator, its evacuation is taken care, provided LTA is applied by the IPPs as per required time line. According to PGCIL, the congestion is only experienced during short-term transaction and in terms of energy, the total quantum of energy that could not be scheduled through day-ahead market of Power Exchange during 2013-14 was about 5.6BU (0.6%) as against annual generation of about 950BU. The same figure has reduced to 3.1BU (0.3%) as against the annual generation of 1048BU.

4.18 In this regard, the Audit in their vetted remarks has stated that there was delay in commissioning of transmission system[†] associated with generation projects, in the State of Odisha due to which there was congestion in evacuation of power in the State. As an illustration, it was noticed that seven generating projects[‡] in Odisha involving installed capacity of 10090 MW of Independent Power Producers (IPPs) were scheduled for commissioning between February 2010 and December 2013. However, BOD of PGCIL approved the transmission system associated with these generating projects only in December 2010 with scheduled completion by December 2013 *i.e.* coinciding with the commissioning of the last project. According to Audit, the delay on the part of PGCIL to plan the transmission system resulted in congestion in evacuation of power from four units of 600 MW each of Sterlite project commissioned between October 2010 and April 2012[§]. Audit also further pointed out that one unit (350 MW) of Kamalanga TPP of M/s GMR was commissioned in March 2013 while execution of the associated transmission

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[†] ***Transmission Phase-I generation projects in Odisha Part B***

[‡] ***Sterlite, GMR, Nav Bharat, Monnet, Jindal, Lanco Babandh, and Ind Bharat***

[§] ***14 October 2010, 29 December 2010, 16 August 2011 and 25 April 2012.***

system by PGCIL was still in progress (April 2014). As explained above, there was congestion in evacuation of long term power transfer transactions also.

In this regard Ministry of Power was asked as to how the Ministry justify the claim of PGCIL that the congestion in the transmission system is only in short term transaction where as Audit has cited the delay in commissioning at transmission system associated with generation projects in the State of Odisha, and claimed that there was congestion in evacuation of long term power transaction also. The Ministry of Power in their reply stated as under :-

> "While transmission system is built for long term transactions, the short term transactions are allowed through open access only on the residual margins available in the transmission system as per present regulations. Congestion means a situation where the demand for transmission capacity exceeds the available transfer capability. Further, congestion is occurring mainly as cheaper power is replacing costlier generating resources which are un-despatched mainly due to higher fuel cost. Moreover, the fact that congestion is taking place and there is some generation that is not getting dispatched, does not necessarily imply that demand/load is not being met. The generators of Odisha did not apply for long term Access in time. As per CERC regulations, 3-4 years is required for planning and construction of transmission lines. Thus, congestion in execution of long term power in Odisha was basically due to delay in LTA application by the generators to PGCIL. However, in spite of this, all efforts were made to accommodate them in the existing network to the extent possible."

(v) Non Adjustment of STOA charges from Project Cost

4.19 As per Audit Report, between 2004-05 and 2012-13, PGCIL received Rs. 906.49 crore as part of Short term open access (STOA) charges but did not maintain project-wise details of transmission schemes where these STOA charges were utilized. In view of this, PGCIL was asked to clarify whether the CERC had prescribed a methodology to ensure that Short term open access (STOA) charges collected by PGCIL are utilised in building new transmission systems. In response to the query, PGCIL submitted as follows:

> "It is submitted that PGCIL, as CTU, was permitted to retain 25% (12.5% in case of inter-regional links) of the STOA charges for taking care of new transmission development in the country, in the CERC provisions from 2004 to 2013 (Upto Sep'13). It is also mentioned that CERC had considered the views of all the concerned entities including SEBs, generators and other related authorities in the matter and the

subject CERC Open Access Regulations did not have any provision for adjusting the STOA charges against the project cost of new Projects. As per the CERC mandate, PGCIL had been utilising the STOA charges in core activities of building new transmission system and for discharging CTU activities.It is also mentioned that having experience and expertise in the line of transmission including technical knowhow and intellectual assets possessed, PGCIL also carries out certain activities for the development of the sector as a whole which are not monetized such as :-

Providing services :

- Professional services for Planning of Transmission system in line with the National Electricity Policy,
- Professional analysis for determination of ATC/TTC declaration,
- Communication planning, protection audit
- Professional inputs for competitive Bidding process/document preparation etc.
- Coordination & support to State Transmission Utilities (STUs)
- Providing advanced PSS/E software to State utilities
- Organizing training programs for personnel of State utilities
- Coordination with State utilities etc.

Further, CERC notified CERC (Sharing of Inter-State Transmission charges and Losses) Regulations, 2010 which came into effect w.e.f. 01.07.2011. As per the Regulation, PGCIL, as Central Transmission Utility, was entrusted with the responsibility of billing, collection and disbursement of Inter-State transmission charges to various Designated ISTS Customers (DICs-presently 76 in no.) on behalf of all the ISTS Licensees in the country (including PGCIL, presently 19 in no.). PGCIL provides the said services without any claim of charges, being CTU, for development of the sector. " However, the Hon'ble Commission, vide its Amendment to the Open Access Regulations issued in Sep'2013, directed CTU to disburse 100 % of STOA charges to the DICs and CTU has been accordingly complying with the same since 11.09.2013."

4.20 In this regard, the Audit, in the vetted remarks, submitted as follows:

"PGCIL has stated that CERC Open Access Regulations did not have any provision for adjusting the STOA charges against the project cost

of new projects. In this regard, Audit found that as per CERC (Open Access in Inter-state Transmission) Regulations, 2004 read with CERC order dated 30 January 2004, PGCIL was allowed to retain 25 *per cent* and 12.5 *per cent* of STOA charges collected in intra regional and inter regional transmission systems respectively and the balance was to be adjusted towards reduction in the transmission charges payable by Long-term customers. While allowing retention of STOA charges, CERC in its order dated 30 January 2004 stated that, "...25% of the revenue received from the short-term customers shall be retained by the transmission licensee, which is expected to be utilised in the core activity of building new transmission system."CERC amended (September 2013) the relevant Regulation relating to collection and disbursement of transmission charges (*i.e*. 75:25 and 87.5:12.5 ratios for intra-regional and inter-regional transmission system usage respectively) and provided that STOA charges had to be returned by CTU (PGCIL) to long term customers through adjustment of monthly transmission charges payable by them. PGCIL received `906.49 crore between 2004-05 and 2012-13 on account of the above mentioned 25 *per cent* (12.5 *per cent* in case of inter regional) component of STOA charges but did not maintain project-wise details of inter-regional/intra regional transmission schemes where such STOA charges were utilised. This meant that PGCIL had used this as a revenue stream for itself instead of using it for funding new transmission systems/schemes, which would have resulted in reduction of tariff of such schemes to be recovered from customers. The reply that the STOA charges were utilized in core activities of building new transmission system is to be viewed against the fact that details of projects wherein such charges were utilized were not available with PGCIL. In the absence of project-wise accounting/disclosure while filing tariff petition for new transmission systems, the condition on which PGCIL was allowed to retain the charges *i.e.* utilization of the funds in building new transmission systems, remained unfulfilled. As regards the claim that the charges were also utilised for discharging CTU activities, the stand is not in line with CERC Order dated 30 January 2004 which envisaged utilisation of charges in the core activity of 'building new transmission system'. Thus, the conditions stipulated by CERC for retention of STOA charges were not followed by PGCIL which resulted in denial of the benefit of reduction in the cost of new transmission projects to the extent of Rs.906.49 crore between 2004-05 and 2012-13.Such retention of STOA charges by PGCIL has been

withdrawn by CERC with effect from September 2013. However, the amount recovered earlier, as mentioned above remained unadjusted".

(vi) Transmission and Distribution Losses

4.21 The issue of transmission and distribution losses also prominently drew attention of the Committee during the examination of the Performance Audit report. While explaining the difference between transmission and distribution losses during the evidence before the Committee on 28 September 2015, representatives of PGCIL claimed that transmission losses are way below as compared to distribution losses. When asked as to how PGCIL justifies its claim that transmission losses are way below as compared to distribution losses, in a subsequent written reply, the Committee have been apprised as under:

"Energy losses occur in the process of supplying electricity to consumers due to technical and commercial losses. The technical losses are due to energy dissipated in the conductors and equipment used for transmission, transformation, sub- transmission and distribution of power. Transmission System constitutes High Voltage System i.e. 132kV & above, whereas Distribution System constitutes Lower Voltage System i.e. 66kV & below. Transmission Losses are technical losses in the Transmission System. Transmission losses in general remain in the range of 3-4 % in an integrated transmission system. Higher the transmission voltage, lower will the transmission losses. Transmission losses are at optimum level in line with the international standards. Distribution Losses are sum of technical & commercial losses (due to non-metering, defective meters, and errors in meter reading, non-billing, non-realization, electricity theft etc.)."

4.22 The Average Region-wise Inter-State Transmission System or ISTS loss (in %) is as follows:

Year Region	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**
North	3.60	3.55	3.37	2.86	3.76
West	4.64	3.61	3.68	3.60	3.78
South	5.36	4.86	4.35	3.72	3.57
East	2.43	2.69	2.73	2.27	2.27
North-East	3.29	3.91	3.43	2.86	3.48
All India (Avg.)	**3.86**	**3.72**	**3.51**	**3.06**	**3.37**

4.23 The All India Transmission and Distribution (T&D) Losses (in %) as per CEA Report is as follows:

Year	T & D Losses (in %)
2010-11	23.97
2011-12	23.65
2012-13	23.04
2013-14	21.46*
2014-15	20.83@

* Provisional; @ Estimated

Chapter-5

Other issues

(i) Land Acquisition and Compensation

5.1 Though, the issue was not examined by the C&AG in the present audit report, compensation to the affected farmers/ land owners because of transmission infrastructure development activities of PGCIL, being an important issue, was deliberated upon by the Committee on Public Undertakings during the course of examination of the subject. The Committee are aware that affected farmers/ land owners have been raising their concerns over the inadequate compensation. There have been instances where no compensation has been given to affected farmers/ land owners. In view of this, PGCIL was enquired by the Committee to offer their comments on the issue of compensation to the affected farmers/ land owners owing to transmission and infrastructure development activities of PGCIL. In response to the query, PGCIL in their reply, stated as follows:

- "PGCIL is implementing transmission projects in the country in accordance with the provisions of the Electricity Act, 2003. The provisions stipulated that in section 67-68 of the said act read in conjunction with section 10 & 16 of the "Indian Telegraph Act, 1885" governs the compensation. vide MOP's Gazette Notification dated 24.12.03 under section 164 of the Electricity Act, PGCIL executes the work.
- The licensees vested with powers of Telegraph Authority under section 164 are governed by the provisions of Indian Telegraph Act (Section 10 -16) for compensation which stipulates only damages are to be compensated without acquisition of land which are assessed/reviewed by revenue authorities.
- Prior consent of land owners are also not applicable as per rule 3 subrule-4 of the said notification as PGCIL executes the work with the powers of Telegraph Authority under section 164 of the Electricity Act vide Gazette Notification dated 24.12.03 .

5.2 As brought out above the present provisions of applicable act/rules prohibits acquisition of land for towers and only user rights with respect of laying and maintenance of electric lines for the purpose of transmission of electricity are granted. The provisions in The Electricity Act, 2003 and Indian Telegraph Act, 1885 regarding compensation for laying of transmission lines are as follows:

1. The Electricity Act, 2003, Part-VIII, Section 67 & 68
   Section 67 (3-5):
   Section 67 (3)- A licensee shall, in exercise of any of the powers conferred by or under this section and the rules made thereunder, cause as little damage, detriment and inconvenience as may be, and shall make full compensation for any damage,

detriment or inconvenience caused by him or by any one employed by him.

(4) Where any difference or dispute [including amount of compensation under sub-section (3)] arises under this section, the matter shall be determined by the Appropriate Commission.

(5) The Appropriate Commission, while determining any difference or dispute arising under this section in addition to any compensation under sub-section (3), may impose a penalty not exceeding the amount of compensation payable under that sub-section.

Section 68 (5 & 6):

(5) Where any tree standing or lying near an overhead line or where any structure or other object which has been placed or has fallen near an overhead line subsequent to the placing of such line, interrupts or interferes with, or is likely to interrupt or interfere with, the conveyance or transmission of electricity or to interrupt or interfere with, the conveyance or transmission of electricity or the accessibility of any works, an Executive Magistrate or authority specified by the Appropriate Government may, on the application of the licensee, cause the tree, structure or object to be removed or otherwise dealt with as he or it thinks fit.

(6) When disposing of an application under sub-section (5), an Executive Magistrate or authority specified under that sub-section shall, in the case of any tree in existence before the placing of the overhead line, award to the person interested in the tree such compensation as he thinks reasonable, and such person may recover the same from the licensee.

Explanation. - For purposes of this section, the expression tree shall be deemed to include any shrub, hedge, jungle growth or other plant.

2. The Indian Telegraph Act, 1885, Part-III, Section 10 (“C”):

Section 10 – The Telegraph Authority may, from time to time, place and maintain a telegraph line under, over, along, or across, and posts in or upon any immovable property, Provided that –

a) the Telegraph Authority shall not exercise the powers conferred by this section except for the purposes of a telegraph

established or maintained by the [Central Government], or to be so established or maintained;

b) the [Central Government] shall not acquire any right other than that of user only in the property under, over, along, across in or upon which the Telegraph Authority places any telegraph line or post; and

c) except as hereinafter provided, the Telegraph Authority shall not exercise those powers in respect of any property vested in or under the control or management of any local authority, without the permission of that authority; and

d) in the exercise of the powers conferred by this section, the Telegraph Authority shall do as little damage as possible, and, when it has exercised those powers in respect of any property other than that referred to in clause (c), shall pay full compensation to all persons interested for any damage sustained by them by reason of the exercise of those powers.

5.3 The local authorities / District Magistrates have been provided with absolute powers to fix the compensation and even adjudicate during the dispute for compensation under section 16 of Indian Telegraph Act. As the damages have not been defined in the said act, PGCIL, used to pay compensation for the damages caused to crops/ trees and structures. However, the land owners/farmers are now demanding the cost of land for tower base as well as cost of land value diminution in the corridor area due to laying of transmission line on their land. In many cases DC/DM have ordered payment of enhanced compensation under section 16 (1) of Indian Telegraph Act and same has been paid to land owner/farmers by PGCIL.

5.4 The issue of demand of such enhanced compensation was brought to the notice of the Ministry of Power also and the issue was also discussed in the Power Minister meeting in Guwahati wherein Hon'ble Minister of Power I/C constituted a High Power Committee for looking into the issue of Right of way (RoW) compensation and to suggest a uniform policy/rules in this regard. The Committee after detailed deliberation submitted their recommendations. Based on the recommendations of the above Committee, the Ministry of Power has issued "Guidelines for payment of compensation towards damages in regard to Right of Way for Transmission lines" on 15th October, 2015. These guidelines shall be applicable for determining the compensation towards damages as stipulated in section 67 and 68 of the Electricity Act, 2003 read with section 10 and 16 of Indian Telegraph Act, 1885, which will be in addition to the compensation towards normal crop and tree damages. This compensation will be payable only for transmission lines supported by a tower base of 66 kV and above and not for sub-transmission and distribution lines below 66 kV.

5.5 PGCIL is going to adopt these guidelines. The major points of the Guidelines are mentioned below:

> 1. "Compensation @85% of land value as determined by District Magistrate or any other authority based on circle rate/Guideline value/StampAct rates for tower base area (between four legs) impacted severely due to installation of tower/pylon structure
>
> 2. Compensation towards diminution of land value in the width of Right of Way (RoW) corridor due to laying of transmission line and imposing certain restriction would be decided by the States as per categorization/type of land in different places of States, subject to a maximum of 15% of land value as determined based on Circle rate/Guideline value/Stamp Act rates.
>
> 3. In areas where lands owners have been offered /accepted alternate mode of compensation by concerned corporation/Municipality under Transfer Development Rights (TDR) policy of State, the licensee/Utility shall deposit compensation amount as per (i) & (ii) above with the concerned Corporation/Municipality/Local Body of the State Government
>
> 4. For this purpose , the width of RoW corridor shall not be more than that prescribed."

(ii) <u>Health Hazards of Towers and Transmission lines</u>

5.6 Another issue flagged by the Committee during their deliberations was that most of the farmers/landowners have apprehensions about exposure to the high tension towers and transmission lines, particularly during stormy weather which may cause serious health hazards.

5.7 When enquired about the measures taken up by PGCIL to ensure the safety of people exposed to the high tension towers and transmission lines, PGCIL in their reply, submitted as follows:

> "As per National / International Standards, adequate ground / electrical clearances and protections such as earthing, have been built in PGCIL Transmission Lines so that normal activities can be carried out by the farmers / landowners without any adverse effect on their lives / health. Transmission line high voltage conductors are stung at a suitable height so that required minimum electrical clearance with respect to ground & buildings etc. as stipulated under Indian Electricity Rules and CEA's regulations on Safety Requirements, are maintained. At the stipulated heights of conductors, the Electric and Magnetic Fields (EMF) remain within limits as per International practices. Various

studies carried out in this field infer that there is no conclusive evidence that the low frequency EMF originated from the high voltage transmission line is a cause for health effects in humans. PGCIL ensures that transmission lines are designed & constructed in such a manner that all the statutory regulations are strictly followed. The required minimum electrical clearances with respect to ground & building etc. are maintained so as to keep the electric and magnetic fields within the specified limits. This ensures the safety of the people exposed to the high tension towers and transmission lines. Further, following measures have also been built in PGCIL Transmission Lines to ensure safety of people living / working / moving in the vicinity of high tension towers and transmission lines:

a) Caution Boards in English or Hindi & local language is displayed in the Towers to warn the people in the vicinity of the Towers, as required by the statutory laws / standards.

b) Anti-climbing Devices are fixed on the Towers to prevent people from climbing the Towers inadvertently.

c) Protections have been built in the PGCIL Stations connecting the Transmission Lines to ensure that the charged Line / Circuit automatically trips in case of any fault anywhere in the Transmission Lines.

d) Adequate electrical clearance from the live conductors to the ground, as laid down by the safety requirements under Indian Electricity Act, Rules & Regulations have been ensured.

e) All high tension towers have been earthed to ensure that any fault current is discharged to the ground immediately.

f) All EHV transmission lines have very fast acting protection system which clears the fault within milliseconds as per the guidelines of CEA. Fault is cleared much earlier than the time taken by the conductor to fall on ground or tower collapse during stormy weather."

5.8 When asked about the safety standards, such as maintaining the desired level of ground clearance while laying transmission lines etc., being followed by PGCIL to ensure the safety of the people having exposure to the high tension towers and transmission lines, the Committee have been apprised as under:

"Indian Electricity Rules and CEA's Regulations on Safety Requirements specify the minimum electrical clearances to be maintained with respect to ground and Buildings etc. Also, the electric

> and magnetic fields limits are specified under ICNIRP (International Commission on Non-Ionizing Radiation Protection). It may be mentioned that the guidelines regarding limiting exposure to electric & magnetic fields have been prepared by ICNIRP after assessment of studies on direct & indirect effects, review of current knowledge & scientific literature and examining results of various epidemiological & biological studies /data (including WHO studies)."

5.9 PGCIL in their reply have further stated that during various activities at site like survey and construction, site engineers interact with people and try to allay their misconceptions and create awareness about the high tension towers and transmission lines.

PART II

Observations/Recommendation:

National Electricity Grid

1. **The Committee note with appreciation that PGCIL has achieved a significant milestone in the process of formation of National Grid through integration of all five regions on 31st December, 2013 thereby reaching the stage of one nation, one grid and one frequency. This has made India the only country in the world which has developed a single synchronous grid for the entire country's power systems which, in itself, is amongst the third largest in the world. However, though in technical terms, the integration of all five regions has been done, the development of electricity Grid is an ongoing process and hence capacity augmentation of the grid is being done continuously. To achieve the XIIth Plan target of 72250 MW inter regional capacity by 2016-17, PGCIL is still required to add about 20511 MW more in less than one and half year's period from now. The Committee note from the latest response of the Ministry of Power that they are very confident of achieving the target of 72250 MW by the end of XIIth Plan. While the Committee desire to be apprised of the hitherto progress in capacity augmentation of the National Grid, they feel that the Grid should also be capable of meeting deficit in a particular region like the Southern Region from a surplus region like Western or Eastern Region, as observed by the C&AG in their Performance Audit Report. Only then the actual purpose of having a National Grid could be considered to be accomplished. The Committee, therefore, would like the Ministry of**

Power to submit a note to them providing the overall capacity as well as the capability and performance of the National Grid on this account in the last three years. Also as the MoP has envisaged 24x7 power supply in the country by the year 2019, the Committee desire to be apprised of the roadmap, if any, made for achieving the target, which includes expenditure, infrastructure and other requirements at the Central level, State level and private sector level too.

Renewable-based Capacity of National Grid

2. In order to meet the huge energy demand in the country, the Committee are of the opinion that the electricity production in the country will have to be increased manifold. This requires greater capacity expansion of the National Electricity Grid in order to swiftly evacuate the electricity generated through a diverse set of sources, apart from fossil fuels. Also with the pressing need for a low carbon footprint of economic growth to tackle climate change, it is expected that in future energy mix of India would witness greater diversification in the form of growing share of renewables based energy. Keeping it in view, the Committee feel that PGCIL must give due importance to the inclusion of renewable energy based electricity generation projects into the National Electricity Grid. However, it is a matter of concern that at present, the renewable based capacity of the Grid is only 36 GW against the total 279 GW of installed capacity. Also out of the 36 GW renewable capacity, a major share i.e. 23 GW is wind-based and solar component is just 4 GW. The Committee feel that since India has a vast eco-friendly solar energy potential and the Government is already

running the National Solar Mission to achieve grid parity by 2022 as well as parity with coal-based thermal power by 2030, CPSUs in the energy sector like PGCIL should participate more in the same, particularly when the CPSUs have already been asked by the Government to set up Grid-connected Solar PV power projects under the said Mission. The Committee desire to be apprised if PGCIL has participated in the same. They expect that with growing share of renewable electricity in the energy mix of the country, PGCIL will correspondingly endeavour to meet the optimum level of renewable based inter regional Grid capacity. The Committee also hope that the Ministry of Power will extend the necessary policy support to facilitate the initiatives of PGCIL in this regard. They would desire to be furnished with the future plans of PGCIL in the direction of enhancing renewable-based capacity of the National Grid.

Transmission Planning and Coordination

3. The Committee take note of the provisions made under Section 73 of the Electricity Act, 2003 which confers the responsibility of preparing a perspective plan for development of electricity systems to Central Electricity Authority (CEA) in order to provide reliable and affordable electricity for all consumers. CEA fulfills this responsibility in consultation with other stakeholders, viz. Central Transmission Utility, Members of Standing Power Committee, beneficiary States, etc. Accordingly, a National Electricity Plan is prepared in every five year by CEA, keeping in view the broad requirement of transmission system. However, despite such a comprehensive and participatory process of

transmission planning, the objective of affordable and reliable electricity for all consumers is still a distant dream as is evident from transmission congestion, transmission and distribution losses and higher prices being paid by the end user for electricity. The Committee opine that this state of affairs undoubtedly warrants a relook at the present transmission system planning process and framework of coordination among various stakeholders. The Committee, therefore, desire the Ministry of Power to undertake a comprehensive review of the transmission system planning process keeping in view the prevailing anomalies in the Power Sector, constraints being faced by the CPSUs and prospective electricity requirement of the Country. The Committee are of the firm opinion that such an exercise will help the Ministry of Power to plug in the loopholes in the present system and evolve a better roadmap for their future endeavours.

<u>Total Transfer Capability (TTC)</u>

4. During their examination of the issue concerning TTC of the National Grid, the Committee observe that both the Audit and the PGCIL hold completely divergent viewpoints on the matter. The PGCIL does not consider Total Transfer Capability in order to access the capacity augmentation of inter-regional power transfer corridors, while according to Audit, TTC is an important criteria to ensure better appreciation of the ability of transmission network to transfer power and thus in accordance with the 'Procedure for making application for Grant of Medium Term Open Access in Inter State Transmission System' notified by CERC, PGCIL should notify TTC for 4 years i.e.

upto March, 2019. Considering TTC as an important yardstick to evaluate the capacity augmentation of grid, the Audit has also highlighted that during XI plan, against the cumulative transmission capacity of 26050 MW, the total transfer capability was only 11530 MW. However, the PGCIL considers only transmission capacity, which is a fixed parameter, while assessing capacity augmentation in inter-regional grid. According to PGCIL, it is quite difficult to evaluate the capacity augmentation in the inter-regional power corridors on the basis of TTC as it is a variable parameter which gets impacted by various external factors such as absence of firm schedules, delay of transmission elements, lack of conformity regarding upcoming power generation projects, load as well as non-availability of any published international standard on the same. Thus, despite considering TTC an important parameter, PGCIL admitted before the Committee that it was facing constraints with respect to evaluation of capacity augmentation in inter-regional power corridors in terms of TTC. The Committee also note the Audit's observation that as per CERC regulations, PGCIL is required to declare TTC till March, 2019 in March, 2015, but PGCIL has declared TTC only till March, 2016. Taking note of the differing views of Audit and PGCIL, the Committee feel that a final clear view of the Ministry is warranted on whether PGCIL is required to declare TTC for a period of 4 years as per CERC regulations. The Committee, in agreement with audit's observations, are of the view that ideally PGCIL should declare TTC targets as per CERC regulations since without such long term planning it is not possible to grant long term access and medium term open access to Inter-State transmission systems. However, given the constraints, as explained by PGCIL with respect to

declaration of TTC, the Committee feel that these issues need to be addressed with an efficient prospective transmission system planning. The Committee are of the opinion that these constraints, to an extent, are indicative of lacunae in the coordination mechanism related to transmission system planning. The Committee therefore, desire that the Ministry should step in to explore technical as well as administrative solutions to address all the issues in transmission system planning process, in consultation with CEA/CERC, so as to eliminate the scope of uncertainties which may emerge in future. Further, the Committee desire that the progress on TTC issue by the recently constituted National Reliability Council for Electricity (NRCE) may be intimated to them. The Committee feel that without being deterred by the absence of any published international standard on TTC, the Ministry should endeavour to pool in the available technical expertise in the Country and develop TTC parameters for the National Grid. The Committee would also like to be apprised of any augmentation in the current TTC of the National Grid as well as its transmission capacity, particularly after getting assurance from the PGCIL as well as the Ministry of Power during the oral evidences that the constraints faced by the SR in the National Electricity Grid will be addressed shortly.

<u>Regional inequalities in Power Prices</u>

5. With integrated development and operationalisation of Regional Grids, a state has been reached where generation capacity available anywhere in the Country could be transmitted to deficit regions which

has facilitated bringing down price of energy in market from Rs.8-9 per unit to 3-4 per unit. However, the Committee observe that regional inequalities in the prices of power still persist. There are States such as Tamil Nadu, Kerala, Karnataka and Andhra Pradesh which are paying Rs.5.1 to Rs.7.3 per unit as against Market Clearing Price of Rs.3.5 per unit for power procurement whereas State of Chhatisgarh, Odisha, West Bengal and Sikkim are receiving lower prices (Rs.2.8-2.9 per unit against Market Clearing Price of Rs.3.5 per unit). The Committee observe that first of all, these prices hardly seem real as the price paid by the general public for power is much higher than the Market Clearing Price of Rs.3.5 per unit. As regards the wide gap in prices of power in different States, they feel that this problem is partly attributed to the congestion in transmission system. The Committee are of the view that development of more transmission corridors may have impact on reduction of regional inequalities of power prices in short run. However, in view of the fact that there are many factors which contribute to regional inequalities in power prices for instance, the Power Purchase Agreements signed by Discoms, efficiency of utilities, cost of supply of power etc., the Committee are of the considered view that it is primarily the domain and responsibility of the Ministry of Power and as such they need to take a holistic view on the issue and work out a solution to ensure economic exchange of power across various regions connected with the Grid so as to bring down the price of power.

6. Apart from ensuring electricity transfer at cheaper prices across the grid, it is also important to ensure that benefits of the formation of integrated National Electricity Grid, particularity the downfall in prices,

is trickled down to the end user of the power, which, in view of the Committee, is not happening presently. Owing to various anomalies in the power sector such as speculation practices at power exchanges, growing losses of Discoms because of difference between average cost of power supplying and average revenue realization, as admitted by the Secretary(Power) during the oral evidence, the benefits of the formation of National Electricity Grid are not reaching to the end-users and regional inequalities in power prices persist. At the same time, the Committee would like to refer to the issue of cross-subsidies aptly brought out in the National Electricity Policy wherein it is stated that cross-subsidies have increased to unsustainable levels and they hide inefficiencies and losses in operations. The policy further suggests that the existing cross-subsidies for consumers apart from those below poverty line, would need to be reduced progressively and gradually. The Committee, therefore, urge the Ministry of Power to explore the ways to resolve various policy-level issues as well as technical, managerial and coordination related issues which are presently hampering the growth of a robust and dynamic yet affordable power sector.

<u>Grid Disturbance of July 2012: Fixing Accountability</u>

7. The Committee note from the Audit report that the proximate cause for the severe Grid disturbance on 30 & 31 July 2012 involving NR, ER and NER, that resulted in non-serving of 757 Million Units of energy to consumers, was ill-planned shut down of the 400 kv Bina-Gwalior-Agra Trunk Line. Later on the basis of Audit observations as

well as the evidences of the representatives of PGCIL and the Ministry of Power, the Committee gather that multiple factors were found to be responsible for this major Grid disturbance, such as over drawl/underdrawl by power utilities, inadequate response by the State level Dispatch Centres to Regional Load Dispatch Centres as well as the specific reason of over-loading of Bina-Gwalior-Agra trunk line. The Committee are constrained to note that even though three years have passed, investigations to fix accountability of the responsible units/authority/individual remain inconclusive. Even during the evidence of the Ministry of Power, the Committee was not given a satisfactory reply with respect to the issue of fixing accountability of entities/authorities/individuals for not following the relevant regulation/Electricity Act provisions leading to the said Grid failure, despite availability of the High Level Enquiry Committee report on the incident. The Committee strongly feel that to prevent the occurrence of such incidents in future, it is necessary to fix the responsibility of the violators and take action accordingly, It is essential to discourage any further non compliance on the part of various stakeholders. They desire to be apprised of the specific action taken on this particular point.

<u>Role of Personnel manning NLDC & RLDCs</u>

8. The Committee note from the transcript of phone conversations between the NLDC, ERLDC and WRLDC personnel on 29 July, 2012 i.e. a day before the major GD, as given in the audit report that though the impending crisis was being felt yet the situation was handled in an

utterly unprofessional manner. It showed that the personnel manning the dispatch centres were either untrained, lacked requisite competence or had no powers to take appropriate decisions or prevail upon the region violating the grid code to follow the procedure. The Committee feel that the role of personnel in NLDC/RLDCs is like a signaller-cum-train controller who is not only responsible for smooth traffic regulation but also has safety-critical responsibility to manage any contingency, which may affect smooth operation of the area network. Hence, the Committee recommend that all personnel managing NLDCs and RLDCs must be appropriately trained to handle the on-line/computerized systems and adequately empowered to handle any violation of grid codes by any constituent region of the National Grid to prevent any major GD. The Committee hope that the High Level Enquiry Committee which had analysed the GD of July, 2012 has delved on the matter. The Committee would like to be apprised of the steps taken in this direction by the competent authorities.

<u>Independent Analysis of GDs</u>

9. The Committee note that in line with Central Electricity Authority Grid Standards and Indian Electricity Grid Code provisions, first investigation Reports are filed by Regional Load Dispatch Centers with Regional Power Committee. Regional Power Committees after detailed analysis prepare detailed Report after taking into account the views of Members of utilities/experts etc. The Committee however feel that this arrangement is similar to an in house mechanism which provide for a post grid disturbance analysis and the way forward in view of the

lessons learnt from the incidents of Grid Disturbances. The Committee suggest that for a better Post Grid disturbance analysis, the inputs from the RLDCs/RPCs may be utilized by an independent institutional arrangement which may analyze the causes of and suggest remedies for Grid disturbances without any bias. The Committee, therefore, recommend that the Ministry of Power should explore the possibilities of engaging an independent institutional mechanism having technical experts from the power utilities for post grid disturbance analysis. They would also like to be apprised about the status of notification of CERC's draft Ancillary Services Framework, which would statedly provide NLDC and RLDCs an opportunity to suo motu reduce generation immediately without disturbing any State's net drawl schedules, in case of a network contingency.

Loop In Loop Out (LILO) Short Term Arrangements

10. The Committee note from the Audit Report that some developers such as M/s Sterlite and GMR have been postponing their obligations under Long-term Access Agreements with PGCIL in Odisha. These obligations inter-alia involve the completion of a dedicated line from generation plant to nearest pooling stations so as to ensure transfer of power under LTA Agreements. However, despite postponing their commitments under LTAs, these developers remained connected to the Grid under Short-term Access Agreements (STOA) through Loop in Loop out (LILO) arrangement which work on margins available in the Grid. As per Audit, such a LILO agreement has caused revenue losses to PGCIL on account of differences between LTA charges and STOA

charges, as well as congestion in some places such as Chhattisgarh due to inadequacy of transmission system. PGCIL, however, was not in agreement with the Audit Observation. According to the PGCIL, interim loop in loop out arrangements has benefitted the Indian Grid as considerable quantum of power under short term, which would have otherwise remained stranded, could be transferred and facilitated. The Committee were informed by PGCIL that postponing of obligation by developers has not caused any revenue loss to them.

Notwithstanding the arguments and counter arguments of Audit and PGCIL, the Committee are of the considered view that even though LILO has benefitted PGCIL and has not caused any revenue loss on account of postponing of obligations under the LTA, yet PGCIL should not overlook the violation of Long Term Agreement by private developers. Meanwhile the Committee are surprised to know that even today the developer of sterlite Generation Power station has not completed a dedicated line upto Jharsuguda Pooling station. They, therefore, desire to be apprised about the measures taken to ensure that such delays do not become a regular feature in case of private developers. The Committee recommend that the MoP and PGCIL should take up the issue with CERC and take legal action so as to ensure that private developers do not manipulate the LILO arrangements at their advantage and must fulfill their obligation under LT Agreement earnestly.

Transmission & Distribution Losses

11. High electric losses cripple a utility's ability to properly invest in its system and provide stable service. The Committee note that the transmission and distribution losses have, in the last five years, remained between 20-24% on an average. In this connection, they have been informed that transmission losses are technical losses in the process of supplying electricity and as per PGCIL, 3-4% of such losses are at par with the international standard. The Committee note that the average Inter-State Transmission System loss is around 3.37% out of 20.83% total loss in 2014-15. This trend is visible in previous year too which implies that while technical losses are not a cause of concern, the Distribution losses are constantly on a very high side. The Committee have been informed that such losses, suffered mainly by the Discoms, are due to non-metering, defective metres, non-billing, non-realisation, electricity theft etc. As the Country suffers huge revenue loss due to such a high percentage of distribution losses, the Committee urge the Ministry of Power to press upon the Discoms to utilize various technical and managerial solutions to tackle issues like non-metering, non-billing etc. efficiently in consultation with State Governments, so as to contain the losses.

Compensation to affected Farmers/Land Owners

12. The Committee take note of the fact that PGCIL does not acquire land for towers and it s only granted user rights with respect of laying and maintenance of electric lines for the purpose of transmission of

electricity and pay compensation under the relevant provisions of the Electricity Act, 2003 and Indian Telegraph Act, 1885. The Committee further note that earlier PGCIL used to pay compensation for the damages caused to crops/trees and structures, however, following the landowners demands to pay cost of land for tower base as well as cost of land value diminution in the corridor area due to laying of transmission lines, New Guidelines have been issued by the Ministry of Power on the 15th October, 2015 for payment of enhanced compensation towards damages in regard to Right of Way for transmission lines to all stakeholders including PGCIL, POSOCO, CERC, all States/UTs and State Power Utilities. PGCIL has assured the Committee that the New Guidelines would be soon adopted by them. The Committee appreciate the same and hope that the guidelines will be adopted by all the States/UTs too and implemented in their true spirit so that grievances of the affected persons are addressed in a satisfactory manner. Besides, the Committee desire that the PGCIL should study best practices all around the world to explore and implement technical solutions to establish transmission networks which may involve minimum of right of way permission, for instance, laying of underground transmission lines at par with the best of the practices followed in developed countries.

<u>Awareness regarding Health Hazards of Transmission Infrastructure:</u>

13. The Committee note that the PGCIL is following the Indian Electricity Rules and CEA's regulations on safety requirements regarding the minimum electrical clearances to be maintained with

respect to ground and building etc. The Committee also note that PGCIL is following the requisite guidelines regarding limiting exposure to Electric & Magnetic Fields(EMF) as specified by International Commission on Non-Ionizing Radiation Protection. This includes installation of protecting devices, anti-climbing devices, provision of earthing in all high tension wires as well as a very fast-acting protection system to clear any faults. Also, during the site surveys, PGCIL engineers interact with people and try to allay their fears. While the Committee believe that PGCIL is taking all requisite protective measures, they feel that owing to a lack of mass awareness, people still harbour misconceptions about the high tension towers and transmission lines. Such apprehension in an aggravated form may cause public resistance towards transmission system infrastructure development activities of PGCIL. Thus the Committee feel that there is an urgent need to create substantial awareness among people in order to allay such misconceptions. The Committee, therefore, desire that the MoP should chalk out a definite strategy to inform people about safety standards followed by PGCIL during the setting up of transmission lines/towers etc. through the use of social media, SMS in local language, local bodies etc. which will have a wider coverage and appeal and generate adequate awareness among people to allay their misconceptions regarding the transmission lines and towers.

New Delhi;
25 February, 2016
6 Phalguna, 1937 (S)

SHANTA KUMAR
Chairperson
Committee on Public Undertakings

Appendix I

COMMITTEE ON PUBLIC UNDERTAKINGS
(2015-16)

MINUTES OF THE SECOND SITTING OF THE COMMITTEE

The Committee sat on Monday, the 8th June 2015 from 1100 hrs. to 1145 hrs. in Room No. 139, First Floor, Parliament House Annexe, New Delhi.

PRESENT

Shri Shanta Kumar - Chairperson

MEMBERS

Lok Sabha

2. Shri Lal Krishna Advani
3. Shri Prahlad Patel
4. Prof. Saugata Roy

Rajya Sabha

5. Shri Narendra Budania
6. Shri Tapan Kumar Sen

SECRETARIAT

1.	Shri M.K. Madhusudhan	Director
2.	Shri G. C. Prasad	Deputy Secretary

OFFICE OF C&AG

1.	Shri P. Mukherjee	Dy. C&AG (Comm.)-cum-Chairman, Audit Board
2.	Shri P. Sesh Kumar	Director General (Commercial)-I

2. At the outset, the Chairperson welcomed the officials of C&AG of India to the Sitting. Then, the officials of C&AG made a power point presentation with respect to Performance Audit Report No. 18 of 2014 on Planning and Implementation of Transmission Projects by Power Grid Corporation of India Limited (PGCIL) and Grid Management by Power System Operations Corporation Limited (POSOCO). In their presentation, the officials of C&AG highlighted the inadequacies in the transmission network and delay in commissioning of transmission projects being developed by PGCIL. They also gave a detailed account of the issue pertaining to the management of National Grid by POSOCO.

3. After the presentation of C&AG officials, members of the Committee sought clarification on various issues, highlighted in the presentation. The officials of C&AG responded in detail to the queries of members.

4. The Committee then decided to take Oral Evidence of the representatives of the Ministry of Power, PGCIL and Central Electricity Regulatory Commission in connection with examination of the subject.

The Committee then adjourned.

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Appendix II

COMMITTEE ON PUBLIC UNDERTAKINGS
(2015-16)

MINUTES OF THE EIGHTH SITTING OF THE COMMITTEE

The Committee sat on Monday, the 28th September 2015 from 1100 hrs. to 1240 hrs. in Room No. 139, First Floor, Parliament House Annexe, New Delhi.

PRESENT

Shri Shanta Kumar - Chairperson

MEMBERS

Lok Sabha

2. Shri Lal Krishna Advani
3. Shri Ramesh Bais
4. Shri Nand Kumar Singh Chauhan
5. Shri Prahlad Patel
6. Shri Ram Sinh Rathwa
7. Prof. Saugata Roy

Rajya Sabha

8. Shri Narendra Budania
9. Shri Praful Patel
10. Shri Rangasayee Ramakrishna

SECRETARIAT

1.	Smt. Sudesh Luthra	Joint Secretary
2.	Smt. Anita B. Panda	Director
3.	Shri G. C. Prasad	Deputy Secretary

OFFICE OF C&AG

Shri P.K. Mishra Director General (Commercial)

POWER GRID CORPORATION OF INDIA LIMITED

1.	Shri R. N. Nayak	CMD
2.	Shri I. S. Jha	Director (Projects)
3.	Shri R. T. Agarwal	Director (Finance)
4.	Shri Ravi P Singh	Director (Personnel)
5.	Shri R. P. Sasmal	Director (Operations)
6.	Shri S. K. Soonee	CEO, POSOCO

2. At the outset, the Chairperson welcomed the representatives of Power Grid Corporation of India Limited (PGCIL) to the Sitting. He then drew the attention of the representatives to Direction 55(1) of the Directions by the Speaker regarding confidentiality of evidence before the Parliamentary Committees.

3. The representatives of PGCIL then made a power point presentation with respect to the Performance Audit Report No. 18 of 2014 on Planning and Implementation of Transmission Projects by Power Grid Corporation of India Limited (PGCIL) and Grid Management by Power System Operations Corporation Limited (POSOCO).In their presentation, they provided brief overview of activities being undertaken by PGCIL and POSOCO in the areas of transmission system planning and grid operations. Thereafter, they clarified on various issues highlighted in the above said Audit Report which inter-alia include development and management of National Electricity Grid, transmission capacity and transfer capability of interregional power transfer corridors, supervision and control of Inter-State transmission system for dispatch of electricity, status of transmission access to various power generating projects and remedial measures being taken up by the PGCIL and POSOCO to prevent grid disturbances like the major such disturbance in July, 2012.

4. After the presentation, members raised various queries on a wide range of issues concerning power transmission and role of PGCIL and POSOCO. The queries were related to issues such as targets regarding the capacity augmentation in the interregional power transfer corridors, transmission and distribution losses, fluctuation in grid

frequency, grid failure of 30 and 31 July 2012 and the Company's failure to address the grievances of farmers, whose land has been acquired for erecting towers and other transmission infrastructure and impact of high tension wires on human beings etc. The representatives of PGCIL responded to some of the queries. In respect of points for which information was not readily available with them, the Chairperson directed that written replies may be furnished at the earliest.

(The witnesses then withdrew).

A verbatim record of the proceedings has been kept separately.

The Committee then adjourned.

Appendix III

COMMITTEE ON PUBLIC UNDERTAKINGS

(2015-2016)

MINUTES OF THE FIFTEENTH SITTING OF THE COMMITTEE

The Committee sat on Wednesday, the 06th January 2016 from 1500 hrs to 1645 hrs in Committee Room No. 074, Ground Floor, Parliament Library Buidling, New Delhi.

PRESENT

Shri Shanta Kumar - Chairperson

MEMBERS

Lok Sabha

2. Shri Lal Krishna Advani
3. Shri Prahlad Patel
4. Shri Ram Sinh Rathwa
5. Shri Raypati Sambasiva Rao
6. Prof. Saugata Roy
7. Shri Sushil Kumar Singh

Rajya Sabha

8. Shri Praful Patel
9. Shri Rangasayee Ramakrishna
10. Shri Tapan Kumar Sen

SECRETARIAT

1.	Smt. Sudesh Luthra	Joint Secretary
2.	Smt. Anita B. Panda	Director
3.	Shri G.C. Prasad	Deputy Secretary

OFFICE OF C&AG OF INDIA

1.	Shri P.K. Mishra	Director General (Comm-I)
2.	Smt.Tanuja S. Mittal	Principal Director
3.	Shri Manish Kumar	Principal Director

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2. At the outset, the Chairperson welcomed the Members to the sitting of the Committee.

3. **** **** **** **** **** **** ****

4. The Committee then took up for consideration the draft Report based on Performance Audit Report No. 18 of 2014 on Planning and implementation of transmission projects by 'Power Grid Corporation of India Limited and Grid Management by Power System Operation Corporation Limited' and adopted the same without any changes / modifications.

5. The Committee thereafter authorized the Chairperson to finalise the aforesaid draft Reports on the basis of factual verification by Ministries/ Departments concerned and present the same to Parliament in due course.

(The representatives of C&AG then withdrew)

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A verbatim record of the proceedings has been kept separately.

The Committee then adjourned.