

Record Notes of Annual Performance Review of TPNODL held on 30.07.2025 at 11:30AM at OERC in the presence of the Commission

Date of Review : 30th July, 2025

Period of Review : April 2024 - March 2025

The performance of TPNODL for the FY 2024-25 was reviewed by the Commission on 30th July, 2025 at 11:30 AM. The CEO, TPNODL presented the performance of TPNODL and senior officials of TPNODL were present during the review.

TPNODL started its operation w.e.f. 01.04.2021 through the Vesting Order dated: 25.03.2021 in Case No.-9/2021 of the Commission. The operational area of TPNODL spreads across 27,857 sq.kms. area of northern part of Odisha with its headquarter office at Balasore. Distribution network comprises of 249 Nos. of 33/11 kV sub-stations (150 Nos. are SCADA enabled), 566 Nos. of PTRs (2765 MVA), 81168 nos. of DTRs (3150 MVA), 3605 kms. of 33 kV lines, 42651 kms. of 11 kV lines and 68962 kms. of LT lines (48210 kms. of LT AB cable) which caters to a consumer base of about 1999491 (as on 31.03.2025) covering 5 Nos. of Revenue Districts (5 Circles, 16 Divisions, 50 Sub-Divisions, 159 Sections & 4 GRFs).

In the FY 2024-25, the EHT sales, HT sales and LT sales are 3065.29 MU, 826.43 MU and 2576.47 MU respectively and total sales is 6468.20 MU. As compared to the sales in the FY 2023-24, the EHT sales has reduced by about 1.6% while there has been growth of about 20.5% and 17.4% growth seen in case of HT & LT sales respectively. Overall increase in sales is by 8.8% against the total sales of 5996.36 MU in the FY 2023-24. The consumer base has increased in the range of 2.3% over the last financial years with complete sanitisation of the consumer base. The total number of consumers as on 31.03.2025 is 19,99,491. Total numbers of employees of the licensee is 2280 with a ratio of 1.15 per 1000 consumers and 10,953 numbers of BA employees have been engaged by TPNODL.

TPNODL has 16 Customer Care centres (one per each division) in urban areas and 139 Nos. of PDS linked Anubhav Kendras in rural areas along with 24 X 7 call centre assistance to address consumer grievances. Various customer engagement initiatives have been taken by TPNODL such as, 'SAMBANDH' which is a monthly consumer meet at division level, 'JAAGRITI' i.e. a youth engagement session at college level, organising gram panchayat & village level meetings and KCG (Key Consumer Group) meets for close interaction with high value consumers. Electrical and road safety sessions have been conducted at school level to sensitise students about electrical safety and energy conservation. TPNODL has submitted that more than 90% of new connections have been energised within 5 days from date of application through its BPR (Business Process Re-engineering)- "Sanjog Express". Digitalization campaigns have been conducted for promoting digital payment and facilities such as QR code-based payment & click-pay (through a dedicated link) have been developed for ease of digital payment.

TPNODL has incorporated various practices under preventive maintenance such as ensuring blue silica gel in all DTRs (Project Neela), replacement of pin porcelain insulators with polymer insulators, onsite PTR overhauling (Project Navikaran) and use of inverted cones on poles to avoid reptile faults. Drone based feeder audit is being carried out to identify weal spots, flash over marks, Insulator damage, vegetation growth, improper binding etc. TPNODL has completed feeder audits of 29 Nos. of PSSs, 24 Nos. of 33 kV feeders & 95 Nos. of 11 kV feeders in the FY 2024-25, covering approximately 1461 kms of the network. Ariel thermos scanning is conducted with a drone equipped

with infrared camera that detects heat signatures. In the FY 2024-25, TPNODL has completed scanning of 119 Nos. of feeders & 29 PSSs, thereby rectifying 1246 numbers of detected hotspots. Ultrasound scanning (Partial Discharge Monitoring) is being done to predict the future failure through capturing the electrical discharge & preventive measures to mitigate untimely breakdown. TPNODL has completed surveys of 35 Nos. of 33 kV feeders, 56 Nos. of 11 kV feeders and has taken action for rectification wherever necessary.

TPNODL has achieved the Vesting Order targets w.r.t AT&C loss reduction, CAPEX investment and Past Arrear collection. The metering status of TPNODL is 100% for 33 kV and 11 kV feeders. However, only 54.24 % of 33/11 kV PTRs and 12.19% of DTRs are metered. TPNODL has completed the audit of all the 33 kV feeders and the average energy loss based on audited figures is 3.38%. Around 99.85% of the consumers are metered, out of which 12.72% are Smart Meters. TPNODL has 544 Nos. of Groups breakers installed at 11 kV feeder level as on 31.03.2025 and this has been increasing from 488 as on 31.03.2023 and 524 Nos. as on 31.03.2024. For the FY 2024-25, the SAIFI is 526 Nos. and SAIDI is 324.31 Hrs. TPNODL has achieved 95% GIS mapping of assets and 98% of Consumer Indexing.

From among all the PSSs, around 71% are SCADA integrated and 60% of the PSSs are automated. TPNODL has submitted that the ODSSP PSSs have RTU for local SCADA access. However, these would be replaced for remote SCADA access in a phased manner. TPNODL has submitted that it has 15 Nos. of RMUs at 33 kV level and 149 Nos. RMUs at 11 kV level and 121 Nos. of Auto -Reclosers. Around 21% of RMUs and 97% of Auto-reclosers are automated.

Commission's Observations/ Directions:

1. The Commission took cognizance of the presentation made by the TPNODL and analysed various performance parameters. The summarized crucial performance parameters for FY 2024-25 as presented by TPNODL along with previous years are given in the table below;

<u>Annual Performance of TPNODL as on 31.03.2025</u>				
BULK SUPPLY	2023-24	2024-25	Commisson's approval 2024-25	Increase/ Decrease in FY25 over FY24 (%)
AVG. DEMAND (MVA)	1123.83	1231.72	1478.00	9.60
Energy input (MU)	7047.15	7388.95	8163.00	4.85
SALE TO CONSUMERS (MU)				
EHT	3115.166	3065.294	3555.280	-1.60
HT	685.813	826.434	774.742	20.50
LT	2195.379	2576.467	2678.782	17.36
TOTAL	5,996.36	6,468.20	7,008.80	7.87
DISTRIBUTION LOSS (%)				
LT	25.11%	18.24%	22.68%	-27.36
HT & LT	26.72%	21.30%	25.05%	-20.31
OVERALL	14.91%	12.46%	14.14%	-16.43
BILLING EFFECIENCY (%)				
LT	74.89%	81.76%	77.32%	9.18
HT & LT	73.28%	78.70%	74.95%	7.41
OVERALL	85.09%	87.54%	85.86%	2.88
BILLING TO CONSUMERS (CR.)				
EHT	1976.42	1973.33	2213.25	-0.16
HT	466.11	564.43	514.55	21.09
LT	1217.66	1365.85	1321.59	12.17

TOTAL	3,660.19	3,903.60	4,049.39	6.65
COLLECTION RECEIVED (CR.)				
EHT	2044.88	1985.18	2191.12	-2.92
HT	461.74	553.93	509.40	19.97
LT	1291.36	1422.82	1308.37	10.18
TOTAL	3,797.97	3,961.93	4,008.90	4.32
COLLECTION EFFICIENCY (%)				
EHT	103.46%	100.60%	99.00%	-2.77
HT	99.06%	98.14%	99.00%	-0.93
LT	106.05%	104.17%	99.00%	-1.77
HT & LT	104.12%	102.41%	99.00%	-1.64
OVERALL	103.76%	101.49%	99.00%	-2.19
AT & C LOSS (%)				
LT	20.58%	14.83%	23.45%	-27.93
HT & LT	23.71%	19.40%	25.80%	-18.16
OVERALL	11.71%	11.15%	15.00%	-4.74

From the above table it is observed that there is increase in the sales at HT & LT level whereas no appreciable change is seen in EHT sales. The overall increase in sales of TPNODL in FY 24-25 over FY 23-24 is 7.87%. TPNODL must take proactive steps to reduce the number of interruptions, failure of PTR (7 Nos.) & DTR (3447 Nos.) and time of restoration. Necessary preventive maintenance of distribution lines, clearing out of vegetation/creepers and condition monitoring of DTRs/ PTRs must be done regularly.

- The TPNODL system has expanded over the years and system improvement can be identified from the details in the table below;

Particulars	As on 31st March 2023	As on 31st March 2024	As on 31st March 2025
No. of Active Consumers			
EHT	41	42	43
HT	659	748	834
LT	2,040,888	1,953,723	1,998,614
Total	2,041,588	1,954,513	1,999,491
Network System			
No. of PTRs	550	564	566
No. of DTRs.	74726	77688	81168
MVA Capacity of PTRs	2615	2704	2765
MVA Capacity of DTRs	2787	2832	3150
Length of 33 KV Line (ckm.)	3024	3226	3605
Length of 11 KV Line (ckm.)	40189	41108	42651
Length of LT Line (ckm.)	67486	68139	68962
Length of LT AB cable (ckm)	44786	47197	48210
Percentage of LT cable (%)	66.36	69.27	70.00
Length of HT cable (ckm)	64.40	126.90	201.40
No. of 33 kV feeders	108	115	131
No. of 11 kV feeders	825	853	888

- The SAIFI and SAIDI of TPNODL as per their submission are 526 Nos. and 324.31 Hrs. for the FY 24-25. But in the absence of complete digitization/ metering of all the DTRs, which currently

is merely 12.19%, the data of SAIDI and SAIFI cannot be relied upon. Therefore, the DISCOMs directed to install 3 to 4 Smart Meters in every Village to monitor duration of availability of power supply, interruption analysis and deriving SAIFI & SAIDI values. Similarly, the Smart Meters already installed in Urban and Semi-Urban areas may be used for the above purposes. This may be done as an interim arrangement till all the DTRs are provided with Smart Meters.

4. The length of LT lines has increased to 68962 ckm as on 31.03.2025 as compared to 68139 ckm as on 31.03.2024 and LT cable % of the total LT lines in TPNODL is only 70%. The DISCOMs must plan the network system in such a manner that the LT line length should be kept within a threshold and should be mostly as LT cable. Further, out of 81168 Nos. of DTRs, 46.7% are single phase DTRs, 30.37% are less than 63 MVA, 10.4% are 63 kVA and 12.4% are above 100 kVA. TPNODL must take initiative to phase out lower capacity DTRs (i.e. 10 kVA, 16 kVA, 25 kVA) and standardize the DTRs in the system based on the area/ population of consumers. Such action would reduce overall O&M cost, reduce failure as less No. of DTRs can be maintained properly and overall transformer loss will also reduce. All the new DTRs should be planned basing on load growth in that area. Further, steps should be taken to move towards a 3 phase system even in rural areas and such initiative would help DISCOMs to balance loads in all three phases.
5. The total distribution loss is ascertained as 12.46% after assuming no technical loss at EHT level and 8% at HT level on normative basis. TPNODL has already completed 100% metering of 33 kV & 11 kV feeders and thus, it must endeavor to complete 100% metering of all DTRs of capacity greater than 63 kVA so that the actual HT & LT loss can be calculated and loss prone area can be identified. This would help to focus the real loss prone areas which is otherwise shielded from corrective actions and normative loss figures at HT level can be assessed properly.
6. The DISCOM must further take necessary steps to reduce these losses at LT level by further reducing the length of LT lines wherever possible, using proper size of conductor, upgradation of overloaded DTRs, preventive maintenance with proper patrolling and actions to detect & check theft of electricity using ABC. The distribution losses have reduced from 16.43% in FY 2022-23 and 14.91% in FY 2023-24 to 12.46% in the FY under review (FY 2024-25). The performance of TPNODL has been good as far as reduction of AT&C loss and distribution loss are concerned but system improvement needs further prioritization. Considering the CAPEX investments already done in the past years with Commission's approval and the Government's Grants provided under various schemes, the expected losses should have reduced further. The Divisions like BTED, Basta (31.46%), BSED, Bhadrak (27.86%), KUED, Kuakhai (27.13%) and AED and Anandpur (23.63%) have very high LT loss and need special attention.
7. The loading level of the DTRs must be continuously monitored and upgraded with higher capacity to avoid failures due to overloading. Phase balancing of the DTRs must also be ensured. The inconvenience of power supply interruption due to overloading failure must be avoided with proactive upgradation beforehand. The swapping of DTRs as well as PTRs must be done for optimum use of DTRs/ PTRs while upgrading the capacity of DTRs/ PTRs.
8. It is observed that out of total 566 Nos. of PTRs, only 555 nos. of PTRs have Circuit Breakers and associated relay protection system which is not expected after more than four years of operation of TPNODL. Any fault in PTRs without proper protection system would affect EHT system of OPTCL thereby tripping of the Power Transformer(s) affecting the power supply of larger area which could have been avoided. TPNODL must ensure installation of CB and the associated protection system in all the PTRs (both on HV & LV side of PTRs) on priority basis.

There are 544 Nos. of Group control breakers. However, there should be individual CBs for each 33 kV & 11 kV feeders and PTRs instead of any Group Control Breakers at 33 kV and 11 kV level to achieve the objective of reliable power supply.

9. TPNODL has installed surge arresters for only 537 Nos. of PTRs (out of 566 Nos. of PTRs) and 11,976 Nos. of DTRs (out of 81168 Nos. of DTRs). Action plan should be there to ensure that the protection system complete in all respect including provision of Surge Arresters, is in place at 33 kV & 11 kV level for all feeder/lines/cables, power transformers, etc. along with timeline for completion. The provision of required protection for DTRs should be taken up and completed in phases as early as possible. The relay coordination should be done properly in consultation with OPTCL to avoid tripping at OPTCL end.
10. Out of 81168 Nos. of DSSs, 38985 Nos. of DSSs (48%) are without proper fencing and 6 Nos. of PSSs without boundary wall. This endangers the safety of humans, animals and the equipment. Due to various reasons fatal accidents have occurred in the licensee's area of operations resulting in 24 deaths of human and 20 animal deaths in the FY 2024-25. TPNODL needs to take steps to create an accident free operating environment ensuring zero casualty of employees (including BA employees) and create awareness among public regarding electrical safety. The shortcomings of unavailability of boundary walls/ fencing, inadequate safety ground clearance, absence of proper earthing etc. must be addressed with corrective measures.
11. Licensee has taken various initiatives and has developed many platforms for addressing consumer grievances. However, lot more action is still required to increase consumer satisfaction level. It has come to the notice of the Commission that the response from call center or digital media platforms is not upto mark and routine/ standard reply is received by consumers for any query relating to restoration of power supply in case of fault. There seems to be no standard practice for routine maintenance. Wherever possible, outage for providing new connection(s), upgradation/ augmentation work, replacement of DTRs/ defective meters may be clubbed with scheduled maintenance activities covering maintenance of DTRs, PTRs, tree trimming, clearing of vegetations etc. Frequent power interruptions for all such activities must be avoided. The schedule should be planned in advance and accordingly consumers must be intimated. The complaint handling system/ procedure followed at TPNODL end must be reviewed and improved accordingly.
12. The Commercial losses needs to be improved by sensitizing the consumers of such high loss prone areas/ Divisions of the DISCOM. The DISCOM may communicate the consumers of such area in transparent manner by mentioning following information in a Notice Board on monthly basis at Section Office/ PSS Office and if possible, at the Panchayat office in both English and Odia language;
 - a. Duration of power supply available in the area.
 - b. No. of interruptions and duration of outage due to routine maintenance
 - c. Billed amount against consumers in the area
 - d. Revenue realized and outstanding dues of the consumers in the area against the bills raised.
13. There is a notion among the consumers that the Smart Meters record higher reading as compared to the Static meters. The DISCOMs may install a Smart Meter alongside the current Static Meter at any government office, such as Panchayat Office to show the consumers that the energy recorded in both the meters are the same. This may remove some of the wrong perceptions/ apprehensions in the mind of consumers about the Smart Meters.

14. TPNODL has employee ratio of 1.15 per 1000 consumers which is almost close to the approved ratio of 1.4 per 1000 consumers as per the direction of the Commission. However, this does not take into account the strength of BA employees engaged by the licensee, which is 13059 who are engaged in O&M of distribution line, PSSs & DTRs and involved in projects and A&G activities. The employee expenses of TP DISCOMs are about 13% of the Average Cost of Supply (ACoS) and the percentage would increase further if the BA employees engaged under A&G and R&M are taken into consideration. As per the Report of Forum of Regulators (FOR) on 'Analysis of Factors Affecting Viability of DISCOMs and Recommendations for its Improvement' published in January 2025, mentions that employee expenses below 5% of ACoS is highly desirable, expenses in the range of 5-6% of ACoS is acceptable and anything beyond 6% requires graded rationalization. However, with utilities in hilly areas and island areas, percentage will vary based on Utility specific factors. Therefore, the employee expenses of TP DISCOMs, which is very high, needs corrective measures for reduction.
15. The TP DISCOMs may put collaborative effort and take up consumer awareness program to create appealing short videos on various power system issues such as importance of earthing, sensitise benefits related to Smart Meter, digital payments & LCCB in domestic houses, encourage PMSGY scheme & PM-KUSUM scheme etc. These short videos can be circulated in digital platforms and in their official websites. The scrolling related to these topics may be given during the eligible TV channels that people of different age groups prefer, so as to cater the information to all age group viewers.
16. All 33kV & 11kV feeders/lines & 33/11 kV transformers are supposed to be provided with CBs, prioritizing 33kV system followed by 11kV system. Direct tapping of lines/feeders without proper CBs/ RMU and Group control breaker arrangement at 33kV and 11kV level should be removed on priority basis to achieve the objective of reliable power supply.
17. Even after completion of more than 4 years of operation, guard wires have not been provided at road/ bridge/ railway crossings to avoid fatal accidents due to conductor snapping. DISCOMs are directed to complete such work by end of FY 2025-26 for 33kV/ 11 kV lines. Conversion to UG cable as proposed under CAPEX investments may be taken up in stages based on importance and cost benefit analysis. To reduce transient faults on lines, tree trimming, clearing of vegetation along the distribution lines and at electric poles/ tower locations need to be taken up regularly.
18. The Distribution Licensee is directed to;
 - a. Take initiatives for development and peomotion of EV charging infrastructure in their area of operation.
 - b. Take up pilot projects in co-ordination with Government of Odisha for V2G (Vehicle to Grid) projects to support the grid during peak hours.
19. As discussed to realise a trip free system, DISCOMs are directed to start with some identified cities in the operating area of each DISCOM (as advised by the Commission) like Bhubaneswar & Puri (in TPCODL area) Balasore & Keonjhar (in TPNODL area), Berhampur (in TPSODL area) and Rourkela & Sambalpur (in TPWODL area). The planning can be done to start with limited area of operation in the city so that minimum interruption/ interruption free operation is realized and visible by the service provider and the customers. This would enhance the level of confidence and subsequently, operating area may be increased/ extended in phases to cover the

entire city or to other areas to achieve the ultimate objective. A broad concept is enclosed as Annexure-I along with a check list.

Annexure-I

Broad concept of interruption free/ minimum interruption operation

The broad criteria/considerations in respect of Planning, Design & Engineering and O&M are expected to be in following line for developing trip free/uninterrupted and safe power supply to cities/towns with ultimate objective of 24x7 quality power supply to all.

(1) Planning :

- a) Planning based on Distribution system load flow study should be the basis for strengthening and expansion of distribution network. The load demand of various PSS shall be such that 33 kV and 11 kV feeders, PTRs and DTRs are within 80% of their rated capacity considering present and future load growth for next 5 years.
- b) The cyclone resilient Distribution system (Distribution lines & Sub-stations) needs to be planned & designed for coastal areas in line with relevant guidelines of GoI & GoO, to prevent large scale damage to Distribution assets of the State during cyclone.
- c) No. of PSS and transformation capacity in the operating area of the Distribution licensee must be adequate for meeting present load and future load for next 5 years.
- d) City PSSs should be indoor AIS (indoor switchgear) or indoor GIS (GIS is preferred to AIS, particularly in cyclone prone area, in order to improve reliability and reduce maintenance cost and improve aesthetics) and SCADA enabled for real time monitoring, remote control & unmanned operation ensuring cyber security and should be suitable for Advance Distribution Management System. The reliability indices i.e. SAIDI, SAIFI, CAIDI & CAIFI must be derived from the SCADA and AMI (smart metering) without human intervention. Adequate space provision for feeders & transformers should be there for future expansion to avoid creation of new PSS in near future in nearby area.
- e) The MVA capacity of PSS need to be standardised. All PSSs should have N-I contingency for both incomer (ideally from OPTCL's GSS) and PTR. PTR should be of identical rating and minimum Rating of PTR should be 2X16/12.5 MVA and PSS capacity should be at least 32/25 MVA in initial phase and to be enhanced by addition of 3rd PTR of similar rating. The minimum rating of DTRs in cities/towns should be 63 kVA (11 kV/0.4 kW) and above considering future load growth, thereby the no. of DTRs and tapping points would be reduced at 11 kV level which will support/help in easy monitoring and providing smooth & trouble-free service. Accordingly, provision of No. of 11 kV feeders needs to be planned (at least 4 no. of 11 kV feeder in initial stage and provision for additional feeder in subsequent phase).
- f) Formation of ring(s) between PSSs would further improve reliability and ring(s) is to be fed from at least two 132 kV/33 kV GSS or 220 kV/33 kV GSS or combination of both.
- g) Important/critical installation like hospital, airport, water works, govt. establishment, defence establishment, etc. should have duplicate connectivity to improve reliability and availability of power supply. As far as possible Agriculture feeder should be segregated for solarisation (pump level & feeder level solarisation under KUSUM-C). As far as possible, industrial feeder(s) should be separated.
- h) All overhead distribution lines have to be either covered conductor or ABC depending on voltage level and are through which the line is traversing to avoid any fatal accidents and theft of electricity. In city area underground cable system shall be provided at 33 kV level in initial phase and may be extended to 11 kV system in stages.

- i) The conductor size and cable size shall be suitable for catering to load growth in next 5 years.
- j) Replacement of old & aged assets need to be planned in advance to ensure interruption free power supply.
- k) Adoption of state-of-art technology, digitalisation (wherever feasible), adoption of best practices and promotion of innovation should be our prime objective to improve performance, increase operational efficiency and minimize human intervention.

(2) Design & Engineering :

- a) The switching scheme (busbar scheme) in each PSS has to be Double Bus/Main & Transfer Bus Scheme with bus coupler or in worst case single bus with sectionalizer at 33 kV level and single bus with sectionalizer at 11 kV level.
- b) The length of 33 kV and 11 kV lines should be ideally limited to about 30 kM and about 50 kM respectively without any direct tapping at 33 kV level and direct tapping at 11 kV level should be reduced in course of time. Existing direct tapping point should be provided with RMU (i.e. with CB and/motorised isolator for remote control) and RMU should have provision for PT so as to provide required metering arrangement for energy audit. The size of conductor and length of line are to be decided properly to avoid overloading of line and improve voltage profile (address low voltage issue). The conductor size shall be uniform for entire length of line (conductor of different sizes should not be in different sections of existing line).
- c) In case of ring formation between PSSs, the size of conductor linking the PSSs as well as the link from GSS need to be properly decided taking into account the load on the PSSs and considering outage of one of the links from GSSs.
- d) Provision of Auto reclosure, sectionaliser and Fault Passage Indicator (FPI) are to supplement the reliable and trouble free operation of the system by reducing area of outage during faults.
- e) The required relay protection system (using digital numerical relay) including surge arresters should be in place for all 33 kV and 11 kV feeders, PTRs and DTRs. The required fire protection should also be provided in all PSS.
- f) The duplicate battery and associated battery charging system should be in place and rating of battery & associated charger should be standardised.
- g) Proper earthing of equipment in PSS including transformer and fencing should be done for smooth operation of relays and to avoid accidents. The communication system should be provided with Surge Protective Device (SPD).
- h) The Distribution Transformers (DTRs) shall be provided with LT Distribution Boxes (LTDBs).
- i) The vacuum type CB should be preferred to SF6 type CB considering environmental hazard.

- j) All road crossing of overhead lines should be provided with guard wire and minimum safe electrical ground clearance should be maintained at all places for all overhead lines with bare conductors. DTRs are to be fenced to avoid unauthorised access and accident(s).
- k) Provision for islanding scheme should be in place to isolate the faulty section of the feeder connecting rural areas so that power supply to city area is not affected.
- l) Asset mapping and consumer indexing has to be completed so as to trace the connectivity of a consumer from the delivery point upto DTR&PSS and asset register is to be linked with asset mapping.
- m) Metering has to be completed at all level (33 kV and 11 kV feeders, DTR, PTR, consumers of all category) and smart metering shall be the ultimate objective so that actual AT&C loss can be assessed based on energy audit and relevant data can be used for better operation & control of the system.
- n) All domestic consumers are to be provided with Earth Leakage Circuit Breaker (ELCB) for safety.
- o) Standardisation of rating of equipment/material including PTRs & DTRs, standardisation of MVA capacity of PSS, span length of 33 kV & 11 kV overhead lines and standard specification for all equipment/material including PTR, DTR has to be formulated to optimise cost of procurement, for faster delivery, to avoid repetition of type tests and to facilitate interchangeability.
- p) The insulators of overhead distribution lines in coastal area shall be polymer based and higher thickness of galvanisation of steel structures need to be ensured.
- q) All equipment/material should comply to relevant IS; Rules, Regulations and guidelines of CEA, MoP, OERC.

(3) O&M :

- a) The condition of poles/towers of existing lines and their foundation need to be checked keeping in view the resilience of the structure and foundation for cyclonic wind speed and accordingly, they are to be replaced/strengthened. The requirement of interposing pole for long spans in existing line(s), double pole and guy wire etc need to be assessed and provided for existing overhead line to maintain required minimum safe electrical ground clearance and to avoid cascade failure. Regular condition monitoring (using modern diagnostic tools) of supporting structures, conductor, insulators, hardware fitting of overhead line and underground cables, ABCs, covered conductors need to be conducted to ensure healthiness of assets. Regular tree trimming need to be ensured.
- b) Condition monitoring of assets in PSS (equipment/material) including PTRs & DTRs need to be carried out by conducting various diagnostic tests using modern diagnostic tools to keep the equipment/material healthy in order to provide trouble free service. In addition, power quality monitoring needs to be done using suitable devices/meters. Earthing system needs to

be monitored regularly for safe operation of protection system and safety of human being & animals.

- c) Proper database needs to be maintained and need to be available for statistical & econometric analysis, performance assessment/review and validation of result of Distribution system study.
- (4)** In addition to above, any other additional features may be included based on past experience and future trend adopting best practices & state-of-art technology.