ANNUAL ENERGY AUDIT REPORT

OF TP NORTHERN ODISHA DISTRIBUTION LIMITED (TPNODL)

[DC Registration No.-DIS0038OD]

Submitted to:

TP NORTHERN ODISHA DISTRIBUTION LIMITED

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ABBREVIATIONS

AMI	:	Advanced Metering Infrastructure
AMR	:	Automated Meter Reading
AT & C	:	Aggregate Technical and Commercial
BEE	:	Bureau of Energy Efficiency
CKT	:	Circuit Kilometer
CT	:	Current Transformer
DC	:	Designated Consumer
DISCOM	:	Electricity Distribution Company
DT	:	Distribution Transformer
EA	:	Energy Auditor
EHT	:	Extra High Tension
EHV	:	Extra High Voltage
EM	:	Energy Manager
FY	:	Financial Year
HT	:	High Tension
HVDS	:	High Voltage Distribution System
KVA	:	Kilo Volt Ampere
LT	:	Low Tension
MoP	:	Ministry of Power
MU	:	Million Unit
MW	:	Mega Watt
NO	:	Nodal Officer
OA	:	Open Access
POC	:	Point of Connection
PT	:	Potential Transformer
PVC	:	Polyvinyl chloride
PX	:	Power Exchange
RE	:	Renewable Energy
RLDC	:	Regional Load Dispatch Centre
SDA	:	State Designated Agency
SLD	:	Single Line Diagram
SLDC	:	State Load Dispatch Centre
T&D	:	Transmission and Distribution
TPNODL	:	Tata Power Northern Odisha Distribution Limited
XLPE	:	Cross-linked polyethylen

ACKNOWLEDGEMENT

Power Tech Consultants (PTC) places on record its sincere thanks to management of TP Northern Odisha Distribution Limited (TPNODL) for entrusting the task of conducting Energy Audit of TPNODL.

PTC acknowledges with gratitude the wholehearted support and co-operation extended by Mr. Bhaskar Sarkar, CEO, TPNODL, Mr. Dushyant Kumar Tyagi (Chief of Operation), Mr. Manish Kriplani (HoG EA), Mrs. Malancha Ghose, AGM (Elect.), Mr. Amit Kumar (HoG OT), Mr. Pravakar Sahoo Mr. Sumit Parasar, Mr. Ved Prakash and Operation & Project Department while carrying out the study at TPNODL.

PTC sincerely thanks to all the officials and staff members of TPNODL who have rendered their all-possible cooperation and assistance to the audit team during the entire period of the audit.

M/s. Power Tech Consultants
(Bibhu Charan Swain)
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AUDIT TEAM DETAILS

The following team members of M/s. Power Tech Consultants were involved in the Annual Energy Audit of TPNODL for FY 2021-22

Sl. No.	Organization	Team Member	Designation	Role
1	Power Tech Consultants	Mr. Bibhu Charan Swain	Sr. Consultant Accredited Energy Auditor Regd. No. –AEA-0121	Project Head, Review of Data and Report
2		Mr. Subhranshu Sekhar Rath	General Manager	Inspection, Review of Data & Report
3		Mr. Suresh Gurjar	Manager (Project)	Field Visit, Document verification & Report writing
4		Mr. Nirjhar Biswal	Assistant Manager (Project)	Field Visit, Collection & Verification of Data, Report Writing
5		Mr. Suraj Kumar Bhujabala	Assistant Manager (Project)	Field Visit, Collection & Verification of Data, Report Writing
6		Mr. Subash Mallick	Project Associate	Field Visit, Collection & Verification of Data, Report Writing
7		Mr. Suman Sourav Nayak	Project Associate	Field Visit, Collection & Verification of Data, Report Writing

CERTIFICATE

We certify the following:

- The data collection has been carried out diligently and truthfully.
- All data measuring devices used by the auditor are in good working condition, have been calibrated and have valid certificates from the authorized approved agencies and tampering of such devices has not occurred.
- All reasonable professional skill, care and diligence had been taken in preparing the energy audit report and the contents thereof are a true representation of the facts.
- Adequate training provided to personnel involved in daily operations for implementation of recommendations.
- The energy audit has been carried out in accordance with the BEE (Manner and Intervals for Conduct of Energy Audit in electricity distribution companies) Regulations, 2021.

M/s. Power Tech Consultants
(Bibhu Charan Swain)
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1.0 EXECUTIVE SUMMARY

TP Northern Odisha Distribution Limited (TPNODL) is a joint venture of Tata Power (51%) and Govt of Odisha (49%) on the Public-Private Partnership (PPP) model. TPNODL licensed area is spread over geography of 27857 Sq.Km and serves a registered consumer base of 2.05 million. TPNODL has been carrying out the business of distribution and Retail Supply Licensee. TPNODL has been carrying out the business of distribution and retail supply of electricity in the 5 districts of Odisha namely, Balasore, Bhadrak, Jajpur, Keonjhar and Mayurbhanj. The Company is operating through 5 Circles, 16 Divisions, 50 Subdivisions, 159 Sections with a Corporate Office based at Balasore. The business of TPNODL utility is governed by the provisions of license issued by Hon'ble Odisha Electricity Regulatory Commission (OERC) for business of distribution and retail supply of electricity in North Odisha.

TPNODL receives electrical power at 33kV level from 27 numbers of Grid Sub stations (GSS) out of which 3 nos. of GSS are rated at 220/33kV, and 23 GSS at 132/33kV located within the vicinity of TPNODL operational area. TPNODL distributes the power at 33kV / 11kV / 415V / 230V depending on the demand of the consumers.

Fact sheet of TPNODL:

The Fact sheet of TPNODL is furnished below.

Supply Area	27857 Sq.Km
Maximum Demand	938 MVA
Power Transformer Installed Capacity	2,313 MVA
No. of Distribution Transformer (DT)	72323
Distribution Transformer (DT) Installed Capacity	2657 MVA
HT Mains-33 kV	2895 Ckt. KMs
HT Mains-11 kV	37591 Ckt. KMs
LT Mains	66672 Ckt. KMs
Nos. of 33 kV Feeders	98
Nos. of 11 kV Feeders	797
Nos. of 33/11 kV Sub Station	228
Nos. of Power Transformer	505

The Energy and Performance Fact Sheet of TPNODL for the last 2 financial years is furnished below:

PARTICULARS	FY 20-21	FY 21-22
Total Sale (MU)	3922	4347
T & D Loss (%)	20.63%	18.40%
Billing Efficiency (%)	79.37%	81.60%
Billing To Consumers (Rs. in Cr.)	2125.49 Cr.	2560.14 Cr.
Collection Received (Rs. in Cr.)	2004 Cr.	2411.66 Cr.
Collection Efficiency (%)	94.28%.	94.20%
AT& C Loss (%)	25.17%	23.13%

Metering Status of TPNODL:

Category	FY 2020-21			FY 2021-22		
	Total	No. of Metering Completed	% of Metering Completed	Total	No. of Metering Completed	% of Metering Completed
33 kV Feeders	91	91	100.00%	98	98	100%
11 kV Feeders	720	655	90.97%	797	545	68.38%
Distribution Transformers	70429	2208	3.14%	72323	2208	3.05%
Consumers	2008133	1902980	94.76%	2089083	2010760	96.25%

Abstract of Energy Bill Served by GRIDCO to TPNODL:

Sl.No.	Month	SMD Approved by OERC(kVA)	SMD Permitted by OERC(kVA)	Actual SMD (kVA)	Total Energy Billed (MU)	Total Energy Sale (MU)	LOSS (%)	Total Energy Billed as per OERC (MU)	Total Energy Sale as per OERC (MU)	LOSS (%) As per OERC
1	Apr-21	1100000	1210000	888627	484.141	339.216	30%	484.142	339.216	30%
2	May-21	1100000	1210000	819284	410.394	347.978	15%	410.394	347.978	15%
3	Jun-21	1100000	1210000	887428	444.989	342.477	23%	444.919	342.477	23%
4	Jul-21	1100000	1210000	883171	483.680	372.693	23%	484.235	372.693	23%
5	Aug-21	1100000	1210000	908721	508.672	387.623	24%	508.672	387.623	24%
6	Sep-21	1100000	1210000	889893	452.575	400.417	12%	452.575	400.417	12%
7	Oct-21	1100000	1210000	926873	472.413	399.005	16%	472.548	399.005	16%
8	Nov-21	1100000	1210000	763045	391.575	373.219	5%	392.829	373.219	5%
9	Dec-21	1100000	1210000	738317	390.734	337.478	14%	390.925	337.478	14%
10	Jan-22	1100000	1210000	729812	404.162	350.518	13%	404.378	350.518	13%
11	Feb-22	1100000	1210000	771882	375.102	317.098	15%	375.244	317.098	15%
12	Mar-22	1100000	1210000	937943	506.037	379.276	25%	506.182	379.276	25%
TOTAL		**13200000**	**14520000**	**10144996**	**5324.474**	**4346.998**	**18%**	**5327.043**	**4346.998**	**18%**

Critical Observation: There is difference in the total input energy to the DISCOM in Primary data (Energy Billed by GRIDCO to TPNODL) and in Secondary data (TPNODL reported energy input data to Hon'ble OERC). TPNODL has acquired licensee of the Utility on 1st April 2021 by virtue of the vesting order of the Hon'ble OERC. TPNODL has reported that there might be an error which has occurred before the transition date. TPNODL is advised to rely on both primary and secondary set of data while reporting the major energy data like, total input energy and total billed energy in future.

ENERGY CONSERVATION MEASURES:

DETAILS OF ENERGY CONSERVATION MEASURES RECOMMENDED IN THE ENERGY AUDIT REPORT [2022-23]							
Sl. No.	**Energy Saving Measures**	**Investment (In Cr)**	**Targeted Annual Energy Savings in MU**	**Targeted Financial Savings in rupees (In Cr)**	**Payback Period**	**Date of Completion of measure / likely completion**	**Remarks**
A	**Loss Reduction**		245.76	85.53	3.71	FY 2022-23	As per the annual reduction in T&D loss target of Hon'ble OERC and detailed note attached
	Installation of AMR meters at Distribution transformers	4.5					
	Conversion of LT Bare conductor to AB Cable	4.93					
	Meters and metering equipment for energy audit	1.19					
	Equipment for Meter data	0.46					

	downloading						
	Equipment for AMR enablement of 3 phase consumer meters	0.45					
	Field Testing equipment - Metering (Portable Calibrator)	1					
	Total (A)	**12.53**					
B	**Reliability**						
	Refurbishment of 33KV/11KV Primary Substation (PSS)	10					
	33 KV Conductor up gradation	11.2					
	11 KV Conductor up gradation	8.8					
	Refurbishment of 11KV/0.415 KV Distribution Substation (DSS)	2.4					
	Installation of LV protection at DSS	5.54					
	Installation of Auto reclosure / Sectionalizers, RMUs, and FPIs	10.6					
	33 kV and 11 kV Voltage Regulators for voltage improvement	4.2					
	LT FLC System	3.52					
	Installation of station transformers (PPS)	2.55					
	Capacitor Bank at PSS for low voltage improvement	0.88					
	Earthing of Power Transformers and Distribution Transformers	0.49					
	Total (B)	**60.18**					
C	**Network Optimisation & Load Growth**						

	Augmentation of Power Transformer	4.98					
	Augmentation of Distribution Transformer	20.81					
	Addition of LT lines	13.66					
	Addition of 11 kV Lines (O/H and U/G)	16.98					
	Addition of 33 kV Overhead Lines (O/H and U/G)	10.87					
	Addition of New PTR and New DTRs along with Associated HT/LT lines	15.58					
	Provision for Nua Balasore Project.	10					
	Total (C)	**92.88**					
D	**Disaster Mitigation**						
	Conversion of 2nos PSS from AIS to GIS	20.4					
	Conversion of pole mounted DTR to plinth mounted (100 KVA and above)	3.52					
	Height enhancement of the lines at river crossing	4.5					
	Strengthening of poles in the cyclone prone area	2.4					
	Trolley Mounted Pad Substations	1.17					
	Overhead to Underground conversion for Major City	20					
	Emergency Preparedness (Life boat and other emergency accessories)	1.8					
	Total (D)	**53.79**					
E	**Technology & Civil Infrastructure**						

	DC Hardware	10.33					
	Software Licenses for IT Application	12.66					
	End computing devices	8.96					
	Cyber Security	1.2					
	Automation of non ODSSP PSS	7.66					
	SCADA-ADMS	9.05					
	GIS Software Implementation and Land Base and Network Survey and Digitization for Balasore and Jajpur Circle	17.94					
	Civil Infrastructure (Office Buildings, PSS, Stores, Approach Roads, Record room, Cafeteria Canteen, MRT office and others)	25.12					
	Security cameras and heavy-duty Racking system / Storage solutions for the store	0.96					
	Offices Equipment	3.93					
	Total (E)	**97.81**					
Grand Total		**317.19**	**245.76**	**85.53**	**3.71**		

CALCULATION OF PAYBACK PERIOD:

Approved sale of TPNODL as approved by commission for FY 2022-23= 4915.30 MU

Calculated T&D Loss of TPNODL for FY 2021-22= 18.40 %

Target T&D Loss as approved by Hon'ble OERC for FY 2021-22= 18.35%

So, Targeted Annual Energy Savings in MU = 4915.30*(18.40%-18.35%) = 245.76 MU

Approved Bulk Supply Price of GRIDCO for FY 2022-23= 3.20 per Unit

Approved Transmission Tariff of OPTCL for FY 2022-23= 0.28 per Unit

Hence financial saving of TPNODL due to T&D loss reduction= (3.20+0.28)*245.76/10=85.53 crs

Total investment approved by Hon'ble OERC for T&D Loss=317.19 Cr.Rs

Simple Payback period = TOTAL INVESTMENT / SAVINGS = 317.19/85.53= 3.71 Years

SYSTEM ADEQUACY & NETWORK PLANNING FOR LOAD GROWTH OF TPNODL:

The existing network of TPNODL is already overloaded or approaching the overload limit. It is anticipated that some of the Power Transformers, Distribution Transformers, 11kV & 33kV Lines may be overloaded in next 2 to 3 years with the consumer growth of around 5% per annum.

Major Category	Activity	Amount (in Cr.)
Load Growth	Meter installation for all new connection	**32.49**
	Network extension to release new connection	**20**
	Addition/Augmentation of Power Transformers	**15**
	11KV System Augmentation	**10**
Total		**77.49 Cr.**

Augmentation of Power Transformers:

Sr.No.	Description	UOM	Qty	Amount in Crores
A	Augmentation from 8 MVA to 12.5 MVA Power Transformer	EA	2	3.95
B	Augmentation from 5 MVA to 8 MVA Power Transformer	EA	5	6.01
Total				9.96

Augmentation of Distribution Transformers:

Sr.No.	Description	UOM	Qty	Amount in Crores
A	Augmentation of 200/250 KVA to 400 KVA Distribution Transformers	EA	23	4.32
B	Augmentation of 100 KVA to 250 KVA Distribution Transformers	EA	71	7.03
C	Augmentation of 25/63 KVA to 100 KVA Distribution Transformers	EA	165	9.46
Total				**20.81**

Addition of 11 kV Lines:

Sr.No.	Description	UOM	Qty	Amount in Crores
A	11 kV Addition Line (O/H) -100 sq.mm AAAC	Ckm	163	32.71
B	11 kV Addition Line (U/G) - 3Cx400 sq.mm XLPE Cable	Ckm	2	1.25
Total				**33.96**

Addition of 33 kV Lines:

Sr.No.	Description	UOM	Qty	Amount in Crores
A	33 kV Addition Line (O/H) -148 sq.mm AAAC	Ckm	82.8	19.82
B	33 kV Addition Line (U/G) - 3Cx400 sq.mm XLPE Cable	Ckm	2.5	1.92
Total				**21.74**

Addition of New PTR & New DTRs Along with Associated HT/LT lines:

Sr.No.	Description	UOM	Qty	Amount in Crores
A	Addition of New DTR along with associated HT / LT Line.	Nos	135	20.77
B	Addition of PTRs	Nos	10	10.38
Total				**21.74**

The present annual energy audit is conducted in compliance with BEE (Manner and Intervals for Conduct of Energy Audit in electricity distribution companies), Regulations 2021 by Power Tech Consultants.

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2.0 SUMMARY OF CRITICAL ANALYSIS AND MAJOR OBSERVATIONS AND RECOMMENDATIONS:

The observations and critical comments with regards of the energy data as furnished in the Pro-forma by TPNODL is furnished as under.

1. In Cell D-25-26-27 of the "Infrastructure Detail" sheet of the Pro-forma in the line length of AB cable, there should be provision for separate entry for line length of AB cable, Underground Cable, 66kV, 33kV. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

2. The Cell C-28 of "Infrastructure Details" sheet of the Pro-forma may be read and considered as Energy Purchase Particular. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

3. There is no separate segregation of input energy and sale to consumers at 33kV and 11kV levels as per the prevailing practice of TPNODL. However in the "Infrastructure Details" sheet of the Pro-forma [Ref Row 4(ii) and 4(iii)], there is a requirement to fill the data of 11kV and 33kV voltage wise energy input and energy sale. TPNODL has clubbed both the 33kV and 11kV energy input and energy sale and provided the data in 11kV row. It is recommended that in future TPNODL is required to segregate the 11kV and 33kV Input Energy and Energy Sale.

4. In the Pro-Forma it is recommended that after Row-76 of "Infrastructure Details" sheet of the Pro-forma there has to be another row having provision to incorporate the energy supplied to 33/11 KV , 33/0.415 Substation.

5. In Energy Accounting Summary of "Infrastructure Details" sheet of the Pro-forma [Ref Row 5(ii) and 5(iii)], TPNODL has reported HT Input by reverse calculating the difference of total sale and HT sale and assuming 8% loss in the HT System, which is not the correct approach. Since majority of the 33kV Feeders are metered at GSS end and all the 33kV consumers are supplied with meters and majority of the outgoing 11KV Feeders in the PSS are being metered, therefore TPNODL is in a position to capture the Total Input Energy and Energy Sale at 33KV System. In view of the same it is recommended TPNODL should take a corrective approach to capture 33kV and 11kV Input Energy and Energy Sale as per the meter data and should not consider the normative approach of 8% distribution loss in HT Systems.

6. 33kV meters are installed at Grid Substation (GSS) interface points and at each consumer points. However, 33kV meters are not installed at the input point to the 33/11 kV substation (PSS).

7. TPNODL informed that they have not completed 100% metering of the 11KV Feeder and accordingly submitted the received energy at the 11kV Feeder where they have installed the meter. Further TPNODL submitted that they have not installed meters at DTR and wherever the earlier meters were installed in DT level, the data were not captured in regular interval due to lack of metering and billing personnel . At DTR level the metering data is not available. TPNODL is required to audit the DTR's and provide the metering data. TPNODL has also informed that the consumers are not properly mapped or indexed to each 11KV/33KV Feeders. In view of the same TPNODL couldn't submit the data at Cell K-3 (Received at Feeder), Cell L-3(Feeder consumption), Cell M-3(Final net export at

feeder level) in the "Details of Feeder Levels" sheet of the Pro-forma due to which T&D loss and AT&C loss of feeder wise losses could not be computed.

8. In the Cell S-11 & S-12 of "Form Input Energy" sheet of the Pro-forma the remarks couldn't be entered as the cell is protected. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

9. In the Cell R-23-24 of "Form Input Energy" sheet of the Pro-forma the length of AB cable and length of underground cable may be considered as length of LT-AB cable and length of LT underground cable.

10. In cell no P-28 of "Form input energy" sheet of the pro-forma the (period from-- to --) may be considered as 1st April 2021-31st Mar 2022. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

11. In the cell D-29 of "Form Input Energy" sheet of the pro-forma, the voltage level unit should be in kV, instead of kVA. Again in Cell E-29 & F-29 "Form Input Energy" sheet of the pro-forma the unit of division & subdivision (KVA) may be edited. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

12. Station consumption at OPTCL Grid Substation is considered as Export for adjustment purpose in the BSP Bill of GRIDCO and hence same are mentioned accordingly in the "Form Input Energy" sheet of the pro-forma.

13. It is observed that the EHT/HT consumption is low as compared to LT Consumption. It is recommended that TPNODL should pray before Hon'ble Commission for tariff rationalisation measures to be adopted for HT / EHT Consumers. TPNODL may be required to incentivise the Industrial Consumption by taking up better tariff rationalisation measures in future tariff hearing process, as increase in HT / EHT consumption will help in reducing the T&D loss and AT & C loss.

14. It is found that the % of defective meters are more in consumer category like Kutri Jyoti, Agro, Allied Agro, Agricultural, Street Lighting and Specified Public purpose. It is recommended to give special emphasize on Kutri Jyoti, Agro, Allied Agro, Agricultural, Street Lighting and specified Public purpose category consumer for replacement of defective meters with correct one. In the next tariff hearing process TPNODL may propose to the Hon'ble Commission DBT based subsidy for these consumers in which the subsidy linked with the above category consumer can be transferred through Direct Benefit Transfer (DBT) Scheme based on the correct meter reading. In case meter is tampered and found to be defective, then the transfer of subsidy may be stopped till the meter is replaced with correct meter.

15. It is found that the state and central government are implementing a no. of electrification project in which meters are becoming defective and stopped working after few months of installations. Currently very few meters manufacturers have been approved by TPNODL. It is recommended that TPNODL should empanel a nos. of quality meter manufacturers from where the contractor should procure meters and install in Government sponsored project and the meter manufacturer should issue guarantee certificate of each meter for a period of 5 years in favour of the local DISCOM where the project is being implemented so that in case of any defective meter is found by the DISCOM, then same can be replaced by the meter manufacturers directly. TPNODL should inform both State and Central Government implementing agency regarding % increase in defective meters happening in their sponsored scheme so that they can take appropriate remedial measures.

The observations and critical comments with regards of the Field Visit of the Audit team to various TPNODL Grid Substations (GSS):

1. It is observed that the 33kV meters are installed at Grid Substation (GSS) interface points and at each consumer points. However 33kV meters were not installed at the input point to the 33/11 kV substation (PSS) for the FY 2020-21 but in the FY 2021-22 there is a significant increase in the meter installed at the 33/11 kV substation (PSS) input point.

2. SCADA system has been implemented in various Grid Substations across TPNODL to collect data from the PSS for better load management but automation of the PSS has not been implemented yet.

3. It is observed that in some of the Primary Substations the Silica gel breather of the Transformer are in bad condition. It is recommended that TPNODL should maintain the GSS for better safety and to avoid the unwanted loss and damage.

4. It is also observed that in some of the Grid Substation there is no or very less Metal spreading which is a safety issue. It is recommended that TPNODL should do the metal spreading in the required Substations.

5. It is observed that the DT metering in various DTs under TPNODL is underway. It is recommended that DTR metering should be done across TPNODL, made functional and meter reading should be taken on monthly basis for better load management and analysis.

The various loss reduction recommendations are furnished below.

1. It is recommended that TPNODL should pray before the Hon'ble Commission for tariff rationalisation measures to be adopted for HT / EHT Consumers so that HT / EHT Industries will be incentivised to procure power from DISCOM without depending much on Open Access. TPNODL may be required to incentivise the Industrial Consumption by taking up better tariff rationalisation measures in future tariff hearing process, as increase in HT / EHT consumption will help in reducing the T&D loss and AT & C loss.

2. It is recommended that TPNODL should initiate dialogue with Urban Local Bodies and the Agricultural Department regarding higher percentage of defective meters found in street lights and agricultural sectors. It is recommended that the TPNODL should involve Government Machinery and political people for awareness creation and to reduce meter tampering and theft of electricity. TPNODL should initiate dialogue with the Agricultural Department regarding higher percentage of agricultural connections having no meters and take early action for providing connections with meters.

3. It is recommended that the TPNODL should involve the Government Machinery and Agricultural Department for awareness creation for metered power supply connection and to reduce meter tampering. It is proposed that the subsidy meant for Agriculture Category Consumer should be Aadhar linked and should be transferred through Direct Benefit Transfer (DBT) Scheme based on the correct meter reading. In case there is no meter or meter is tampered and found to be defective, then the transfer of electricity tariff subsidy

as well as other Agriculture Subsidy of the Agriculture Department may be stopped till the defective meter is replaced with the correct meter.

4. It is proposed that TPNODL should promote Energy Efficient Lighting System (LED Bulbs, Tube lights and Energy Efficient Fans) in association with BEE / EESL / Private ESCO in its utility area. The availability of LED Bulbs, Tube Lights, BLDC Fans, IE3 Meters which are supposed to be distributed to consumers through BEE / EESL / Private ESCO as part of the Utility based Demand Side Management Program are not available in plenty. TPNODL may discuss with BEE / EESL / Private ESCO to open more outlets and increase the LED Lights, Super-Efficient AC and Fans Distribution.

5. Promoting the use of renewable energy (Solar) through facilitation:

   Hon'ble Commission has notified Net Metering Scheme for Solar Roof Top Project in the consumer premises. TPNODL should popularize the scheme for LT consumers and provide prompt support and cooperation to the consumer for net metering agreement and solar project interconnection with DISCOM systems. Once Solar Interconnection happens at the LT systems, this will improve the voltage profile and reduce LT loss. Also the RPO of GRIDCO / DISCOM can be compiled which may reduce the BSP in future and will lead to financial savings for DISCOM.

6. At present Hon'ble OERC has implemented kVAh billing for the HT/ EHT/ Commercial / MSME and Industrial consumers. In view of the kVAh billing, the consumer which are having low power factor are paying higher energy bills, still the awareness about kVAh billing is not there and consumers are operating with low Power Factors. TPNODL may carry out special drives for awareness and sensitisation about kVAh billing. This may lead to more numbers of APFC installation and improvement in Power Factor and will lower the burden on the existing infrastructure. TPNODL may sign MoU with ESCO / AFPC installer under the Utility based Demand Side Management program so that APFC installer will assess the data base of Consumers with low power factor, take necessary action for installation of APFC Panels in consultation with Consumers directly.

7. Exploring opportunities in industrial segments (using efficient motors, pumps, compressors, capacitor bank, etc). TPNODL can coordinate and inform BEE / EESL / Private ESCO to provide the Industrial LED lighting Solution, IE3 Motors in RESCO / PMC level as per the provision of DSM Regulations. This will facilitate Demand Side Management in a long way.

8. TPNODL should conduct more nos. of Consumer awareness programs on saving electricity, electricity wastage, power theft, using electricity during off peak hour, using star rated equipment.

ACTION PLAN OF THE DISCOM:

Action Plan of the DISCOM to complete communicable metering of Feeders, DTs and Consumers:

In order to revive feeder and DT metering a complete survey has been planned by TPNODL. 100% 33KV and 11KV feeder metering is being targeted to be completed by the end of FY 22-23. The AMR and Modem installation is targeted to be completed by March 23.

With reference to the issue of communicable DT Meters, the procurement of the smart meter is under process. TPNODL is planning to install the same w.e.f. FY 22-23. TPNODL has planned to complete 100% DT meter installation work by FY 24-25. TPNODL is also in process in rectification of DTR metering in a phased manner along with modem installation.

The consumer meter installation is in ongoing process, TPNODL have strengthened the system to liquidate all the pendency in FY 2022-23.

Detail	Plan FY 21-22	Plan FY22-23	Plan FY23-24
33kv Feeder Metering (Emanating From GSS)	91	91	91
11KV Feeder Metering	327	720	720
DTR Metering (11/.4, 33/.4) KV	2269	2469	6469

TPNODL is recommended to maintain the status of DTR metering of Transformer below 25 kVA.

Action plan on reducing losses of those feeders whose T&D loss is > 40%:

TPNODL have done sample study for 86 Feeders. These 86 feeders have been taken under initiative of project light house feeders for reduction of T&D losses.

Following Actions have been taken:

- Structured maintenance by the O&M team.
- Extensive tree trimming activities carried out by section team.
- Refurbishment activities in comprises of replacement of poles, defective accessories and worn out conductors.
- Maintenance and planning group will be monitoring the network availability, reliability and ability parameters and analyse reasons of outage and planned corrective actions.
- Meter management group team will be replacing the faulty meters and burnt meters.

3.0 BACKGROUND

Energy Conservation has become a top most priority in today's scenario in order to have a sustainable growth, productivity, enhancement & environmental protection. Considering the vast potential of energy savings and benefits of energy efficiency as per the report prepared by National Development Council (NDC) Committee on power, Govt. of India enacted the Energy Conservation Act 2001. The aim of EC Act 2001 is to provide the much-needed legal framework and other institutional arrangements so that various energy efficiency improvement drives can be easily launched at the state and national level. In order to implement the various provisions under the EC Act 2001, the Government of India established the Bureau of Energy Efficiency (BEE) on 1st March 2002 for development of policies and strategies with a thrust on self regulation and market principles, with the primary objective of reducing energy intensity of the Indian Economy and to enact and enforce energy efficiency through various regulatory and promotional measures.

Role of BEE

BEE coordinates with designated consumers, designated agencies and other organizations and recognizes, identifies and utilizes the existing resources and infrastructure, in performing the functions assigned to it under the Energy Conservation Act. The Energy Conservation Act provides for regulatory and promotional functions.

The Major Promotional Functions of BEE include:

- Create awareness and disseminate information on energy efficiency and conservation
- Arrange and organize training of personnel and specialists in the techniques for efficient use of energy and its conservation
- Strengthen consultancy services in the field of energy conservation
- Promote research and development
- Develop testing and certification procedures and promote testing facilities
- Formulate and facilitate implementation of pilot projects and demonstration projects
- Promote use of energy efficient processes, equipment, devices and system
- Take steps to encourage preferential treatment for use of energy efficient equipment or appliances
- Promote innovative financing of energy efficiency projects
- Give financial assistance to institutions for promoting efficient use of energy and its conservation
- Prepare educational curriculum on efficient use of energy and its conservation
- Implement international co-operation programmes relating to efficient use of energy and its conservation

Perform Achieve and Trade (PAT) Scheme

National Mission of Enhanced Energy Efficiency (NMEEE) is one of the eight national missions of the NAPCC released by the Prime Minister on 30th June 2008. BEE has been entrusted with the task of preparing the implementation plan for NMEEE. PAT scheme is formulated under National

Mission for Enhanced Energy Efficiency (NMEEE) which is one of eight plans in the National Action Plan on Climate Change (NAPCC).

PAT is a regulatory instrument framed by BEE and Ministry of Power to reduce specific energy consumption in energy intensive industries and reduce T & D loss in DISCOMs with an associated market based mechanism to enhance the cost effectiveness through certification of excess energy saving which can be traded in power exchange.

Purpose of Audit and Accounting Report

DISCOMs are currently focusing on Energy Conservation and Energy Efficiency to a larger extent for reducing the T & D Loss and improving the performance. Efficient energy management, usage of energy efficient technologies and adopting best-practices for reduction T & D Loss would help utility to improve their billings, collection, energy sale and profitability. As per the PAT scheme of BEE, TPNODL being a DISCOM having annual AT & C losses more than 1000 Million kWh i.e. 86000 Metric Tonne of Oil Equivalent (MTOE) is a Designated Consumer as per EC Act 2001.

The main focus of the audit is to establish T & D Loss for the year 2021-22, collection of technical information like annual energy consumption, nos. of connections, nos. of disconnections, connected load and percentage of total connected load, energy billed, net input energy, power factor, total supply hours, scheduled outage, scheduled supply hours, unscheduled outage, available supply hours and evaluation of T & D loss, AT & C loss and billing efficiency of utility, finding out deviations from the baseline T & D loss, evaluations of energy management systems, exploring future energy conservation measures, energy saving potentials and providing recommendation for the same.

In line with Section 14(g) of the Energy Conservation(EC) Act, the Central Government has notified targets (in the form of Specific Energy Consumption) for Designated Consumers (DCs) on 26th October 2021 under the PAT cycle-VII. The baseline Distribution loss of TPNODL has been fixed as 18.74% for baseline year 2018-19 to with baseline net input energy 5575.61MU. TPNODL has been directed to reduce its T&D Loss to 17.60 % in Target Year 2024-25.

BEE (Manner and Intervals for Conduct of Energy Audit in electricity distribution companies), Regulations 2021 has been notified on 6th October 2021 and as per Regulation 3 of the said Regulations, it is required that the TPNODL to conduct the annual energy audit by an Accredited Energy Auditor and submit the report to BEE and SDA.

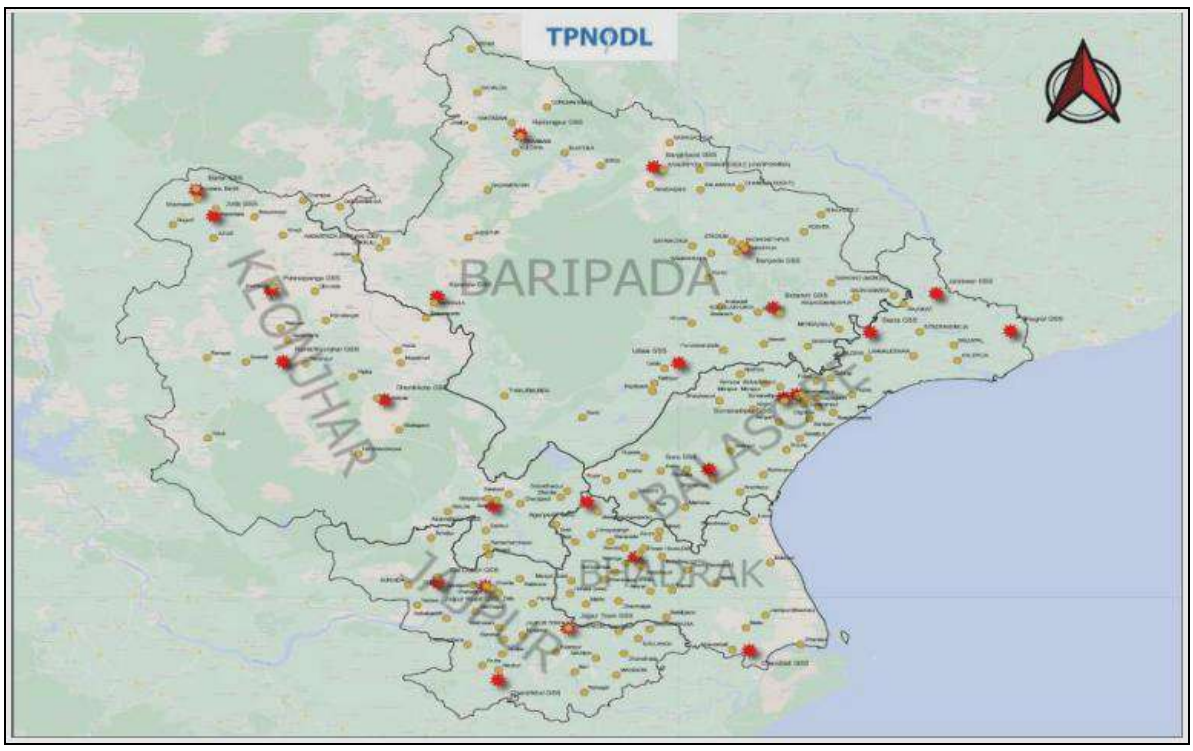
The management of TPNODL evinced keen interest in availing the services of PTC for conducting Annual Energy Audit of TPNODL. The proposal for conducting energy audit of the DISCOM was accepted by the management of TPNODL vides their PO No. 4800001331 dated 03.08.2022. Accordingly, PTC has been entrusted with the work of conducting the annual energy audit and submission of reports for the same. The field study, measurement and audit activities by PTC was conducted at site from 8th June 2022 to 9th June 2022 & 3rd August 2022 to 4th August 2022 and the report has been prepared based on the field study data, available technical data as well as information / inputs received from TPNODL.

4.0 INTRODUCTION ABOUT DISCOMS (DC)

TP Northern Odisha Distribution Limited (TPNODL) is a joint venture of Tata Power (51%) and Govt of Odisha (49%) on the Public-Private Partnership (PPP) model. Govt. of Odisha (GoO)'s share is held by it through its 100% owned company GRIDCO. TPNODL was vested in the Utility of NESCO for distributing and retail supply of electricity in the northern part of Odisha, through a Vesting Order issued by the Hon'ble Odisha Electricity Regulatory Commission (OERC). The business of TPNODL utility is governed by the provisions of license issued by Hon'ble Odisha Electricity Regulatory Commission (OERC) for distribution and retail supply of electricity in North Odisha.

TPNODL procures power from GRIDCO which is a state-owned company, engaged in the business of purchase of electricity in bulk from various generators located inside Odisha and the state share of power from Central generators. GRIDCO supplies power to all power distribution utilities, including TPNODL under the existing Bulk Supply Agreement between TPNODL and the GRIDCO. The power procurement price is the Bulk Supply Price at which GRIDCO supplies power to Distribution utilities which is determined by Hon'ble OERC and apportioned based on the ability of each DISCOM to pay the energy charges to GRIDCO.

TPNODL license area is spread over geography of 27857 Sq.Km having coastal line of about 150 Km serving the registered consumer base of 2.05 million. TPNODL procures power from GRIDCO which is a state owned company. It receives electrical power at a sub transmission voltage of 33KV from Odisha Power Transmission Company Limited's (OPTCL) 220/132/33 kV Grid Substations and then distributes the power at 33KV / 11KV / 440V / 230V depending on the demand of the consumers. For effective operations, license area is divided in 5 circles which is further sub divided in 16 Divisions, 50 Sub-division & 159 sections which manages the commercial and O&M activities in order to serve its consumer.



The details of administrative set up of TPNODL are furnished below.

Name and Address of Designated Consumer:
TP Northern Odisha Distribution Limited (TPNODL)
Corporate Office: Januganj, Dist: Balasore-756019, Odisha
Phone: 06782-244865, Fax: 06782-244259
Email: ceooffice@tpnodl.com, manish.kriplani@tpnodl.com
Website: www.tpnodl.com

NAME AND CONTACT DETAILS OF ENERGY MANAGER AND AUTHORIZED SIGNATORY OF DISCOM:

Authorized Signatory:
Mr. Bhaskar Sarkar, Chief Executive Officer
Phone: 9223512396
E-mail: ceooffice@tpnodl.com

Nodal Officer:
Mr. Dushyant Kumar Tyagi, Chief Operation
Phone: 9971555724
Email: dk.tyagi@tpnodl.com

Designated Energy Manager:
Mr. Manish Kriplani, HoG EA
Phone: 9799495503
E-mail: manish.kriplani@tpnodl.com

IT Manager:
Mr. Amit Kumar, HoG OT
Phone: 9560044457
Email: amit.kumar@tpnodl.com

Financial Manager:
Mr. Pravakar Sahoo, Manager Finance
Phone: 9438906024
Email: pravakar.sahoo@tpnodl.com

The details of organisational set up of TPNODL are furnished below:

DETAILS	As on 31st March 2021	As on 31st March 2022
No. of Circles	5	5
No. of Divisions	16	16
No. of Subdivisions	50	50
No. of Sections	159	159

Sr. No.	Circle	Division	Sub-div
1	Balasore	**BED, Balasore**	Supply No-I
			Supply No-II
		BTED, Basta	Basta
			Jamsuli
		JED, Jaleswar	Jaleswar S/D
			Bhograi S/D
		CED, Balasore	RE-I
			RE-II
			Nilagiri
		SED, Soro	Soro
			Bahanaga
			Markona
			Khaira
2	Bhadrak	**BNED, Bhadrak**	No.I Bhadrak
			No.II Bhadrak
			Basudevpur
			Dhamra
			Tihidi
		BSED, Bhadrak	Bhadrak Rural
			Dhamnagar
			Asurali S/D
3	Baripada	**BPED, Baripada**	Baripada
			Rural S/D, Baripada
			Betnoti
			Kuliana
			Moroda
		UED, Udala	Khunta
			Udala
		RED, Rairangpur	Rairangpur-I
			Rairangpur-II
			Karanjia
			Joshipur
4	Jajpur Road	**JRED, Jajpur Road**	Panikoili
			Jajpur Road
			Duburi
		JTED, Jajpur Town	No.I Jajpur Town
			Dasharathpur
			Binjharpur
		KUED, Kuakhia	Bari
			Dharamasala
			Kuakhia
5	Keonjhar	**KED, Keonjhar**	No.I Keonjhar
			No.II Keonjhar
			Turumunga
		JOED, Joda	Joda
			Champua
			Barbil
		AED, Anandapur	Anandapur
			Ghatagaon
			Bidyadharpur

4.1 SUMMARY PROFILE OF TPNODL

TPNODL receives electrical power at 33kV level from 27 numbers of Grid Sub stations (GSS) out of which 3 nos. GSS are rated at 220/33kV, and 23 nos. at 132/33kV located within the vicinity of TPNODL operational area.

TPNODL distributes the power at 33kV / 11kV / 415V / 230V depending on the demand of the consumers. At present, there are 98 numbers of 33KV feeders with a combined route length of approximately 2,868 KMs supplying power to 228 numbers of 33/11KV Primary Substation (Structures). The 33KV supply is stepped down to 11KV level through 505 numbers of 33/11KV power transformers at these primary substations with an installed capacity of 2,313 MVA. Nearly 765 numbers of 11KV feeders radiates from the 33/11KV primary substations having length of approximately 37,296 KMs and supply power to HT consumers connected at 11KV level and LT customers connected to 11/0.415KV distribution substation. Approximately 71,358 numbers of distribution transformers are installed in all five circles with an installed capacity of 2618 MVA. The length of the LT feeders is 66,470 KMs approximately.

The Detail of Network Systems of TPNODL is furnished below:

Network System	As on 31st March 2021	As on 31st March 2022
Length of 33 KV Line (km.)	2868	2895
Length of 11 KV Line (km.)	37069	37591
Length of LT KV Line (km.)	66300	66672
Length of LT AB Cable (km.)	43604	43971

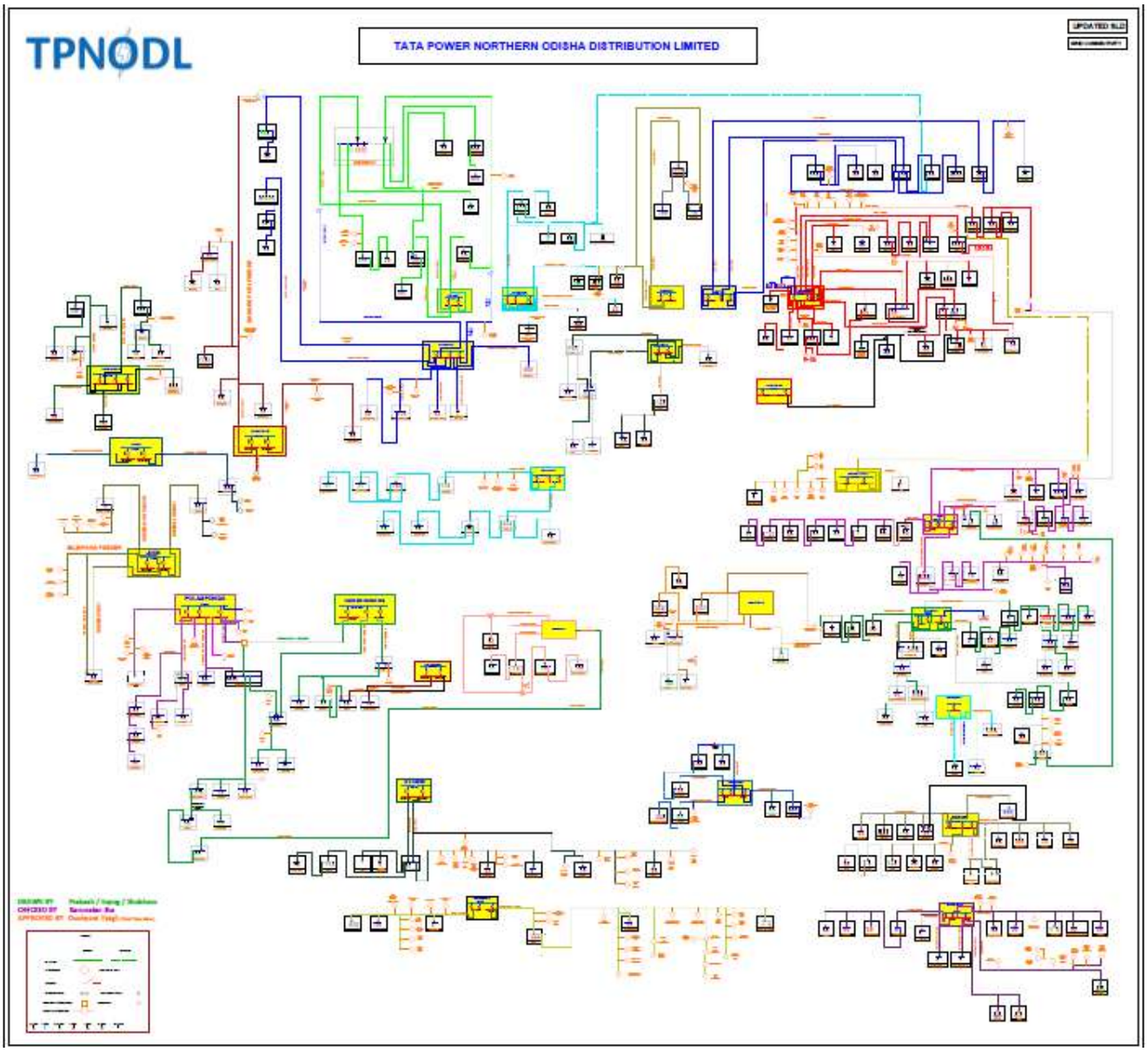
Metering Status of TPNODL:

CATEGORY WISE % OF METERING COMPLETED						
Category	FY 2020-21			FY 2021-22		
	Total	No. of Metering Completed	% of Metering Completed	Total	No. of Metering Completed	% of Metering Completed
33 kV Feeders	91	91	100.00%	98	98	100%
11 kV Feeders	720	655	90.97%	797	545	68.38%
Distribution Transformers	70429	2208	3.14%	72323	2208	3.05%
Consumers	2008133	1902980	94.76%	2089083	2010760	96.25%

Comments on the above table:

As per the performance review report of TPNODL submitted to Hon'ble OERC, the percentage of DT Metering in the FY 2020-21 is around 3.14 % and in the FY 2021-22 it is around 3.05%.

SLD of TPNODL as a whole:



Consumer Base of TPNODL:

The details of total numbers of Consumers in TPNODL area is furnished below:

Consumer Category	No of connection (Nos)	No of connection Un-metered (Nos)	Total Number of connections (Nos)
Residential	1863780	73095	1936875
Agricultural	22981	3472	26453
Commercial/Industrial-LT	102813	431	103244
Commercial/Industrial-HT	469	0	469
Others	20717	1325	22042
Total	2010760	78323	2089083

The Detail of Assets under TPNODL is furnished below:

ASSETS	As on 31st March 2021	As on 31st March 2022
No. of 33 KV feeders (Including GRIDCO interface)	91	98
No. of 11 KV feeders	720	797
No. of 33 / 11 kV POWER Transformers	488	524
No. of Distribution Transformers (11/0.4 & 33/ 0.4 kV)	70429	72323

5.0 DISCUSSION AND ANALYSIS

The main objective of Energy Audit is to establish the following.

- Energy input to the system
- Energy utilized / sold (Energy Sales) to the consumer
- Energy losses in the system.
- To assess the efficiency of the system
- To identify the area of high T&D losses
- To assess the extent of theft & pilferage
- To take appropriate steps for making the system technically more efficient and financially sustainable

Energy audit distinctly addresses the problems of energy losses. Hence any savings in energy usage and reduction of losses directly leads to the profitability of the utility.

The Energy and Performance Fact Sheet of TPNODL for the last 2 financial years is furnished below:

Energy Accounts of Previous Year:

TPNODL has purchased around 4941.190 MU of Energy from GRIDCO in FY 2020-21 and has billed around 3921.633 MU of energy to its various consumers and thus has a T&D Loss of around 20.63 % & AT&C Loss of around 25.17%in FY 2020-21 as per the performance review report of TPNODL submitted to Hon'ble OERC.

PARTICULARS	FY 2020-21
Input Energy(MU)	4941.190
Total Sale (MU)	3921.633
T & D Loss (%)	20.63%
Billing Efficiency (%)	79.37%
Billing To Consumers (Rs. in Cr)	2125.49
Collection Received (Rs. in Cr)	2003.99
Collection Efficiency (%)	89.58%
AT& C Loss (%)	25.17%

Energy Accounts and performance of TPNODL in Current Year:

TPNODL has purchased around 5327.043 MU of Energy from GRIDCO in FY 2021-22 and has billed around 4346.998 MU of energy to its various consumers and thus has a T&D Loss of around 18.40% & AT&C Loss of around 23.13%in FY 2021-22 as per the performance review report of TPNODL submitted to Hon'ble OERC.

PARTICULARS	FY 2021-22
Input Energy(MU)	5327.043
Total Sale (MU)	4346.998
T & D Loss (%)	18.40%
Billing Efficiency (%)	81.60%
Billing To Consumers (Rs. in Cr)	2560.14
Collection Received (Rs. in Cr)	2411.66
Collection Efficiency (%)	94.20%
AT& C Loss (%)	23.13%

Division Wise Energy & Performance Fact Sheet of TPNODL for FY 2021-22:

Name of Division	Energy Input (MU) (Assuming HT Loss 8%)	Energy Sold (MU)	T & D Loss (%) (Assuming HT Loss 8%)	Billing Efficiency (%)	Billing to Consumer (Rs. in Crs.)	Collection Received (Rs. in Crs.)	Collection Efficiency (%)	AT & C Loss (%)
BED, BALASORE	294.834	257.411	12.69%	87.31%	161.16	153.33	95.14%	16.93%
BTED, BASTA	139.527	80.784	42.10%	57.90%	38.98	30.38	77.94%	54.87%
JED, JALESWAR	237.002	183.469	22.59%	77.41%	95.89	84.74	88.37%	31.59%
CED, BALASORE	299.004	205.224	31.36%	68.64%	119.25	119.26	100.01%	31.36%
SED, SORO	210.638	169.587	19.49%	80.51%	85.17	71.66	84.13%	32.26%
BNED, BHADRAK (N)	477.349	357.623	25.08%	74.92%	209.40	189.28	90.39%	32.28%
BSED, BHADRAK (S)	168.600	110.929	34.21%	65.79%	54.33	49.54	91.18%	40.01%
BPED, BARIPADA	330.291	256.682	22.29%	77.71%	135.04	114.24	84.60%	34.26%
UED, UDALA	100.170	92.818	7.34%	92.66%	45.90	31.81	69.29%	35.80%
RED, RAIRANGPUR	237.551	191.723	19.29%	80.71%	96.88	69.50	71.74%	42.10%
JRED, JAJPUR ROAD	1288.052	1192.110	7.45%	92.55%	760.81	764.71	100.51%	6.97%
JTED, JAJPUR TOWN	197.539	109.546	44.54%	55.46%	53.79	52.01	96.69%	46.38%
KUED, KUAKHIA	289.027	169.683	41.29%	58.71%	93.10	90.40	97.10%	43.00%
KED, KEONJHAR	268.023	262.467	2.07%	97.93%	161.31	157.74	97.79%	4.24%
JOED, JODA	609.893	587.640	3.65%	96.35%	386.12	380.51	98.55%	5.05%
AED, ANANDAPUR	179.543	119.302	33.55%	66.45%	63.01	52.57	83.42%	44.57%
TPNODL TOTAL	**5327.043**	**4346.998**	**18.40%**	**81.60%**	**2560.14**	**2411.66**	**94.20%**	**23.13%**

Category wise nos. of Consumers:

TPNODL is licensed to distribute electricity to consumers and collect revenue. The different categories of consumers in TPNODL are as per the following.

- EHT
- HT
- Domestic
- Kutir Jyoti
- L.T. General (Com)
- Agriculture
- Agro
- Allied-Agro
- Street Lighting
- PWW
- Small Industry
- Medium Industry
- Specified Pub. Purpose (P.I.)

Details of category wise nos. of consumers and their annual energy consumption, contract demand, correct meter, without meter and defect meter for the last financial year are given below:

Category wise no. of consumer under TPNODL

Category	FY 2021-22	
	Live Cons. (Nos)	% of Total Live Consumers
EHT	37	0.00%
HT	614	0.03%
Domestic	1861176	89.09%
Kutir Jyoti	75673	3.62%
L.T. General (Com)	97819	4.68%
Agriculture	26450	1.27%
Agro	1687	0.08%
Allied-Agro	50	0.00%
Street Lighting	1311	0.06%
PWW	4184	0.20%
Small Industry	4341	0.21%
Medium Industry	1084	0.05%
Specified Pub. Purpose (P.I.)	14657	0.70%
Total	**2089083**	**100.00%**

Observations & Recommendations:

- From the above table, it is found that the total consumers in TPNODL in FY 2021-22 are 2089083.
- Among all categories, the percentage of domestic category consumers is around 89 % in FY 2021-22.
- Whereas percentage of nos. of HT consumers is around 0.03% in FY 2021-22, the percentage of nos. of EHT consumers is around 0.001% in FY 2021-22.

Category wise connected contract demand under TPNODL

Category	FY 2021-22	
	CD (KW)	% w.r.t. total CD
EHT	542400	17.01%
HT	239665	7.52%
Domestic	1834181	57.53%
Kutir Jyoti	19738	0.62%
L.T. General (Com)	268022	8.41%
Agriculture	107033	3.36%
Agro	24891	0.78%
Allied-Agro	743	0.02%
Street Lighting	5870	0.18%
PWW	27195	0.85%
Small Industry	40323	1.26%
Medium Industry	47725	1.50%
Specified Pub. Purpose (P.I.)	30315	0.95%
Total	**3188101**	100.00%

Category wise no. of consumers having defective meter in TPNODL

Category	FY 2021-22		
	Live Cons. (Nos)	No. of Defect Meter	% w.r.t. total Defect Meter
EHT	37	0	0.00%
HT	614	0	0.00%
Domestic	1861176	238620	87.39%
Kutir Jyoti	75673	23654	8.66%
L.T. General (Com)	97819	5584	2.04%
Agriculture	26450	3803	1.39%
Agro	1687	41	0.02%
Allied-Agro	50	1	0.00%
Street Lighting	1311	85	0.03%
PWW	4184	98	0.04%
Small Industry	4341	23	0.01%
Medium Industry	1084	3	0.00%
Specified Pub. Purpose (P.I.)	14657	1147	0.42%
Total	**2089083**	**273059**	**100.00%**

Category wise no. of consumers having correct meter under TPNODL

	FY 2021-22		
	Total Cons. (Nos)	No. of correct meters	% w.r.t. total
EHT	37	37	0.00%
HT	614	614	0.04%
Domestic	1861176	1551565	89.29%
Kutir Jyoti	75673	49915	2.87%
L.T. General (Com)	97819	91804	5.28%
Agriculture	26450	19175	1.10%
Agro	1687	1637	0.09%
Allied-Agro	50	49	0.00%
Street Lighting	1311	567	0.03%
PWW	4184	4055	0.23%
Small Industry	4341	4318	0.25%
Medium Industry	1084	1081	0.06%
Specified Pub. Purpose (P.I.)	14657	12884	0.74%
Total	**2089083**	**1737701**	100.00%

Category wise no. of consumers without meter under TPNODL

Category	FY 2021-22		
	Total Cons. (Nos)	No. of cons without meter	%w.r.t total
EHT	37	0	0.00%
HT	614	0	0.00%
Domestic	1861176	70991	90.64%
Kutir Jyoti	75673	2104	2.69%
L.T. General (Com)	97819	431	0.55%
Agriculture	26450	3472	4.43%
Agro	1687	9	0.01%
Allied-Agro	50	0	0.00%
Street Lighting	1311	659	0.84%
PWW	4184	31	0.04%
Small Industry	4341	0	0.00%
Medium Industry	1084	0	0.00%
Specified Pub. Purpose (P.I.)	14657	626	0.80%
Total	**2089083**	**78323**	**100.00%**

OBSERVATIONS & RECOMMENDATIONS

- From the above table it is found that the total nos. of consumer without meter in TPNODL is 78323 in FY 2021-22.
- The percentage of no. of consumers without meter in Agriculture around 4.43% in FY 2021-22 and as compared to the percentage of without metered consumer in agriculture in FY 2020-21 (18.41%), there has been a significant reduction.
- Percentage of no. of without meter in Street lighting is around 0.84 % and as compared to the percentage of without metered consumer in agriculture in FY 2020-21 (58.57%), there has been a significant reduction.

5.1 BILLED AMOUNT OF TPNODL

Total energy billed, amount billed, gross amount collected by the DISCOM for FY 2021-22 is furnished below:

ANNUAL BILLED AMOUNT IN CRORES			
Financial Year	Total Energy Billed	Amount Billed	Gross Amount Collected
	Million kWh	Rs. Cr	Rs. Cr
FY 2021-22	4346.998	2560.14	2411.66

Abstract of Energy Bill Served by GRIDCO to TPNODL

Sl.No.	Month	SMD Approved by OERC(kVA)	SMD Permitted by OERC(kVA)	Actual SMD (kVA)	Total Energy Billed (MU)	Total Energy Sale (MU)	LOSS (%)	Total Energy Billed as per OERC (MU)	Total Energy Sale as per OERC (MU)	LOSS (%) As per OERC
1	Apr-21	1100000	1210000	888627	484.141	339.216	30%	484.142	339.216	30%
2	May-21	1100000	1210000	819284	410.394	347.978	15%	410.394	347.978	15%
3	Jun-21	1100000	1210000	887428	444.989	342.477	23%	444.919	342.477	23%
4	Jul-21	1100000	1210000	883171	483.680	372.693	23%	484.235	372.693	23%
5	Aug-21	1100000	1210000	908721	508.672	387.623	24%	508.672	387.623	24%
6	Sep-21	1100000	1210000	889893	452.575	400.417	12%	452.575	400.417	12%
7	Oct-21	1100000	1210000	926873	472.413	399.005	16%	472.548	399.005	16%
8	Nov-21	1100000	1210000	763045	391.575	373.219	5%	392.829	373.219	5%
9	Dec-21	1100000	1210000	738317	390.734	337.478	14%	390.925	337.478	14%
10	Jan-22	1100000	1210000	729812	404.162	350.518	13%	404.378	350.518	13%
11	Feb-22	1100000	1210000	771882	375.102	317.098	15%	375.244	317.098	15%
12	Mar-22	1100000	1210000	937943	506.037	379.276	25%	506.182	379.276	25%
TOTAL		**13200000**	**14520000**	**10144996**	**5324.474**	**4346.998**	**18%**	**5327.043**	**4346.998**	**18%**

Critical Observation: There is difference in the total input energy to the DISCOM in Primary data (Energy Billed by GRIDCO to TPNODL) and in Secondary data (TPNODL reported energy input data to Hon'ble OERC). TPNODL has acquired licensee of the Utility on 1st April 2021 by virtue of the vesting order of the Hon'ble OERC. TPNODL has reported that there might be an error which has occurred before the transition date. TPNODL is advised to rely on both primary and secondary set of data while reporting the major energy data like, total input energy and total billed energy in future.

5.2 METERED/UNMETERED ENERGY SALE OF TPNODL

Annual energy consumption of the consumers in TPNODL for FY 2021-22 is given below.

Annual Metered/ Unmetered Energy Consumption (in MU) under TPNODL

ANNUAL METERED/UNMETERED ENERGY CONSUMPTION IN MU				
Financial Year	**Total Input Energy**	**Metered Energy Sales**	**Unmetered Energy Sales**	**Estimated unaccounted energy/theft**
FY 2021-22	5327.043	4008.423	338.575	980.045

Percentage of metered, unmetered & unaccounted energy consumption

% OF METERED/UNMETERED & UNACCOUNTED ENERGY CONSUMPTION				
Financial Year	**Total Input Energy**	**Metered Energy Sales in %**	**Unmetered Energy Sales in %**	**Estimated unaccounted energy/theft in %**
FY 2021-22	5327.043	75.24%	6.37%	18.39%

Observations & Recommendations:

- The estimated unaccounted energy/theft is around 18.39% which is very high and lead to increased AT&C Loss of TPNODL.

5.3 LOSSES IN DISTRIBUTION NETWORK

The losses in a distribution network are classified into three categories i.e. Transmission & Distribution (T&D) Loss, Technical Loss and Commercial loss.

1. T&D loss is the difference between energy supplied to a network and the total energy billed. It includes both technical & commercial loss.

T&D Loss =Input energy to the system- Energy billed to the consumer
Distribution (T&D) Loss = Input energy supplied to DISCOM system (-) Energy billed to consumer by DISCOM

% Distribution (T&D) Loss = [Input Energy (-) Energy Billed] x 100 ÷ [Input Energy]

2. Technical loss or line loss occurs mainly due to the heating effects, loose bindings, earthing problem, unbalancing, inadequate size of conductors, shifting of load centre, low power factor/reactive losses etc. This loss is difficult to calculate and the most accurate method is the load flow study using network analysis software.

The Technical losses in the system comprises of the following

- 33 kV & 11 kV Line Losses
- Distribution Transformer Losses (Iron & Copper losses)
- L.T. Line Losses
- Miscellaneous Technical Losses
- Losses due to Loose Jump Connections in the line
- Losses due to Short Circuits & Earth Faults
- Losses in Service Mains of Installations.
- Losses incurred in CT"S & Current Coils of Energy Meters.

3. Commercial Loss is the difference between T & D loss and Technical loss.
   Commercial Loss = Distribution Loss (-) Technical Loss

The commercial losses comprises of the following

- Mistakes in the billing.
- Meters not recording (MNR)
- Meters not recording correctly
- Meters by passed due to defects/ intentionally
- Meters not read & billed.
- Theft and pilferage.

5.3.1 CALCULATION OF T&D LOSS

Distribution Loss or T&D loss is the difference between energy supplied to a network and the total energy billed. It includes both technical and commercial losses.

Sample Calculation:

A typical calculation for T&D Loss for FY 2021-22 is furnished below.

The total demand of TPNODL for FY 2021-22 = 845 MVA

The total Energy Input to TPNODL for FY 2021-22 = 5327MU

BST Bill (P/U) = 3.48
BST Bill of GRIDCO to TPNODL for FY 2021-22 = Energy input (MU) x BST Bill (P/U)/10)+0.0713
=5327*(3.48/10) +0.0713
= 1853.86 Cr
Total Energy sale to all consumer i.e. EHT, HT and LT for FY 2021-22= 4347 MU
Energy sale to EHT consumer = 1676 MU
Energy sale to HT consumer = 503 MU
Energy sale to LT consumer = 2168 MU
For HT Category of T & D Loss is assumed at 8%

T & D Loss in LT Category = 1-(Energy sale to LT consumer in MU/ ((Total Energy input in MU - Energy sale to EHT consumer in MU) – ((Energy input in MU - Energy sale to EHT consumer in MU) x 8%) - Energy sale to HT consumer in MU))
= 1-(2168 MU/ ((5327 MU- 1676 MU) - ((5327 MU- 1676 MU)*8%) - 503 MU))
= 0.2408**= 24.08%**

T & D Loss in HT & LT Category = 1-(((Energy sale to HT consumer in MU+ Energy sale to LT consumer in MU)/ (Total Energy input in MU- Energy sale to EHT consumer in MU)))
=1-(((503 MU+2168 MU)/ (5327 MU- 1676 MU)))
=0.2684= **26.84%**

Overall T & D Loss of TPNODL for FY 2021-22 = 1- Total Energy sale to consumer including EHT, HT and LT in MU/ Total Energy input in MU
=1-(4347 MU/5327 MU)
=0.1839= **18.39%**

Based on the above methodology T&D loss for FY 2021-22 is calculated & furnished below:

PARTICULARS	FY 2021-22
BULK SUPPLY	
Demand (MVA)	**845**
Energy input (MU)	**5327**
SALE TO CONSUMERS (MU)	
EHT	1676
HT	503
LT	2168
TOTAL SALE (MU)	**4347**
T & D LOSS (%)	
HT & LT T&D Loss	**26.84 %**
OVERALL T & D LOSS (%)	**18.39 %**

Month wise T & D loss FY 2021-22 is furnished below:

Table3.1: T&D LOSS FOR FY 2021-22

PARTICULARS	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	TOTAL
BULK SUPPLY													
Demand (MVA)	888.63	819.28	887.43	883.17	908.72	889.89	926.87	763.05	738.32	729.81	771.88	937.94	845.42
Energy input (MU)	484.14	410.39	444.92	484.24	508.67	452.58	472.55	392.83	390.93	404.38	375.24	506.18	5327.04
SALE TO CONS (MU)													
EHT	129.18	118.45	115.97	128.12	143.58	135.83	145.73	138.81	150.56	154.65	141.62	173.55	1676.03
HT	37.53	34.37	34.30	43.88	41.44	38.45	41.66	43.23	43.68	45.74	46.13	52.85	503.27
LT	172.51	195.15	192.21	200.70	202.60	226.14	211.62	191.18	143.24	150.13	129.36	152.88	2167.71
TOTALSALE (MU)	339.22	347.98	342.48	372.69	387.62	400.42	399.01	373.22	337.48	350.52	317.10	379.28	4347.00
T & D LOSS (%)													
LT	40.3%	16.7%	28.4%	29.3%	31.2%	10.6%	18.3%	-0.4%	19.3%	18.4%	23.4%	39.6%	24.1%
HT & LT	40.8%	21.4%	31.1%	31.3%	33.2%	16.5%	22.5%	7.7%	22.2%	21.6%	24.9%	38.2%	26.8%
OVERALL (%)	29.9%	15.2%	23.0%	23.0%	23.8%	11.5%	15.6%	5.0%	13.7%	13.3%	15.5%	25.1%	18.4%

5.3.2 CALCULATION OF AT&C LOSS

AGGREGATE TECHNICAL & COMMERCIAL (AT&C) LOSS:

Aggregate Technical & Commercial Loss (AT&C Loss) is defined as the summation of all technical as well as commercial power loss that occurs due to electrical power flow through sub-transmission and distribution network.

Technical Loss is defined as the summation of power loss through 33 kV, 11 kV line and LT Line loss including transformer loss and others.

Commercial Loss is defined as the summation of power loss occurring due to theft/ pilferage, deficient meter, inefficiency in billing & unrealized revenue due to collection inefficiency.

COMPUTATION OF AT& C LOSS

Aggregate Technical & Commercial Loss (AT&C) is computed from the actual meter readings of the meter installed at various locations in the system.

Sample Calculation:

A typical calculation AT & C loss for FY 2021-22 is furnished below:

The total demand of TPNODL for FY 2021-22 = 845

The total Energy Input to TPNODL for FY 2021-22 = 5327 MU

The total Energy sale by TPNODL for FY 2021-22 =4347 MU

Total collection received by TPNODL = 2411 Cr

Total Billing to consumers done by TPNODL = 2560 Cr

Overall Billing Efficiency (%) for FY 2021-22 = (Total Sale in MU/ Total input in MU)*100

= (4347/5327)*100 = **81.60 %**

Overall Collection Efficiency (%) for FY 2021-22

= (Total Collection Received (Rs. in Cr) / Total Billing to Consumers (Rs. in Cr))*100

= Rs (2411 /2560) Cr = **94.17 %**

AT & C Loss (%) for FY 2021-22

AT & C Loss (%) = 1-{Collection Efficiency (%) x Billing Efficiency (%)}

Overall AT & C Loss (%) for FY 2021-22 = 1-(94.17% * 81.60%)

= 0.2315

= 23.15 %

AT & C Loss for FY 2021-22 is furnished below:

Particulars	FY 2021-22
Total Sale (MU)	4347 MU
T & D Loss (%)	18.39%
Billing Efficiency (%)	81.60
Billing To Consumers (Rs. in Cr)	2560 Cr
Collection Received (Rs. in Cr)	2411 Cr
Collection Efficiency (%)	94.17 %
AT & C Loss (%)	23.15 %

Month wise AT & C loss for last financial year is furnished below:

Table3. 4: AT&C LOSS FOR FY 2021-22

PARTICULARS	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	TOTAL
SALE TO CONSUMERS (MU)													
TOTAL SALE (MU)	339.22	347.98	342.48	372.69	387.62	400.42	399.01	373.22	337.48	350.52	317.10	379.28	4347.00
T & D LOSS (%)													
OVERALL (%)	29.9%	15.2%	23.0%	23.0%	23.8%	11.5%	15.6%	5.0%	13.7%	13.3%	15.5%	25.1%	18.4%
BILLING EFFICIENCY (%)													
OVERALL (%)	70%	85%	77%	77%	76%	88%	84%	95%	86%	87%	85%	75%	82%
BILLING TO CONSUMERS (Rs. in Crs.)													
TOTAL	193.55	204.49	200.31	215.81	224.38	234.27	232.22	219.23	204.74	209.32	192.67	229.14	2560.14
COLLECTION RECEIVED (Rs. in Crs.)													
TOTAL	158.93	147.08	181.82	165.47	178.51	186.23	198.35	178.74	205.51	208.58	204.01	398.42	2411.66
COLLECTION EFFICIENCY (%)													
OVERALL (%)	82%	72%	91%	77%	80%	79%	85%	82%	100%	100%	106%	174%	94%
AT & C LOSS(%)													
OVERALL (%)	42%	39%	30%	41%	39%	30%	28%	23%	13%	14%	11%	-30%	23%

Sample Study

Calculation of Technical loss of 33KV feeder line loss (33KV to 11KV)

The 33 KV feeder line loss and 33/11 kV power transformer loss is calculated by comparing the energy inputs received at the 33 kV feeder emanating from OPTCL substation with the output energy in the 11KV outgoing feeder of the 33/11 kV substation.

Energy Audit calculation for Panikoili 33KV feeder:

CONSUMER	METER NO	MF	CONSUMPTION (KW)			
			Oct-21	Nov-21	Dec-21	Jan-22
PANIKOILI PSS	NES82766	120000	36,97,620	26,69,180	24,07,800	24,19,380
KRUPALI RICE MILL	NES52189	1500	1,90,765	1,35,835	1,43,985	2,80,196
ASHRIBAD AGRO PRODUCT	NSC94606	1200	1,19,496	3,888	52,008	1,67,790
SRIKRUPALU STEEL &CASTING	NES52148	1500	11,805	31,860	68,445	56,885
ASHIRBAD AGRO PRODUCTS PLTD	NES50346	1800	6,81,410	2,85,084	5,32,404	6,72,007
HAREKRISHNA RICE MILL	NSC94507	1200	3,65,190	3,16,292	32,328	3,36,341
KRUPALU SOLVENT	NES83175	1200	98,896	9,492	39,852	1,49,034
NOBEL GAS	NSC10723	1200	5,316	5,064	4,764	4,606
HP PETROL PUMP	NDT00068	1	1,095	909	1,082	10,048
TOTAL			**51,71,593**	**34,57,604**	**32,82,668**	**40,96,287**
NIKOILI FEEDER CONSU	**2984330**	**400**	**53,71,920**	**35,13,640**	**33,36,072**	**42,05,232**
%AGE LOSS			**3.73%**	**1.59%**	**1.60%**	**2.59%**

However we have recommended a sample format for conducting future energy audit in 33 kV feeders in Annexure. TPNODL may adopt the same in future.

11 kV Feeder loss sheet:

Sno	Circle	Division	PSS	Feeder	Meter Sl No.	Feeder Consumption (Kwh)	Billed Unit (Jan- Mar22) Kwh	Loss Unit (Kwh)	Cummlative Loss %
1	Balasore	BED	Digraniya	BANIAMANDIR	NES50712	2212427	1997957	214470	10%
2	Balasore	BED	Goaplgaon	RANIPATANA	2984461	1428792	1285969	142823	10%
3	Balasore	BED	Goaplgaon	SUELPUR	2984471	2998632	2050767	947865	32%
4	Balasore	CED	FULADI	FULADI	X0528147	1413300	1149098	264202	19%
5	Balasore	CED	FULADI	NAGRAM	X0528170	482730	414924	67806	14%
6	Balasore	CED	FULADI	PADAMPUR	X0528164	618600	489010	129590	21%
7	Keonjhar	KED	TURMUNGA	KHIREITANGIRI	XB402158	222150	175556	46595	21%
8	Keonjhar	KED	PATNA	PATNA	XB473278	852600	680682	171918	20%
9	Keonjhar	JOED	JODA	BANEIKALA	14195835	1341600	1182946	158654	12%
10	Keonjhar	JOED	JHUMPURA	JHUMPURA	X0282735	1124400	909144	215256	19%
11	Keonjhar	AED	ANANDPUR	FAKIRPUR	NES50799	748000	589960	158040	21%
12	Keonjhar	AED	GHASIPURA	SALAPADA	NES83189	1472100	1141169	330931	22%
13	Keonjhar	AED	REKIKOTE	KESHDURAPAL	1200089	454020	401135	52885	12%
14	Keonjhar	AED	SAINKUL	BHAGANAI	16192172	229450	166560	62890	27%
15	Keonjhar	AED	BIDYADHARPUR	SOSO	NES50875	634320	566100	68220	11%

Circle	Division	PSS	Name Of Light House Feeder	Meter Sl No.	Total Consumer Count	Cummlative Loss %	PLH
Balasore	BED	CITY	Town Feeder	NES50712	5281	20%	NO
Balasore	BED	Digraniya	BANIAMANDIR	NES50712	2865	21%	YES
Balasore	BED	Swadhinpadiya	BALARAMGADI	ORU21097	1754	19%	YES
Balasore	BED	Swadhinpadiya	GABAGAON	ORU21098	1876	23%	NO
Balasore	BED	Goaplgaon	Ranipatna	2984461	2079	45%	YES
Balasore	BED	Goaplgaon	Suelpur Feeder	2984471	4269	22%	YES
Balasore	BED	Ganeshwarpur	Town Feeder	NES50712	1979	34%	YES
Balasore	BED	Sovarampur	Sambhalpur	X0430106	2577	10%	NO
Balasore	CED	Bhalkasuni	Berhampur(Telipal)	NES50855	2992	46%	NO
Balasore	CED	Bhalkasuni	Sajanagarh	NES508074	7346	17%	YES
Balasore	CED	FULADI	FULADI	X0528147	3573	33%	NO
Balasore	CED	FULADI	Nagaram	X0528170	918	19%	YES
Balasore	CED	FULADI	Padampur	X0528164	2153	10%	NO
Balasore	JED	DEHURDA	Town	NES82791	3146	46%	YES
Balasore	JED	DEHURDA	CHAUKI	NES82727	2108	10%	NO
Balasore	JED	DEHURDA	JAIRAMPUR	NES82726	4796	10%	NO
Balasore	JED	DEHURDA	ALALBINDHA	NSC10811	1635	31%	NO
Balasore	JED	Kamarda	BANIAMANDIR	NES50712	2865	28%	NO
Balasore	SED	Oupada	Oupada	NSC92263	1944	19%	YES
Balasore	SED	Khantapada	Panpana	1200095	3457	24%	YES
Balasore	SED	Gandibed	Chandagochhi	X0667508	4036	41%	YES
Balasore	SED	Dungura	Dungura	NSC92146	4355	21%	YES
Balasore	SED	Khaira	Khaira Bazar	NSC92296	1225	15%	YES
Balasore	BTED	Basta	Head Quarter	NES50712	2257	29%	YES
Keonjhar	JOED	JHUMPURA	JHUMPURA	X0282735	3265	24%	YES
Keonjhar	AED	ANANDPUR	FAKIRPUR	NES50799	2001	29%	YES
Keonjhar	AED	GHASIPURA	SALAPADA	NES83189	3301	21%	YES
Keonjhar	AED	SAINKUL	BHAGANAI	16192172	1536	36%	YES
Keonjhar	AED	BIDYADHARPUR	SOSO	NES50875	1966	38%	YES
Baripada	BPED	Shamakhunta	Bhanjpur	NES50837	2801	33%	YES
Baripada	BPED	Kochilakhunta	Kochilakhunta	NES82802	379	32%	YES
Baripada	BPED	Rasgovindpur	Rasgovindpur	NES83209	1532	33%	YES
Baripada	BPED	Stadium	Ambika	NES50663	3566	26%	YES
Baripada	BPED	Shamakhunta	Rangamatia	NES50680	912	25%	YES
Baripada	BPED	Betnoti	Betnoti Town	NES82735	4395	20%	YES
Baripada	BPED	Bangiriposi	Bangiriposi	NES82783	3379	37%	YES
Baripada	BPED	Baisinga	Baisinga	NES83225	4830	40%	YES
Baripada	BPED	Jharpokharia	Jharpokharia	NES82710	4817	41%	YES
Baripada	BPED	Chhancha	CKT House	NES50727	4061	15%	YES
Baripada	RED	Thakurmunda	Thakurmunda	NES50739	3421	49%	YES
BHADRAK	BSED	BARPADA	BARPADA	X0528151	595	33%	NO
BHADRAK	BSED	BARPADA	KAUPUR	KAU22343	4494	11%	YES
BHADRAK	BNED	BIDEIPUR	BALIMUNDA	2984473	6912	28%	NO
BHADRAK	BNED	BASUDEVPUR	PADMAPUR	2984497	10645	17%	YES
BHADRAK	BNED	BASUDEVPUR	BAZAR	2984496	4251	19%	YES
BHADRAK	BNED	DHAMARA	DOSINGA	X0440742	4454	32%	YES
BHADRAK	BNED	ERAM	BARAPUR	X0528111	3849	23%	YES
BHADRAK	BNED	POWERHOUSE	CHARAMPA-I	2984467	4172	11%	YES
Jajpur	JRED	CHORDA	SAPAGHADIA	XE430070	4861	45%	YES
Jajpur	JRED	BYASASAROBAR	RACHHIPUR	18137892	5110	17%	YES
Jajpur	JRED	RAGADI	RAGADI	ORU21108	4074	27%	YES
Jajpur	JRED	SALAKANA	BT ROAD	WBBC1851	4543	33%	YES
Jajpur	JRED	DUBURI	PANKAPAL	X0282744	1817	29%	YES
Jajpur	JRED	DAMODARPUR	MANGALPUR	1200144	1635	34%	YES
Jajpur	JTED	JAJPUR TOWN	GOKHANA	NES83273	1555	36%	YES
Jajpur	JTED	DHAMDHADA	KHANDARA	NES51970	2003	38%	YES
Jajpur	JTED	MAINDA	MAINDA	WBBC1841	6384	36%	NO
Jajpur	JTED	MAINDA	CHHIKANA	WBBC1842	2879	27%	YES
Jajpur	JTED	MNASARA	KANTIPUR	WBBC1840	2794	27%	YES
Jajpur	JTED	MNASARA	KALYANPUR	NES82704	1105	23%	YES
Jajpur	JRED	BOULANGA	MANGALPUR	X0423918	7161	18%	YES
Jajpur	JTED	KANTIPADIA	NANDIPUR	X0440758	2884	43%	YES
Jajpur	KUED	MATHASAHI	MADHUBAN	WBBC1849	3906	24%	YES
Jajpur	KUED	KUAKHIA	KHANDITIRA	X0424039	715	32%	YES
Jajpur	KUED	BARI	BARI	WBBC1837	12565	14%	YES
Jajpur	KUED	RATNAGIRI	RATNAGIRI	WBBC1848	3805	35%	YES
Jajpur	KUED	NEULPUR	SUNDARIA	NDT01546	743	32%	YES
Jajpur	KUED	JARKA	NAGPAL	X0282755	1450	38%	YES
Jajpur	KUED	NARSINGHPUR	KUNDAPATANA	1200088	1260	35%	NO
Jajpur	KUED	KABATABANDHA	BALRAMPUR	NES83274	3240	23%	YES

However we have recommended a sample format for conducting future energy audit in 11 kV feeders in Annexure. TPNODL may adopt the same in future.

RECOMMENDATION

- 33 kV System Loss should be estimated as the difference of sending end energy from the 220 / 132 / 33 kV Grid Sub-Station and receiving end energy of Primary Substation including energy sent out to Bulk consumers at 33 kV level.
- 33 kV Loss should be computed considering one month consumption by taking meter reading of all the incoming 33 kV feeders of Primary Sub-Station including bulk 33 kV consumer and related 33 kV outgoing feeders of Grid Sub-Station.
- 33 kV line loss = Σ(33 kV O/G Feeder meter reading at GRID SUB-STATION - Σ(33 kV I/C meter reading at PRIMARY SUBSTATION + 33 kV I/C meter reading at HT Bulk))
- Computation of 33/11 kV transformer loss: Σ 33 kV I/C meter reading at primary Substation –Σ 11 kV O/G meter reading at primary Substation.

➢ **COMPUTATION OF 11 kV LOSS:**

Energy Loss of 11 kV feeders should be arrived at by the difference between the sending end energy i.e. 11 kV outgoing feeders of primary sub-station and energy recorded at LV side of DTR including Bulk consumer connected in the same 11 kV feeder.
11 kV Loss should be computed considering one month's energy consumption by taking the meter reading of the 11 kV feeder of Primary Substation and all the DTR meter reading connected in the same 11 kV feeder and bulk consumer connected in the same 11 kV feeder.

Thus the total 11 kV loss for this circle found out as

11 kV line loss = Σ(11 kV O/G Feeder meter reading at PRIMARY SUBSTATION – Σ All DTRs' meter reading connected to that 11 kV feeder) – Σ 11 kV I/C meter reading at HT Bulk.

➢ **COMPUTATION OF LT LOSS:**

Energy Loss of LT feeders should be arrived at by the difference between the sending end energy i.e. Distribution Transformer (DTR) and Energy recorded at consumer meters of LT consumers connected in the same DTR.

LT Loss should be computed considering one month's energy consumption by taking meter reading of DTR and the entire Consumers' meter reading connected to the same DTR.

Thus the total LT line loss for these circles is found out as

LT line loss = Σ (11/0.44 KV DTR meter reading – Σ All consumers' meter reading connected to that DTR)

- **COMPUTATION OF COMMERCIAL LOSS:**

Commercial Loss may be found out as

= AT&C Loss – Technical Loss

= {(1 – Billing Efficiency x Collection Efficiency) x 100} – (33 kV loss + 33/11 kV transformer loss) + (11 kV Line Loss + LT Line Loss)

The Billing efficiency, Collection Efficiency, Energy Billed and Energy to be collected from the TPNODL.

Technical Loss i.e.; 33 kV, 11 kV and LT Line Losses to be computed as mentioned above.

Hence Total amount of Commercial Loss has been arrived by deducting all other components from AT&C Loss.

RECOMMENDATION

a) Energy loss due to theft/ pilferage:

During field survey it was observed that there is some energy lost due to theft/ pilferage in the Power system. It needs to be prevented by checking periodically.

b) Defective meters:

Considerable percentage of defective meters is one of the reasons for provisional billing and consequential commercial losses in the DISCOM. Some energy meters installed at the consumer premises are found to be defective.

In other cases, it was found that the consumers deliberately conceal the information regarding defective meters. With the assistance of the local linemen/ meter reader, the consumer takes the benefit of provisional billings, resulting in commercial loss. It needs to be prevented by strict vigilance measures and quality meter replacement programme.

- **COMPUTATION OF LOSS DUE TO UNREALIZED REVENUE**

Unrealized revenue is the revenue which is not realized due to non-payment by the consumers. Hence Energy loss due to unrealized revenue is the amount of energy loss converted from equivalent revenue loss.
Hence the total loss due to unrealized revenue found out as
Loss due to Unrealized Revenue= Σ (Energy Billed – Collections in MU)

RECOMMENDATION

Technical loss recommendation

- Reduction in Transmission losses:
- Improvement in power factor
- Reconduct ring of transmission line
- Conversion of single circuit to double circuit

Reduction of Transformer losses:

- Improvement of die electric strength of transformer oil
- Improvement of power factor
- Thermographs of primary/ secondary cable/ bus terminations
- Reduction of contact resistance of terminations
- Regular checking and replacement of silica gel

Reduction of Bus losses

- Visual inspection of bus for detection of any loose connections or oxidation
- Thermographs of bus section for thermal imaging to detect any hot spots/ joints
- Reduction in contact resistance by proper termination after cleaning & tightening of contacts
- Replacement of bus by that of higher cross section & of material of higher conductivity (copper in place of Aluminium) if necessary.

6.0 DEMAND SIDE MANAGEMENT (DSM), ENERGY EFFICIENCY & CONSERVATION:

Demand Side Management (DSM) is applied to energy efficiency measures that would modify or reduce end-user's energy demand. It is basically the selection, planning and implementation of measures intended to have an influence on the demand either caused directly or indirectly by the utility's programs. Hon'ble OERC has framed Odisha Electricity Regulatory Commission (Demand Side Management) Regulations, 2011, based on which DISCOM has to prepare the action plan and take measures for implementation of DSM Regulations.
TPNODL has established a Distribution System Operations Control Centre i.e. (DSOCC) (ABT Cell) in its Head Office for management of load at 33KV and 11KV feeder level, so that it can adhere to allotted drawl schedule of SLDC.

Following DSM measures and energy conservation options are proposed to be implemented in TPNODL.

Promoting the use of Energy Efficient Products:

It is proposed that TPNODL should promote Energy Efficient Lighting System (LED Bulbs, Tube lights and Energy Efficient Fans) in association with BEE / EESL / Private ESCO in its utility area. The availability of LED Bulbs, Tube Lights, BLDC Fans, IE3 Meters which are supposed to be distributed to consumers through BEE / EESL / Private ESCO as part of the Utility based Demand Side Management Program are not available in plenty. TPNODL may discuss with BEE / EESL / Private ESCO to open more outlets and increase the LED Lights, Super Efficient AC and Fans Distribution.

Promoting the use of renewable energy (Solar) through facilitation:

Hon'ble Commission has notified Net Metering Scheme for Solar Roof Top Project in the consumer premises. TPNODL should popularize the scheme for LT consumers and provide prompt support and cooperation to the consumer for net metering agreement and solar project interconnection with DISCOM systems. Once Solar Interconnection happens at the LT systems, this will improve the voltage profile and reduce LT loss. Also the RPO of GRIDCO / DISCOM can be compiled which may reduce the BSP in future and will lead to financial savings for DISCOM. TPNODL should conduct more nos. of Consumer awareness programs on saving electricity, electricity wastage, power theft, using electricity during off peak hour, using star rated equipment.

Sensitization Program on kVAh Billing:

At present Hon'ble OERC has implemented kVAh billing for the HT/ EHT/ Commercial / MSME and Industrial consumers. In view of the kVAh billing, the consumer which are having low power factor are paying higher energy bills, still the awareness about kVAh billing is not there and consumers are operating with low Power Factors. TPNODL may carry out special drives for awareness and sensitisation about kVAh billing. This may lead to more numbers of APFC installation and improvement in Power Factor and will lower the burden on the existing infrastructure. TPNODL may sign MoU with ESCO / AFPC installer under the Utility based Demand Side Management program so that APFC installer will assess the data base of Consumers with low power factor, take necessary action for installation of APFC Panels in consultation with Consumers directly.

Facilitating Industrial Energy Efficiency:

TPNODL can facilitate DSM measures in industrial segments by promoting use of energy efficient motors, pumps, compressors, capacitor bank, etc. TPNODL can coordinate and inform BEE / EESL / Private ESCO to provide the Industrial LED lighting Solution, Solution, IE3 Motors and Energy Efficient in ESCO / PMC model as per the provision of DSM Regulations. This will facilitate Demand Side Management in a long way.

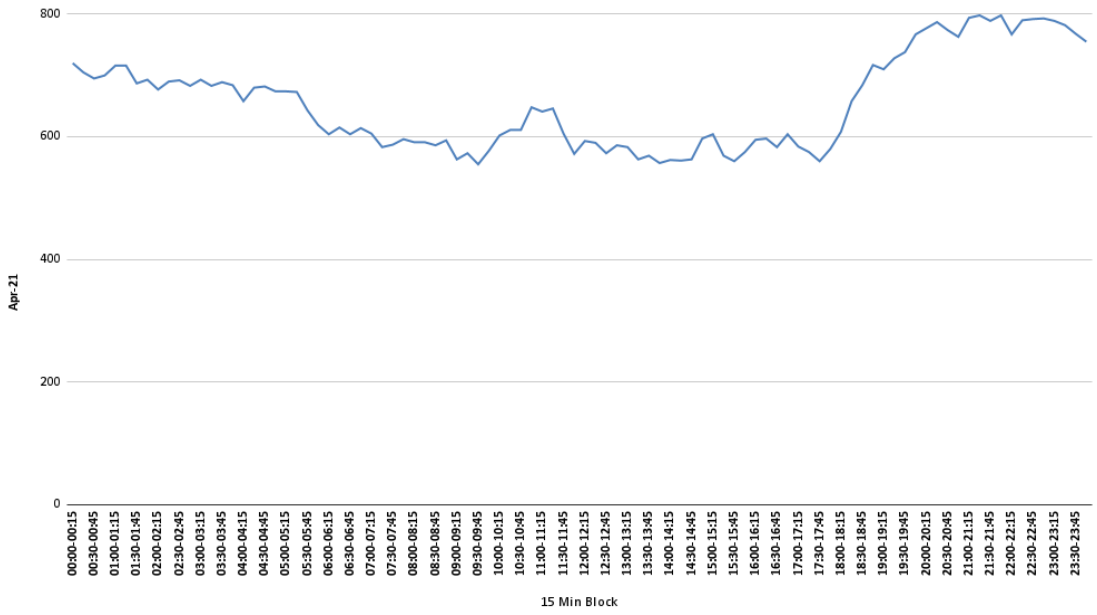
The costs benefit analysis various proposed DSM measures are furnished below.

6.1 ANALYSIS OF BLOCK WISE DRAWAL PATTERN

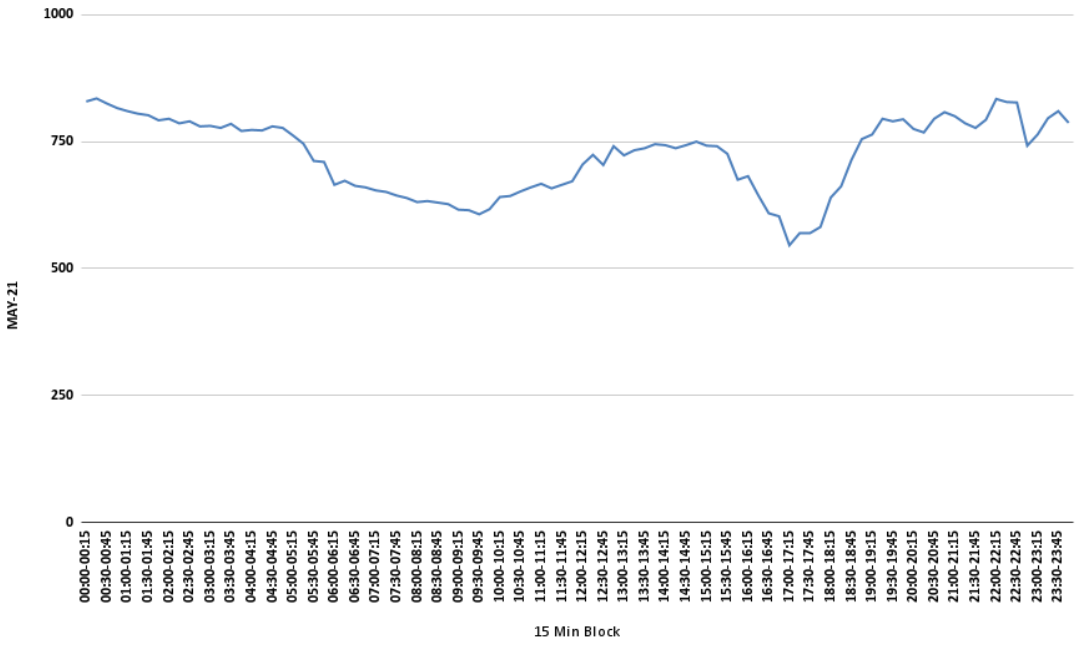
During Audit period we have collected the month wise 15 minute block wise drawl data of TPNODL for the period of April 21 to March 22 and analyzed the same.

The Block wise Monthly Average data was calculated and the trend of drawl pattern is presented Below:

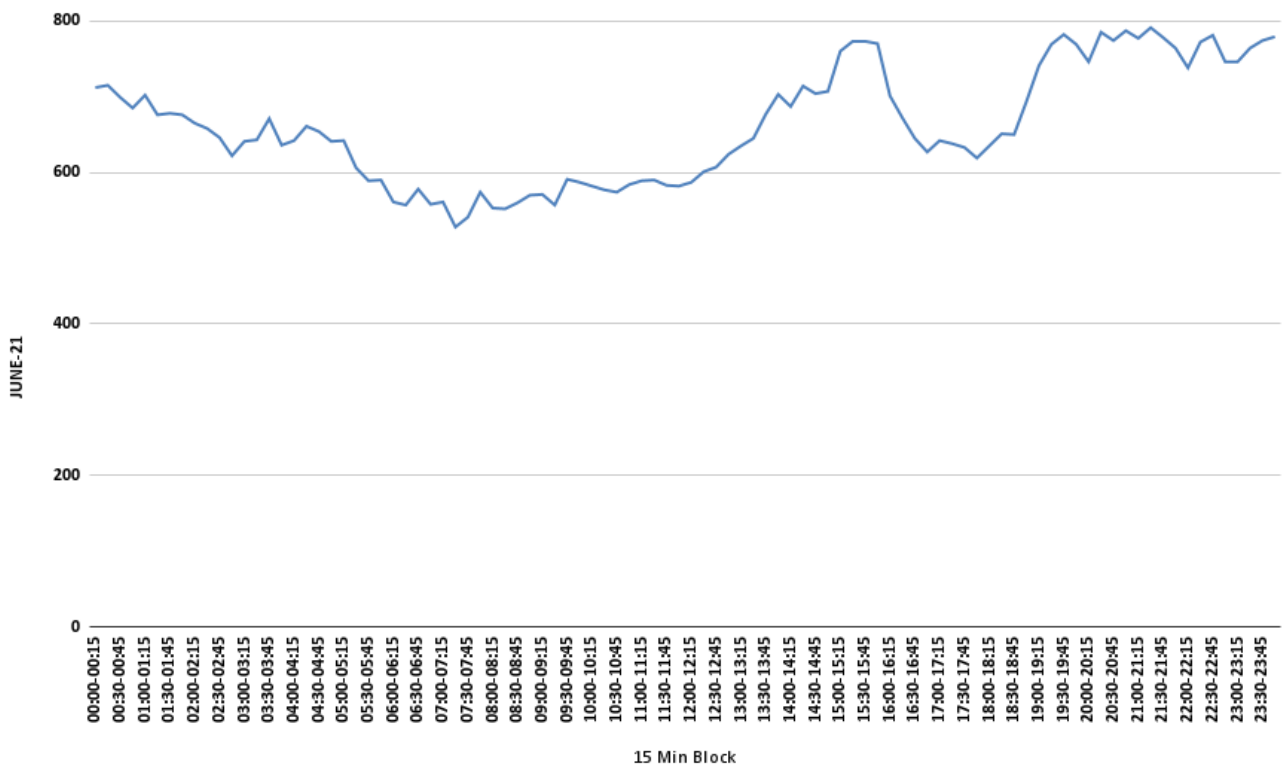
Block Wise Monthly Average Drawl Load Pattern for the Month of Apr-21:



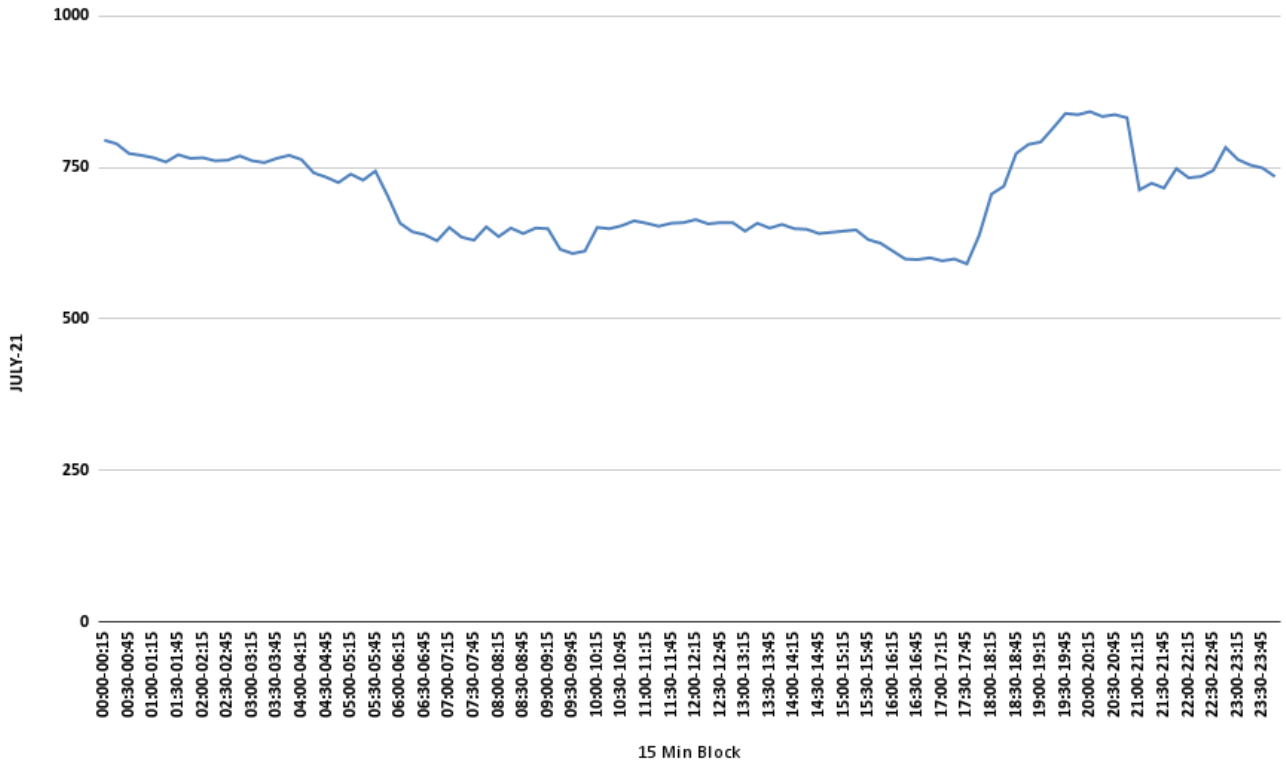
Block Wise Monthly Average Drawl Load Pattern for the Month of May-21:



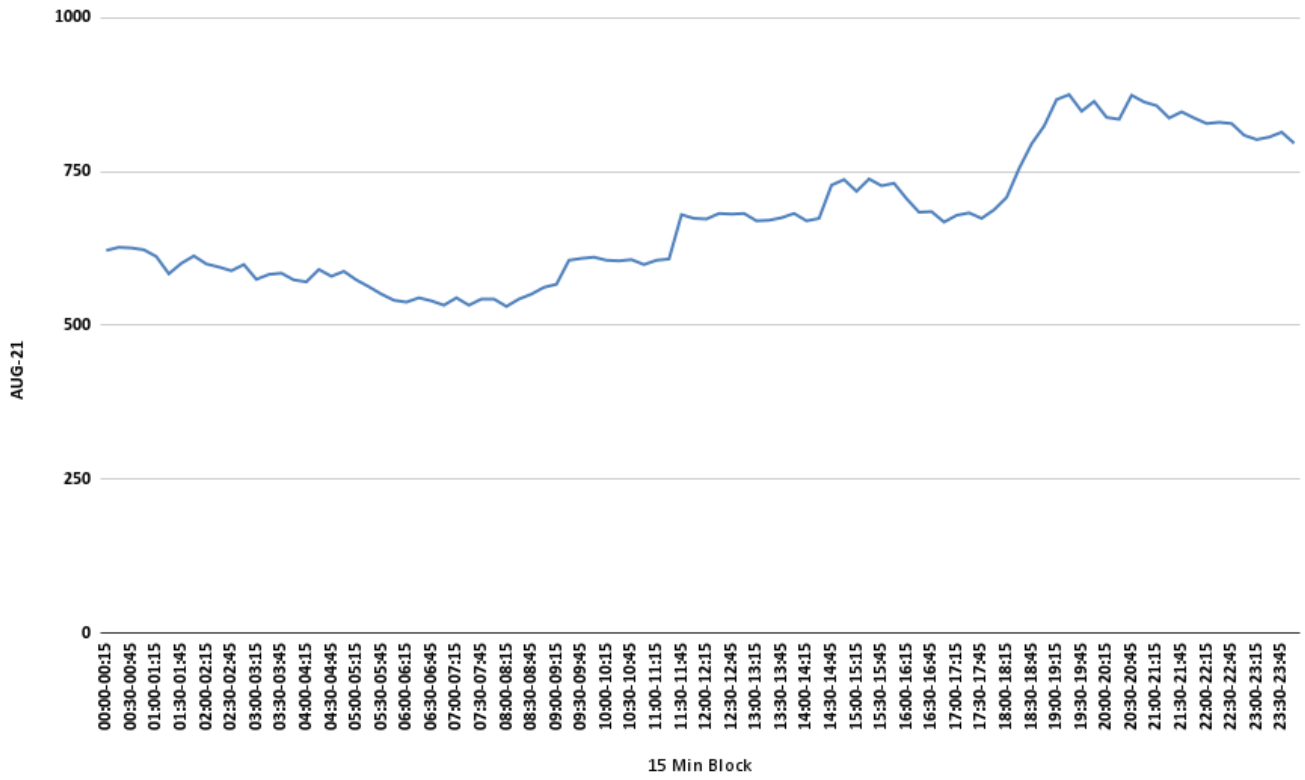
Block Wise Monthly Average Drawl Load Pattern for the Month of June-21:



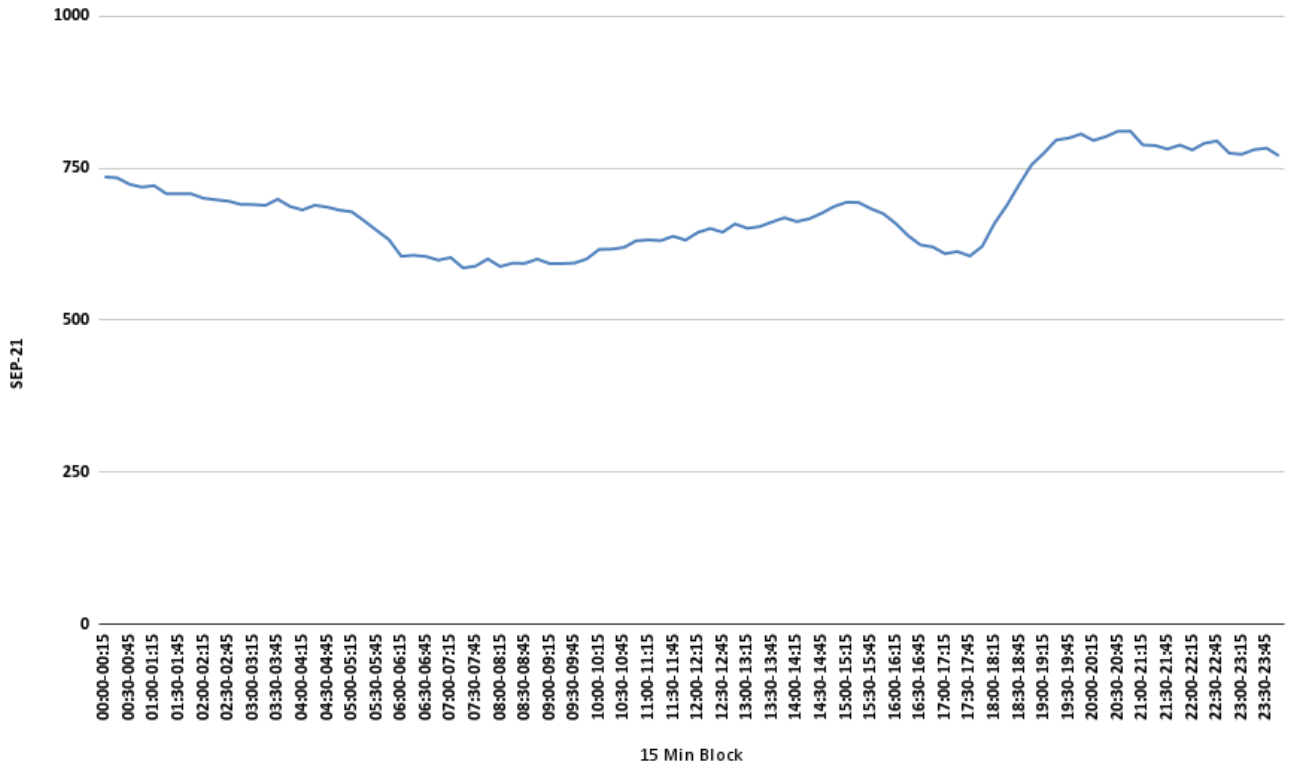
Block Wise Monthly Average Drawl Load Pattern for the Month of July-21:



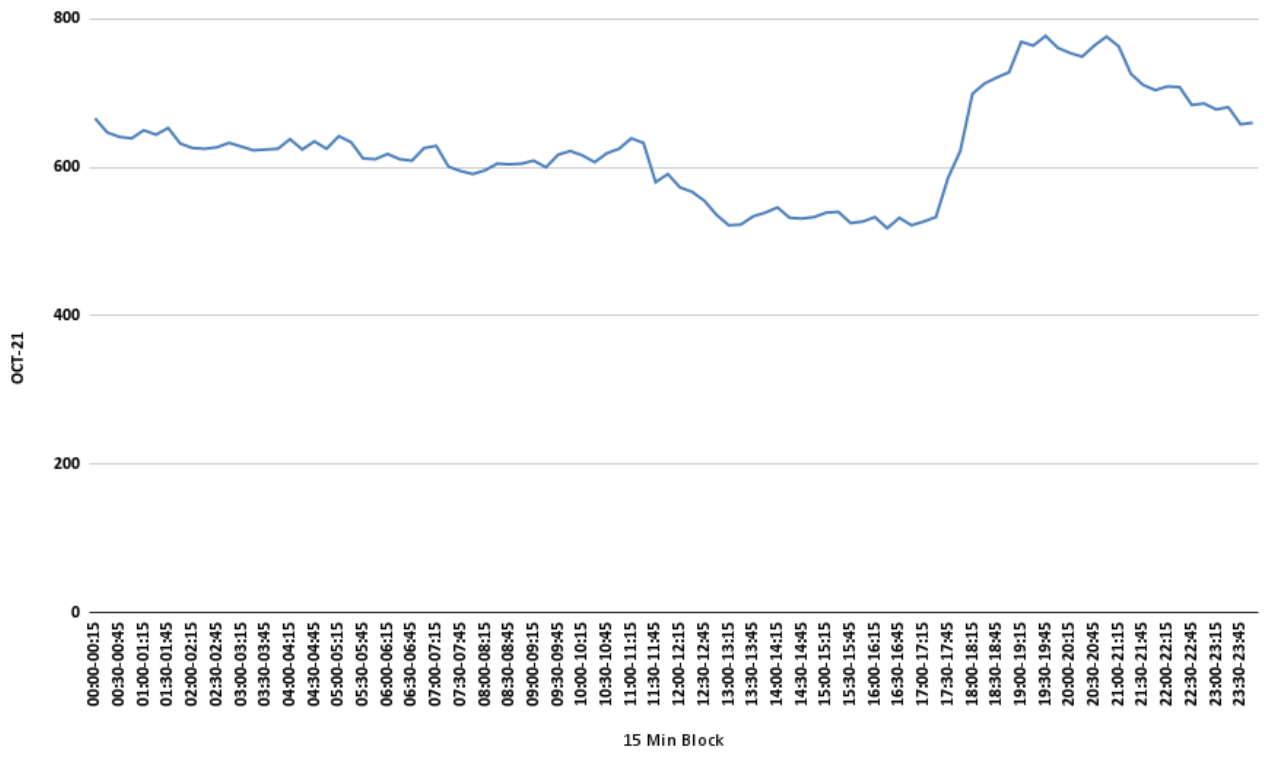
Block Wise Monthly Average Drawl Load Pattern for the Month of Aug-21:



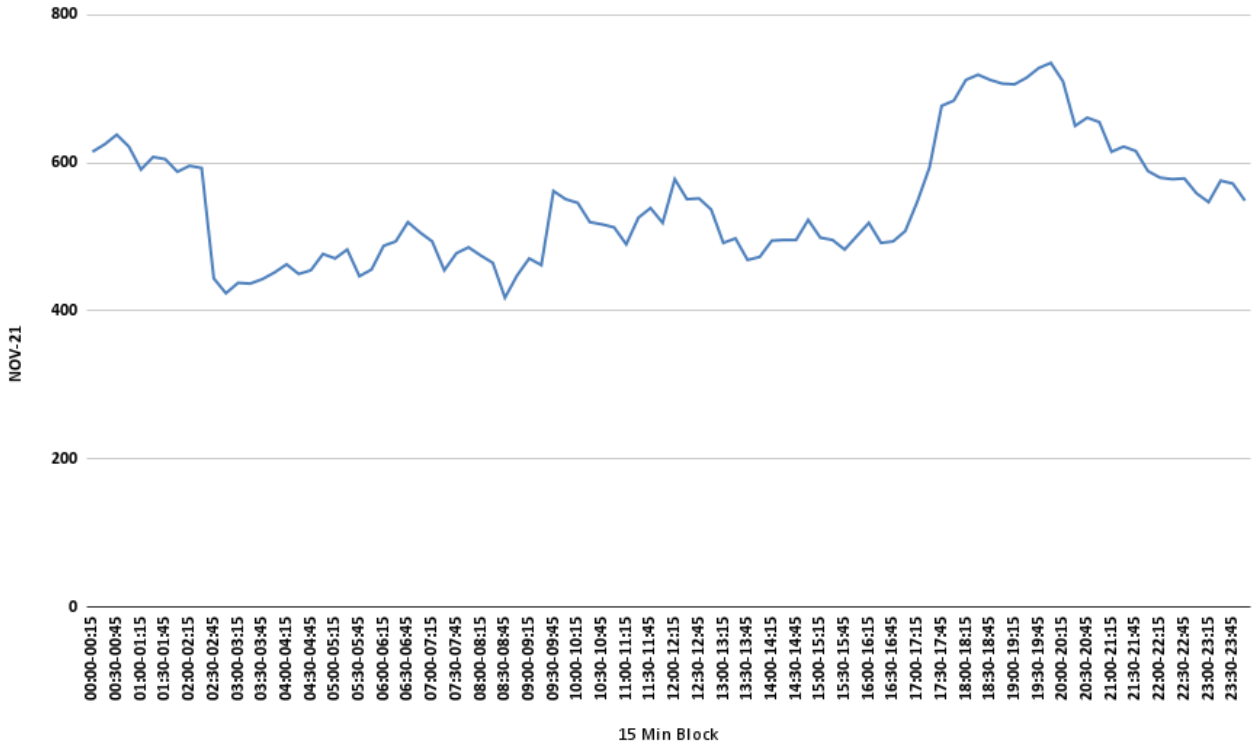
Block Wise Monthly Average Drawl Load Pattern for the Month of Sep-21:



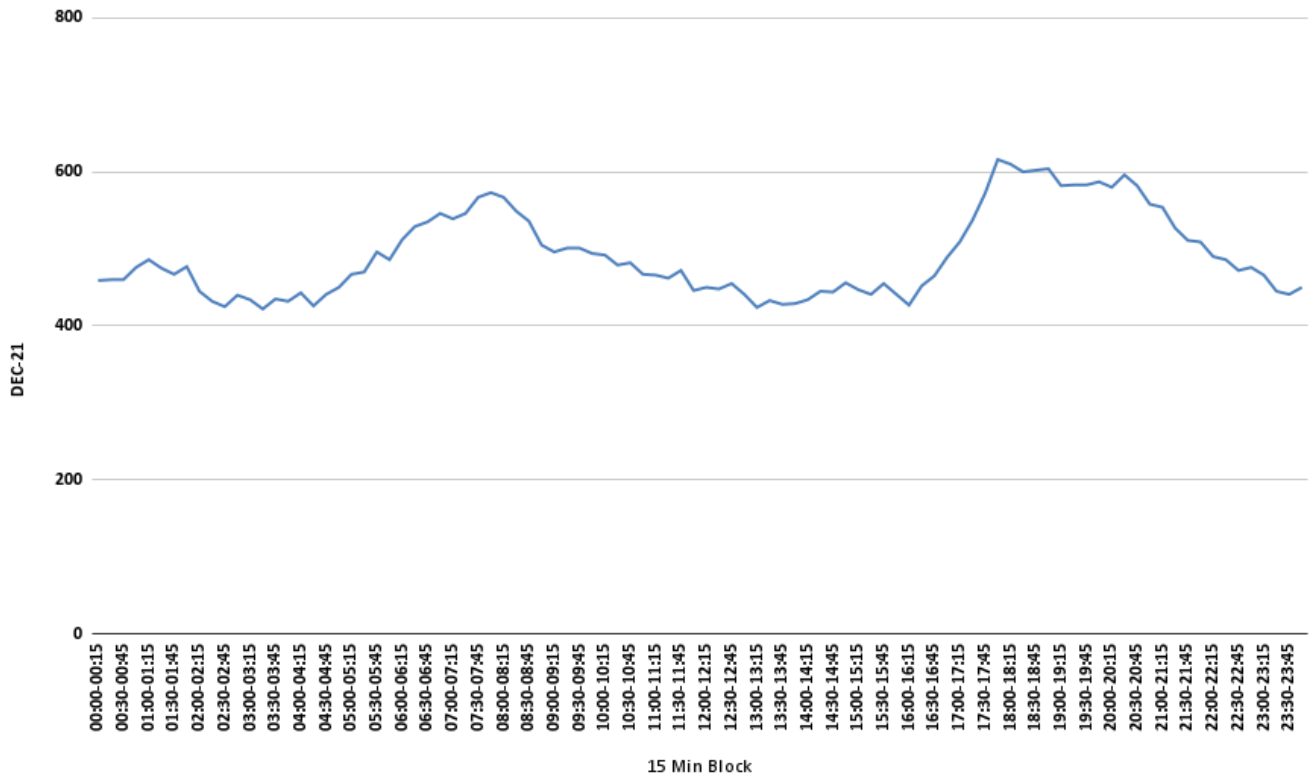
Block Wise Monthly Average Drawl Load Pattern for the Month of Oct-21:



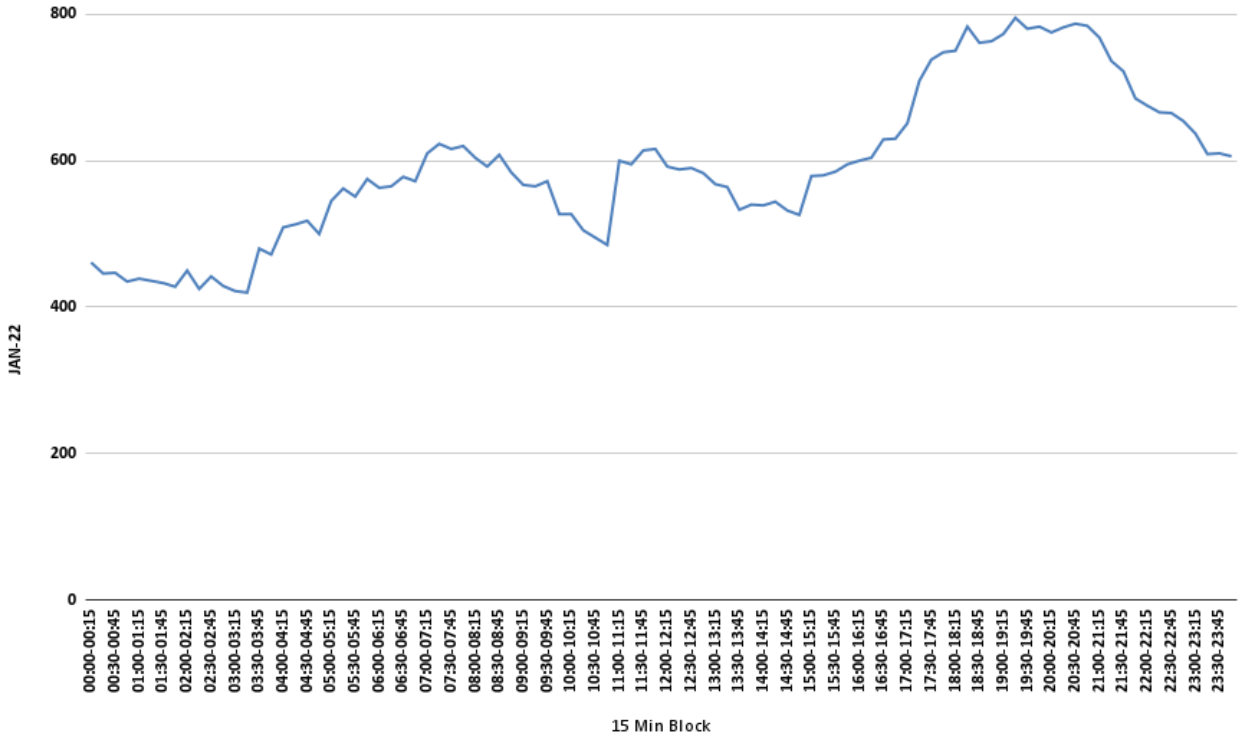
Block Wise Monthly Average Drawl Load Pattern for the Month of Nov-21:



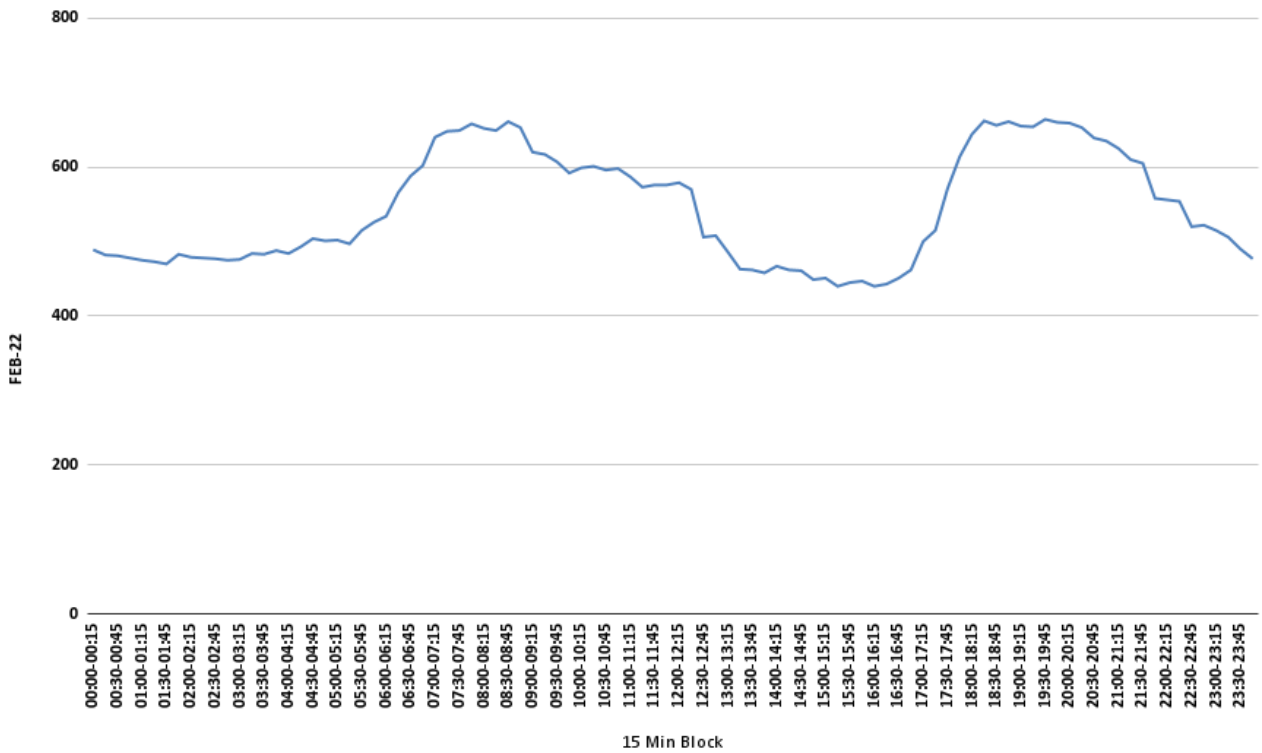
Block Wise Monthly Average Drawl Load Pattern for the Month of Dec-21:



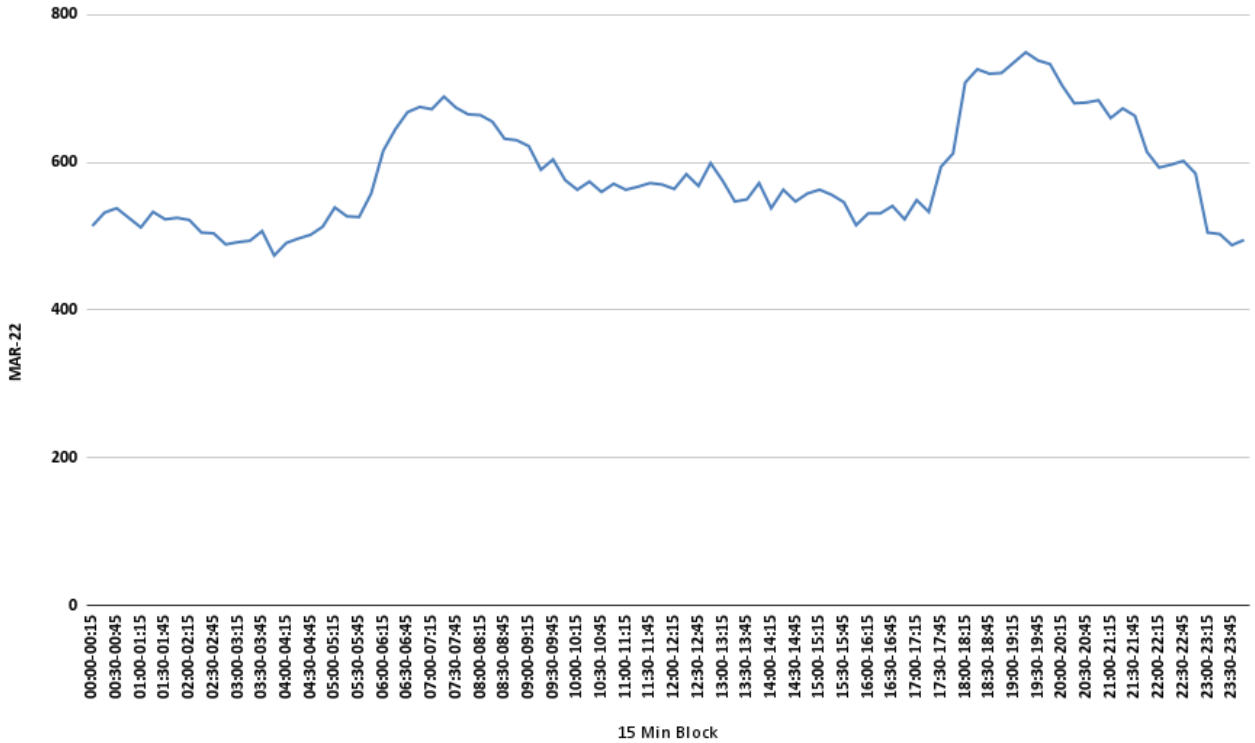
Block Wise Monthly Average Drawl Load Pattern for the Month of Jan-22:



Block Wise Monthly Average Drawl Load Pattern for the Month of Feb-22:



Block Wise Monthly Average Drawl Load Pattern for the Month of Mar-22:



The monthly average 15-minute block wise drawl pattern is presented below in a tabular form.

BLOCK WISE MONTHLYAVERAGE DRAWAL LOAD PATTERN												
15 Min Block	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22
00:00-00:15	720	829	712	795	622	736	666	615	459	461	489	514
00:15-00:30	705	835	715	789	627	734	647	625	460	446	482	532
00:30-00:45	695	825	699	773	626	724	641	638	460	447	481	538
00:45-01:00	700	816	685	770	623	719	639	622	476	435	478	525
01:00-01:15	716	810	702	766	612	721	650	591	486	439	475	512
01:15-01:30	716	805	676	759	584	708	644	608	475	436	473	533
01:30-01:45	687	802	678	771	601	708	653	605	467	433	470	523
01:45-02:00	693	792	676	765	613	708	632	588	477	428	483	525
02:00-02:15	677	795	665	766	600	701	626	596	445	450	479	522
02:15-02:30	690	786	658	761	595	698	625	593	432	425	478	505
02:30-02:45	692	790	646	762	589	696	627	444	425	442	477	504
02:45-03:00	683	780	622	769	599	691	633	424	440	429	475	489
03:00-03:15	693	781	641	761	575	690	628	438	434	422	476	492
03:15-03:30	683	777	643	758	583	689	623	437	422	420	484	494
03:30-03:45	689	785	671	765	585	699	624	443	435	480	483	507
03:45-04:00	684	771	636	770	574	687	625	452	432	472	488	474
04:00-04:15	658	773	642	763	571	681	638	463	443	509	484	491
04:15-04:30	680	772	661	741	591	689	624	450	426	513	493	497
04:30-04:45	682	780	654	734	580	686	635	455	441	518	504	502
04:45-05:00	674	777	641	725	588	681	625	477	450	500	501	513

05:00-05:15	674	762	642	739	574	678	642	471	467	545	502	539
05:15-05:30	673	746	606	729	563	663	634	483	470	562	497	527
05:30-05:45	643	712	589	744	551	648	612	447	496	551	515	526
05:45-06:00	619	710	590	703	541	633	611	456	486	575	526	558
06:00-06:15	604	665	561	658	538	605	618	488	512	563	534	616
06:15-06:30	615	673	557	644	545	607	611	494	529	565	566	645
06:30-06:45	604	663	578	639	540	605	609	520	535	578	588	668
06:45-07:00	614	660	558	629	533	599	626	506	546	572	602	675
07:00-07:15	605	654	561	651	545	603	629	494	539	610	640	672
07:15-07:30	583	651	528	635	533	586	601	455	546	623	648	689
07:30-07:45	587	644	541	630	543	589	595	478	567	616	649	674
07:45-08:00	596	639	574	652	543	601	591	486	573	620	658	665
08:00-08:15	591	631	553	636	531	588	596	475	567	604	652	664
08:15-08:30	591	633	552	650	543	594	605	465	549	592	649	655
08:30-08:45	586	630	560	641	551	594	604	418	536	608	661	632
08:45-09:00	594	627	570	650	562	601	605	448	505	584	653	630
09:00-09:15	563	616	571	649	567	593	609	471	496	567	620	622
09:15-09:30	573	615	557	615	606	593	600	462	501	565	617	590
09:30-09:45	555	607	591	608	609	594	617	562	501	572	607	604
09:45-10:00	577	617	587	612	611	601	622	551	494	527	592	576
10:00-10:15	602	641	582	651	606	616	616	546	492	527	599	563
10:15-10:30	611	643	577	649	605	617	607	520	479	505	601	574
10:30-10:45	611	652	574	654	607	620	619	517	482	495	596	560
10:45-11:00	648	660	584	662	599	631	625	513	467	485	598	571
11:00-11:15	641	667	589	658	606	632	639	490	466	600	587	563
11:15-11:30	646	658	590	653	608	631	633	526	462	595	573	567
11:30-11:45	605	665	583	658	680	638	580	539	472	614	576	572
11:45-12:00	572	672	582	659	674	632	591	519	446	616	576	570
12:00-12:15	593	705	587	664	673	644	573	578	450	592	579	564
12:15-12:30	590	724	601	657	682	651	567	551	448	588	570	584
12:30-12:45	573	704	607	659	681	645	555	552	455	590	506	568
12:45-13:00	586	741	624	659	682	658	536	537	441	583	508	599
13:00-13:15	583	723	635	645	670	651	522	492	424	568	486	575
13:15-13:30	563	733	645	658	671	654	523	498	433	564	463	547
13:30-13:45	569	737	677	650	675	662	534	469	428	533	462	550
13:45-14:00	557	745	703	656	682	669	539	473	429	540	458	572
14:00-14:15	562	743	687	649	670	662	546	495	434	539	467	538
14:15-14:30	561	737	714	648	674	667	532	496	445	544	462	563
14:30-14:45	563	743	704	641	728	676	531	496	444	532	461	547
14:45-15:00	597	750	707	643	737	687	533	523	456	526	449	558
15:00-15:15	604	742	760	645	718	694	539	499	447	579	451	563
15:15-15:30	569	741	773	647	738	694	540	496	441	580	440	556
15:30-15:45	560	726	773	631	727	683	525	483	455	585	445	546
15:45-16:00	575	675	770	625	731	675	527	501	441	595	447	515
16:00-16:15	595	682	701	612	706	659	533	519	427	600	440	531
16:15-16:30	597	644	672	599	684	639	518	492	452	604	443	531
16:30-16:45	583	609	645	598	685	624	532	494	465	629	451	541
16:45-17:00	604	603	627	601	668	621	522	508	489	630	462	523

17:00-17:15	584	546	642	596	679	609	527	548	509	651	500	549
17:15-17:30	575	570	638	599	683	613	533	594	537	709	515	533
17:30-17:45	560	570	633	591	674	606	586	677	572	738	571	594
17:45-18:00	580	582	619	638	688	621	622	684	616	748	614	612
18:00-18:15	608	640	635	706	708	659	699	712	610	750	644	708
18:15-18:30	658	662	651	719	755	689	713	719	600	783	662	726
18:30-18:45	684	714	650	773	795	723	721	712	602	761	656	720
18:45-19:00	717	755	694	788	824	756	728	707	604	763	661	721
19:00-19:15	710	764	741	792	867	775	769	706	582	773	655	735
19:15-19:30	728	795	769	815	875	796	764	715	583	795	654	749
19:30-19:45	738	790	782	839	848	799	777	728	583	780	664	738
19:45-20:00	767	794	769	837	864	806	761	735	587	783	660	733
20:00-20:15	777	775	746	842	838	796	754	710	580	775	659	704
20:15-20:30	787	768	785	834	835	802	749	650	596	782	653	680
20:30-20:45	774	795	774	837	874	811	764	661	582	787	639	681
20:45-21:00	763	808	787	832	863	811	776	655	558	784	635	684
21:00-21:15	794	800	777	713	857	788	763	615	554	768	625	660
21:15-21:30	798	786	791	724	837	787	726	622	527	736	610	673
21:30-21:45	789	777	778	716	847	781	711	616	511	722	605	663
21:45-22:00	798	793	764	748	837	788	704	589	509	685	558	614
22:00-22:15	767	834	738	733	828	780	709	580	490	675	556	593
22:15-22:30	790	828	772	735	830	791	708	578	486	666	554	597
22:30-22:45	792	827	781	745	828	795	684	579	472	665	520	602
22:45-23:00	793	742	746	783	809	775	686	559	476	654	522	585
23:00-23:15	789	764	746	763	802	773	678	547	466	637	515	505
23:15-23:30	782	796	764	754	806	780	681	576	445	609	506	503
23:30-23:45	768	810	774	749	814	783	658	572	441	610	490	488
23:45-00:00	755	787	779	735	796	770	660	549	450	606	477	495

6.2 ENERGY EFFICIENCY IN DEMAND SIDE MANAGEMENT

The purpose of Energy Efficiency and Demand Side Management should be to reduce the load during peak period and enhance load during the non-peak period.

DSM activity should be also carried out to protect the Environment and to win the trust of consumers. The DSM can be carried out at three levels: DISCOM level, consumer level and by using technology like energy storage.

- The DSM activities are to be initiated by DISCOM however need to be carried out by consumers. DISCOM can only manage a few DSM activities like voltage regulation and power factor regulation.

- It is proposed that enough data are required to be generated by carrying out consumer load Research and third-party experts should be engaged.

- DSM programmes need skill about energy conservation and art of Communication with a consumer. It is better to engage Energy Manager/ Energy Auditors in a DSM cell.

Awareness program on DSM should be conducted. Based on the analysis of data and third-party survey report and action plan to be prepared for submission to Hon'ble OERC.

- At the consumer level, the involvement of consumers is must for the success of demand side management. Awareness, Incentives, penalties and legislation are four main tools to involve consumers. The DSM scheme should be formulated based on these four tools.

- Awareness is the key to the success of the DSM programme. However at present no such awareness program on DSM is being conducted by DISCOM and it is proposed to implement the same.

Cost Benefit Analysis for proposed DSM Measures:

Cost Benefit Analysis for Replacement of 75 W Household Fans with 32 W BLDC Fans			
Sl. No.	**Particulars**	**Unit**	**TPNODL**
1	Total Nos. Consumers	**Nos.**	2089083
2	Total Nos. Of Residential, Commercial and Industrial consumers in LT Systems	**Nos.**	2040119
3	Proposed Nos. Fan to be replaced in the Utility based DSM Project	Nos.	103347
4	Wattage of Existing Fan	Watt	75
5	Wattage of BLDC Fan	Watt	32
6	Present Total load before Replacement	MW	8
7	Future Load after Replacement with BLDC Fan	MW	3
8	Reduction in Demand due to BLDC Fan Program	MW	4
9	Run hour /Day	Hour	10
10	Annual Energy Saving assuming 300 Running Days in a year	MU	13.33
11	Energy Charge of the LT Consumers	Rs./kWh	5.30
12	Annual Financial Savings for Consumer @ Rs 5.30/unit	Crore Rs.	7.07
13	Bulk Supply Price of GRIDCO	Rs./kWh	3.20
14	OPTCL Transmission Charges	Rs./kWh	0.28
15	Power Purchase Cost of DISCOM	Rs./kWh	3.48
16	AT&C Loss of DISCOM	%	19.17%
17	Annual deemed Monetary Savings for DISCOM considering Power Purchase Cost and AT & C Loss	Rs./kWh	0.67
18	LT Realisation	Rs./kWh	2.9
19	Monetary Profit to DISCOM due to DSM Project in prospects to DISCOM	Rs./kWh	0.58

20	Deemed Monetary Savings for DISCOM considering Overall DSM Prospective	Rs./kWh	1.25
21	Total Annual deemed Monetary Savings for DISCOM considering Overall DSM Prospective	Crore Rs.	1.663
22	Total Investment Required	Crore Rs.	36.17
23	Simple Payback Period	Year	5.12

Cost Benefit Analysis for Replacement of Existing AC with 5 Star Super Efficient AC			
Sl. No.	**Particulars**	**Unit**	**TPNODL**
1	Total Nos. Consumers	**Nos.**	2089083
2	Total Nos. Of Residential, Commercial and Industrial consumers in LT Systems	**Nos.**	2040119
3	Proposed Nos. AC to be replaced in the Utility based DSM Project	Nos.	10335
4	Wattage of Existing AC	Watt	1625
5	Wattage of Super Efficient AC	Watt	962
6	Present Total load before Replacement	MW	16.79
7	Future Load after Replacement with Super Efficient AC	MW	9.94
8	Reduction in Demand due to Super Efficient AC Program	MW	6.85
9	Run hour /Day	Hour	6
10	Annual Energy Saving assuming 300 Running Days in a year	MU	12.33
11	Energy Charge of the LT Consumers	Rs./kWh	5.30
12	Annual Financial Savings for Consumer @ Rs 5.30/unit	Crore Rs.	6.54
13	Bulk Supply Price of GRIDCO	Rs./kWh	3.20
14	OPTCL Transmission Charges	Rs./kWh	0.28
15	Power Purchase Cost of DISCOM	Rs./kWh	3.48
16	AT&C Loss of DISCOM	%	19.17%
17	Annual deemed Monetary Savings for DISCOM considering Power Purchase Cost and AT & C Loss	Rs./kWh	0.67
18	LT Realisation	Rs./kWh	2.52
19	Monetary Profit to DISCOM due to DSM Project in prospects to DISCOM	Rs./kWh	0.96
20	Deemed Monetary Savings for DISCOM considering Overall DSM Prospective	Rs./kWh	1.63
21	Total Annual deemed Monetary Savings for DISCOM considering Overall DSM Prospective	Crore Rs.	2.007
22	Total Investment Required	Crore Rs.	42.68
23	Simple Payback Period	Year	6.53

Cost Benefit Analysis for Replacement of Existing Motors with IE3 Motors			
Sl. No.	**Particulars**	**Unit**	**TPNODL**
1	Total Nos. Of Commercial and Industrial consumer in LT/HT Systems	Nos.	103713
2	Total Connected Load of Commercial and Industrial Consumer	MW	912.98
3	Total Energy Consumption of Commercial and Industrial Consumer	MU	1729.84
4	Motor Load in the Industry assuming Motor Load to be 60% of the Connected Load	MW	547.79
5	Existing Motor Load proposed to be replaced with IE3 Motors Considering life cycle period of 10 years	MW	54.78
6	No. Of Motors to be installed considering penetration level of different capacity of Motors in MSME whose Weighted Average is calculated to be 16.13 kW per Motors	Nos.	3396
7	% Saving in Energy due to Installation of IE3 Motors	%	5%
8	Cost of IE3 Motors assuming 4275 per kW	Rs./kW	4275.00
9	Run hour /Day	Hour	12
10	Annual Energy Saving considering 300 running days and 12 hours operation	MU	9.86
11	Energy Charge of the Commercial / Industrial Consumers	Rs./kWh	6.20
12	Annual Financial Savings for Consumer @ Rs 6.20/unit	Crore Rs.	6.11
13	Bulk Supply Price of GRIDCO	Rs./kWh	3.20
14	OPTCL Transmission Charges	Rs./kWh	0.28
15	Power Purchase Cost of DISCOM	Rs./kWh	3.48
16	AT&C Loss of DISCOM	%	19.17%
17	Total Investment Required	Crore Rs.	23.42
18	Simple Payback Period	Year	3.83

7.0 FIELD STUDY

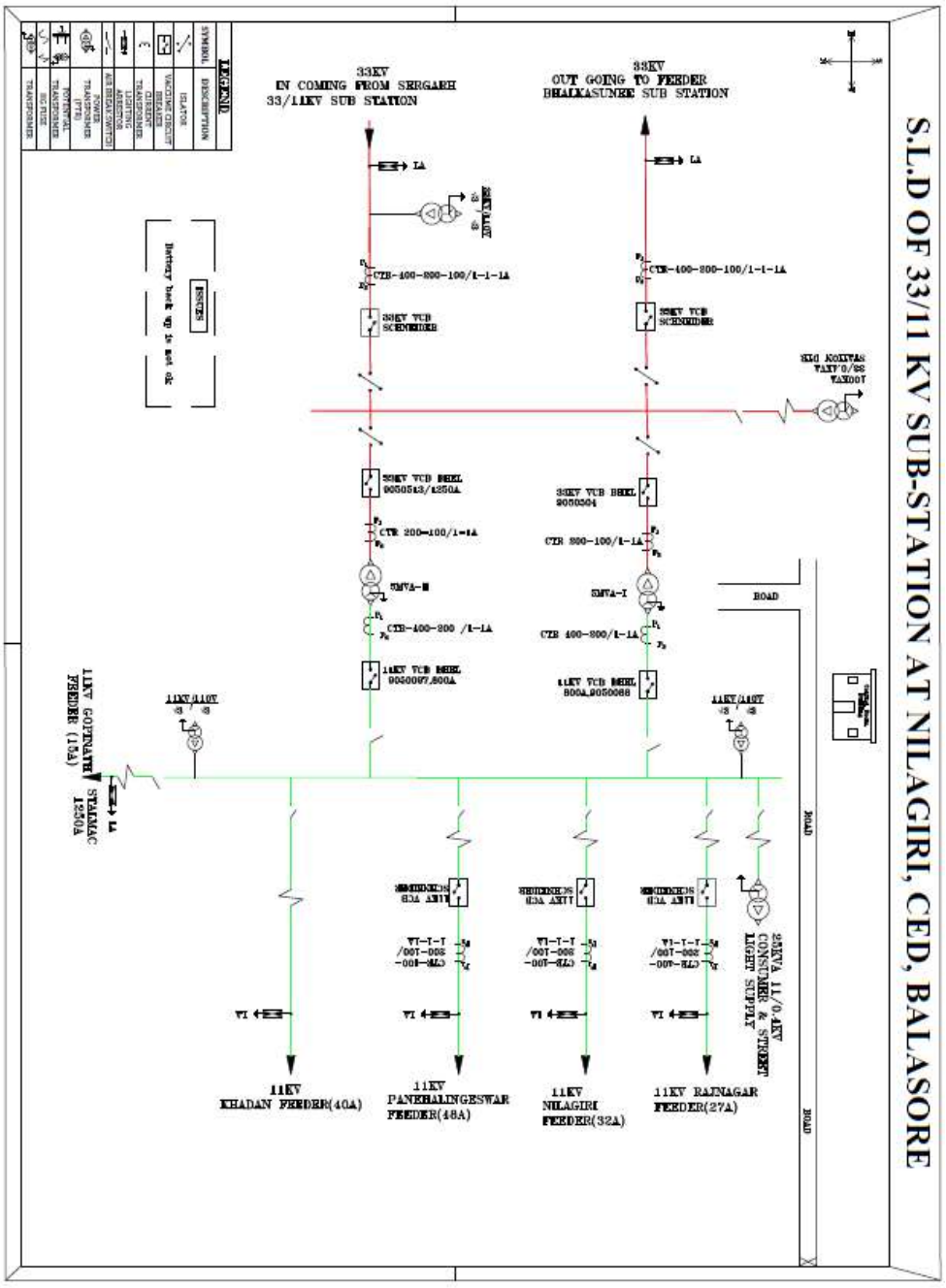
Sl. No.	Date	Place	Activity
1	03.10.2022 & 09.06.2022	TPNODL corporate Office	Arrival on Site, Opening meeting, Discussed audit methodology & substation visit agenda discussion
2	03.10.2022	Nilgiri 33/11 kV PSS	Field Visit, Inspection, Collection & Verification of data
3	03.10.2022	Kalimandir 33/11 kV PSS	Field Visit, Inspection, Collection & Verification of data
4	03.10.2022	Gopalgaon 33/11 kV PSS	Field Visit, Inspection, Collection & Verification of data
5	09.06.2022	Betanati 33/11 kV PSS	Field Visit, Inspection, Collection & Verification of data
6	09.06.2022	Rajghat 33/11 kV PSS	Field Visit, Inspection, Collection & Verification of data

VISIT TO NILGIRI 33/11 KV SUBSTATION, CED, BALASORE:

OBSERVATIONS:

- The 33 KV incoming is from Sergarh 33/11 kV substation.
- There is one 33 KV outgoing to Bhalkasunee PSS.
- Five 11 KV Feeder emanate from the structure namely Rajnagar, Nilgiri, Panchalingeswar, Gopinathpur and Khadan.
- The 11 kV Feeders have peak ampere of 27 Amp (Rajnagar), 32 Amp (Nilgiri), 48 Amp (Panchalingeswar), 15 Amp (Gopinathpur), 40 Amp (Khadan).
- There are two nos. of 5 MVA Power Transformers in the structure out of which two 11 kV feeders namely Rajnagar & Nilgiri emanate from one Power Transformer & three 11 kV feeders namely Panchalingeswar, Gopinathpur & khadan emanate from the other Power Transformer.
- The meters of 11kV feeders are working and the reading of Kwh, KVArh, KVAh, KW, KVA etc are shown in the energy meter in the Control panel.
- The meter at 33 kV incoming meter is smart meter and is working properly.

SINGLE-LINE DIAGRAM OF NILGIRI 33/11 KV SUBSTATION:

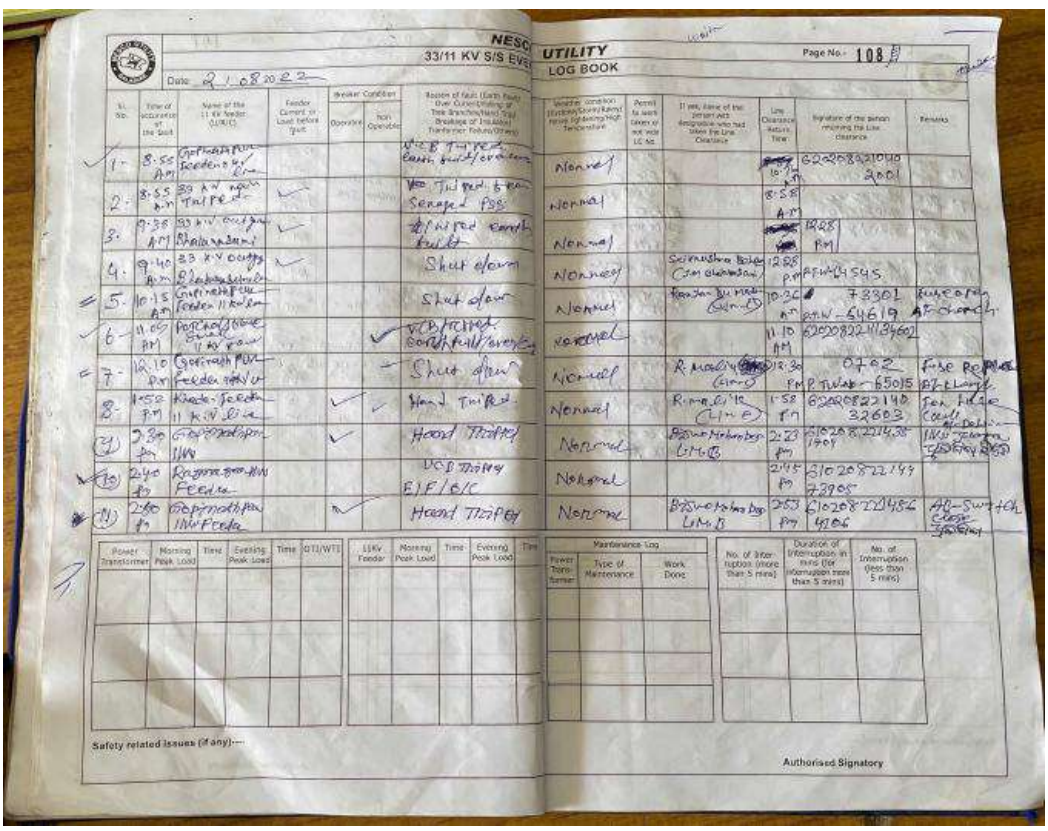


SNAPSHOTS TAKEN DURING VISIT TO NILGIRI 33/11 KV SUBSTATION:

Visit to Nilgiri PSS

Control Panels at Nilgiri PSS

33 kV Incoming Smart Meter is in working condition



Log Book Verification in the PSS.

Oil Leakage issue of the Transformer at Nilgiri PSS.

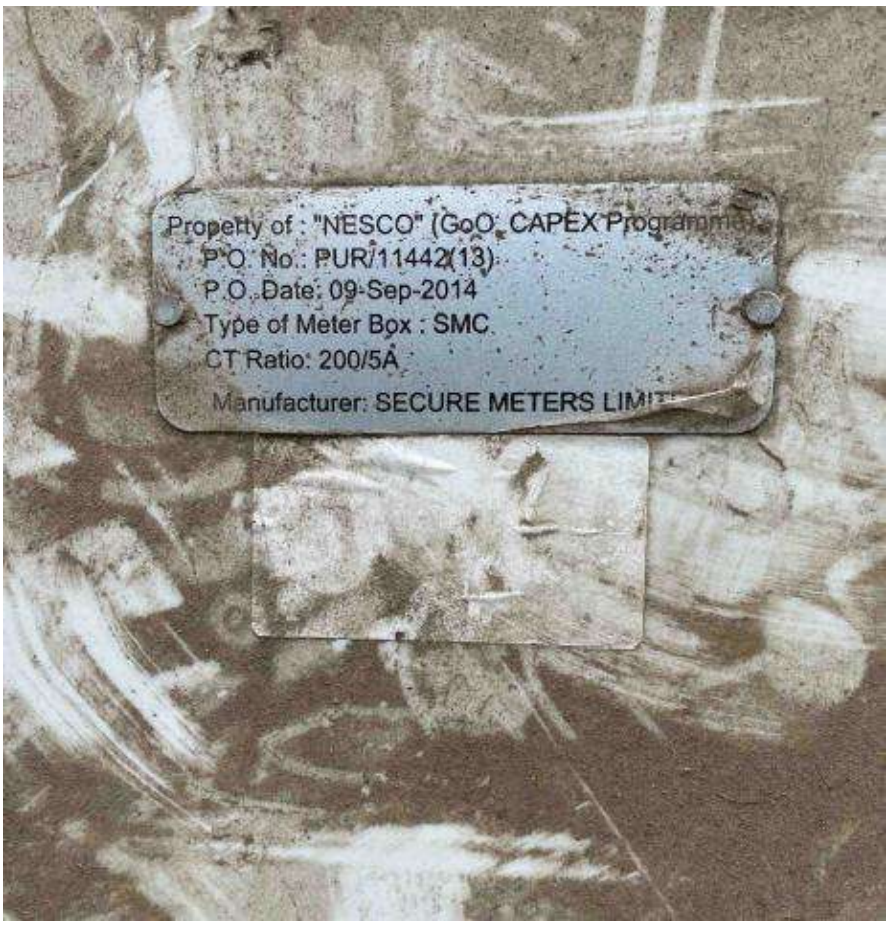
Earthing at the PSS

Silica gel of the Transformer is in good condition

Broken boundary wall of the PSS

Snapshots of field visit to various DTs metered by TPNODL:


Property of : "NESCO" (GoO, CAPEX Programme)
P.O. No.: PUR/11442(13)
P.O. Date: 09-Sep-2014
Type of Meter Box : SMC
CT Ratio: 200/5A
Manufacturer: SECURE METERS LIMITED

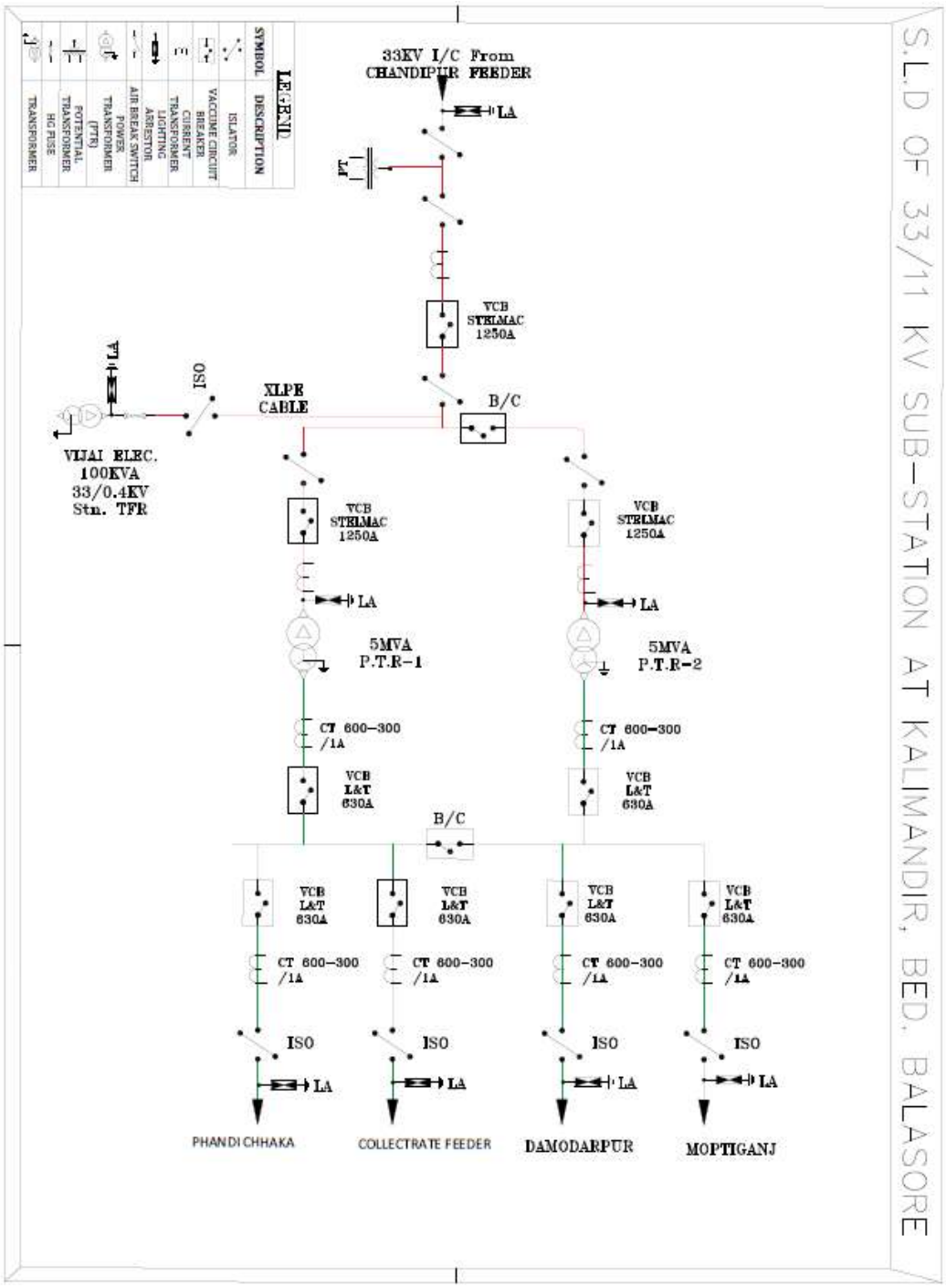

Property of : "NESCO" (GoO, CAPEX Programme)
P.O. No.: PUR/11442(13)
P.O. Date: 09-Sep-2014
Type of Meter Box : SMC
CT Ratio: 200/5A
Manufacturer: SECURE METERS LIMITED

VISIT TO KALIMANDIR 33/11 KV SUBSTATION, BED, BALASORE:

OBSERVATIONS:

- The 33 KV incoming is from Chandipur Feeder.
- Four 11 KV Feeder emanate from the structure namely Phandi Chhaka, Collectorate Feeder, Damodarpur and Motiganj.
- The 11 kV Feeders have peak ampere of 37 Amp (Phandi Chhaka), 32 Amp (Collectorate Feeder), 42 Amp (Damodarpur) & 40 Amp (Motiganj).
- There are two nos. of 5 MVA Power Transformers in the Structure out of which two 11 kV feeders namely Phandi Chhaka & Collectorate Feeder emanate from one Power Transformer & two 11 kV feeders namely Damodarpur & Motiganj emanate from the other Power Transformer.
- The meters of 11kV feeders are smart meters and the reading of Kwh, KVArh, KVAh, KW, KVA etc are shown in the energy meter in the Control panel.
- The meter at 33 kV Incoming is working properly.
- SCADA System is implemented in the Substation for better monitoring.

SINGLE-LINE DIAGRAM OF KALIMANDIR 33/11 KV SUBSTATION:



Power Tech Consultants

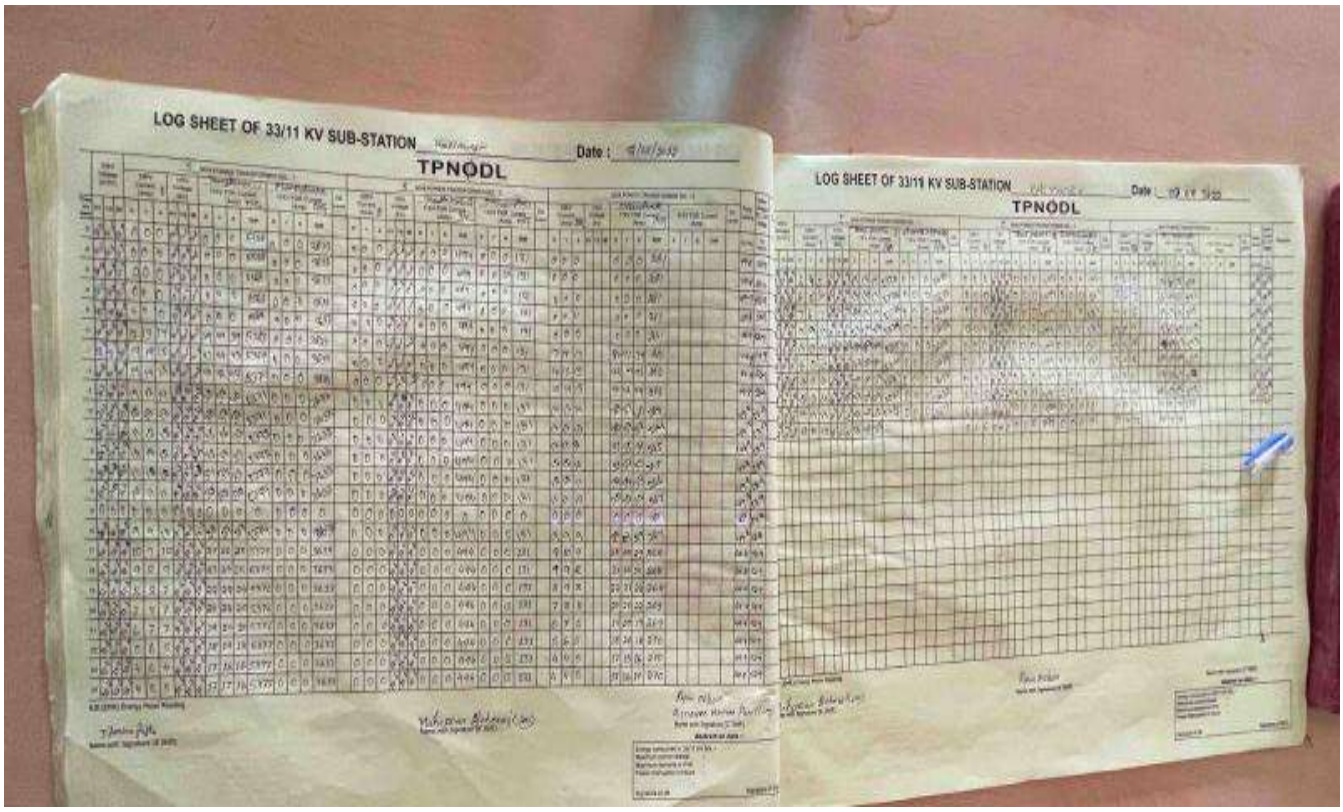
SNAPSHOTS TAKEN DURING VISIT TO KALIMANDIR 33/11 KV SUBSTATION:

Visit to 33/11 kV Kali Mandir Sub-station

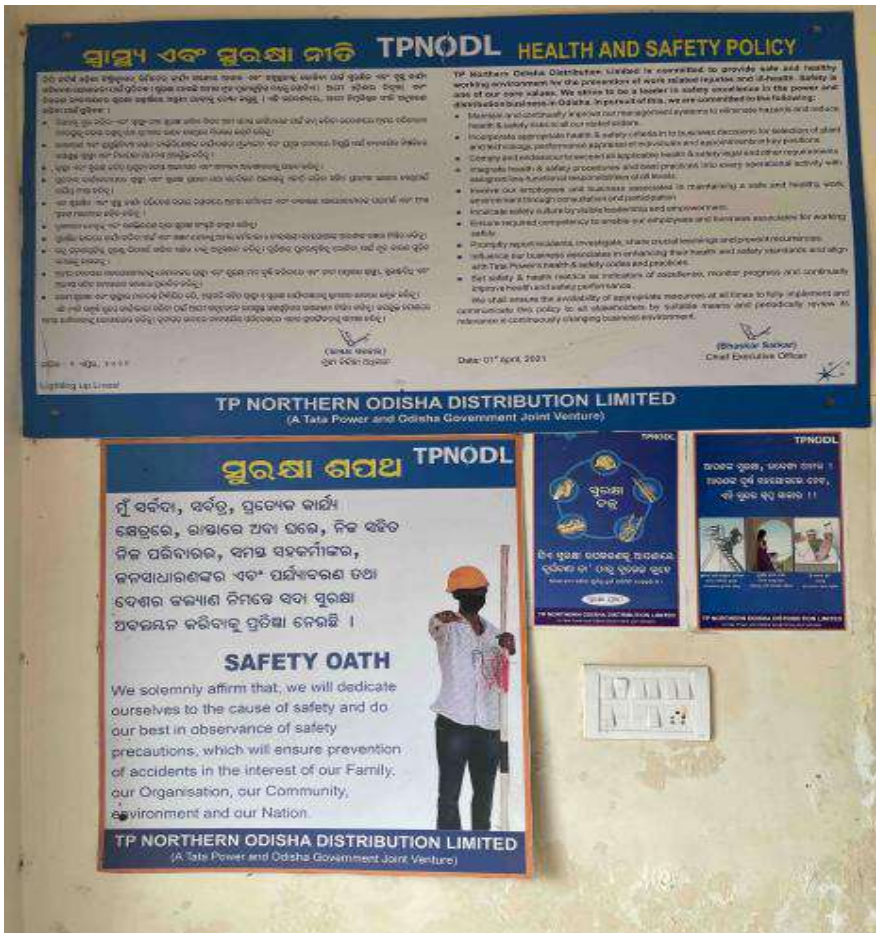
Control Panels at the 33/11 kV Kali Mandir Sub-Station

SCADA system implemented at the PSS.

33 kV Incoming smart meter at the PSS



Log Books



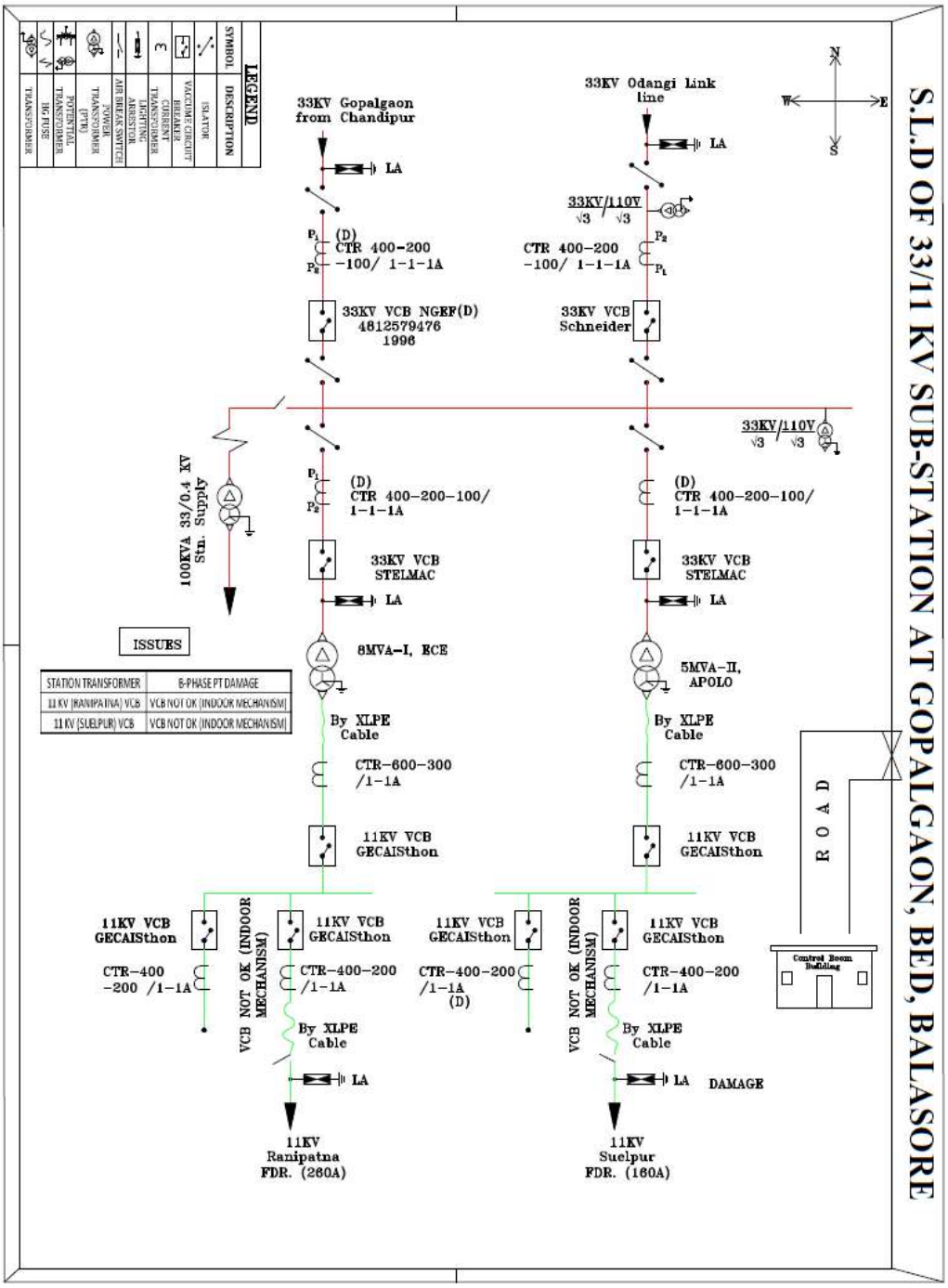
Display of SOP & Safety Protocols at the PSS

VISIT TO GOPALGAON 33/11 KV SUBSTATION, BED, BALASORE:

OBSERVATIONS:

- The 33 KV incoming is from Chandipur Feeder.
- Two 11 KV Feeder emanate from the structure namely Ranipatna & Suelpur.
- The 11 kV Feeders have peak ampere of 260 Amp (Ranipatna), 160 Amp (Suelpur).
- There are two Power Transformers in the structure out of which one is of 8 MVA from which Ranipatna feeder emanates and the other is of 5 MVA from which Suelpur feeder emanates.
- The meters of 11kV feeders are working and the reading of Kwh, KVArh, KVAh, KW, KVA etc are shown in the energy meter in the Control panel.
- The meter at 33 kV incoming is smart meter and is working properly.
- There is earthing issue in the PSS & the quality of earthing is not good.
- Metal spreading is not done in some parts of the PSS, which may cause damage.
- The 33Kv incoming line is very close to the ground which can cause serious problems.

SINGLE-LINE DIAGRAM OF GOPALGAON 33/11 KV SUBSTATION:



SNAPSHOTS TAKEN DURING VISIT TO GOPALGAON 33/11 KV SUBSTATION:

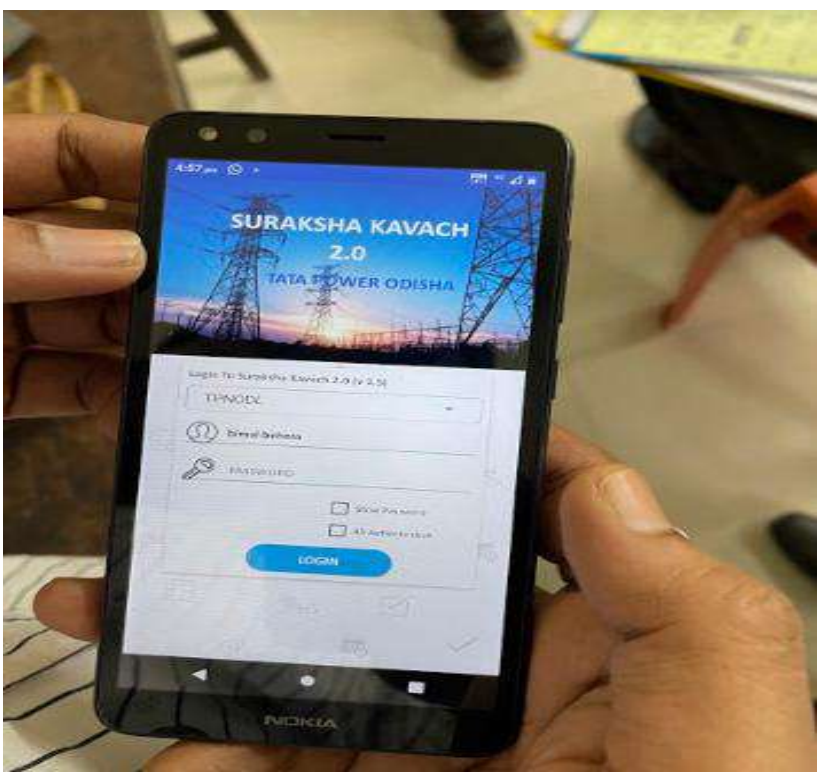
Visit to 33/11 kV Gopalgaon Feeder

Control Panels at the 33/11 kV Gopalgaon Feeder.

Silica Gel of Transformer at the PSS

33 kV Incoming Smart Meter at the PSS

33kV Incoming line is very close to the ground causing safety issue



Tripping details uploaded by using Mobile Applications

VISIT TO BETANATI 33/11 KV SUBSTATION:

OBSERVATIONS:

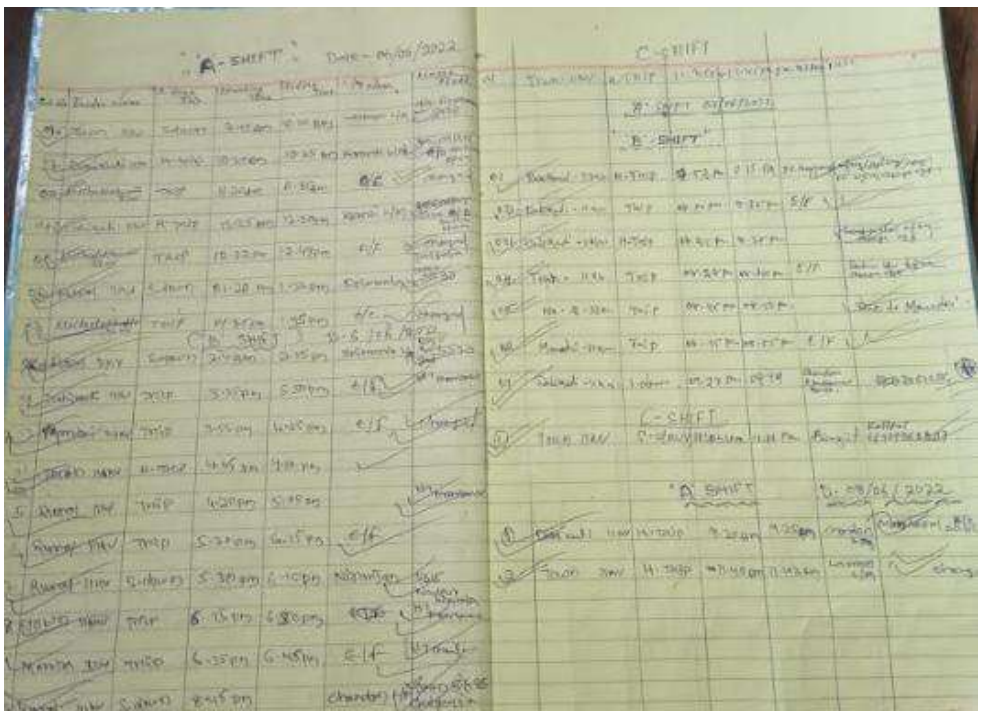
- There are two 33 KV incoming line to the PSS from Betanati-1 & Betanati-2 feeders and four 33 kV outgoing lines namely Kuchulakhuntia, Barkand, Baisingha and Manitri.
- Three 11 KV Feeders emanate from the structure namely Rural feeder, Town Feeder and Dahikoti feeder.
- There are three Power Transformers in the structure out of which two are of 5 MVA and one is of 3.5 MVA. Rural 11 KV feeder is being supplied from Power Transformer -1 of 5 MVA, Town 11 KV feeder is being supplied from Power Transformer-2 of 5 MVA and Dahikoti 11 KV feeder is being supplied from Power Transformer 3 of 3.15 MVA.
- The 11 kV Feeders is of length 40km, 39km & 42Km of Rural feeder, Town Feeder and Dahikoti feeder respectively.
- The meters of 11kV feeders are working and the reading of Kwh, KVArh, KVAh, KW, KVA etc are shown in the energy meter in the Control panel.
- Earthing Chambers are not being maintained by sectional field officers and Structure metal lying is not done properly.
- It is found that VCB operation is done manually which is very unsafe and it must be avoided for safety purpose.

SNAPSHOTS TAKEN DURING VISIT TO BETANATI 33/11 KV SUBSTATION:

Visit to 33/11 kV Betanati substation

Control Panel of the substation

Manual VCB tripping at the substation



Log book maintained at the substation

VISIT TO GAON ARMADA 33/11 KV SUBSTATION:

OBSERVATIONS:

- The 33 KV incoming is from Rajghat Feeder which is at a distance 6 Kms from Basta Division of Balasore. Basta Division is getting 33 KV Power supply from OPTCL 132/33 KV Jaleswar grid.
- Four 11 KV Feeder emanate from the structure namely Basunli, Kasafalia, Tambakhuri and Amrda.
- There are two nos. of 5 MVA Power Transformers in the Structure out of which two 11 kV feeders namely Basunli & Kasafalia Feeder emanate from one Power Transformer & two other 11kV feeders namely Tambakhuri & Amrda emanate from the other Power Transformer.
- The meters of 11kV feeders are smart meters and the reading of Kwh, KVArh, KVAh, KW, KVA etc are shown in the energy meter in the Control panel.
- The meter at 33 kV incoming is working properly.

SNAPSHOTS TAKEN DURING VISIT TO GAON ARMADA 33/11 KV SUBSTATION:

Visit to Gaon Armada 33/11 Kv Substation

Power Transformers at the Sub-Station

Control Panels at the Sub-Station.

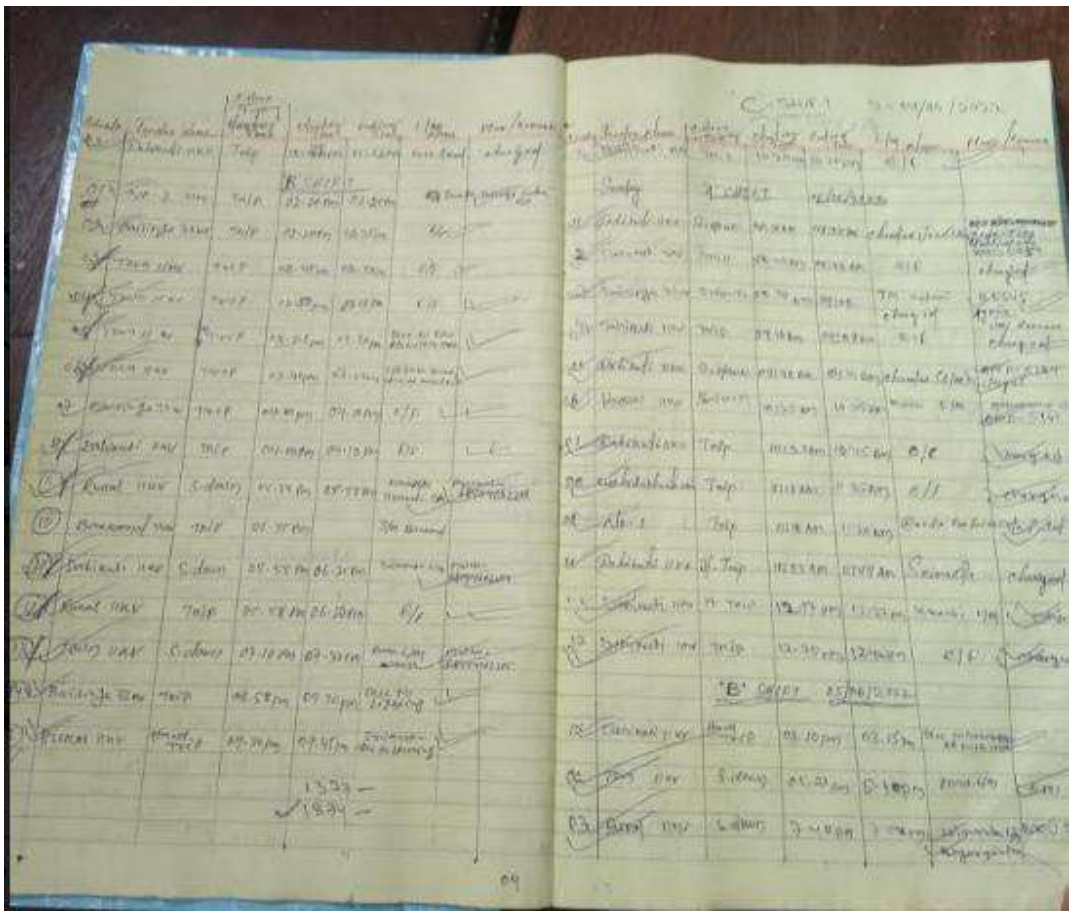
VISIT TO GAON RAJGHAT 33/11 KV SUBSTATION:

OBSERVATIONS:

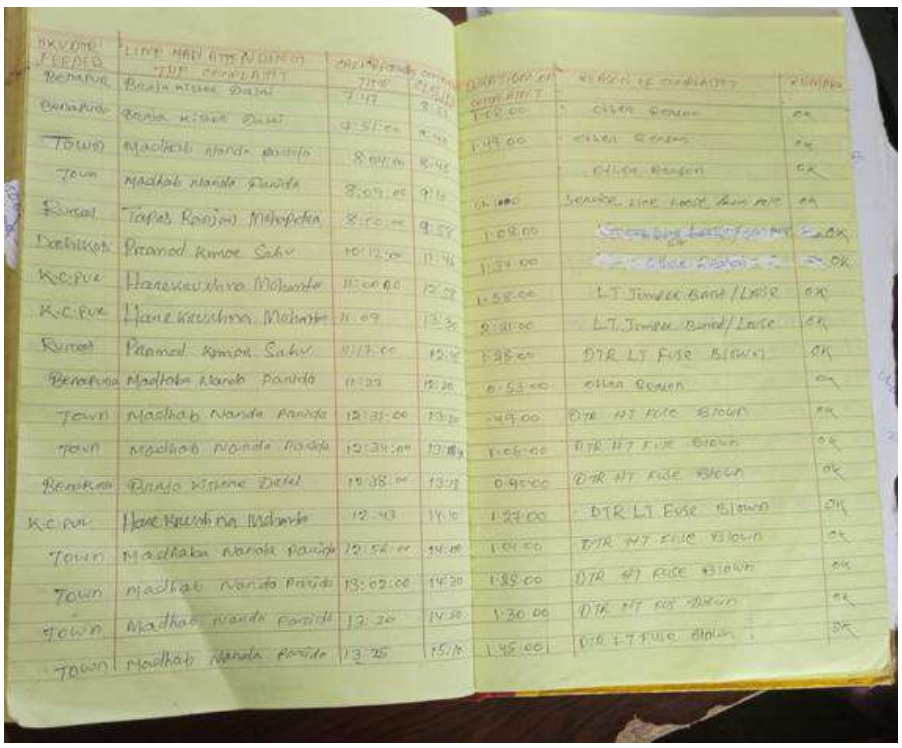
- The 33 KV incoming is from Jaleswar OPTCL 132/33 KV Grid which is at a distance 6 Kms from the Substation.
- One 33 kV outgoing line is going to Gaon Armada 33/11 KV structure.
- Two 11 KV Feeder emanate from the structure namely Chasipada and Velora. The distance from the structure is 35 Km & 65 Km to Chasipada & velora feeder respectively.
- The meters of 11kV feeders are smart meters and the reading of Kwh, KVArh, KVAh, KW, KVA etc are shown in the energy meter in the Control panel.
- The meter at 33 kV incoming is not working.
- Earthing Chambers are not being maintained by sectional field officers and Structure metal lying is not done properly.

SNAPSHOTS TAKEN DURING VISIT TO GAON RAJGHAT 33/11 KV SUBSTATION:

Control Panels at the Sub-Station.



Log Book Verification by the Audit Team.



8.0 DETAILS OF VARIOUS SYSTEM IMPROVEMENT & LOSS REDUCTION PROJECT UNDERTAKEN BY TPNODL

PROJECTS IMPLEMENTED BY TPNODL ACROSS ODISHA

Tata Power Northern Odisha Distribution Limited (TPNODL) has invested in a number of projects across Odisha for the benefit of its habitants, bringing electricity to remote regions, villages and underdeveloped areas since its inception. From providing electricity to installing LED lights, to securing the electrical network in the elephant corridor area and laying cables to providing dedicated electrical feeders for the fishery sectors, TPNODL is constantly working towards the development of the areas which it services.

Details of some of the projects executed by TPNODL, Odisha is furnished below:

1. Biju Grama Jyoti Yojana (BGJY)

Biju Grama Jyoti Yojana (BGJY) is being funded by the Government of Odisha. Under this scheme habitations having population less than 100 are taken up for electrification. All the BPL households of the aforesaid habitations and Private LI points are taken up for electrification.

The following works were executed under this scheme:-

- No. of Habitations electrified till date- 4466 out of 4768
- No. of BPL energized: - 61616 out of 68333
- No. of Pvt. LI Points charged- 890 out of 1350

Electrification of balance habitations has been included in SAUBHAGYA scheme.

2. Biju Sahanchal Vidyut Karan Yojana (BSVY)

Biju Sahanchal Vidyut karan Yojana is being funded by Government of Odisha. Under this scheme electrification of habitations having population less than 100 in urban areas i.e. (municipality and NSC) and BPL Households of those habitations are taken up.

The following works were executed under this scheme:-

- No. of Habitations electrified till date- 654 out of 715
- No. of BPL energized: 10196 out of 11836

Electrification of balance Habitations has been included in SAUBHAGYA scheme.

3. Deen Dayal Upadhyaya Gramya Jyoti Yojana (RAJIV GANDHI GRAMINA VIDYUTKARANA YOJANA (RGGVY- 12th Plan)

All the balance un-electrified and partially electrified villages and the households are decided to cover under this scheme. The scope of work is as follows:-

- No. of UE villages electrified till date- 66 out of 66 nos.
- No. of PE villages electrified till date - 6393 out of 6396
- No. of BPL HH energized -119112 out of 119112

- No. of APL HH energized -192623 out of 193142 (HOTO of balance 519 nos HH's are in progress)

All the electrification work has been completed and closure report Submitted to Government.

4. Deen Dayal Upadhyaya Gramya Jyoti Yojana (DDUGJY)

Project Cost is 470.15 Cr. The villages which are left out from all the above schemes were identified for electrification under this scheme along with other system strengthening work i.e. new/ upgradation of both 33KV /11KV line, renovation of 33/11KV line, separate dedicated feeder to Block head quarter with HVDS system, replacement/ renovation of bare LT line with AB cable, upgradation of single phase transformer to 3-Ph 25KVA, etc. were taken up under this scheme.

OPTCL is the executing agency and NPTI (Feedback Infra) is engaged as Project Monitoring Agency (PMA). Work is awarded to M/S Vindhya Telelinks Ltd. The work has already been started and is in verge of completion under five districts of TPNODL and the progress of the scheme is as follows:

- Electrification of SAGY Village-6 nos. of villages has been completed against the scope of 7 nos.
- Electrification of PE Village- 562 nos. of villages has been completed against the scope of 564 nos.
- No of Households electrified- 35649 nos. HH's have been completed against the scope of 35670 nos.
- Construction of new 33KV feeder- 171.184 KM has been completed against the target of 171.184 KM.
- Construction of 11 KV feeders for Agriculture Purpose- 229.46 KM has been completed against the scope of 231.36 KM.
- Construction of 11 KV feeders for Domestic Purpose- 97.03 KM has been completed against the scope of 97.03 KM.
- Renovation of LT line with AB cabling- work of 325 KM has been completed against the scope of 325 KM.
- Renovation of 33/11KV s/s- Work has already been completed in 70 nos. of structure against the scope of 71 nos.

5. Integrated Power Development Scheme (IPDS)

Government of India has launched Integrated Power Development Scheme (IPDS) for the urban areas with the following components:

- Strengthening of sub-transmission and distribution network in urban areas.
- Erection of new sub-stations including Gas Insulated Sub-station along with associated 66 KV / 33 KV/ 22 KV/ 11 KV lines.
- Augmentation of existing sub-stations capacity by installation of higher capacity/additional power transformer along with associated equipment/ switchgears etc.
- Erection of HT lines for reorientation/ re-alignment including augmentation of existing lines.
- Installation of new distribution transformers and augmentation of existing distribution transformers along with associated LT lines.
- Installation of capacitors.
- Renovation and modernization of existing sub-stations and lines

- Laying of under-ground cables in densely populated areas and areas of tourism and religious importance
- High voltage distribution system (HVDS)Aerial Bunched Cable for theft prone areas
- Metering of feeders / distribution transformers / consumers in urban areas.
- IT enablement of distribution sector and strengthening of distribution network.

Rs.326.35 Crs was sanctioned for execution of the above works under this scheme. OPTCL is the executing agency and NPTI (Feedback Infra) is engaged as Project Monitoring Agency (PMA). Work has been awarded to M/s OSIC.

- 33KV new line - 80.23 CKm has been completed against the scope of 80.89 CKm.
- 33KV Aug line - 8.4 CKm has been completed against the scope of 8.4 CKm.
- 11KV new line - 296.78 Ckm has been completed against the scope of 298.08 Ckm.
- 11KV Aug line - 19.16 CKm has been completed against the scope of19.16 CKm.
- Transformers - 992 nos has been completed against the scope of 992 nos.
- LT new line - 680.84 Ckm has been completed against the scope of 680.84 Ckm.
- LT Aug line - 696.43 CKm has been completed against the scope of 696.43 Ckm.
- New Substations - 7 nos has been completed against the scope of 7 nos.
- Augmented Substations - 27 nos has been completed against the scope of 27 nos.
- Solar Panel - 29 nos has been completed against the scope of 29 nos.

6. Odisha Distribution System Strengthening Programme (ODSSP PH-I, II, III): -

For quality supply of power to the consumers and to address the low voltage problem in rural area, Government of Odisha in Energy Department has decided to construct 99 nos of New 33/11 KV Substations in three phases in TPNODL operational area with an aim to reduce the high technical loss arising due to the length of 11 KV and 33KV lines and to provide uninterrupted power supply at appropriate voltage to the consumers by increasing the number of 33/11 KV Substations.

Work has already been started and charging has been completed in 85 nos of substations and 75 nos. of 33/11KV substations have been handed over to DISCOMs out of the scope of 99.

8.1 CAPEX PROGRAMME

In order to improve the reliability and reduce the losses, major interventions like Network reinforcement, Technology adoption is proposed in this plan so that equipment failure / tripping can be reduced and reliability, billing & collection efficiency can be improved. The network demands urgent refurbishment like re-conductoring of feeders, optimization of feeder length, dedicated feeders for industrial/ commercial customers, replacement of damaged / tilted poles, provision of intermediate poles, replacement of joints, enhancing system protection, replacement of sick equipment and network augmentation to improve the reliability of power supply. Introduction of advanced technologies and analytics will be prime focus area for improving the accuracy of the meter reading, curtail tampering of the meters and providing better and effective customer services. Further Business process re-engineering is required to improve the customer services. Technology adoption is also required to provide quality customer services, manage revenue cycle processes for reduction of AT&C losses and efficiently manage to deliver reliable and quality supply in safe manner to its consumer by meeting various standards of operation.

To address the challenges and reduction of AT & C loss and quality power supply to consumers, TPNODL proposed to take up a detailed Capex investment plan in the FY 2022-23 under different heads. TPNODL has inherited the power distribution network in dilapidated state at some places, which is not compliant with the requisite statutory standards and poses threat to consumers, staff etc. Further, underrated/ undersized/ worn out conductors, poor earthing, presence of either faulty equipment's or non-availability of equipment's/ switchgears/ protection devices are creating potential safety hazards to the employees, consumers, children, animals, public, etc.

TPNODL has identified several challenges related to Safety, 33kV/11kV/0.415kV/0.230kV network, Metering infrastructure, Customer Services and Technology usage. The scope includes renovation/modernization of existing and new 33/11KV S/S, re-conduct ring of 33KV & 11KV lines, implementation of HVDS system and AB conduct ring, installation of theft proof energy meters etc. The capital investments have been proposed under the following broad cost centres that shall be aligned with multiple initiatives and schemes so as to reduce AT & C losses, improve system reliability and augment the network to support continuous load growth. Further, a need is also felt to improve the existing facilities and infrastructure to provide a better consumer experience.

TPNODL has categorised the various activities of the Capital Investment Plan under 6 major subheads.

- Statutory Compliance/Safety
- Loss Reduction
- Reliability Improvement
- Load Growth
- Disaster Mitigation
- Technology & Civil Infrastructure

Out of the above, we have considered CAPEX related to Loss Reduction, Reliability Improvement, and Technology Intervention under the scope present Energy Account Audit as we feel that these major categories will lead to T&D Loss Reduction and AT&C Loss Reduction.

Loss Reduction

The technical losses are due to energy dissipated in the conductors of distribution line and equipment in Network System. Technical losses are directly dependent on the network characteristics such as lengthy distribution lines, overloading of the Line, inadequate size of conductors, Unequal load distribution on 3 phases of the line, Poor workmanship, old Conductor having multiple joints. It is also observed that, meters are not installed on Feeders & Distribution Transformers leading to no energy accounting. As a result, it is not possible to determine energy input accurately and hence unable to measure AT&C losses at each level. Energy accounting provides the means to identify areas of leakages, wastage, and inefficient energy usage.

Therefore, in this head, following activities are planned for execution:

- Data collection & analysis for detecting problematic meters.
- Energy Monitoring System (AMR)
- LT bare to ABC Conversion
- On-site testing of meters to detect any metering abnormalities/theft.

Major Category	Activity	Amount
Loss Reduction	Installation of AMR meters at Distribution transformers.	4.50
	Conversion of LT Bare conductor to AB Cable	9.86
	Meters and metering equipment for energy audit	1.19
	Equipment for Meter data downloading	0.92
	Equipment for AMR enablement of 3 phase consumer meters	0.50
	Field Testing equipment - Metering (Portable Calibrator)	1.00
	Total (2)	**17.97**

Installation of AMR meters at Distribution transformers:

In the absence of the DT meter the correct peak loading on the DTs also not available so TPNODL has proposed to install the AMR meters on the DTs with the following objectives:

- For correct energy audit
- For recording of the DT peak loading
- Reducing the no of transformer burning due to overloading

LT Bare Line to AB cable conversion:

To improve the safety factor, minimize the safety accident risk, reduce the chances of fault & strengthen existing 415V network, it is suggested to replace the overhead bare conductors with new aerial bundled cables. This in turn will help in providing reliable power supply for all consumers & stakeholders.

Moreover, during the survey, it is observed that LT bare conductor is more prone to hooking resulting into direct theft of the electricity. To avoid direct hooking, it is proposed to convert LT OH bare conductor into LT AB cable. This will help in eliminating the direct theft issue and thus protecting the revenue leakage.

The same shall be resulted in reducing direct 'hooking' on bare LT conductor lines thereby reducing commercial losses drastically in theft prone areas. LT Bare Line to ABC conversion would encompass following scope:

- LT Bare conductors shall be replaced with LT ABC.
- Erection of mid span pole.
- Earthing of every 5th Pole and poles which are installed across the road.
- Erection of Mid span pole wherever the span length is more than 40 meters to reduce the Sag.
- Installation of Distribution Box and removing of jumbling of service line cables.

Benefits:

- Reliable Power supply to the Consumers since bare conductor will get converted into insulated cable.
- Comparatively safer than the LT Bare conductor and eliminate the element of risk if comes in proximity.
- Simpler installation, as crossbars and insulators are not required.
- Suitable for congested lanes as well.
- Electricity theft is becoming hard as hooking would not be possible.
- Less required maintenance and necessary inspections of lines.

Network Reliability:

TPNODL have many long overhead feeders. The present power distribution network is in bad condition resulting into frequent trippings and as a result consumer are not getting reliable and quality power supply.

Table below shows tripping occurred in FY18-19, FY 19-20, FY20-21and FY21-22 till Dec-21.

Category of Feeder	In FY - 18-19		In FY -19-20		In FY -20-21		In FY -21-23 till Dec-21	
	No. of tripping	Duration of tripping	No. of tripping	Duration of tripping	No. of tripping	Duration of tripping	No. of tripping	Duration of tripping
	No.	Min	No.	Min	No.	Min	No.	Min
ALL 33 kV Incoming Feeders	5,260	838	5,968	872	3359	614	14,754	9,89,200
ALL 11 kV outgoing Feeders	3,50,582	88,397	46,6528	95,962	24,7894	45,448	2,90,834	90,53,898

The numbers of tripping are extremely high when compared to best-in-class utilities. TPNODL intends to implement the following actions to improve the reliability of power supply:

- Identification and replacement of faulty / sick equipment causing frequent tripping.
- Introduction of technology to ensure faster restoration of supply in case of any tripping.

Various initiatives proposed to improve the reliability of power supply in 11kV and downstream network is given below:

- 33 kV &11 kV Network refurbishment to ensure Horizontal / Vertical clearances and as per Load flow distribution planning done by GRIDCO.
- Primary Substation (PSS) Distribution Substation (DSS) Refurbishment.
- Installation of Auto Reclosure & Sectionalizer is important in critical feeders.
- Installation of Communicable overhead FPIs for faster identification of faults.

- Installation of LV protection at Distribution substation to arrest the LT faults at LT level itself instead escalating to the 11kV feeder level.
- Replacement of Battery & Battery charger to strengthen the DC protection system in 33/11kV Grid Substations.
- Installation of AB switches at 33kV & 11kV lengthy feeders for improving reliability during planned / unplanned outages.
- Proposal for trolley mounted pad substations.
- Installation of lightning arrestors.

Major Category	Activity	Amount
Reliability	Refurbishment of 33KV/11KV Primary Substation (PSS)	20.00
	33 KV Conductor up gradation	11.20
	11 KV Conductor up gradation	8.80
	Refurbishment of 11KV/0.415 KV Distribution Substation (DSS)	4.80
	Installation of LV protection at DSS	5.54
	Installation of Auto reclosure / Sectionalizers ,RMUs, &FPIs	21.19
	33KVand 11 Kv Voltage Regulators for voltage improvement	4.20
	LT FLC System - Vehicle Fitted (5 Nos. -- 1 for each circle) + Power Analyser for Transformer workshop (2 Nos.) +Ultrasound Scanner (5 Nos. -- 1 for each circle)	3.52
	Installation of station transformers (PPS)	2.55
	Capacitor Bank at PSS for low voltage improvement	0.88
	Earthing of Power Transformers and Distribution Transformers	0.98
	Total (3)	**83.65**

Refurbishment of Primary Substations (PSS):

To strengthen the existing network, it is suggested to replace the sick equipment in the existing network. Further, this replacement will help in utilization of the resources to the optimum level, managing the load in case of any exigency and mitigate the issue of overloading etc.

Following is the refurbishment work to be done:

- Replacement of the faulty equipment (VCB, CT/PT, CRP, Isolator, etc.) in PSS.
- Replacement / provision of AB switches.
- Provision of new / additional earthing as per site requirement.
- Carry out civil works as per site requirement.
- Replacement of damaged support structure at PSS. This includes MS / GI structure, channels etc. Dismantling of existing structure and erection of new structure at same location has been considered in scope of the work.
- Replacement of Battery and Charger.

- Replacement of all undersize bus bars with standard size to remove hotspot.
- Carry out civil works as per site requirement.
- Detailed technical inspection and testing of the equipment.

33 kV & 11 kV Network Refurbishment / Conductor up gradation:

To ensure safety of equipment and human beings / animals, refurbishment of 33kV, 11kV and LV lines is urgently required in phase manner starting from critical area where movement of public / animals is high.

Refurbishment job would encompass following scope:

- Straightening of tilted poles.
- Replacement of damaged poles, insulators, and accessories.
- Earthing of every 5th Pole and poles which are installed across the road.
- Erection of Mid span pole wherever the span length is more than 50 Mtrs to reduce the Sag.
- Restringing of conductor to increase the vertical clearance by reducing the sag.
- Replacement of the conductor in the sections having multiple joints.
- Replacement of weak Jumpers and connections.
- Replacement of binding wire joints with wedge connector to remove hotspots.
- Installation of Danger boards, Anti climbing devices, stay sets etc. to ensure safety & statutory compliance. TPNODL intends to implement the following actions to improve the reliability of power supply.

Refurbishment of Distribution Substation (DSS):

Existing DSS are in shabby condition with damaged or ill-maintained HT & LT protection equipment. All connections at pole mounted or plinth mounted substations are in very bad condition which not only cause high technical loss but also give rise to undue interruptions. The Aluminium lug / sockets used in DTs and other equipment in the substations are observed to be of inadequate size and proper crimping of lugs with the help of crimping tools found missing at almost all places. This is resulting into generation of hotspots and failure of connections. Replacement of the old/ non functional equipment CT/PT, Isolator, in PSS is required to be done.

Refurbishment/Life Enhancement of DSS helps in addressing the above-mentioned issues, improves the reliability of power system and above all ensures safety.

TPNODL proposes for activities under Refurbishment of Distribution Substation:

- Detailed technical inspection and testing of the equipment.
- Replacement of damaged support structure at DSS. This includes MS / GI structure, channels etc.
- Dismantling of existing structure and erection of new structure at same location has been considered in scope of the work.
- Installation of palm connectors at HT and LT side of Distribution Transformers and ensuring that all connections are through palm connectors.
- Replacement of all undersize conductors with standard size to remove hotspot.

- Replacement / provision of AB switch, DD Fuse units, LT ACB or MCCB (depending on Transformer ratings) and all associated cables / conductors.
- Provision of new / additional earthing in all DSS as per site requirement.
- Installation of fencing to safeguard the DSS equipment and to maintain safety clearances.
- Installation of danger boards, anti-climbing devices, stay-sets etc. to ensure safety & statutory compliance.
- Carry out civil works as per site requirement.

S.No	Description	UOM	Unit Rate	Quantity Considered in this FY 22-23 (Nos.)	Amount (in Crores)
1	100 KVA DSS	EA	0.04	65	2.34
2	250 KVA DSS	EA	0.05	33	1.67
3	500 KVA DSS	EA	0.05	15	0.79
	Total			**113**	**4.80**

Installation of LV protection at DSS:

To reduce the effect of LT fault on 11kV System, it is recommended to install the MCCB on Pole Mounting substation for 100 kVA, ACB on 250 KVA & 500 KVA Distribution Substations.

S.No	Description	UOM	Unit Rate	Quantity Considered in this FY 22-23 (Nos.)	Amount (in Crores)
1	Supply and Installation of MCCB-100 KVA	EA	0.007	520	3.65
2	Supply and Installation of ACB -250 KVA	EA	0.012	140	1.68
3	Supply and Installation of ACB-500 KVA	EA	0.034	6	0.21
	Total			**609**	**5.54**

Installation of Auto-reclosure / Sectionalizers, FPI, RMU AB switches:

TPNODL currently has many very long overhead feeders. Moreover, it is observed that multiple 11kV feeders are controlled through single 11kV breaker or AB switch in some primary substation. This will ensure efficient operation & monitoring under steady state, dynamic & transient condition of the system.

S.No	Description	UOM	Quantity	Unit Rate	Amount (INR)
1	Supply & Installation Auto Reclosure	Nos	10	0.156	1.56
2	Supply & Installation Sectionaliser	Nos	30	0.157	4.70
3	Supply & Installation RMU 4 way O/D at 11 KV	Nos	35	0.169	5.92
4	Supply & Installation RMU 3 way O/D at 11 KV	Nos	32	0.160	5.13
5	Supply & Installation RMU 4 way O/D at 33 KV	Nos	5	0.526	2.63
6	Supply & Installation FPI	set of 3	147	0.008	1.16
				Total	**21.10**

Benefits:

Auto-Recloser and Sectionaliser-Benefits:

- Continuity of power supply for the consumers resulting in fewer complaints from consumers.
- Reduce the time of power supply disconnection in cases of transient faults.
- Reduce the unsold energy due to faults.
- Reduce the cost of manpower operating in managing disconnected lines.
- Maximum utilization of the network components.
- Event Log and Remote control.
- Reduce cost of fault finding.

RMU- Benefits:

- The major advantage of Ring Main Units is the safety they provide to the operators. Like the operation of switching devices with interlocking system requires less knowledge and effort.
- Working with IEDs allows remote operation. SCADA implementation is easy with smart Ring main units.
- The space occupied by RMUs is less as they are Gas Insulated Switchgear.
- The time taken for installation and commissioning of RMUs is very less. RMUs require less maintenance.
- Beautification in the network.

FPI – Benefits

- Easy fault identification.
- Easy to install, even on live network.
- Detects both short circuit and low current earth faults.
- Indicates both permanent and transient faults.
- Highly visible red flashlight.
- Reduction in supply restoration time by 1-2 hrs.
- Reduction in un-served energy
- Enhancing customer satisfaction

Load Growth:

To meet the consumer growth, both network infrastructure needs to be extended, strengthened, or augmented and new energy meters to be installed to release the new connection. Some of the connections can be released from the existing network and some may require augmentation/addition/extension before release of new connection.

Also, with the increase in consumer base there is load on DTR. Few DTR's got overloaded & got burnt.

Below table shows the details of Burnt transformers in FY 21-22 till Jan 22.

Circle	PTR burnt till Jan-22		DTR Burnt in till- Jan 22	
	No.	Capacity (MVA)	No.	Capacity (MVA)
Balasore	10	42.2	788	34.84
Bhadrak	4	9.75	410	20.99
Baripada	5	14.5	443	17.77
Jajpur road	4	23.15	426	21.61
Keonjhar	3	15	243	11.65
Total	26	104.6	2310	106.87

So to tackle the above issues, activities are needed to be done for proper supply of power to the consumers.

Major Category	Activity	Amount
Network Optimisation & Load Growth	Augmentation Power Transformers	9.96
	Augmentation of Distribution Transformers	20.81
	Addition of LT lines	13.66
	Addition of 11 kV Lines (O/H and U/G)	33.96
	Addition of 33 kV Overhead Lines (O/H and U/G)	21.74
	Addition of New PTR and New DTRs along with Associated HT/LT lines	31.15
	Provision for Nua Balasore Project	10.00
	Total (4)	**141.28**

Augmentation of 33kV, 11Kv line, Power Transformers and DTs:

Augmentation of 33/11kV new line:

During site survey it is observed that most of 33/11kV Primary Sub-Stations are having single incoming 33kV source. With failure of single existing 33kV source entire 33/11kV PSS gets shutdown thereby causing shutdown to all the downstream 11kV & LT network consumers. It is also observed that HT consumers on 33kV and 11kV are being fed through tapping point instead of a dedicated feeder. In case of technical fault at one of the HT consumers leads to tripping of incoming source and another connected HT consumer. To overcome this issue, it is proposed to study to establish link line from alternative available source.

Augmentation/ addition of Power Transformers:

To cater the increasing load demand, PTR augmentation/ Addition is required to avoid any overloading and N-1 fail situations. Also, to ensure reliable power supply to our consumers, PTRs must be kept at optimum loading to avoid any mechanical stress on the transformers due to overloading. To avoid any overloading issues especially in urban areas where the load growth is high, it is required to augment some of the power transformers in city area which are over loaded /may get overloaded considering load growth for the next two years.

It will give benefit to consumers as follows:

- Reliable power supply by ensuring N-1 reliability at PTR level.
- Reduce over-burdening of existing PTRs thereby reducing power cuts.

Augmentation/ Addition of Distribution transformer:

To cater the increasing load demand, DT augmentation and new DT addition is required to avoid overloading of transformer leading to transformer failure and power interruptions. Also, to ensure reliable power supply to our consumers, Distribution Transformers need to be kept at optimum loading to avoid any mechanical stress on the transformers due to overloading. To avoid these overloading issues especially in urban areas where the load growth is high, it is required to augment the capacity of the Distribution transformers/ addition of new distribution transformer to mitigate the overloading issue.

It will provide benefit to consumers as follows:

- Reliable power supply by reducing chances of fault in network, thereby reducing power interruptions.
- Reduce over-burdening of existing Distribution transformers thereby reducing power cuts.

Addition of 33KV, 11KV and LT lines:

It is observed that in some of the feeders, conductor sizes are different resulting into compromising the circuit capacity which is limited to the lowest size of the conductor available in the circuit. Looking at the existing load demand and factoring the projected load growth, it is required to be rectified to avoid overloading of the network and to provide alternate source to the existing feeders, load balancing on the feeders and reducing the length of the lengthy feeders. This will help in optimizing the feeder loading and will support in shifting the load to another structure or OPTCL grid in case of any source failure.

Technology & Civil Infrastructure: Proposed Technology Transformation:

Major Category	Activity	Amount
Technology & Civil Infrastructure	DC Hardware	10.33
	Software Licenses for IT Application	12.66
	End computing devices	8.96
	Cyber Security	1.20
	Automation of non ODSSP PSS	15.31
	SCADA-ADMS	18.09
	GIS Software Implementation and Land Base & Network Survey & Digitization for Balasore & Jajpur Circle	35.87
	Civil Infrastructure (Office Buildings , PSS, Stores, Approach Roads, Record room , Cafeteria Canteen , MRT office and others)	25.12
	Security cameras and heavy duty Racking system / Storage solutions for the store	0.96
	Offices Equipment	3.93
	Total (6)	**132.43**

- Augmentation of Data Centre Hardware and communication network.
- Software Licenses, Applications and Cyber Security practices.
- End Computing Devices.
- Operation Technology Implementation of SCADA-ADMS & Automation of PSS.
- GIS Software Implementation and GIS mapping of Land Base, Network, and consumer
- Indexing. This will help in Multiple swapping and Cost optimization.

Augmentation of Data Centre Hardware and communication Network:

Benefits:

- Augmentation of Data centre infrastructure to cover new IT & digital services for employees and consumers.
- Augmentation of IPDS data centre for will result in an integrated approach to ensure commonality of applications and maximum utilization of physical as well as human resources.
- Centralized Data Centre for pan TPNODL.

Software Licenses and Applications:

Benefits:

- Compliance of cyber security guidelines published by MoP will ensure safety of IT/OT applications and data.
- CIS application shall be used for MBC activities of entire TPNODL. CIS ensures digitization of the entire MBC process leading to accuracy and transparency.
- Penetration of digital services to provide the information faster to our consumers and bringing agility in employees for faster work and deliver up to data services to the consumers.
- Office will be connected through secured OFC.

End computing devices:

Benefits:

- Enhancing the reach of computerization across the organization
- Build a culture of following online processes and less of paper movement.
- Availability of end user computing devices up to last level like section for proper use of various IT applications towards more effective and transparent execution of business processes.
- Build a more robust and reliable communication platform based on our own network as an alternate to cell phone communication.
- Enable seamless real time communication across TPNODL.
- End user computing devices will enable use of IT applications up to section level.

Operation Technology Implementation of SCADA-ADMS & Automation:

Operation Technology Implementation of SCADA-ADMS & Automation	Amount in Rs Cr
SCADA-ADMS	18.09
Field Automation including switch, fire alarm, RTU & etc.	15.31

Benefits:

- Adoption of very strong integrated automated application for pan TPNODL area.
- Ensure secured and much better services to customers.
- Integrated and secure processes with strong access control of PSS.
- Monitoring of PSS network assets.
- Ensure customer delight and effective solutions for addressing needs.
- Enhanced user experience with extensive standard features & functionalities.
- Standardized process workflow across organization.
- Centralized data base for synchronized data.

GIS Software Implementation and Land Base & Network Survey:

Benefits:

- Adoption of very strong integrated application landscape for enterprise wide implementation.
- Pan TPNODL satellite image will ensure seamless land base data creation with completely matched edge between the circles.
- Ensure secured services to customers to safe guard the confidentiality, integrity and availability of IT systems.
- Integrated processes with strong access control.
- Drive the culture of safety and ethics among the workforce and all stakeholders.
- Ensure customer delight and effective solutions for addressing needs.
- Stringent data integrity to avoid any revenue leakage.
- Increased Billing and collection efficiency.
- Enhanced user experience with extensive standard features & functionalities.
- Standardized process workflow across organization.
- Centralized data base for synchronized data.
- Enhanced integration and automation capabilities with non-SAP applications.
- Using SAP standard capabilities combined with customer presentment platforms for a delightful customer experience.

8.2 ENERGY BILL PAYMENT OPTION AND CUSTOMER CARE

- **Payment Gateway** – A centralized proprietary payment gateway is planned to be established which would seamlessly integrate with all collection touch points like website, mobile app, counters, partner agencies, mobile wallets into a single repository where verification and validation of payments would be done and would be posted to the SAP Billing platform to ensure no GIGO and keep the billing system safe and secured from direct external exposure
- **Website** - Content management system with dynamic website would be placed with integrations to payment gateway and other key systems.
- **NORTHCO Connect** – Mobile app which would run on all devices and with ease of use features and enablement for customer satisfaction
- **Suraksha Portal & Behavior based Safety app** – As safety is a key aspect and needs to be woven in the company culture, best practices followed at Tata Power DDL will be implemented.
- **BIRD** – Bill Inward Recipient Desk is an application for submission, approval and processing of vendors invoices online, check status of the invoice and track the same.
- **Flash Application** - Platform to capture and evaluate reliability indices and a backbone to power system control team.
- **Complaint management system & Anubhav Portal** which is end to end feedback capture and CAPA closure with information dissemination to all stakeholders is planned to be implemented to bring transparency and effective response to customer needs.
- **MIS Application**: For offloading Oracle 10G server and MS Access system

SUMMARY OF ENERGY CONSERVATION MEASURES

DETAILS OF ENERGY CONSERVATION MEASURES RECOMMENDED IN THE ENERGY AUDIT REPORT [2022-23]							
Sl. No.	**Energy Saving Measures**	**Investment (In Cr)**	**Targeted Annual Energy Savings in MU**	**Targeted Financial Savings in rupees (In Cr)**	**Payback Period**	**Date of Completion of measure / likely completion**	**Remarks**
A	**Loss Reduction**		245.76	85.53	3.71	FY 2022-23	As per the annual reduction in T&D loss target of Hon'ble OERC and detailed note attached
	Installation of AMR meters at Distribution transformers	4.5					
	Conversion of LT Bare conductor to AB Cable	4.93					
	Meters and metering equipment for energy audit	1.19					
	Equipment for Meter data downloading	0.46					
	Equipment for AMR enablement of 3 phase consumer meters	0.45					
	Field Testing equipment - Metering (Portable Calibrator)	1					
	Total (A)	**12.53**					
B	**Reliability**						
	Refurbishment of 33KV/11KV Primary Substation (PSS)	10					
	33 KV Conductor up gradation	11.2					
	11 KV Conductor up gradation	8.8					
	Refurbishment of 11KV/0.415 KV Distribution Substation (DSS)	2.4					
	Installation of LV protection at DSS	5.54					
	Installation of Auto reclosure /	10.6					

	Sectionalizers, RMUs, and FPIs						
	33 kV and 11 kV Voltage Regulators for voltage improvement	4.2					
	LT FLC System	3.52					
	Installation of station transformers (PPS)	2.55					
	Capacitor Bank at PSS for low voltage improvement	0.88					
	Earthing of Power Transformers and Distribution Transformers	0.49					
	Total (B)	**60.18**					
C	**Network Optimisation & Load Growth**						
	Augmentation of Power Transformer	4.98					
	Augmentation of Distribution Transformer	20.81					
	Addition of LT lines	13.66					
	Addition of 11 kV Lines (O/H and U/G)	16.98					
	Addition of 33 kV Overhead Lines (O/H and U/G)	10.87					
	Addition of New PTR and New DTRs along with Associated HT/LT lines	15.58					
	Provision for Nua Balasore Project.	10					
	Total (C)	**92.88**					
D	**Disaster Mitigation**						
	Conversion of 2nos PSS from AIS to GIS	20.4					
	Conversion of pole mounted DTR to plinth mounted (100 KVA and above)	3.52					

	Height enhancement of the lines at river crossing	4.5					
	Strengthening of poles in the cyclone prone area	2.4					
	Trolley Mounted Pad Substations	1.17					
	Overhead to Underground conversion for Major City	20					
	Emergency Preparedness (Life boat and other emergency accessories)	1.8					
	Total (D)	**53.79**					
E	**Technology & Civil Infrastructure**						
	DC Hardware	10.33					
	Software Licenses for IT Application	12.66					
	End computing devices	8.96					
	Cyber Security	1.2					
	Automation of non ODSSP PSS	7.66					
	SCADA-ADMS	9.05					
	GIS Software Implementation and Land Base and Network Survey and Digitization for Balasore and Jajpur Circle	17.94					
	Civil Infrastructure (Office Buildings, PSS, Stores, Approach Roads, Record room, Cafeteria Canteen, MRT office and others)	25.12					
	Security cameras and heavy-duty Racking system / Storage solutions for the store	0.96					

	Offices Equipment	3.93					
	Total (E)	**97.81**					
Grand Total		**317.19**	**245.76**	**85.53**	**3.71**		

CALCULATION OF PAYBACK PERIOD:

Approved sale of TPNODL as approved by commission FY 2022-23= 4915.30 MU

Calculated T&D Loss of TPNODL for FY 2021-22= 18.40 %

Target T&D Loss as approved by Hon'ble OERC for FY 2021-22= 18.35%

So, Targeted Annual Energy Savings in MU = 4915.30*(18.40%-18.35%) = 245.76 MU

Approved Bulk Supply Price of GRIDCO for FY 2022-23= 3.20 per Unit

Approved Transmission Tariff of OPTCL for FY 2022-23= 0.28 per Unit

Hence financial saving of TPNODL due to T&D loss reduction= (3.20+0.28)*245.76/10=85.53 Cr

Total investment approved by Hon'ble OERC for T&D Loss=317.19 Cr

Simple Payback period = Total Investment / Savings = 317.19/85.53= 3.71 Years

9.0 CONCLUSION

In line with Section 14(g) of the Energy Conservation(EC) Act, the Central Government has notified targets (in the form of Specific Energy Consumption) for Designated Consumers (DCs) on 26th October 2021under the PAT cycle-VII. The baseline Distribution loss of TPNODL has been fixed as 18.74% for baseline year 2018-19 with baseline net input energy 5575.61MU. TPNODL has been directed to reduce its T&D Loss to 17.60 % in Target Year 2024-25.

TPNODL Management has endeavoured for continual improvement in its drive for achieving energy efficiency by adopting various energy saving measures with most energy efficient technology. Considering the trend in their energy performance, it is expected that TPNODL may get a target for further reduction of its T & D Loss from its present level. Hence, TPNODL should focus to achieve the future target by adopting a strict energy conservation plan and energy efficiency measures.

Overall, the TPNODL management has a very progressive outlook and is open to ideas involving moderate to low investment, to improve the Energy Efficiency. Hence we feel TPNODL management needs to put best effort to achieve Energy Conservation in future.

10.0 LIST OF ANNEXURE FOR TPNODL MEA

ANNEXURE (I): INTRODUCTION OF VERIFICATION FIRM: Details are provided in the MEA report of TPNODL for FY 2021-22.

ANNEXURE (II): MINUTES OF MEETING WITH DISCOM TEAM:

MINUTES OF MEETING BETWEEN TPNODL & POWER TECH CONSULTANTS (PTC) ON 8th June 2022.

For M/s. Tata Power Northern Odisha Distribution Limited

- Mr. Manish Kriplani
- Mr. Ved Prakash Upadhaya

For M/s. Power Tech Consultants

- Mr. Bibhu Charan Swain
- Mr. Dambrudhar Kar
- Mr. Suman Sourav Nayak

The following points were discussed during the various meetings held between TPNODL & Power Tech Consultants (PTC) and the following documents were asked from TPNODL for the audit work of Annual Energy Audit for FY 2021-22:

- Power Tech Consultants (PTC) provided the questionnaire for the DISCOM mandatory energy audit and requested the required data to TPNODL.
- Power Tech Consultants (PTC) requested TPNODL for Form 1, Form 3, OERC Review of Performance from the FY 20-21 and Sector Specific Energy Accounting pro forma sheet and the required data was provided by TPNODL.
- The Field visit plan for the identified 33 kV feeders, associated 11 kV, DTR and LT lines for the purpose of audit was discussed.
- List of 33 kV audited feeders where loss was calculated was provided.
- Sample PSS SLD List of 11 kV Feeders were provided by TPNODL.
- Category wise consumer list, Category wise OK Meter, Defective Meter and without meter information for the FY-2021-22 was provided by TPNODL.
- Power Tech Consultants (PTC) requested TPNODL for Monthly Drawl pattern and BSP Bill of each month for FY 2021-22 and the requested data was provided by TPNODL.

MINUTES OF MEETING BETWEEN TPNODL & POWER TECH CONSULTANTS (PTC) ON 3rd August 2022.

For M/S Tata Power Northern Odisha Distribution Limited

- Mr. Manish Kriplani
- Mr. Ved Prakash Upadhaya

For M/S Power Tech Consultants

- Mr. Bibhu Charan Swain
- Mr. Dambrudhar Kar
- Mr. Suman Sourav Nayak

The following points were discussed during the various meetings held between TPNODL & Power Tech Consultants (PTC):

- TPNODL Provided the Filled in Sector Specific Pro-Forma for FY 2021-22 to be verified by Power Tech Consultants and the same was verified.
- List of 11 kV audited feeders where loss was calculated was provided.
- Abstract loss of 33 kV feeders was provided by TPNODL.
- OERC approved Capex order for TPNODL was provided to Power Tech Consultants.
- TPNODL Provided the Responses on Critical Analysis And Major Observations And Recommendations by Power Tech Consultants.

ANNEXURE (III): CHECK LIST PREPARED BY AUDITING FIRM:

QUESTIONNAIRES FOR CONDUCTING MANDATORY ENERGY AUDIT IN TPNODL		
Sl. No.	Particulars	Remarks
1	Name of all the heads of DISCOM and their designations, phone numbers and mail ids, contact details to be collected.	Received
	DISCOM DETAILS (FOR FY 2021-22)	
2	Details of the DISCOM to be collected.	Received
3	Single Line Diagram of distribution network, Details of assets of DISCOM, Consumer details, and supply area to be collected.	Received
4	Category wise nos. of consumer and their annual energy consumption (Domestic, Industrial, Commercial, Agricultural) to be collected.	Received
5	Category wise nos. of consumer and their annual energy consumption (LT, HT, EHT, Unmetered connections) to be collected.	Received
6	Details of nos. of connections, nos. of disconnections, connected load and % of total connected load, energy billed, Net Input energy, Power Factor, Total Supply Hour, Scheduled outage, scheduled supply hours, Unscheduled Outage, Available Supply Hours to be collected.	Not available
7	Details of Feeders by consumer class of categories (Domestic, Industrial, Commercial, Agricultural and Municipalities) to be collected.	Not available
8	Metered Energy Sales, Unmetered Energy Sales, unaccounted energy / theft, Total Energy Billed, Amount billed, Gross Amount Collected, Arrears Collected, subsidy received from state and central government details to be collected.	Received
9	Collection of data regarding system improvement and loss reduction and their status with project cost, project period for report and Form-III preparation.	Received
10	Collection of Annual Report submitted to Honourable OERC, Month wise Energy Audit Report.	Received
11	Collection of MEA, Form-I, Form-II and Form-III and M & V Audit Report for earlier PAT cycle	Received

ANNEXURE (IV): BRIEF APPROACH, SCOPE & METHODOLOGY FOR AUDIT:

SCOPE OF WORK

The Scope of Work for the detailed energy audit is as per following:

1. Visit to DISCOM office and discussion with DISCOM officials and management on Energy Audit, Energy Efficiency and Energy Management.
2. Verification of details of category wise nos. of consumer and their annual energy consumption (Domestic, Industrial, Commercial, Agricultural and Municipalities)
3. Verification of details of category wise nos. of consumer and their annual energy consumption (LT, HT, EHT, Unmetered connections)
4. Verification of details of nos. of connections, nos. of disconnections, connected load and % of total connected load, energy billed, Net Input energy, Power Factor, Total Supply Hour, Scheduled outage, scheduled supply hours, Unscheduled Outage, Available Supply Hours.
5. Verification of details of Feeders by consumer class of categories (Domestic, Industrial, Commercial, Agricultural and Municipalities)
6. Verification of Metered Energy Sales
7. Verification of Unmetered Energy Sales

8. Estimation of unaccounted energy / theft
9. Verification of Total Energy Billed, Amount billed, Gross Amount Collected, Arrears Collected, subsidy received from state and central government
10. Verification of Average Billing Rate (ABR)
11. Total revenue billed categories wise & Consumption wise
12. Categories wise & Consumption wise ABR with tariff subsidy
13. Categories wise & Consumption wise ABR without tariff subsidy
14. Verification of T & D Loss
15. Verification of collection Efficiency (Categories Wise)
16. Verification of Billing Efficiency (Categories Wise)
17. Verification of Transmission and Distribution Losses
18. Verification of AT &C Losses
19. Analysis of T &D Losses, AT & C Losses, T & D loss, AT & C loss reduction targets given by State Electricity Regulatory Commission (SERC) to DISCOMs.
20. T&D Loss and AT&C loss reduction projection by Electricity Distribution Companies.
21. Review of the energy losses data (AT & C & T&D) of the last year with the authenticated documents.
22. Verification of detailed calculation methodology adopted by DISCOMs for calculating AT & C and T&D loss.
23. Compare the performance data with SERC / FOR/ CERC standard data.
24. Study of Loss Reduction measures undertaken by DISCOM.
25. Study of Demand Side Management undertaken by DISCOM
26. Identification of a power sub-station at 66kV/33kV level having input energy
27. injection points and 11kV/440V transformers for verification of the status of
28. energy metering along with their healthiness of incoming / outgoing feeders at
29. 66kV, 33 kV and 11 kV and DTRs at field for sample study.
30. Carrying out field study to ascertain the status of consumer metering, type and healthiness for various categories of consumers, meter calibration frequency bands the time taken for replacement of faulty meters.
31. Verification of energy sales (metered and unmetered) in the distribution network area of identified power sub-station.
32. Computation of losses:

- Above 11 kV level:
  - Computation of grid losses by using grid balancing approach.
  - Verification of the healthiness and life of Power transformer.
  - Computation of energy handled and power transformer losses at each voltage level (like 66/33, 33/11, 66/11).
- At 11 kV level:
  - Computation feeder wise losses of all 11kV feeders emanating from identified power sub-station.
- Below 11 kV level:
  - Calculation of DT transformation losses.
  - Verification of the healthiness and life of the distribution transformer.
  - Computation LT losses (DT wise) under the distribution network of identified power sub-stations.

33. Evaluation of existing Energy Management policy, Energy Management systems.
34. Providing recommendations to reduce T & D loss, AT & C Losses, furnishing details of energy saving measures, investment to be made and cost benefit analysis of each recommended energy savings measures.
35. Identification of cost effective energy saving opportunities in short, medium & long term.
36. Development of an action plan for time bound implementation activities.
37. Based on the above study the draft detailed energy audit report is prepared and submitted for review of the management. After receipt of necessary observation, the draft report shall be modified and final report shall be submitted to the management.
38. The Detailed Energy Audit and report preparation has been carried out in accordance with provision of "The Bureau of Energy Efficiency (Manner and Intervals of Time for conduct of Energy Audit) Regulations, 2010" and its amendment from time to time and based on revised scope of work as prescribed by BEE.

METHODOLOGY

The following step by step methodology and approach were adopted to carry out the detailed energy audit of TPNODL:

1. The program of visit of the energy audit team to TPNODL for carrying out the energy audit work was informed to management.
2. A pre audit meeting was held with the concerned TPNODL officials. During this kick off meeting, the importance of energy audit for the Designated Consumers (DC) and the procedure to be adopted for audit work was explained.
3. The representative of the TPNODL accompanied the energy audit team to different sections including MIS, MRT, and ABT cell, Energy Audit section for system familiarization and for collection of technical & financial information.
4. All the staff /heads of the departments were requested to co-operate with the energy audit team for data collection.
5. Data collection was carried through discussions with the Technical in-charge of TPNODL and from past MIS records.
6. The details of Division, sub division, Sections, Assets list, Details of 220/132/33 KV Network, Details of 11 KV Network, Power sale, details of billing and details of consumer were collected.
7. Details of category wise nos. of consumers and their annual energy consumption (Domestic, Industrial, Commercial, Agricultural and Municipalities) (LT, HT, EHT, Unmetered connections) were collected.
8. Details of nos. of connections, nos. of disconnections, connected load and % of total connected load, energy billed, Net Input energy, Power Factor, Total Supply Hour, Scheduled outage, scheduled supply hours, Unscheduled Outage, Available Supply hours were collected from TPNODL.
9. Details of Feeders by consumer class of categories (Domestic, Industrial, Commercial, Agricultural and Municipalities) were collected from TPNODL.
10. The metered energy sales, unmetered energy sales and estimated unaccounted energy / theft was collected.

11. Measurement was carried out at 33 KV and 11 kV meter point at sample basis to analyze the power loss and unaccounted energy.
12. Details of total Energy Billed, Amount billed, Gross Amount Collected, Arrears Collected, subsidy received from state and central government and verified.
13. Average Billing Rate (ABR) was collected.
14. Category wise Billing efficiency and Collection efficiency were calculated for TPNODL for the last financial year.
15. T & D Loss, AT & C Loss were arrived for TPNODL for the last financial year.
16. Studied Demand Side Management and Loss Reduction measures undertaken by TPNODL.
17. Existing Energy Management policy, Energy Management systems was evaluated Energy Conservation options to reduce T & D loss and AT & C Losses were identified and tabulated on the basis of priority.
18. Draft soft copy of the energy audit report consisting of observations and recommendations with adequate financial justification, vendor support data, etc. was prepared and submitted to TPNODL for acceptance.
19. Final energy audit report shall be submitted to Management of TPNODL after acceptance of the draft energy audit report.

ANNEXURE (V): INFRASTRUCTURE DETAILS: Details are provided in the MEA report of TPNODL for FY 2021-22.

ANNEXURE (VI): ELECTRICAL DISTRIBUTION SYSTEM: Details are provided in the MEA report of TPNODL for FY 2021-22.

ANNEXURE (VII): POWER PURCHASE DETAILS:

GRIDCO Limited
Registered Office: Janpath,
Bhubaneswar 751022
CIN: L40109OR1995SGC003980
Bill of Supply (Provisional)
For TPNODL
April-2021

GRIDCO GSTIN:21AABCG5398P3Z3
Good's Description: Electricity
HSN Code: 27160000
Ref No: GR/BS/21-22/ 031

Date: 06-May-21
Pay By Date: 05-Jun-21

The Chief Executive Officer
TP Northern Odisha Distribution Limited
Janugang, Balasore, Odisha
GSTIN: 21AAICT5123C1ZX

A. Total Energy for the month

a) Energy from 01.04.21 to 03.04.21 (Pro-rata)	48.617730 MU
b) Energy from 04.04.21 to 30.04.21 (Pro-rata)	435.522900 MU
B. SMD approved by OERC (applicable till 03.04.21)	11,00,000 kVA
SMD permitted by OERC (applicable till 03.04.21)	12,41,000 kVA
SMD approved by OERC (applicable from 04.04.21 onwards)	11.00.000 kVA
SMD permitted by OERC (applicable from 04.04.21 onwards)	12,10,000 kVA
Actual SMD occurred on 01.04.21 at 23:00 hrs	8,88,627 kVA
Excess SMD drawal	kVA

Item No			Amount (Rs.)
1	Current Charges:		
	(a) Bulk Supply Price @ 316.30 Paise per kWh for the Energy from 01.04.21 to 03.04.21	15,37,77,879.99	
	(a) Bulk Supply Price @ 320.00 Paise per kWh for the Energy from 04.04.21 to 30.04.21	1,39,36,73,280.00	
	(b) Excess Demand Charge @ Rs 250 per kVA	0.00	
	Sub Total: (a+b)		1,54,74,51,159.99
2	Debit/Credit Bill for the month of _____ vide Bill No. ____ Dtd.____		0.00
3	Total Current Charges: Items (1+2)		1,54,74,51,159.99
4	TCS Claims during the month		
	TCS u/s 206 C (1H)of IT Act,1961 @0.1% on 1		15,47,451.00
5	Total Current Charges incl. TCS: Items (3+4)		1,54,89,98,611.00
6	Add Late Payment Surcharge for the month of Apr-2021 (Annex-4)		-
7	TCS u/s 206 C (1H)of IT Act,1961 @1% on 6		-
8	Add: Previous amount outstanding :-		
	(i) Outstanding energy charges	1,55,67,16,927.00	
	(ii) TCS on 8(i)	15,56,717.00	
	(iii) Outstanding LPS	-	
	Total Previous Outstanding: (i+ii)		1,55,82,73,644.00
9	Less payment received during the month		
	(a) Amount reserved	-	
	(b) TCS Amount received	-	
	(c) Rebate allowed	-	
	(d) Amount received towards Arrear Dues	-	
	(e) Other Adjustment (if any)	-	
	Total Payment and Adjustment: (a+b+c+d+e)		-
10	Total amount claimed through this bill: Items (5 to 9)		3,10,72,72,255.00
	(Rounded off to the nearest Rupee)		3,10,72,72,255.00

(Rupees three hundred ten crore seventy two lakh seventy two thousand two hundred fifty five only)

Checked by
DGM(F), PP

DGM (SBC)

For & on behalf of GRIDCO
Sr.GM (T&BS)

GRIDCO

G R I D C O Limited
Registered Office: Janpath,
Bhubaneswar 751022
CIN: L40109OR1995SGC003960
Bill of Supply (Provisional)
For TPNODL
May-2021

GRIDCO GSTIN:21AABCG5398P3Z3
Good's Description: Electricity
IIGN Code: 27160000
Ref No: GR/BS/21-22/ 058

Date: 09-Jun-21
Pay By Date. 09-Jul-21

The Chief Executive Officer
TP Northern Odisha Distribution Limited
Januganj, Balasore, Odisha
GSTIN: 21AAICT5123C1ZX

A Total Energy for the month	410.394191 MU
B. SMD approved by OERC	11,00,000 kVA
SMD permitted by OERC	12,10,000 kVA
Actual SMD occurred	8,19,284 kVA
Excess SMD drawal	0 kVA

Item No			Amount (Rs.)
1	Current Charges:		
	(a) Bulk Supply Price @ 320 Paise per kWh for the Energy	1,31,19,61,411.20	
	(b) Excess Demand Charge @ Rs 250 per kVA	0.00	
	Sub Total: (a+b)		1,31,32,61,411.20
2	Credit Bill for the month of Apr-2021 vide Bill No GR/BS/21-22/035 Dtd 21.05.21		(98,155.44)
3	Total Current Charges: Items (1+2)		1,31,31,63,255.76
4	TCS Claims during the month:		
	TCS u/s 206 C (1H)of IT Act,1961 @0.1% on 1		13,13,261.00
5	Total Current Charges incl. TCS: Items (3+4)		1,31,44,76,517.00
6	Add Late Payment Surcharge for the month of May-2021 (Annex-4)		-
7	TCS u/s 206 C (1H)of IT Act,1961 @1% on 6		-
8	Add: Previous amount outstanding :-		
	(i) Outstanding energy charges	3,10,41,68,087.00	
	(ii) TCS on 8(i)	31,04,168.00	
	(iii) Outstanding LPS	-	
	Total Previous Outstanding: (i+ii)		3,10,72,72,255.00
9	Less payment received during the month		
	(a) Amount received against Mar'21 Bill	1,54,11,49,758.00	
	(b) TCS Amount received	15,56,717.00	
	(c) Rebate allowed	1,55,67,169.00	
	(d) Amount received towards Arrear Dues	0.00	
	(e) Other Adjustment (if any)	0.00	
	Total Payment and Adjustment: (a+b+c+d+e)		(1,55,82,73,644.00)
10	Total amount claimed through this bill: Items (5 to 9)		2,86,34,75,128.00
	(Rounded off to the nearest Rupee)		2,86,34,75,128.00

(Rupees two hundred eighty six crore thirty four lakh seventy five thousand one hundred twenty eight only)

Checked by

DGM(F), PP

DGM (EBC)

For & on behalf of GRIDCO

Sr.GM (T&BS)

GRIDCO

G R I D C O Limited
Registered Office: Janpath,
Bhubaneswar 751022
CIN: L40109OR1995SGC003960

Bill of Supply
For TPNODL
June-2021

GRIDCO GSTIN:21AABCG5398P3Z3
Good's Description: Electricity
HSN Code: 27160000
Ref No: GR/BS/21-22/1080

Date: 06-Jul-21
Pay By Date: 05-Aug-21

The Chief Executive Officer
TP Northern Odisha Distribution Limited
Januganj, Balasore, Odisha
GSTIN: 21AAICT5123C1ZX

A. Total Energy for the month	444.989105 MU
B. SMD approved by OERC	11,00,000 kVA
SMD permitted by OERC	12,10,000 kVA
Actual SMD occurred	8,87,428 kVA
Excess SMD drawal	0 kVA

Item No			Amount (Rs.)
1	Current Charges:		
	(a) Bulk Supply Price @ 320 Paise per kWh for the Energy	1,42,39,65,136.00	
	(b) Excess Demand Charge @ Rs 250 per kVA	0.00	
	Sub Total. (a+b)		1,42,39,65,136.00
2	Debit/Credit Bill for the month of _____ vide Bill No. ____ Dtd ____		0.00
3	Total Current Charges: Items (1+2)		1,42,39,65,136.00
4	Add Late Payment Surcharge for the month of Jun-2021 (Annex-4)		-
5	Add: Previous amount outstanding :-		
	(i) Outstanding energy charges	2,86,06,14,416.00	
	(ii) TCS on 5(i)	28,60,712.00	
	(iii) Outstanding LPS	-	
	Total Previous Outstanding: (i+ii)		2,86,34,75,128.00
6	Less payment received during the month		
	(a) Amount received against Apr'21 Bill	1,53,19,76,648.00	
	(b) TCS Amount received	15,47,451.00	
	(c) Rebate allowed	1,54,71,612.00	
	(d) Amount received towards Arrear Dues	0.00	
	(e) Other Adjustment (if any)	0.00	
	Total Payment and Adjustment: (a+b+c+d+e)		(1,54,89,88,411.00)
7	Total amount claimed through this bill: Items (3 to 7)		2,73,84,41,653.00
	(Rounded off to the nearest Rupee)		2,73,84,41,653.00

(Rupees two hundred seventy three crore eighty four lakh forty one thousand six hundred fifty three only)

Checked by

DGM(F), PP

DGM (EBG)

For & on behalf of GRIDCO

Sr.GM (T&BS)

OPTCL
Lifeline of Odisha

ODISHA POWER TRANSMISSION CORPORATION LIMITED
(A Government of Odisha Undertaking)
Registered Office:Janpath,Bhubaneswar-751022
PAN-AAACO7873L
GSTIN-21AAACO7873L1Z6
Monthly Transmission Charges Invoice
For **TPNODL**
July-2021

Date: 06-Aug-2021
Invoice No: TRANS/TPNODL/Cur/July-21 Pay By Date: 04-Sep-2021

To,
The Chief Executive Officer,
TP Northern Odisha Distribution Ltd.,
Januganj, Balasore,
Odisha-756019

Data furnished by SLDC towards Wheeling Charges for TPNODL

A	Actual Energy drawn	630.623928	MU
	Station Consumption	0.267379	MU
	Injection by 11kV and 33kV Generators	0.555074	MU
	Open Access Energy	146.121625	MU
B	Energy to be billed towards wheeling charges for Feb-	483.679850	MU

ITEM NO		PARTICULARS	AMOUNT	AMOUNT
A		**Wheeling Charges**		
	i	Wheeling charges @ 28.00P/kWh		13,54,30,358
B		**Adjustment for past bills (Annexure-2)**		-19,556
		(Adjustment for post Intra ABT period)		
C		**Total current charges(A+B+C)**		13,54,10,802
D		**Delayed payment Surcharged Accrued**		0
E		**Previous amount outstanding**		
	i	Outstanding Wheeling Charges	12,47,76,136	
	ii	Outstanding DPS	0	
		Total of previous amount outstanding (i+ii)		12,47,76,136
F		**Less payment received during the month**		
	i	Amount received towards last month bill	11,97,85,090.00	
	ii	Rebate allowed on that bill	24,95,523.00	
	iii	Collection towards arrears		
	iv	Collection towards TDS	24,95,523.00	
		Total of payment received during the month		12,47,76,136
G		**Total amount claimed through this bill (C+D+E-F)**		13,54,10,802
		Rupees Thirteen Crore Fifty Four Lakh Ten Thousand Eight Hundred Two Only		
H		**Rebate on Payment of Current Charges**		
	i	Payable with 2% Rebate on or 09-Aug-2021		13,27,02,586
	ii	Payable with 1% Rebate on or 04-Sep-2021		13,40,56,694
	iii	Payable without Rebate after 04-Sep-2021		13,54,10,802

For and on behalf of OPTCL

GM (RT&C)

GRIDCO

G R I D C O Limited

Registered Office: Janpath,
Bhubaneswar 751022
CIN: L40109OR1995SGC003960

Bill of Supply

For TPNODL

August-2021

GRIDCO GSTIN:21AABCG5398P3Z3
Good's Description: Electricity
HSN Code: 27160000
Ref No: GR/BS/21-22/130

Date: 04-Sep-21
Pay By Date: 04-Oct-21

The Chief Executive Officer
TP Northern Odisha Distribution Limited
Janugani, Balasore, Odisha
GSTIN: 21AAICT5123C1ZX

A. Total Energy for the month	508.672343 MU
B. SMD approved by OERC	11,00,000 kVA
SMD permitted by OERC	12,10,000 kVA
Actual SMD occurred	9,08,721 kVA
Excess SMD drawal	0 kVA

Item No			Amount (Rs.)
1	Current Charges:		
	(a) Bulk Supply Price @ 320 Paise per kWh for the Energy	1,62,77,51,497.60	
	(b) Excess Demand Charge @ Rs 250 per kVA	0.00	
	Sub Total: (a+b)		1,62,77,51,497.60
2	Debit/Credit Bill for the month of _____ vide Bill No ____ Dtd ____		0.00
3	Total Current Charges: Items (1+2)		1,62,77,51,498.00
4	TCS Claims during the month		
	TCS u/s 206 C (1H)of IT Act,1961 @0.1% on 1	16,27,751.00	
	Sub Total:		16,27,751.00
5	Total Current Charges incl. TCS: Items (3+4)		1,62,93,79,249.00
6	Add Late Payment Surcharge for the month of Aug-2021 (Annex-6)		
7	Add: Previous amount outstanding :-		
	(i) Outstanding energy charges	2,97,32,93,408.00	
	(ii) Outstanding TCS	29,73,517.00	
	(iii) Outstanding LPS		
	Total Previous Outstanding: (i+ii)		2,97,62,66,925.00
8	Less payment received during the month		
	(a) Amount received against Jun'21 Bill	1,40,97,25,485.00	
	(b) TCS Amount received	14,23,965.00	
	(c) Rebate allowed	1,42,39,651.00	
	(d) Amount received towards Arrear Dues	0.00	
	(e) Other Adjustment (if any)	0.00	
	Total Payment and Adjustment: (a+b+c+d+e)		(1,42,53,89,101.00)
9	Total amount claimed through this bill: items (5 to 8)		3,18,02,57,073.00
	(Rounded off to the nearest Rupee)		3,18,02,57,073.00

(Rupees three hundred eighteen crore two lakh fifty seven thousand seventy three only)

Checked by

DGM(F), PP

DGM (EBC)

For & on behalf of GRIDCO

Sr.GM (T&BS)

GRIDCO

G R I D C O Limited
Registered Office: Janpath,
Bhubaneswar 751022
CIN: L40109OR1995SGC003960

Bill of Supply
For TPNODL
September-2021

GRIDCO GSTIN:21AABCG5398P3Z3
Good's Description: Electricity
HSN Code: 27160000
Ref No: GR/BS/21-22/154

Date: 05-Oct-21
Pay By Date: 04-Nov-21

The Chief Executive Officer
TP Northern Odisha Distribution Limited
Janugani, Balasore, Odisha
GSTIN: 21AAICT5123C1ZX

A. Total Energy for the month	452.574647 MU
B. SMD approved by OERC	11,00,000 kVA
SMD permitted by OERC	12,10,000 kVA
Actual SMD occurred	8,89,893 kVA
Excess SMD drawal	0 kVA

Item No			Amount (Rs.)
1	Current Charges:		
	(a) Bulk Supply Price @ 320 Paise per kWh for the Energy	1,44,82,38,870.40	
	(b) Excess Demand Charge @ Rs 250 per kVA	0.00	
	Sub Total: (a+b)		1,44,82,38,870.40
2	Debit/Credit Bill for the month of _____ vide Bill No ____ Dtd.____		0.00
3	Total Current Charges: Items (1+2)		1,44,82,38,870.00
4	TCS Claims during the month		
	TCS u/s 206 C (1H)of IT Act,1961 @0.1% on 1	14,48,239.00	
	Sub Total:		14,48,239.00
5	Total Current Charges incl. TCS: Items (3+4)		1,44,96,87,109.00
6	Add Late Payment Surcharge for the month of Sep-2021 (Annex-6)		
7	Add: Previous amount outstanding :-		
	(i) Outstanding energy charges	3,17,70,79,770.00	
	(ii) Outstanding TCS	16,27,751.00	
	(iii) Outstanding LPS		
	Total Previous Outstanding: (i+ii)		3,17,87,07,521.00
8	Less payment received during the month		
	(a) Amount received against Jul'21 Bill	1,53,38,34,989.00	
	(b) TCS Amount received	15,49,552.00	
	(c) Rebate allowed	1,54,93,283.00	
	(d) Amount received towards Arrear Dues	0.00	
	(e) Other Adjustment (if any)	0.00	
	Total Payment and Adjustment: (a+b+c+d+e)		(1,55,08,77,824.00)
9	Total amount claimed through this bill: Items (5 to 8)		3,07,75,16,806.00
	(Rounded off to the nearest Rupee)		3,07,75,16,806.00

(Rupees three hundred seven crore seventy five lakh sixteen thousand eight hundred six only)

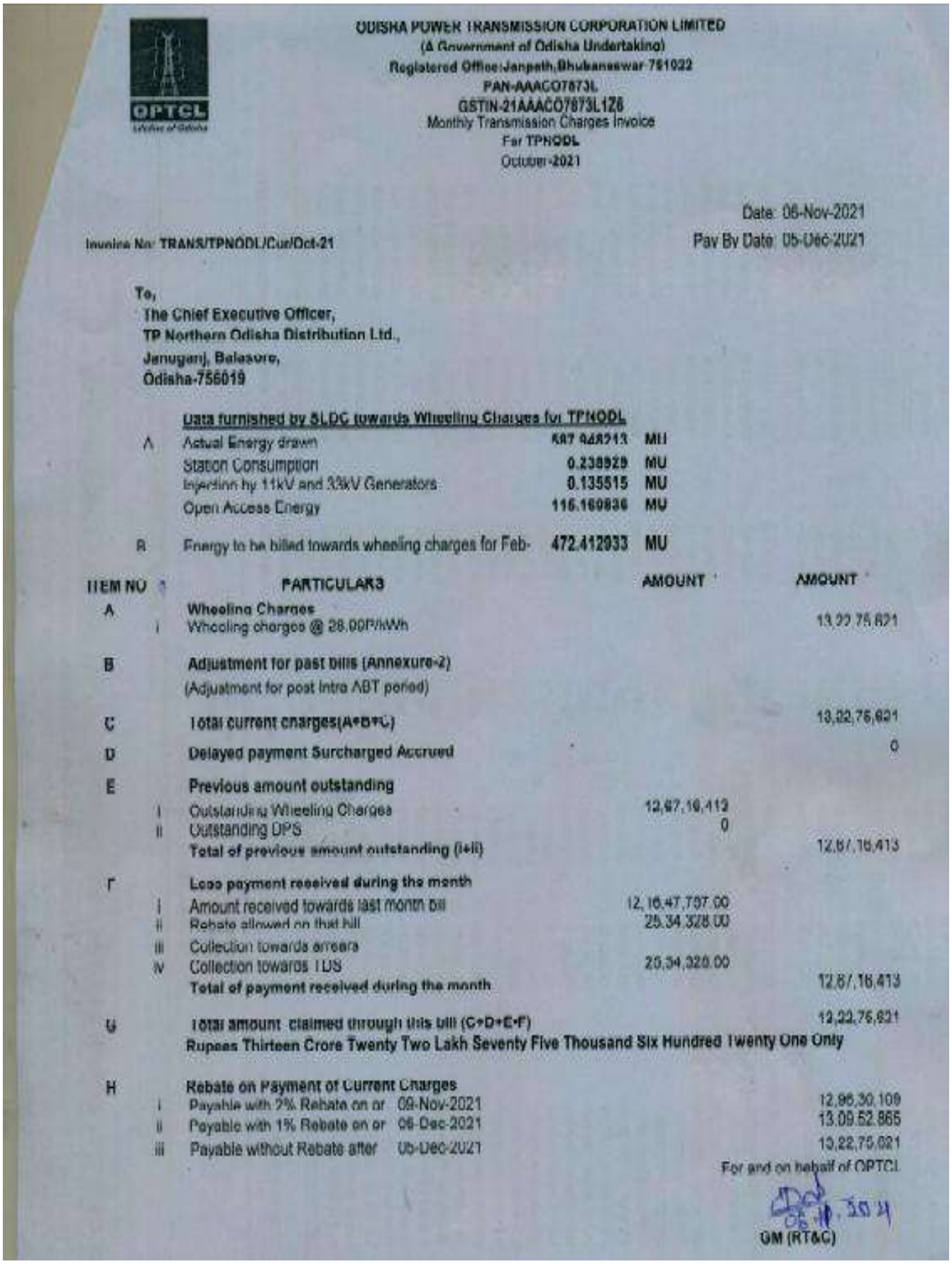
Checked by

DGM(F), PP

DGM (EBC)

For & on behalf of GRIDCO

Sr.GM (T&BB)



ODISHA POWER TRANSMISSION CORPORATION LIMITED
(A Government of Odisha Undertaking)
Registered Office:Janpath,Bhubaneswar 751022
PAN-AAACO7873L
GSTIN-21AAACO7873L1Z8
Monthly Transmission Charges Invoice
For TPNODL
October-2021

Date: 08-Nov-2021
Invoice No: TRANS/TPNODL/Cur/Oct-21
Pay By Date: 05-Dec-2021

To,
The Chief Executive Officer,
TP Northern Odisha Distribution Ltd.,
Janugani, Balasore,
Odisha-756019

Data furnished by SLDC towards Wheeling Charges for TPNODL

A	Actual Energy drawn	497.948913	MU
	Station Consumption	0.238929	MU
	Injection by 11kV and 33kV Generators	0.135515	MU
	Open Access Energy	116.160836	MU
B	Energy to be billed towards wheeling charges for Feb-	472.412933	MU

ITEM NO	PARTICULARS	AMOUNT	AMOUNT
A	**Wheeling Charges**		
i	Wheeling charges @ 28.00P/kWh		13,22,75,621
B	**Adjustment for past bills (Annexure-2)**		
	(Adjustment for post Intra ABT period)		
C	**Total current charges(A+B+C)**		13,22,75,621
D	**Delayed payment Surcharged Accrued**		0
E	**Previous amount outstanding**		
i	Outstanding Wheeling Charges	12,87,19,413	
ii	Outstanding DPS	0	
	Total of previous amount outstanding (i+ii)		12,87,19,413
F	**Less payment received during the month**		
i	Amount received towards last month bill	12,16,47,797.00	
ii	Rebate allowed on that bill	25,34,328.00	
iii	Collection towards arrears		
iv	Collection towards TDS	25,34,328.00	
	Total of payment received during the month		12,87,19,413
G	**Total amount claimed through this bill (C+D+E-F)**		13,22,75,621
	Rupees Thirteen Crore Twenty Two Lakh Seventy Five Thousand Six Hundred Twenty One Only		
H	**Rebate on Payment of Current Charges**		
i	Payable with 2% Rebate on or 09-Nov-2021		12,96,30,109
ii	Payable with 1% Rebate on or 05-Dec-2021		13,09,52,865
iii	Payable without Rebate after 05-Dec-2021		13,22,75,621

For and on behalf of OPTCL

GM (RT&C)

OPTCL
Lifeline of Odisha

ODISHA POWER TRANSMISSION CORPORATION LIMITED
(A Government of Odisha Undertaking)
Registered Office:Janpath,Bhubaneswar-751022
PAN-AAACO7873L
GSTIN-21AAACO7873L1Z6
Monthly Transmission Charges Invoice
For TPNODL
November-2021

Date: 08-Dec-2021
Invoice No: TRANS/TPNODL/Cur/Nov-21 Pay By Date: 06-Jan-2022

To,
The Chief Executive Officer,
TP Northern Odisha Distribution Ltd.,
Januganj, Balasore,
Odisha-756019

Data furnished by SLDC towards Wheeling Charges for TPNODL

A	Actual Energy drawn	493.678751	MU
	Station Consumption	0.170849	MU
	Injection by 11kV and 33kV Generators	0.366294	MU
	Open Access Energy	101.566805	MU
B	Energy to be billed towards wheeling charges for Feb-	391.574803	MU

ITEM NO		PARTICULARS	AMOUNT	AMOUNT
A		**Wheeling Charges**		
	i	Wheeling charges @ 28.00P/kWh		10,96,40,945
B		**Adjustment for past bills (Annexure-2)**		
		(Adjustment for post Intra ABT period)		
C		**Total current charges(A+B+C)**		10,96,40,945
D		**Delayed payment Surcharged Accrued**		0
E		**Previous amount outstanding**		
	i	Outstanding Wheeling Charges	13,22,75,621	
	ii	Outstanding DPS	0	
		Total of previous amount outstanding (i+ii)		13,22,75,621
F		**Less payment received during the month**		
	i	Amount received towards last month bill	12,69,84,597.00	
	ii	Rebate allowed on that bill	26,45,512.00	
	iii	Collection towards arrears		
	iv	Collection towards TDS	26,45,512.00	
		Total of payment received during the month		13,22,75,621
G		**Total amount claimed through this bill (C+D+E-F)**		10,96,40,945
		Rupees Ten Crore Ninety Six Lakh Forty Thousand Nine Hundred Forty Five Only		
H		**Rebate on Payment of Current Charges**		
	i	Payable with 2% Rebate on or 10-Dec-2021		10,74,48,126
	ii	Payable with 1% Rebate on or 06-Jan-2022		10,85,44,536
	iii	Payable without Rebate after 06-Jan-2022		10,96,40,945

For and on behalf of OPTCL
08.12.2021
GM (RT&C)

OPTCL
Lifeline of Odisha

ODISHA POWER TRANSMISSION CORPORATION LIMITED
(A Government of Odisha Undertaking)
Registered Office:Janpath,Bhubaneswar-751022
PAN-AAACO7873L
GSTIN-21AAACO7873L1Z6
Monthly Transmission Charges Invoice
For TPNODL
December-2021

Date: 06-Jan-2022
Invoice No: TRANS/TPNODL/Cur/Dec-21
Pay By Date: 04-Feb-2022

To,
The Chief Executive Officer,
TP Northern Odisha Distribution Ltd.,
Januganj, Balasore,
Odisha-756019

Data furnished by SLDC towards Wheeling Charges for TPNODL

A	Actual Energy drawn	506.091392	MU
	Station Consumption	0.175398	MU
	Injection by 11kV and 33kV Generators	0.392593	MU
	Open Access Energy	114.789106	MU
B	Energy to be billed towards wheeling charges	390.734295	MU

ITEM NO		PARTICULARS	AMOUNT	AMOUNT
A		**Wheeling Charges**		
	i	Wheeling charges @ 28.00P/kWh		10,94,05,603
B		**Adjustment for past bills (Annexure-2)**		-
C		**Total current charges(A+B+C)**		10,94,05,603
D		**Delayed payment Surcharged Accrued**		-
E		**Previous amount outstanding**		
	i	Outstanding Wheeling Charges	10,96,40,945	
	ii	Outstanding DPS	0	
		Total of previous amount outstanding (i+ii)		10,96,40,945
F		**Less payment received during the month**		
	i	Amount received towards last month bill	10,52,55,307.00	
	ii	Rebate allowed on that bill	21,92,819.00	
	iii	Collection towards arrears		
	iv	Collection towards TDS	21,92,819.00	
		Total of payment received during the month		10,96,40,945
G		**Total amount claimed through this bill (C+D+E-F)**		10,94,05,603
		Rupees Ten Crore Ninety Four Lakh Five Thousand Six Hundred Three Only		
H		**Rebate on Payment of Current Charges**		
	i	Payable with 2% Rebate on or 10-Jan-2022		10,72,17,491
	ii	Payable with 1% Rebate on or 04-Feb-2022		10,83,11,547
	iii	Payable without Rebate after 04-Feb-2022		10,94,05,603

For and on behalf of OPTCL

GM (RT&C)

OPTCL
Lifeline of Odisha

ODISHA POWER TRANSMISSION CORPORATION LIMITED
(A Government of Odisha Undertaking)
Registered Office: Janpath,Bhubaneswar 751022
PAN-AAACO7873L
GSTIN-21AAACO7873L1Z6
Monthly Transmission Charges Invoice
For TPNODL
January-2022

Date: 07-Feb-2022
Invoice No: TRANS/TPNODL/Cur/Jan-22 Pay By Date: 08-Mar-2022

To,
The Chief Executive Officer,
TP Northern Odisha Distribution Ltd.,
Januganj, Balasore,
Odisha-756019

Data furnished by SLDC towards Wheeling Charges for TPNODL

A	Actual Energy drawn	534.923244	MU
	Station Consumption	0.199855	MU
	Injection by 11kV and 33kV Generators	0.215889	MU
	Open Access Energy	130.345074	MU
B	Energy to be billed towards wheeling charges	404.162426	MU

ITEM NO		PARTICULARS	AMOUNT	AMOUNT
A		**Wheeling Charges**		
	i	Wheeling charges @ 28.00P/kWh		11,31,65,479
B		**Adjustment for past bills (Annexure-2)**		2,48,724.00
C		**Total current charges(A+B+C)**		11,34,14,203
D		**Delayed payment Surcharged Accrued**		-
E		**Previous amount outstanding**		
	i	Outstanding Wheeling Charges	10,94,05,603	
	ii	Outstanding DPS	0	
		Total of previous amount outstanding (i+ii)		10,94,05,603
F		**Less payment received during the month**		
	i	Amount received towards last month bill	10,50,29,379.00	
	ii	Rebate allowed on that bill	21,88,112.00	
	iii	Collection towards arrears		
	iv	Collection towards TDS	21,88,112.00	
		Total of payment received during the month		10,94,05,603
G		**Total amount claimed through this bill (C+D+E-F)**		11,34,14,203
		Rupees Eleven Crore Thirty Four Lakh Fourteen Thousand Two Hundred Three Only		
H		**Rebate on Payment of Current Charges**		
	i	Payable with 2% Rebate on or 09-Feb-2022		11,11,45,919
	ii	Payable with 1% Rebate on or 08-Mar-2022		11,22,80,061
	iii	Payable without Rebate after 08-Mar-2022		11,34,14,203

For and on behalf of OPTCL

07.02.22
GM (RT&C)

OPTCL
Lifeline of Odisha

ODISHA POWER TRANSMISSION CORPORATION LIMITED
(A Government of Odisha Undertaking)
Registered Office:Janpath,Bhubaneswar-751022
PAN-AAACO7873L
GSTIN-21AAACO7873L1Z6
Monthly Transmission Charges Invoice
For TPNODL
February-2022

Date: 07-Mar-2022
Invoice No: TRANS/TPNODL/Cur/Feb-22
Pay By Date: 05-Apr-2022

To,
The Chief Executive Officer,
TP Northern Odisha Distribution Ltd.,
Januganj, Balasore,
Odisha-756019

Data furnished by SLDC towards Wheeling Charges for TPNODL

A	Actual Energy drawn	482.338094	MU
	Station Consumption	0.175112	MU
	Injection by 11kV and 33kV Generators	0.142508	MU
	Open Access Energy	106.918652	MU
B	Energy to be billed towards wheeling charges	375.101822	MU

ITEM NO		PARTICULARS	AMOUNT	AMOUNT
A		**Wheeling Charges**		
	i	Wheeling charges @ 28.00P/kWh		10,50,28,510
B		**Adjustment for past bills**		
C		**Total current charges(A+B+C)**		10,50,28,510
D		**Delayed payment Surcharged Accrued**		
E		**Previous amount outstanding**		
	i	Outstanding Wheeling Charges	11,34,14,203	
	ii	Outstanding DPS	0	
		Total of previous amount outstanding (i+ii)		11,34,14,203
F		**Less payment received during the month**		
	i	Amount received towards last month bill	10,88,77,635.00	
	ii	Rebate allowed on that bill	22,68,284.00	
	iii	Collection towards arrears		
	iv	Collection towards TDS	22,68,284.00	
		Total of payment received during the month		11,34,14,203
G		**Total amount claimed through this bill (C+D+E-F)**		10,50,28,510
		Rupees Ten Crore Fifty Lakh Twenty Eight Thousand Five Hundred Ten Only		
H		**Rebate on Payment of Current Charges**		
	i	Payable with 2% Rebate on or 09-Mar-2022		10,29,27,940
	ii	Payable with 1% Rebate on or 05-Apr-2022		10,39,78,225
	iii	Payable without Rebate after 05-Apr-2022		10,50,28,510

For and on behalf of OPTCL

GM (RT&C)

OPTCL
Lifeline of Odisha

ODISHA POWER TRANSMISSION CORPORATION LIMITED
(A Government of Odisha Undertaking)
Registered Office:Janpath,Bhubaneswar-751022
PAN-AAACO7873L
GSTIN-21AAACO7873L1Z6
Monthly Transmission Charges Invoice
For **TPNODL**
March-2022

Date: 06-Apr-2022
Invoice No: TRANS/TPNODL/Cur/Mar-22 Pay By Date: 05-May-2022

To,
The Chief Executive Officer,
TP Northern Odisha Distribution Ltd.,
Januganj, Balasore,
Odisha-756019

Data furnished by SLDC towards Wheeling Charges for TPNODL

A	Actual Energy drawn	600.371221	MU
	Station Consumption	0.263453	MU
	Injection by 11kV and 33kV Generators	0.144413	MU
	Open Access Energy	93.926254	MU
B	Energy to be billed towards wheeling charges	506.037101	MU

ITEM NO		PARTICULARS	AMOUNT	AMOUNT
A		**Wheeling Charges**		
	i	Wheeling charges @ 28.00P/kWh		14,16,90,388
B		**Adjustment for past bills**		
C		**Total current charges(A+B+C)**		14,16,90,388
D		**Delayed payment Surcharged Accrued**		-
E		**Previous amount outstanding**		
	i	Outstanding Wheeling Charges	10,50,28,510	
	ii	Outstanding DPS	0	
		Total of previous amount outstanding (i+ii)		10,50,28,510
F		**Less payment received during the month**		
	i	Amount received towards last month bill	10,08,27,370.00	
	ii	Rebate allowed on that bill	21,00,570.00	
	iii	Collection towards arrears		
	iv	Collection towards TDS	21,00,570.00	
		Total of payment received during the month		10,50,28,510
G		**Total amount claimed through this bill (C+D+E-F)**		14,16,90,388
		Rupees Fourteen Crore Sixteen Lakh Ninety Thousand Three Hundred Eighty Eight Only		
H		**Rebate on Payment of Current Charges**		
	i	Payable with 2% Rebate on or 08-Apr-2022		13,88,56,580
	ii	Payable with 1% Rebate on or 06-May-2022		14,02,73,484
	iii	Payable without Rebate after 05-May-2022		14,16,90,388

For and on behalf of OPTCL

GM (RT&C)

ANNEXURE (VIII): LINE DIAGRAM (SLD): Details are provided in the MEA report of TPNODL for FY 2021-22.

ANNEXURE (IX): CATEGORY OF SERVICE DETAILS:

(Details of Consumers)						
Summary of Energy						
Period From Apr_2021 To Mar_2022						
S.No	Type of Consumers	Category of Consumers (EHT/HT/LT/Others)	Voltage Level (In Voltage)	No of Consumers	Total Consumption (In MU)	Remarks (Source of data)
1	Domestic	LT/HT		1861176	1512.748	FG Billing Source
2	Commercial	LT/HT		97819	324.483	FG Billing Source
3	IP Sets					
4	Hor. & Nur. & Coffee/Tea & Rubber (Metered)					
5	Hor. & Nur. & Coffee/Tea & Rubber (Flat)					
6	Heating and Motive Power					
7	Water Supply	HT		4184	50.19	FG Billing Source
8	Public Lighting	HT		1311	18.493	FG Billing Source
9	HT Water Supply					
10	HT Industrial	HT		320	372.713	FG Billing Source
11	Industrial (Small)	LT		4341	21.442	FG Billing Source
12	Industrial (Medium)	LT		1084	35.616	FG Billing Source
13	HT Commercial					
14	Applicable to Government Hospitals & Hospitals					
15	Lift Irrigation Schemes/Lift Irrigation Societies	HT		3	0.383	FG Billing Source
16	HT Res. Apartments Applicable to all areas					
17	Mixed Load	HT				FG Billing Source
18	Government offices and department	HT		14657	24.578	FG Billing Source
19	Industrial	EHT		37	1676.025	FG Billing Source
20	Kutir Jyoti	LT		75673	27.398	FG Billing Source
21	Agriculture	LT		26450	120.291	FG Billing Source
22	OTHERS	LT/HT		2028	162.638	FG Billing Source
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
			Total	2089083	4347.00	FG Billing Source

ANNEXURE (X): DETAILED FORMATS TO BE ANNEXED:

33KV MONTHLY ENERGY AUDIT REPORT															
SL.NO.	132/33 KV or 220/33KV Grid Name	33 KV Feeder Name	Electrical Length of the Feeder	Total INPUT in MU=A	CONSUMPTION BY 33KV CONSUMER IF ANY=B	NAME OF 33/11KV S/S	INPUT TO 33/11KV S/S	11KV Feeder Name	FDR_CD	INPUT IN 11KV FEEDERS IN MU=C1,C2,C3	TOTAL INPUT TO THE 11KV FEEDERS CORRESPONDING TO 33/11KV S/S=C= C1+C2+C3	TOTAL(33KV CONSUMER+11KV FEEDERS*) Consumption in MU (B)=D=B+C	LOSS IN MU E=(D-A)	AVERAGE % LOSS (E/A*100)	Average Loss during Last Quarter as observed

11KV MONTHLY ENERGY AUDIT REPORT																
SL NO	Name of Distribution Division	Name of 11KV Feeder	Feeder Code	Length of Feeder in KM	No of DTR	Total DTR Capacity in KVA	No of Consumer	Previous Reading-X	Present Reading-Y	MF	Input in MU, (Z=(Y-X)*MF)	Billing to HT Consumer	Billing to LT Consumer	Total Units Billed in MU	Loss in MU	Loss in %age	Average Loss during Last Quarter as observed

CALCULATION OF AVERAGE T & D LOSS OF DTs UNDER TPNODL														
SL. NO	Name of 11 kV Feeder and Loss in MU	Name of the Feeder Manager	Name of Distribution Transformer	DTR CODE	DTR Capacity in KVA	No Of Consumer under DTR	AVG T & D LOSS CALCULATION							DTR Loading in %
							NO. OF MONTHS TAKEN FOR AVERAGE CALCULATION	TOTAL UNITS ADVANCED (IN MU)	TOTAL UNITS BILLED (IN MU)	LOSS OF UNITS (IN MU)	AVG NO OF BILL GENERATED	AVG NO OF MR GENERATED	T & D LOSS(%)	

					T&D LOSS TABLE								
PARTICULARS	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	TOTAL
BULK SUPPLY													
Demand (MVA)													
Energy input (MU)													
SALE TO CONS (MU)													
EHT													
HT													
LT													
TOTAL SALE (MU)													
T & D LOSS (%)													
LT													
HT & LT													
OVERALL (%)													

					AT & C LOSS TABLE								
PARTICULARS	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	TOTAL
SALE TO CONSUMERS (MU)													
TOTAL SALE (MU)													
T & D LOSS (%)													
OVERALL (%)													
BILLING EFFICIENCY (%)													
OVERALL (%)													
BILLING TO CONSUMERS (Rs. in Crs.)													
TOTAL													
COLLECTION RECEIVED (Rs. in Crs.)													
TOTAL													
COLLECTION EFFICIENCY (%)													
OVERALL (%)													
AT & C LOSS (%)													
OVERALL (%)													

ANNEXURE (XI): LIST OF DOCUMENTS VERIFIED WITH EACH PARAMETER: Details are furnished in Sector Specific Pro-forma.

ANNEXURE (XII): BRIEF DESCRIPTION OF UNIT: Details are provided in the MEA report of TPNODL for FY 2021-22.

ANNEXURE (XIII): LIST OF PARAMETERS ARRIVED THROUGH CALCULATION OR FORMULAE WITH LIST OF DOCUMENTS AS SOURCE OF DATA: Details are provided in the MEA report of TPNODL for FY 2021-22.

TPNODL COMMENTS ON CRITICAL ANALYSIS AND MAJOR OBSERVATIONS AND RECOMMENDATIONS:

1. Comment by POWER TECH CONSULTANTS:

In Cell D-25-26-27 of the "Infrastructure Detail" sheet of the Pro-forma in the line length of AB cable, there should be provision for separate entry for line length of AB cable, Underground Cable, 66kV, 33kV. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

Response by TPNODL:
The Pro-forma is provided by BEE and the sheets are protected. The BEE will be requested for the aforesaid changes.

2. Comment by POWER TECH CONSULTANTS:

The Cell C-28 of "Infrastructure Details" sheet of the Pro-forma may be read and considered as Energy Purchase Particular. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

Response by TPNODL:
The Pro-forma is provided by BEE and the sheets are protected. The BEE will be requested for the aforesaid changes.

3. Comment by POWER TECH CONSULTANTS:

There is no separate segregation of input energy and sale to consumers at 33kV and 11kV levels as per the prevailing practice of TPNODL. However in the "Infrastructure Details" sheet of the Pro-forma [Ref Row 4(ii) and 4(iii)], there is a requirement to fill the data of 11kV and 33kV voltage wise energy input and energy sale. TPNODL has clubbed both the 33kV and 11kV energy input and energy sale and provided the data in 11kV row. It is recommended that in future TPNODL is required to segregate the 11kV and 33kV Input Energy and Energy Sale.

Response by TPNODL:
We are in process of rectification of 11 kV Feeder metering in phased manner and energy accounting will be segregated for them.

4. Comment by POWER TECH CONSULTANTS:

In the Pro-Forma it is recommended that after Row-76 of "Infrastructure Details" sheet of the Pro-forma there has to be another row having provision to incorporate the energy supplied to 33/11 KV , 33/0.415 Substation.

Response by TPNODL:
BEE will be requested for the same to make changes in the format.

5. Comment by POWER TECH CONSULTANTS:

In Energy Accounting Summary of "Infrastructure Details" sheet of the Pro-forma [Ref Row 5(ii) and 5(iii)], TPNODL has reported HT Input by reverse calculating the difference of total sale and HT sale and assuming 8% loss in the HT System, which is not the correct approach. Since majority

of the 33kV Feeders are metered at GSS end and all the 33kV consumers are supplied with meters and majority of the outgoing 11KV Feeders in the PSS are being metered, therefore TPNODL is in a position to capture the Total Input Energy and Energy Sale at 33KV System. In view of the same it is recommended TPNODL should take a corrective approach to capture 33kV and 11kV Input Energy and Energy Sale as per the meter data and should not consider the normative approach of 8% distribution loss in HT Systems.

Response by TPNODL:
The methodology adopted is as per OERC approval. Also, it is worth to mention here that we are in process of segregating the energy input at each level by feeder metering.

6. Comment by POWER TECH CONSULTANTS:

33kV meters are installed at Grid Substation (GSS) interface points and at each consumer points. However, 33kV meters are not installed at the input point to the 33/11 kV substation (PSS).

Response by TPNODL:
33 kV Feeder meter rectification is in progress (102 No. of 33 kV Feeder meter revived). Metering will be completed as per BEE Targets.

7. Comment by POWER TECH CONSULTANTS:

TPNODL informed that they have not completed 100% metering of the 11KV Feeder and accordingly submitted the received energy at the 11kV Feeder where they have installed the meter. Further TPNODL submitted that they have not installed meters at DTR and wherever the earlier meters were installed in DT level, the data were not captured in regular interval due to lack of metering and billing personnel. At DTR level the metering data is not available. TPNODL is required to audit the DTR's and provide the metering data. TPNODL has also informed that the consumers are not properly mapped or indexed to each 11KV/33KV Feeders. In view of the same TPNODL couldn't submit the data at Cell K-3 (Received at Feeder), Cell L-3(Feeder consumption), Cell M-3(Final net export at feeder level) in the "Details of Feeder Levels" sheet of the Pro-forma due to which T&D loss and AT&C loss of feeder wise losses could not be computed.

Response by TPNODL:
T&D loss calculated for the 93 feeder in Q1 of FY-22-23 and submitted to BEE and Metering will be completed as per BEE Targets.

8. Comment by POWER TECH CONSULTANTS:

In the Cell S-11 & S-12 of "Form Input Energy" sheet of the Pro-forma the remarks couldn't be entered as the cell is protected. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

Response by TPNODL:
BEE will be requested for the same to make changes in the format.

9. Comment by POWER TECH CONSULTANTS:

In the Cell R-23-24 of "Form Input Energy" sheet of the Pro-forma the length of AB cable and length of underground cable may be considered as length of LT-AB cable and length of LT underground cable.

Response by TPNODL:
BEE will be requested for the same to make changes in the format.

10. Comment by POWER TECH CONSULTANTS:

In cell no P-28 of "Form input energy" sheet of the pro-forma the (period from—to—) may be considered as 1st April 2021-31st Mar 2022. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

Response by TPNODL:
BEE will be requested for the same to make changes in the format.

11. Comment by POWER TECH CONSULTANTS:

In the cell D-29 of "Form Input Energy" sheet of the pro-forma, the voltage level unit should be in kV, instead of kVA. Again in Cell E-29 & F-29 "Form Input Energy" sheet of the pro-forma the unit of division & subdivision (KVA) may be edited. TPNODL may request BEE/SDA for necessary changes in the Pro-forma.

Response by TPNODL:
BEE will be requested for the same to make changes in the format.

12. Comment by POWER TECH CONSULTANTS:

It is observed that the EHT/HT consumption is low as compared to LT Consumption. It is recommended that TPNODL should pray before Hon'ble Commission for tariff rationalisation measures to be adopted for HT / EHT Consumers. TPNODL may be required to incentivise the Industrial Consumption by taking up better tariff.

Response by TPNODL:
Rationalisation measures in future tariff hearing process, as increase in HT / EHT Consumption will help in reducing the T&D loss and AT & C loss.

13. Comment by POWER TECH CONSULTANTS:

It is found that the % of defective meters are more in consumer category like Kutri Jyoti, Agro, Allied Agro, Agricultural, Street Lighting and Specified Public purpose. It is recommended to give special emphasize on Kutri Jyoti, Agro, Allied Agro, Agricultural, Street Lighting and specified Public purpose category consumer for replacement of defective meters with correct one. In the next tariff hearing process TPNODL may propose to the Hon'ble Commission DBT based subsidy for these consumers in which the subsidy linked with the above category consumer can be transferred through Direct Benefit Transfer (DBT) Scheme based on the correct meter reading. In case meter is tampered and found to be defective, then the transfer of subsidy may be stopped till the meter is replaced with correct meter.

Response by TPNODL:
Being policy matter it will be discussed at the suitable platform. However, focus is being carried out at these categories for the meter replacement and revenue collection.

14. Comment by POWER TECH CONSULTANTS:

It is found that the state and central government are implementing a no. of electrification project in which meters are becoming defective and stopped working after few months of installations. Currently very few meters' manufacturers have been approved by TPNODL. It is recommended that TPNODL should empanel a nos. of quality meter manufacturers from where the contractor should procure meters and install in Government sponsored project and the meter manufacturer should issue guarantee certificate of each meter for a period of 5 years in favour of the local DISCOM where the project is being implemented so that in case of any defective meter is found by the DISCOM, then same can be replaced by the meter manufacturers directly. TPNODL should inform both State and Central Government implementing agency regarding % increase in defective meters happening in their sponsored scheme so that they can take appropriate remedial measures.

Response by TPNODL:
The energy meters are being procured by the Quality meter manufacturers after qualifying stringent quality parameters and process of selection. TPNODL has strong focus for the defective meter replacement and being reviewed by the management at frequent intervals.

General Information					
1	**Name of the DISCOM**	TPNODL			
2	**i) Year of Establishment**	1st April 2021			
	ii) Government/Public/Private	Public Private Partenership			
3	**DISCOM's Contact details & Address**				
i	City/Town/Village	**TP NORTHERN ODISHA DISTRIBUTION LIMITED**			
ii	District	BALASORE			
iii	State	ODISHA		Pin	756019
iv	Telephone	06782-244865		Fax	06782-244259
4	**Registered Office**				
i	Company's Chief Executive Name	**BHASKAR SARKAR**			
ii	Designation	CHIEF EXECUTIVE OFFICER			
iii	Address	TP NORTHERN ODISHA DISTRIBUTION LIMITED			
iv	City/Town/Village	Januganj		P.O.	
v	District	BALASORE			
vi	State	ODISHA		Pin	756019
vii	Telephone	06782-244865		Fax	06782-244259
5	**Nodal Officer Details***				
i	Nodal Officer Name (Designated at DISCOM's)	Mr. Dushyant Kumar Tyagi			
ii	Designation	Chief of Operation			
iii	Address	BALASORE			
iv	City/Town/Village	Januganj		P.O.	
v	District	BALASORE			
vi	State	Odisha		Pin	756019
vii	Telephone	06782-244865		Fax	06782-244259
6	**Energy Manager Details***				
i	Name	Mr. Manish Kriplani			
ii	Designation	HOD (Energy Audit)		Whether EA or EM	
iii	EA/EM Registration No.				
iv	Telephone	9799495503		Fax	
v	Mobile	9799495503	E-mail ID	manish.kirplani@tpnodl.com	
7	**Period of Information**				
	Year of (FY) information including Date and Month (Start & End)	1st April, 2021 - 31st March, 2022			

M/s. Power Tech Consultants
Authorised Signatory

POWER TECH CONSULTANTS

Dushyant Tyagi
Chief Commercial Services & CSR
TPNODL

Performance Summary of Electricity Distribution Companies			
1	Period of Information Year of (FY) information including Date and Month (Start & End)	1st April, 2021 - 31st March, 2022	
2	**Technical Details**		
(a)	**Energy Input Details**		
(i)	Input Energy Purchase (From Generation Source)	Million kwh	5327.04
(ii)	Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kwh	5327.04
(iii)	Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kwh	4347.00
(b)	Transmission and Distribution (T&D) loss Details	Million kwh	980.05
		%	0.18
	Collection Efficiency	%	94%
(c)	Aggregate Technical & Commercial Loss	%	23%

I/We undertake that the information supplied in this Document and Pro-forma is accurate to the best of my knowledge and if any of the information supplied is found to be incorrect and such information result into loss to the Central Government or State Government or any of the authority under them or any other person affected, I/we undertake to indemnify such loss.

Authorised Signatory and Seal

Signature:-
Name of Energy Manag Mr. Manish Kriplani
Registration Number:

Name of Authorised Signatory
Name of th TPNODL
Full Addre Januganj, Balasore-Pin 756019

M/s. Power Tech Consultants
(Bibhu Charan Swain)
Authorised Signatory

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Dushyant Tyagi
Chief Commercial Services & CSR
TPNODL

Form-Details of Input Infrastructure

1	Parameters	Total	Covered during in audit	Verified by Auditor in Sample Check	Remarks (Source of data)
i	Number of circles	5			TPNODL Database
ii	Number of divisions	16			TPNODL Database
iii	Number of sub-divisions	50			TPNODL Database
iv	Number of feeders	797			TPNODL Database
v	Number of DTs	72323			TPNODL Database
vi	Number of consumers	2089083			TPNODL Database
2	**Parameters**	**66kV and above**	**33kV**	**11/22kV**	**LT**
a. i.	Number of conventional metered consumers	37	144	470	2010760
ii	Number of consumers with 'smart' meters	NA	NA	NA	NA
iii	Number of consumers with 'smart prepaid' meters	NA	NA	NA	NA
iv	Number of consumers with 'AMR' meters	37	144	470	NA
v	Number of consumers with 'non-smart prepaid' meters	NA	NA	NA	NA
vi	Number of unmetered consumers	NA	NA	NA	78323
vii	**Number of total consumers**	37	136	450	2089083
b.i.	Number of conventionally metered Distribution Transformers	NA	NA	2208	NA
ii	Number of DTs with communicable meters	NA	NA	608	NA
iii	Number of unmetered DTs	NA	NA	70115	NA
iv	**Number of total Transformers**	NA	NA	72323	NA
c.i.	Number of metered feeders	NA	98	387	NA
ii	Number of feeders with communicable meters	NA	98	49	NA
iii	Number of unmetered feeders	NA	0	410	NA
iv	**Number of total feeders**	NA	98	797	NA
d.	Line length (ct km)	107158.4			
e.	Length of Aerial Bunched Cables	43971.4			
f.	Length of Underground Cables	401			

3	Voltage level	Particulars	MU	Reference	Remarks (Source of data)
i	66kV and above	Long-Term Conventional	0	Includes input energy for franchisees	
		Medium Conventional	0		
		Short Term Conventional	0		
		Banking	0		
		Long-Term Renewable energy	0		
		Medium and Short-Term RE	0	Includes power from bilateral/ PX/ DEEP	
		Captive, open access input	0	Any power wheeled for any purchase other than sale to DISCOM. Does not include input for franchisee.	
		Sale of surplus power	0		
		Quantum of inter-state transmission loss	0	As confirmed by SLDC, RLDC etc	
		Power procured from inter-state sources	0	Based on data from Form 5	
		Power at state transmission boundary	0		
ii	33kV	Long-Term Conventional	0		
		Medium Conventional	0		
		Short Term Conventional	0		
		Banking	0		
		Long-Term Renewable energy	0		
		Medium and Short-Term RE	0		
		Captive, open access input	0		
		Sale of surplus power	0		
		Quantum of intra-state transmission loss	0		
		Power procured from intra-state sources	0		
iii		**Input in DISCOM wires network**	0		
iv	33 kV	Renewable Energy Procurement	0		
		Small capacity conventional/ biomass/ hydro plants Procurement	0		
		Captive, open access input	0		
v	11 kV	Renewable Energy Procurement	0		
		Small capacity conventional/ biomass/ hydro plants Procurement	0		
		Sales Migration Input	0		
vi	LT	Renewable Energy Procurement	0		
		Sales Migration Input	0		
vii		**Energy Embedded within DISCOM wires network**	0		
viii		**Total Energy Available/ Input**	0		

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4	Voltage level	Energy Sales Particulars	MU	Reference	
i	LT Level	DISCOM' consumers	2,168	Include sales to consumers in franchisee areas, unmetered consumers	FG Billing Source
		Demand from open access, captive	0	Non DISCOM's sales	
		Embedded generation used at LT level	0	Demand from embedded generation at LT level	
		Sale at LT level	2,168		FG Billing Source
		Quantum of LT level losses	960		FG Billing Source
		Energy Input at LT level	3,128		FG Billing Source
ii	11 kV Level	DISCOM' consumers	503	Include sales to consumers in franchisee areas, unmetered consumers	FG Billing Source
		Demand from open access, captive	0	Non DISCOM's sales	
		Embedded generation at 11 kV level used	0	Demand from embedded generation at 11kV level	
		Sales at 11 kV level	503		FG Billing Source
		Quantum of Losses at 11 kV	20		FG Billing Source
		Energy input at 11 kV level	523		FG Billing Source
iii	33 kV Level	DISCOM' consumers		Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive	0	Non DISCOM's sales	
		Embedded generation at 33 kV or below level	0	This is DISCOM and OA demand met via energy generated at same voltage level	
		Sales at 33 kV level	0		
		Quantum of Losses at 33 kV	0		
		Energy input at 33kV Level			
iv	> 33 kV	DISCOM' consumers	1676	Include sales to consumers in franchisee areas, unmetered consumers	EHT Consumer-37
		Demand from open access, captive	0	Non DISCOM's sales	
		Cross border sale of energy	0		
		Sale to other DISCOMs	0		
		Banking	0		
		Energy input at > 33kV Level	1,676		FG Billing Source
		Sales at 66kV and above (EHV)	1,676		FG Billing Source
		Total Energy Requirement	**5,327**		BST Bill OPTCL
		Total Energy Sales	**4,347**		FG Billing Source

Energy Accounting Summary

5	DISCOM	Input (in MU)	Sale (in MU)	Loss (in MU)	Loss %
i	LT	3,128	2,168	960	0.30691439
ii	11 Kv	523	503	20	0.038469622
iii	33 kv	0	0	0	0
iv	> 33 kv	1,676	1676	0	0
6	**Open Access, Captive**	**Input (in MU)**	**Sale (in MU)**	**Loss (in MU)**	
i	LT	0	0	0	0
ii	11 Kv	0	0	0	0
iii	33 kv	0	0	0	0
iv	> 33 kv	0	0	0	0

Loss Estimation for DISCOM	
T&D loss	980
D loss	980
T&D loss (%)	0.183976503
D loss (%)	0.183976503

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Details of Division Wise Losses (See note below**)

Division Wise Losses

Period FromApri21_2021 To March_2022

S.No	Name of circle	Circle code	Name of Division	Consumer profile								Energy parameters					Losses		Commercial Parameter			AT & C loss (%)
				Consumer category	No of connection metered (Nos)	No of connection Un-metered (Nos)	Total Number of connections (Nos)	% of number of connections	Connected Load metered (MW)	Connected Load Un-metered (MW)	Total Connected Load (MW)	% of connected load	Input energy (MU)	Billed energy (MU) Metered energy	Billed energy (MU) Unmetered/assessment energy	Billed energy (MU) Total energy	% of energy consumption	T&D loss (MU)	T&D loss (%)	Billed Amount in Rs. Crore	Collected Amount in Rs. Crore	Collection Efficiency	
1	Balasore	1	BED	Residential	49645	1752	51397	82%	106.999	1.756	108.755	57%	294.834	85.219	6.957	92.176	36%	37.423	13%	44.7682	37.2227	83.15%	
				Agricultural	65	0	65	0%	0.216	0	0.216	0%		0.202	0.072	0.274	0%			0.0747	0.0709	94.91%	
				Commercial/Industrial-LT	10944	4	10948	17%	33.137	0.045	33.182	17%		34.012	2.273	36.285	14%			27.3919	24.7128	90.22%	
				Commercial/Industrial-HT	49	0	49	0%	21.664	0	21.664	11%		52.055	0	52.055	20%			39.6161	39.8066	100.48%	
				Others	574	15	589	1%	28.122	0.025	28.147	15%		73.928	2.693	76.621	30%			49.3043	51.5149	104.48%	
	Sub-total				**61277**	**1771**	**63048**	**100%**	**190.138**	**1.826**	**191.964**	**100%**	**294.834**	**245.416**	**11.995**	**257.411**	**100%**	**37.423**	**13%**	**161.1552**	**153.3279**	**95.14%**	**17%**
2	Balasore	1	TED (BASTA	Residential	72531	4767	77298	91%	91.858	4.865	96.723	79%	139.527	37.411	13.616	51.027	63%	58.743	42%	23.1632	17.6019	75.99%	
				Agricultural	1669	1236	2905	3%	6.645	3.847	10.492	9%		5.319	7.617	12.936	16%			3.0584	2.3023	75.28%	
				Commercial/Industrial-LT	4161	5	4166	5%	11.02	0.017	11.037	9%		10.378	0.682	11.06	14%			8.2537	8.0937	98.06%	
				Commercial/Industrial-HT	1	0	1	0%	0.5	0	0.5	0%		0.875	0	0.875	1%			0.6516	0.7035	107.97%	
				Others	828	158	986	1%	3.116	0.291	3.407	3%		4.044	0.842	4.886	6%			3.851	1.678	43.57%	
	Sub-total				**79190**	**6166**	**85356**	**100%**	**113.139**	**9.02**	**122.159**	**100%**	**139.527**	**58.027**	**22.757**	**80.784**	**100%**	**58.743**	**42%**	**38.9779**	**30.3794**	**77.94%**	**55%**
3	Balasore	1	ED Jaleswa	Residential	99777	10269	110046	90%	92.765	7.144	99.909	61%	237.002	54.42	18.395	72.815	40%	53.533	23%	31.622	25.4444	80.46%	
				Agricultural	2530	1481	4011	3%	11.011	6.934	17.945	11%		4.897	14.665	19.562	11%			4.5048	4.0646	90.23%	
				Commercial/Industrial-LT	6240	30	6270	5%	16.016	0.05	16.066	10%		16.618	1.297	17.915	10%			13.6427	11.0838	81.24%	
				Commercial/Industrial-HT	5	0	5	0%	0.825	0	0.825	1%		0.81	0	0.81	0%			0.7681	0.9517	123.90%	
				Others	1070	359	1429	1%	27.902	0.404	28.306	17%		69.499	2.868	72.367	39%			45.3556	43.1975	95.24%	
	Sub-total				**109622**	**12139**	**121761**	**100%**	**148.519**	**14.532**	**163.051**	**100%**	**237.002**	**146.244**	**37.225**	**183.469**	**100%**	**53.533**	**23%**	**95.8932**	**84.742**	**88.37%**	**32%**
4	Balasore	1	ED Balasor	Residential	105254	3839	109093	92%	108.509	3.393	111.902	60%	299.004	66.543	16.669	83.212	41%	93.78	31%	36.8806	29.786	80.76%	
				Agricultural	2093	191	2284	2%	7.976	0.885	8.861	5%		8.495	1.663	10.158	5%			2.201	0.4867	22.11%	
				Commercial/Industrial-LT	6296	28	6324	5%	24.522	0.031	24.553	13%		23.37	1.28	24.65	12%			19.2088	18.43	95.95%	
				Commercial/Industrial-HT	52	0	52	0%	25.409	0	25.409	14%		64.789	0	64.789	32%			50.7248	61.9621	122.15%	
				Others	1334	139	1473	1%	15.529	0.135	15.664	8%		21.439	0.976	22.415	11%			10.2389	8.5967	83.96%	
	Sub-total				**115029**	**4197**	**119226**	**100%**	**181.945**	**4.444**	**186.389**	**100%**	**299.004**	**184.636**	**20.588**	**205.224**	**100%**	**93.78**	**31%**	**119.2541**	**119.2615**	**100.01%**	**31%**
5	Balasore	1	SED SORO	Residential	137370	4269	141639	93%	140.449	4.208	144.657	75%	210.638	88.37	14.207	102.577	60%	41.051	19%	43.6188	37.067	84.98%	
				Agricultural	1773	85	1858	1%	7.006	0.564	7.57	4%		6.902	1.539	8.441	5%			1.7331	0.257	14.83%	
				Commercial/Industrial-LT	7182	31	7213	5%	21.312	0.056	21.368	11%		22.723	1.328	24.051	14%			18.3208	16.4223	89.64%	
				Commercial/Industrial-HT	37	0	37	0%	8.953	0	8.953	5%		9.558	0	9.558	6%			9.0336	7.9193	87.66%	
				Others	2104	167	2271	1%	10.832	0.235	11.067	6%		23.31	1.65	24.96	15%			12.4651	9.993	80.17%	
	Sub-total				**148466**	**4552**	**153018**	**100%**	**188.552**	**5.063**	**193.615**	**100%**	**210.638**	**150.863**	**18.724**	**169.587**	**100%**	**41.051**	**19%**	**85.1714**	**71.6586**	**84.13%**	**32%**
6	Bhadrak	2	NED Bhadra	Residential	171770	4076	175846	93%	185.13	3.482	188.612	63%	477.349	139.723	20.584	160.307	45%	119.727	25%	71.6041	56.2414	78.54%	
				Agricultural	781	15	796	0%	3.607	0.111	3.718	1%		2.982	0.697	3.679	1%			0.7108	0.1047	14.73%	
				Commercial/Industrial-LT	11684	63	11747	6%	37.674	0.047	37.721	13%		39.15	1.772	40.922	11%			31.3326	30.0352	95.86%	
				Commercial/Industrial-HT	52	0	52	0%	41.099	0	41.099	14%		80.33	0	80.33	22%			58.1064	56.6276	97.46%	
				Others	1564	45	1609	1%	26.598	0.122	26.72	9%		70.476	1.908	72.384	20%			47.6496	46.2691	97.10%	
	Sub-total				**185851**	**4199**	**190050**	**100%**	**294.108**	**3.762**	**297.87**	**100%**	**477.349**	**332.661**	**24.961**	**357.622**	**100%**	**119.727**	**25%**	**209.4035**	**189.278**	**90.39%**	**32%**
7	Bhadrak	2	SED Bhadra	Residential	106099	4030	110129	94%	101.328	3.897	105.225	77%	168.6	70.195	14.018	84.213	77%	58.894	35%	36.987	34.9307	94.44%	
				Agricultural	967	48	1015	1%	4.878	0.256	5.134	4%		4.224	1.019	5.243	5%			1.135	0.1495	13.17%	
				Commercial/Industrial-LT	4279	47	4326	4%	13.774	0.064	13.838	10%		13.306	0.684	13.99	13%			10.6961	10.4375	97.58%	
				Commercial/Industrial-HT	10	0	10	0%	6.783	0	6.783	5%		2.408	0	2.408	2%			2.2747	2.0547	90.33%	
				Others	1173	71	1244	1%	4.826	0.13	4.956	4%		3.404	0.448	3.852	4%			3.2329	1.9643	60.76%	
	Sub-total				**112528**	**4196**	**116724**	**100%**	**131.589**	**4.347**	**135.936**	**100%**	**168.6**	**93.537**	**16.169**	**109.706**	**100%**	**58.894**	**35%**	**54.3257**	**49.5367**	**91.18%**	**41%**
8	Baripada	3	BPED	Residential	217721	4145	221866	93%	209.66	3.283	212.943	75%	330.291	150.787	20.418	171.205	66%	72.386	22%	75.666	58.7441	77.64%	
				Agricultural	2986	52	3038	1%	10.136	0.26	10.396	4%		9.911	2.295	12.206	5%			2.4133	0.8143	33.74%	
				Commercial/Industrial-LT	11543	6	11549	5%	40.839	0.032	40.871	14%		39.528	1.402	40.93	16%			31.5427	29.5135	93.57%	
				Commercial/Industrial-HT	36	0	36	0%	8.96	0	8.96	3%		15.436	0	15.436	6%			12.6712	13.5127	106.64%	
				Others	2461	15	2476	1%	11.855	0.015	11.87	4%		16.14	1.988	18.128	7%			12.7418	11.6517	91.44%	
	Sub-total				**234747**	**4218**	**238965**	**100%**	**281.45**	**3.59**	**285.04**	**100%**	**330.291**	**231.802**	**26.103**	**257.905**	**100%**	**72.386**	**22%**	**135.035**	**114.2363**	**84.60%**	**34%**
9	Baripada	3	UED	Residential	99636	5707	105343	95%	72.225	3.513	75.738	79%	100.17	58.144	14.689	72.833	78%	7.352	7%	32.6769	20.1773	61.75%	
				Agricultural	1136	37	1173	1%	4.008	0.266	4.274	4%		2.909	0.744	3.653	4%			0.7677	0.2508	32.67%	
				Commercial/Industrial-LT	3524	2	3526	3%	11.892	0.004	11.896	12%		11.571	0.522	12.093	13%			8.9233	8.5929	96.30%	
				Commercial/Industrial-HT	3	0	3	0%	0.441	0	0.441	0%		0.172	0	0.172	0%			0.1918	0.1857	96.82%	
				Others	1212	9	1221	1%	2.957	0.013	2.97	3%		3.548	0.519	4.067	4%			3.3421	2.5986	77.75%	
	Sub-total				**105511**	**5755**	**111266**	**100%**	**91.523**	**3.796**	**95.319**	**100%**	**100.17**	**76.344**	**16.474**	**92.818**	**100%**	**7.352**	**7%**	**45.9018**	**31.8053**	**69.29%**	**36%**
10	Baripada	3	RED	Residential	195987	1419	197406	94%	151.129	0.958	152.087	75%	237.551	116.117	16.412	132.529	69%	45.828	19%	58.587	36.8173	62.84%	
				Agricultural	2828	54	2882	1%	12.253	0.541	12.794	6%		9.742	1.292	11.034	6%			2.1366	0.2792	13.07%	
				Commercial/Industrial-LT	6694	8	6702	3%	22.793	0.022	22.815	11%		22.547	1.599	24.146	13%			18.1705	16.684	91.82%	
				Commercial/Industrial-HT	19	0	19	0%	5.077	0	5.077	3%		9.917	0	9.917	5%			7.257	7.9525	109.58%	
				Others	2412	18	2430	1%	8.743	0.046	8.789	4%		11.63	2.467	14.097	7%			10.7272	7.7643	72.38%	
	Sub-total				**207940**	**1499**	**209439**	**100%**	**199.995**	**1.567**	**201.562**	**100%**	**237.551**	**169.953**	**21.77**	**191.723**	**100%**	**45.828**	**19%**	**96.8783**	**69.4973**	**71.74%**	**42%**
11	Jajpur	4	JRED	Residential	85703	8917	94620	92%	103.494	5.744	109.238	23%	1288.052	84.093	27.815	111.908	9%	95.942	7%	53.1529	48.8498	91.90%	
				Agricultural	1468	102	1570	2%	6.477	0.433	6.91	1%		7.503	1.472	8.975	1%			1.6594	0.1523	9.18%	
				Commercial/Industrial-LT	5595	47	5642	5%	28.553	0.066	28.619	6%		30.012	1.669	31.681	3%			25.1085	24.9348	99.31%	
				Commercial/Industrial-HT	57	0	57	0%	287.092	0	287.092	61%		919.973	0	919.973	77%			598.1067	611.0231	102.16%	
				Others	715	17	732	1%	36.325	0.019	36.344	8%		118.026	1.547	119.573	10%			82.785	79.7485	96.33%	
	Sub-total				**93538**	**9083**	**102621**	**100%**	**461.941**	**6.262**	**468.203**	**100%**	**1288.052**	**1159.607**	**32.503**	**1192.11**	**100%**	**95.942**	**7%**	**760.8125**	**764.7085**	**100.51%**	**7%**
12	Jajpur	4	JTED	Residential	94641	3224	97865	94%	85.546	3.63	89.176	82%	197.539	70.319	15.526	85.845	78%	87.993	45%	38.5698	37.7586	97.90%	
				Agricultural	865	96	961	1%	3.357	0.439	3.796	4%		2.737	2.215	4.952	5%			1.0542	0.1852	17.57%	
				Commercial/Industrial-LT	3986	47	4033	4%	12.748	0.065	12.813	12%		13.923	1.136	15.059	14%			10.9477	10.9653	100.16%	
				Commercial/Industrial-HT	1	0	1	0%	0.2	0	0.2	0%		0.329	0	0.329	0%			0.1078	0.2562	237.66%	
				Others	602	110	712	1%	2.057	0.316	2.373	2%		2.754	0.607	3.361	3%			3.1087	2.8447	91.51%	
	Sub-total				**100095**	**3477**	**103572**	**100%**	**103.908**	**4.45**	**108.358**	**100%**	**197.539**	**90.062**	**19.484**	**109.546**	**100%**	**87.993**	**45%**	**53.7882**	**52.01**	**96.69%**	**46%**
13	Jajpur	4	KUED	Residential	105373	7579	112952	94%	86.988	6.673	93.661	64%	289.027	67.169	21.752	88.921	52%	119.345	41%	39.2289	36.9812	94.27%	
				Agricultural	1345	36	1381	1%	11.651	0.274	11.925	8%		5.029	3.17	8.199	5%			1.8293	0.392	21.43%	
				Commercial/Industrial-LT	4928	73	5001	4%	20.925	0.158	21.083	14%		20.324	1.842	22.166	13%			17.6078	17.3427	98.49%	
				Commercial/Industrial-HT	34	0	34	0%	17.794	0	17.794	12%		47.685	0	47.685	28%			31.8634	33.9519	106.55%	
				Others	600	80	680	1%	2.632	0.188	2.82	2%		2.108	0.603	2.711	2%			2.5749	1.7342	67.35%	
	Sub-total				**112280**	**7768**	**120048**	**100%**	**139.99**	**7.293**	**147.283**	**100%**	**289.027**	**142.315**	**27.367**	**169.682**	**100%**	**119.345**	**41%**	**93.1043**	**90.402**	**97.10%**	**43%**
14	Keonjhar	5	KED	Residential	112677	2406	115083	94%	89.117	1.332	90.449	54%	268.023	70.38	7.976	78.356	30%	5.556	2%	36.4004	30.6125	84.10%	
				Agricultural	1051	17	1068	1%	4.575	0.114	4.689	3%		3.624	1.749	5.373	2%			1.0693	0.252	23.57%	
				Commercial/Industrial-LT	5517	7	5524	4%	21.406	0.02	21.426	13%		21.606	0.919	22.525	9%			17.311	17.0542	98.52%	
				Commercial/Industrial-HT	33	0	33	0%	24.779	0	24.779	15%		94.217	0	94.217	36%			62.4186	66.6232	106.74%	
				Others	1323	18	1341	1%	27.264	0.055	27.319	16%		60.992	1.004	61.996	24%			44.1086	43.1993	97.94%	
	Sub-total				**120601**	**2448**	**123049**	**100%**	**167.141**	**1.521**	**168.662**	**100%**	**268.023**	**250.819**	**11.648**	**262.467**	**100%**	**5.556**	**2%**	**161.3079**	**157.7412**	**97.79%**	**4%**
15	Keonjhar	5	JOED	Residential	79946	3483	83429	92%	80.609	1.943	82.552	28%	609.893	72.563	11	83.563	14%	22.251	4%	38.8813	36.1457	92.96%	
				Agricultural	800	18	818	1%	3.7	0.166	3.866	1%		2.769	0.691	3.46	1%			0.6952	0.257	36.97%	
				Commercial/Industrial-LT	5580	6	5586	6%	23.175	0.006	23.181	8%		25.85	1.011	26.861	5%			20.7843	19.8322	95.42%	
				Commercial/Industrial-HT	63	0	63	0%	140.935	0	140.935	48%		378.749	0	378.749	64%			256.8158	256.4105	99.84%	
				Others	1111	7	1118	1%	42.01	0.009	42.019	14%		93.649	1.36	95.009	16%			68.9435	67.8638	98.43%	
	Sub-total				**87500**	**3514**	**91014**	**100%**	**290.429**	**2.124**	**292.553**	**100%**	**609.893**	**573.58**	**14.062**	**587.642**	**100%**	**22.251**	**4%**	**386.1201**	**380.5092**	**98.55%**	**5%**
16	Keonjhar	5	AED	Residential	129650	3213	132863	95%	98.89	2.432	101.322	78%	179.543	70.323	14.282	84.605	71%	60.241	34%	37.1174	28.9477	77.99%	
				Agricultural	624	4	628	0%	2.342	0.038	2.38	2%		1.9	0.629	2.529	2%			0.4709	0.133	28.24%	
				Commercial/Industrial-LT	4660	27	4687	3%	15.558	0.05	15.608	12%		16.121	1.086	17.207	14%			13.2601	12.546	94.61%	
				Commercial/Industrial-HT	17	0	17	0%	4.503	0	4.503	3%		5.73	0	5.73	5%			4.8825	5.8959	120.76%	
				Others	1634	97	1731	1%	6.273	0.065	6.338	5%		8.488	0.743	9.231	8%			7.2812	5.0434	69.27%	
	Sub-total				**136585**	**3341**	**139926**	**100%**	**127.566**	**2.585**	**130.151**	**100%**	**179.543**	**102.562**	**16.74**	**119.302**	**100%**	**60.241**	**34%**	**63.0121**	**52.566**	**83.42%**	**45%**

M/s. Power Tech Consultants

(Bishu Charan Swain)

Authorised Signatory

POWER TECH CONSULTANTS

76	Total		Residential	1863780	73095	1936875	93%	1804.699	88.251	1892.949	58%	5127.043	1301.776	254.316	1556.092	36%	980.045	18%	599.9247	577.3283	42.07%	
			Agricultural	22981	2472	25453	1%	89.836	25.128	114.968	4%		79.145	41.129	120.274	3%			25.5117	10.1515	39.79%	
			Commercial/Industrial-LT	102813	431	103244	5%	355.344	0.733	356.077	11%		261.018	20.502	281.341	7%			282.3045	255.5009	94.59%	
			Commercial/Industrial-HT	409	0	409	0%	535.014	0	535.014	17%		1563.033	0	1563.033	36%			1135.3498	1155.3122	102.57%	
			Others	20717	1325	22042	1%	257.041	2.065	259.105	8%		583.431	22.221	605.652	14%			407.7104	385.062	94.58%	
77	At company level			2010760	78323	2089083	100%	3111.933	76.182	3188.115	100%	5127.043	4009.428	338.57	4346.998	100%	980.045	18%	2580.1412	2411.6599	94.20%	25%

** Note - It shall be mandatory to record the energy supplied **separately** for each category of consumers which is being provided **a separate** rate of subsidy in the tariff, by the state government, **so that the** subsidy due for the electricity distribution company is quarterly calculated by multiplying the energy supplied to each of such category of **consumers by the applicable rate of subsidy notified by the state government.**

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I/We undertake that the information supplied in this Document and Pro-forma is accurate to **the best of my knowledge and if any of the information supplied is found to be incorrect and such information result into loss to the Central Government or State Government or any of the authority under them or any other person affected, I/we undertake to indemnify such loss.**

Authorised Signatory and Seal

Name of Authorised Signatory:

Signature:
Name of Energy Manager:
Registration Number:

M/s. Power Tech Consultants
(Bishu Charan Swain)
Authorised Signatory

POWER TECH CONSULTANTS

Manish Kapoor

Dushyant Tyagi
Chief Commercial Services & CSR
TPNODL

Form-Input energy(Details of Input energy & Infrastructure)

A. Summary of energy input & Infrastructure

S.No	Parameters	Period From April21 to Mar'22	Remarks (Source of data)
A.1	Input Energy purchased (MU)	5327.04	BST Bill OPTCL
A.2	Transmission loss (%)	0%	
A.3	Transmission loss (MU)	0	
A.4	Energy sold outside the periphery(MU)	0	
A.5	Open access sale (MU)		
A.6	EHT sale	0	
A.7	Net input energy (received at DISCOM periphery or at distribution point)-(MU)	5327.05	BST Bill OPTCL
A.8	Is 100% metering available at 66/33 kV (Select yes or no from list)	Yes	
A.9	Is 100% metering available at 11 kV (Select yes or no from list)	No	
A.10	% of metering available at DT	3%	TPNODL Data Base
A.11	% of metering available at consumer end	83%	TPNODL Data Base
A.12	No of feeders at 66kV voltage level	0	TPNODL Data Base
A.13	No of feeders at 33kV voltage level	98	TPNODL Data Base
A.14	No of feeders at 11kV voltage level	797	TPNODL Data Base
A.15	No of LT feeders level	45894	TPNODL Data Base
A.16	Line length (ckt. km) at 66kV voltage level	0	TPNODL Data Base
A.17	Line length (ckt. km) at 33kV voltage level	2895	TPNODL Data Base
A.18	Line length (ckt. km) at 11kV voltage level	37591	TPNODL Data Base
A.19	Line length (km) at LT level	66672	TPNODL Data Base
A.20	Length of Aerial Bunched Cables	43774	TPNODL Data Base
A.21	Length of Underground Cables	401	TPNODL Data Base
A.22	HT/LT ratio	0.607241421	TPNODL Data Base

B. Meter reading of Input energy at injection points

S.No	Zone	Circle	Voltge Level (KVA)	Division (KVA)	Sub-Division (KVA)	Feeder ID	Feeder Name	Feeder Metering Status (Metered/ unmetered/ AMI/AMR)	Status of Meter (Functional/Non-functional)	Metering Date: Date of last actual meter reading/ communication	Feeder Type (Agri/ Industrial/Mixed)	Status of Communication: % data received through automatically if feeder AMR/AMI	Status of Communication: Number of hours when meter was unable to communicate in period	Status of Communication: Total Number of hours in the period	Period from...to...: Meter S.No	Period from...to...: CT/PT ratio	Period from...to...: Import (MU)	Period from...to...: Export (MU)	Sales	Remarks (Source of data)
B.1	TPNODL	Bhadark	33 kV	BSED			FACOR Ltd								APM02348/APM12563	1000	17.168			OPTCL BST
B.2	TPNODL	KEONJHAR	33 kV	AED			Bhadrak Railway Traction								APM02422/APM03539	1000	59.234			OPTCL BST Bill
B.3	TPNODL	KEONJHAR	33 kV	AED			FACOR Power 132kV								OPT00719	1000	0.400			OPTCL BST Bill
B.4	TPNODL	KEONJHAR	33 kV	AED			Dhamra Port Feeder1 132kV								OPT00017/00018	1000	55.575			OPTCL BST Bill
B.5	TPNODL	KEONJHAR	132 kV	JOED			Dhamra Port Fdr2 132kV (Tr.)								OPT00019/00020	1000	30.688			OPTCL BST Bill
B.6	TPNODL	KEONJHAR	132 kV	JOED			Traction Feeder 132kV								OPT01264/OPT01089	1000	57.502			OPTCL BST Bill
B.7	TPNODL	KEONJHAR	132 kV	JOED			BIRLA Tyre Feeder 132kV								APM02335/OPT00127 /OPT01135	1000	2.690			OPTCL BST Bill
B.8	TPNODL	Balasore	132 kV	BED			ISPAT Feeder 132kV								APM02387/OPT00130 /OPT01202	1000	0.000			OPTCL BST Bill
B.9	TPNODL	Balasore	132 kV	BED			IMAMI Feeder 132kV								OPT00146	1000	15.625			OPTCL BST Bill
B.10	TPNODL	Balasore	132 kV	BED			Stork Feeder 132kV								OPT00040/OPT00108	1000	1.142			OPTCL BST Bill
B.11	TPNODL	Balasore	33 kV	BED			Traction Feeder 132kV								APM03820/OPT01036 /OPT01030	1000	53.160			OPTCL BST Bill
B.12	TPNODL	Balasore	33 kV	BED			Bamnipal(New) Feeder 132kV								STA04527/OPT01136/ OPT00887	1000	88.718			OPTCL BST Bill
B.13	TPNODL	Balasore	33 kV	BED			TOMKA Traction Feeder 132kV								OPT00765/OPT00806	1000	25.610			OPTCL BST Bill
B.14	TPNODL	BARIPADA	33 kV	BED			NINL Feeder 220kV								STA04524	1000	3.653			OPTCL BST Bill
B.15	TPNODL	BARIPADA	33 kV	BED			MESCO(lilo)								APM03702/ORBR3222	1000	0.000			OPTCL BST Bill
B.16	TPNODL	KEONJHAR	33 kV	JOED			Mishrilal Feeder 132kV								APM12569/APM02322	1000	50.471			OPTCL BST Bill
B.17	TPNODL	KEONJHAR	33 kV	JOED			JFAL Feeder 132kV								APM02277/APM12565	1000	0.000			OPTCL BST Bill
B.18	TPNODL	BARIPADA	33 kV	BED			BRPL Feeder 132kV								APMB2336	1000	116.314			OPTCL BST Bill
B.19	TPNODL	BARIPADA	33 kV	BED			BC Mohanty fdr 132kV (8MVA 132/11KV Trf)								OPT01748	1000	75.848			OPTCL BST Bill
B.20	TPNODL	BARIPADA	33 kV	BED			Jakhapura Traction Fdr 132kV								APM03827/OPT01031	1000	85.856			OPTCL BST Bill
B.21	TPNODL	BARIPADA	33 kV	BED			Jindal Feeder1 220kV								APM02356/APM2401/ OPT01615	1000	111.228			OPTCL BST Bill
B.22	TPNODL	Balasore	33 kV	BTED			Jindal Feeder2 220kV								APM02243/APM02320 /OPT01613	1000	117.619			OPTCL BST Bill
B.23	TPNODL	Balasore	33 kV	BTED			Rohit Ferrotech 220kV								APM02705/APM02400 /OPT01617	1000	229.636			OPTCL BST Bill
B.24	TPNODL	Balasore	33 kV	BTED			Maithan Feeder 220kV								B0004474/B0004475	1000	2.183			OPTCL BST Bill
B.25	TPNODL	JAJPUR	132 kV	JRED			TATA Steel Feeder1 400kV								OPT00944/OPT001228 /OPT00205	1000	320.999			OPTCL BST Bill
B.26	TPNODL	JAJPUR	132 kV	JRED			TATA Steel Feeder2 400kV								OPT00944	1000	323.745			OPTCL BST Bill
B.27	TPNODL	JAJPUR	132 kV	JRED			VISA Steel 220kV								APM02725/OPT01619	1000	65.654			OPTCL BST Bill
B.28	TPNODL	BARIPADA	33 kV	BED			Emami Feeder 220kV								XE575991	1000	41.543			OPTCL BST Bill
B.29	TPNODL	BARIPADA	33 kV	BED			RAMCO Feeder 132kV								ORU47773	1000	31.568			OPTCL BST Bill
B.30	TPNODL	Bhadark	132 kV	BNED			Traction Feeder 132kV								APM12622/APM12623	1000	53.692			OPTCL BST Bill
B.31	TPNODL	Bhadark	132 kV	BNED			MSP Feeder 132kV								OPT01268	1000	77.446			OPTCL BST Bill
B.32	TPNODL	Bhadark	132 kV	BNED			ESIL Feeder 132kV								ORBR4982	1000	113.177			OPTCL BST Bill
B.33	TPNODL	Bhadark	132 kV	BNED			Traction Feeder 132kV								APM02510/APM02658 /OPT01840	1000	27.225			OPTCL BST Bill
B.34	TPNODL	Bhadark	132 kV	BNED			FAP Feeder 132kV								APM03672/OPT00112	1000	132.441			OPTCL BST Bill
B.35	TPNODL	Bhadark	33 kV	BSED/BNED			ARYA Steel 132kV								APM02298/APM02290 /OPT01845	1000	54.099			OPTCL BST Bill
B.36	TPNODL	Bhadark	33 kV	BSED/BNED			BRPL Feeder								OPT00851/OPT00855	1000	70.215			OPTCL BST Bill
B.37	TPNODL	Bhadark	33 kV	BNED/BSED			Jaganath Steel Feeder 132kV								APM02233	1000	5.003			OPTCL BST Bill
B.38	TPNODL	Balasore	33 kV	JED			Trf1-10MVA 132/11kV								APM02345/APM03830 /OPT01841	1000	2.806			OPTCL BST Bill
B.39	TPNODL	Balasore	33 kV	JED			Trf2-10MVA 132/11kV								APM02702/APM03838 /OPT01843	1000	18.234			OPTCL BST Bill
B.40	TPNODL	KEONJHAR	132 kV	JOED			JSPL Trf1-50MVA 220/33kV								OPT00013/14	1000	203.105			OPTCL BST Bill
B.41	TPNODL	KEONJHAR	132 kV	JOED			JSPL Trf2-50MVA 220/33kV								OPT00015/16	1000	215.328			OPTCL BST Bill
B.42	TPNODL	JAJPUR	132 kV	JRED			JSPL Trf3-20MVA 220/33kV								OPT00376/OPT00807	1000	19.423			OPTCL BST Bill
B.43	TPNODL	Bhadark	33 kV	BNED			TATA Steel Long Products ltd 220kV								APM02440/OPT00120 /OPT01400	1000	0.017			OPTCL BST Bill
B.44	TPNODL	Bhadark	33 kV	BNED			IMTCPL Feeder								OPT00672	1000	2.276			OPTCL BST Bill
B.45	TPNODL	JAJPUR	33 kV	KUED			Bansapani Tr. Feeder 132kV								OPT00103/00125	1000	56.171			Export to TPCODL
B.46	TPNODL	JAJPUR	33 kV	KUED			Joda East Iron Mines(Tata)								OPT01142	1000	52.688			OPTCL BST Bill
B.47	TPNODL	JAJPUR	33 kV	KUED			Trf1-63MVA 132/33kV								APM03504/OPT00129	1000	157.648			OPTCL BST Bill
B.48	TPNODL	JAJPUR	33 kV	KUED			Trf2-12.5MVA 132/33kV								APM02262/OPT00128 /OPT00973	1000	157.833			OPTCL BST Bill
B.49	TPNODL	KEONJHAR	33 kV	AED			Trf3-63MVA 132/33kV								APM03732/02424/OP T01011	1000	152.101			OPTCL BST Bill
B.50	TPNODL	JAJPUR	132 kV	JRED			Trf1-12.5 MVA 132/33kV								OPT000756/OPT00749	1000	16.891			OPTCL BST Bill
B.51	TPNODL	JAJPUR	132 kV	JRED			Trf2-12.5 MVA 132/33kV								OPT01704	1000	16.903			OPTCL BST Bill
B.52	TPNODL	JAJPUR	132 kV	JRED			Trf1-40MVA 132/33kV								OPT01392	1000	37.248			OPTCL BST Bill
B.53	TPNODL	JAJPUR	220 kV	JRED			Trf2-40MVA 132/33kV								OPT01378	1000	37.071			OPTCL BST Bill
B.54	TPNODL	JAJPUR	33 kV	JRED			Trf1-31.5MVA 132/33kV								APM02232/02228/OP T01862	1000	50.519			OPTCL BST Bill
B.55	TPNODL	JAJPUR	33 kV	JRED			Trf2-31.5MVA 132/33kV								APM02263/02265/OP T01864	1000	51.401			OPTCL BST Bill
B.56	TPNODL	JAJPUR	220 kV	JRED			Trf3-12.5MVA 132/33kV								APM02281/02297/OP T01866	1000	26.043			OPTCL BST Bill
B.57	TPNODL	JAJPUR	220 kV	JRED			Trf1-20MVA 132/33kV								OPT00024/26	1000	49.483			OPTCL BST Bill
B.58	TPNODL	JAJPUR	220 kV	JRED			Trf2-12.5MVA 132/33kV								OPT00027/28/OPT001 11	1000	31.311			OPTCL BST Bill
B.59	TPNODL	JAJPUR	220 kV	JRED			Trf3-20MVA 132/33kV								OPT01953	1000	49.784			OPTCL BST Bill
B.60	TPNODL	JAJPUR	220 kV	JRED			Trf1-40MVA 132/33kV								APM02696/03859/OP T01860	1000	105.010			OPTCL BST Bill
B.61	TPNODL	JAJPUR	400 kV	JRED			Trf2-20MVA 132/33kV								APM02704/03770/OP T01861	1000	70.676			OPTCL BST Bill
B.62	TPNODL	JAJPUR	400 kV	JRED			Trf3-40MVA 132/33kV								APM12576/12577	1000	102.880			OPTCL BST Bill
B.63	TPNODL	JAJPUR	33 kV	JRED			Trf1-63MVA 132/33kV								STA04529/APM02407	1000	123.953			OPTCL BST Bill
B.64	TPNODL	JAJPUR	220 kV	JRED			Trf2-63MVA 132/33kV								APM02279/APM03682 /OPT01643	1000	124.086			OPTCL BST Bill
B.65	TPNODL	JAJPUR	132 kV	JRED			Trf3-63MVA 132/33kV								OPT00021/00023/008 24	1000	121.416			OPTCL BST Bill
B.66	TPNODL	KEONJHAR	132 kV	JOED			Trf1-40MVA 132/33kV								OPT01518	1000	32.218			OPTCL BST Bill
B.67	TPNODL	JAJPUR	33 kV	JRED			Trf2-20MVA 132/33kV								OPT01447	1000	19.444			OPTCL BST Bill
B.68	TPNODL	JAJPUR	33 kV	JRED			Trf1-40MVA 132/33kV								APM02315/03850/OP T01713	1000	53.779			OPTCL BST Bill
B.69	TPNODL	JAJPUR	33 kV	JRED			Trf2-40MVA 132/33kV								APM03582/03852	1000	54.061			OPTCL BST Bill
B.70	TPNODL	JAJPUR	33 kV	JRED			Trf3-40MVA 132/33kV								APM12604/12605	1000	56.778			OPTCL BST Bill
B.71	TPNODL	JAJPUR	33 kV	JTED			Trf1-20MVA 132/33kV								APM03532/03829	1000	52.510			OPTCL BST Bill
B.72	TPNODL	JAJPUR	33 kV	JTED			Trf2-12.5MVA 132/33kV								APM03510/03854	1000	31.070			OPTCL BST Bill
B.73	TPNODL	JAJPUR	33 kV	JTED			Trf3-20MVA 132/33kV								APM02523/APM02656	1000	51.229			OPTCL BST Bill
B.74	TPNODL	Balasore	132 kV	JED			Trf1-12.5MVA 132/33kV								OPT00950	1000	39.803			OPTCL BST Bill
B.75	TPNODL	Balasore	33 kV	JED			Trf2-12.5MVA 132/33kV								OPT01293	1000	38.323			OPTCL BST Bill
B.76	TPNODL	Balasore	33 kV	JED			Trf1-12.5MVA 132/33kV								APM03741/03661	1000	31.719			OPTCL BST Bill
B.77	TPNODL	Balasore	33 kV	JED			Trf2-12.5MVA 132/33kV								APM03658/APM03538	1000	31.461			OPTCL BST Bill
B.78	TPNODL	KEONJHAR	132 kV	JOED			Trf3-20 MVA 132/33kV								APM02331/APM02365	1000	50.748			OPTCL BST Bill
B.79	TPNODL	KEONJHAR	132 kV	JOED			Trf1-40MVA 132/33kV								OPT01610	1000	43.498			OPTCL BST Bill
B.80	TPNODL	KEONJHAR	33 kV	JOED			Trf2-40MVA 132/33kV								OPT01612	1000	40.089			Export to Wesco
B.81	TPNODL	KEONJHAR	220 kV	JOED			Trf1-40MVA 132/33kV								APM02344/03836/OP T01829	1000	96.284			OPTCL BST Bill
B.82	TPNODL	KEONJHAR	220 kV	JOED			Trf2-40MVA 132/33kV								APM02695/03866/OP T01869	1000	97.025			OPTCL BST Bill
B.83	TPNODL	KEONJHAR	220 kV	JOED			Trf3-40MVA 132/33kV								STA04528/03867/OPT 01881	1000	98.102			OPTCL BST Bill
B.84	TPNODL	KEONJHAR	220 kV	JOED			Trf1-40MVA 132/33kV								APM02419/03842/OP T01763	1000	102.231			OPTCL BST Bill
B.85	TPNODL	Keonjhar	220 kV	JOED			Trf2-20MVA 132/33kV								APM03860/APM02268 /OPT01764	1000	65.037			OPTCL BST Bill
B.86	TPNODL	KEONJHAR	33 kV	JOED			Trf3-40MVA 132/33kV								APM12632/12633	1000	103.380			OPTCL BST Bill
B.87	TPNODL	KEONJHAR	33 kV	JOED			Trf1-20MVA 132/33kV								APM02698/APM2376/ OPT01857	1000	70.253			OPTCL BST Bill
B.88	TPNODL	KEONJHAR	33 kV	JOED			ChandikholeTrf - 2								APM03514/APM3674	1000	70.498			OPTCL BST Bill
B.89	TPNODL	Keonjhar	33 kV	JOED			Chandikhole Trf - 3								APM03702/APM3703	1000	69.606			OPTCL BST Bill
B.90	TPNODL	KEONJHAR	220 kV	JOED			Trf1-40MVA 220/33kV								APM02708/03845	1000	66.862			OPTCL BST Bill
B.91	TPNODL	JAJPUR	132 kV	JRED			Trf2-40MVA 220/33kV								OPT00976	1000	66.046			OPTCL BST Bill
B.92	TPNODL	JAJPUR	132 kV	JOED			TRF-20 MVA 220/33kV								OPT00620	15000	1.037			OPTCL BST Bill
B.93	TPNODL	Keonjhar	132 kV	KED			Trf2-20MVA 132/33kV								APM03540/OPT00113	1000	39.306			OPTCL BST Bill
B.94	TPNODL	BARIPADA	33 kV	RED			Trf5-20MVA 132/33kV								APM12582/OPT00114 /OPT00788	1000	33.200			OPTCL BST Bill
B.95	TPNODL	BARIPADA	33 kV	RED			Trf6-40MVA 132/33kV								OPT00115/OPT00693	1000	52.377			OPTCL BST Bill
B.96	TPNODL	BARIPADA	33 kV	RED			Trf4-20MVA 132/33kV								APM03784/OPT00155 /OPT00699	1000	38.397			OPTCL BST Bill
B.97	TPNODL	KEONJHAR	33 kV	KED			Trf7-15MVA 220/33kV(SMPL)								APM03736/OPT 00154/OPT00704	1000	13.091			OPTCL BST Bill
B.98	TPNODL	KEONJHAR	33 kV	KED			Trf1-12.5MVA 132/33kV								OPT00131/OPT136	1000	32.763			OPTCL BST Bill
B.99	TPNODL	KEONJHAR	33 kV	KED			Trf2-12.5MVA 132/33kV								OPT00132/OPT137	1000	35.156			OPTCL BST Bill
B.100	TPNODL	KEONJHAR	132 kV	JOED			Trf1-20MVA 132/33kV								APM02269/03837/OP T01395	1000	50.865			OPTCL BST Bill
B.101	TPNODL	JAJPUR	132 kV	JRED			Trf2-20MVA 132/33kV								APM02479/03865/OP T01019	1000	47.368			OPTCL BST Bill
B.102	TPNODL	JAJPUR	33 kV	JRED			Trf3-40MVA 132/33kV								APM02332/03849/OP T01059	1000	75.035			OPTCL BST Bill
B.103	TPNODL	KEONJHAR	132 kV	KED			Trf1-12.5MVA 132/33kV								OPT00035/00036/ORB P7487	1000	31.016			OPTCL BST Bill
B.104	TPNODL	KEONJHAR	132 kV	KED			Trf2-12.5MVA 132/33kV								OPT00037/00038	1000	32.320			OPTCL BST Bill
B.105	TPNODL	KEONJHAR	33 kV	JOED			Trf3-20MVA 132/33kV								OPT00864	1000	51.887			OPTCL BST Bill
B.106	TPNODL	KEONJHAR	33 kV	JOED			Trf1-20 MVA 132/33kV								OPT01786	1000	32.201			OPTCL BST Bill
B.107	TPNODL	KEONJHAR	132 kV	KED			Less Badachana feeder								APM03659/APM3660	1000	-82.139			OPTCL BST Bill
B.108	TPNODL	KEONJHAR	33 kV	KED/JOED			33KV TENSA 33KV FEEDER (WESCO)								APM03828/OPT00153 /OPT00668	1000	-52.858			OPTCL BST Bill
B.109	TPNODL	KEONJHAR	33 kV	KED/JOED			Patnaik Steel 33kV								APM02382& APM02229/OPT01389 & OPT01087	1000	0.000			OPTCL BST Bill

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[illegible]	Total (MU)	[illegible]	[illegible]				
[illegible]	Net input energy at DISCOM periphery (MU)	[illegible]					

Color code			Parameter
			Please enter voltage level or leave blank
			Please enter feeder / band name or leave blank
			Enter meter no or leave blank
			Enter CT-PT ratio or leave blank
1			Please enter numeric value or 0
			Please select yes or no from list
			Formula protected

I/We undertake that the information supplied in this Document and Pro-formas is accurate to the best of my knowledge and if any of the information supplied is found to be incorrect and such information result into loss to the Central Government or State Government or any of the authority under them or any other person affected, I/we undertake to indemnify such loss.

Authorised Signature and Seal:

Signature:-
Name of Energy Manager:
Registration Number:

Name of Authorised Signatory:
Name of the DISCOM:
Full Address:

M/s. Power Tech Consultants
(Bibhu Charan Swain)
Authorised Signatory

POWER TECH CONSULTANTS

Dushyant Tyagi
Chief Commercial Services & CSR
TPNODL

Details of Input Energy Sources

Period From....To....

A. Generation at Transmission Periphery (Details)

S.No.	Name of Generation Station	Generation Capacity (In MW)	Type of Station Generation (Based- Solid (Coal ,Lignite)/Liquid/Gas/Renewable (biomass-bagasse)/Others)	Type of Contract (in years/months/days)	Type of Grid (Intra-state/Inter-state)	Point of Connection (POC) Loss MU	Voltage Level (At input)	Remarks (Source of data)
1	SUB-STATION	25 MW	Railway	NA	NA	NA	EHT	Data base
2	POWER LTD.	60 MW	Steel	NA	NA	NA	EHT	Data base
3	ELECTRICAL DIVIS	25 MW	Railway	NA	NA	NA	EHT	Data base
4	M/S EMAMI CEMENT LTD.	11 MW	Cement	NA	NA	NA	EHT	Data base
5	PLANT 2005	23 MW	Ferroy	NA	NA	NA	EHT	Data base
6	M/S TATA STEEL LTD.	16 MW	Steel	NA	NA	NA	EHT	Data base
7	CEMENTS LTD.	750KW	Cement	NA	NA	NA	EHT	Data base
8	LTD.	20 MW	SPONGE IRON	NA	NA	NA	EHT	Data base
9	M/S JSW CEMENT LTD...	12 MW	Cement	NA	NA	NA	EHT	Data base
10	LIMITED	have two CPP but	Steel and Power	NA	NA	NA	EHT	Data base
11	STEELS & PWR LTD	35 MW	steel	NA	NA	NA	EHT	Data base

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(Details of Consumers)						
Summary of Energy						
Period From Apr_2021 To Mar_2022						
S.No	Type of Consumers	Category of Consumers (EHT/HT/LT/Others)	Voltage Level (In Voltage)	No of Consumers	Total Consumption (in MU)	Remarks (Source of data)
1	Domestic	LT/HT		1861176	1512.748	FG Billing Source
2	Commercial	LT/HT		97819	324.483	FG Billing Source
3	IP Sets					
4	Hor. & Nur. & Coffee/Tea & Rubber (Metered)					
5	Hor. & Nur. & Coffee/Tea & Rubber (Flat)					
6	Heating and Motive Power					
7	Water Supply	HT		4184	50.19	FG Billing Source
8	Public Lighting	HT		1311	18.493	FG Billing Source
9	HT Water Supply					
10	HT Industrial	HT		320	372.713	FG Billing Source
11	Industrial (Small)	LT		4341	21.442	FG Billing Source
12	Industrial (Medium)	LT		1084	35.616	FG Billing Source
13	HT Commercial					
14	Applicable to Government Hospitals & Hospitals					
15	Lift Irrigation Schemes/Lift Irrigation Societies	HT		3	0.383	FG Billing Source
16	HT Res. Apartments Applicable to all areas					
17	Mixed Load	HT				FG Billing Source
18	Government offices and department	HT		14657	24.578	FG Billing Source
19	Industrial	EHT		37	1676.025	FG Billing Source
20	Kutir Jyoti	LT		75673	27.398	FG Billing Source
21	Agriculture	LT		26450	120.291	FG Billing Source
22	OTHERS	LT/HT		2028	162.638	FG Billing Source
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
			Total	2089083	4347.00	FG Billing Source

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Dushyant Tyagi

Chief Commercial Services & CSR

TPNODL

(Details of Feeder-wise losses)

Sl No.	Zone	Received at Circle (In MU)	Received at Division (In MU)	Received at Sub-division (In MU)	Name of the Station	Feeder Code/ID	Feeder Name	Type of Feeder (Urban/Mixed/Industrial /Agricultural/Rural)	Type of feeder meter (AMI/AMR/Other)	Received at Feeder (Final in MU)	Feeder Consumption (In MU)	Final Net Export at Feeder Level (In MU)	T&D losses	AT&C losses	% Data Received through Automatically (if feeder AMR/AMI)	Remarks
1	BALASORE				CHANDIPUR	432111201	ITR-1 (DRDO)	URBAN								
2	BALASORE				CHANDIPUR	432111202	PRO EXPERIMENTAL	URBAN								
3	BALASORE				DIGRANIA	432112201	RANASAHI	RURAL								
4	BALASORE				DIGRANIA	432112202	SUNHAT	RURAL								
5	BALASORE				DIGRANIA	432112203	BANIAMANDIR	RURAL								
6	BALASORE				GOPALGAON	432113201	RANIPATANA	URBAN								
7	BALASORE				GOPALGAON	432113202	SUELPUR	URBAN								
8	BALASORE				SWADHIN PADIA (ODSSP)	432114201	BALARAMGADI	RURAL								
9	BALASORE				SWADHIN PADIA (ODSSP)	432114202	GABAGAON	RURAL								
10	BALASORE				SWADHIN PADIA (ODSSP)	432114203	NIDHIPADA	RURAL								
11	BALASORE				SWADHIN PADIA (ODSSP)	432114204	FISHERI	RURAL								
12	BALASORE				KALIMANDIR (IPDS)	432115201	COLLECTRATE FEEDER	URBAN								
13	BALASORE				KALIMANDIR (IPDS)	432115203	PHANDI CHHAKA	URBAN								
14	BALASORE				CITY	432121201	BALASORE-I	URBAN								
15	BALASORE				CITY	432121202	BALASORE-II	URBAN								
16	BALASORE				CITY	432121206	INDUSTRIAL	URBAN								
17	BALASORE				CITY	432121203	CITY SUNHAT	URBAN								
18	BALASORE				CITY	432121204	SATYANAGAR	URBAN								
19	BALASORE				CITY	432121205	ALUPUR	URBAN								
20	BALASORE				GANASWARPUR	432122201	INDUSTRIAL-1	RURAL								
21	BALASORE				GANASWARPUR	432122202	BAMUL	RURAL								
22	BALASORE				GANASWARPUR	432122203	INDUSTRIAL-2	RURAL								
23	BALASORE				GANASWARPUR	432122204	TOWN	RURAL								
24	BALASORE				GANASWARPUR	432122205	SUTAI/JANUGANJ	RURAL								
25	BALASORE				GANASWARPUR	432122206	KURUDA	RURAL								
26	BALASORE				RAMESWAR MANDIR (ODSS	432123201	NUASAHI	URBAN								
27	BALASORE				RAMESWAR MANDIR (ODSS	432123202	BUS STAND	URBAN								
28	BALASORE				SOVARAMPUR	432124201	BALIA	URBAN								
29	BALASORE				SOVARAMPUR	432124202	SAHADEVKHUNTA	URBAN								
30	BALASORE				SOVARAMPUR	NA	SAMALPUR	URBAN								
31	BALASORE				BASTA	432211201	BASTA	URBAN								
32	BALASORE				BASTA	432211202	AMARDA(Kundpur)	RURAL								
33	BALASORE				BASTA	432211203	MATHANI	RURAL								
34	BALASORE				BASTA	432211204	SARTHA	RURAL								
35	BALASORE				BASTA	432211205	HEAD QUARTER	URBAN								
36	BALASORE				KUSUDHIA	432212201	KUSUDIHA	RURAL								
37	BALASORE				KUSUDHIA	432212202	MANUDIHA	RURAL								
38	BALASORE				KUSUDHIA	432212203	RASALPUR	RURAL								
39	BALASORE				RAJGHAT	432213201	CHASIPADA	RURAL								
40	BALASORE				RAJGHAT	432213202	VELLORE	RURAL								
41	BALASORE				BALIAPAL	432222201	BALIAPAL	URBAN								
42	BALASORE				BALIAPAL	432222202	PARULIA	URBAN								
43	BALASORE				BALIAPAL	432222203	KHAPARAPADA	URBAN								
44	BALASORE				BALIAPAL	432222204	PRATAPUR	URBAN								
45	BALASORE				KALIPADA (ODSSP)	432223201	CHOWMUKH	RURAL								
46	BALASORE				KALIPADA (ODSSP)	432223202	PRATAPPUR	RURAL								
47	BALASORE				LANGALESWAR	432224201	FISERY	URBAN								
48	BALASORE				LANGALESWAR	432224202	CHADDA	URBAN								
49	BALASORE				LANGALESWAR	432224203	BANIADIHA	URBAN								
50	BALASORE				LANGALESWAR	432224204	LANGLASWAR OLD	URBAN								
51	BALASORE				LANGALESWAR	432224205	LANGLASWAR NEW	URBAN								
52	BALASORE				SIMILIA (sitadiya) (ODSSP)	432225201	MACHHARANKA	RURAL								
53	BALASORE				SIMILIA (sitadiya) (ODSSP)	432225202	SITADIHA	RURAL								
54	BALASORE				SIMILIA (sitadiya) (ODSSP)	432225203	KHAPARAPADA	RURAL								
55	BALASORE				JAMSULI	432226201	PAUNSKULI	RURAL								
56	BALASORE				JAMSULI	432226202	NAIKUDI -1	RURAL								
57	BALASORE				JAMSULI	432226203	SINGILA	RURAL								
58	BALASORE				JAMSULI	432226204	MUKULLSI	RURAL								
59	BALASORE				BARTANA (ODSSP)	432311201	PAIKASIA	RURAL								
60	BALASORE				BARTANA (ODSSP)	432311202	KHALABADIA	RURAL								
61	BALASORE				SHAYAMNAGARCHAPALA (O	432312201	KHUADA	RURAL								
62	BALASORE				HATIGARH	432313201	RAJNAGAR	URBAN								
63	BALASORE				HATIGARH	432313202	BEHERASAHI	URBAN								
64	BALASORE				HATIGARH	432313203	CHUDAMANIPUR	URBAN								
65	BALASORE				HATIGARH	432313204	MAHULIA -1	URBAN								
66	BALASORE				HATIGARH	432313205	SAGY	URBAN								
67	BALASORE				JALESWAR	432314201	TOWN	URBAN								
68	BALASORE				JALESWAR	432314202	CHALANTI	URBAN								
69	BALASORE				JALESWAR	432314203	SALIKOTHA	URBAN								
70	BALASORE				JALESWAR	432314204	BARAGADIA	URBAN								
71	BALASORE				NAMPO	432315201	DEMURIA	RURAL								
72	BALASORE				NAMPO	432315202	AMBLIATHA	RURAL								
73	BALASORE				NAMPO	432315203	SUGO	RURAL								
74	BALASORE				TEGHARI	432317201	MAHULIA -2	URBAN								
75	BALASORE				BHOGRAI	432321201	BHOGRAI	URBAN								
76	BALASORE				BHOGRAI	432321202	KHALABADIA (BARTANA)	RURAL								
77	BALASORE				BHOGRAI	432321203	GANDA	RURAL								
78	BALASORE				DEHURDA	432322201	DEULA	URBAN								
79	BALASORE				DEHURDA	432322202	DEHURDA (TOWN)	URBAN								
80	BALASORE				DEHURDA	432322203	CHAUKI	RURAL								
81	BALASORE				DEHURDA	432322204	JAIRAMPUR	RURAL								
82	BALASORE				DEHURDA	432322205	ALALBINDHA	RURAL								
83	BALASORE				JAGANNATHPUR	432324201	CHANDANESWAR	URBAN								
84	BALASORE				JAGANNATHPUR	432324202	RANKOTHA	RURAL								
85	BALASORE				JAGANNATHPUR	432324203	NIMATPUR	URBAN								
86	BALASORE				KAMARDA	432325201	KUSUDA	RURAL								
87	BALASORE				KAMARDA	432325202	BALIM	RURAL								
88	BALASORE				KAMARDA	432325203	BASUDA	RURAL								
89	BALASORE				KAMARDA	432325204	KAMARDA	URBAN								
90	BALASORE				KAMARDA	432325205	MAHAGAV	URBAN								
91	BALASORE				KAMARDA	432325206	PUTINA	URBAN								
92	BALASORE				MOHAGAB (ODSSP)	432326202	UPALA	RURAL								
93	BALASORE				MOHAGAB (ODSSP)	432326204	BELDA	RURAL								
94	BALASORE				FULADI	432411201	FULADI	RURAL								
95	BALASORE				FULADI	432411202	PADAMPUR	RURAL								
96	BALASORE				FULADI	432411203	NAGRAM	RURAL								
97	BALASORE				ODANGI	432412201	JANKHARAI(Balisuan)	RURAL								
98	BALASORE				ODANGI	432412202	AMARA	RURAL								

M/s. Power Tech Consultants

Authorised Signatory (Bibhu Charan Sraii)

POWER TECH CONSULTANTS

BEFORE THE ODISHA ELECTRICITY REGULATORY COMMISSION
PLOT NO.4, CHUNUKOLI, SAILASHREE VIHAR,
CHANDRASEKHARPUR, BHUBANESWAR

IN THE MATTER OF : Annual Performance Review of TP Northern Odisha Distribution Ltd. (TPNODL) for the FY 2021-22.

And

IN THE MATTER OF : TP Northern Odisha Distribution Ltd.
Corporate Office - Januganj, Balasore, Odisha- 756019

J.N. BEHERA, NOTARY, BLS
Sl. No. 3316 Vol. II
Date 10

Affidavit verifying submission of information for the Annual Performance Review of TPNODL for the financial year 2021-22

I, Sri Pratap Kumar Mohanty aged about 56 years, son of late Gyanendra Prasad Mohanty, residing at Balasore, do hereby solemnly affirm and state as follows:

I am the Sr. General Manager (Risk, Regulatory & Legal) of TP Northern Odisha Distribution Ltd (TPNODL), Corporate Office-Januganj, Balasore, Odisha-756019.

The statements made in the submission are true to the best of my knowledge and the statements made are based on information and records and I believe them to be true.

Dated

Pratap Kumar Mohanty
DEPONENT

J.N. BEHERA
Notary Public, Balasore

L.T.PERFORMANCE FOR THE PERIOD APR-21 TO MAR-22					
Name of Division :	**TPNODL AS WHOLE**				
Category	**No. of Consumer**	**Consumption (MU)**	**Amount Billed (Rs. in Crs.)**	**Amount Collected (Rs. in Crs.)**	**Collection Efficiency (%)**
Domestic	1861176	1512.748	680.01	559.97	82.35%
Kutir Jyoti	75673	27.398	10.58	4.92	46.45%
L.T. General (Com)	97819	324.483	242.14	226.67	93.61%
Agriculture	26450	120.291	25.22	9.88	39.16%
Agro	1687	31.852	6.61	9.82	148.55%
Allied-Agro	50	0.617	0.39	0.40	101.91%
Street Lighting	1311	18.493	13.97	11.29	80.84%
PWW	4184	50.190	45.91	28.36	61.78%
Small Industry	4341	21.442	14.96	15.27	102.06%
Medium Industry	1084	35.616	35.40	34.73	98.11%
Specified Pub. Purpose (P.I.)	14657	24.578	20.12	19.52	97.00%
TOTAL LT	2088432	2167.708	1095.31	920.83	84.07%
Energy Input in LT (MU)	2855.673				
Energy Sold in LT (MU)	2167.708				
LT LOSS (%)	24.09%				
AT & C Loss (%)	36.18%				
Realisation Cost per LT Input (P/U)	322				

TP NORTHERN ODISHA DISTRIBUTION LIMITED
TPNODL
BALASORE

PERIOD OF REVIEW - APR-21 TO MAR-22														
NAME OF THE DIVISION	TPNODL AS WHOLE													
PARTICULARS	2020-21 (Apr to Mar)	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Total
BULK SUPPLY														
Demand (MVA)	774.978	888.627	819.284	887.428	883.171	908.721	889.893	926.873	763.045	738.317	729.812	771.882	937.943	845.416
Energy Input (MU)	4941.190	484.142	410.394	444.919	484.235	508.672	452.575	472.548	392.829	390.925	404.378	375.244	506.182	5327.043
BST Bill of GRIDCO (Rs. in Crs.)	1640.96	168.57	142.90	154.92	168.60	177.10	157.58	164.53	136.79	136.13	140.81	130.67	176.24	1854.83
BST Bill (P/U)		3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	
SALE TO CONSUMERS (MU)														
EHT	1424.984	129.175	118.453	115.968	128.115	143.580	135.828	145.725	138.811	150.557	154.651	141.615	173.547	1676.025
HT	388.865	37.530	34.374	34.296	43.882	41.439	38.454	41.664	43.228	43.684	45.738	46.128	52.848	503.265
LT	2107.784	172.511	195.151	192.213	200.696	202.604	226.135	211.616	191.180	143.237	150.129	129.355	152.881	2167.708
TOTAL SALE (MU)	3921.633	339.216	347.978	342.477	372.693	387.623	400.417	399.005	373.219	337.478	350.518	317.098	379.276	4346.998
T & D LOSS (%)														
HT (Assume 8%)	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
LT	25.94%	40.32%	16.68%	28.37%	29.27%	31.19%	10.60%	18.30%	-0.37%	19.28%	18.41%	23.37%	39.61%	24.09%
HT & LT	29.00%	40.83%	21.38%	31.14%	31.32%	33.16%	16.47%	22.50%	7.72%	22.24%	21.57%	24.89%	38.15%	26.84%
OVERALL (%)	20.63%	29.93%	15.21%	23.02%	23.03%	23.80%	11.52%	15.56%	4.99%	13.67%	13.32%	15.50%	25.07%	18.40%
Billing Efficiency (%)														
HT	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%	92.00%
LT	74.06%	59.68%	83.32%	71.63%	70.73%	68.81%	89.40%	81.70%	100.37%	80.72%	81.59%	76.63%	60.39%	75.91%
HT & LT	71.00%	59.17%	78.62%	68.86%	68.68%	66.84%	83.53%	77.50%	92.28%	77.76%	78.43%	75.11%	61.85%	73.16%
OVERALL (%)	79.37%	70.07%	84.79%	76.98%	76.97%	76.20%	88.48%	84.44%	95.01%	86.33%	86.68%	84.50%	74.93%	81.60%
BILLING TO CONSUMERS (Rs. in Crs.)														
EHT	920.84	85.64	81.24	79.46	88.02	95.17	91.22	96.07	91.97	98.17	100.93	93.85	110.64	1112.38
HT	252.38	25.52	25.18	24.75	28.92	28.43	27.23	29.26	30.22	31.08	33.02	32.58	36.26	352.45
LT	952.27	82.40	98.08	96.10	98.88	100.79	115.82	106.89	97.04	75.48	75.37	66.24	82.23	1095.31
TOTAL	2125.49	193.55	204.49	200.31	215.81	224.38	234.27	232.22	219.23	204.74	209.32	192.67	229.14	2560.14
Billing to Govt Dept. & PSU	96.48	10.56	8.85	8.57	11.64	12.19	13.39	16.05	16.30	17.26	17.56	17.59	17.67	167.61
COLLECTION RECEIVED (Rs. in Crs.)														
EHT	913.10	84.94	91.33	87.24	79.48	85.80	103.03	104.92	94.40	96.71	98.05	100.89	93.69	1120.48
HT	266.60	25.14	24.43	25.49	23.85	29.42	28.12	28.41	28.76	31.38	32.44	32.53	60.37	370.35
LT	824.29	48.84	31.31	69.10	62.14	63.29	55.09	65.01	55.58	77.41	78.10	70.60	244.36	920.83
TOTAL	2003.99	158.93	147.08	181.82	165.47	178.51	186.23	198.35	178.74	205.51	208.58	204.01	398.42	2411.66
Collection from Govt Dept. & PSU	186.46	6.14	2.41	3.03	3.53	7.19	15.17	12.22	12.21	16.81	18.33	16.18	42.10	155.33
COLLECTION (P/U) Rs.	4.06	3.28	3.58	4.09	3.42	3.51	4.11	4.20	4.55	5.26	5.16	5.44	7.87	4.53
COLLECTION EFFICIENCY (%)														
EHT	99.16%	99.19%	112.43%	109.79%	90.30%	90.16%	112.94%	109.22%	102.64%	98.51%	97.14%	107.50%	84.68%	100.73%
HT	105.64%	98.53%	97.04%	102.97%	82.48%	103.47%	103.26%	97.12%	95.19%	100.97%	98.23%	99.84%	166.49%	105.08%
LT	86.56%	59.28%	31.92%	71.91%	62.84%	62.79%	47.56%	60.82%	57.27%	102.56%	103.63%	106.58%	297.15%	84.07%
HT & LT	90.56%	68.56%	45.22%	78.27%	67.29%	71.74%	58.16%	68.62%	66.28%	102.09%	101.98%	104.36%	257.16%	89.18%
OVERALL (%)	94.28%	82.11%	71.92%	90.77%	76.67%	79.56%	79.49%	85.42%	81.53%	100.38%	99.65%	105.89%	173.88%	94.20%
Collection efficiency excl. Govt & PSU dues %)	89.58%	83.49%	73.94%	93.25%	79.31%	80.74%	77.45%	86.10%	82.06%	100.65%	99.22%	107.28%	168.50%	94.31%
AT & C LOSS(%)														
LT	35.89%	64.62%	73.40%	48.49%	55.55%	56.79%	57.48%	50.31%	42.51%	17.22%	15.45%	18.33%	-79.43%	26.18%
HT & LT	35.70%	59.43%	64.44%	46.11%	53.79%	52.04%	51.41%	46.82%	38.84%	20.61%	20.01%	21.62%	-59.05%	34.76%
OVERALL (%)	25.17%	42.47%	39.02%	30.13%	40.99%	39.38%	29.67%	27.88%	22.54%	13.35%	13.62%	10.52%	-30.29%	23.13%

TPNODL

CONSUMER MIX DATA AS ON 31.03.2022

Sl. No.	Name of the Division	Category in terms of Area			Category in terms of Use of power (MU)							No of Villages	No of Villages Electrified
		Urban	Rural	Total	Kutir Jyoti	Agricultural	Domestic	Commercial	Industrial	Traction	Others		
1	BED, Balasore	56424	6624	**63048**	0.021	0.274	92.155	44.386	43.954	57.518	19.103	2933	2933
2	BTED, Basta	3841	81515	**85356**	0.051	12.936	50.976	9.679	2.256	0	4.886		
3	JED, Jaleswar	16245	105516	**121761**	3.385	19.562	69.43	15.715	3.01	55.021	17.346		
4	CED, Balasore	5362	113864	**119226**	0.142	10.158	83.07	17.222	72.217	0	22.415		
5	SED, Soro	14906	138112	**153018**	0.269	8.441	102.308	21.223	12.386	0	24.96		
6	BNED, Bhadrak (N)	34410	155640	**190050**	1.144	3.679	159.163	81.779	39.473	60.296	12.088	1314	1314
7	BSED, Bhadrak (S)	1968	114756	**116724**	0.196	5.243	84.017	12.676	3.722	0	3.852		
8	BPED, Baripada	39962	199003	**238965**	7.065	12.206	164.14	38.469	17.897	0	18.128	3966	3966
9	UED, Udala	6640	104626	**111266**	3.95	3.653	68.883	9.949	2.316	0	4.067		
10	RED, Rairangpur	11540	197899	**209439**	3.939	11.034	128.59	23.633	10.43	0	14.097		
11	JRED, Jajpur Road	18825	83796	**102621**	0.164	8.975	111.744	44.927	906.727	111.504	8.069	1388	1388
12	JTED, Jajpur Town	8498	95074	**103572**	0.325	4.952	85.52	14.114	1.274	0	3.361		
13	KUED, Kuakhia	2563	117485	**120048**	0.958	8.199	87.963	18.412	51.439	0	2.711		
14	KED, Keonjhar	19528	103521	**123049**	1.729	5.373	76.627	24.778	91.964	53.669	8.327	2125	2125
15	JOED, Joda	29226	61788	**91014**	0.56	3.46	83.003	31.765	373.845	83.689	11.32		
16	AED, Anandapur	10345	129581	**139926**	3.5	2.529	81.105	15.93	7.007	0	9.231		
TOTAL		**280283**	**1808800**	**2089083**	**27.398**	**120.674**	**1528.694**	**424.657**	**1639.917**	**421.697**	**183.961**	**11725**	**11726**

TP NORTHERN ODISHA DISTRIBUTION LTD. TPNODL * BALASORE

TPNODL

STATUS OF ARREAR

(Rs. in Crs.)

Category	Arrears as on 31.03.2021	Billing for the period (Apr-21 to Mar-22)	Collection against current dues (Apr-21 to Mar-22) against '3'	Collection against arrear during (Apr-21 to Mar-22) against '2'	Total collection	Arrear for the period (Apr-21 to Mar-22)	Arrear as on 31-03-2022
1	2	3	4	5	6=4+5	7=3-4	8=2-5+7
EHT	**454.55**	1112.38	1089.36	31.12	**1120.48**	**23.02**	**446.45**
HT	**78.46**	307.11	306.20	17.42	**323.62**	**0.90**	**61.95**
LT	**1900.27**	973.04	675.71	136.52	**812.23**	**297.33**	**2061.08**
Govt & PSU HT	**19.87**	45.34	44.81	1.92	**46.73**	**0.53**	18.49
Govt & PSU LT	**30.39**	122.27	104.10	4.50	**108.60**	**18.17**	44.06
Total of above	**2483.55**	**2560.14**	**2220.19**	**191.47**	**2411.66**	**339.95**	2632.03

PERFORMANCE OF TPNODL - SYSTEM IMPROVEMENT

Particulars	As on 31st March 2020	As on 31st March 2021	As on 31st March 2022
No. of Circles	5	5	5
No. of Divisions	16	16	16
No. of Subdivisions	50	50	50
No. of Sections	159	159	159
No. of Special Police Stations	5	5	5
No. of Courts	1	1	1
No. of consumers			
EHT	38	36	37
HT	534	557	614
LT	1905984	2007540	20,88,432
Total	1906556	2008133	**20,89,083**
Network System			
Length of 33 KV Line (km.)	2650	2868	2895
Length of 11 KV Line (km.)	32534	37069	37591
Length of LT KV Line (km.)	54927	66300	66672
Length of conductor stolen (km.)	13.24	0.33	0.00
Cost involved (Cr.)	0.05	0.09	0.00
No. of 33 KV Group & Feeder Breakers Required	30	136	50
No. of 33 KV Group & Feeder Breakers Installed	165	166	173
No. of 11 KV Group & Feeder Breakers Required	39	126	70
No. of 11 KV Group & Feeder Breakers Installed	222	228	240
FEEDER METERING			
No. of 33 KV feeders (excluding GRIDCO interface)	91	91	98
No. of 33 KV feeder metering	91	91	98
No. of 11 KV feeders	696	720	797
No. of 11 KV feeder metering	696	655	545
No. of 33 / 11 kv transformers	462	488	524
No. of 33/11 kv transformer metering position	196	246	246
No. of Distribution transformers (11/0.4 & 33/ 0.4 kv)	64563	70429	72323
No. of Distribution transformer metering position	1864	2208	2208

Particulars	As on 31st March 2020	As on 31st March 2021	As on 31st March 2022
MVA Capacity of DTRs	2203	2584	2657
Energy Audit Carried Out-33 KV	63	74	77
Energy Audit Carried Out-11 KV	510	617	545
Energy Audit Carried out- No of DTRs	167	455	455
Consumer Metering Position			
Total number of meters	1791235	1902980	20,10,760
No. of working meters	1600071	1717944	17,37,701
Percentage of working meters (%)	89%	90%	86%
New meters installed (3 ph)	4215	5637	4930
New meters installed (1 ph)	690059	196044	255855
No of 3 Phase Consumers	48143	51097	34775
No of Consumers with TOD benefit	1130	1124	1046
No of Consumers 10 KW load and above	10793	11439	12761
No of Consumer AMR metering	7669	12979	9431
Total No of consumers	1906556	2008133	2089083
No of consumers added	190132	101577	80950
No of meters purchased	1050	500	124310
No of meters used for installation for new consumer and replacements for old consumers	694274	201681	260785
Cost involved in purchase of meters (Rs. in Crs.)	0.27	0.13	9.08
Cost of meter rent Collected (Rs. in Crs.)	14.64	19.60	22.80
Anti Theft Measures			
No of cases Finalised under Section 126 & 135	4681	5428	37893
Amount Finalised (Rs. Cr.)	6.02	6.41	47.89
Amount Accessed during filing of case (Rs. Cr.)	6.47	7.30	64.37
No of new connections given	202644	114201	113608
No of Connection Regularised	7215	2145	2011
Amount Collected (Cr.)	0.65	1.14	21.65
No. of FIR Lodged	17	6	12
No. of illegal consumers prosecuted/Initiated in Court	0	0	12
Number of Disconnection made	59018	61609	67022
Revenue realised (Rs. Cr.)	30.11	34.42	206.05

Particulars	As on 31st March 2020	As on 31st March 2021	As on 31st March 2022
Franchisee Activity			
No of Micro-Franchisees (WSHG)	101	76	211
No of Consumers Covered	66573	97897	184767
No of Macro-Franchisees	0	0	0
No of Consumers Covered	0	0	0
No of Input Based-Franchisees	1	1	0
No of Consumers Covered	40348	43732	0
Total no of consumers covered under Franchisee	106921	141629	184767
QUALITY OF SUPPLY			
Failure of Power Transformers	23	17	27
No. of Distribution Transformers burnt	2416	2312	2533
Cost involved (Cr.)	4.19	3.85	4.41
No of Interruptions in 33 KV Feeders	5968	5544	7856
No of Interruptions in 11 KV Feeders	471247	463803	339516
No. of Grievances received through CHP	457	518	388
Disposed through CHP including Bijuli Adalat	456	511	341
No. of GRF Orders received	456	511	341
No. of GRF Orders Complied	310	402	241
SYSTEM IMPROVEMENT WORKS DURING REVIEW PERIOD			
Installation of New Transformers (DTR)	1	4	0
Upgradation of Transformers (DTR)	4	8	21
Installation of Pillar Box	0	0	0
Length of AB Cable Laid (KM)	49.15	12.19	29.84
Conversion of Single Phase to Three Phase Lines	2.112	4.91	0
Amount Estimated under deposit work (Rs. in Crs.)	44.69	52.18	219.44
Amount Finalized for 6 % calculation (Rs. in Crs.)	2.62	2.46	14.40

TP NORTHERN ODISHA DISTRIBUTION LIMITED
TPNODL
BALASORE

ODISHA ELECTRICITY REGULATORY COMMISSION
BIDYUT NIYAMAK BHAWAN PLOT NO. 4, CHUNUKOLI, SHAILASHREE VIHAR, BHUBANESWAR-751021

****

Present: Shri U. N. Behera, Chairperson
Shri S. K. Parhi, Member
Shri G. Mohapatra, Member

Case No. 9/2021

IN THE MATTER OF: **Suo Motu Proceeding on sale of utility of NESCO under Section 20 of the Electricity Act 2003 and for vesting of Utility (NESCO) to the intending purchaser under Section 21 of the said Act.**

And

IN THE MATTER OF:

Director (Regulatory Affairs), OERC
..... Designated Petitioner

Vrs.

Principal Secretary to Government,
Department of Energy, Government of Odisha,
Bhubaneswar -1 and Others ..... Respondents

NESCO Power Engineer's Association
..... Intervenor

ORDER

Date of order: 25.03.2021

1. North Eastern Electricity Supply Company of Odisha Limited (the **"NESCO"**) was incorporated on 19th November 1997 under the Companies Act, 1956. Pursuant to the Odisha Electricity Reforms Act 1995 and Odisha Electricity Reforms Rules 1998, all the assets of GRIDCO pertaining to the distribution business in the Northern Zone of GRIDCO comprising districts of Balasore, Mayurbhanj, Keonjhar, Jajpur, and Bhadrak were transferred to NESCO.

2. On 1st April 1999, 51% (fifty one percent) shares of GRIDCO in NESCO were transferred to BSES Limited selected through competitive bidding process. NESCO continued to be managed by BSES Limited and later by its successor R-Infra

Limited.

3. Under Section 19 of the Electricity Act, 2003 (the **"Act"**), the Commission revoked license of NESCO with effect from Mar 2015 and appointed CMD, GRIDCO as the administrator under Section 20(d) of Act and vested the management and control of NESCO Utility along with their assets, interests and rights with the CMD, GRIDCO Limited. The order on revocation of licenses by the Commission was upheld by the Hon'ble APTEL in Appeal No. 64 of 2015 and has also been confirmed by the Hon'ble Apex Court vide their Order dated 24.11.2017 in Civil Appeal No.18500 of 2017.

4. Thereafter, in terms of Section 20 of Act the Commission initiated a transparent and competitive bidding process for selection of an investor for sale of utility of NESCO and had issued the updated Request for Proposal (the **"RFP"**) on 31.07.2020.

5. In response to the said RFP, single bid was received by the bid due date. After detailed evaluation by independent bid evaluation committee set up by the Commission, The Tata Power Company Limited (the **"TPCL"**) was recommended as the successful bidder and Commission accepted the same under Section 20(1)(a) of the Act.

6. Thereafter, the Commission issued a Letter of Intent (the **"LoI"**) to TPCL vide Letter No. OERC/RA/SALE of NESCO-26/2019(II)/160 dated 29.01.2021. TPCL communicated the acceptance of the LoI vide Letter No. T&D/BD/DOM/FY21/OERC/ NESCO/PPP/100 dated 05.02.021.

7. That as per the terms of the RFP, upon completion of sale, NESCO Utility shall vest in a special purpose vehicle (the **"Project SPV"** or **"Operating Company"**) in which TPCL shall hold 51% (fifty one percent) equity shares and Government of Odisha ("GoO") shall hold 49% (forty nine percent) equity shares through GRIDCO.

8. The Commission vide letter No. OERC/RA/SALE OF NESCO-26 /2019 (Vol.II)/162 dated 29.01.2021 then directed GRIDCO to incorporate the SPV to which the utility of NESCO shall be vested and license of NESCO Utility shall be transferred. TP Northern Odisha Distribution Limited (the **"TPNODL"**) will be incorporated as a wholly owned subsidiary of GRIDCO with an authorized share capital of Rs. 1000 crores (Indian Rupee One thousand crores) only and paid-up capital of Rs. 5 lakhs (Indian Rupee Five lakhs) only. TPNODL shall be the SPV in

ORDER OF THE COMMISSION

28. As per Section 21(a) of the Act, the utility of NESCO shall be vested in TPNODL with effect from 01.04.2021 (the **"Effective Date"**) subject to completion of sale and delivery of the utility to TPNODL.

29. The Commission approves the transaction structure proposed by the parties. TPNODL has been incorporated with a paid-up share capital of Rs. 5 lakhs (Indian Rupee Five lakhs). The trade payables to GRIDCO (in the books of NESCO Utility) amounting to Rs. 249.95 crores (Indian Rupees Two hundred forty nine crores and ninety five lacs) only shall be converted to equity share capital of TPNODL. With this, the equity share capital shall be Rs 250 crores (Indian Rupee Two hundred fifty crores) only. TPCL shall purchase equity shares equivalent to 51% (fifty one percent) of the equity share capital in TPNODL from GRIDCO at the premium of Rs. 63.75 crores (Indian Rupee Sixty three crores and seventy five lakhs) only by paying to GRIDCO an amount of Rs. 191.25 crores (Indian Rupee One hundred ninety one crores and twenty fifty lakhs) only.

30. The amount of Rs. 191.25 crores (Indian Rupee One hundred ninety one crores and twenty five lakhs) only is already deposited by TPCL with the Commission as per the requirement of RFP documents. The Commission shall, after vesting of utility of NESCO with TPNODL, remit the amount after deducting the Transaction Process Costs incurred by the Commission for the sale process directly to GRIDCO. Suitable accounting adjustments may be made in the financial statements of NESCO Utility and GRIDCO to this effect.

31. If the Administrator of NESCO Utility delivers the utility to TPNODL but the sale does not get completed in its entirety by 01.04.2021, TPNODL shall, as per Section 20(4) of the Act, operate and maintain the utility for a maximum period of upto 7 (seven) days from 01.04.2021, pending completion of transaction. In case transaction is not completed in its entirety within such extended period, then the Commission may, at its discretion, either grant extension on day by day basis or cancel the LoI. The decision of the Commission shall be final in this regard.

39. Capital investment plan

(a) The RFP required the bidders to provide a capital expenditure plan for first 5 (five) years of licensed operations as part of their bid.

(b) In its Bid submitted in response to the RFP, TPCL committed capital expenditure of Rs. 1,270 crores (Indian Rupee One thousand two hundred and seventy crores) only for period FY 2021-22 to FY 2025-26 as follows:

Table 1: Capital Expenditure Commitment by TPCL

Capex Commitment (INR Cr)					
FY22	**FY23**	**FY24**	**FY25**	**FY26**	**Total**
246	376	259	247	141	1,270

(c) To allow flexibility in the capital expenditure planning, the Commission stipulates that, in the capital expenditure plan to be submitted by TPNODL as per the license conditions, the capital expenditure commitment for each year of the period FY 2021-22 to FY 2025-26 must be such that capital expenditure proposed up to a year shall be at least equal to the cumulative capital expenditure committed up to that year in the Bid submitted by TPCL. For avoidance of doubt, the minimum cumulative capital expenditure to be proposed by TPNODL for the period FY 2021-22 to FY 2025-26 must be as provided in the table below:

Table 2: TPCL Cumulative Capital Expenditure for 5 years

Cumulative Capex Expenditure (INR Cr)				
Upto 31-Mar-2022	**Upto 31-Mar-2023**	**Upto 31-Mar-2024**	**Upto 31-Mar-2025**	**Upto 31-Mar-2026**

Cumulative Capex Expenditure (INR Cr)				
Upto 31-Mar-2022	**Upto 31-Mar-2023**	**Upto 31-Mar-2024**	**Upto 31-Mar-2025**	**Upto 31-Mar-2026**
246	622	882	1,129	1,270

(d) TPNODL would be required to seek the Commission's approval on the detailed capital expenditure plan in line with the regulations. TPNODL shall satisfy the Commission that the capital expenditure plan submitted in line with regulations adheres to the capital expenditure plan submitted as part of the Bid.

(e) The Commission will evaluate the performance of TPNODL at the end of 3rd (third) and 5th (fifth) financial year of operation. Failure to incur cumulative committed capex or meet the timelines committed as part of Bid may lead to imposition of a penalty which may be in the form of encashment of Performance Guarantee. However, before encashment of Performance Guarantee, the Commission will notify TPCL and will allow TPCL to wire transfer the penalty amount within notified timelines. Failure to transfer the amount within the timelines will lead to encashment of Performance Guarantee. Upon encashment, TPCL shall be required to replenish the Performance Guarantee to its original value as provided in para 35(g) of this Order. The Commission shall provide TPNODL and/ or TPCL with a reasonable opportunity to be heard before encashment of Performance Guarantee.

(f) The penalty amount from wire transfer or encashment of TPCL's Performance Guarantee shall be transferred to the TPNODL and the same shall be deducted by the Commission during the true-up process or future Aggregate Revenue Requirement so that the benefit of the penalty amount, so collected, is passed on to consumers.

(g) The capital investments made by TPNODL shall be allowed recovery of depreciation in line with the rates prescribed in Annexure – 3 till the time applicable regulation is notified by the Commission. The depreciation rates specified in regulations shall prevail over the rates specified in Annexure – 3 as and when applicable regulation is notified by the Commission.

(h) Depreciation on all existing assets transferred to TPNODL shall be determined based on the existing methodology being followed by the Commission.

(i) The funding on account of the various ongoing schemes of the Government of Odisha will be made available to TPNODL as and when available and applicable.

40. AT&C loss targets

(a) As per terms of the RFP, the bidders were required to provide AT&C loss trajectory for first 10 years of operations i.e. FY 2021-22 to FY 2030-31 with the condition that the AT&C loss level in FY 2023-24 and FY 2025-26 shall not be higher than 21.5% and 16.0% respectively. As part of its Bid, TPCL has provided the AT&C loss reduction trajectory shown in the following table:

Table 3: AT&C Loss Trajectory Commitment by TPCL

AT&C Loss Trajectory (%)									
FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31
24.32	22.32	20.80	17.80	15.50	12.50	11.50	10.50	9.50	8.90

(b) As stated in the RFP, the Commission shall review the performance of TPNODL at the end of FY 2023-24 and FY 2025-26 to ascertain whether the committed AT&C loss targets have been achieved. In case of failure to achieve the targets, the Commission shall have the right to recover the penalty amount by encashing the Performance Guarantee for any shortfall in meeting the AT&C loss targets committed by TPCL in its Bid and/or revoke the license of TPNODL. TPCL shall be liable to pay a penalty of Rs. 40 crores (Indian Rupee Forty crores) for every 1% (one percent) shortfall in meeting the committed AT&C loss targets, or proportionately for a part thereof, found as a result of the Commission's review at the end of the FY 2023-24 and FY 2025-26. For the purpose of clarity, for example, if at the end of FY 2023-24, TPNODL has achieved an AT&C loss of 22.00%, vis-à-vis the committed target of 20.80% (being the committed AT&C loss for FY 2023-24 provided in Table 3), an amount of Rs. 48 crores, being [Rs. 40 crores x (22.00 – 20.80)], shall be recovered by the Commission by way of encashment of the Performance Guarantee. However, before encashment of Performance Guarantee, the Commission will notify TPCL and will allow TPCL to wire transfer the penalty amount within notified timelines. Failure to transfer the amount within the timelines will lead to encashment of Performance Guarantee. Upon encashment, TPCL shall be required to replenish the Performance Guarantee to its original value as provided in para 35(g) of this Order. The Commission shall provide TPNODL and/or TPCL with a reasonable opportunity to be heard before encashment of Performance Guarantee.

(c) The penalty amount from wire transfer or encashment of TPCL's Performance Guarantee shall be transferred to the TPNODL and the same shall be deducted by OERC during the true-up process or future Aggregate Revenue Requirement so that the benefit of the penalty amount, so collected, is passed on to consumers.

(d) The penalty for non-achievement of AT&C loss targets may be relaxed by the Commission under conditions of Force Majeure, including acts of God, acts of GoO or the Government of India (de jure or de facto) or regulatory body or public enemy, war, riots, embargoes, industry-wide strikes, thereby, hindering the performance by TPNODL or any of its obligations hereunder. The Commission's decision in this regard shall be final and binding on all parties.

41. AT&C Loss Trajectory for tariff determination

(a) As part of the RFP, the Commission provided the following 10-year AT&C loss trajectory to be adopted for determination of tariff for period FY 2021-22 to FY 2030-31:

Table 4: 10-year AT&C Loss Trajectory for Tariff Determination

AT&C Loss Trajectory for Tariff Determination (%)									
FY22	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**	**FY29**	**FY30**	**FY31**
19.17	19.17	17.09	15.00	13.83	12.76	11.77	10.85	10.00	9.50

(b) TPNODL would be entitled to retain any gains resulting from its meeting and surpassing the AT&C loss trajectory for tariff determination. Such gains would be over and above the return on equity allowed by the Commission as part of OERC (Terms and Conditions for Determination of Wheeling Tariff and Retail Supply Tariff) Regulations 2014 (the "**Tariff Regulations**") and shall not be adjusted as other income or in any way appropriated through any truing up process or future Aggregate Revenue Requirement process.

ODISHA ELECTRICITY REGULATORY COMMISSION
BIDYUT NIYAMAK BHAVAN
PLOT NO.4, CHUNOKOLI, SAILASHREE VIHAR,
BHUBANESWAR - 751021
****

Present: **Shri G. Mohapatra, Officiating Chairperson**
Shri S. K. Ray Mohapatra, Member

Case No. 15/2022

M/s. TPNODL .....Petitioner
Vrs.
GRIDCO & Others .....Respondents

In the matter of: **Application for approval of Capital Investment Plan for the FY 2022-23 in the Licensed Area of TP Northern Odisha Distribution Ltd ("TPNODL").**

For Petitioner: Shri Bhaskar Sarkar, Chief Executive Officer, TPNODL

For Respondents: Ms. Sonali Patnaik, ALO, DoE, GoO, Shri Lalit Mishra, DGM (Fin.), GRIDCO, Shri B. K. Das, GM (RT&C), OPTCL and Shri R. P. Mahapatra.

O R D E R

Date of Hearing: 10.05.2022 **Date of Order: 14.07.2022**

The Petitioner, M/s. TP Northern Odisha Distribution Limited (TPNODL), has submitted an application for approval of Capital Expenditure (Capex) to the tune of Rs. 442.97 Cr for FY 2022-23 to carry out various system improvement and safety activities in its area of operation. This application has been filed pursuant to the direction of the Commission at para 39 in the vesting order in Case No. 9/2021.

2. TPNODL's licensed area is spread over a geographical area of 27857 sq.km and it serves a registered consumer base of around 20 lakh. TPNODL procures power from GRIDCO through Odisha Power Transmission Corporation Limited (OPTCL)'s 220/132/33 kV grid substations at sub transmission voltage level of 33 kV and then distributes the power at 33 kV/11 kV/440 volt/230 volt depending on the demands of the consumers. A snapshot of infrastructure available with TPNODL has been provided in the table as follows:

Sl. No.	Particulars	Unit	Details (as on 31-Mar-22)
1.	Area	Sq. km	27,857
2.	Consumers	No.	20,51,642
3.	Circles	No.	5
4.	Divisions	No.	16
5.	Sub-divisions	No.	50
6.	Sections	No.	159
7.	33/11 kV sub-stations	No.	228
8.	33/11 kV PTR	No.	505
9.	33/11kV PTR capacity	MVA	2,313
10.	11/0.415 kV DTR	No.	71,358
11.	11/0.415 kV DTR Capacity	MVA	2,618
12.	33 kV OH & UG Line	Ckt. km.	2,868
13.	11 kV OH & UG Line	Ckt. km.	37,296
14.	LT Bare & ABC Line	Ckt. km.	66,469

3. TPNODL in compliance with the Vesting Order has to seek the approval of the Capital Expenditure Plan in line with the regulations. The extracts from the Vesting Order are as follows:

"39. Capital investment plan

.....

(b) In its Bid submitted in response to the RFP, TPCL committed capital expenditure of Rs. 1,270 Cr (Indian Rupee One thousand two hundred and seventy Cr) only for period FY 2021-22 to FY 2025-26 as follows:

Table 1: Capital Expenditure Commitment by TPCL

Capex Commitment (INR Cr)					
FY 22	***FY 23***	***FY 24***	***FY 25***	***FY 26***	***Total***
246	*376*	*259*	*247*	*141*	*1,270*

(c) To allow flexibility in the capital expenditure planning, the Commission stipulates that, in the capital expenditure plan to be submitted by TPNODL as per the license conditions, the capital expenditure commitment for each year of the period FY 2021-22 to FY 2025-26 must be such that capital expenditure proposed up to a year shall be at least equal to the cumulative capital expenditure committed up to that year in the Bid submitted by TPCL. For avoidance of doubt, the minimum cumulative capital expenditure to be proposed by TPNODL for the period FY 2021-22 to FY 2025-26 must be as provided in the table below:

Table 2: TPCL Cumulative Capital Expenditure for 5 years

Cumulative Capex Expenditure (INR Cr)				
Upto 31-Mar- 2022	***Upto 31-Mar-2023***	***Upto 31-Mar-2024***	***Upto 31-Mar-2025***	***Upto 31-Mar-2026***
246	*622*	*882*	*1,129*	*1,270*

62. In view of the necessity of the proposed capital investment plan, the Commission hereby grants in principle approval to following proposals and the summary of the approved cost under the Capex plan for the FY 2022-23 are as follows:

Approved Capex Plan FY 2022-23

Sl. No.	Major Category	Activity	DPR Cost (Rs. Cr)	Board Approved Cost (Rs. Cr)	OERC Approved Cost (Rs. Cr) (Considering dis-allowance due to variation in CDB rates & last year backlogs)
1	Statutory and Safety	Fencing of Distribution substations	4.68	4.68	2.34
		Boundary wall for Primary substations	4.95	4.95	3.96
		Development of training infrastructure for safety and strengthening of LOTO system	3.05	3.05	3.05
		Total	**12.68**	**12.68**	**9.35**
2	Loss Reduction	Installation of AMR meters at Distribution transformers	4.50	4.50	4.50
		Conversion of LT Bare conductor to AB Cable	9.86	9.86	4.93
		Meters and metering equipment for energy audit	1.19	1.19	1.19
		Equipment for Meter data downloading	0.92	0.92	0.46
		Equipment for AMR enablement of 3 phase consumer meters	0.50	0.50	0.45
		Field Testing equipment - Metering (Portable Calibrator)	1.00	1.00	1.00
		Total	**17.97**	**17.97**	**12.53**
3	Reliability	Refurbishment of 33KV/11KV Primary Substation (PSS)	20.00	20.00	10.00
		33 KV Conductor up gradation	11.20	11.20	11.20
		11 KV Conductor up gradation	8.80	8.80	8.80
		Refurbishment of 11KV/0.415 KV Distribution Substation (DSS)	4.80	4.80	2.40
		Installation of LV protection at DSS	5.54	5.54	5.54
		Installation of Auto reclosure / Sectionalizers, RMUs, and FPIs	21.19	21.19	10.60
		33 kV and 11 kV Voltage Regulators for voltage improvement	4.20	4.20	4.20

Sl. No.	Major Category	Activity	DPR Cost (Rs. Cr)	Board Approved Cost (Rs. Cr)	OERC Approved Cost (Rs. Cr) (Considering dis-allowance due to variation in CDB rates & last year backlogs)
		LT FLC System - Vehicle Fitted (5 Nos. -- 1 for each circle) + Power Analyser for Transformer workshop (2 Nos.) +Ultrasound Scanner (5 Nos. -- 1 for each circle)	3.52	3.52	3.52
		Installation of station transformers (PPS)	2.55	2.55	2.55
		Capacitor Bank at PSS for low voltage improvement	0.88	0.88	0.88
		Earthing of Power Transformers and Distribution Transformers	0.98	0.98	0.49
		Total	**83.65**	**83.65**	**60.18**
4	Network Optimisation & Load Growth	Augmentation of Power Transformer	9.96	9.96	4.98
		Augmentation of Distribution Transformer	20.81	20.81	20.81
		Addition of LT lines	13.66	13.66	13.66
		Addition of 11 kV Lines (O/H and U/G)	33.96	33.96	16.98
		Addition of 33 kV Overhead Lines (O/H and U/G)	21.74	21.74	10.87
		Addition of New PTR and New DTRs along with Associated HT/LT lines	31.15	31.15	15.58
		Provision for Nua Balasore Project	10.00	10.00	10.00
		Total	**141.28**	**141.28**	**92.88**
5	Disaster Mitigation	Conversion of 2nos PSS from AIS to GIS	20.40	20.40	20.40
		Conversion pole mounted DTR to plinth mounted (100 KVA and above)	3.52	3.52	3.52
		Height enhancement of the lines at river crossing	4.50	4.50	4.50
		Strengthening of poles in the cyclone prone area	2.40	2.40	2.40
		Trolley Mounted Pad Substations	2.34	2.34	1.17
		Overhead to Underground conversion for Major City	20.00	20.00	20.00
		Emergency Preparedness (Life boat and other emergency accessories)	1.80	1.80	1.80
		Total	**54.96**	**54.96**	**53.79**
6	Technology and Civil Infrastructure	DC Hardware	10.33	10.33	10.33
		Software Licenses for IT Application	12.66	12.66	12.66
		End computing devices	8.96	8.96	8.96
		Cyber Security	1.20	1.20	1.20
		Automation of non ODSSP PSS	15.31	15.31	7.66
		SCADA-ADMS	18.09	18.09	9.05
		GIS Software Implementation and Land Base and Network Survey and Digitization for Balasore and Jajpur Circle	35.87	35.87	17.94
		Civil Infrastructure (Office Buildings, PSS, Stores, Approach Roads, Record room, Cafeteria Canteen, MRT office and others)	25.12	25.12	25.12

Sl. No.	Major Category	Activity	DPR Cost (Rs. Cr)	Board Approved Cost (Rs. Cr)	OERC Approved Cost (Rs. Cr) (Considering dis-allowance due to variation in CDB rates & last year backlogs)
		Security cameras and heavy-duty Racking system / Storage solutions for the store	0.96	0.96	0.96
		Offices Equipment	3.93	3.93	3.93
		Total	**132.43**	**132.43**	**97.81**
Grand Total			**442.97**	**442.97**	**326.54**

63. In summary, the year-wise and cumulative Capex approved by the Commission is as under:

Requirement of Minimum Capex as per Vesting Order for FY 2021-22	**Rs. 246.00 Cr.**
Capex Approved by the Commission for FY 2021-22	**Rs. 258.78 Cr.**
Requirement of Minimum Capex as per Vesting Order for FY 2022-23	**Rs. 376.00 Cr.**
Capex Approved by the Commission for FY 2022-23	**Rs. 326.54 Cr.**
Total Minimum Cumulative Capex as per Vesting Order till FY 2022-23	**Rs. 622.00 Cr.**
Total Cumulative Capex Approved by the Commission till FY 2022-23	**Rs. 585.32 Cr.**

64. The approved cost shall be passed in the ARR as per the norm subject to rational utilization by the petitioner and prudence check through audit.