CAPEX Plan for FY 2021-22

Detailed Project Report (DPR)

Submitted By

TP Western Odisha Distribution Ltd

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Capex plan for FY 21 - 22

Executive Summary

TP Western Odisha Distribution Limited (TPWODL) is incorporated as a joint venture of Tata Power (51%) and Odisha Government (49%) on the Public-Private Partnership (PPP) model. TPWODL took over the license to distribute electricity in the central part of Odisha, which was earlier served by erstwhile WESCO, through a competitive bidding process. TPWODL's utility business shall be governed by the provisions of license issued by Honb'le OERC for distribution and retail supply of electricity in Western Odisha. OERC regulates the working of the entire power sector of Odisha state, including determination of tariff chargeable to end consumers and establishing performance norms (mainly related to Loss reduction, Safety, Reliability of power supply and Consumer service delivery).

TPWODL license area is spread over a geography of 48,207 Sq.Km and serve the registered consumer base of 2.07 million. TPWODL 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 for supply in all power distribution utilities, including TPWODL. It receives electrical power at a sub transmission voltage of 33KV from **O**disha **P**ower **T**ransmission **C**ompany **L**imited'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 17 Divisions, 57 Sub-division and 202 Sections which manages the commercial and O&M activities in order to serve its consumer.

In FY 19-20, against the total input energy of 7524 MU, billed energy was 6115 MU resulting into billing efficiency of around 81.26%. Out of this 6115 MU billed energy, Approximately, 43% of the energy billed in a particular year is supplied to Domestic Consumers while EHT and HT Consumers contributing to 26% and 31% of the total billing (in terms of units) respectively. In terms of Revenues, Domestic Consumers contribute to around 34% while EHT and HT Consumers 33% and 33% respectively.

During the initial understanding, it is observed that the inherited power distribution network is not compliant up to requisite statutory standards at most of the places and it is in a dilapidated state. Distribution lines are lengthy and most of the feeders are of radial nature. Even some of the span have under-rated / uneven sized conductor thus compromising the circuit capacity as per the lowest capacity of the conductor available in the network even if for a

small section. O/H network have worn out conductors, poor Earthing, damaged / tilted poles/ accessories resulting into abnormal sag. As a result, safety clearances are compromised at many locations, which possess threat to the safety of employees, public at large and animals. Similarly, 33/11KV Primary substation and 11/0.415 kV Distribution Substations are in very deteriorated condition. In Primary Substations few faulty equipment exists which are either bypassed or removed and supply is being managed without proper switching devices resulting into escalation of faults / cascade tripping to upstream devices thereby impacting the large consumer base. In Distribution Substations the Air Break Switch, HG/DO Fuse units, LV Protection devices are not functioning at most of the locations. Apart from this, earthing system in primary Substation, Distribution Substation and Lines are in deteriorated condition. Fuse arrangements installed at Distribution Substations are installed at lower height and exposed thereby creating a potential safety hazard for human being and animals. It is very hazardous for employees to work on such system.

33/11 kV Primary Substation's (PSS) boundary walls are broken and there is no fencing to the outdoor switch yards. This makes the PSS unsafe for stray animals and any unauthorized entry. Apart from this, earthing system is in a very poor condition; many breakers and CTs are bypassed resulting into non- availability of basic protection system.

One of the burning problem observed is the presence of a large number of non-metered and defective meters resulting into poor billing efficiency. Additionally, Meters installed at consumer premises are of mix type such as electro-mechanical meters, consumer owned meters, electronic meters etc. Meter sealing to ensure revenue protection from unauthorized access to electricity is another area, which needs to be emphasized.

The level of hygiene and sanitation at the work place is appalling. Office buildings are very old which may needs to be strengthen. Infrastructure of the offices requires revamping to ensure conducive work environment, additional space for employees and visiting consumer.

To address the above key challenges and to safeguard the assets along with consumer interest, substantial investment is required. This will enhance the reliability, reduction in AT&C losses, safe environment and efficiency improvement along with customer satisfaction.

With this objective of ensuring reliable power supply and ensuring best customer services to the end consumers, TPWODL has come up with capital investment plan in five major

heads viz Statutory and Safety, Reliability, Loss reduction, Load Growth and Infrastructure and Technology adoption. The detail of each head are subsequently mentioned along with estimated Capex requirement and associated activities.

As per the present network condition, it would require Rs. 1663 Cr Capital investment to ensure reliable power supply to the end customer. However, such a huge investment would adversely affect tariff so we have staggered investment in 5 years. With Capex investment of Rs. 462.42 Cr. planned for year 21-22, we shall start our journey as planned on the path of becoming a benchmark utility in next 10 years.

TPWODL proposes to invest Capital Expenditure of Rs. 462.42 Cr. in FY 21 – 22 under five proposed major categories i.e.

1. Statutory, Safety and Security
2. Loss Reduction
3. Reliability
4. Load Growth
5. Technology adoption & Infrastructure

Proposed Capex Plan FY 21 -22

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)
1	Statutory , Safety and Security	i)Life enhancement of feeder network in respect of maintaining safe horizontal / vertical clearances	Increasing Safety clearances of 33KV/11KV line/cable for Urban and rural Areas.	15.24
			Installation of new Cradle guard	
			Intermediate poles and insulated conductor for animal safety in forest areas (not covered any govt. approved schemes)	5.3
		ii). Provision of Safety Equipment & PPEs to workforce	Electrical Testing Equipment	12.05
			Safety Equipment for work force.	
		Iii) Earthing, Fencing	Additional Earthing at Grid Sub-station	55.54
			Additional Earthing at distribution Sub station	
			Boundary Wall and infrastructure works at Grid sub-station	
			Fencing provision at distribution Sub station	
		iv) Meter Testing Lab	Establishment of additional NABL accredited Meter Testing Labs – 3 Nos	10.35
				98.48
2	Loss Reduction	i)Energy Meter replacement	Meter replacement against burnt / Faulty / obsolete Technology / DT Meter and No Meter (3.53 Lacs)	81.63
		ii) Technical Intervention-Installation of Smart meters	Installation of 27800 Nos of Smart meters	47.37
		iii) Refurbishment /augmentation of 33KV/11KV/0.415 KV network to reduce Losses.	33KV line/cable Augmentation	38.4
			11KV line and LT network Augmentation	
				167.4
	Reliability	i) Refurbishment/Life enhancement of 33/11KV Primary Substation /	33/11KV bay equipment refurbishment	20.16
			Replacement of Battery & Battery Charger at Grid sub-station.	

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)
		Additional New Substations		
		ii) Pilot Project for Installation of Fault Passage Indicator (FPI)	Fault Passage Indicator on 33 KV and 11KV voltage level.	2
		iii) Augmentation of LV side protection System along with DT LA.	LT ACB & MCCB- 400 Amp -25 Nos	12.45
			Lightning Arrestors- 400 Set	
			Switch fuse unit- 1500 Nos	
			Feeder Pillar- 400 Nos	
		iv) Installation of AB switches/ Isolators/ Insulators on 33KV and 11Kv Network.	AB Switch 11KV & 33 KV- 400 Amp/ 200 Amp- 1300 Nos	14.3
			Isolator 33KV –850 Nos	
			Insulator 33 KV and 11KV – 17000 Nos,	
			HT spacers for 150 Km	
				48.91
4	Load Growth	Network enhancement / Unforeseen emergency Capex requirement	33KV & 11KV new line, additional link-line	39.71
			Addition and Augmentation of DT & PTR	
				39.71
5	Technology & Infrastructure	i) Infrastructure to meet Customer needs.	Infrastructure for Customer Care, Call Centre, Payment Centre and Section Offices	2.04
		ii) Technology Intervention-IT & Technology.	IT & Technology for process efficiency & enhanced productivity.	42.02
		iii) Technology Intervention- GIS & SCADA Implementation.	Implementation of GIS & SCADA (1st phase)	34.19
		v)Security system in Central Store	Security system in Central stores.	1.05
		vi) Improvement of Civil Infrastructure	Construction and Up gradation of office infrastructure, PSCC, IT , wash room, connecting road , record room	23.62

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)
			Equipment foundation for breaker, new transformer , PT, Gravel filling , inside substation work	
			Up gradation of Storage space access Road, height of storage platform	
		vii)Ready to Use assets for Offices	Ready to Use assets for Offices.	5
				107.92
Grand Total (A+B+C+D+E)				**462.42**

*The Grand Total cost is exclusive of Project Employee Cost and calculated Interest During Construction (IDC). The IDC would be approximately Rs.20 Cr. Project Employees Cost for Capex job would be approximately Rs. 23 Cr.

Proposed Capex required for FY 20-21: (From 01.01.2021 to 31.03.2021)

S.No	Items	Amount (In Cr.)	Remarks
1	Civil Work	2.50	Refurbishment of offices, Washroom, Workstation and storage space.
2	Procurement of Safety equipment	0.60	Procurement of safety tools, tackles, PPE's and other items
3	Procurement of IT related items	1.00	Procurement of Laptop, Printer, Desktop.
	Total	**4.10**	

TPWODL- Profile

TPWODL, a Joint Venture of Tata Power Company Limited and Odisha Government, commenced its power distribution operations in Western Odisha area from 1st Jan 2021. TPWODL is responsible for supplying power supply to 2.07 million customers comprising of industrial, commercial and residential customers. TPWODL operational area is spread across 48,207 Sq.KM covering nine districts of Western Odisha, namely Sundargarh, Jharsuguda, Sambalpur, Debagarh, Bargarh, Sonapur, Naupada, Bolangir and Kalahandi. For effective operations, the entire license area is split into five circles, which are further divided into 17 Divisions, 57 Sub divisions and 202 Sections. Most of the commercial and technical activities are managed at sub-divisions and sections level, which are interface points for customers and utility.

Table 1 indicates the details of Circle, Division & Sub- Divisions

Circle Name	Division Name	Area in Sq. km	Sub Division Name
Sambalpur Circle	SED – SAMBALPUR	2380	SDO-I, AINTHAPALI, SBP
			SDO-II, KHETRAJPUR, SBP
			ELECTRICAL SUB DIVISION , BURLA
			ELECTRICAL SUB-DIVISION , HIRAKUD
	SEED – SAMBALPUR	4400	SDO-I, HUTAPARA
			SD0-II, DHANUPALI
			SDO-RENGALI
			SDO, RAIRAKHOL
	JED – JHARSUGUDA	990	SDO No-1, JHARSUGUDA
			SDO No-2, JHARSUGUDA
			SDO, KUCHINDA
	BED – BRAJRAJNAGAR	1200	SDO,BRAJRAJNAGAR
			SDO,BELPAHAR
	DED – DEOGARH	2780	SDO,DEOGARH
Rourkela Circle	RSED – ROURKELA	1980	SDO No –I, ROURKELA
			SDO No -5, ROURKELA
			SDO No -7, ROURKELA
	RED – ROURKELA	1020	SDO No -2, ROURKELA
			SDO. No-3, ROURKELA

Capex plan for FY 21 - 22

Circle Name	Division Name	Area in Sq. km	Sub Division Name
			SDO No – 4,ROURKELA
			SDO No -6, ROURKELA
	SED – SUNDARGARH	3920	SDO,SUNDARGARH
			SDO, UJALPUR
	SED – RAJGANGPUR	2950	SDO-I,RAJGANGPUR
			SDO-II, Rajgangpur
			SDO,KALUNGA
			SDO, KUARMUNDA
Bargarh Circle	BED –BARGARH	2060	SDO No-I, BARGARH
			SDO No-II, BARGARH
			SDO,BHATLI
			SDO,BHEDEN
			SDO,ATABIRA
	BWED – BARGARH	3830	SDO,BARPALLI
			SDO,PADAMPUR
			SDO,PAIKMAL
			SDO,SOHELA
Bolangir Circle,	BED – BOLANGIR	3240	SDO – I, BOLANGIR
			SDO – II, BOLANGIR
			SDO,TUSURA
			SDO,LOISINGHA
	SED – SONEPUR	2280	SDO,SONEPUR
			SDO,BINKA
			SDO, B.M.PUR
	TED – TITILAGARH	3340	SDO-I, TITILAGARH
			SDO-II, TITILAGARH
			SDO, KANTABANJI
			SDO, PATNAGARH
Bhawani-Patna Circle	NED – NUAPARA	3852	SDO, NUAPARA
			SDO, KHARIAR ROAD
			SDO, KHARIAR
	KEED – KALAHANDI	4790	SDO NO-I, BHAWANIPATNA
			SDO NO-II, BHAWANIPATNA
			SDO, NARLA
			SDO, KESINGA
		3195	SDO, JUNAGARH

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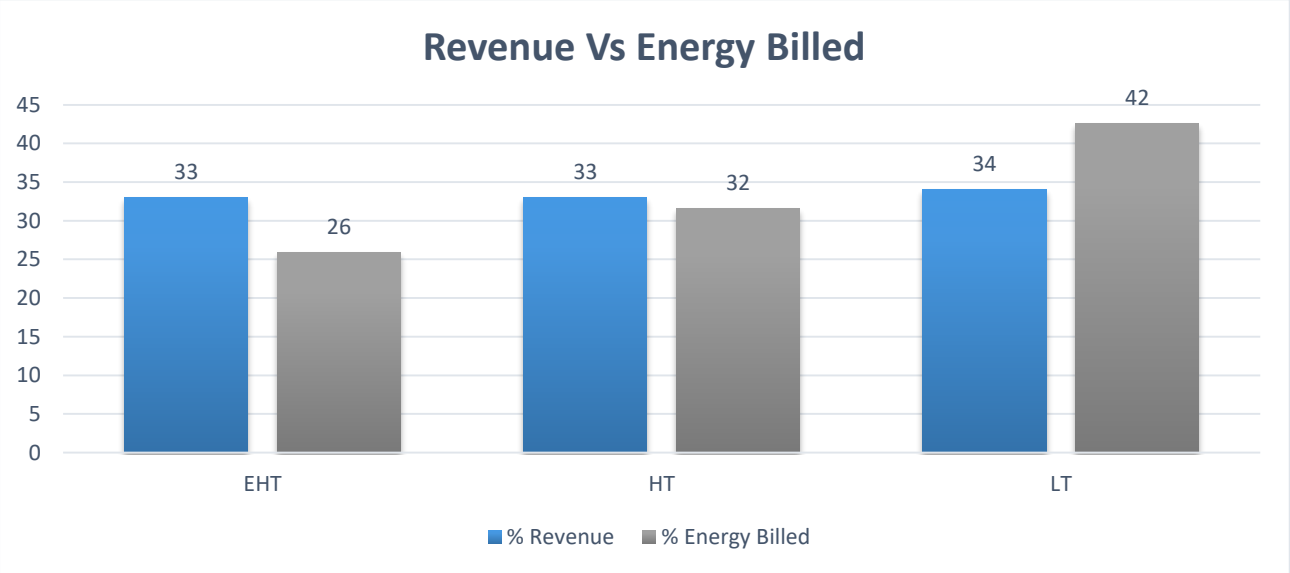
Circle Name	Division Name	Area in Sq. km	Sub Division Name
	KWED – KALAHANDI		SDO, DHARMAGARH
			SDO,CHARBAHAL

Below graph represents the share of customer base, their energy consumption and contribution in revenue based on FY 19-20 data



Existing Supply System

TPWODL receives electrical power at 33KV level from 49 numbers of 220/33KV or 132/33KV transmission substation (OPTCL) located within and in the vicinity of TPWODL operational area. TPWODL distributes the power at 33KV / 11KV / 440V / 230V depending on the demand of the consumers.

At present, there are 154 numbers of 33KV feeders with a combined circuit length of approximately 4,723 KMs supplying power to 278 numbers of 33/11KV Primary Substation (Structures). The 33KV supply is stepped down to 11KV level through 608 numbers of 33/11KV power transformers with an installed capacity of 2976 MVA at these primary substations. Nearly 1000 numbers of 11KV feeders emanates from the 33/11KV primary substations having cumulative length of approximately 44,297 KMs and supply power to HT consumers connected at 11KV level and other LT customers connected to 11/0.415KV distribution substation. Approx. 64,500 numbers of distribution transformers are installed in all five circles with an installed capacity of 3040 MVA. The length of the LT network is approximately 53,837 KMs. These LT feeders supply power to three phase and single-phase consumers.

Table 2 gives a snapshot of vital parameters and asset base of all five circles of TPWODL.

S .No	Circle	ROURKELA CIRCLE	SAMBALPUR CIRCLE	BARGARH CIRCLE	BOLANGIR CIRCLE	KALAHANDI CIRCLE	Total
1	Area (Sq. KM)	9870	11750	5890	8860	11837	48207
2	Input Energy (MU)(Apr'20 to Nov '20)	1676	1322	763	764	470	4995
3	AT&C (%)-up to Nov'20	7.57%	16.14%	68.78%	61.48%	51.71%	29.92%
4	No. of Consumers-Nov'20	426720	435228	288384	491230	432971	2074533
5	No of 33/11KV Substation	58	69	36	61	54	278
6	No. of PTR 33/11 KV	128	141	94	137	108	608
7	PTR capacity 33/11KV (MVA)	650	717	500	638	468	2976

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S .No	Circle	ROURKELA CIRCLE	SAMBALPUR CIRCLE	BARGARH CIRCLE	BOLANGIR CIRCLE	KALAHANDI CIRCLE	Total
8	No. of DTR 11/0.415 KV	13198	12603	11690	14547	12462	64500
9	DTR capacity 11/0.415 KV (MVA)	606	668	581	689	495	3040
10	33KV Line (O/H & U/G-Ckt Km)	880	930	593	1515	806	4723
11	11KV Line (O/H & U/G-Ckt Km)	8910	9068	6772	10981	8566	44297
12	LT Line (Bare & ABC-Ckt Km)	12190	9513	7790	14939	9404	53837

Network Analysis

In TPWODL, Every area has different characteristics and thus have different challenges. However, during our limited site visits, we witnessed unsafe network condition from safety point of view to our employees, public and animals.

The following issues were observed and the same needs urgent attention to make the network strengthen, safe, reliable and statutory compliant:

- Unsafe horizontal / vertical clearances in 33 KV and 11KV feeders.
- Damaged Conductor / Poles / Stay wire /Boundary walls.
- Poor Earthing of the Poles & Structure.
- Absence of cradle wire in overhead MV feeders.
- Inadequate DC and protection system.
- Overloading of Network at few locations.
- Damaged / Missing fence at most of the Distribution Transformers Substations & 33/11KV Primary Substations (Structures) resulting into easy accessibility for Public and animals.
- Non-availability of Safety Equipment & PPEs.

Applicable reference Regulations of CEA (Measures relating to Safety and Electric Supply – 2010). Are listed in ***Annexure – 2***

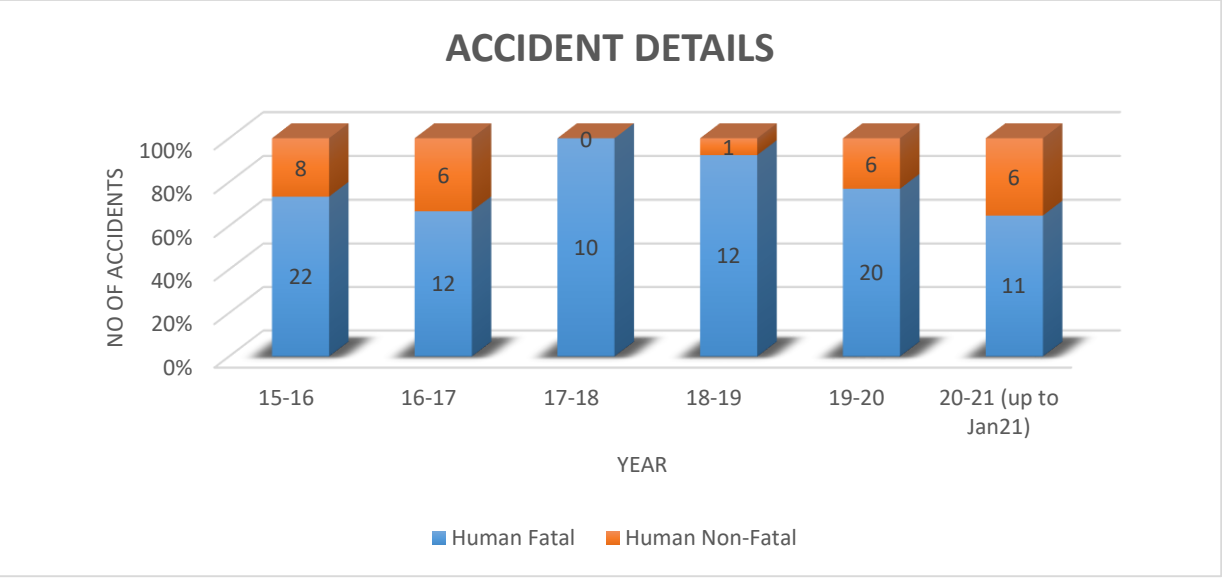
Having done analysis of last five years accident data, it is observed that most of the accident happened either due to deficiency in the network infrastructure or easy accessibility of the live parts to the Public and Animals. Even employees working in O&M department does not have required PPE.

Table below shows Year wise details of Fatal / Non-fatal Electrical accidents occurred under WESCO's operational area during Calendar Year 2015-2020.

YEAR WISE FATAL/NON-FATAL ACCIDENT REPORT							
	Human		Total Human	Animal		Total Animal	Total Victim
Year	Fatal	Non-Fatal		Fatal	Non-Fatal		
15-16	22	8	30	10	0	10	40
16-17	12	6	18	5	1	6	24
17-18	10	0	10	5	0	5	15
18-19	12	1	13	3	0	3	16
19-20	20	6	26	7	8	15	41
20-21 (up to Jan21)	11	6	17	10	2	12	29
Total	**87**	**27**	**114**	**40**	**11**	**51**	**165**

It is pertinent to mention here that the number of fatal accident outgo the number of non-fatal accident, for both Human and Animals. Further, almost 77% of fatal accident involved humans, which is very serious.

Below figure shows the detailed accident analysis of Humans.



From the above table, it is observed that majority of the fatal and non-fatal accident occurred in 11KV & LV network and thus focused approach must be followed on these segments to make the network safe & secure. As a responsible distribution utility, we need to curtail the accidents. Hence, potentially unsafe locations needs to be addressed and attended time to time to ensure safe network for employees, Public and Animals.

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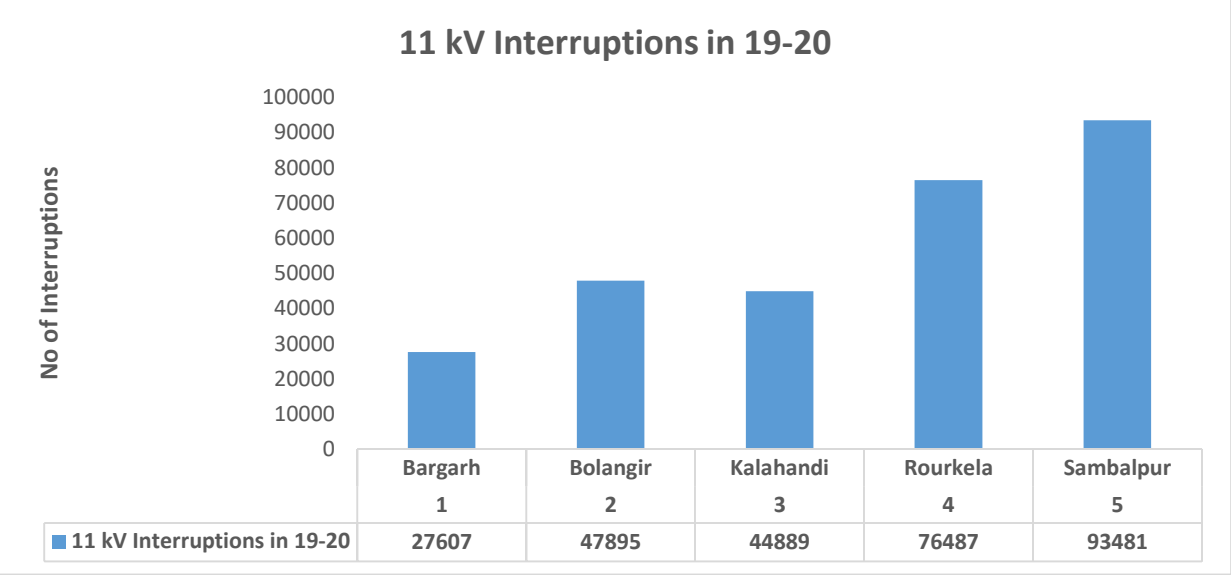
Apart from high number of Accidents, other major problem is high number of DT failure and extremely high number of interruption at 11 kV level due to dilapidated network condition. This affects the supply system very badly. The interruption at 11 kV feeders is too high by any utility standard. The table below gives a snapshot of feeder tripping recorded at the 33/11 kV Substations in different circles

In one year total tripping are at a staggering 2.9 Lacs

S No	CIRCLE	11 kV Interruptions in 19-20
1	Baragarh	27,607
2	Bolangir	47,895
3	Kalahandi	44,889
4	Rourkela	76,487
5	Sambalpur	93,481
	Total	**2,90,359**



Issues of Network Infrastructure and mitigations

Unsafe Horizontal and Vertical Clearance.

Power distribution utility is bound to comply all statutory compliance and any non-compliance attracts penalties apart from damage to brand image. In erstwhile WESCO area, compliance to statutory guidelines was not adhered at many locations. On preliminary analysis, it is observed that most of the network are laid on 8mtrs / 9 Mtrs poles with lengthy span. As per construction practice, 1/6th of the total pole length is erected below the ground and thus only available length is approx. 7.5 Mtrs above ground. Considering the fittings and accessories installation, there is hardly any room to account for increased sag or rise in road level. To further worsen the problem; the span length varies from 60-120 Mtrs. More span length causes high sag. In WESCO licensed area, there are many locations which are not complying with the statutory guidelines and hence require huge funds and efforts to make the network safe. At some places, due to re- construction of the roads, vertical clearances of the lines have reduced to the dangerous level causing violation of statutory guidelines. TPWODL proposes to take up refurbishment/life enhancement work for lines to rectify all such defects. Since the volume of such locations are high, huge investment spread across many years would be required to rectify all the deficiencies.

Damaged Poles / Conductors / Stay / boundary Walls.

Due to vast geography widespread network and absence of preventive maintenance practices; the existing network has become very weak. Major element which resulted into weak network includes damaged pole, worn out conductors, and damaged stay wires. At some locations, poles or support structure are damaged, rusted or tilted. Major factors causing damage to the poles includes structural deterioration of poles, flood, cyclone, heavy vegetation etc. Tilting of poles has resulted in increase in conductor sag and if replacement / refurbishment of the tilted or broken pole is not done, mechanical strength of the line will reduce and may result into falling of line during high speed winds / storms. Falling of line can cause fatal accident. It is also a major concern for ensuring reliable power supply to the consumers as restoration may take many days depending upon the location and severity of damage to the line. To prevent tilting of any pole from its normal position due to abnormal wind pressure, installation of Stay wire is required. At many places egg (stay/guy) insulators are either missing or damaged, which may cause major safety concern not only for the safety

of Public but animal also in case of leakage current. Especially animal use the stay wire for rubbing their skin and if the stay wire is live, the animals are likely to get electrocuted. Moreover, there are other reasons, which have resulted into depletion of existing network such as use of undersized conductor in overhead feeders, poor condition of the conductor, multiple joints in a single span in many sections, poor binding wire joints etc. witnessed in the sections causing hot spot and may result into jumper parting. At some locations, stay wire are also damaged resulting into weaker mechanical support to the poles. Under the refurbishment/life enhancement activity TPWODL has planned to replace damaged poles, replacement of worn out conductor, re- sag the conductor, install mid-span pole, introduce stay-wire at start, end and at every H- pole with at least two stay together with two-anchor rod in same pit. This will strengthen the line and will reduce the effect of the bad weather conditions and at the same time will help to reduce accident due electrocution caused by leakage current.

No or poor Earthing of the Poles & Structure.

In an electrical installation, earthing system play important role for proper working of the power distribution system, and protection of human beings against electric shock. Metal frame of all power distribution equipment are connected with the general mass of the earth, which is always at zero potential. It is worth mentioning that the general mass of the earth do not have any resistance. As per Central Electricity Authority Regulations (Measures relating to Safety and Electric Supply,2010) rule 41, there is provision of earthing, neutral wire in a 3-phase, 4-wire system and the additional third wire in a 2- phase, 3-wire system. The grounding system must have minimum of two or more earth pits (electrodes) to ensure effective grounding. Further, according to rule 42, installation with connected load of above 5 kW, and voltage exceeding 250 V shall have a suitable earth leakage protective device to isolate the load in case of earth fault or leakage in the circuit. In case the earthing of any power equipment or network becomes weak or defective due to corroded connections or damaged connection, clearance of fault may take more time and putting stress on the equipment connected in the network. During the site visits, it is observed that at most of the places proper earthing was not evident and at some of the 33/11KV primary substation, earthing is not adequate. Further the condition of earthing in old installations is observed to be extremely bad due to depletion of earthing electrodes/spikes and connections. This situation is dangerous for the stability of power system and there are chances of electric shock to the

human beings and animals if corrective actions are not taken urgently. Therefore, there is urgent need to strengthen the earthing system to ensure safety of man and material. TPWODL proposes to strengthen the earthing system by introducing fresh earthing in both DSS and PSS as part of refurbishment activity. This will enhance life not only of equipment but shall also help in proper functioning of protection relays.

To strengthen earthing system in existing grid station, it is proposed to commission additional earth pit in view of higher soil resistivity, poor earth mesh connectivity.

Absence of Cradle/Guard wire in Overhead feeders crossing the road.

Guarding is an arrangement provided in overhead MV/HV/LV feeders, by which a live conductor, when accidentally gets broken, is prevented to come in contact with public or animals and vehicles moving beneath the road. By having cradle guards in place, immediately after a live conductor breaks, it first touches the cradle guard thus completing the electrical circuits necessary for the operation of the protection relays installed at substations. This in-turn trips the circuit breaker and danger to any living object is averted. At present, most of the network is overhead and there is no provision of guard or cradle wire installed beneath the overhead conductors. This pose serious safety threat to the general public since the network is in dilapidated condition and possibility of conductor parting cannot be ruled out. In such scenario, cradle guard will help in avoiding accidents caused by snapping of conductors of overhead MV feeders. TPWODL proposes to put in place the cradle wire/guard wire on all road crossings near school, college, Hospitals and market area in first priority as a part of the refurbishment activity of lines.

Poor condition/Absence of fencing/ boundary wall at most of the Distribution Substations & 33/11KV Primary Substations (Structure's)

Absence of boundary walls and fencing around the Primary Substation and Distribution Substations has exposed the live power distribution equipment to the human beings and animals, who are not aware of the consequences of coming in direct contact or in the arching zone of high voltage equipment. Our site visits indicate that most of the 33/11KV Primary Substations and 11/0.415KV Distribution Substations either have broken boundary fence or there is no boundary fence majorly in rural areas. It is also observed that there is no fence between the substation premises and live 33KV switchyard in almost all 33/11KV Primary Substations. There are high chances of entry of unauthorized persons or animals in high

voltage switchyards. There are information's regarding electrocution of human beings and animal's at substations in the past. TPWODL proposes to put up fencing/build boundary wall under the DSS and PSS Refurbishment job.

Non-availability of safety equipment & PPEs.

Personal protective equipment, or PPE, protects its user against any physical harm or hazards that the workplace environment may present. It is important because it exists as a preventative measure for industries that are known to be more hazardous, like manufacturing, mining and Electricity Distribution. It is important that PPEs and safety equipment provided to staff to carryout construction and maintenance activities should meet safety regulations and guidelines. Availability of correct type and size of PPE's for different activities ensures safety of workforce against injuries, incidents and accidents. Reduction in injuries, incidents and accidents helps to improve the productivity.

Any power distribution utility is bound to comply with all statutory requirements. Non-compliance results in enforcement action, penalties, harassment and loss of brand image. The network in TP Western Odisha Distribution Limited is not up to the industry standard as a result of which huge number of accidents takes place every year. We as a responsible organization have to ensure that network is complaint to the statutory guidelines/requirements so that safety of employees, public at large and animals can be ensured.

To meet above stated objective and ensure safe and reliable network, it is proposed to carry out refurbishment (Life Enhancement) activities to extend the useful life of the assets. All expenditure involved in refurbishment of Substations and Feeders shall be covered under Capital Expenditure.

It is proposed to procure following safety devices:

1. Fire Extinguisher of different types and sizes.

2. Sand Buckets

3. Discharge Rod

4. First Aid Box and tool kit etc.

Key Challenges

One of the major challenges for TPWODL is the present dilapidated network which is not up to the industry standard and pose threat to safety of employees, public at large and animals.

The 33 kV, 11 kV and LV overhead lines are extremely lengthy having radial feed with undersized worn out bare conductor. These lines are having long spans with damaged, bent and tilted poles, poor joints. There is compromised safety clearances, and non-availability of guard wires observed in MV overhead feeders. The Existing O/H 33KV Lines are extended through farms on 8 Mtrs Poles at few sections. Due to surface re-filling the safety vertical clearance has become a threat to the farmers. Hence, it is essential to divert these 33KV lines or replace the 8 Mtrs Pole by higher one.

11/0.415 kV Distribution Substations (DSS) boundary fencing at most of the places are observed either damaged or not available, posing major safety threat to public and animals. Most of the AB switches and DD fuse are bypassed/damaged. There is no effective LT feeder protection system in place at the secondary side of most Distribution Substations. In place of LT Fuse box/MCCB box/ feeder Pillar, aluminium wire are used as fuse wire on the secondary side of the distribution substations at all substations. These fuse units are installed at very low height and with no fencings at DSS. It is a potential safety threat to general public and animals. Earthing system is also in bad condition in almost all feeders and substations. All of the above deficiencies makes the distribution substations highly unsafe and unreliable, which may lead to potential accidents.

At many 33/11 KV primary substations (Structures or PSS), boundary walls are observed broken and there is no fencing between the substation premises and 33KV outdoor switchyard. This makes the PSS highly unsafe as there are chances of entry of unauthorized persons and animals into the live switchyard and undue accident / incident. The existing earthing system is in very bad condition and ineffective. Many circuit breakers and CTs are bypassed since long for want of spares and consumables. Automobile batteries and underrated battery chargers are used at many substations due to non-availability of standard equipment in stores. This puts the basic protection system at stake and there are chances of major damage to substation capital intensive equipment if the defects are not attended / addressed urgently. Sample Standard BOQ and site pictures depicting the network condition and violation of statutory compliance posing safety threat to Public, Employees and animals are captured and presented in **Annexure - 1**

Energy Meters are installed at consumer premises in a mix of electro- mechanical meters, consumer owned meters, electronic meters etc. which are connected to TPWODL system through PVC insulated service cable supported by GI wire which also serves as earth point to the consumer installation. TPWODL is also planning to review the meter seals to avoid chances of meter tempering or any other type of undesired activity by consumer resulting into loss of revenue to TPWODL. In order to maintain the standard, TPWODL intends to discontinue the practice of consumer owned and consumer installed energy meters. Instead, TPWODL is planning to use insulated meter box, armored service cable, and proper meter seals on meter box and terminal cover.

Network therefore needs urgent investment to address the operational, commercial, and safety related challenges to improve the reliability of supply, customer services, and safety of staff, general public, and animals.

Besides TPWODL is also planning to improve the office infrastructure through revamping and other civil interventions. These activities are urgently needed to provide conducive work environment to TPWODL employees and all consumer visiting TPWODL offices for one or the other work. Many of the office buildings are very old and need urgent refurbishment. Call Centre and Customer care Centers needs to be established / developed further to provide better connectivity to all category of consumers with TPWODL and provide them unique service experience.

As explained earlier, TPWODL has identified a number of challenges related to Safety, 33KV/11KV/0.415KV network, Metering infrastructure, Customer Services, and Technology usage. These challenges are planned to be addressed through a systematic investment plan by TPWODL. The proposed Capex plan represents a justified and efficient level of total capital investment estimated by TPWODL to meet the service obligation: improving safety, reliability of network, level of service standards

TPWODL has taken over the assets of erstwhile WESCO on “as is where is” basis. These assets are not in good operating condition and in a large number of cases, the required safety equipment are not in place. Further the network is in dilapidated condition, in adequate clearances and a total revamping of the network is required for providing reliable and quality power supply to the consumers. The network demands urgent refurbishment like re-stringing of feeders, replacement of damaged / tilted poles, provision of intermediate poles, replacement of short height poles, replacement of joints, introduction of HT spacers and

wedge connectors, diversion of lines, new lines, introduction of LT feeder Pillars, refurbishment of earthing system, replacement of sick equipment and network augmentation to improve the reliability of power supply. The other interventions includes installation of state of the art equipment to ensure better operation and control of the network and faster restoration of supply in case of interruptions.

Faulty Energy Meters replacement, introduction of advanced technologies and analytics will be prime focus area for improving the accuracy of the meter reading, contain tampering of the meters and providing better and effective customer services. Leveraging meter technology and conducting drives of meter replacement and installation of meters at distribution transformers shall be critical for improving energy accounting.

During the initial phase, capital investments are proposed under the following broad cost centers that shall be aligned with multiple initiatives and schemes 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 by necessary civil jobs and IT facilities to provide a better consumer experience and a modern, rich, and conducive work environment to all employees for better performance.

The Key activities proposed under each categories is listed below:

1. Statutory, Safety and Security

1.1 Life enhancement of feeder network in respect of maintaining safe horizontal / vertical clearances

i. Increasing Safety clearances of 33KV/11KV line/cable for Urban and rural Areas.
ii. Installation of new Cradle guard
iii. Intermediate poles and insulated conductor for animal safety in forest areas (not covered any govt. approved schemes)

1.2 Provision of Safety Equipment & PPEs to workforce

i. Electrical Testing Equipment
ii. Safety Equipment for work force.

1.3 Earthing, Fencing and Boundary Wall

i. Additional Earthing at Grid Sub-station
ii. Additional Earthing at distribution Sub station
iii. Boundary Wall and infrastructure works at Grid sub-station

iv. Fencing provision at distribution Sub station

1.4 Meter Testing Lab

2. Loss Reduction

2.1 Energy Meter Replacement

i. Burnt Meter Replacement

ii. Faulty Meter Replacement

iii. Obsolete Technology Meter Replacement

iv. DT Meter & No Meter

2.2 Installation of Smart meters

2.3. Refurbishment /augmentation of 33KV/11KV/0.415 KV network to reduce Losses

i. 33KV line/cable Augmentation.

ii. 11KV line and LT network Augmentation.

3. Network Reliability

3.1 Refurbishment/Life enhancement of 33/11KV Primary Substation.

3.2 Introduction of FPI

3.3 Installation of LV protection at DSS along with LV protection relays, LA, switch fuse unit & feeder pillar

3.4 Installation of AB switches/ Isolators/ Insulator for improving Reliability.

4. Load Growth

4.1 33KV/11KV new line, link line to cater load growth

4.2 Addition and Augmentation of DT & PTR

5. Technology & Infrastructure

5.1 Infrastructure for Customer Care, Call Centre, Payment Centre and Section Offices

5.2 IT & Technology for process efficiency & enhanced productivity

5.3 Implementation of 1st phase of GIS and SCADA Roadmap

5.4 Security System in Central Store

5.5 Improvement of Civil Infrastructure

5.6 Ready to Use assets for Office

1 Safety, Statutory and Security

1.1 Refurbishment / Life enhancement of 33KV & 11KV Line:

33KV or 11KV feeders are important asset for a distribution utility which connects various substations and provide power to end consumers. TPWODL has nearly 4723 KMs of 33KV and 44297 KMs of 11KV feeders under its operational area. Besides, nearly 53837 KMs of LT feeders provides power to the end customers. Almost entire MV network is overhead, and nearly 31114 KMs of LT network is also overhead.

Proper upkeep of the feeders is important for ensuring safety and reliability of power supply. During site visits, it was observed that most of the 33KV / 11KV / LT feeders are in deteriorated condition and poses safety threat to the human beings and animals. Most of the feeders have binding wire / multiple joints. As a result, there are chances of snapping of conductors and subsequent electrocution of human beings / animals since cradle guards are not provided. Due to scarcity of staff and materials, there is no structured maintenance planning is done. Tree branches / creepers are coming in contact with live conductors at many locations. Huge number of tripping's are reported on 33KV and 11KV feeders in previous years. With poor condition of network and absence of maintenance activity, it is difficult for utility to ensure reliable and quality power supply to the end users. During site visits, it has been observed that conductor of different sizes are being used in different phases which limits the circuit capacity. Moreover, over sagged wires in 33KV or 11KV feeders are posing major threat to the lives of human beings and animals. At some places, due to re-construction / widening of roads, vertical/horizontal clearances of the feeders have been reduced. This is not only causing violation of statutory guidelines but also increasing the chances of accidents.

To ensure safety and reliable power supply to end consumers TPWODL propose refurbishment of 33KV, 11KV and LV lines in phase manner emphasizing critical areas such as schools, hospitals, markets and other key installations.

Refurbishment job would encompass following scope.

1. Straightening of tilted poles.

2. Replacement of damaged poles.
3. Replacement of damaged insulators/LA.
4. Earthing of Poles.
5. Erection of mid span pole to reduce sag wherever required.
6. Installation of 11KV Line spacers.
7. Restringing of conductor to increase the vertical clearance by reducing the sag.
8. Replacement of the conductor in the sections having multiple joints.
9. Installation of cradle guard wire in the feeder crossing roads. While installing the cradle guard wire, pole across the road shall be converted into double pole structure to increase the height and provide mechanical support to the section.

1.2 Provision of Safety Equipment & PPEs to workforce

Due to non-availability of required PPE, there are several incidents occurred while carrying out the operation and maintenance activities on network. Similarly the desired testing tools are not available resulting sever incidences. The available PPE's and testing instruments are not up to the standard and not maintained.

1.3 Earthing Fencing and Boundary Wall

To strengthen earthing system in existing primary sub station, it is proposed to commission additional earth pit in view of higher soil resistivity, poor earth mesh connectivity. We proposed to commission 10 no of additional earth pit for PSS 3 no of additional DSS and earthing on every 5th pole

It is proposed to cover 80 Nos of boundary wall and 2500 Nos of fencings in this DPR as phase-1. The segregation is as below:

S. No	Proposed fencing at	ROURKE LA	SAMBALPUR	BARGARH	BOLANGIR	KALAH ANDI	Total (In Nos)
1	33/11KV Primary Substations (Structure's)	20	20	13	13	14	80
2	11/0.415KV Distribution Substations	500	500	500	500	500	2500

1.4 Establishment of Meter Testing Lab:

At present, there are 4 Meter test labs in TPWODL at Burla, Balangir, Rajgangpur and Rourkela. There are three 3-phase test benches at all these locations but that are also in dilapidated condition. To ensure high quality in bulk supply of meters, TPWODL has to be develop meter test lab in these three Circle. These labs will ensure the statutory requirement of meter testing across TPWODL. The CAPEX plan for developing three labs in FY 21-22 is given below

Material	Qty
SINGLE PHASE 20 POSITION BENCH FOR STATIC METER	4
THREE PHASE 20 POSITION BENCH FOR STATIC METER	3
Grand Total	7

Similarly, requirement of testing equipment for LT & HT meters is given below:

Testing equipment	Qty
LT meter- testing equipment(onsite testing)	17
HT meter- testing equipment(onsite testing)	5
HT-CTPT testing equipment	5

Relevant Clause as per Supply code 2019: As per the clause no. 102 (d) of OERC Supply code “The licensee/supplier shall set up appropriate number of accredited testing laboratories or utilize the services of other accredited testing laboratories. The licensee/supplier shall take immediate action to get the accreditations of their existing meter testing laboratories from NABL, if not already done

Capex requirement for Statutory & Safety:

For FY 2021- 22, TPWODL propose capital expenditure of INR 98.48 Cr to ensure Safety and Statutory compliant network. Since the geography is vast and huge investment is required to make the network fully compliant to safety and statutory standards, and since this huge investment is not possible in a single year, TPWODL shall address network deficiencies at critical locations. Table below suggest the activities to be performed along with funds required under Statutory and Safety Head.

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)	Annexure No
1	Statutory , Safety and Security	i)Life enhancement of feeder network in respect of maintaining safe horizontal / vertical clearances	Increasing Safety clearances of 33KV/11KV line/cable for Urban and rural Areas.	15.24	Annexure-3
			Installation of new Cradle guard		
			Intermediate poles and insulated conductor for animal safety in forest areas (not covered any govt. approved schemes)	5.3	
		ii). Provision of Safety Equipment & PPEs to workforce	Electrical Testing Equipment	12.05	Annexure-4
			Safety Equipment for work force.		
		iii) Earthing Fencing and boundary wall	Additional Earthing at Grid Sub-station	55.54	Annexure-5
			Additional Earthing at distribution Sub station		
			Boundary Wall and infrastructure works at Grid sub-station.		
			Fencing provision at distribution Sub station		
		iv) Meter Testing Lab	Establishment of additional NABL accredited Meter Testing Labs – 3 Nos	10.35	Annexure-6
				98.48	

2. Loss Reduction

During limited site inspections, energy meters were observed missing at consumer's premises. There were many non- functional energy meters comprising of obsolete technology based energy meters, burnt, rusted and faulty energy meters. The above issues are resulting into reduction in billing efficiency, high AT&C losses. This also caused increase in making provisional billing, defective bills and substantial consumer complaints leading to customer dissatisfaction. Errors in bills leads to non-payment of bills and thus hampers the collection efficiency.

Further, it is also observed that, meters are not installed on all Distribution Transformers leading to no energy accounting at DT level. As a result, it is not possible to determine the level of energy input and hence unable to measure AT&C losses at DT level. Energy accounting provides the means to identify areas of leakages, wastage and inefficient energy usage.

The present AT&C Loss of existing system is 28.56%. To reduce the techno-commercial losses the following key activities are planned for execution

- Replacement of Burnt / Faulty / Electromechanical Meters
- Installation of Smart Meters along with back end IT infrastructure
- Refurbishment /augmentation of 33KV/11KV/0.415 KV network to reduce Losses.

2.1 Energy Meter Replacement

Replacement of Burnt / Faulty / Obsolete Technology Meters:

It is learnt that nearly 2,88,000 no of meters are reported defective and around 65,0000 no of consumers have not been provided energy meters though connection is energized in books and energy is being consumed by the consumers. Count of meters under various fault category have been captured and an estimate is prepared for replacement of these defective meters. In total, around 0.65 Lacs no meters cases and 2.88 Lacs defective meters cases Mechanical meters exist in TPWODL area. Considering the past trends, it is expected that additional fifty thousand meters are likely to become defective in FY 21-22 (2.5% of existing Meters population base). Further, there are around 0.40 Lacs electro-mechanical meters, which also require replacement so as to record the energy consumption accurately. In No

meter or defective meter cases, it is estimated that service cable replacement would be required wherever found defective or missing and thus certain percentage of service cable is also considered in the plan. For installation of Meters, Meter box will also be installed to protect the meters from energy theft. In FY 21-22, it is planned to replace / install around 3.53 Lacs meters which are directly contributing to the non-technical losses and accordingly Capex investment of Rs. 81.63 Cr will be required for replacement of these meters. The mentioned cost includes 5% Contingency over and above the total cost.

Activity	Sub Activity	Amount Crores
Meter Replacement against burnt, Faulty, Mechanical and No Meter	Meter Replacement	49.53
	Meter Box for above Meters and HT Metering Accessories	7.86
	Service Cable	18.52
	Meter Accessories Seals/ Modems etc.	1.83
Sub Total		77.74
Contingency @5%		3.89
Total		**81.63**

2.2 Installation of Smart Meters

TPWODL is in the process of deploying Advance Metering Infrastructure (AMI) throughout its territory. The scope of work includes to Supply and Installation of smart meters along with Head End System that has the ability to communicate with all Cellular network platform that can support AMI system over a single communications platform.

These meters will be installed in a span of next three years. Smart meter project includes installation of complete IT backend infrastructure. In phase-1 total 27,800 Nos smart meter installation is proposed in FY-22.

Activity	Sub – Activity	Cost (In Cr)
Smart Meters	Installation of Smart Meters along with back end IT Infrastructure:	47.37

2.3 Refurbishment /augmentation of 33KV/11KV/0.415 KV network to reduce Losses.

Most of the 33KV, 11KV & LV feeders are connected radially and have long length by typical standards. The number of joints in the feeder are also on higher side. The long length of the

feeders and joints are the potential source of technical losses and causing poor voltage regulation in the network. This year, it is proposed to introduce new 11KV Feeders to re-configure the existing lengthy feeders in such a way as to reduce the length and loading of existing feeder and thus the technical loss.

To summarize, TPWODL proposes capital expenditure of INR **167.4 Cr** for Distribution Loss reduction schemes in FY 21-22 to sustain and further reduce the existing AT&C loss level

S.No.	Major Category	Activity	Works covered	Amount (Cr)	Annexure No
2	Loss Reduction	i)Energy Meter replacement	Meter replacement against burnt / Faulty / obsolete Technology / DT Meter and No Meter (3.53 Lacs)	81.63	Annexure-7
		ii) Technical Intervention- Installation of Smart meters	Installation of 27800 Nos of Smart meters	47.37	Annexure-8
		iii) Refurbishment /augmentation of 33KV/11KV/0.415 KV network to reduce Losses.	33KV line/cable Augmentation	38.4	Annexure-9
			11KV line and LT network Augmentation		
				167.4	

3. Network Reliability

TPWODL have a large number of long overhead feeders with an average length of 30 KM in urban and 110 KMs in rural areas. The present power distribution network is in extremely dilapidated condition resulting into frequent trippings and as a result, consumers are not getting reliable and quality power supply. Out of 278 numbers of 33/11KV Primary Substations, 179 substations are connected with more than one source of supply and remaining 111 Primary Substations are connected in radial mode. There are 172 PSS, which are old and 106 Nos of PSS are recently commissioned vide ODSSP scheme.

Following key issues observed in old type PSS:

a. Absence of incoming line breakers.

b. Absence of L.A, CT, PT and AB Switches.

c. Absence of primary and secondary breakers of Power Transformer.

d. Absence of protection relays.

e. Non- functional Battery and Battery charger.

Because of above shortage of equipment and necessary protection co-ordination, we observed multiple trippings resulting into frequent power failure to the end consumer.

To ensure highest reliability, few 33/11KV substations should have more than one source of power supply along with desired protection and equipment. TPWODL intends to implement the following actions to improve the reliability of power supply

- Identification and replacement of faulty equipment causing frequent tripping's.
- Identification and commissioning of new equipment which are required as per industry standard
- Introduction of technology to ensure faster restoration of supply in case of any tripping.

3.1 Refurbishment/Life enhancement of 33/11KV Primary Substation

3.1.1 Refurbishment/Life enhancement of 33/11KV Primary Substation:

PSS being the vital part of entire distribution network. Generally, the primary voltage to PSS is 33KV and secondary at 11KV. In TPWODL, there are 608 numbers of 33/11KV power transformers with an installed capacity of 2976 MVA. Nearly 1000 numbers of 11KV feeders emanates from the 33/11KV primary substations having cumulative length of approximately 44,297 KMs.

PSS being a vital installation between customer and utility, it is proposed to refurbish bay equipment's to improve the reliability.

The following activities are planned:

1. Replacement of incoming 33 KV line and power transformer breaker along with relay and protection control panel wherever applicable.
2. Replacement of 11KV Power transformer LT and 11KV feeder breaker.
3. Replacement of 33KV and 11KV CT, PT and LA.
4. Replacement of Isolator and AB Switch.
5. Water Supply for earth pit: Due to higher ambient temperature and being rock land resulting in high resistivity of soil. Due to this Earthing system is not being maintained at desired level. To overcome this issue, it is proposed to pore additional water to the earth pits and maintained ground water level thereby achieving the desired lower soil resistance. To make availability of water, 10 no's bore wells are proposed at identified locations in first phase.

3.1.2 Replacement of Battery & Battery Charger:

Battery & Battery Charger: Installation of Battery & Battery charges have been proposed to strengthen the DC system in the 33/11KV Grid Substations. During the field visits, it is learnt that some of the Battery and Battery charges are not operational and needs immediate replacement. In this year, 43 sets of Battery & Battery chargers (18 Nos 48 V and 25 Nos 24 V DC) are proposed to be replaced.

3.2 Installation of Fault Passage Indicator (FPI):

As per present network scenario majority of 11KV & 33KV, networks are overhead in nature.

Also average feeder length is more than 80KM. Many OH feeders are passing through forest area. Most faults that occur on overhead lines are transient faults caused by lightning and tree branches touching the live line conductor.

While restoring the power supply, the operator has to take decision based on his own judgment and trial errors. This multiple trials resulting into stress on equipment and overall system.

This is resulting into breakdown of equipment, long duration shutdown and revenue loss.

TPWODL would like to introduce communicable type fault passage indicator, LORA system to assist operator in faster decision making which restoring supply post failure.

In first year 220 no's of FPI are proposed to install at key strategic locations.

3.3: Augmentation of LT side protection System along with DT LA.

The LT feeders emanating from 11/0.415KV distribution substations are connected up to consumer premises. DSS has been commissioned at load center. Which are mostly located in public area.

Most of DSS protection and control are not operating properly. As a result, fault in any one LT circuit resulting into tripping of DT incoming 11KV feeder. Also, while carrying out maintenance or replacing the LT circuit blown fuses the operator needs to take hand trip of entire 11KV feeder from PSS. Thus in above both circumstances affecting the supply of all customers connected on the same grid.

To overcome this situation, TPWODL is planning to strength the control and protection system at LT side at DSS level. Various initiatives proposed this year to improve the reliability of power supply in 11KV and downstream network are given below,

Installation of LV protection at Distribution substation.

1. Installation of ACB & MCCB- 400 Amp -25 Nos
2. Installation of Lightning Arrestors at DSS- 400 Set
3. Installation of Switch fuse unit- 1500 Nos
4. Installation of Hanging Feeder Pillar- 400 Nos

The above initiative will not only ensure availability of LV protection system at DSS but will also ensure positive isolation to maintain safe working condition.

We also proposed to install 11KV lightning arresters for distribution transformers along with LV protection.

3.4: Installation of AB Switches/ Isolator/ Insulator for improving the reliability:

As per present network, condition 11KV & 33KV feeder length are very long more than 100KM. In case of line fault, the entire feeder or long part of feeder remain isolated until fault gets cleared. To isolate the faulty section, we proposed to install additional AB Switches/ Isolator/ Insulator in between for improving the reliability.

TPWODL currently has a large number of very long overhead feeders, particularly in rural areas, with lengths as high as 110 km. Moreover, it is observed that multiple 11KV feeders are controlled through single 11KV breaker or AB switch in some primary substation.

In first year, we proposed to install AB switches and isolators identified high tripping feeders. Similarly, in rural section, AB switches are proposed at lengthy 33KV & 11KV Feeders to have provision of isolation of section during any outages. This will help in improving the reliability.

We propose to replace damaged or deteriorated 11KV & 33KV insulators on above identified feeders to enhance reliability of power supply.

For FY 2021-22, TPWODL proposes Capital expenditure of Rs **48.91 Cr** to strengthen the network, introduce technologies to enhance customer satisfaction in terms of safe and reliable power supply.

S.No.	Major Category	Activity	Works covered	Amount (Cr)	Annexure No
	Reliability	i)Refurbishment/Life enhancement of 33/11KV Primary Substation / Additional New Substations	33/11KV bay equipment refurbishment	20.16	Annexure-10
			Replacement of Battery & Battery Charger at Grid sub-station.		

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)	Annexure No
		ii) Pilot Project for Installation of Fault Passage Indicator (FPI)	Fault Passage Indicator on 33 KV and 11KV voltage level.	2	Annexure-11
		iii) Augmentation of LV side protection System along with DT LA.	LT ACB & MCCB- 400 Amp	12.45	Annexure-12
			Lightning Arrestors		
			Switch fuse unit		
			Feeder Pillar		
		iv) Installation of AB switches/ Isolators/ Insulators on 33KV and 11Kv Network.	AB Switch 11KV & 33 KV- 400 Amp/ 200 Amp	14.3	Annexure-13
			Isolator 33KV		
			Insulator 33 KV and 11KV		
			HT spacers		
				48.91	

4. Load Growth

Considering the 5% load growth trend, it is expected that approximately 90K-100K new

Connections would be applied in FY 2021-22. In order to meet this load growth appropriate network infrastructure needs to be strengthened.

4.1 33KV/11KV new line, link line addition:

During site survey, it was 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. There are multiple HT consumers source also mixed with incoming source of 33/11KV PSS. In case of technical fault at one of the HT consumer leads to tripping of incoming source and other connected HT consumer.

To overcome this issue it is proposed to establish link line from alternative available source.

At present 11KV feeders are radial and do not have ring connectivity with another 11KV feeder as per N-1 philosophy. It is proposed to establish ring connectivity between nearest 11KV feeder in the vicinity and adjacent PSS 11KV feeder. Few such link lines will be established in first phase for some important feeders like Hospitals, town, commercial and key government establishments.

4.2 Addition and Augmentation of DT's & PTR's:

It is observed that actual load demand has been increased substantially more than the assessed one due to various government approved electrification schemes. To cater the load enhancement cases and natural load growth it is essential to augment the existing infrastructure as per the need.

In addition to above after establishing the link line it is essential to have adequate capacity DT's and PT's in event of transfer of load from one grid to other .With said addition, there shall be improvement in voltage profile .

To support this phenomenon, we need to add/augment DT's and PTR's considering the following criteria's,

Capex plan for FY 21 - 22

1. Existing load of both adjacent connected grids.
2. Individual incoming line capacities.
3. Rating of PTR at each PSS.
4. Existing load at each PSS & DSS.
5. New sanctioned load at each PSS & DSS.
6. Future load growth.

Based on the above criteria TPWODL shall add/ replace PTR's & DT's accordingly.

Major Category	Activity	Works covered	Amount (Cr)	Annexure No
Load Growth	Network enhancement / Unforeseen emergency Capex requirement	33KV & 11KV new line, additional link-line	39.71	Annexure-14
		Addition and Augmentation of DT & PTR		
			39.71	

5. Technology & Infrastructure

In this head, all expenditure related to technology adoption and strengthening of various offices and establishment of Call center, data center etc. have been considered. Presently, customers are interacting through very few available medium for resolution of their issues and queries.

5.1 Call Centre & Customer Care Centre:

It is utmost important to resolve the consumer grievances as quickly as possible. Presently there are nine numbers of customer care centers similarly there are 35 Nos of extension counters running at various places. The present Call Center and Customer Care Centre facilities needs to be enhanced. To ensure basic facilities and hygiene condition at Customer care center / Division / Sub-division / Section, offices the existing set up needs to be renovated.

For establishment of Call Centre and Customer care center at selected locations, capital expenditure of INR 2.04 Cr. is proposed in FY 2021-22 in first phase.

5.2 Technology Intervention-IT & Technology.

TPWODL is going to leverage the power of Information Technology to provide best in class services to the consumers and improving efficiency through automation of certain processes. Existing website is hosted on the domain of service provider's environment and this needs to be migrated to the data center of the utility for security and further integration needs. The current site is a static site and for enhancing customer satisfaction and engagement, the same needs to be made responsive dynamic website which can be opened on any device or mobile. Presently the employees are using GMAIL as their internal communication. Mailing platform needs to be migrated to Microsoft Outlook for security and integrity.

IT systems will be implemented to provide end-to-end solutions for important business functions viz Commercial, Operations, Finance, HR and Administration etc.

A robust and reliable communication system will be the foundation to support business applications like IT, Operations, Commercial and Customer care services. Communication Network will be required to support value added services like Video applications (Video Conferencing), Enterprise services, Commercial - ERP, CRM, Payment Gateway etc. It is proposed to develop a robust, reliable, resilient, scalable and Secure Communication

system in a phased wise manner. When various mission critical IT & OT applications and data traffic between (Grids/Offices) is required for communication technology (should be deployed through IP/MPLS VPN system). In digital utility there is need to strengthen cyber security while increasing digital coverage. To enable employees to work on automated systems, various type of servers would be required for running the applications.

Metering, Billing and Collection will be the backbone for various enterprise functions & it will be implemented for customer relationship management, billing and other commercial processes. To enable employees to work on automated systems, front end computing devices (Laptop and Desktop along with UPS) would be required for the employees. All these locations will be equipped with PCs, Printers, Scanners, etc.

To meet above mentioned requirement, a robust IT infrastructure is required to be developed well supported by state of the art equipment, capital expenditure of Rs 42.02 Cr is proposed in FY 21-22 and details under various category is mentioned in the table below:

S. No.	Description	Amt. (INR Cr.)
1	Primary Data Centre	0.63
2	Front-end devices & End user licenses	10.69
3	Call Centre & Customer care Centre (IT system only)	3.76
4	DC hardware	7.11
5	DC software & Licenses (ERP, MBC, DB, OS etc.)	14
6	Locational Network	3.4
7	Communication Network	2.43
	Total	**42.02**

5.3 Technology Intervention- GIS & SCADA Implementation.

Currently there is no concept of Centralized Power System Control Centre or Area Power System Control Centre in TPWODL, as a centralize agency to monitor the network and coordinate the network operations in real-time. There is a strong need to setup the Centralized Power System Control Centre along with Area Power System Control Centre to coordinate the network operations in real-time by implementing state of the art technologies available in the market for distribution network.

In view of Centralized Monitoring and Control of the entire distribution network, it is proposed to establish the SCADA System to cover the entire TPWODL distribution network covering all the 5 circles i.e. SAMBALPUR,ROURKELA, BARGARH, BOLANGIR,

Capex plan for FY 21 - 22

BHAWANI PATNA comprising of 315 nos. of 33/11 kV Primary Sub-Stations.

With this objective of ensuring reliable power supply and ensuring best customer services to the end consumers, TPWODL has come up with capital investment addressing the following major functional requirement:

i. Centralized System for visibility of the entire distribution network.

ii. Enables standardized Data Acquisition and Reporting.

iii. Perform all critical system operations including routine and emergency operations with enhanced operational availability of distribution network and reliable power supply to customers.

iv. Predictive and Analytical tools for efficient management and decision making for the entire distribution network.

v. System supporting Cyber Securities management through Centralized Account Management, domain controller, IPS & IDS, User Authentications, Network Segmentation, Access Control, Route and Traffic Control, Implementation of Trust Boundaries, OS up gradation, patch management of application and OS, monitoring of real-time alert of compromise and potential compromise

vi. The Centralized System will provide common training platform for systems and maintenance of assets.

vii. Enhanced Operational safety.

viii. Implementation of adequate Network Management and Cyber Security measures.

TPWODL proposes for a Capital Expenditure in five year plan in phased manner i.e.

1) Deployment of New SCADA System with the concept of MCC & BCC s.
2) Monitoring and Control of 315 nos. of Sub-stations with proposed SCADA System.
3) Integration of 33/11 KV SCADA compatible switch gear of ODSSP 33/11KV S/Stn
4) RTU installation, Commissioning & Testing to monitor As-Is condition of old type Sub-station
5) Deployment of New Communication system for coordinate the entire substation.

Sub-station Automation System under ODSSP Scheme

The ODSSP scheme has focused on supply of quality power to consumers and intends to address the problem of low voltage in rural areas. The scheme focusses on construction of 33/11 kV Sub-stations in the Wesco; over 142 Nos. of 33/11 kV sub stations has been planned to commission under three phases. Presently these Sub-stations are manned and locally monitored and controlled under the instruction of Area In charge. These substations are lagging in terms of having SCADA connectivity, remote control that need to be installed or replaced in a period.

However, these substations are automated and equipped with 33/11 kV CRPs, Numerical Relays, VCBs, Battery Charger and Multi-Function Meters (MFMs). All these devices are integrated at sub-station level with Data Concentrator Unit (DCU) or RTU. The numerical relays and Multifunction meters are communicating with RTU over IEC 61850 and Modbus protocol respectively. These RTUs are compatible with communication to any Central/Standalone SCADA System over IEC60870-5-101/104.

To achieve remote monitoring and control through SCADA system, it is proposed to integrate the Critical/Urban/Industrial sub-station of ODSSP scheme first. The remaining Sub-stations can be integrated sub sequentially.

Subsequent section of this document is restricted to address the SCADA and Grid Substation Automation System (GSAS) implementation and expenditure plan in phases:

Five Year Plan following Substations are covered

S No	Phase	Stations/Major work Description	Total Number of Sub-Station Covered
1	Phase-1, FY 21-22	a) Establishment of MCC & BCC b) 20 no's of ODSSP Substation integration c) 27 nos. of old Substation	47
2	Phase -2, FY 22-23	a) 72 no's of ODSSP Substation integration b) 37 nos. of old Substation	105

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S No	Phase	Stations/Major work Description	Total Number of Sub-Station Covered
3	Phase-3, FY 23-24	a) 50 no's of ODSSP Substation integration b) 52 no's of old Substation	102
4	Phase-4*	a) 31 no's of old Substation	30
5	Phase-5	a) 30 no's of old Substation	31
	Total Nos. of Sub-Station Covered *In phase-4, contingency of work considered, spill over from phase-2 or 3 in case of unavoidable circumstances		315

5.5 Security system in Central Store:

TPWODL operates his distribution business inventory management through four designated central stores located at Burla, Rajgangpur, Bolangir and Kesinga.

The store offices are observed in dilapidated condition and do not have adequate lighting, access and internal road, storage platforms and fire protection system thereby compromising with the safety & Security of the material and personal .

The internal and access roads are needs to be constructed.

5.6 Improvement of Civil Infrastructure:

TPWODL currently have offices in all the five circles and subdivisions. Some of them are owned and about 40% offices are on rented property. TPWODL is facing challenge while accommodating additional new employees in current office buildings and infrastructure. The current existing infrastructure are old and needs modernization to provide hygienic, well ventilated and spacious work environment.

It may also be noted that no annual repairs or refurbishment in all office buildings have been made in recent years hence, immediate rehabilitation of the said buildings are required.

These office locations are touch base points between end consumers and utility. Hence, aesthetic

along with safety of each stakeholders needs to be focused.

To ensure above it is proposed to carry out civil infrastructure of designated offices in phase manner.

Up gradation of Road and Offices

It is observed that various Grid Sub Stations, access road needs repair and strengthening along-with drainage system. In addition, it is required to complete structural rehabilitation and refurbishment of existing Offices/ Control Rooms. The area grading/ leveling, repairs to existing cable trenches and trench covers needs to be done for maintaining safety during operation. During rainy season road condition further, worsen.

5.6.1 Construction of building for PSCC,IT, SCADA & GIS

The existing office has inadequate storage and sitting space to accommodate all establishments. There is no concept of Power System Control Center (PSCC) to remote monitoring & operation of network. To establish PSCC, a dedicated building is required. New building is proposed with following facilities:

1. Seating capacity 300 employees.
2. PSCC Control Room.
3. Master Control Center for supervisory Control And Data Acquisition System (SCADA).
4. IT Center.
5. Centralized Training Center.

5.7 Ready to Use assets for Offices

In TPWODL, The office space is currently crowded and haphazardly planned for seating arrangements, moreover, most of the circulation area has been occupied with files, documents etc.

In order to provide best in class services to consumers, earn consumer delight and improve satisfaction among other stakeholders and maintaining a clean & safe working environment, following infrastructures are required.

- **Office air conditioning systems** are required to provide a comfortable working environment to bring and control Energy Efficiency, Humidity, Air Quality, and Reduction in Noise & Keeping Business Critical Equipment at the Right Temperature.
- **Water cooler & Purifiers** are required for proper hydration employees and to ensure good health and improve overall efficiency. An employee should drink at least eight

glasses of water a day to be properly hydrated as Water increases the amount of blood flow and oxygen to the brain and other body parts which in turn increases brain activity and attentiveness

- **Ergonomic office chairs** for sitting long periods with ease. This naturally helps employees work more efficiently and productively. Another benefit is reduction in healthcare expenses related to poor posture from unsuitable office chairs.
- **Photocopier machines** to offer a fast and easy way of getting single or multiple copies of documents & Improves Functionality of businesses.
- **Vehicles** to provide car pool facility to the company staff as well as car facility to the sr. management team.
- **File cabinets** are basic requirements to keep office space organized and tip-top. It helps store important papers, documents, photographs, magazines and training materials in one single place for easy and immediate access besides offering secure storage, it offers instant access to files of thousands of customers and employees.
- **Canteen facilities are the necessity of satisfying employees with a better range of foods and healthy options."**

"Workplace canteens need to provide with options to cater for lunch with meals or light breakfast items and fruit or snacks for mid-afternoon along with tea/ cold drinks/ coffee in order to promote healthy eating & refreshments for employees and stakeholders.

To summarize, total 107.92 Cr. capital expenditure is proposed for Technology and Infrastructure section

S.No.	Major Category	Activity	Works covered	Amount (Cr)	Annexure No
5	Technology & Infrastructure	i) Infrastructure to meet Customer needs.	Infrastructure for Customer Care, Call Centre, Payment Centre and Section Offices	2.04	Annexure-15
		ii) Technology Intervention-IT & Technology.	IT & Technology for process efficiency & enhanced productivity.	42.02	Annexure-16

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)	Annexure No
		iii) Technology Intervention- GIS & SCADA Implementation.	Implementation of GIS & SCADA (1st phase)	34.19	Annexure-17
		v)Security system in Central Store	Security system in Central stores.	1.05	Annexure-18
		vi) Improvement of Civil Infrastructure	Construction and Up gradation of office infrastructure, PSCC, IT , wash room, connecting road , record room	23.62	Annexure-19
			Equipment foundation for breaker, new transformer , PT, Gravel filling , inside substation work		
			Up gradation of Storage space access Road, height of storage platform		
		vii)Ready to Use assets for Offices	Ready to Use assets for Offices.	5	Annexure-20
				107.92	

Capex plan for FY 21 - 22

SUMMARY

S.No.	Major Category	Activity	Works covered	Amount (Cr)
1	Statutory , Safety and Security	i)Life enhancement of feeder network in respect of maintaining safe horizontal / vertical clearances	Increasing Safety clearances of 33KV/11KV line/cable for Urban and rural Areas.	15.24
			Installation of new Cradle guard	
			Intermediate poles and insulated conductor for animal safety in forest areas (not covered any govt. approved schemes)	5.3
		ii). Provision of Safety Equipment & PPEs to workforce	Electrical Testing Equipment	12.05
			Safety Equipment for work force.	
		Iii) Earthing, Fencing	Additional Earthing at Grid Sub-station	55.54
			Additional Earthing at distribution Sub station	
			Boundary Wall and infrastructure works at Grid sub-station	
			Fencing provision at distribution Sub station	
		iv) Meter Testing Lab	Establishment of additional NABL accredited Meter Testing Labs – 3 Nos	10.35
				98.48
2	Loss Reduction	i)Energy Meter replacement	Meter replacement against burnt / Faulty / obsolete Technology / DT Meter and No Meter (3.53 Lacs)	81.63
		ii) Technical Intervention-Installation of Smart meters	Installation of 27800 Nos of Smart meters	47.37
		iii) Refurbishment /augmentation of 33KV/11KV/0.415 KV network to reduce Losses.	33KV line/cable Augmentation	38.4
			11KV line and LT network Augmentation	
				167.4
	Reliability	i) Refurbishment/Life enhancement of 33/11KV	33/11KV bay equipment refurbishment	20.16

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)
		Primary Substation / Additional New Substations	Replacement of Battery & Battery Charger at Grid sub-station.	
		ii) Pilot Project for Installation of Fault Passage Indicator (FPI)	Fault Passage Indicator on 33 KV and 11KV voltage level.	2
		iii) Augmentation of LV side protection System along with DT LA.	LT ACB & MCCB- 400 Amp -25 Nos	12.45
			Lightning Arrestors- 400 Set	
			Switch fuse unit- 1500 Nos	
			Feeder Pillar- 400 Nos	
		iv) Installation of AB switches/ Isolators/ Insulators on 33KV and 11Kv Network.	AB Switch 11KV & 33 KV- 400 Amp/ 200 Amp- 1300 Nos	14.3
			Isolator 33KV --850 Nos	
			Insulator 33 KV and 11KV -- 17000 Nos,	
			HT spacers for 150 Km	
				48.91
4	Load Growth	Network enhancement / Unforeseen emergency Capex requirement	33KV & 11KV new line, additional link-line	39.71
			Addition and Augmentation of DT & PTR	
				39.71
5	Technology & Infrastructure	i) Infrastructure to meet Customer needs.	Infrastructure for Customer Care, Call Centre, Payment Centre and Section Offices	2.04
		ii) Technology Intervention-IT & Technology.	IT & Technology for process efficiency & enhanced productivity.	42.02
		iii) Technology Intervention- GIS & SCADA Implementation.	Implementation of GIS & SCADA (1st phase)	34.19
		v)Security system in Central Store	Security system in Central stores.	1.05
		vi) Improvement of Civil Infrastructure	Construction and Up gradation of office infrastructure, PSCC, IT , wash room, connecting road , record room	23.62

Capex plan for FY 21 - 22

S.No.	Major Category	Activity	Works covered	Amount (Cr)
			Equipment foundation for breaker, new transformer , PT, Gravel filling , inside substation work	
			Up gradation of Storage space access Road, height of storage platform	
		vii)Ready to Use assets for Offices	Ready to Use assets for Offices.	5
				107.92
Grand Total (A+B+C+D+E)				**462.42**

*The Grand Total cost is exclusive of Project Employee Cost and calculated Interest During Construction (IDC). The IDC would be approximately Rs.20 Cr.

Proposed Capex required for FY 20-21: (From 01.01.2021 to 31.03.2021)

S.No	Items	Amount (In Cr.)	Remarks
1	Civil Work	2.50	Refurbishment of offices, Washroom, Workstation and storage space.
2	Procurement of Safety equipment	0.60	Procurement of safety tools, tackles, PPE's and other items
3	Procurement of IT related items	1.00	Procurement of Laptop, Printer, Desktop.
	Total	**4.10**	

Benefits of Proposal

Refurbishment of substations and feeders will benefit TPWODL through

i. Improvement of voltage profile.

ii. Reduction in number of outages

iii. Increase in vertical clearances

iv. Reduction in equipment downtime

v. Reduction in unserved energy

vi. Enhanced reliability of power supply

vii. Reduction in number of accidents.

viii. Ease of Operation and Operational flexibility

Benefits of SCADA:

Centralized operation would ensure optimum resource utilization of the hardware and software and functionalities used in the SCADA System. Other benefits include:

i. This will ensure efficient operation & monitoring under steady state, dynamic & transient condition of the system.

ii. To achieve improvement in operations considering complex Load- Demand cycle changes to bring in better and holistic visibility while making critical decisions.

iii. Optimize on unscheduled power interchange, maximize utilization of the assets

iv. Better Inventory management, low maintenance cost

v. Multi-skilling of operational and maintenance personals

vi. Enhanced operational safety

vii. Using the latest Operating systems, with enhanced functionalities, enabling Analysis and Power System studies/event analysis including Integrated Graphical User Interface (GUI) for SCADA, ADMS and other applications, which would be uniform across all substations and would be cyber security compliant for IT/OT integration requirements of the future.

viii. With common system interfaces, it brings in optimized resource management, common training platform for systems, and maintenance of assets. Avoidance of multiple systems in OS and software is also affected.

ix. Data exchange with redundancy to any external system

x. Better Control on Cyber Security Management, optimization of cyber security measures implementation

xi. Better Data Synchronization between MCC, APSCC, ensuring data accuracy, availability and reliability

xii. N-2 Communication redundancy will be provided at critical location for communication by using advanced MPLS Technology

xiii. Improved reliability of service

xiv. Better Integration and coordination with enterprise system to provide relevant information to those internal & external users that rely on accurate information in a timely manner

Benefits to Customer

i. Reduction in restoration time of outage

ii. Improved reliability of service

iii. Better control of power quality and enhanced use of reactive power sources

iv. Useful feedback information to the customer in terms of expected outage duration time etc.

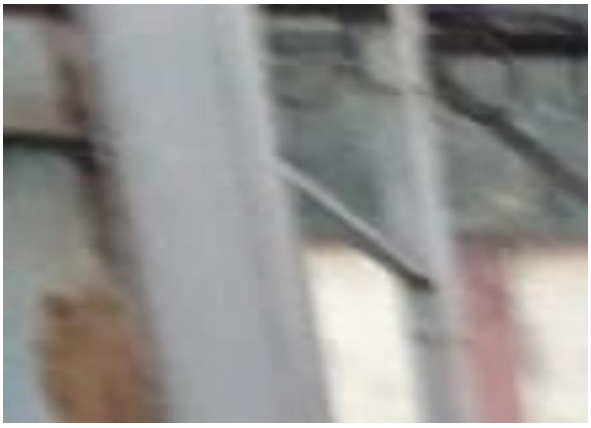
v. Monitoring the potential quality problems and the reliability problems due to supply interruptions.

Annexure-1 Sample Site Photographs and Standard BOQ

No Cable trenches & Metal Clad in switchyard: damaged:

Power Transformer LA

Poor PTR Earthing connections



Old Control Panel with non-working Relays

Poor Distribution lines

Old & non-working DC Chargers

Capex plan for FY 21 - 22

HT Line Low Vertical Clearance

Bypassed/Damaged AB Switches

Hot Spot at Connections

Deteriorated & leaked Civil Structure

Deteriorated Switchgear's at Primary Substation

Deteriorated PPE's

Capex plan for FY 21 - 22

Sample Calculation sheet

Analysis of Cost of materials for 1Km. Of 33KV. Line with 11mtr. Long 150x150mm joist Pole with 232mm² AAAC and 2no.DP cut point (50mtr. Span).						
Sl. No	**Description of materials**	**Unit**	**Qty.**	**Rate in Rupees**	**Rate in Rupees including GST**	**Amount in Rupees including GST**
1	11mtr long 150x150 MM RS Joist Pole	No.	23	24739	29192.02	671416.46
2	232 mm sq. AAAC	Km.	3.15	156500.00	184670	581710.50
3	Top Channel 100X50X6mm. 4x4.5 = 18mtr. (9.2Kg./Mtrs.)	Kg.	165.6	65.00	76.7	12701.52
4	Double Pole Bracing Channel 100X50X6mm. 4x4= 16mtr (9.2 Kg/Mtrs)	Kg.	147.2	65.00	76.7	11290.24
5	50x50x6mm.MS Bracing Angle 4x4.5 = 16mtr. (4.5Kg./Mtrs.)	Kg.	81	65.00	76.7	6212.70
6	33KV V cross arm (22 Kg), GI	No.	19	1800.00	2124	40356.00
7	GI Back Clamp for V cross arm (33KV)1.7 kg each	No.	19	150.00	177	3363.00
8	33 KV F Clamp(4.98kg/no)	No.	19	300.00	354	6726.00
9	33KV pin insulator porcelain	No.	63	350.00	413	26019.00
10	33 KV G.I.Pin	No.	63	192.00	226.56	14273.28
11	Disc Insulator B&S Type(120 KN)	No.	45	1360.00	1604.8	72216.00
12	33KV Single tension HW Fittings B&S Type for 232 mm sq. AAAC 4 bolted (120 KN)	Set	15	1680.00	1982.4	29736.00
13	HT Stay Set Complete	Set	10	1050.00	1239	12390.00
14	7/8 SWG GI Stay wire	Kg.	180	75.00	88.5	15930.00
15	HT Stay Insulator	Set	10	50.00	59	590.00
16	Stay Clamp	Pair	10	125.00	147.5	1475.00
17	Coil Earthing	No.	23	166.00	195.88	4505.24
18	Clamp for bracing Channel	Kg.	12	65.00	76.7	920.40
19	G.I. Nuts, bolt & Washer	Kg.	40	78.00	92.04	3681.60
20	Cupping of pole (Including supply of materials (1 M x0.5 Mx0.5 M)	No.	23	2183.00	2575.94	59246.62
21	Concreting of Stay (1 M x 0.5 M x 0.5 M)	No.	10	1000.00	1180	11800.00
22	Sundry's (Paint, Danger board, Clamp, Connector, Anticlimbing device, Binding tape and wire).	L.S.	1	1800.00	2124	2124.00
20	Total Cost of material A					1588683.56
21	Stock, Storage & Insurance @ 3% of A=B		3%			47660.51
22	Sub Total A+B=C					1636344.07
23	T&P @ 2% of C		2%			32726.88
24	Contingency @ 3% of C		3%			49090.32
25	Transportation @ 7.5% of C+ GST on transportation cost		7.50%			144816.45
26	Erection Charges for PSC Pole @ 20% +applicable taxes		20%			-
27	Erection Charges for Joist Pole @ 5%+ applicable taxes		5%			40,801.98
28	Erection Charges @ 10% of other materials except Pole + Applicable taxes		10%			111484.64
29	Sub-total D					2015264.34
30	Over Head Charges @ 6% of D (Supervision Charges)=E		6%			120915.86
31	Sub-Total D+E=F					2136180.20
32	Labour Cess @ 1% of F		1%			21361.80
33	GST @18% Over Head Charges @ 6% of D (Supervision Charges) (E)					21764.85
34	**Grand Total**					**2179306.86**
		Or Say				**2179307.00**

**The Grand Total cost is exclusive of staff cost and Interest during Construction (IDC).

Annexure -2 (Statutory Guidelines)

CEA regulations (Measures relating to Safety and Electric Supply – 2010)

41. Connection with earth: The following conditions shall apply to the connection with earth of systems at voltage normally exceeding 125 V but not exceeding 650 V, namely:-

(i) neutral conductor of a 3-phase, 4-wire· system and the middle conductor of a 2- phase, 3-wire system shall be earthed by not less than two separate and distinct connections with a minimum of two different earth electrodes or such large number as may be necessary to bring the earth resistance to a satisfactory value both at the generating station and at the sub-station.

(iii} neutral conductor shall also be earthed at one or more points along the distribution system or service line in addition to any connection with earth which may be at the consumer's premises.

58 (1) No conductor of an overhead line, including service lines, erected across a street shall at any part thereof be at a height of less than—

- For lines of voltage not exceeding 650 volts—5.8 meters
- For lines of voltage exceeding 650 volts but not exceeding 33 kV---6.1 meters

58 (2) No conductor of an overhead line, including service lines, erected along any street shall at any part thereof be at a height less than—

- For lines of voltage not exceeding 650 volts—5.5 meters
- For lines of voltage exceeding 650 volts but not exceeding 33 kV—5.8 meters

58 (3) No conductor of an overhead line, including service lines, erected elsewhere than along or across any street shall be at a height less than—

- For lines of voltage up to and including 11000 volts, if bare----4.6 meters.
- For lines of voltage up to & including 11,000 volts, if insulated—4.0 meters.
- For lines of voltage exceeding 11,000 volts—but not exceeding 33 kV----5.2 meters

Maximum interval between supports- All conductors shall be attached to supports at intervals not exceeding the safe limits based on the ultimate_ tensile strength of the

conductor and the factor of safety specified under regulations 57. Provided that in the case of overhead lines carrying conductors of voltage not exceeding 650 V when erected in, over, along or across any street, the interval shall not, without the consent in writing of the Electrical Inspector, exceed 65 meters.

69. Lines crossing or approaching each other and lines crossing- Street and road.

ii) Guarding shall be provided where lines of voltage not exceeding 33 kV cross a road or street.

(iii) Where an overhead line crosses or is in proximity to another overhead line, guarding arrangements shall be provided so to guard against the possibility of their coming into contact with each other.

70. Guarding- (1) Where guarding is required under these regulations the following shall be observed namely:

i. Every guard-wire shall be connected with earth at each point at which its electrical continuity is broken.

ii. Every guard-wire shall have an actual breaking strength of not less than 635 kg and if made of iron or steel, shall be galvanized.

iii. Every guard-Wire or cross-connected systems of guard-wires shall have sufficient current-carrying capacity to ensure them rendering dead, without risk of fusing of the guard-wire or wires, till the contact of any live wire has been removed.

72. Earthing- (1) All metal supports and all reinforced and pre-stressed cement Concrete supports of overhead lines and metallic fittings attached thereto, shall be either permanently and efficiently earthed by providing a continuous earth wire and securely fastening to each pole and connecting with earth ordinarily at three points in every km with the spacing between the points being as neatly equidistant as possible or each support and the metallic fitting attached thereto shall be efficiently earthed.

(2) Metallic bearer wire used for supporting insulated wire of overhead service lines of voltage not exceeding 650 V shall be efficiently earthed or insulated.

(3) Each stay-wire shall be similarly earthed unless insulator has been placed· in it at a height not less than 3.0 meters from the ground.

Statutory guidelines (CEA – Technical Standards for Construction of Electrical Plants and Electric Lines, 2010) in respect of Lines and its associated Poles and Towers, Span Length, Erection of Poles, and Stay

71. Fencing and Approach Arrangement- Fencing shall be provided around the sub-station. A metalled approach road to transport the equipment should be provided leading from the main road.

77. Transformer Mounting Structure-

1) The transformer shall be mounted on a single pole, H pole structure or on a plinth depending upon site requirements, size and weight of the transformer.
2) Direct single pole mounting shall be used for transformers up to 25 kVA only.
3) The transformers of more than 25 kVA and up to 250 kVA can be mounted on H pole structure or on plinth. Transformers above 250 kVA shall be mounted on plinth only.
4) The structures shall be provided with anti-climbing devices and danger board.
5) The plinth shall be higher than the surroundings. The plinth foundation shall be of concrete.
6) Plinth mounted distribution sub-stations shall be adequately protected by fencing so as to prevent access to the equipment by unauthorized persons, animals and shall be provided with standard danger boards. The enclosure shall permit free circulation of air on all sides.

95. Supports (Poles and Towers)-

1) The supports shall be poles or narrow based lattice towers with fully galvanized structure as per site requirement.
2) Poles may be used for 33 kV, 22 kV, 11 kV and LT lines (lines below 500 V) as per requirement. The poles shall be pre-cast concrete (PCC) pole, pre-stressed cement concrete (PSCC) pole, steel joist, rail pole or steel tubular pole as required, provided PCC and PSCC poles shall not be used at cut-points and as end poles.
3) Poles shall conform to relevant IS as the case may be.
4) Concrete poles shall be preferred in plain areas.

5) In hilly areas appropriate snow or ice loading shall be considered for design of poles and towers.

6) For locations involving long spans or higher clearances on account of crossing of power or communication lines or a railway line, specially designed poles/lattice towers may be used.

7) For angles of deviation of more than 10 degree, double pole structure shall be used.

8) The height of the pole above the ground level, length of pole below ground and working load shall be decided taking into consideration wind zone, terrain, topography, and the statutory clearances required to be maintained and these shall conform to relevant IS.

96. Line Span-

1) Line span shall be decided taking into consideration topography, wind pressure, type of support, conductor configuration and ultimate tensile strength of conductor.

2) The span shall be within the range specified by IS.

3) Uniform span shall be maintained as far as possible between consecutive pole structures.

4) While constructing a line, if a road crossing occurs at mid span, then a pole shall be placed on one side of the road so as to avoid mid span at the road crossing.

5) While crossing another power line, the lower voltage line shall be underneath. The lower line shall normally not cross at mid span of the upper line.

6) While placing poles on high ground, shorter poles can be used while maintaining proper ground clearance at the middle of the span.

7) Poles shall normally not be placed along the edges, cuts, or embankments of creeks and streams.

8) At all the places where the new line crosses over roads or another existing line, adequately earthed guard wire mesh below the line shall be provided to avoid the conductor of the new line falling over the areas below, in case of any break. In cases where the line passes below an existing line, the guard wire

mesh shall be provided above the new line under construction.

97. Erection of Poles- Erection of poles shall be carried out in accordance with the provisions of relevant IS.

98. Factor of Safety- The supports shall be suitable for the wind loads as per relevant IS. The minimum factor of safety for supports shall be as per Central Electricity Authority (Measures Relating to Safety and Electricity Supply), Regulations as and when these are notified by the Authority.

99. Earthing of Poles-

1) All metallic supports shall be permanently and effectively earthed. The Earthing arrangement shall conform to relevant IS.
2) Metal cross arms and insulator pins for PCC and PSCC poles shall be bonded together and normally earthed at every pole for 33 kV or 22 kV or 11 kV lines and at every 5th pole for lines below 500 volts.
3) The support on each side of a road crossing, railway crossing or river crossing shall be earthed.
4) Normally coil Earthing shall be provided except for locations involving railways, telegraph line, power line crossings and special structures where pipe/rod type Earthing shall be provided. Whenever the electric lines pass close to a well or a permanently moist place, an earth should be provided in the well or the marshy place and connected to the electric line pole.
5) All steel poles on which switches, transformers, fuses etc. are mounted shall be earthed.
6) All poles above 650 volts, irrespective of inhabited areas, shall be earthed. For poles below 650 V guarding with continuous earth-wire shall be provided invariably, connected to earth at three equidistant points in one km.

100. Stay Arrangements-

1) To prevent tilting of a pole from its normal position due to abnormal wind pressure and deviation of alignment, the pole shall be kept in position by stays. The stays shall be provided at:
   a) Angle locations;

b) Dead end locations;
c) Tee off points;
d) Steep gradient locations;
e) cut- point;
f) Along the straight run at minimum two locations in 1 km.

2) Galvanized iron stay wires and stay rods of adequate size shall be used. The individual wire used to form "stranded stay-wire" shall have a minimum tensile strength complying with relevant IS. For double pole structure, four stays along the line, two in each direction and two stays along the bisection of the angle of deviation or as required depending on the angle of deviation shall be provided.
3) When two or more stays are provided on the same pole, each stay shall be grouted entirely separate from the other.
4) The angle between the pole and stay wire shall be about 45 degrees and in no case it shall be less than 30 degrees. ·
5) Stays shall be anchored by either providing base plates, angle iron or rail.
6) Stay wires shall be connected to the pole with a Porcelain Guy Strain Insulator. The standard Guy Strain insulators shall be as per relevant IS. The Porcelain insulator shall be inserted in the stay wire at a height of minimum 3 m vertically above the ground level. The strain insulators shall be free from defects, thoroughly vitrified and smoothly glazed.
7) Wooden insulators shall not be used for stay/guy wire.

101. Protective Guard- Guard wire shall be used where an overhead line crosses or is in proximity to any telecommunication line or any other overhead line and in populated localities. Every guard wire shall be connected to earth wherever its electrical continuity is broken. The minimum factor of safety for stay wires, guard and bearer wires shall not be less than 2.5 based on ultimate strength of the wire.

Annexure -3 DPR for Line Refurbishment for safety

List of Locations along with length and estimate for 33KV Line:

SNo.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt. km	cost/unit	Amount (Rs)
1	BWED, Baragarh	Bijepur	Augmentation	148	33/11 KV PSS Sarandapali	33/11 KV PSS Bijepur	13	928851	**12075063**
2	BED, Balangir	Dumerbahal	New Line	148	Fasibandha	Jail S/S	0.5	1772026	**886013**
3	TED, Titlagarh	Kantabanji	New Line	232	Kabarstanpada	33/11kv s/s,Kantabanji	1.5	2179307	**3268961**
4	RED, Rkl	Koelnagar	New Line	232	Jagannathpali	Jagannathpali	0.03	2179307	**65379**
5	SED, Sundargarh	Subdega	New Line	232	132/33KV A Sankara Grid	Karamdihi 33KC S/S	18	2179307	**39227526**
6	SED, Sundargarh	Subdega	Augmentation	232	Karamdihi 33KV S/S	Subdega 33KV S/S	21	1316408	**27644568**
Total							**54.03**		**83167509**

List of Locations along with length and estimate for 33KV Line

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt Km	Cost/unit (Rs)	Amount (Rs.)
1	BWED, Bargarh	Barpali Town	Aug. Line	100	KHARAPARA	BARANGPALI	2	408270	**816540**
2	KWED, Bhawanipatna	DHARAMGARH	Aug. Line	100	SASTA S/S	KENDUMUNDIPADA POND	1.5	408270	**612405**
3	NED, Nuapada	Link Line	New. Line	100	Out Post	Putupada	0.5	611211	**305606**
4	NED, Nuapada	Link Line	New Line	100	33/11 KV S/S	Gotma Chowk	1.2	611211	**733453**
5	NED, Nuapada	Link Line	New Line	100	Adam bada Chowk	Dumerdihi	0.8	611211	**488969**
6	NED, Nuapada	Link Line	New Line	100	Jai nanesh Rice Mill	Bariha S/S	0.4	611211	**244484**
7	NED, Nuapada	Chheliapada	Aug. Line	100	Ambedkar Chowk	Sahupada	3	408270	**1224810**

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S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt Km	Cost/unit (Rs)	Amount (Rs.)
8	NED, Nuapada	Putupada	Aug. Line	100	Lalsahebpada	Putupada	4	408270	**1633080**
9	NED, Nuapada	Mission	Aug. Line	100	33/11 KV S/S Khariar	Shanti nagar	2	408270	**816540**
10	NED, Nuapada	Patel Nagar	Aug. Line	100	Bhati	Patel Nagar	4	408270	**1633080**
11	NED, Nuapada	Patel Nagar	Aug. Line	100	Chaulmunda	Chaulmunda end	1.5	408270	**612405**
12	NED, Nuapada	Khariar Road Town	Aug. Line	100	Daga Chowk	Kurumunda	4	408270	**1633080**
13	BED, Balangir	Gandhinagar	Aug. Line	148	Hospital	Brahmanpada	6	548726	**3292356**
14	BED, Balangir	Kansaripada	Aug. Line	148	Mangalamandir	Kansaripada	2.5	548726	**1371815**
15	TED, Titlagarh	Bandupala	Aug. Line	100	Maharaj Sagar	High School Pada S/s	1.5	408270	**612405**
16	TED, Titlagarh	No.I, Bhatipada	Aug. Line	100	500 KV Machha Bazar	Goru Bazar 4 Pole	2	408270	**816540**
17	RED, Rkl	Plantsite	Aug. Line	100	jatrapadia	nala road	1.2	408270	**489924**
18	RED, Rajgangpur	11KV GOPAPALI	Aug. Line	100	VEDVYAS MANDIR	SINGHTOLA	2.5	408270	**1020675**
19	RED, Rajgangpur	11 KV BELDIHI	Aug. Line	100	CHIKATMATI	SAN NUAGAON	4.5	408270	**1837215**
20	RED, Rajgangpur	11 KV BELDIHI	Aug. Line	100	BELDIHI	TX BRICKS	2.5	408270	**1020675**
21	SED, Sundargarh	No. I	New Line	148	DRDA Chowk	Ranibagicha Bypass	2.5	766931	**1917328**
22	SED, Sambalpur	GANDHINAGAR	Aug. Line	100	DURGAMANDIR C/P	GUJATAL PHED C/P	4	408270	**1633080**
23	SED, Sambalpur	Burla	Aug. Line	100	Grid S/s	Silver moon Hotel	5	408270	**2041350**
24	SED, Sambalpur	Mundoghat	Aug. Line	100	Grid S/s	Old Jhankarpali	6	408270	**2449620**
25	SED, Sambalpur	Senhapali	Aug. Line	100	Jharapali	Bagbira	10	408270	**4082700**
26	BNED, Brajrajnagar	GANDHICHOWK	New Line	100	Odiamess	Police Outpost	0.8	611211	**488969**
27	BNED, Brajrajnagar	GANDHICHOWK	New Line	100	Police Outpost	Fusecall S/S	0.7	611211	**427848**

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S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt Km	Cost/unit (Rs)	Amount (Rs.)
28	BNED, Brajrajnagar	GANDHICHOWK	New Line	100	Durga Mandap	AshokPatel Complex	0.6	611211	**366727**
29	DED, Deogarh	RE	New Line	100	Jail chook	Nilabeni sahi	3	611211	**1833633**
	Total						**80.2**		**36457311**

Proposal for guarding on 33 kV & 11 kV road crossing to improve safety

S.No.	Name of Circle	Name of Division	No of Locations for 33 KV Fdr	No of Location for 11 KV Fdr	Rate including GST (Rs.)	Total Amount (Rs.)
1	Rourkela	RED, Rkl	20	264	6,051	1718484
2		RSED, Rkl	32	320	6,051	2129952
3		RED, Rajgangpur	36	256	6,051	1766892
4		SED, Sundargarh	20	272	6,051	1766892
5	Sambalpur	SED, Sambalpur	16	320	6,051	2033136
6		SEED, Sambalpur	32	408	6,051	2662440
7		JED, Jharsuguda	52	552	6,051	3654804
8		BNED, Brajrajnagar	36	192	6,051	1379628
9		DED, Deogarh	16	232	6,051	1500648
10	Bargarh	BED, Bargarh	24	276	6,051	1815300
11		BWED, Bargarh	18	220	6,051	1440138
12	Balangir	BED, Balangir	34	292	6,051	1972626
13		TED, Titlagarh	24	392	6,051	2517216
14		SED, Sonepur	12	300	6,051	1887912
15	Kalahandi	KEED,Bhawanipatna	24	328	6,051	2129952
16		KWED, Bhawanipatna	26	212	6,051	1440138
17		NED, Nuapada	14	156	6,051	1028670
		Total	**436**	**4992**	**1,02,867**	**3,28,44,828**

Proposal for Mid Pole and Covered Conductor:

Item	Abstract of Works	Unit	Unit Quantity	Quantity	Cost for Supply of Unit Quantity of Work (in Rs.)	Total Material Supply Cost (Rs.)	Cost for Erection of Unit Quantity of Work (in Rs.)	Total Erection Cost (Rs.)	Total Material + Erection Cost (in Rs.)
A	11 KV Intermediate 9Mtr Long 150x150 RS Joist Pole (30.6 Kg / Mtrs) with Accessories.	No.	1	231	23,360	53,96,266	7,367	17,01,993	70,98,259
	Replacement of Bare Conductor with 100 sqmm Single Core Insulated Covered Conductor on 11 KV Line and return dismantled of existing Bare Conductor to WESCO store.	Km	3.15	40	9,45,000	3,78,00,000	2,03,109	81,24,399	4,59,24,399
	Total 11 KV Works (B)					**4,31,96,266**		**98,26,392**	**5,30,22,658**

**** The Estimated Item Cost is based on approved Cost Data for Electrical Materials in Year 2018-19 vide NO. 1763/EL.DDUGJY-03/2018/ En, dated 25/02/2019.**

Annexure - 4 DPR for PPE, FFEs, Safety and Testing Equipment

Required Safety Equipment quantity and cost:

S No.	Item Description	Unit	Rev. Qty	Rate including GST (Rs.)	Total Amount (Rs.)
1	FIRE EXTINGUISHER ABC 6 KG CAPACITY.(Ceasefire)	EA	750	10,408	7805700
2	FIRE EXTINGUISHER CO2 CAP 4.5KG (ceasefire)	EA	750	17,700	13275000
3	FIRE EXTINGUISHER MECH FOAM 9 LTR (ceasefire)	EA	10	7,788	77880
4	FIRE EXTINGUISHER MECH FOAM 60LTR (ceasefire)	EA	200	53,100	10620000
5	SAND BUCKET	EA	400	354	141600
6	FIRE EXTINGUISHER CO2 CAP 4.5KG (ceasefire)	EA	11	17,700	194700
7	FIRST AID BOX (FS - 401) with Medicine	EA	500	1,416	708000
9	DISCHARGE ROD FOR 11-33-66KV	EA	300	14,160	4248000
10	TOOL KIT HD COMPLETE WITH CANVAS BAG	EA	300	23,600	7080000
	Total				**44150880**

Required Electrical Testing Equipment quantity and cost:

S.No	Instrument Name	Unit	Qty	Rate including GST (Rs.)	Total Amount (Rs)
1	Earth Resistance Tester Digital	EA	60	23,600	1416000
2	Insulation Tester	EA	17	8,260	140420
3	Insulation Tester Digital	EA	60	9,440	566400
4	Digital Multimeter	EA	300	94,400	28320000
5	Phase sequence meter	EA	60	1,180	70800
6	10 mA to 20 Amp Tong tester With display for CT secondary	EA	60	94,400	5664000
7	1-Ph Variac	EA	18	2,360	42480
8	3-Ph Variac	EA	18	11	191.16
9	1ph Relay Test Kit	EA	18	2,36,000	4248000
10	Breaker Timer	EA	18	47,200	849600

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S.No	Instrument Name	Unit	Qty	Rate including GST (Rs.)	Total Amount (Rs)
11	Breaker Contact Resistance meter	EA	18	4,13,000	7434000
12	Trf Winding resistance KIT Digital	EA	18	2,00,600	3610800
13	HV Tan Delta Test Kit	EA	6	3,54,000	2124000
14	CT/PT analyser	EA	2	8,85,000	1770000
16	BDV Tester	EA	18	2,36,000	4248000
17	Hydrometer(SG tester)	EA	5	1,180	5900
18	Oil Test kit	EA	1	3,54,000	354000
19	BANANA Connectors	EA	60	9,440	566400
20	Tool Kit	EA	300	11,800	3540000
21	Thermovision camera	EA	5	8,37,800	4189000
22	Ultrasonic inspection kit	EA	18	1,41,600	2548800
23	Neon Tester	EA	250	18,880	4720000
Total					**76428791**

Annexure - 5 DPR for Earthing, Fencing and Boundary wall

Estimate for Boundary Wall

S.No	Item Description	Unit	Qty	Rate (Rs)	Amount(Rs)
1	Excavation	Cum	110	250	27500
2	PCCM-10	Cum	6	6000	36000
3	RCC Raft M-20	Cum	20	7000	140000
4	Rcc Column M-20	Cum	5	7500	37500
5	RCC For Beam M-20	Cum	5	7500	37500
6	Brick Masonary 1:5	Cum	20	6000	120000
7	External Plaster in CM 1:4	Sqmm	200	500	100000
8	Str. Steel	MT	0.2	85000	17000
9	Barb wire	Rm	270	27	7290
10	Concertina Coil	Rm	30	475	14250
11	Reinf Steel	MT	1.5	75000	112500
12	Painting with Cement based paint	Sqmm	200	160	32000
Total Amount for 30 M					681540
Estimated cost for 1M					**22718**
Total Boundary Wall Considered for one Grid Station = 120M					
Total No of Locations Considered in FY-22 = 80					
Total Length of Boundary wall considered for FY-22 = 120 x 80 =					9600
Estimated cost(Lacs) considered for FY-22 for Boundary Wall = 9600x22718					**2180.9**

Estimate for Fencing

S.No	Item Description	Unit	Qty	Rate (Rs)	Amount (Rs)
1	Excavation	Cum	2	200	400
2	PCC	Cum	1.5	5500	8250
3	Brick works	Cum	1.2	6000	7200
4	Plaster	Sqmm	12	304	3648
5	Str Steel	MT	0.6	90000	54000
6	Welded Mesh	Sqmm	40	460.8	18432
Total Cost for 16 M					**91930**
Estimated cost for 1M					**5745.63**
Total Fencing considered for one DT Location= 20M					
Total Nos. of Locations Considered in FY-22 = 2500					
Total Length of Boundary wall considered for FY-22 = 2500 x 20 =					50000
Estimated cost (Lacs) considered for FY-22 for Boundary Wall = 50000x5745.63					**2872.8**

Estimate for Earthing of PSS & DSS

S.No.	Description of work	UOM	Qty	Rate incl. GST	Amount (Rs)
1	Earthing- 150 No PSS @10 each	EA	1500	16000	24000000
2	Earthing- 1400 No DSS @3 each	EA	4200	5144	21606586
3	Earthing- 160 Ckt Km 33KV/11KV Lines @5 each	EA	850	5144	4372761
	Total				**49979347**

Annexure- 6 DPR for Meter Testing Lab

To ensure high quality in bulk supply of meters, TPWODL has planned to develop 3 meter test labs at Burla, Balangir and Rajgangpur. These labs will ensure the statutory requirement of meter testing in pan TPWODL.

As per the clause no. 102 (d) of OERC Supply code "The licensee/supplier shall set up appropriate number of accredited testing laboratories or utilize the services of other accredited testing laboratories. The licensee/supplier shall take immediate action to get the accreditations of their existing meter testing laboratories from NABL, if not already done".

Below mentioned testing equipment are required to be procured in addition to facilities already available.

Material	Unit Rate (W/o Tax) (Rs.)	Rate With Tax (Rs.)	Qty	Cost (Cr)
SINGLE PHASE 20 POSITION BENCH	7000000	8260000	4	3.30
THREE PHASE 20 POSITION BENCH	9000000	10620000	3	3.19
Grand Total			7	6.49

Test Equipment for meter testing in field

To ensure the statutory guidelines of testing of meters in field, and to address the meter testing on consumer request against fast/slow meter.

As per the guideline of OERC supply code, Clause No. 111(iii) "The licensee/supplier shall also conduct periodical inspection/testing of the meters at site as per the following schedule or earlier":

Distribution utility needs to test the consumers meters as per the below mentioned scheduled:

a) Single phase meters at least once every five years
b) LT three phase meters at least once every three years
c) HT/EHT meters including MDI at least once a year

Below mentioned testing equipment are required to be procured.

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Testing equipment	Year-1	Cost per equipment (without Tax) (Rs.)	Cost per equipment (with Tax) (Rs)	Total Cost (Cr)
LT meter- testing equipment(onsite testing)	17	110000	129800	0.22
HT meter- testing equipment(onsite testing)	5	600000	708000	0.35
HT-CTPT testing equipment	5	1000000	1180000	0.59
Total				1.16

One LT Standard Meter per Division and one HT standard Meter (HT Meter Testing Equipment + HT CTPT Test Equipment) per Circle has been taken in to considerations.

Civil Works

To ensure smooth operation of Meter Management and establish a robust quality chain of meters and accessories with in area of operations, meter testing labs to be developed at 03 circles with new test bench facility. All 3 labs will be NABL accredited.

In each lab, there shall be storage facility available for meters and allied equipment (10x10 Room) in addition to the existing structure.

In existing structure, there will be requirement civil work with respect to false celling, luminous level and cooling to adhere the requirements of IS-17025:2019

Below table given tentative cost for developing of one MMG Lab at all each of three locations.

S. No.	Description	Unit Cost (Cr)	Total Cost (Cr)
1	Creation of one bay measuring (10x16.5 m) including false ceiling , CC flooring , Bath & Toilet (10.5x 5M) etc.	0.70	2.1
2	Furniture, Administration and Supervision Charges etc.	0.20	0.6
	Total	**0.90**	**2.7**

Total cost of refurbishment of three labs will be 10.35 Cr.

Annexure-7 DPR for Energy Meter Replacement

Study of data elaborated that there are connections with are having Defective meters, No Meters and Electromechanical meters. These meters are leading to reduction in billing efficiency and thus are contributing to AT&C losses, increased provisional billing, billing error and complaints. Error in bills is leading to non-payment of bill and thus hampers the collection efficiency and increased dissatisfaction level in the customers.

Meter Requirement for Loss reduction:

Count of meters under different fault category have been captured and an estimate has been prepared based on that. There are 0.96 Lac No/Without meters cases, 2.17 Lac Defective meter cases which are already persisting. It is expected that additional 50 K meters will get defective per annum (2.5% of existing meters population) and in addition to this there are 0.40 Lac of mechanical meters in circuit. This DPR for one year targets to replace 3.53 Lac meters in first year itself that are contributing to losses.

Following table enumerates the requirements of meters along with its supply cost and installation cost which are considered for replacement in next FY 202122 for as loss reduction in different categories of meters:

Type of meter	Reason for replacement	Qty	Meter Cost (Cr)	Installation Cost (Cr)	Total Cost (Cr)
Single Phase meters	No Meters	61679	4.33	2.39	6.71
	Old Defective Meters	210500	14.76	12.61	27.37
	Electromechanical Meter	40000	2.80	2.40	5.20
Three Phase Whole Current meters	No Meters	35000	6.88	1.69	8.58
	Defective Meters	6000	1.18	0.45	1.63
	Electromechanical Meter	0	0.00	0.00	0.00
Three Phase LT CT meters	No Meters	0	0.00	0.00	0.00
	Defective Meters	100	0.02	0.02	0.04
	Electromechanical Meter	0	0.00	0.00	0.00
Three Phase HT CT meters	No Meters	0	0.00	0.00	0.00
	Defective Meters	0	0.00	0.00	0.00
	Electromechanical Meter	0	0.00	0.00	0.00
Grand Total		**353279**	**29.98**	**19.56**	**49.53**

Meter Boxes requirement:

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For installation of meters, meter box will be required to give it protection from external environment and theft. These boxes also help in ensuring increased life of meters. Below table provide details of the expenditure for installation of meters.

Meter Boxes	Year 2021-22 (Count)	Cost per unit (Rs)	Year 2021-22 Cost (Cr)
Single phase	312179	98.54	3.06
Poly Phase	41000	404.44	1.66
LTCT	100	5829.34	0.06
CTPT unit/Metering Cubical 11 KV	200	51802.00	1.04
CTPT unit/Metering Cubical 33 KV	50	167560.00	0.84
Resin Cast CT & PT for Metering Cubical	635	10487	0.67
Oil Cooled CT & PT for Feeder Meter	350	15000	0.53
Total			**7.86**

Cable Requirement:

In no meter and defective meter cases, it is expected that in 10% of cases will be there in which cable replacement will be required on account of defective or poor condition of cable

Cable Size (Sq. mm)	Cable length - (KM)	Cost per Meter (Rs)	Supply Cost of Cable (Cr)	Rate of Installation Rs / cable	Inst. cost of cable (Cr)	Total Cost (Cr)
2 Core * 4 sq. mm	1873.07	36.48	6.83	456.66	3.42	10.25
2 Core * 10 sq. mm	561.92	54.50	3.06	543.36	1.02	4.09
4 Core * 10 sq. mm	101.48	69.27	0.70	578.53	0.20	0.91
4 Core * 25 sq. mm	202.95	127.00	2.58	624.30	0.63	3.21
4 Core * 95 sq. mm	0.648	340.50	0.02	1922.10	0.004	0.03
4 core * 150 sq. mm	0.432	523.10	0.02	1922.10	0.003	0.03
Total			**13.22**		**5.27**	**18.52**

Note:

It has been estimated that in meter replacement cases, 30% cases will be there in which cable replacement will be required owing to damaged cable, short length of cable etc.Rate of installation of cable of cable is rate for installation of one length of cable up 30 M.

Metering Accessories requirements:

Below mentioned accessories are mandatory for installation of meters and to ensure communication of right revenue meters.

Accessories	Count of Accessories Required	Cost per unit (Rs)	Material Cost (Cr)	Rate of Installation (Rs)	Inst Cost of Accessories (Cr)	Total Cost (in Cr)
Modem	2200	4012	0.88	284.79	0.06	0.95
Poly carbonate seals	1943035	4.54	0.88	0.00	0.00	0.88
Total			**1.76**		**0.06**	**1.83**

Total Meter Replacement Cost

Activity	Sub Activity	Amount Crore
Meter Replacement against burnt, Faulty, Mechanical and No Meter	Meter Replacement	49.53
	Meter Box for above Meters and HT Metering Accessories	7.86
	Service Cable	18.52
	Meter Accessories Seals/ Modems etc.	1.83
Sub Total		77.74
Contingency @5%		3.89
Total		**81.63**

Annexure- 8 DPR for Smart Meter Installation

To leverage the latest metering technology, it has been envisaged that Smart metering should be deployed along with back end IT infrastructure. Out if total 270 Cr CAPEX required for 2 Yrs., 150 Cr will be required in 1st year and remaining 120 Cr for 2nd Year. Below table elaborates the requirement of smart meters for newt 2 years:

IT Hardware					
Sl. No.	**Particulars**	**Unit**	**Rate**	**Qty**	**Amount with Tax, Cr**
1	Server and Networking Infra. for HES of Smart Meter	Nos.	1,01,58,000	1	1.20
2	Server and Networking Infra. for MDM	Nos.	1,01,58,000	1	1.20
Sub-Total for IT Hardware					**2.40**
IT Software					
1	Application Software for HES- Smart Meter	Nos.	1,27,15,000	1	1.50
2	Application Software for MDM	Nos.	1,27,15,000	1	1.50
3	Integration of Smart Meter HES	Nos.	90,06,000	1	1.06
4	Integration of MDM	Nos.	90,06,000	1	1.06
5	Windows software-Smart Meter	Set	1,70,79,000	1	2.02
6	Data Analytics	Set	-	1	0.00
Sub-Total for IT Software					**7.14**
Meters					
1	Single Phase Smart Meters	Nos.	3,500	-	0.00
2	Three Phase Smart Meters	Nos.	6,400	15,000	11.33
3	Three Phase LT CT Smart Meters	Nos.	6,162	12,310	8.95
4	Three Phase HT Smart Meters	Nos.	6,162	501	0.36
Sub-Total for Meters				**27,811**	**20.64**
Communication Infra					
1	Backhaul MPLS line Hardware	Set	2,00,000	2	0.05
Sub-Total for Communication Infra					**0.05**
Meter Replacement Charges					
1	Replacement and Commissioning of Single Phase Meter	Nos.	400	-	0.00
2	Replacement and Commissioning of Three Phase Meter	Nos.	450	15,000	0.80
3	Replacement and Commissioning of LTCT Meter	Nos.	2,500	12,310	3.63
4	Replacement and Commissioning of HTCT Meter	Nos.	2,500	501	0.15
Sub-Total for Meter Replacement Charges				**27,811**	**4.58**
Meter Box Charges					
1	Meter Box for 1 Phase Meter	Nos.	250	-	0.00
2	Meter Box for 3 Phase Meter	Nos.	600	15,000	1.06

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3	Meter Box for LT CT Meter WITH CT	Nos.	5,500	12,310	7.99
4	Meter Box for HT CT Meter with CTPT	Nos.	60,000	-	0.00
Sub-Total for Meter Box				**27,310**	**9.05**
Staff and Logistical Charges					
1	Staff and logistical Charges	Nos.	-	0	2.36
Sub-Total for Staff and Logistical Charges					**2.36**
Contingency Fund					
1	Contingency Fund(5% of Total Project Value)	Nos.	-	0	1.16
Sub-Total for Contingency fund					**1.16**
Total					**47.37**

Annexure- 9 DPR for Line refurbishment for Loss Reduction

Location wise details with estimated cost for 33 KV Feeder

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
1	BWED, Bargarh	Barpali	Aug	232	132/33 KV GRID S/S	33KV GRID S/S BARPALI	10	1316408	**13164080**
2	BWED, Bargarh	Agalpur	Aug	232	132/33 KV GSS Barpali	33/11 KV PSS Charmunda	6	1316408	**7898448**
3	KEED,Bhawanipatna	KESINGA-2	New	100	BSA KESINGA	KESINGA 33/11 KV S/S	0.5	1196973	**598486**
4	TED, Titlagarh	Patnagarh	Aug	232	132/33 KV Rampur Grid	33/11 KV Patnagarh Structure	6	1316408	**7898448**
5	SED, Sonepur	Sonepur	New	232	To be tapped on 33 KV Bmpur feeder at Block Chowk	33/11 KV S/S, Sonepur	0.5	2179307	**1089653**
6	RED, Rkl	Koelnagar	New	232	Koelnagar	koelnagar	0.01	2179307	**21793**
7	RSED, Rkl	BONAI FEDDER	New	232	JALDA C BLOCK PANCH AYAT	33/11 KV GRID S/S JALDA	2.4	2179307	**5230336**
8	RED, Rajgangpur	33KV KALUNGA	Aug	232	KEDIA CARBON PLANT	GOTIDHARA CHOWK	4	1316408	**5265632**
9	RED, Rajgangpur	33KV INDUSTRIAL	Aug	232	MARANG PEDI	SLM METAL	0.25	1316408	**329102**
10	RED, Rajgangpur	33KV INDUSTRIAL	Aug	232	AURN STEEL	SPONGE UDYOG	0.4	1316408	**526563**
11	RED, Rajgangpur	33KV INDUSTRIAL	Aug	232	R.B AGARWALA	SEETA SPONGE	0.3	1316408	**394922**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
12	RED, Rajgangpur	BIRMITRAPUR	Aug	232	GOBIRA	PSS BIRMITRAPUR	13	1316408	**17113304**
13	RED, Rajgangpur	ROURKELA-1	Aug	232	BILAIGARH ISOLATOR	Kalunga	13	1316408	**17113304**
14	RED, Rajgangpur	ROURKELA-2	Aug	232	BILAIGARH ISOLATOR	M/s Radhakrishna Ispat	13.5	1316408	**17771508**
15	RED, Rajgangpur	IDC-SAWMILL LINK LINE	New	232	IDC S/S	SAWMILL S/S	2.3	2179307	**5012406**
16	RED, Rajgangpur	ROURKELA - 2	New	232	PSS MANDIA KUDAR	ROURKELA -2	1.5	2179307	**3268960**
Total							**73.66**		**102696948**

Location wise details with estimated cost for 11KV Feeder

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
1	BED, Bargarh	Ghulipali	New	100	Division -I Old	Ghulipali Chowk	0.7	611211	427848
2	BED, Bargarh	Gobindpali	New	100	Division -2 Capex Grid	Canal Chowk	1.7	611211	1039059
3	BED, Bargarh	Attabira town	Aug	100	Putubandh	Chudamill	0.2	408270	81654
4	BED, Bargarh		Aug	100	Baimantikra	Andhrapada	2	408270	816540
5	BED, Bargarh	saranda	Aug	100	Attabira grid	Saranda chowk	4	408270	1633080
6	BED, Bargarh	Industrial-1	Aug	100	Padhanpali	Pole factory/Rly Station	2.5	408270	1020675

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
7	BED, Bargarh	RENGALI CAMP	Aug	100	Attabira grid	RENGALI CAMP CHOWK	2	408270	816540
8	BED, Bargarh	Pvt.Bus Stand	Aug	100	Rly Stn Rd	Sambad Office	2	408270	816540
9	BED, Bargarh	Pvt.Bus Stand	Aug	100	Master Tikra	Goru Market	2	408270	816540
10	BED, Bargarh	Town-1	Aug	100	sadarfandi	Khajurkanta	2	408270	816540
11	BED, Bargarh	Town-1	Aug	100	sadarfandi	Nadikhandi	2.8	408270	1143156
12	BED, Bargarh	Town-1	Aug	100	Nadikhandi	Baltitikra	2	408270	816540
13	BED, Bargarh	Town-2	Aug	100	govt bus stand	Gajanan complex	0.7	408270	285789
14	BED, Bargarh	Town-2	Aug	100	Gourpada	Hospital	0.8	408270	326616
15	BED, Bargarh	Industrial-1	Aug	100	Fandi	Ruhuniatikra	2.5	408270	1020675
16	BED, Bargarh	Pvt.Bus Stand	Aug	100	Div-2 capex	Pvt.Bus Stand	1.6	408270	653232
17	BED, Bargarh	Bandutikira	Aug	100	Div-2 capex	Bandutikira	1.5	408270	612405
18	BED, Bargarh	Bandutikira	Aug	100	Div-2 capex	Back Side SDO-I Office	1.2	408270	489924
19	BED, Bargarh	Town	Aug	100	turunga	ambapali chowk	10	408270	4082700
20	BWED, Bargarh	Bijepur Town	Aug	100	Hospital Chowk	Uperpada Bijepur	5	408270	2041350
21	BWED, Bargarh	Town-1	Aug	100	Town-1	Town-1	20	408270	8165400

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
22	BWED, Bargarh	Town-2	Aug	100	Town-2	Town-2	5	408270	2041350
23	KWED, Bhawanipatna	DHARAMGARH	Aug	100	33/11kv s/s	GODBHANJA	0.4	408270	163308
24	KWED, Bhawanipatna	DHARAMGARH	Aug	100	S. T SCHOOL	SUB-DIVISION OFFICE	0.5	408270	204135
25	BED, Balangir	NO -3 LALTIKARA	New	148	LALTIKARA	DHUMAMARA	5	766931	3834655
26	BED, Balangir	NO-1	New	100	SWASTIK MEDICAL	WOMENS COLLAGE SQURE	0.22	611211	134466
27	BED, Balangir	NO-2	New	100	SWASTIK MEDICAL	ATACAL	0.01	611211	6112
28	BED, Balangir	NO-3	New	100	TRANSPORT GARAGE	NALKHANDI PADA	0.15	611211	91682
29	BED, Balangir	NO-5	New	100	SIDDHI AQUa	JORE	0.03	611211	18336
30	BED, Balangir	NO-5	New	100	SIDDHI BINAYAK	KAMAKHI NAGAR	0.35	611211	213924
31	BED, Balangir	Malpada	Aug	148	Power House Grid	Ganes Chowk	8	548726	4389808
32	BED, Balangir	NO-1	Aug	100	NEW BUS STAND	SAGAR PADA &DEM PADA	3.6	408270	1469772
33	BED, Balangir	NO-2	Aug	100	RUGUDI PADA DURGA MANDAP	OFFICER COLONY	1.5	408270	612405
34	BED, Balangir	NO-5	Aug	100	GAS GODAM	SATOATHY PAN SHOP	3.2	408270	1306464

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
35	TED, Titlagarh	LIC Link	New	100	C. T. School	Shisumandir	2	611211	1222422
36	TED, Titlagarh	LIC Link	New	100	L.I.C. Office	Baisno Devi Mandir Pada	1	611211	611211
37	TED, Titlagarh	Patnagarh-I	New	148	Rampur	33/11 KV Tendapadar Grid	2	766931	1533862
38	TED, Titlagarh	Railway	New	100	33/11kv s/s Kantabanji	Railway feeder	4	611211	2444844
39	TED, Titlagarh	Town-1 Link	New	100	Near Nac park Link	Ampada Feeder-1 link	0.4	611211	244484
40	TED, Titlagarh	Town-2 Link	New	100	Chatuanka Four pole	Patnagarh 500kva s/s	0.4	611211	244484
41	TED, Titlagarh	Patnagarh-II	Aug	100	33/11 KV Patnagarh Structure	Ramji Chowk	3.5	408270	1428945
42	TED, Titlagarh	Patnagarh-II	Aug	100	Rampur 315 KVA S/S	Raampur cut point	0.3	408270	122481
43	TED, Titlagarh	Town-1	Aug	100	Signalpada	Patelcolony	8	408270	3266160
44	SED, Sonepur	Navodaya	New	55	Tarva Block	Navodaya	4	401221	1604884
45	SED, Sonepur	Collector	New	100	Grid	Nursary Chowk	3	611211	1833633
46	SED, Sonepur	Badbazar	New	100	Grid	Nalani Chowk	3.5	611211	2139239
47	SED, Sonepur	FROM BINKA FEEDER TO GULUNDA AGRICULTURE FEEDER	New	55	JHARAPADA	ANTARDACENAL ROAD	8	401221	3209768

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
48	SED, Sonepur	Santinagar	Aug	100	RWSS office	Ambedakar Chowk	0.6	408270	244962
49	RED, Rkl	Gbpalli link fdr	New	100	Amarnath Basti	Filter House	2	611211	1222422
50	RED, Rkl	Timber Colony-II	New	100	33/11kv s/s Gbpalli	Bsnl chhak	1.7	611211	1039059
51	RED, Rkl	NAYABAJAR	New	100	NAYABAJAR	SETOR-5.GOLGHAR	1.2	611211	733453
52	RED, Rkl	Plantsite	Aug	148	source	tailend	4.5	548726	2469267
53	RED, Rkl	Uditnagar	Aug	148	source	tailend	5.2	548726	2853375
54	RED, Rkl	power house	Aug	100	nirmal market	indo school	0.4	408270	163308
55	RED, Rkl	Main Road	Aug	148	source	tailend	6.3	548726	3456974
56	RSED, Rkl	RDA	New	100	C3M-89	BSNL 500KVA S/S	0.3	611211	183363
57	RSED, Rkl	LINK FEEDER	New	100	PANPOSH NAC CHOWK	COLLEGE BOUNDARY	1.5	611211	916817
58	RSED, Rkl	LINK FEEDER	New	148	SURUCHI BAKERY	4 POLE TARANGINI MARKET	0.1	766931	76693
59	RSED, Rkl	PHASE-II	New	148	GRID	NAC JJ MARKET	5	766931	3834655
60	RSED, Rkl	LAHUNIPADA	New	55	RAJAMUNDA	LAHUNIPADA	7	401221	2808547
61	RSED, Rkl	KOIDA	New	55	KOIDA	NARAYANPOSHI	10	401221	4012210
62	RSED, Rkl	PANPOSH BASTI	Aug	100	33/11 KV S/S CHHEND	RAILWAY LEVEL CROSSING	3.1	408270	1265637
63	RSED, Rkl	JALDA INDUSTRIAL FEDDER	Aug	100	JALDA A BLOCK N.H	PURNA JALDA	1.5	408270	612405

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
64	RSED, Rkl	JALDA INDUSTRIAL FEDDER	Aug	100	PURNA JALDA	NUATOLI LINE AB SWITCH	0.4	408270	163308
65	RSED, Rkl	JALDA INDUSTRIAL FEDDER	Aug	100	PURNA JALDA	PURNA JALDA SCHOOL	1	408270	408270
66	RSED, Rkl	JALDA INDUSTRIAL FEDDER	Aug	100	NUATOLI LINE AB SWITCH	KANSAR NADITOLA L.I POINT	3.5	408270	1428945
67	RSED, Rkl	JALDA TOWN FEDDER	Aug	100	JALDA GIRL HIGH SCHOOL	UTKAL NAGAR	2	408270	816540
68	RSED, Rkl	JALDA TOWN FEDDER	Aug	100	RANGILA CHOWK	GANJU MARKET	0.5	408270	204135
69	RSED, Rkl	JALDA TOWN FEDDER	Aug	100	AUTO COLONY	BANDHABASA	1.9	408270	775713
70	RSED, Rkl	JALDA TOWN FEDDER	Aug	100	GIRI BASTI	LAXMI MARKET	1.1	408270	449097
71	RSED, Rkl	JALDA TOWN FEDDER	Aug	100	AUTO COLONY	LABOUR COLONY	0.9	408270	367443
72	RSED, Rkl	JALDA TOWN FEDDER	Aug	100	AUTO COLONY	BRITANIA COLONY	2	408270	816540
73	RSED, Rkl	JALDA TOWN FEDDER	Aug	100	RH COLONY FIELD	NARAYAN MARKET	0.8	408270	326616
74	RSED, Rkl	KALINGA VIHAR	Aug	100	CHHEND GRID	HIG-A-60	2.5	408270	1020675
75	RSED, Rkl	KALINGA VIHAR	Aug	100	HIB-B-105	HIG-B-23	0.4	408270	163308
76	RSED, Rkl	KALINGA VIHAR	Aug	100	HIG-A-60	L-12,PH-III	0.3	408270	122481
77	RSED, Rkl	KALINGA VIHAR	Aug	100	MI-1	L2-108	1.5	408270	612405
78	RSED, Rkl	KALINGA VIHAR	Aug	100	MI-230	MI-190	0.25	408270	102068

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
79	RSED, Rkl	KALINGA VIHAR	Aug	100	L-II-42	L-II-55	0.15	408270	61241
80	RSED, Rkl	KALINGA VIHAR	Aug	100	HIG-A-38	HIG-B-256	0.4	408270	163308
81	RSED, Rkl	KALINGA VIHAR	Aug	100	TULSITOLA AB SWITCH	BIRSAMUNDA HIGH SCHOOL	1.75	408270	714473
82	RSED, Rkl	KALINGA VIHAR	Aug	100	PUMP HOUSE,PH-III	MIG-II=79	0.3	408270	122481
83	RSED, Rkl	KALINGA VIHAR	Aug	100	MIG-II-359	MIG-II-226	0.35	408270	142895
84	RSED, Rkl	RDA	Aug	100	CHHEND GRID	C3M-89	1.2	408270	489924
85	RSED, Rkl	RDA	Aug	100	C3L-54	S3M1-66	0.2	408270	81654
86	RSED, Rkl	RDA	Aug	100	L-I-114	TISCO Road	0.2	408270	81654
87	RSED, Rkl	RDA	Aug	100	kanak manjari school	bput metering unit	0.35	408270	142895
88	RSED, Rkl	COLLEGE FEEDER	Aug	100	DUA S/S	MAYFAIR S/S	0.8	408270	326616
89	RSED, Rkl	IND. TOWN FEEDER	Aug	100	FROM IND GRID	SURUCHI BAKERY	1	408270	408270
90	RSED, Rkl	PHASE-I	Aug	100	33/11 KV S/S	V.S.S MARKET	2.5	408270	1020675
91	RSED, Rkl	PHASE-I	Aug	100	AHUTI BHAWAN	FITNESS PARK	0.7	408270	285789
92	RSED, Rkl	LUHAKERA	Aug	100	ISPAT COLLEGE	KHATAL BASTI	0.75	408270	306203
93	RSED, Rkl	LUHAKERA	Aug	100	OMFED	BANKIA BASTI	0.25	408270	102068
94	RSED, Rkl	LUHAKERA	Aug	100	FROM SOS	BAGBUDI BASTI	0.35	408270	142895
95	RSED, Rkl	LUHAKERA	Aug	100	BANK COLONY	BAGBID 'B' BASTI	0.6	408270	244962

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
96	RED, Rajgangpur	JHARTARANG	New	100	PSS IDC	NEAR GSS KALUNGA	2.5	611211	1528028
97	RED, Rajgangpur	TCI feeder	New	100	33/11KV S/S Vedvas	Dandiapali	3.5	611211	2139239
98	RED, Rajgangpur	JAMUNANAKI	New	100	PSS KUARMUNDA	JAMUNANAKI	1	611211	611211
99	RED, Rajgangpur	RAMPAL	New	100	PSS BIRMITRAPUR	RAMPAL	15	611211	9168165
100	RED, Rajgangpur	KUTRA	New	100	POLICE STATION	FIRE STATION	0.8	611211	488969
101	RED, Rajgangpur	LAXMIPOSH	New	100	SAMLAIMUNDA	BIJADIHI	4.5	611211	2750450
102	RED, Rajgangpur	11KV VEDVYAS	Aug	100	SAWMILL CHOWK	SAWMILL	0.5	408270	204135
103	RED, Rajgangpur	11KV VEDVYAS	Aug	100	PAHADI BAR FRONT	CANAL ROAD	1	408270	408270
104	RED, Rajgangpur	IDC-III	Aug	100	33/11KV IDC S/S	KHADATOLA	3	408270	1224810
105	RED, Rajgangpur	IDC	Aug	100	JAGANNATH ENGG	BHANDATOLA	4	408270	1633080
106	RED, Rajgangpur	BIJABAHAL	Aug	100	TALSARA	RAMPAL	6	408270	2449620
107	RED, Rajgangpur	KUARMUNDA TOWN	Aug	100	PSS KUARMUNDA	TELIPOSH	9	408270	3674430

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
108	RED, Rajgangpur	PADAMPUR	Aug	100	PSS KUARMUNDA	JAMUNANAKI	12	408270	4899240
109	RED, Rajgangpur	SARVESH	Aug	100	BELDHIPA	THANA S/S	3	408270	1224810
110	RED, Rajgangpur	MANDIA KUDAR	Aug	100	PSS RAJGANGPUR	BARPALI TOLL GATE	30	408270	12248100
111	RED, Rajgangpur	KUMARKELA	Aug	100	PSS BHAGATTOLA	MANDIRIA	6	408270	2449620
112	RED, Rajgangpur	RAJGANGPUR TOWN	Aug	100	RAILWAY CROSSING SINGHAPADA	TUNGURIPALI	10	408270	4082700
113	RED, Rajgangpur	SINGARMUNDA	Aug	100	EKMA	PAMRA	3	408270	1224810
114	SED, Sundargarh	No. I	Aug	148	Sankara 33/11KV S/S	Mahesdihi	5	548726	2743630
115	SED, Sundargarh	PMU	Aug	148	Sankara 33/11KV S/S	DRDA	5	548726	2743630
116	SED, Sundargarh	College	Aug	148	College 33/11KV S/S	PHD	9	548726	4938534
117	SED, Sundargarh	RRIT	Aug	148	College 33/11KV S/S	Regent Market	6.5	548726	3566719
118	SED, Sambalpur	WESCO-I	New	100	KRUSHNA MANDIR S/S	GAPABANDHU CHOWK	0.2	611211	122242
119	SED, Sambalpur	FARMROAD	New	100	CHERUAPADA	LATH COMPLEX	0.5	611211	305606

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
120	SED, Sambalpur	GOPALPALI	Aug	100	TIKIRAPADA START	TAIL END	1.5	408270	612405
121	SED, Sambalpur	GOPALPALI	Aug	100	RANIBANDH START	TAIL END	1.4	408270	571578
122	SED, Sambalpur	REMED	Aug	100	START	TAIL END	8	408270	3266160
123	SED, Sambalpur	SAMBALPUR II	Aug	100	GRID	SAPHLAHARA	9	408270	3674430
124	SED, Sambalpur	ALINDRE	Aug	100	RIKSHAW PADA	LARVANGA	18	408270	7348860
125	SED, Sambalpur	MEDICAL	Aug	100	CHAKRABARTIPADA C/P	PATHARLINE C/P	2	408270	816540
126	SEED, Sambalpur	Dhanupali -II	New	100	Putbandh 33/11 KV S/s	Sony Hotel Dhanupali	2.3	611211	1405785
127	SEED, Sambalpur	BROOKS HILL	New	100	DEER PARK	TV S/S	0.5	611211	305606
128	SEED, Sambalpur	RAIRAKHOL	New	100	PATHAGARA	SUNDHIMUNDA	3	611211	1833633
129	SEED, Sambalpur	PODABALANDA	New	100	RAIRAKHOL GRID	PODABALANDA	10	611211	6112110
130	SEED, Sambalpur	Dhanupali	Aug	100	Bhatra	khaliabandh	2	408270	816540
131	SEED, Sambalpur	Sakhipada	Aug	100	Kalibadi	Golebazar	0.7	408270	285789

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
132	SEED, Sambalpur	C S Colony	Aug	100	Settlement	Pantha Nivas	0.5	408270	204135
133	JED, Jharsuguda	Durgamandap	New	100	Hanuman Mandir, Sarbahal	Gaudpada	0.5	611211	305606
134	JED, Jharsuguda	No.I Jharsuguda	New	100	Near Lodha SS	Back side of Big Bazar	1.2	611211	733453
135	JED, Jharsuguda	No.III Jharsuguda	New	100	Siria Bagicha	Dipupada Church	2.1	611211	1283543
136	JED, Jharsuguda	No.III Jharsuguda	New	100	Siria Bagicha	Sarasmal	0.5	611211	305606
137	JED, Jharsuguda	No.III Jharsuguda	New	100	Malipada	Gualapada	0.5	611211	305606
138	JED, Jharsuguda	LIC (Beheramal)	Aug	55	Ekatali	Towards Tower	0.3	275244	82573
139	JED, Jharsuguda	LIC (Beheramal)	Aug	55	Bombay Chowk-St. Marry Hospital	Babuabagicha	0.8	275244	220195
140	JED, Jharsuguda	Kacheri	Aug	55	BTM	BTM Kali Mandir	0.6	275244	165146
141	JED, Jharsuguda	LIC (Beheramal)	Aug	55	Beheramal Over Bridge	Radhamadhab	1.2	275244	330293
142	JED, Jharsuguda	Panchpada	Aug	55	Panchpada SH	Panchpada PHD	2.3	275244	633061
143	JED, Jharsuguda	Panchpada	Aug	55	BTM Field	Nanda S/s	0.5	275244	137622

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
144	JED, Jharsuguda	Panchpada	Aug	55	Bombey Chowk	Sital Colony	0.4	275244	110098
145	JED, Jharsuguda	LIC (Beheramal)	Aug	100	4-pole AB switch Cox Colony	Beheramal Over Bridge	1.5	408270	612405
146	JED, Jharsuguda	Sunarimunda	Aug	100	Rly Fatak	Brundamal	3	408270	1224810
147	JED, Jharsuguda	Sunarimunda	Aug	100	Rly Fatak	Pal Hights	0.8	408270	326616
148	JED, Jharsuguda	Sunarimunda	Aug	100	Near Milon Hotel	Buromal	1.5	408270	612405
149	JED, Jharsuguda	No.I Jharsuguda	Aug	100	33/11KV SS Sarasmal	Near Milon Hotel	4	408270	1633080
150	JED, Jharsuguda	No.I Jharsuguda	Aug	100	Jhanda Chowk	Jain SS	2.2	408270	898194
151	JED, Jharsuguda	No.III Jharsuguda	Aug	100	Siria Bagicha	Babuabagicha	4.5	408270	1837215
152	JED, Jharsuguda	No.I Jharsuguda	Aug	100	Mungapada	Post Mortam	2.5	408270	1020675
153	JED, Jharsuguda	Sripura	Aug	100	Sunarimunda Rly fatak	Kureibaga AB Switch	2	408270	816540
154	JED, Jharsuguda	Kali Mandir	Aug	100	Niharika 315KVA Ss	Bharat General Store	2.2	408270	898194
155	JED, Jharsuguda	Kali Mandir	Aug	100	Ghanashyam School Road	Jharmunda	2.5	408270	1020675

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
156	BNED, Brajrajnagar	BRAJRAJNAGAR	Aug	100	Kukrikani	Katabhaga 100kva S/S	2	408270	816540
157	BNED, Brajrajnagar	BRAJRAJNAGAR	Aug	100	Katabhaga 11kv line AB switch	Ratakhandi S/S	2	408270	816540
158	BNED, Brajrajnagar	TOWN	Aug	100	Training Centre	Khalguda	0.8	408270	326616
159	BNED, Brajrajnagar	TOWN	Aug	100	Sai Mandir School	Vivekanan da School	0.6	408270	244962
160	BNED, Brajrajnagar	JUNADIHI	Aug	100	Mirdhadera	Baunsbeda	0.9	408270	367443
161	BNED, Brajrajnagar	JUNADIHI	Aug	100	Bagmar	Bhatia Coal Washree	0.7	408270	285789
162	BNED, Brajrajnagar	JUNADIHI	Aug	100	Gualapada	Baunsbeda	2	408270	816540
163	BNED, Brajrajnagar	JUNADIHI	Aug	100	Nuapada	Mirdhadera	0.8	408270	326616
164	BNED, Brajrajnagar	JUNADIHI	Aug	100	Bhatia Coal Washree	Kadupada	1.2	408270	489924
165	BNED, Brajrajnagar	JUNADIHI	Aug	100	Mirdhadera Football field	Tarini Mandir	1.7	408270	694059
166	BNED, Brajrajnagar	LAMTIBAHAL	Aug	100	Nuapara S/S	By-Pass S/S	6	408270	2449620
167	BNED, Brajrajnagar	LAMTIBAHAL	Aug	100	Sanjob	Ramgard	5	408270	2041350

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 KV Feeder	Line Type	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs.)
168	BNED, Brajrajnagar	LAMTIBAHAL	Aug	100	V.L.T	Kishore Agarwal Petrol Pump	1.5	408270	612405
169	BNED, Brajrajnagar	LAMTIBAHAL	Aug	100	Bhootbangla	Daniel Public School	1.5	408270	612405
170	DED, Deogarh	Town 1	New	100	Deogarh PSS	Post office chook	2	611211	1222422
Total							**482.76**		**222544785**

Location wise details with estimated cost for LT Feeder

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
1	SED, Sambalpur	BHARATI CUB S/S	95	DTR	LADU HOTEL	0.3	870254	261076
2	SED, Sambalpur	LADU HOTEL	95	DTR	GOPABANDHU CHOWK	0.2	870254	174051
3	SED, Sambalpur	BOARD COLONY	95	DTR	MAIN ROAD	0.3	870254	261076
4	SED, Sambalpur	AGRICULTURE S/S	95	DTR	MAIN ROAD	0.2	870254	174051
5	SED, Sambalpur	HANUMAN STATUE	95	TULI HOUSE	EX CHAIR MAN HOUSE	0.3	870254	261076
6	SED, Sambalpur	LAXMI PUJA S/S	95	GURUWARA LINE	GURUDWARA LINE	0.5	870254	435127
7	SED, Sambalpur	FARMROAD	95	NANDINICOLONY	HANUMAN MANDIR	2	870254	1740508
8	SED, Sambalpur	NALIAKHANDI	95	NALIAKHANDI	CHERUAPADA	1.6	870254	1392406

Capex plan for FY 21 - 22

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
9	SED, Sambalpur	FARMROAD	95	SANJIVANI	RAILWAY SATION	3.3	870254	2871838
10	SED, Sambalpur	GURUDWARA	95	AGRESEN CHOWK	TIWARIGALI	2	870254	1740508
11	SED, Sambalpur	GHEEKUNDI	95	PATHANPADA	SUNARIPADA	3	870254	2610762
12	SED, Sambalpur	TALBHATAPADA	95	SUBSATION	DURGAMANDIR	2.4	870254	2088610
13	SED, Sambalpur	LIC BUILDING	95	LIC BUILDING	TALBHATAPADA	2	870254	1740508
14	SED, Sambalpur	MURARKA	95	MURARKA	BALAJECOLONY	2.8	870254	2436711
15	SEED, Sambalpur	GOUDAPARA S/S	95	S/S	SAMALEI MANDIR LANE	0.3	870254	261076
16	SEED, Sambalpur	Maruti nagar	95	S/s	Maruti nagar	2	870254	1740508
17	SEED, Sambalpur	Samaleswari ITI	95	S/s	Basti area	1.5	870254	1305381
18	SEED, Sambalpur	MOTIJHARAN	95	PABITRA GALI	BEAUTY PARLOUR	0.4	870254	348102
19	SEED, Sambalpur	CEMENT GODOWN	95	BACK SIDE OF LATH WORKSHOP	BASTI	0.25	870254	217564
20	SEED, Sambalpur	CEMENT GODOWN	95	BACK SIDE OF MUNNA CEMENT GODWN	BASTI	0.3	870254	261076
21	SEED, Sambalpur	PIPALTAL	50	KHASKHAS GODWN	END BASTI	0.12	689947	82794
22	SEED, Sambalpur	PIPALTAL	95	GITARANI PANDA HOUSE	MUNEER ALMIRAH FACTORY	0.3	870254	261076

Capex plan for FY 21 - 22

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
23	SEED, Sambalpur	PIPALTAL	95	BACK SIDE OF NCC MESS	GELEI BARIK HOUSE	0.25	870254	217564
24	SEED, Sambalpur	PIPALTAL	95	BACK SIDE OF COTTON FACTORY	PANIGRAHI HOUSE	0.3	870254	261076
25	SEED, Sambalpur	PIPALTAL	95	INFRONT OF ODIA UP SCHOOL SONAPALI	END BASTI	0.24	870254	208861
26	SEED, Sambalpur	DHANKUADA	95	BLOCK OFFICE FRONT	TALPADA	0.21	870254	182753
27	SEED, Sambalpur	DHANKUADA	95	INFRONT OF VETERANERY OFFICE	MISHRA HOUSE	0.21	870254	182753
28	SEED, Sambalpur	DHANKUADA	95	INFRONT OF PANCHAYAT OFF GALI	MUNDA PADA	0.4	870254	348102
29	SEED, Sambalpur	DHANKUADA	95	BACK SIDE OF CELEBRATION GARDEN	SAH U HOUSE	0.4	870254	348102
30	SEED, Sambalpur	DHANKUADA	95	BLOCK MAIN RD	BISHI HOUSE	0.21	870254	182753
31	SEED, Sambalpur	DHANKUADA	95	BLOCK MAIN RD	BACK SIDE OF PRANSANTA DASH HOUSE	0.15	870254	130538
32	SEED, Sambalpur	SONAPALI VILLAGE	95	RASI FACTORY	DIXITPALI	0.5	870254	435127
33	SEED, Sambalpur	SONAPALI VILLAGE	95	MUNDA PADA	GENGUTIPALI VIA BANDHA	0.4	870254	348102
34	SEED, Sambalpur	SONAPALI VILLAGE	95	INFRONT IF SIRAJ HOUSE	MUNDA BASTI	0.2	870254	174051
35	SEED, Sambalpur	MARKUS	95	S\S	BASTI	0.4	870254	348102
36	SEED, Sambalpur	LIYAQAT ALI	95	S\S	LIBERTY HOUSE	0.21	870254	182753

Capex plan for FY 21 - 22

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
37	SEED, Sambalpur	GAUSHIYA MASJID	95	MASJID	BASTI	0.3	870254	261076
38	SEED, Sambalpur	SONAPALI RD	95	BACK SIDE OF PARWEZ KALYAN MANDAP	MANSOOR ALI HOUSE	0.3	870254	261076
39	SEED, Sambalpur	KHETIPADA	95	S\S	TALIPADA	0.24	870254	208861
40	SEED, Sambalpur	BHUTAPADA BANDH	95	S\S	TALIPADA	0.5	870254	435127
41	SEED, Sambalpur	KHETIPADA	95	MASTER HOUSE	KASAIKHANA	0.3	870254	261076
42	SEED, Sambalpur	KHETIPADA	95	BACK SIDE OF MASTER HOUSEMASTER HOUSE	BASTI	0.21	870254	182753
43	SEED, Sambalpur	Tumbesingha	95	Tumbesingha	Tumbesingha	0.3	870254	261076
44	SEED, Sambalpur	MADABHATI S/S	95	S/S	KHANDADHIP	1.5	870254	1305381
45	SEED, Sambalpur	TIKIRA COLONY	95	S/S	BURDA ROAD	1	870254	870254
46	SEED, Sambalpur	DEHURISAHI	50	S/S	MANDIR PADA	1.5	689947	1034921
47	SEED, Sambalpur	RAMMANDIR	50	MANDIR GALI		0.6	689947	413968
48	SEED, Sambalpur	NUASAHI	50	S/S	PHD GALI	1	689947	689947
49	SEED, Sambalpur	Hawa maidan	95	Comissioner Colony		0.3	870254	261076
50	SEED, Sambalpur	SP Residance	95	S/s	SP Office	0.2	870254	174051

Capex plan for FY 21 - 22

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
51	SEED, Sambalpur	Saraswata Colony	95	Saraswata Colony		0.2	870254	174051
52	JED, Jharsuguda	COLLEGE CHOWK	95	COLLEGE CHOWK	LIC CHOWK	0.6	870254	522152
53	JED, Jharsuguda	AGRICULTURE	95	RAJIB GANDHI CHOWK	MUKUNDI STADIUM	0.7	870254	609178
54	JED, Jharsuguda	SAIDA	95	BADKISAN PADA	TUNGURIPADA	0.5	870254	435127
55	BNED, Brajrajnagar	Main Market	95	Main Market	Main Market	1	870254	870254
56	RSED, Rkl	JAMIA COLONY	95	JAMIA COLONY	JAMIA COLONY	0.5	870254	435127
57	RSED, Rkl	KOUSALAYA VIHAR	95	KOUSALAYA VIHAR	KOUSALAYA VIHAR	0.3	870254	261076
58	RSED, Rkl	MANI COLONY	95	MANI COLONY	MANI COLONY	0.4	870254	348102
59	RSED, Rkl	TARKERA	95	TARKERA	TARKERA	0.4	870254	348102
60	RSED, Rkl	MODERN INDIA	50	NEAR AUTO COLONY ROAD		0.1	689947	68995
61	RSED, Rkl	ABC COLONY	50	CHURCH	ABC COLONY ROAD	0.2	689947	137989
62	RSED, Rkl	JALDA C BLOCK BAZAR	50	NEAR DURGA MANDAP	TOWN ROAD	0.2	689947	137989
63	RSED, Rkl	TANGARPALI 1	50	BURUDIHI		0.15	689947	103492
64	RSED, Rkl	TANGARPALI 1	50	PATRA BASTI		0.2	689947	137989
65	RSED, Rkl	BANPOSH-I	95	BANPOSH	BACK SIDE BIRSAMUNDA SCHOOL	0.3	870254	261076
66	RSED, Rkl	BANPOSH-I	95	S/S	MANGARAJ HOUSE	0.3	870254	261076
67	RSED, Rkl	BANPOSH-I	95	BORELL	KALLA GALI	0.2	870254	174051
68	RSED, Rkl	BANPOSH-II	95	BANKIA ROAD	FIELD	0.3	870254	261076
69	RSED, Rkl	MUTTON SHOP	95	S/S	BUS STAND	0.25	870254	217564

Capex plan for FY 21 - 22

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
70	RSED, Rkl	S3M1-66	95	SHOPNO-1	SOUCHALAY	0.25	870254	217564
71	RSED, Rkl	TULSITOLA CHURCH	50	S/S	NEW BASTI	0.3	689947	206984
72	RSED, Rkl	GUDIA TOLA	95	DILLIP BASTI	TATA BASTI	0.4	870254	348102
73	RSED, Rkl	GUDIA TOLA	95	SUNDHI BASTI	MAIN ROAD	0.4	870254	348102
74	RSED, Rkl	CCHORATOLA	95	S/S	CHORATOLA BASTI	0.4	870254	348102
75	RSED, Rkl	PARKING	95	S/S	CHORATOLA BASTI.	0.6	870254	522152
76	RSED, Rkl	250 KVA ECR	95	ECR-250	ECR-270	0.4	870254	348102
77	RSED, Rkl	100 KVA BIDUT BASTI	95	BIDUT BASTI	DHAMARA BASTI AREA	0.6	870254	522152
78	RED, Rajgangpur	MUSLIM BASATI	50	MUSLIM BASTI	MD.ASLAM KHAN HOUSE	0.4	689947	275979
79	RED, Rajgangpur	GOIBHANGA	50	GOIBHANGA	GOIBHANGA RAILWAY GATE	0.2	689947	137989
80	RED, Rajgangpur	SHIVAM	50	SHIVAM	HIGHSCHOOL	0.4	689947	275979
81	RED, Rajgangpur	RADHAKRISHNA	50	RADHAKRISHNA	SURAJ MINERAL	0.5	689947	344974
82	RED, Rajgangpur	GOIBHANGA	50	GOIBHANGA	RIVER ROAD	0.5	689947	344974
83	RED, Rajgangpur	SARLA	50	SARLA	MALLICKPALI	0.4	689947	275979
84	RED, Rajgangpur	MAHA LAXMI	50	MAHA LAXMI	LITTLE STAR ROAD	0.3	689947	206984
85	RED, Rajgangpur	BHALUPATRA	50	BHALUPATRA	CANAL ROAD	0.5	689947	344974
86	RED, Rajgangpur	BHATAPADA	95	MAZAR	BHATI ROAD	1.2	870254	1044305
87	RED, Rajgangpur	SREERAM COLONY	95	CKT-I	TAIL END	1.7	870254	1479432

Capex plan for FY 21 - 22

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
88	BED, Bargarh	Highschool s/s	95	Boys high school	Attabira cinema hall	0.4	870254	348102
89	BED, Bargarh	Ganesh Mandir	95	Sub-station	Mahanadi Minerals	0.25	870254	217564
90	BED, Bargarh	Satsang Vihar	95	Sub-station	Satsang Mandir	0.3	870254	261076
91	BED, Bargarh	Malgodampada	95	Sub-station	Pole factory	0.3	870254	261076
92	BED, Bargarh	Reserve Police	95	Sub-station	Muncipality Dumping yard	0.3	870254	261076
93	BED, Bargarh	Mission Hospital	95	Sub-station	Mundapada	0.25	870254	217564
94	BWED, Bargarh	RCMS S/s	50	RCMS	Deoli Road	0.5	689947	344974
95	BWED, Bargarh	Bhoipada	50	High School Backside	Bhoipada	0.15	689947	103492
96	BWED, Bargarh	Rang ghar -II	95	Rang ghar -II	Tail end	0.65	870254	565665
97	BWED, Bargarh	Telipada	95	Telipada	Tail end	0.65	870254	565665
98	BWED, Bargarh	Vetenary S/s	95	Vetenary S/s	Tail end	0.65	870254	565665
99	BWED, Bargarh	Ganesh Nagar	95	Ganesh Nagar	Tail end	0.6	870254	522152
100	BED, Balangir	TRANSPORT GARAGE	95	YOGA MANDIR	KALIA HOUSE	0.6	870254	522152
101	BED, Balangir	TELIGOAT PADA	95	MANGAL MANDIR	NEAR POND	0.2	870254	174051
102	BED, Balangir	BIJAKHAMAN	95	WIND SHOP	COLONY PADA	0.4	870254	348102
103	BED, Balangir	SIDDHI BINAYAK GARDEN	95	SIDDHI BINAYAK GARDEN S/S	GAGAN SWAIN	0.7	870254	609178
104	BED, Balangir	MATKHAI MANDIR	95	MATKHAI MANDIR	NEAR POND	0.6	870254	522152
105	BED, Balangir	RCMS	95	SUSANTA KISHOR DASH	GALI LAST	0.7	870254	609178
106	BED, Balangir	GRID S/S	95	GRID S/S	BACK SIDE OF KAMALU JAIN	0.45	870254	391614

Capex plan for FY 21 - 22

S. No.	Division	Name of DTR	Conductor Details				cost/unit (Rs.)	Estimated cost (Rs.)
			Size of Proposed ABC	Location From	Location To	Length in Km		
107	BED, Balangir	CHANTI PADAR ROAD S/S	95	CHANTI PADAR ROAD S/S	JAGANNATH MANDIR	4.8	870254	4177219
108	BED, Balangir	POST OFFICE S/S	95	OFFICERS COLONY	GANTIA PADA. NAC OFFICE	0.7	870254	609178
109	BED, Balangir	SHIBA MANDIR	95	SHIBA MANDIR S/S	MAHANTI PADA,INFRONT OF THANA, MARWADIPADA	0.45	870254	391614
	Total					**69.25**		**58782966**

Annexure -10 DPR for PSS Refurbishment

Equipment details needed for refurbishment of PSS

S.No.	Description of work	UOM	Qty	Rate incl. GST (Rs)	Amount (Rs)
1	33 KV New -VCB	EA	80	849914	67993104
2	33 KV Defective VCB Replacement	EA	58	600000	34800000
3	11 KV New VCB	EA	74	456435	33776204
4	11 KV Defective VCB Replacement	EA	98	400000	39200000
5	33KV LA	EA	554	12799	7090544
6	11KV LA	EA	777	5716	4441105
Total					**187300957**

Equipment requirement with PSS Location

Sl No.	Division	Section	Name of 33/11 KV SS	VCB				Lightning Arrester	
				33 KV New (in Nos)	33 KV Def. Replacement (in Nos)	11 KV New (in Nos)	11 KV Def. Replacement (in Nos)	33 KV (in Nos)	11 KV (in Nos)
1	SED, Sambalpur	BURLA-I	MEDICAL			2	2	3	6
2	SED, Sambalpur	AINTHAPALI	AINTHAPALI			1	4		12
3	SED, Sambalpur	Goshala	Goshal	1	0	0	2	12	24
4	SED, Sambalpur	BURLA	BURLA		2	4		3	12
5	SED, Sambalpur	BADBAZAR	BADBAZAR					2	2
6	SEED, Sambalpur	DHANUPALI	Putibandh	1	0	0	0	12	24
7	SEED, Sambalpur	RAIRAKHOL	RAIRAKHOL	3	1		3	15	10
8	JED, Jharsuguda	Sahapada	Badmal	3	3	2	2	12	18
9	JED, Jharsuguda	Beheramal	Sarasmal	2	2	0	4	15	30
10	JED, Jharsuguda	Beheramal	Lahandabud	0	1				
11	JED, Jharsuguda	Pahadi	Purna		1	0	1		
12	JED, Jharsuguda	Kachery	Kachery	2		0			

Capex plan for FY 21 - 22

Sl No.	Division	Section	Name of 33/11 KV SS	VCB				Lightning Arrester	
				33 KV New (in Nos)	33 KV Def. Replacement (in Nos)	11 KV New (in Nos)	11 KV Def. Replacement (in Nos)	33 KV (in Nos)	11 KV (in Nos)
13	JED, Jharsuguda	KUCHINDA	KUCHINDA	0	1	0	2	12	15
14	BNED, Brajrajnagar	GUMADERA	MUCHBAHAL	2	0	0	0	12	12
15	BNED, Brajrajnagar	PANCHGAON	PANCHGAON	2	1	0	1	9	12
16	BNED, Brajrajnagar	BANDHBAHAL	BANDHBAHAL	0	2	1	2	6	9
17	DED, Deogarh	DEOGARH	DEOGARH	1		1		6	15
18	KEED,Bhawanipatna	KESINGA	KESINGA			1	2		6
19	KEED,Bhawanipatna	NAKTIGUDA	NAKTIGUDA	2	0	1	3	9	27
20	KEED,Bhawanipatna	COLLEGE SQUARE	KUSADUNGURI					12	12
21	KWED, Bhawanipatna	DHARAMGARH-1	DHARAMGARH	0	2			9	3
22	KWED, Bhawanipatna	JUNAGARH NO-I	JUNAGARH	0	2	0	0	3	6
23	NED, Nuapada	Khariar-I	Khariar	1					
24	NED, Nuapada	Khariar-I	Khariar		3				
25	NED, Nuapada	Khariar-I	Khariar			2			
26	NED, Nuapada	Khariar-I	Khariar				1		
27	NED, Nuapada	Khariar-I	Khariar					12	12
28	NED, Nuapada	Khariar Road-I	Khariar Road	1					
29	NED, Nuapada	Khariar Road-I	Khariar Road				1		
30	NED, Nuapada	Khariar Road-I	Khariar Road				1		
31	NED, Nuapada	Khariar Road-I	Khariar Road			1			
32	NED, Nuapada	Khariar Road-I	Khariar Road					3	12
33	NED, Nuapada	Nuapada	Nuapada	1					
34	NED, Nuapada	Nuapada	Nuapada	1					
35	NED, Nuapada	Nuapada	Nuapada				2		
36	NED, Nuapada	Nuapada	Nuapada					9	12

Capex plan for FY 21 - 22

Sl No.	Division	Section	Name of 33/11 KV SS	VCB				Lightning Arrester	
				33 KV New (in Nos)	33 KV Def. Replacement (in Nos)	11 KV New (in Nos)	11 KV Def. Replacement (in Nos)	33 KV (in Nos)	11 KV (in Nos)
37	RSED, Rkl	LATHIKATA	LATHIKATA	2	1	2	2	3	12
38	RSED, Rkl	PANPOSH	PANPOSH	1	1	2	2	3	9
39	RSED, Rkl	JALDA	JALDA						
40	RSED, Rkl	CHHEND	CHHEND	1	1		4	15	30
41	RSED, Rkl	INDUSTRIAL ESTATE	Industrial Estate	2	1			12	12
42	RSED, Rkl	INDUSTRIAL ESTATE	Pilot Project		1			9	9
43	RED, Rajgangpur	KALUNGA-I	SAWMILL					6	9
44	RED, Rajgangpur	KALUNGA-II	IDC	2	1			6	
45	RED, Rajgangpur	BIRMITRAPUR	BIRMITRAPUR	2	2	2	2	9	15
46	RED, Rajgangpur	KUARMUNDA	KUARMUNDA	2	2	2	2	21	27
47	RED, Rajgangpur	KUTRA	KUTRA	2	0	2	2	15	21
48	RED, Rajgangpur	BARGAON	BARGAON	2	3	0	1	18	21
49	RED, Rajgangpur	KANSBAHAL	MANDIAKUDAR	2	2	1	1	6	15
50	BED, Bargarh	ATTABIRA-1	ATTABIRA PSS	1		3		3	3
51	BED, Bargarh	No-1, Bargarh	Div-1	2		1		6	3
52	BED, Bargarh	No-1, Bargarh	Div-2 capex		1		1	3	
53	BWED, Bargarh	PADAMPUR-1	Padampur	3	0	6	0	12	24
54	BWED, Bargarh	BARPALI-1	Barpali	2	0	4	2	9	15
55	BWED, Bargarh	Bijepur-1	Bijepur	3	0	3	0	3	9
56	TED, Titlagarh	No.I, Titilagarh	Titilagarh	2	1	3	3	15	12
57	TED, Titlagarh	Patnagarh-I	Patnagarh	1			2	9	21
58	TED, Titlagarh	Kantabanji	Kantabanji	1	1		2	3	6
59	SED, Sonepur	BINKA	BINKA		1		1	2	
60	RED, Rkl	power house	power house			2		12	12
61	RED, Rkl	Koelnagar	Koelnagar	2			6	12	12

Capex plan for FY 21 - 22

Sl No.	Division	Section	Name of 33/11 KV SS	VCB				Lightning Arrester	
				33 KV New (in Nos)	33 KV Def. Replacement (in Nos)	11 KV New (in Nos)	11 KV Def. Replacement (in Nos)	33 KV (in Nos)	11 KV (in Nos)
62	RED, Rkl	REC	Saktinagar	3	2		2	15	9
63	RED, Rkl	MSPALLI	GBPALLI			1	1	15	12
64	RED, Rkl	BASANTI-II	BASANTI	1	3	2	0	12	6
65	RED, Rkl	BNDM	BNDM			1	1		
66	SED, Sundargarh	No. II	College		3		3	6	6
67	SED, Sundargarh	No. I	Sankara	2	1	1	2	15	18
68	SED, Sundargarh	Sargipali	Sargipali	2	1	2	4	18	18
69	SED, Sundargarh	UJALPUR	SADAR	2	1	3	3	18	18
70	SED, Sundargarh	UJALPUR	KARUABAHAL	2	1	3	3	18	18
71	SED, Sundargarh	LEFRIPADA	LEFRIPADA	2	2	1	5	15	18
72	SED, Sundargarh	HEMGIR	GARJANBAHAL	2	2	2	4	21	21
73	SED, Sundargarh	SARGIPALI	GULTHA	1		1			
74	SED, Sundargarh	SARGIPALI	DARLIPALI	2		1			
75	SED, Sundargarh	UJALPUR	TUMBAPALI	1		1			
76	BED, Balangir	NO - 4 BALANGIR	SUDPADA	1	1	1	0	0	0
77	BED, Balangir	NO - 4 BALANGIR	JAIL		1				
78	BED, Balangir	NO - 1 BALANGIR	POWER HOUSE					1	0
79	BED, Balangir	NO-II	INDUSTRIAL GRID			1			
80	BED, Balangir	NO - 3, BALANGIR	LALTIKARA			4	4	3	12
81	BED, Balangir	REC	PUINTALA					6	12
82	BED, Balangir	TUSURA	TUSURA	1				3	21
	Total			**80**	**58**	**74**	**98**	**554**	**777**

Replacement of Battery & Battery Charger at Primary substation

S.No.	Description of work	UOM	Qty	Rate incl. GST (Rs)	Amount (Rs)
1	Battery Bank	EA	45	50000.00	2250000
2	Battery Charger	EA	44	273710	12043238
					14293238

Location details where Battery & Battery Charger replacement required at Primary substation.

S.No.	Division	Section	Name of 33/11 KV SS	Battery	Battery Charger
1	SED, Sambalpur	BURLA-I	MEDICAL	√	
2	SED, Sambalpur	AINTHAPALI	AINTHAPALI		√
3	SED, Sambalpur	Goshala	Goshal	√	√
4	SED, Sambalpur	BURLA	BURLA		√
5	SED, Sambalpur	BADBAZAR	BADBAZAR	√	√
6	SEED, Sambalpur	DHANUPALI	Putibandh	√	√
7	SEED, Sambalpur	RAIRAKHOL	RAIRAKHOL	√	√
8	JED, Jharsuguda	Sahapada	Badmal		√
9	JED, Jharsuguda	Beheramal	Sarasmal	√	√
10	JED, Jharsuguda	Beheramal	Lahandabud		√
11	JED, Jharsuguda	Pahadi	Purna	√	
14	BNED, Brajrajnagar	GUMADERA	MUCHBAHAL	√	√
17	DED, Deogarh	DEOGARH	DEOGARH	√	√
20	KEED,Bhawanipatna	COLLEGE SQUARE	KUSADUNGURI	√	
21	KWED, Bhawanipatna	DHARAMGARH-1	DHARAMGARH	√	√
22	KWED, Bhawanipatna	JUNAGARH NO-I	JUNAGARH	√	√
23	NED, Nuapada	Khariar-I	Khariar	√	√
27	NED, Nuapada	Khariar-I	Khariar	√	√
32	NED, Nuapada	Khariar Road-I	Khariar Road	√	√
36	NED, Nuapada	Nuapada	Nuapada	√	√
37	RSED, Rkl	LATHIKATA	LATHIKATA	√	√
38	RSED, Rkl	PANPOSH	PANPOSH	√	√
39	RSED, Rkl	JALDA	JALDA	√	
40	RSED, Rkl	CHHEND	CHHEND	√	√
44	RED, Rajgangpur	KALUNGA-II	IDC	√	√
45	RED, Rajgangpur	BIRMITRAPUR	BIRMITRAPUR	√	√

Capex plan for FY 21 - 22

S.No.	Division	Section	Name of 33/11 KV SS	Battery	Battery Charger
46	RED, Rajgangpur	KUARMUNDA	KUARMUNDA	√	√
47	RED, Rajgangpur	KUTRA	KUTRA	√	√
48	RED, Rajgangpur	BARGAON	BARGAON	√	√
49	RED, Rajgangpur	KANSBAHAL	MANDIAKUDAR	√	√
51	BED, Bargarh	No-1, Bargarh	Div-1	√	√
53	BWED, Bargarh	PADAMPUR-1	Padampur	√	√
54	BWED, Bargarh	BARPALI-1	Barpali	√	√
55	BWED, Bargarh	Bijepur-1	Bijepur	√	√
56	TED, Titlagarh	No.I, Titilagarh	Titilagarh		√
58	TED, Titlagarh	Kantabanji	Kantabanji	√	√
60	RED, Rkl	power house	power house	√	√
61	RED, Rkl	Koelnagar	Koelnagar	√	√
62	RED, Rkl	REC	Saktinagar	√	√
64	RED, Rkl	BASANTI-II	BASANTI	√	√
65	RED, Rkl	BNDM	BNDM	√	√
66	SED, Sundargarh	No. II	College	√	√
67	SED, Sundargarh	No. I	Sankara	√	√
68	SED, Sundargarh	Sargipali	Sargipali	√	√
69	SED, Sundargarh	UJALPUR	SADAR	√	√
76	BED, Balangir	NO - 4 BALANGIR	SUDPADA	√	√
77	BED, Balangir	NO - 4 BALANGIR	JAIL	√	
78	BED, Balangir	NO - 1 BALANGIR	POWER HOUSE	√	
80	BED, Balangir	NO - 3, BALANGIR	LALTIKARA	√	√
81	BED, Balangir	REC	PUINTALA	√	√

Annexure-11 DPR for Fault Passage Indicator (FPI)

S.No.	Description of work	UOM	Qty	Rate incl. GST (Rs.)	Amount (Rs.)
1	11KV Communicable Fault Passage Indicator	EA	160	80000	12800000
2	33KV Communicable Fault Passage Indicator	EA	60	120000	7200000
					20000000

Annexure -12 DPR for LV protection at DSS

S.No.	Description of work	UOM	Qty	Rate incl. GST (Rs.)	Amount (Rs.)
1	11KV LA at DSS@3 each	SET	400	22743	9097200
2	LT ACB/ MCCB- 400 Amp	EA	25	413456	10336400
3	Switch Fuse Unit	EA	1500	55000	82500000
4	Hanging type Feeder Pillar	EA	400	56642	22656800
					124590400

Annexure -13 DPR for Installation of AB switches/ Isolators/ Insulators

S.No.	Description of work	UOM	Qty	Rate incl. GST (Rs.)	Amount (Rs.)
1	11KV AB Switch - 400 Amp	EA	900	26373	23736082
2	11KV AB Switch - 200 Amp	EA	200	20782	4156490
3	33 KV AB Switch - 400 Amp	EA	200	39643	7928575
4	HT Spacers	EA	150	35000	5250000
5	Insulator Pin/ Disc with accessories	EA	17000	2000	34000000
6	33 KV Isolator	EA	850	80000	68000000
					143071146

Annexure-14 DPR for Line, DT & PTR for Load Growth

33KV & 11KV new line, additional link-line location along with Estimate

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
1	BWED, Bargarh	Barpali Town	Aug	11	100	TAHASIL CHOWK	J.NAGAR RLY CROSSING	3.5	408270	**1428945**
2	BWED, Bargarh	Barpali Town	Aug	11	100	R.M.C CHOWK	PURNIBANDHA	3	408270	**1224810**
3	BWED, Bargarh	Barpali Town	Aug	11	100	KHARA PARA	JOGIMUNDA	2	408270	**816540**
4	BWED, Bargarh	Bijepur Town	Aug	11	100	Bijepur Grid	Charpali	7	408270	**2857890**
5	BWED, Bargarh	Bijepur Town	Aug	11	100	Bhairavpur	Manikchura	5	408270	**2041350**
6	BWED, Bargarh	Bijepur Town	Aug	11	100	S dumerpali	Birmal	5	408270	**2041350**
7	BWED, Bargarh	Barpali Town	Aug	11	100	Gandhi Chowk	Football field	0.5	408270	**204135**
8	BWED, Bargarh	Barpali Town	Aug	11	100	Daily Market	Mandir	0.8	408270	**326616**
9	BWED, Bargarh	Barpali Town	Aug	11	100	Barpali Town Feeder	Barpali Town Feeder	5	408270	**2041350**
10	BWED, Bargarh	Barpali Town	Aug	11	100	Barpali Town Feeder, Tahasil Chowk to Pharmacist College	Barpali Town Feeder, Tahasil Chowk to Pharmacist College	7	408270	**2857890**
11	BWED, Bargarh	Barpali Town	Aug	11	100	Barpali Town Feeder, Tahasil Chowk to Modern Public School	Barpali Town Feeder, Tahasil Chowk to Modern Public School	4	408270	**1633080**
12	KEED,Bhawanipatna	KESINGA	Aug	33	148	KESINGA 132/33 S/S	KESINGA 33/11 S/S	2.3	928851	**2136357**
13	KEED,Bhawanipatna	TOWN	Aug	11	100	KESINGA 33/11 S/S	NAC KESINGA	1	408270	**408270**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
14	KEED,Bhawanipatna	TOWN	Aug	11	100	NEAR YOUNG BLOOD	RAILWAY FATAK	2	408270	**816540**
15	KEED,Bhawanipatna	JAGANNATH PADA	Aug	11	100	KESINGA 33/11 S/S	EXCISE OFFICE	1.8	408270	**734886**
16	KEED,Bhawanipatna	JAGANNATH PADA	Aug	11	100	BSA CHOWCK	JAGANNATH PADA	1.3	408270	**530751**
17	KEED,Bhawanipatna	NO-3 FEEDER	Aug	11	100	NAKTIGUDA	OUAT	1	408270	**408270**
18	KEED,Bhawanipatna	NO-3 FEEDER	Aug	11	100	ALAM SUBSTATION	DSP SUBSTAION	1	408270	**408270**
19	KEED,Bhawanipatna	COLLEGE FEEDER	Aug	11	100	RESERVE ABSWTCH	TATA SHOW ROOM	5	408270	**2041350**
20	KEED,Bhawanipatna	NO-2FEEDER	Aug	11	100	NAKTIGUDA	KHRIAR CHECK GATE	2	408270	**816540**
21	KEED,Bhawanipatna	NO-2FEEDER	Aug	11	100	DARSAN SINGH SUBSTAION	ALAKAPURI SUBSTATION	1	408270	**408270**
22	KWED, Bhawanipatna	Dharamgarh	Aug	33	100	panchayat collage	sishu mandir	2.5	788395	**1970987**
23	KWED, Bhawanipatna	TOWN	New	11	100	PANCHAYAT COLLAGE	Dr PANDA KENAL ROAD	0.4	611211	**244484**
24	KWED, Bhawanipatna	KEBIDI	New	11	100	33/11 S/S	CHILCHILA CHOWK	7	611211	**4278477**
25	KWED, Bhawanipatna	TENTULIAPADA	New	11	100	33/11 S/S	TENTULIAPADA	5	611211	**3056055**
26	KWED, Bhawanipatna	KASTURA	New	11	100	TAHASIL OFFICE	HANDAKHALPADA	0.5	611211	**305605.5**
27	KWED, Bhawanipatna	BODEN	Aug	11	100	RAJIVPUR TAPPING	TALPADAR	1	408270	**408270**
28	KWED, Bhawanipatna	JUNAGARH TOWN	Aug	11	100	SUNARI BANDH	MONARK PALACE	2.5	408270	**1020675**
29	KWED, Bhawanipatna	JUNAGARH TOWN	Aug	11	100	DANGA GHATPADA	PHD OFFICE	3.5	408270	**1428945**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
30	KWED, Bhawanipatna	KASTURA	Aug	11	100	KALAMPUR CHOWK	KHALIABHATA	2.5	408270	**1020675**
31	NED, Nuapada	BADI	New	33	148	132/33 Grid	Kenal site	0.6	1772026	**1063215**
32	NED, Nuapada	Khariar Road	New	33	100	132/33 Grid	Near Gurubhej Rice Meal	5	1196973	**5984865**
33	NED, Nuapada	Khariar-I	Aug	33	232	132/33 Grid Khariar	33/11 S/S Khariar	6.5	1316408	**8556652**
34	NED, Nuapada	Khariar-II	Aug	33	232	132/33 Grid Khariar	33/11 S/S Khariar	5.5	1316408	**7240244**
35	NED, Nuapada	Banka	Aug	11	100	Gotma	Dumerpani Road	2	408270	**816540**
36	BED, Balangir	NO-1	New	11	100	CHITA MOHANTY HOUSE	SITARAM NAGAR	0.15	611211	**91681**
37	BED, Balangir	NO-1	New	11	100	DASAMATI NAGAR	RABI NAGAR	0.03	611211	**18336**
38	BED, Balangir	NO-1	New	11	100	SASTRI NAGAR PANJABI HOUSE	NANDA HOUSE	0.15	611211	**91681**
39	BED, Balangir	NO-1	New	11	100	CENTRAL SCHOOL	SASTRI NAGAR	0.12	611211	**73345**
40	BED, Balangir	NO-4	New	11	100	POLE FACTORY	BHARAT PETROL PUMP	0.03	611211	**18336**
41	BED, Balangir	NO-4	New	11	100	DOMPING YARD	HARIJAN PADA	0.47	611211	**287269**
42	BED, Balangir	NO-5	New	11	100	BAJARANG S/S	BARAI NAGAR	0.05	611211	**30560**
43	BED, Balangir	NO-5	New	11	100	RLY ROAD	UDAYA NAGAR	0.01	611211	**6112**
44	BED, Balangir	NO-5	New	11	100	RCMS	CIRCUIT HOUSE BACK SIDE	0.03	611211	**18336.33**
45	BED, Balangir	No- 3 Laltikara	Aug	11	148	Laltikara Grid	Dhumamara	8	548726	**4389808**
46	TED, Titlagarh	Patnagarh-I	New	11	100	Public School	Rampali	0.5	611211	**305605.5**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
						100 A S/S				
47	SED, Sonepur	Tarva Town-I	Aug	11	100	Block Chowk,	Sibtula	6	408270	**2449620**
48	SED, Sonepur	Tarva Town-II	Aug	11	100	Tarva, Kumbharpada	Bapuji Club	3	408270	**1224810**
49	SED, Sonepur	Majhipada	Aug	11	100	Kasturi Hotel	Dherapada	1	408270	**408270**
50	SED, Sonepur	Majhipada	Aug	11	100	Kasturi Hotel	Tahasil Office	1	408270	**408270**
51	SED, Sonepur	Majhipada	Aug	11	100	PHD office	Kasturi Hotel	1	408270	**408270**
52	SED, Sonepur	Badbazar	Aug	11	100	Bhawati Mandir	Amghat	0.5	408270	**204135**
53	SED, Sonepur	Badbazar	Aug	11	100	Kunja Hotel	Madabhati	0.5	408270	**204135**
54	SED, Sonepur	Santinagar	Aug	11	100	Ambedkar Chowk	Santinagar	0.3	408270	**122481**
55	SED, Sonepur	Santinagar	Aug	11	100	Telephone office	Treasury Office	0.2	408270	**81654**
56	SED, Sonepur	Santinagar	Aug	11	100	Santinagar Pada	Sishu Mandir	0.4	408270	**163308**
57	SED, Sonepur	Hardakhol	Aug	11	100	Block Chowk,	Poly Technic	4	408270	**1633080**
58	SED, Sonepur	Collector	Aug	11	100	Panchayat Bhawan	Jail Chowk	2	408270	**816540**
59	SED, Sonepur	Collector	Aug	11	100	Patavadi Chowk	Collector	1.2	408270	**489924**
60	SED, Sonepur	BINKA	Aug	11	100	BINKA 33/11 S/S	RAHELA	4	408270	**1633080**
61	SED, Sonepur	SANKARA	Aug	11	100	BINKA 33/11 S/S	CHARDA	8	408270	**3266160**
62	RED, Rkl	BASANTI	Aug	33	232	CHEEND 132/33 GRID S/S	BASANTI 33/11 S/S	3.2	1316408	**4212505**
63	RED, Rkl	BISRA	Aug	33	232	CISF GATE	33/11 S/S BNDM	3.6	1316408	**4739068**
64	RED, Rkl	Power House	New	11	100	nirmal market	janta niwas	0.3	611211	**183363**
65	RED, Rkl	BASANTI NAGAR	New	11	100	33/11 S/S	ICE FACTORY	3	611211	**1833633**
66	RED, Rkl	HARIPUR	New	11	100	33/11 S/S	HARIPUR	1.5	611211	**916816**
67	RED, Rkl	BNDM Town-2	New	11	100	Sector-C	D/CABIN	3.8	611211	**2322601**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
68	RED, Rkl	OSAP	Aug	11	100	LOKOBARKANI	SECTOR-7,MUNDARI	22	408270	**8981940**
69	RED, Rkl	NAYBAJAR	Aug	11	100	NIT	RAHAMAD NAGAR	8	408270	**3266160**
70	RED, Rkl	BNDM Town-2	Aug	11	100	BNDM to 33/11	D/CABIN	4.5	408270	**1837215**
71	RSED, Rkl	KBOLANG - KOIDA	New	33	232	KBOLANG	KOIDA	25	2179307	**54482675**
72	RSED, Rkl	CHHEND LINK LINE	New	33	148	33/11 IPILOT PROJECT SS	33/11 CHHEND S/S	2.5	1772026	**4430065**
73	RSED, Rkl	33 Industrial Estate Feeder	Aug	33	232	Kachara Pullia	Pilot Project	6	1316408	**7898448**
74	RSED, Rkl	33 Pilto Project Feeder	Aug	33	232	Four Pole Plastic Factory	Netaji Nagar Hill side	3	1316408	**3949224**
75	RSED, Rkl	PANPOSH -II	New	11	100	33/11 S/S KALINGA VIHAR	HOCKEY TRAINING CENTRE	1.9	611211	**1161300**
76	RSED, Rkl	JALDA TOWN FEDDER	New	11	100	JALDA A BLOCK 500AS/S	JALDA A BLOCK 250A S/S	0.1	611211	**61121**
77	RSED, Rkl	MI-1	Aug	11	100	UPPER BALIJODI	ASSURCHAPAL	4	408270	**1633080**
78	RSED, Rkl	MI-1	Aug	11	100	UPPER BALIJODI	TANGARPALLI	5	408270	**2041350**
79	RSED, Rkl	MI-2	Aug	11	100	BAJRANG CHOWK	GIRJATOLA	5	408270	**2041350**
80	RSED, Rkl	11 KV Industrial Estate Feeder	Aug	11	100	33/11 Sub Station	Khariabaha Railway Crossing	10	408270	**4082700**
81	RSED, Rkl	11 KVIndustrial Estate Feeder	Aug	11	100	Khariabaha Railway Croosing	Khariabaha End	8	408270	**3266160**
82	RSED, Rkl	11KV Gangadharapalli Feeder	Aug	11	100	33/11 Sub Station	FCI Basti	1	408270	**408270**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
83	RSED, Rkl	11 Gangadharapalli Feeder	Aug	11	100	Jail Road	Netaji nagar End	5	408270	**2041350**
84	RED, Rajgangpur	Hatibari	New	33	232	U/C GSS KUARMUNDA (220/132/33)	PSS HATIBARI	1	2179307	**2179307**
85	RED, Rajgangpur	PANCHARA	New	11	100	GETUBAHAL	SEMELKANI	2.5	611211	**1528027**
86	RED, Rajgangpur	PANCHARA	New	11	100	SEMELKANI	PANCHARA	2.6	611211	**1589148**
87	RED, Rajgangpur	PURKAPALI	New	11	100	DANAPADA	PURKAPALI	3.5	611211	**2139238**
88	RED, Rajgangpur	KHURAPALI	New	11	100	KHURAPALI	GANGAJAL	2	611211	**1222422**
89	RED, Rajgangpur	ITMA	New	11	100	KUSTUNA	BARAMILE	0.7	611211	**427847**
90	RED, Rajgangpur	BIRINGATOLI	New	11	100	BIRINGATOLI	BICHAPADA	3	611211	**1833633**
91	RED, Rajgangpur	BIRINGATOLI	New	11	100	BUDHAKATA	RAJABASA	3.5	611211	**2139238**
92	RED, Rajgangpur	KUTRA	New	11	100	KUSUMTOLI	RANCHI ROAD	2.5	611211	**1528027**
93	RED, Rajgangpur	BIRMITRAPUR TOWN-II	Aug	11	100	PSS BIRMITRAPUR	BHATI ROAD S/S	3	408270	**1224810**
94	RED, Rajgangpur	KALOSIHIRIA	Aug	11	100	PSS KUARMUNDA	PUTRIKHAMAN	10	408270	**4082700**
95	RED, Rajgangpur	HARIMACHINE	Aug	11	100	PSS RAJGANGPUR	RAMABAHAL	15	408270	**6124050**
96	RED, Rajgangpur	KHURAPALI	Aug	11	100	KHURAPALI	DANDJAMIRA	2.5	408270	**1020675**
97	RED, Rajgangpur	PURKAPALI	Aug	11	100	KHURAPALI	DANAPADA	2.5	408270	**1020675**
98	RED, Rajgangpur	ITMA	Aug	11	100	ITMA	KUSTUNA	2	408270	**816540**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
99	SED, Sundargarh	Collector	New	11	148	Sankara Grid	Collector Office	6	766931	**4601586**
100	SED, Sambalpur	MEDICAL	New	11	100	MEDICAL PSS	MEDICAL	1.4	611211	**855695**
101	SED, Sambalpur	COLLEGE	New	11	55	BAHAL PADA	JAYAMBE APARTMENT	0.3	401221	**120366**
102	SED, Sambalpur	COLLEGE	New	11	55	EKDOPADA	ARYASAMAJ	0.5	401221	**200610**
103	SED, Sambalpur	COLLEGE	New	11	100	RLY CROSSING	MALIPADA	0.4	611211	**244484**
104	SED, Sambalpur	WESCO-II	New	11	100	BURLA GRID	LIC S/S	0.5	611211	**305605**
105	SED, Sambalpur	BUDHARAJA	Aug	11	100	MAIN ROAD	BARUN ENCLAVE-II	0.3	408270	**122481**
106	SED, Sambalpur	BUDHARAJA	Aug	11	100	SRIT DTR-I	SRIT-II	0.2	408270	**81654**
107	SED, Sambalpur	BUDHARAJA	Aug	11	100	KALYAN NAGAR ROAD	EXECUTIVE COLONY DTR	0.15	408270	**61240**
108	SED, Sambalpur	FATAK	Aug	11	100	SHANTI NAGAR CHOWK	FLYOVER BRIDGE	0.4	408270	**163308**
109	SED, Sambalpur	FATAK	Aug	11	100	MAINROAD FATAK	DEHERIPALI S/S	0.15	408270	**61240**
110	SED, Sambalpur	FATAK	Aug	11	100	DAILYMARKET CHOWK	DAILYMARKET S/S	0.3	408270	**122481**
111	SED, Sambalpur	COLLEGE	Aug	11	100	HOSPITAL CHOWK	CHURCH CHOWK	0.4	408270	**163308**
112	SED, Sambalpur	COLLEGE	Aug	11	100	EKDOPADA S/S	ARYASAMAJ S/S	0.5	408270	**204135**
113	SED, Sambalpur	COLLEGE	Aug	11	100	CANAL	JAIAMBE APARTMENT	0.4	408270	**163308**
114	SED, Sambalpur	COLLEGE	Aug	11	100	GAPALMAL S/S	RAILWAY CROSSING	0.4	408270	**163308**
115	SED, Sambalpur	HPCL	Aug	11	100	HIRAKUD S/S C/P	CABLE COLONY C/P	5	408270	**2041350**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
116	SED, Sambalpur	kantapali	Aug	11	100	Amul Godaam	Mandia Dunguri vIllage	1.5	408270	**612405**
117	SED, Sambalpur	kantapali	Aug	11	100	Amul godaam	talipada,Kantapali	2.5	408270	**1020675**
118	SED, Sambalpur	WESCO	Aug	11	100	CHAINI PADA	BUTITIKIRA	3	408270	**1224810**
119	SED, Sambalpur	BADBAZAR	Aug	11	100	GIRD	BANGALI PADA	2.5	408270	**1020675**
120	SED, Sambalpur	FARM ROAD	Aug	11	100	GIRD	AGRESAN BHAWAN	3.6	408270	**1469772**
121	SED, Sambalpur	PHD	Aug	11	100	SOURCE	DHH SBP	3	408270	**1224810**
122	SED, Sambalpur	BALIBANDHA	Aug	11	100	SOURCE	NEAR SANJIVANI S/S	2	408270	**816540**
123	JED, Jharsuguda	Badmal 1	New	33	148	Badmal Biju Pattnaik Chowk	Badmal Grid s/s	2.5	1772026	**4430065**
124	JED, Jharsuguda	KUCHINDA-II	New	33	232	SAIDA BRIDGE	RAMJIPADA, KUCHINDA	6	2179307	**13075842**
125	JED, Jharsuguda	GANESHPADA	New	11	100	KUCHINDA GRID	WEEKLY MARKET	7	611211	**4278477**
126	JED, Jharsuguda	MAHULDIHI	New	11	100	KUCHINDA GRID	MAHULDIHI	8	611211	**4889688**
127	JED, Jharsuguda	TOWN-I	Aug	11	100	KUCHINDA GRID	JAY GURU MANDIR	8	408270	**3266160**
128	JED, Jharsuguda	TOWN-II	Aug	11	100	KUCHINDA GRID	MANTRI MUNDA	8	408270	**3266160**
129	JED, Jharsuguda	GHOSA	Aug	11	100	KUCHINDA GRID	GHOSA	6	408270	**2449620**
130	JED, Jharsuguda	SAIDA	Aug	11	100	KUCHINDA GRID	SAIDA	6	408270	**2449620**
131	DED, Deogarh	Town 1	New	11	100	CKT House	New Collereate	3	611211	**1833633**
132	DED, Deogarh	Town 2	Aug	11	100	Hatisala	College road	4	408270	**1633080**

Capex plan for FY 21 - 22

S. No.	Division	Name of Proposed 33 Feeder	Line Type	Voltage (KV)	Conductor Size sqmm AAAC	Location From	Location To	Length in Ckt km	cost/unit (Rs.)	Amount (Rs)
133	DED, Deogarh	RE	Aug	11	100	Deogarh PSS	Jail chook	5	408270	**2041350**
134	DED, Deogarh	Town 1	Aug	11	100	Municipality	Rajamunda	2	408270	**816540**
Total								**431.94**		**288586784**

Addition and Augmentation of DT & PTR Estimate

S.No.	Description of work	UOM	Qty	Rate incl. GST (Rs.)	Amount (Rs.)
1	Power Transformer 5 to 8 MVA	EA	12	7000000	84000000
2	Distribution Transformer 100 to 250 KVA	EA	70	350000	24500000
					108500000

Annexure- 15 DPR for Call Centre and Customer Care

S.No	Particulars	Estimated Cost (Rs Lacs)	Add GST (Rs Lacs)	Total Inc. GST (Rs Lacs
1	Infrastructure for Customer Care, Call Centre, Payment Centre and Section Offices	172.95	31.13	204.08

Annexure- 16 DPR for IT Infrastructure

S. No.	Description	Amount (Cr.)
1	Primary Data Centre	0.63
2	Front-end devices & End user licenses	10.69
3	Call Centre & Customer care Centre (IT system only)	3.76
4	DC hardware	7.11
5	DC software & Licenses (ERP, MBC, DB, OS etc.)	14
6	Locational Network	3.4
7	Communication Network	2.43
	Total	**42.02**

Annexure- 17 DPR for GIS & SCADA Implementation

Summary of Cost of GIS & SCADA Implementation in 1st Phase

S.No.	Description of work	Phase-1 Cost incl. GST (Cr)
1.	GIS Implementation	9.37
2.	SCADA Implementation	15.30
3.	GSAS Implementation	9.52
	Total	**34.19**

GIS Estimate for Phase-1

S. No	Items /Activities	Unit	Scale	Unit Price (Rs.)	Phase I (Rourkela Circle)	
					QTY	Cost (Rs.)
1	**Hardware**					
1.a	GIS application server	Nos		649650	4	2598600
1a	GIS Web Servers	Nos		649650	4	2598600
1b	GIS Integration servers	Nos		649650	4	2598600
1c	High End Work Station	Nos		200000	12	2400000
1d	Plotter	Nos		1000000	2	2000000
1e	Printer	Nos		20235	4	80940
2	**Software**					
2.a	GIS software Licence	Lumsum		25000000	1	25000000
2.b	Mobile application	Lumsum		10000	60	600000
1	Procurement of Satellite Imagery having 0.5 m or less resolution	Sq. KM	1:1000	500	9870	4935000
2	Creation of Base Map by using High Resolution Satellite Imagery	Sq. KM	1:1000	3,500	9870	34545000
3	33/11 kV substations	Nos	1:1000	5,000	58	290000
4	HT (33, 11 kV) overhead lines/underground cables along with associated line equipment such as RMUs, Distribution Transformers, Capacitors etc. & Asset Painting as per codification Logic	KM	1:1000	2,000	880	1760000
	Total					**₹ 7,94,06,740.00**
	GST @ 18 %					**₹ 1,42,93,213.20**
	Grand Total					**₹ 9,36,99,953.20**

Capex plan for FY 21 - 22

GSAS Estimate for Phase-1

S.No.	Item Description	Rate	Phase # 1	
			Qty	Total Cost (Cr.)
A	**Substation Automation System**			
A.1	**RTU/Data Concentrator for Conventional S/s** 1. RTU comprising Panels, Racks, Sub-racks, Power Supply Modules, CPU, Analog (2x16), Digital Input (10x16) & Control Output (2x16) module as per specification interfacing equipment, required converters & all other required items/accessories including complete wiring for all modules	0.22	27	5.94
A.2	Multi-Function Meter (DI/DO)10/Substation SCADA compatible for Rural Area	0.035	0	0
A.3	Prewired CMR Panel	0.001	0	0
A.4	Ethernet Switch (12 Port)	0.0089	47	0.42
A.5	Ethernet Switch (24 Port)	0.0200	47	0.94
A.6	Layer # 3 Switch	0.0100	0	0
A.7	Router	0.0100	47	0.47
A.8	**Integration support for ODSSP PSS**	0.015	20	0.3
	GSAS COST(Sub-total-A)			8.07
	GST on Total Cost @18%			1.45
	final cost of GSAS			**9.52**

Summary of SCADA Project Cost:

S.No.	Particular	Sambalpur (MCC)	Bargarh	Bolangir	Bhawani Patna	Rourkela (BCC)	Total (Excl. Taxes & duties) (Rs)	Grand Total (Inc.Taxes) (Rs.)
1	Common charges excluding Civil Infra	23299961	2402997	2747997	2552997	23072979	54076930	63810777
2	SCADA/DMS Control centre	146133075	10903310	10903310	10903310	145919862	324762867	383220183
3	Communication system @ 5 year	27600000	15350000	22250000	18350000	23700000	107250000	126555000
	Grand Total(Sub total of 1+2+3))	197033036	28656307	35901307	31806307	192692841	486089797	573585960

Phase wise Cost distribution of SCADA Implementation:

	Phase-1	Phase-2	Phase-3	Phase-4	Phase-5	
	FY21-22	FY22-23	FY23-24	FY24-25	FY25-26	Total
Total in Cr. (Including GST)	**15.30**	**21.69**	**7.00**	**6.68**	**6.7**	**57.4**
Common Charges	1.28	3.83	0.64	0.32	0.32	**6.38**
SCADA/ADMS CC	11.50	15.33	3.83	3.83	3.83	**38.32**
Communication infrastructure	2.53	2.53	2.53	2.53	2.53	**12.66**

Annexure- 18 DPR for Security system in Central stores

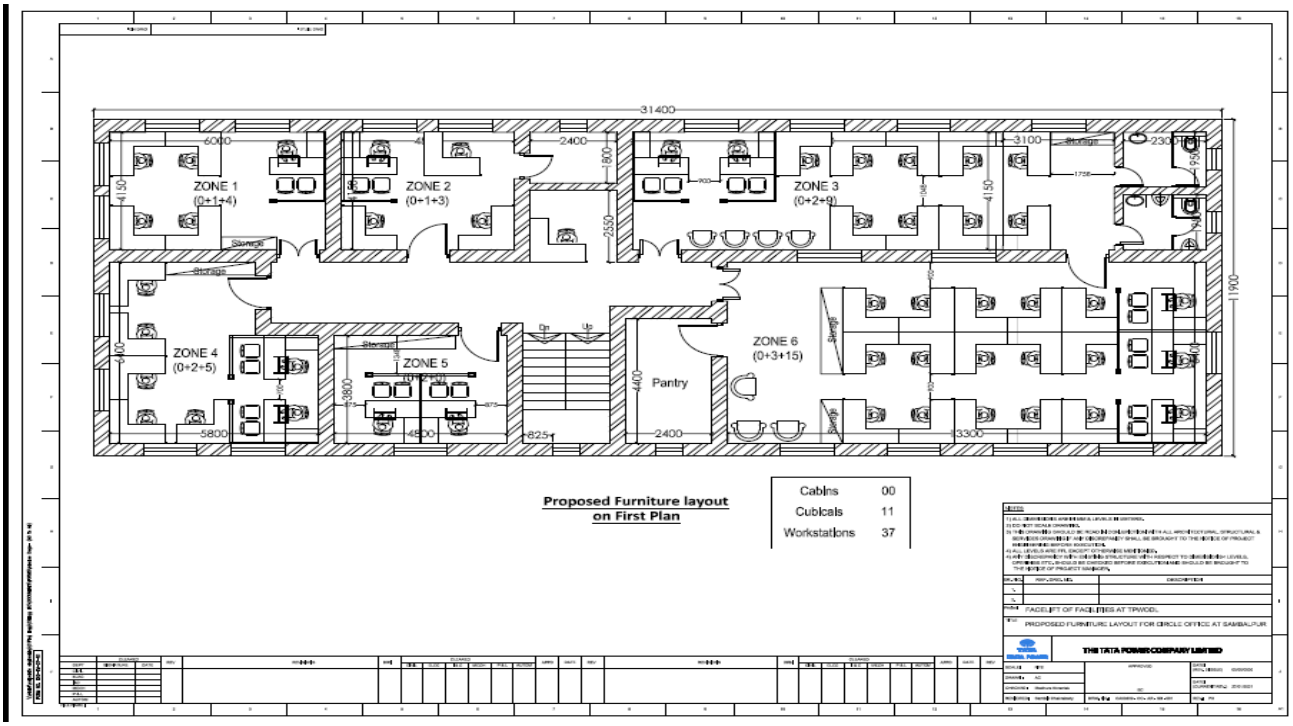
S.No	Particulars	Unit	Estimated Cost per Unit (Rs.)	No of Location	Estimated Value (Rs Lacs)
1	High Mast	NO	416666.67	5.00	20.83
2	Fire Extinguisher	LOT	625000.00	4.00	25.00
3	CCTV	NO	1333333.33	2.00	26.67
4	Watch Tower	NO	400000.00	4.00	16.00
	Total (Rs Lacs)				88.50
	Add GST @ 18%				15.93
	Grand Total (Rs Lacs)				**104.43**

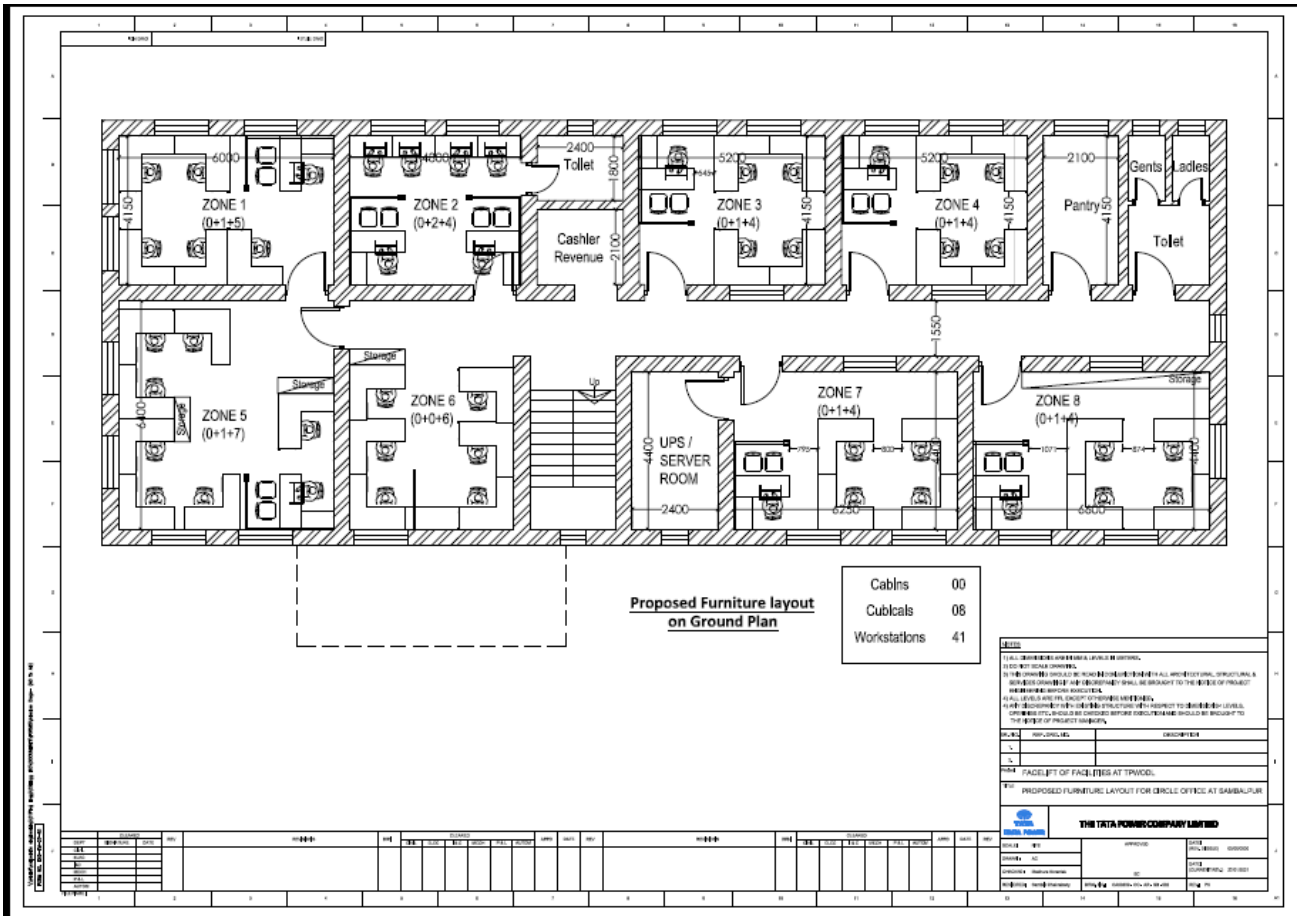
Annexure- 19 DPR for Improvement of Civil Infrastructure

S.No	Particulars	Estimated Cost (Rs Lacs)	Add GST (Rs Lacs)	Total Inc. GST (Rs Lacs)
1	Construction and Up gradation of office infrastructure,	677.78	122	799.78
2	Rehabilitation of wash room,	750.6	135.11	885.71
3	connecting road ,	14.61	2.6298	17.24
4	Record room	49.658	8.9384	58.60
5	Up gradation of Storage space	55.71	10.028	65.74
6	Creating of storage platform	64.08	11.534	75.61
7	Rehabilitation of Existing Store(Shade)	71.69	12.903	84.59
8	Construction of New Store(Shade)	54.41	9.7943	64.21
Total				**2051.48**

S.No.	Description of work	UOM	Qty	Civil Foundation Rate Inc. GST (Rs)	Amount (Rs)
1	33 KV New -VCB	EA	80	**100000**	**8000000**
2	33 KV Defective VCB Replacement	EA	58	**100000**	**5800000**
3	11 KV New VCB	EA	74	**100000**	**7400000**
4	11 KV Defective VCB Replacement	EA	98	**100000**	**9800000**
Total					**31000000**

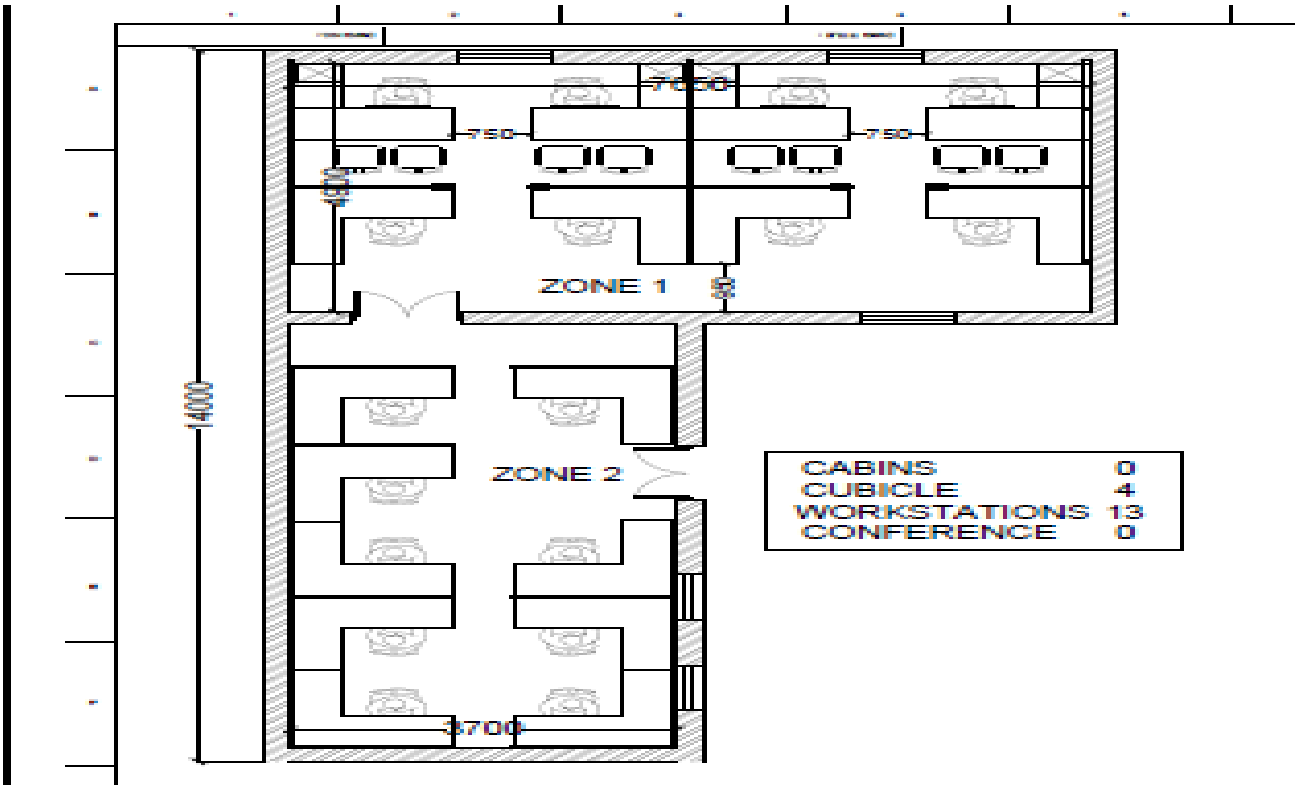
Annexure -20 DPR for Ready to Use assets for Offices





Capex plan for FY 21 - 22

Proposed Layout for 1st floor Circle Office- Sambalpur



PRAYER:

Pursuant to the direction of Honb'le Commission vide suomotu proceeding in case no 82/2020 dated 28.12.2020, para 39, TPWODL is hereby submitting the CAPEX Plan FY21-22 and prayed as follows to:

1. Admit the CAPEX Plan for FY 2021-22.
2. Approve the CAPEX plan to the extent of Rs.462.42 Crs excluding IDC and employee cost capitalization.

The above all expenditures shall be incurred in the first year of operation (i.e. FY21-22). It is submitted that these expenses are estimates based on comprehensive field visit by the team across the utility area and the petitioner is in the process of placing necessary orders for carrying out various initiatives whose cost may turn out to be in variance to the Budgeted estimates. Further, these expenditures and initial year expenditures are likely to be staggered. The estimated cost is based on first year level of activities, which the Honorable Commission shall appreciate, shall be ramped up steadily and shall reach a stable level of activity only in the next couple of years. In view of the above, it is prayed that the initial year estimates or actual expenditure may not be considered as a representative figure or base figure for determination of subsequent years costs.

3. Grant any other relief as deemed fit & proper in the facts and circumstances of this submission.

Chief Financial Officer
TPWODL