

**BEFORE THE ODISHA ELECTRICITY REGULATORY COMMISSION  
BIDYUT NIYAMAK BHAWAN  
PLOT NO. 4, OERC ROAD, SHAILASHREE VIHAR, BHUBANESWAR-751021**

**CASE NO.  
FILING NO. 1**

**IN THE MATTER OF:** An application under condition 10 of License Conditions of Odisha Power Transmission Corporation Limited (OPTCL) approved by Odisha Electricity Regulatory Commission vide order dated 27.10.2006 passed in Case No.22 of 2006.

**AND**

**IN THE MATTER OF:** Investment proposal of OPTCL taken up from FY 2025-26 to FY 2028-29 for establishment of 01 no. 400/220/33kV GSS, 01 no. 33/220kV Solar Pooling Station, 01 no. 400kV D/C (Quad) line, 01 no. 220/132kV Auto Transformer Augmentation, SAS at 03 nos. existing Substations and 04 nos. Telecom projects on availing equity/grant/loan assistance from suitable funding agency.

**AND**

**IN THE MATTER OF:** Odisha Power Transmission Corporation Ltd.  
Janpath, Bhubaneswar-751 007

--- Applicant/ Petitioner

Vs.

1. **The Chief Executive Officer**  
TP Western Odisha Distribution Ltd.  
At/PO: Burla, Dist: Sambalpur-768017
2. **The Chief Executive Officer**  
TP Southern Odisha Distribution Ltd.  
Kamapalli, Courtpetta, Berhampur, Ganjam, Odisha- 760004
3. **The Chief Executive Officer**  
TP Northern Odisha Distribution Ltd.  
At/PO: Januganj, Remuna Golei, Dist. Balasore-756019
4. **The Chief Executive Officer**  
TP Central Odisha Distribution Ltd  
IDCO Tower, 2<sup>nd</sup> Floor, Janpath, Bhubaneswar-751022
5. **The Principal Secretary to Government**  
**Department of Energy, Government of Odisha,**  
2<sup>nd</sup> floor, Kharavel Bhawan,  
Gopabandhu Marg, Keshari Nagar, Bhubaneswar-751001

--- Respondents



**The above-named applicant, Odisha Power Transmission Corporation Ltd.**

**MOST RESPECTFULLY SHOWETH:**

1. That Odisha Power Transmission Corporation Ltd. (hereinafter referred to as "OPTCL") is a deemed Transmission Licensee under fifth proviso of section 14 of the Electricity Act, 2003 (hereinafter referred to as the "Act") and as notified by the Government of Odisha in the Transfer Scheme vide Notification No. 6892 dated 09.06.2005.
2. That Odisha Electricity Regulatory Commission (hereinafter referred to as the "Commission") vide order dated 27.10.2006 passed in Case No.22 of 2006 approved the License Conditions of OPTCL, the deemed Transmission Licensee, which came into force from 1<sup>st</sup> November 2006.
3. That in terms of licence condition 10.1 of the aforesaid licensee conditions, unless otherwise directed by the Commission, the licensee shall obtain prior approval of the Commission for making investment in the licensed business, if such investment is above the limits laid down at licence condition 23.1.

As per license condition 23.1, the Hon'ble Commission has specified the term "Major Investment" as any planned investment in or acquisition of transmission facilities, the cost of which, when aggregated with all other investments or acquisitions (if any) forming part of the same overall transaction, equals or exceeds Rs.10 Crore.

4. That as mentioned under aforesaid licence condition 7.1 and as per provisions contained in section 40 of the Electricity Act, 2003, OPTCL, as a Transmission Licensee, is duty bound to make investment to build, maintain and operate an efficient, coordinated and economical intra-state transmission system.
5. That in the above backdrop and in compliance to the requirement under licence condition 10, OPTCL is filing this investment proposal before the Hon'ble Commission for approval towards following projects on availing equity/grant/loan assistance from suitable funding agency.
6. The highlights of the proposal are given as under:

**System Improvement Projects:**



- Construction of 2x500MVA, 400/220/33kV GIS substation at **ERASAMA, Paradeep** with associated Transmission lines (Already approved vide order dated 01.12.2022 in case no. 57/2021. But filed again for cost escalation due to various reasons)
  - Construction of 4x100 MVA, 220/33 KV Grid Sub-Station with SAS at **Padepadar** with 220 KV D/C line with HTLS conductor connecting to existing 400/220KV Grid Sub-Station UIHEP, Mukhiguda (Line length - 13 Kms. approx.)
  - Connectivity of **NTTPP, NLC**, Talabira to 400/220/132/33 KV Grid Sub-Station, **Lapanga** through 400KV D/C (Quad) line along with extension of 02 Nos. of 400KV AIS bays at Lapanga Grid Substation (Approx. Line Length- 6.75 Kms.)
  - Commissioning of one no. 160MVA, 220/132KV BHEL make Auto Transformer in place of old 100MVA NGEF Auto Transformer-II at Grid Sub Station **Bargarh New** under EHT (O&M) Division, **Barpali** under capital work.
  - Substation Automation System (SAS) conversion of existing conventional GSSs at **Bhanjanagar, Therubali & Cuttack**.
  - Strengthening of Communication Infrastructure through OPGW Implementation and Retrofitting of RTUs in OPTCL
7. Total proposed investment of the above projects works out to **Rs. 1343.70 Cr.** and the details of estimated cost, source of funding and OERC approvals in Transmission Plan are as under:

**SUMMARY OF INVESTMENT, COST AND SOURCE OF FUNDING**

Sl. No.	NAME OF TRANSMISSION REINFORCEMENT WORKS	ESTIMATED COST (Rs. Cr.)	SOURCE OF FUNDING / SCHEME	Approved by OERC in Trans. Plan
1	2x500MVA, 400/220/33kV GIS substation at <b>ERASAMA, Paradeep</b> with associated Transmission lines	854.24	Equity-Paradeep (30:70)	case no. 18/2017 (TP), Case no. 57/2021 (IP)
2	4x100MVA, 33/220kV Solar Pooling Station at <b>Padepadar</b> with associated HTLS line for evacuation of ESPV project at Upper Indravati reservoir.	200.69	100% Grant	New project to be approved in 15 <sup>th</sup> TP



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3	400kV NTTPP, NLC, <b>Talabira-Lapanga D/C</b> (Quad) line	152.46	30:70 (Equity:Debt)	New Project to be approved in 15 <sup>th</sup> TP
4	Commissioning of 01 no. 160MVA 220/132kV Auto Transformer in place of old 100MVA Auto Trf at <b>Bargarh New GSS</b>	15.33	30:70 (Equity:Debt)	Augmentation in existing GSS
5	Substation Automation System (SAS) conversion of existing conventional GSSs at <b>Bhanjanagar, Therubali &amp; Cuttack</b>	96.63	OTSSP-II (30:70 equity:debt)	Augmentation in existing GSS
6	Strengthening of Communication Infrastructure through OPGW Implementation and Retrofitting of RTUs in OPTCL	24.35	(30:70 equity:debt)	Augmentation in existing GSS & line
	<b>TOTAL</b>	<b>1343.70</b>		

- o EFC approved the additional cost for Sl No.1.
  - o EFC Memorandum for projects at Sl. No. 2 & 4 have been submitted to Govt. for GoO for 100% & 30% Budgetary Support respectively.
  - o Project at Sl. No. 3 & 6 will be executed by OPTCL own contribution i.e. 30% equity and 70% loan.
7. That the information on the above proposed investment with regard to the following are filed along with this application as **ANNEXURE- 1 & 2** for kind perusal and approval of the Hon'ble Commission:
- a) Executive Summary
  - b) Technical Considerations
  - c) Techno-Economic justification
  - d) Implementation
  - e) Prior consultation with DISCOMs
  - f) Environmental Considerations
  - g) NPV & IRR
8. That in compliance to the requirements under aforesaid license condition 10.4, the Detailed Project Report (DPRs) containing the relevant information related to the above-mentioned projects are filed along with this application.



9. That, OPTCL hereby submits the justification for creation of each of the proposed 06 nos. projects in the respective DPRs and in the information document filed along with this application.

**PRAYER**

The applicant, Odisha Power Transmission Corporation Ltd., Bhubaneswar most respectfully requests the Hon'ble Commission to approve the investment proposal filed herein for implementation of the projects.

By the applicant  
Through

Bhubaneswar

Date 25.02.2026

Naga Lekha Barik

Sr.GM, RT&C



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- 5. The Principal Secretary to Government**  
**Department of Energy, Government of Odisha,**  
2<sup>nd</sup> floor, Kharavel Bhawan,  
Gopabandhu Marg, Keshari Nagar, Bhubaneswar-751001



*Naga Lakshmi Bank*



AFFIDAVIT VERIFYING THE APPLICATION

Sri Naba Kishore Barik, son of Shyam Sundar Barik, aged about 59 years, residing at Cuttack, do solemnly affirm and say as follows:

1. I am the Senior General Manager, Regulation, Tariff and Commercial, OPTCL, duly authorized by the said applicant to make this affidavit on its behalf.
2. The Statements made in Paragraphs 1 to 9 herein above are based on official information and I believe them to be true.

*Naba Kishore Barik*

**DEPONENT**

Bhubaneswar

Date: *25*.02.2026



**SWORN BEFORE ME**

*N. Mohanty*

**N. MOHANTY**  
**NOTARY**  
Regd. No. ON 20/94  
382, Bhoi Nagar,  
Bhubaneswar-751022

*25-02-2026*

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## 1. EXECUTIVE SUMMARY

OPTCL has technically and economically justified requirements for the immediate implementation of additional system reinforcement of its transmission network to meet the system needs for the years immediately beyond 2024. The proposed projects to be implemented by OPTCL on availing loan assistance from suitable funding agency is the immediate priority and long-term system reinforcement required for the State. The proposed addition will improve the security and supply standards of the OPTCL transmission network and reduce transmission loss. The requirement for OPTCL to undertake such investment to provide an efficient, coordinated and economical system of transmission is called for in condition 7.1 of license conditions of OPTCL (effective from 1<sup>st</sup> November 2006) approved by the Hon'ble Commission vide order dated 27.10.2006 passed in Case No.22 of 2006 and as per provisions contained in section 40 of the Electricity Act, 2003. The technical, economic and environmental aspects of the investment have been considered in compliance with condition 10 for major investments of aforesaid license conditions.

The proposed investment has been taken into account as regards the fundamental requirements to:

- Ensure that the quality of supply to consumers is maintained / improved.
- Enable OPTCL to receive an economic return.

In the light of the above requirements, the proposed investment has been developed and justified based upon:

- Comparative load flow studies using application of planning criteria to meet various combinations of load and generation patterns currently available and anticipated beyond 2024.
- Comparative loss evaluation and also comparison with the capital expenditure of the scheme proposed after capitalization.

A total investment of **Rs. 1343.70 Cr.** for the transmission schemes is proposed as follows:

### **System Improvement Projects:**

- Construction of 2x500MVA, 400/220/33kV GIS substation at **ERASAMA, Paradeep** with associated Transmission lines (Already approved vide order dated 01.12.2022 in case no. 57/2021. But filed again for cost escalation due to various reasons)

- Construction of 4x100 MVA, 220/33 KV Grid Sub-Station with SAS at **Padepadar** with 220 KV D/C line with HTLS conductor connecting to existing 400/220KV Grid Sub-Station UIHEP, Mukhiguda (Line length - 13 Kms. approx.)
- Connectivity of **NTTPP, NLC**, Talabira to 400/220/132/33 KV Grid Sub-Station, **Lapanga** through 400KV D/C (Quad) line along with extension of 02 Nos. of 400KV AIS bays at Lapanga Grid Substation (Approx. Line Length- 6.75 Kms.)
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- Substation Automation System (SAS) conversion of existing conventional GSSs at **Bhanjanagar, Therubali & Cuttack**.
- Strengthening of Communication Infrastructure through OPGW Implementation and Retrofitting of RTUs in OPTCL

#### SUMMARY OF INVESTMENT, COST AND SOURCE OF FUNDING

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2	4x100MVA, 33/220kV Solar Pooling Station at <b>Padepadar</b> with associated HTLS line for evacuation of FSPV project at Upper Indravati reservoir.	200.69	100% Grant	New project to be approved in 15 <sup>th</sup> TP
3	400kV NTTPP, NLC, <b>Talabira-Lapanga</b> D/C (Quad) line	152.46	30:70 (Equity:Debt)	New Project to be approved in 15 <sup>th</sup> TP
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	100MVA Auto Trf at <b>Bargarh New GSS</b>			
5	Substation Automation System (SAS) conversion of existing conventional GSSs at <b>Bhanjanagar, Therubali &amp; Cuttack</b>	96.63	OTSSP-II (30:70 equity:debt)	Augmentation in existing GSS
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	<b>TOTAL</b>	<b>1343.70</b>		

## 2. TECHNICAL CONSIDERATIONS

### 2.1 Planning Criteria

Maintenance of quality power supply to consumers and reduction of technical losses are achieved by application of appropriate planning criteria.

The following criteria have been considered when investigating the proposed new sub-stations as well as transmission lines with respect to the acceptable range of voltages permitted at different points of the system under both normal and contingency situation:

- At all loads under normal steady state operating conditions, the voltages at all points on the main nodal points of the interconnected system should be maintained within a tolerance of + 5% to -5% of the nominal voltage. At other locations and outgoing line circuits a higher voltage tolerance of +10% to -10% can be accepted.
- The loading of all elements should not exceed their rated values for steady state conditions.
- Under a single contingency outage i.e. under outage of any one of power element of the transmission system, the system voltage at any point should not fall below 90% of the nominal value without any immediate corrective action.
- After system re-adjustment, following any single element outage, without considering any load shedding at important load centers, the voltages and loading of all elements should return to normal acceptable levels.

- Under any low load or loss of load situation, the 400kV system voltage should not be allowed to exceed +5% of the nominal value, whereas the 220kV & 132kV system voltage can be permitted to rise to a maximum of +10%.

## 2.2 Overall conclusions of the studies performed with proposed schemes

The System Studies concluded that under the normal steady state conditions, the immediate implementation of the additional proposed sub-stations as well as transmission lines would:

- Improve the system voltage profile at all points of the transmission system.
- Reduce the loading on certain important line sections of the transmission network thereby avoiding overloading of lines or avoiding the line sections being loaded close to their respective capacities.
- Reduce the overall transmission system losses.

The single contingency outage scenario studies indicated certain line outage situations that could lead to potential problems related to overloading of remaining system lines and collapse of system voltages at locations close to the tripped line in the proposed case.

## 2.3 Review of scheme proposed

### 2.3.1 Construction of 2x500MVA, 400/220/33kV GIS substation at ERASAMA, Paradeep with associated Transmission lines (Already approved vide order dated 01.12.2022 in case no. 57/2021. But filed again for cost escalation due to various reasons)

The Scope of the transmission project are as follows:

Brief Description of the Project	Voltage Level	Transformation Capacity / Line Length
GIS Substation at Paradeep	400/220/33 kV	2x 500 MVA
Line from SIJU Earsama to New Duburi	400 kV D/C Line with Twin Moose	136.114 Kms
Line from Earsama to 220kV Paradeep(old)	220 kV D/C line with ACSR Zebra	34.871 Kms

Line from Earsama to 220kV Pratapsasan	220 kV D/C line with ACSR Zebra	61.138 Kms
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Already approved cost of Rs. **634.95** Cr. has been revised to Rs. **854.24** Cr. due to following reasons:

**GIS, Ersama:**

1. The estimate for GIS, Ersama was prepared considering creepage at 25mm/kV & galvanization thickness of equipment structures at 610 gm/sqm. But, actual execution has been done considering creepage at 31mm/kV & galvanization thickness of equipment structures at 910 gm/sqm taking the saline effect in the Sub Station area in to account.
2. After physical possession of the land from Govt. of 54.16Acr, contour survey was carried out for the entire land & soil test was carried out as per the site requirement. In the soil investigation, very low Soil Bearing Capacity (SBC) value was found. Hence, pile foundation was suggested for construction of control room building, 400KV & 220KV GIS hall, all equipment foundation, ICT, reactor, column, quarters etc.
3. The proposed NH-55 is passing adjacent to the S/s land at Ersama & Sub-station land is 4m below the proposed road level. The FGL has been fixed at existing RD road level to avoid water logging & smooth drainage of rain water in the sub staion. Accordingly, borrowed earth for filling & retaining wall to retain the borrowed earth was required.
4. The dimension of 400KV GIS hall was enhanced from 55m x15.5m to 77mx15.5m & 220KV GIS hall was enhanced from 23.5m x 12m to 43mx12m to accommodate future 4 nos. of bay in 220KV & 400KV system as per the direction of Govt. of Odisha. Due to the increase of hall dimension all the associate items like lightening, ventilation, fire alarm, EOT crane installation quantities were increased.
5. The weight of structures has been increased as per the approved design in Wind Zone-VI. At the time of estimation, the realistic data of structural weight in Zone-VI was not available.

6. Laying of Earth mat was considered for the entire S/s including future bay & treated earth pits were considered in place of non treated earth pits in the periphery of the S/s 40mm MS road & GI flat, earthing pipe quantities are increased as per the approved design & drawing.
7. In 400 kV Reactor dia, only one reactor GIS bay module was provided as per the contract/LoA. But to avoid outage in future, provision has been made for another reactor GIS bay module in Reactor dia. To add another bay module in latter stage in the same GIS room for future requirement will be difficult and will not be cost effective.
8. 2nos. 420KV isolators with one earth switch & 4nos. of 245KV, isolators with one earth switch & CSD switch were proposed for additional safety of the line & GIS.
9. Station transformer layout drawing was modified & was proposed to be installed in separate place away from ICT to avoid any damage to ICT as such type of incident occurred at 400/220KV GIS S/s Meramundali-B. For which additional 66KV HT cable & 33KV equipment of higher BIL (more than 52KV) was proposed for station supply. As it is a new item the above price are not available in BOQ or cost data.
10. In 400 KV bay extension at New Duburi the estimate was framed considering I- type one & half Circuit Breaker arrangement with switchable line reactor but such scheme was not feasible as both the line will be entry to the S/s in one direction with space constraint so to avoid such issue D-type scheme has been adopted for which electrical & civil quantities are increased.

**Associated 400kV, 220kV lines:**

1. The major increase is due to consideration of Wind Zone-6 design and non-availability of realistic data during estimation resulted in increase in quantity of tower structures, GI Nuts and Bolts in 400kV, 220kV lines & 220kV bay



extension. The new designs and drawings of the structures are duly vetted by IIT.

2. As per the soil test reports conducted at different locations, the SBC of the soil at most of the locations are found to be very low and pile type foundation has been adopted.
3. In addition to river bed Pile foundations of 1000mm diameter are considered at other locations looking at the soil strata/bearing capacity.
4. For river bed pile foundation with 1000mm dia pile, the concrete mix is M-25 and for other locations (non river bed), M-20 grade RCC has been considered.
5. Adoption of 1000mm dia pile at other locations with M-20 grade concrete have resulted increase in M-20 quantity. The increase in quantity for RCC, boring (1000mm dia) and MS Rod are due to adoption of Wind Zone-6 design and non-availability of realistic data during estimation.
6. The above increase in length of boring, quantity of concrete and weight of MS rod is as per the design developed for wind zone-VI type tower foundation which are duly vetted by IIT.

The said project is approved in 13<sup>th</sup> Transmission plan vide case no. 18/2017, Investment Proposal approval in case no. 57/2021. The working capital for the project has been availed by 30% contribution from Govt. of Odisha as Equity and 70% by availing loan from outside funding agencies.

**2.3.2 Construction of 4x100 MVA, 33/220 KV Grid Sub-Station with SAS at Padepadar with 220 KV D/C line with HTLS conductor connecting to existing 400/220KV Grid Sub-Station UIHEP, Mukhiguda (Line length - 13 Kms. approx.)**

**EXISTING SUPPLY SYSTEM**

UIHEP is a large 600 MW hydroelectric station located near **Mukhiguda in Kalahandi district of Odisha**. It generates at medium voltage at the powerhouse and then steps it up for grid evacuation. The 400/220KV S/Y there are 03 nos. of 220KV outgoing feeders to

Theruvalli and 01 no. of 400KV feeder to PGCIL. With this 225MW of Solar power injection load catering to near by areas will increase.

### **NEED OF THE PROJECT**

This project establishes a benchmark for floating solar development in India, demonstrating the technical feasibility and economic viability of large-scale water-based renewable energy installations. The comprehensive power evacuation strategy ensures reliable delivery of clean energy to the grid while preserving environmental resources and supporting sustainable development objectives. The integration of advanced monitoring, protection, and control systems ensures optimal performance while supporting the broader goals of renewable energy integration and grid modernization. This infrastructure development shall ensure future load growth demands in Kalahandi as well as Koraput Districts of Odisha.

### **SCOPE OF NEW PROPOSAL**

The proposed Supply, Erection and Commissioning of 33/220 kV AIS at AIS Grid Sub-Station at Padepadar with associated lines with an estimated cost of ₹200.69 Cr, which includes: the total scope of works as envisaged in the proposed project is as detailed below.

#### **1. 33/220kV AIS at Padepadar.**

##### **220kV bays (2 main bus scheme)**

220kV Padepadar – Mukhiguda UIHEP feeder – 2 bays.

- 220kV Power transformer – 4 bays
- 50 MVAR Bus Reactor – 1 bays
- Bus Coupler bays – 1 no.

##### **33kV Bays (Main and Transfer bus scheme)**

- 33kV Feeder– 9 bays
- 33KV Transformer – 4 bays
- 33kV Bus Coupler – 4bay
- Bus sectional bay-3 bays.

##### **Transformers & Reactors:**

- 100MVA ,33/220kV Power Transformer– 4 nos
- 50 MVAR Reactor – 1 nos

#### **2. Construction of 220 KV D/C Transmission Line**

01 no. of D/C transmission line from existing UIHEP, Mukhiguda to Proposed AIS (Polling Sub-station ) at Padepadar (Approx.13 KMs with HTLS Conductor).

**3. Construction of 220KV Bays inside UIHEP Mukhiguda**

02 nos. of 220KV Bays shall be constructed inside 400/220KV UIHEP Mukhiguda S/Y.

The working capital for the project will be availed in the form of 100% Grant from Govt. of Odisha. EFC for the same has been submitted to Govt.

**2.3.3 Connectivity of NTTTP, NLC, Talabira to 400/220/132/33 KV Grid Sub-Station, Lapanga through 400KV D/C (Quad) line along with extension of 02 Nos. of 400KV AIS bays at Lapanga Grid Substation (Approx. Line Length- 6.75 Kms.)**

**JUSTIFICATION OF THE PROJECT**

1. M/s NLCIL is setting up a Coal Based Thermal Power Project (Phase-I)- 3x 800 MW and (Phase-II)- 1x800 at Jharsuguda/ Sambalpur as an integrated Thermal Power Project of Talabira-II & III Coal Block.
2. PPA was signed between NLCIL & GRIDCO on dt. 28.09.2023 for the state share of 400MW power from phase-I of NTTTP-3X800MW and 400MW from Phase-II of NTTTP-1X800MW project.
3. MoP has been requested for entire allocation of 800 MW from NLCIL's Talabira Project (Stage-II), over and above the 400 MW already allocated under Stage-I, thereby seeking a total allocation of 1,200 MW out of the total 3,200 MW capacity of the NLCIL Talabira Project.
4. During 20<sup>th</sup> CMETS-ER held on 28.06.2023, it is concluded that 400MW intra-state Connectivity shall be through Talabira-Lapanga 400kV D/C (Quad) line.
5. Ensure uninterrupted power evacuation during N-1 contingency criteria.
6. In order to evacuate 400MW power in Phase-I and consequently 800MW power in Phase-II of NTTTP can only be possible by construction of 400 kV D/C (Quad) Moose line from proposed NTTTP, NLC, Talabira to 400/220/132/33 kV Grid Sub-Station, Lapanga along with 2 nos of 400 kV bay extension at 400/200/132/33 kV GSS, Lapanga
7. This will improve the socio-economic condition of the inhabitants and create many new opportunities for their overall development. The industrial and commercial consumers would be greatly benefited by the proposed project.

**SCOPE OF NEW PROPOSAL**

Connectivity of NTTTP, NLC, Talabira to 400/220/132/33 KV Grid Sub-Station, Lapanga through 400KV D/C (Quad) line along with extension of 02 Nos. of 400KV AIS bays at Lapanga Grid Substation

The total scope of works as envisaged in the proposed project is detailed below.

I] 400KV D/C Quad Moose transmission line from existing : 6.75 KMS

400/220/132/33KV Grid Substation at  
Lapanga to proposed NTPP, Talabira of M/s NLCIL

- |      |  |                |
|------|--|----------------|
| II]  | 400KV Line feeder bays   | : 2 Nos.       |
| III] | Sub-station auxiliaries i.e., battery and battery charger, firefighting equipment etc. | : 1 Set        |
| IV]  | OPGW   | : 6.75 Kms.    |
| V]   | Land, Control room and other civil   | : As required. |

The working capital for the said project has been availed by 30% contribution from Govt. of Odisha as Equity and 70% by availing loan from outside funding agencies. EFC for the same has been submitted to Govt.

**2.3.4 Commissioning of one no. 160MVA, 220/132KV BHEL make Auto Transformer in place of old 100MVA NGEF Auto Transformer-II at Grid Sub Station Bargarh New” under EHT (O&M) Division, Barpali under capital work.**

**NEED OF THE PROJECT**

- Peak Loading for the 2 nos. of Auto Transformer at Bargarh New GSS during summer season is 185MW.
- 132/33KV GSS, Bhatli, 132/33KV GSS, Ghens and 132/33KV GSS, Barpali availed power from Bargarh New GSS. 132/33KV GSS, Bargarh Old and 132/33KV GSS, Thuapali generally availed power from Katapali GSS but in case of failure at Katapali GSS they availed power from Bargarh New GSS. The peak load of these GSS are mentioned below:

Name of GSS	Peak Load
132/33KV GSS, Bhatli	48 MW (on dated 25.04.2025)
132/33KV GSS, Ghens	66 MW (on dated 24.04.2025)
132/33KV GSS, Barpali	60 MW (on dated 23.04.2025), availing power from Bargarh New GSS
132/33KV GSS, Bargarh Old	88 MW (on dated 20.04.2025) availing power from both side
132/33KV GSS, Thuapali	22MW (on dated 04.10.2024)

- Considering the peak load of connected GSS to Bargarh New, N-1 contingency may not be satisfied and may affect the area load adversely.
- Moreover, the 100MVA Auto TRFs is very old and completed their normal life span of service.
- By replacing the 100MVA Auto transformer with a new 160 MVA, it will be able to cater reliable & uninterrupted power supply to connected feeders and required for smooth functioning of the Grid Sub-station.

**SCOPE OF NEW PROPOSAL**

The total scope of works as envisaged in the proposed project is detailed below.

- Procurement of 1 no. 220/132KV 160MVA Auto Transformer along with NIFPES System.
- Dismantling & dragging of the 100MVA NGEF make Auto Transformer
- Erection, Installation, Testing & Commissioning of 1 no. of new 220/132KV 160MVA Auto Transformer with NIFPES System.
- Switchyard and other civil works - As required.

The working capital would be made available by availing 30% equity from Govt. of Odisha and 70% loan from outside funding agencies. EFC for the same has been submitted to Govt.

### **2.3.5 Substation Automation System (SAS) conversion of existing conventional GSSs at Bhanjanagar, Therubali & Cuttack.**

#### **NEED OF THE PROJECT**

The need for implementation of the **Substation Automation System (SAS)** at **Cuttack, Therubali, and Bhanjanagar** Grid Substations arises primarily from the **aging infrastructure, technological obsolescence, and increasing demand for reliable, real-time-controlled transmission operations** within OPTCL's network. These substations, commissioned between **1974 and 1984**, have surpassed their designed service life and continue to operate with **conventional electromechanical control and protection systems** that are no longer adequate for present-day grid management and reliability standards.

At present, these substations face certain operational challenges like high restoration time, limited remote supervision, and poor data visibility — which adversely affect system reliability and operational efficiency. In particular:

- **Cuttack GSS**, serving urban, rural, industrial, and hospital loads, experiences frequent switching operations and voltage variations that require faster, automated response systems.
- **Therubali GSS**, being connected to both **hydro generation sources** and **traction loads**, demands precise monitoring and coordination between evacuation and traction systems — which the existing manual system cannot effectively deliver.
- **Bhanjanagar GSS**, supplying mixed urban and rural feeders, lacks integrated fault recording and protection coordination, leading to increased outage durations and maintenance interventions.

In addition, the absence of digital data exchange and IEC 61850-based communication restricts these substations from integrating with the upcoming **State Transmission Asset Management System (STAMS)** platform for real-time monitoring and

grid analytics. This results in fragmented operational visibility and sub-optimal decision-making at the control centre level.

Implementation of SAS will address these deficiencies by introducing **intelligent electronic devices (IEDs), bay control units, and kiosk-based automation systems** that provide **real-time data, event logging, remote control, and self-diagnostic features**. This will substantially enhance the reliability, safety, and responsiveness of substation operations, while also reducing outage time, manpower dependency, and O&M costs.

Furthermore, the project aligns with the **Odisha Transmission System Strengthening Programme (OTSSP – Phase II)** approved by the **Government of Odisha**, under which SAS is being implemented across remaining OPTCL substations as part of the State's broader digital grid modernization drive

In summary, this project is essential to:

1. Replace obsolete systems with state-of-the-art automation infrastructure.
2. Enable remote operation and real-time monitoring through STAMS integration.
3. Improve system reliability, safety, and service continuity for critical industrial, traction, and hospital loads.

#### **SCOPE OF NEW PROPOSAL:**

- a) Conversion of existing conventional substations into SAS-enabled substations through installation of Kiosk-Based Automation System compatible with the upcoming State Transmission Asset Management System (STAMS).
- b) Retrofitting and replacement of old switchgear with new switchgear of appropriate ratings to enable SAS functionality.
- c) Up-gradation of auxiliary systems including AC Distribution Boards (ACDBs), DC Distribution Boards (DCDBs), control wiring, and associated panels to ensure reliable auxiliary power supply to SAS equipment.
- d) Integration of SAS with STAMS platform for centralized monitoring and control.
- e) At GSS Therubali, provision of complete switching and associated equipment for one presently incomplete tie bay, including circuit breakers, isolators, and CTs to enhance feeder reliability.

The entire working capital for the proposed project would be made available primarily by availing 30% Equity support from Govt. of Odisha under **OTSSP-II** scheme and rest 70% by availing loan from outside funding agency.

#### **2.3.6 Strengthening of Communication Infrastructure through OPGW Implementation and Retrofitting of RTUs in OPTCL**

Brief description of projects to be taken up by Telecom wing in the instant investment proposal are furnished below:



### **1. Replacement of Earth Wire with 48F OPGW in 16 Non-OPGW Grid Substations**

**Scope:** Replacement of conventional earth wire with 48F OPGW over 568 km covering 16 Grid Substations (Satasankha, OLC, Mania, Purusotampur, Boriguma, Paralakhemundi, Kalimela, Ghens, Kantabanji, Jayapatna, Agarpada, Bhograi, Dhenkikote, Ganesh Metaliks, Agalpur Rampur, and B C Mohanty).

**Objective:** Strengthen communication reliability, support SCADA, PMU, SAMAST & STAMS applications, and generate non-tariff revenue through fiber leasing.

**Estimated Cost:** ₹17.59 Crores

**Funding:** Own funding i.e. 30% equity and 70% loan

**Execution Mode:** Turnkey basis

### **2. Replacement of Earth Wire with 48F OPGW in 400 kV Meramundali–Mendhasal Line**

**Scope:** Replacement of conventional earth wire with 48F OPGW along the 105 km stretch of 400 kV Meramundali–Mendhasal line.

**Objective:** Provide dual-path OPGW for enhanced reliability, redundancy, and revenue generation through additional fiber capacity.

**Estimated Cost:** ₹3.86 Crores

**Funding:** Own funding i.e. 30% equity and 70% loan

**Execution Mode:** Supply through open tender; erection through existing rate-contract holders.

### **3. Supply, Testing & Commissioning of 37 Nos. Dual-Reporting Retrofitted RTUs**

**Scope:** Replacement of existing single-reporting RTUs at 37 substations with dual-reporting RTUs compatible with both MCC (SLDC – Bhubaneswar) and BCC (Meramundali).

**Objective:** Ensure redundancy and reliability under SCADA Phase-III; avoid full panel replacement and reduce maintenance cost.

**Estimated Cost:** ₹2.15 Crores

**Funding:** Own funding i.e. 30% equity and 70% loan

**Execution Mode:** Turnkey basis through open tender

### **4. Replacement of Earth Wire with 24F OPGW in 220 kV Mendhasal-Bidanasi Line**

**Scope:** Replacement of conventional earth wire with 24F OPGW along the 33.02 km stretch of 220 kV Mendhasal-Bidanasi line.

**Objective:** to replenish the OPGW that was utilized in the emergency replacement of the existing earth wire in the 220 kV Mendhasal–Bidanasi line.

**Estimated Cost:** ₹0.75 Crores

**Funding:** Own funding i.e 30% equity and 70% loan

**Execution Mode:** through open tender.

### **Summary of Telecom Projects under instant Investment Proposal**

Sl. No.	Name of the Project	Estimated Cost (₹ Crores)
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1	Replacement of Earth Wire with 48F OPGW in 16 Non-OPGW Substations	17.59
2	Replacement of Earth Wire with 48F OPGW in 400 kV Meramundali–Mendhasal Line	3.86
3	Retrofitting of 37 Dual-Reporting RTUs	2.15
4	Replacement of Earth Wire with 24F OPGW in 220 KV Mendhasal-Bidanasi Line	0.75
	<b>Total Estimated Cost</b>	<b>24.35</b>

### 3. TECHNO-ECONOMIC JUSTIFICATION

#### 3.1 Overall assessment of economic benefit

The financial analysis concludes that the immediate implementation of the proposed transmission schemes will involve additional capital expenditure (CAPEX) to the tune of **Rs. 1343.70 Cr.**, reduce the average annual losses to the extent of **14.86 MW** as compared to operation of the system without the proposed transmission schemes, which considering at a rate of Rs. 0.255 per KWH (cost of electricity transmission approved by OERC for FY 2025-26) would result in gain in revenue from transmission charge to the extent of **Rs. 2.23 Cr.** annually.

Simultaneously, anticipated revenue towards sale of additional energy to be transmitted due to immediate implementation of the proposed transmission schemes will be to the tune of **Rs. 210.15 Cr.** annually.

Hence, a total anticipated annual revenue of **Rs. 212.38 Cr.** will be generated.

#### 3.2 Capital Expenditure for the transmission scheme

The capital expenditure for the schemes has been estimated as **Rs 1343.70 Cr.** and indicated in the Table below.

#### SUMMARY OF INVESTMENT, COST AND SOURCE OF FUNDING

Sl. No.	NAME OF TRANSMISSION REINFORCEMENT WORKS	ESTIMATED COST (Rs. Cr.)	SOURCE OF FUNDING / SCHEME	Approved by OERC in Trans. Plan
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1	2x500MVA, 400/220/33kV GIS substation at <b>ERASAMA, Paradeep</b> with associated Transmission lines	854.24	Equity-Paradeep (30:70)	case no. 18/2017 (TP), Case no. 57/2021 (IP)
2	4x100MVA, 33/220kV Solar Pooling Station at <b>Padepadar</b> with associated HTLS line for evacuation of FSPV project at Upper Indravati reservoir.	200.69	100% Grant	New project to be approved in 15 <sup>th</sup> TP
3	400kV NTTTP, NLC, <b>Talabira-Lapanga D/C</b> (Quad) line	152.46	30:70 (Equity:Debt)	New Project to be approved in 15 <sup>th</sup> TP
4	Commissioning of 01 no. 160MVA 220/132kV Auto Transformer in place of old 100MVA Auto Trf at <b>Bargarh New GSS</b>	15.33	30:70 (Equity:Debt)	Augmentation in existing GSS
5	Substation Automation System (SAS) conversion of existing conventional GSSs at <b>Bhanjanagar, Therubali &amp; Cuttack</b>	96.63	OTSSP-II (30:70 equity:debt)	Augmentation in existing GSS
6	Strengthening of Communication Infrastructure through OPGW Implementation and Retrofitting of RTUs in OPTCL	24.35	(30:70 equity:debt)	Augmentation in existing GSS & line
	<b>TOTAL</b>	<b>1343.70</b>		

### 3.3 Transmission loss reduction

The loss reduction realizable by implementing the schemes is given in the table below.

#### SUMMARY OF SYSTEM LOSSES ON THE TRANSMISSION SYSTEM

Sl. No.	DESCRIPTION OF LOAD FLOW CASES	PEAK LOSSES IN MW
1	2x500MVA, 400/220/33kV GIS substation at <b>ERASAMA, Paradeep</b> with associated Transmission lines	8.01
2	4x100MVA, 33/220kV Solar Pooling Station at <b>Padepadar</b>	1.22

	with associated HTLS line for evacuation of FSPV project at Upper Indravati reservoir.	
3	400kV NTPP, NLC, Talabira-Lapanga D/C (Quad) line	5.47
4	Commissioning of 01 no. 160MVA 220/132kV Auto Transformer in place of old 100MVA Auto Trf at <b>Bargarh New GSS</b>	0.16
	<b>TOTAL</b>	<b>14.86</b>

#### 4. IMPLEMENTATION

The proposal for availing loan assistance towards execution of these proposed transmission schemes is being posed before a suitable funding agency.

#### 5. PRIOR CONSULTATION WITH DISCOMS

The Hon'ble Commission invariably in each and every ARR order of OPTCL has directed that OPTCL should have prior discussion and coordination with the DISCOMs before submission of transmission project for approval of OERC in order to avoid idle investments. Accordingly, OPTCL has made prior discussions with DISCOMs.

#### 6. ENVIRONMENTAL CONSIDERATIONS

Total 18.39 Hecter forest area is involved in below two projects

Sl. No.	DESCRIPTION OF LOAD FLOW CASES	FOREST AREA IN HECTORS
1	4x100MVA, 33/220kV Solar Pooling Station at <b>Padepadar</b> with associated HTLS line for evacuation of FSPV project at Upper Indravati reservoir.	8.39
2	400kV NTPP, NLC, Talabira-Lapanga D/C (Quad) line	10
	<b>TOTAL</b>	<b>18.39</b>

No major environmental or resettlement issues are envisaged for these additional transmission schemes.

OPTCL's policy is to generally avoid social and environmental impacts. Where this is not possible, mitigation measures are designed and implemented. A detailed mechanism for suitable and adequate environmental mitigation by compensatory afforestation is well established and generally implemented.

The Environmental Impact Assessment Study has been made and annexed with the Detailed Project Reports.

## **7. NET PRESENT VALUE & INTERNAL RATE OF RETURN**

The Net Present Value as well as the Internal Rate of Return of individual projects have been calculated and annexed with the respective Detailed Project Reports.

## ANNEXURE-2

06 nos. of DPRs of the following Investment proposals are detailed below.

- Construction of 2x500MVA, 400/220/33kV GIS substation at **ERASAMA, Paradeep** with associated Transmission lines (Already approved vide order dated 01.12.2022 in case no. 57/2021. But filed again for cost escalation due to various reasons)
- Construction of 4x100 MVA, 220/33 KV Grid Sub-Station with SAS at **Padepadar** with 220 KV D/C line with HTLS conductor connecting to existing 400/220KV Grid Sub-Station UIHEP, Mukhiguda (Line length - 13 Kms. approx.)
- Connectivity of **NTTPP, NLC**, Talabira to 400/220/132/33 KV Grid Sub-Station, **Lapanga** through 400KV D/C (Quad) line along with extension of 02 Nos. of 400KV AIS bays at Lapanga Grid Substation (Approx. Line Length- 6.75 Kms.)
- Erection and Commissioning of one no. 160MVA, 220/132KV BHEL make Auto Transformer in place of old 100MVA NGEF Auto Transformer-II at Grid Sub Station **Bargarh New**” under EHT (O&M) Division, **Barpali** under capital work.
- Substation Automation System (SAS) conversion of existing conventional GSSs at **Bhanjanagar, Therubali & Cuttack**.
- Strengthening of Communication Infrastructure through OPGW Implementation and Retrofitting of RTUs in OPTCL