ODISHA ELECTRICITY REGULATORY COMMISSION
PLOT NO.4, CHUNOKOLI, SAILASHREE VIHAR,
BHUBANESWAR - 751021
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Present : Shri U.N.Behera, Chairperson
Shri A.K.Das, Member
Shri S.K.Parhi, Member

Case No. 18/2017

M/s. OPTCL …… Petitioner

Vrs.

Department of Energy & Others …..... Respondents

In the matter of: **Application under Chapter 3 of Orissa Grid Code (OGC) Regulations 2015 read with Clause 16 of the License Conditions of OPTCL seeking approval of the Hon'ble Commission to the Intra-State Transmission Plan for Odisha for the balance period of 13th Plan (2019-20 to 2021-22).**

For Petitioner: Shri B.P.Mishra, CGM(RT&C), OPTCL
Shri U.N.Mishra, CGM(PP), OPTCL
Shri R.R.Panda, CGM(Construction), OPTCL
Shri B.K.Sahoo, CGM(O&M), OPTCL
Shri N.C.Swain, SGM (Construction), Zone-1, OPTCL
Shri C.R.Mishra, AGM, OPTCL
Shri S.K.Das, AGM, OPTCL
Shri M.S. Sahu, AGM, GRIDCO
Shri A.K.Banerjee, AGM, OPTCL
Shri A.K.Nanda, AGM, OPTCL

For Respondents: Shri S.K. Tripathy, Director (Operation), OHPC
Shri R.Mishra, GM, OPGC
Shri B.K.Sahu, GM, NESCO Utility
Shri S.K.Sahu, GM, CESU
Shri K.C.Nanda, DGM (F), WESCO Utility
Shri Dipankar Behera, DGM, CESU
Shri H.K.Satpathy, DGM, OPGC
Shri L.D.Upadhaya, AGM, NESCO Utility
Ms.M.Ghose, AGM, NESCO Utility
Shri D.N.Patra, Manager, OHPC
Shri S.K.Patra, Manager, WESCO Utility
Shri H.Behera, Manager, GRIDCO
Ms. Niharika Pattnayak, ALO, DoE, GoO

ORDER

Date of Hearing: 17.10.2017 **Date of Order:09.04.2019**

The Petitioner OPTCL (State Transmission Utility) is endorsed with responsibility of preparing a long-term Transmission System expansion plan and submit it to the Commission

for approval under various applicable provisions under Electricity Act, 2003, OGC 2015 and License Conditions. The state transmission proposal including the system strengthening schemes need to be based on planning studies and as mandated u/s 39(2) of the Electricity Act, 2003, to be finalised in consultation with CTU, State Govt., Generating Companies, Regional Power Committee, Central Electricity Authority and any person notified by the state govt. on this behalf. The extract of Electricity Act, 2003, License Condition and Odisha Grid Code, 2015 depicting the relevant provision are given below:

Extracts of Electricity Act, 2003

As per the Section 39(2) of the Electricity Act, 2003:

The functions of the State Transmission Utility shall be -

(a) to undertake transmission of electricity through intra-State transmission system;

(b) to discharge all functions of planning and co-ordination relating to intra-State transmission system with –

(i) Central Transmission Utility;
(ii) State Governments;
(iii) generating companies;
(iv) Regional Power Committees;
(v) Authority;
(vi) licensees;
(vii) any other person notified by the State Government in this behalf;

(c) to ensure development of an efficient, co-ordinated and economical system of intra-State transmission lines for smooth flow of electricity from a generating station to the load centres;

(d) XXX

Extract of Orissa Grid Code Regulations, 2015

3.8 ***PERSPECTIVE PLAN***

(1) The STU is charged with the responsibility to prepare and submit a long-term (10 years) plan to the Commission for Transmission System expansion to meet the future demand in accordance with the Licence Conditions and the practice direction of the Commission.

(2) For fulfilment of the above requirement the STU shall:

(a)Forecast the demand for power within the State in each of the succeeding five years and provide to the Commission details of the demand forecasts, data, methodology and assumptions on which the forecasts are based.

(b)GRIDCO shall prepare a least cost generation plan for the State to meet the ten years load demand as per the forecast, after examining the economic, technical and environmental aspects of all available alternatives taking into account the existing contracted generation resources and effects of demand side management.

(c) Discharge all functions of planning and co-ordination relating to the State Transmission System compatible with the above load forecast and generation plan a long-term (10 years) plan for the Transmission System in accordance with Section-39 (2) (b) of the Act, compatible with the above load forecast and generation plan in consultation with CEA. Central Transmission Utility (CTU)

shall have to be consulted in connection with systems to evacuate power from inter-State Transmission System.

(3) The STU shall prepare and submit to the Commission on an annual basis, a statement showing in respect of each of the 5 succeeding financial years forecasts of circuit capacity, power flows and loading on the Transmission System under Transmission Licence General Conditions Clause-15.5 of Appendix 4B to OERC (Conduct of Business) Regulations, 2004.

Extracts of Transmission Licence Conditions
CONDITION 16.1
The Licensee shall plan and operate the Transmission System, so as to ensure that Transmission System built, operated and maintained to provide an efficient, economical and co-ordinated system of Transmission, in accordance with the Orissa Grid Code and the Overall Performance Standards.

2. OPTCL, in obedience to the provisions under Section 39 (2) of the Electricity Act, 2003 read with Regulation 3.8 (1) of Odisha Grid Code, 2015 and Conditions 16 of the Licensee Condition has filed the Intra State Transmission Plan (ISTP) report of Odisha for the period from 2019-20 to 2021-22 on 29.3.2017. Earlier, the Commission in Case No. 79/2012 had granted in-principle approval to the feasible projects (59 Sub-stations, 57 transmission lines & capacity augmentation in 71 sub-stations) for implementation during 12th Plan period i.e. by the end of 2016-17 under Intra Sate Transmission Plan (ISTP). Subsequently, while approving the 5 year Business Plan (2014-15 to 2018-19) in Case No. 05/2016, the Commission had approved some new projects in addition to the aforesaid projects to be implemented during the period from 2015-16 to 2018-19. OPTCL has now filed the ISTP for the balance period of 13th plan i.e. for the period from 2019-20 to 2021-22. OPTCL has assigned the job to the Consultant, M/s Power Research & Development Consultants Pvt. Ltd., Bangalore for detail analysis and conduct planning studies. The report comprises of Load Flow Analysis(LFA), Short-circuit Studies(SCS) and contingency studies.

3. The system studies were carried out in the following load and generation scenario for the year 2019-20, 2020-21 & 2021-22.

Sl.No	Particulars	2019-20 (MW)	2020-21 (MW)	2021-22 (MW)
1	Total peak load	5624	5831	7433
2	Total State sector generation	2908	3644	5116
3	Total central sector share	4968	6440	10598
4	CGP share	1452	1452	1452
5	IPP generation	6584	6584	7802
6	Total generation	15912	18120	24968

OPTCL, basing on the result on the system study has proposed the following new transmission assets including installation of 120 MVAr capacitor bank in addition to 1090 MVAr proposed earlier to be available till 2018-19 during the period from 2019-20 to 2021-22.

Sl. No		2019-20	2020-21	2021-22
1	765/400 kV s/s	-	1	-
2	400/220 kV s/s	3	-	1
3	220/132/33 kV s/s	8	2	4
4	132/33 kV s/s	7	2	2
5	220 kV lines	1	-	-
6	132 kV lines	7	-	4

4. The Commission has taken up the matter, which was registered as case no. 18 of 2017. The Commission heard the parties on 20.06.2017 and asked the petitioner to submit the Transient Stability Study (TSS) report, operating status of capacitor banks, views of DISCOMs on the proposed plan & their preparedness for implementing the downstream evacuation system, views of the existing/upcoming generators etc. The representative of State Govt. present during the hearing was also requested to submit the views of the Govt. on the proposed ISTP.

5. In compliance to the aforesaid direction, OPTCL has filed its reply and the matter was again heard on 29.8.2017. On the request of the petitioner, the Commission has allowed some time to file rejoinders and posted the matter for hearing on 26.9.2017. During the hearing on 26.9.2017, the Commission directed the petitioner to submit the views of CEA, bus voltage and sub-station loading in different years etc. including the justification of installation of 1090 MVAr capacitor bank by 2018-19.

6. Heard the parties at length on 17.10.2017. The Commission vide its order dt.17.10.2017 has directed OPTCL for submission of the minutes of the meeting dt.01.09.2017 with CEA regarding establishment of 400 kV s/s at Bhadrak and Paradeep within next 7 days. OPTCL submitted that the 400 kV S/S at Narendrapur and Khuntuni have been approved by CEA in their 18th standing committee meeting on power system planning meeting. Further, the establishment of 400 kV s/s at Bhadrak and Paradeep have been discussed on 01.09.2017.OPTCL submitted the minutes of 19th meeting of standing committee on power system planning for Eastern Region held on 01.09.2017, where-in the members of the committee have agreed for construction of 2X500 MVA, 400/220 KV s/s alongwith 1X125 MVA bus reactor at Bhadrak and Paradeep as Intra State Transmission System to be implemented by OPTCL. The proposed projects are

envisaged primarily to extend reliable power to meet N-1 contingency conditions and reduce system loss.

7. During the pendency of this case i.e. when the finalisation of ISTP was under active consideration of the Commission, OPTCL also submitted investment proposals for setting up of 7 nos. of substations at Kiakata, Kalimela, Ghens, Agarpada, G. Udayagiri, Gondia and Bahugram. The Commission, in its order dated 18.10.2017 in case No.60 of 2016 had accorded in-principle approval of the said projects.

8. The officials of the Commission, for this purpose had several rounds of discussion with the concerned officials of OPTCL, verified the power system studies enclosed in the Intra State Transmission Plan upto the end of 13th plan period i.e. upto 2021-22 to ascertain the year wise requirement of transmission element to cater the growing demand and contingency conditions.

9. No representative from CEA, ERPC and PGCIL were available to furnish their views on the matter during the hearings.

10. The Petitioner OPTCL further submitted that the primary beneficiary DISCOMs would get the benefit due to proposed system reinforcement activities. Overloading of existing s/s and feeders will be reduced and the quality & reliability of power supply shall be ensured. OPTCL stated that the ISTP was prepared taking into consideration of various suggestions of DISCOMs by incorporating provisions of required nos. of 33 kV Bays in different proposed s/s. DISCOMs, the respondents in this case have also submitted that the proposed projects are very much essential to stabilise the power supply in remote areas, hence prayed for approval of the same.

11. The Commission through its officers, cross checked the following information submitted by Petitioner by discussion with OPTCL. They are as follows:

(a) Year-wise demand data on different bus vis-a-vis long term demand forecast approved by the Commission.

(b) Information on transmission element considered for the study.

(c) Information under state / Central generators and IPPs considered in the study.

(d) Load flow analysis, Short-circuit study and Transient Stability Study.

The information submitted by OPTCL on the above technical study are taken into consideration.

12. Heard the petitioner and respondents. The main objective of perspective planning is to build an economical, co-ordinated and efficient transmission system so that power from the generating stations flows unhindered to the grid sub-station maintaining specified level of voltage. With this aim in mind an appropriate Intra-State Transmission plan should be in place and STU should have a definite Road Map for commissioning of the elements of transmission system, those are technically feasible and financially viable. The petitioner, M/s OPTCL requests for approval to the Intra-State Transmission planning for the period from 2019-20 to 2021-22 based on demand forecast and business plan. We have examined the viability of the projects on the basis of the demand forecast vis-a-vis actual demand, transmission planning criteria and the system studies and the following:-

13. Variation in the demand forecast:- The difference between approved peak demand forecast and actual demand is as follows:

Year	Projected peak demand	Actual peak demand
2014-15	**4304**	**3981**
2015-16	**4700**	**4175**
2016-17	**4998**	**4105**
2017-18	**5231**	**4515**

Thus there is a need to recast the projected demand up to 2021-22 agreed by the Commission in its order dated 01.11.2014.

14. The above trend indicates that the projected and approved peak demand is much higher than the actual peak demand achieved. The growth is not in line with the forecast projected by the licensee and approved by the Commission. Therefore we do not agree with the views of OPTCL that the peak load of 7433 MW shall be achieved in 2021-22 unless a significant increase in load and a quantum leap is in place. Therefore we have to adjust the transmission planning accordingly.

15. Since the transmission planning is on the basis of demands projected years ahead of execution, care needs to be taken to avoid stranded transmission assets which will be created under above assumptions. Creation of assets are recognised as capital investments on which returns (RoE and normative interests) are automatically granted in the ARR each year for the entire life of assets usually 25-30 years with consequential increase in O&M cost despite sub-optional utilisation. This is an avoidable burden on the consumers going beyond the financial prudence; the onus of each is endowed with the Commission.

The Electricity Act 2003 and related regulations lays emphasis on investments meeting technical requirement and financial prudency to avoid stranded or underutilisation

assets of assets. Under-loaded transmission infrastructure have disadvantage of high reactive power entailing installation of reactors, high losses and stability issues the cost of which burdens the consumers ultimately techno economical feasibility and benefit vrs. cost are international norms to approve a project for further execution.

16. In accordance with the above, we have examined the projects presently under consideration of the Commission and with Transmission Planning Criteria of Central Electricity Authority.

(a) **Projects at 765 kV**:

It is proposed by the petitioner to have one 765/400 kV, 2x1500 MVA capacity s/s at Begunia to evacuate power from OTPCL generation. GRIDCO has not furnished any views in response to the interim order on dt.01.07.2017. There is no clarity and certainty on commissioning date of OTPCL generating stations and may not be in time horizon for which the approval is being short. The minutes of meeting of CEA also does not clarify the position. Therefore this projects does not find any justification at present. We decide accordingly.

(b) **Projects at 400 kV**:-

Four projects at 400/220 kV capacity have been proposed by OPTCL at Bhadrak, Paradeep, Narendrapur & Khuntuni. It was submitted during hearing that the said projects were discussed and approved by CEA in the 18th Standing Committee Meeting on power system. An extract of the above minutes of the meeting were submitted by the petitioner on 13.11.2017. From this, it is seen that 400/220 KV s/s at Bhadrak, Paradeep and Narendrapur have been examined by CEA and agreed to by all stakeholders in the said meeting at point 35-36 of the minutes, as submitted by the petitioner. Therefore, the Commission accords in principle approval for the above three projects. So far as the proposal of the 400/220 KV Khuntuni s/s is concerned, the extracts of the said meeting discusses the issue at point 36.3 of the said minutes. OPTCL has proposed a ring at Khuntuni with following observations.

In the 18th SCPSPER meeting at para 32, three nos. of 2x500 MVA 400/220 KV substation was proposed which included Khuntuni where “OPTCL informed that with commissioning of Khuntuni substation, one unit of Lanco Babandh (2x660 MW) shall be connected to Khuntuni through a 400 KV D/C line”.

This proposal, as it appears, was also discussed further at 36.4, 36.5 and so on, but the final decision has not been arrived for the ring system proposed by OPTCL. Alternative proposals to this have been floated in the meeting but, no conclusive

decision was agreed. It is also noticed that the loading at Khuntuni may be reduced since Lanco (1x660 MW) is not in state of execution at present. Therefore, we are not inclined to accept the proposal at Khuntuni for 440/220 KV S/s at this stage until the issues above crystallised.

(c) **Projects at 220 KV & 132 KV**:

We have examined the loading furnished by OPTCL of the present 220 kV and 132 kV sub-stations proposed by the petitioner in the year 2021-22 which are as follows:

Sl.No.	Name of s/s	Voltage	Transformer capacity in MVA	Loading as per system studies (%) in 2021-22
1.	Dhenkanal GIS	220/132	2X160	40.7
2.	Bamara	220/132	2x100	31
		132/33	2X20	-
3.	Gunupur	220/132	2x100	23.8
		132/33	2X20	-
4.	Govindpali	220/33	2X20	26.6
5.	M. Rampur	220/33	2X20	21.2
6.	Ratnagiri	220/33	2X40	23.9
7.	Godisahi	220/33	2X63	31
8.	Sarasamala	220/33	2X20	21.5
9.	Balianta	220/132		
		132/33	2X63	27.2
10.	Gothapatna	220/33	2X63	43.4
11.	Autonagar	132/33	2X40	33.3
12.	Turumunga	220/132	2X160	39.6
		132/33	2X20	26.3
13.	Jayapatna	132/33	2X20	21.3
14	Satyanagar	132/33	2X63	44.7
15.	Badagada	132/33	2X63	35.9
16.	Jaleswar	220/132	2X160	20.8
17.	Rairangpur	220/132	2X160	13.5
18.	Athamalik	132/33	2X20	19

The Commission had opined in para 164(v) of ARR & transmission tariff order for the FY 2016-17 (Case No. 55 of 2015) of OPTCL that further expansion and incorporation of 132 kV system should be avoided. The same has been reiterated in para 199 of ARR & transmission tariff order for the FY 2018-19 (Case No. 77 of 2017) of OPTCL. Inspite of that OPTCL does not find any merit in the instructions of the Commission and lines are being continuously expanded at this voltage. This is not appropriate.

Further, the transmission planning criteria at Cl.15.4 stipulates that the capacity of any single substation at different voltage levels shall be within the following limits.

Voltage level	Transformer capacity	
	Existing capacity	Maximum capacity
765 kV	6000 MVA	9000 MVA
400 kV	1260 MVA	2000 MVA
220 KV	320 MVA	500 MVA
132 KV	150 MVA	250 MVA

It further states at clause 15.2 that –

The maximum short circuit level should not exceed 80% of rated short cut capacity of the substation. The rated breaking current capability of switchgear at different voltages as below:

Voltage level	Rated breaking capacity
132 KV	25 KA/31.5 KA
220 KV	31.5 KA/40 KA
400 KV	50 kA / 63 kA
765 KV	40 kA / 50 kA

The studies by consultant M/s PRDC has made to demonstrate the parameters after the line or substations are constructed. But it lacks explanation why the new lines and substations are required to be installed in quantified terms.

As per transmission planning criteria, the STU should connect Generating Stations with load centres for bulk evacuation of powers but not to replace a distribution system. M/s OPTCL has not shown any overloading of existing substations or lines to justify addition of new ones.

Mere addition of lines and substations without any quantified objective shall lead to more system losses in system and transformers, high reactive power leading to further requirement of capacitors banks, stability issues, in under loaded conditions. Ultimately the consumers bear the burden on account of high capital investment, RoE, loan, O&M expenses, manpower cost etc.

The new substations proposed are stated to be within the prescribed limits of breaking capacity after installation; but information on old substations to cater to the load has not been provided. In an answer to the reason of lower growth vis-à-vis the proposed plan, the petitioner has stated that the growth has been approved by commission. They are silent on reason for lack of growth in demand as was proposed by them. Under this backdrop the commission considers it prudent to limit the expansion of lines and substations.

Under contingency conditions the substations at Dhenkanal, Gothpatna, Turumunga are acceptable.

A number of substations have been proposed. Study report concerning loading and short circuit level has also been proposed as follows:

Sl.No.	Location of substations	Voltage (kV)	No. of Transformers	Transformer capacity in (MVA)	Loading as per system studies (%) in 2021-22	3 ph. Fault current (kA)
1.	Dhenkanal GIS	220/132	2	160	40.7	30.2
2.	Bamra	220/132	2	100	31.0	12
		132.33	2	20		
3.	Gunupur	220/132	2	100	23.8	6.1
		132.33	2	20		
4.	Govindpalli	220/33	2	20	26.6	4
5.	M. Rampur	220/33	2	20	21.2	3.6
6.	Godisahi	220/33	2	63	31.0	16.6
7.	Ratnagiri	220/33	2	40	23.9	7.1
8.	Sarasmal	220/33	2	20	21.5	3.9
9.	Balianta	220/132	2	100	-	-
		132/33	2	63	27.2	-
10.	Gothpatna	220/33	2	63	43.4	25
11.	Autonagar Berhampur	132/33	2	40	33.3	14.5
12.	Turumunga	220/132	2	160	39.6	9.2
		132/33	2	20	26.3	
13.	Jayapatna	132/33	2	20	21.3	5.6
14.	Satyanagar	132/33	2	63	44.7	17.1
15.	Badagada	132/33	2	63	35.9	-
16.	Jaleswar	220/132		2X160	20.8	9.4
17.	Athamalik	132/33		2X20	19	4.2
18.	Rairangpur	2X160		2X160	13.5	-

The above studies relate to post installation studies. In none of the above substations or substations nearby the loading and short circuit level at present has been submitted to us to find justification for above substations. The explanations furnished by DISCOMs are as follows:

Name of the Utility	Projects	Justification	Commission views
CESU	For all the substations	1. Improve voltage profile 2. Cater to load growth	No specific quantified parameters details justifying the claim has been furnished in favour of the proposals
OHPC	Machkund	50% Machkund share to be evacuated	Present arrangement technically infeasible new line is necessary. System is needed for power evacuation, justified.
	Jaynagar over voltage	VAR injection by PGCIL	No details provided
WESCO	For all the new 33/11 kV	Anticipated load in each substation	The present load at 132 kV S/S or substation at 220 kV not provided to

	Substation under WESCO are		justify the claim.
NESCO	Ratnagiri	Full load in existing substation. Shifting of load from Jajpur higher feeder distance.	No details furnished. Indicates 23.9% loading.
SOUTHCO	Gunupur 220/132/33	Future traction supply. Auto transformer in overloaded at Akhusingh Feeding from Narendrapur at a distance of 152 km. from Parlakhemundi which is 70 KM from Gunupur Voltage 190 V peak Voltage 150 V rural Voltage 170 V Urban Addl. Load due to Megalift project.	No further details. No. details is furnished. Justifies the demand to raise the voltage level.
	Auto Nagar (Berhampur)	Low voltage 195 KV instead of 220 KV. Ring of city Berhampur	No details furnished.
	Govindpalli	Feed from Balimela at 33 kV at a long distance. Low voltage.	No details furnished.

17. From the above it can be seen that none of the substations proposed by OPTCL meet the standards laid down in the transmission planning criteria of CEA. The projects at Dhenkanal, Gothapatna, Satyanagar and Turumunga appears to have near future demand. Apart from this, Bamara, Gunupur, Balianta, Turumunga requires additional bays for catering to the load at 33 kV. Therefore, we are of the opinion that the projects at Dhenkanal GIS, Bamara, Gunupur, Balianta, Gothapatna, Turumunga, Satyanagar can be considered for execution upto the year 2020-21, 2021-22. Further, OPTCL may undertake its proposed s/s at Govindpali provided funding is received from the State Govt. as grant. We decide accordingly.

18. The projects agreed above, the list of which is enclosed as Annexure-A to this order will be considered by the Commission subject to condition that there will not be any burden on consumer unless it satisfied the technical requirements and meet norms of investment criteria.

19. Appropriate cost benefit analysis should be submitted for approval before any expenditure. In case of gap, OPTCL has liberty to consider viable gap funding either from internal or from external sources. This VGF shall not be considered in the ARR in return on investments. OPTCL shall approach the Commission for approval of

investment proposal of each project along with DPR incorporating system studies under various generation and load scenario during peak and off-peak hours and in different seasons considering appropriate renewable capacity additions. OPTCL shall follow all statutory requirements and obtain our clearances to carry out all the projects and avoid time and cost overrun.

20. Accordingly the case is disposed of.

Sd/-	Sd/-	Sd/-
(S.K.Parhi)	**(A.K.Das)**	**(U.N.Behera)**
Member	**Member**	**Chairperson**

ANNEXURE- A

List of Sub stations approved in Intra State Transmission Plan (Case No. 18 of 2017)

Sl. No	Substation Name	District	Voltage level (kV)	Number of transformer units	Transformer Unit capacity (MVA)
1	Bhadrak	Bhadrak	400/220	2	500
2	Paradeep	Jagatsinghpur	400/220	2	500
3	Narendrapur	Ganjam	400/220	2	500
4	Dhenkanal (New) GIS	Dhenkanal	220/132	2	160
5	Bamara	Sambalpur	220/132	2	100
			132/33	2	20
6	Gunupur	Gajapati	220/132	2	100
			132/33	2	20
7	Govindapalli	Malkangiri	220/33	2	20
8	Godisahi	Cuttack	220/33	2	63
9	Balianta	Khurdha	220/132	2	100
			132/33	2	63
10	Gothapatna	Khurdha	220/33	2	63
11	Autonagar (Berhempur)	Ganjam	132/33	2	40
12	Turumunga	Keonjhar	132/33	2	20
13	Jaypatna	Kalahandi	132/33	2	20
14	Satyanagar	Khurdha	132/33	2	63
15	Badgada	Khurdha	132/33	2	63

List of Transmission lines approved in Intra State Transmission Plan
(Case No.18 of 2017)

Sl No.	Transmission line
1.	220 kV D/C line from Bhadrak 400/220 kV substation to Bhadrak 220/132 kV substation
2.	132 kV S/C line from Dhenkanal 220/132 kV substation to Salipur 132/33 kV substation via Athagarh 132/33 kV substation, Maheshwari ispat, Tangi 132/33 kV substation and Bahugram 132/33 kV substation
3.	LILO of 132 kV S/C line from Katapalli 220 kV132/33 kV substation to Bargarh 132/33 kV substation at Baragarh New 220/132/33 kV substation
4.	132 kV S/C line from Sambalpur 132/33 kV substation to Burla generating station
5.	132 kV S/C line from Joda 220/132/33 kV substation to Bolani 132/11 kV substation via Arya Steel 132 kV bus and Barbil 132/33 kV substation
6.	TTPS to Chainpal 132 kV D/C line conductor augmentation from ACSR to HTLS conductor
7.	Kuchei to Baripada 132 kV D/C line conductor augmentation from ACSR to HTLS conductor
8.	LILO of 132 kV S/C line from Khurda 132/33 kV substation to Shamuka 132/33kV substation at Argul 132/33 kV substation
9.	132kV S/C line from Chainpal 132/33kV substation to Angul 132/33kV substation
10.	132kV D/C line from Pratapsasan 220/132/33kV substation to Jagatsinghpur 132/33V substation
11.	LILO of 132 kV S/C line from Karadagadia 132/33 kV substation to Puri 132/33 kV substation at Samangara 220/132/33kV substation
12.	LILO of 2nd circuit of 132 kV D/C line from Chandaka B 220/132/33kV substation to Nimapara 132/33 kV substation at Ranasinghpur 132/33kV substation