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from Dhamra to Chandbali, Paralakhemundi to R.Udayagiri and Phulbani to Boudh. The estimated investment proposal for execution of the aforesaid projects is Rs.891.52 Cr.

3. As per OPTCL's Licence Condition 7.1 and provision under Section 40 of the Electricity Act, OPTCL, as a Transmission Licensee, is duty bound to make investment to build, maintain & operate an efficient co-ordinated & economic intra-state transmission system. As per OPTCL's Licence Condition 10 read with Condition 23.1, the Petitioner-OPTCL is required to obtain prior approval of the Commission for investment proposal of Rs.10.00 Cr. and above. Accordingly, OPTCL has submitted this investment proposal of Rs.891.52 Cr. for execution of the aforesaid transmission projects, since it exceeds the limit of Rs 10.00 Cr. as mentioned in Licence Condition. As per the Licence Condition, the Commission is to be satisfied about need of such investment and also to examine the economic, techno-commercial & environmental issues attached to such investment proposals. In compliance to the requirements under the License Condition 10.4, OPTCL has submitted the Detailed Project Reports (DPRs) of 14 nos. of the projects for total investment of Rs.891.52 Cr., along with relevant information and justification pertaining to the above projects. OPTCL has proposed the investments primarily to ensure quality power supply to the consumers and simultaneously to get reasonable economic return on such investment. The details of investment proposals based on load flow study are as follows:

- a) OPTCL has proposed the construction of a new 2X20 MVA, 220/132/33kV Grid Sub-station at Turumunga (in the district of Keonjhar) alongwith associated 220 kV D/C line from 400/220 kV GSS of PGCIL at Keonjhar to Turumunga (about 32 kms) and LILO of 132 kV line from Palaspanga to Karanjia (about 21 kms) at Turumunga. OPTCL has estimated an expenditure of Rs.119.31 crores for execution of this project with funding from Japan International Co-operation Agency (JICA). OPTCL submitted that the substation at Turumunga will share about 15 MW of load of Karanjia grid s/s to avoid overloading of transformer. This will provide reliable 132 kV system and will also improve the voltage profile of Karanjia, Palaspanga, Joda and Rairangpur area at 132 kV level. Further, the proposed substation will cater to 7 nos. of 33/11 kV substation namely Turumunga, Patna and 5 nos. commissioned under ODSSP Scheme (Kandeiposi, Khirei tangri, Jyotipur, Machhagarh & Begunaposi) in that area. The substations will strengthen the 132 kV network in the district of Keonjhar. The proposed substation has been approved by the

Commission in the five-year Business Plan for the 2<sup>nd</sup> control period from FY 2019-20 to 2023-24 of OPTCL in Case No.63 /2020, revised Business Plan in Case No.05/2016 and 13<sup>th</sup> Intra State Transmission Plan of OPTCL for the period from FY 2017-18 to 2021-22 in Case No.18/2017. OPTCL has projected reduction of average annual loss to the extent of 2.03 MW, which is equivalent to gain of Rs.209.97 lakh in monetary term (considering Rs.2.98/ kWh). With 70% utilization of 2x160 MVA & 2X20 MVA transformation capacity at the proposed grid S/S and with 3% transmission loss, the additional energy available would be 11562.99 LU/annum, which will bring additional annual revenue of Rs 3237.64 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.3447.61 lakhs from this investment. The average annual rate of return and IRR has thus been found to be 28.90% and 52.76% respectively. OPTCL has submitted that this project is with positive NPV and is financially viable.

- b) OPTCL has proposed 2X63 MVA, 132/33 kV GIS Sub-station at Badagada (Bhubaneswar) in the district of Khurda along with associated 132 kV UG cable from Satyanagar and Kesura. OPTCL has estimated an expenditure of Rs.96.78 crores with funding available from Government under State Capital Region Improvement of Power System (SCRIPS) scheme. OPTCL has submitted that the substation at Badagada will improve the voltage profile of that area and will act as an alternate source of supply to the distribution sub-stations making the distribution system more stable and reliable. The proposed substation at Badagada will feed existing 33/11 kV distribution substations at Badagada, Laxmisagar, Bhimatangi and proposed 33/11 kV distribution substation at Lingipur (covered under ODSSP). Further this substation is required to make 132 kV system voltage level stable in the network connecting to substations at Macnheswar, Unit-8 & Kesura and to share the load of Kesura to avoid transformer overloading. The proposed substation has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63 /2020 and 13<sup>th</sup> Intra State Transmission Plan of OPTCL in Case No.18/2017. OPTCL has projected reduction of average annual loss to the extent of 0.55 MW, which is equivalent to gain Rs.56.69 lakhs in monetary term (considering Rs.2.98/ kWh). With 70% utilization of 2x63 MVA transformation capacity at the proposed grid S/S and with 3% transmission loss, the additional energy available would be 4047.05

LU/annum, which will bring additional annual revenue of Rs. 1133.17 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.1189.86 lakhs from this investment. The average annual rate of return has thus been found to be 12.29%. Since, this project is being funded by Government grant, OPTCL has submitted that this project is financially viable.

- c) OPTCL has proposed 2X160 MVA, 1X40 MVA and 1X20 MVA, 220/132/33 kV Grid Sub-station at Bamra (in the district of Sambalpur) alongwith associated transmission lines (LILO of CKT-II of existing Budhipadar-Tarkela 220 kV D/C line and LILO of existing Budhipadar-Tarkera 132 kV line). The grid substation will supply power to South Eastern (SE) Railway at 3 nos. of RTSS i.e. Dhutra Bamra and Garposh and provision has been kept for LILO at 220 kV & 132 kV level for improving reliability power supply to SE Railway. OPTCL has estimated an expenditure of Rs.106.87 crores with 50% loan and 50% deposit by Railways as grant. OPTCL has submitted that the length of 33 kV feeder from Sundergarh GSS to Bamra distribution s/s is about 67 kms. The voltage profile is very poor in Bamra and Garposh area due to long line with more nos. of connected distribution substation. The proposed sub-station will eliminate the low voltage profile and frequent interruptions of Bamra, Rangiatikra, Garposh and nearby area. The proposed sub-station will feed about 2 nos of 33/11 kV substations (Garposh & Rangiatikra) and 3 traction substations (Dhatura, Garposh, Bamra) and reduce load on 132/33 kV GSS at Rajgangpur & Sundargarh. The proposed substation has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24.in Case No.63 /2020 and 13<sup>th</sup> Intra State Transmission Plan of OPTCL in Case No.18/2017. OPTCL has projected reduction of average annual loss to the extent of 0.54 MW, which is equivalent to gain Rs.55.61 lakhs in monetary term (considering Rs.2.98/ kWh). With 70% utilization of the transformation capacity of the proposed grid S/S and with 3% transmission loss, the additional energy available would be 12205.38 LU/annum, which will bring additional annual revenue of Rs.3417.51 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.3473.11 lakhs from this investment. The average rate of return and IRR has thus been found to be 32.50% and 67.99% respectively. OPTCL has submitted that this project is with positive NPV and is financially viable.
- d) OPTCL has proposed the construction of 2X20 MVA, 220/33 Grid Sub-station at Daspalla (in the district of Nayagarh) along with associated LILO of

Bhanjanagar-Meramundali 220 kV line at Dasapalla substations at an estimated expenditure of Rs.64.08 crores with funding arrangement from JICA. OPTCL has submitted that the entire Nayagarh district is now fed from only 220/33 kV GSS at Nayagarh. Many of the interior villages of Nayagarh and Dasapalla are experiencing low voltage problem. The construction of proposed s/s will not only improve the 220 kV voltage profile in Nayagarh and Bhanjananagr area but also would reduce load on Nayagarh GSS & strengthen the transmission network to facilitate uninterrupted power supply to the villages covered under R.I. Circle Dihagaon, Nachhipur and Neliguda of Dasapalla Tahasil in the district of Nayagarh. The proposed substation at Dasapalla will feed 33/11 kV substations at Dasapalla, Gania, Banigochha, Kulur Kumpa & Chamundia. The proposed substation has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24. in Case No.63 /2020 and revised plan of OPTCL for the period from FY 2014-15 to 2018-19 in Case No.05/2016. OPTCL has projected reduction of average annual loss to the extent of 0.64 MW, which is equivalent to gain of Rs.65.54 lakhs in monetary term (considering Rs.2.98/ kWh). With 70% utilization of the transformation capacity of the proposed grid S/S and with 3% transmission loss, the additional energy available would be 1284.78 LU/annum, which will bring additional annual revenue of Rs.359.74 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.425.28 lakhs from this investment. The average rate of return and IRR has thus been found to be 6.64% and (-) 0.20% respectively. OPTCL submitted that this project is with negative NPV and is not financially viable. However, this project is required in the interest of the public specifically for implementation of different Government schemes to help the inhabitants of that area.

- e) OPTCL has proposed LILO of existing Therubali-Narendrapur 220 kV D/C line at 220/132/33 kV Aska Grid Sub Station and associated 220 kV line Bay extension (2 bays) at Aska Sub-station at an estimated expenditure of Rs.42.13 crores with funding arrangement from Government under RRCP-1 Scheme as grant. OPTCL has submitted that the construction of this LILO line will eliminate the possibility of black outs during natural calamity as well as other adverse conditions. This will also enhance reliability of power system, decrease loading of the existing Bhanjanagar-Aska 220 kV D/C line, increase system

availability, decrease power interruption in Aska, Berhampur, Purusottampur, Chikiti areas. The proposed project will increase stability & reliability of 220 kV network in northern part of Odisha by improving voltage profile & providing uninterrupted power supply. The proposed project has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63 /2020. OPTCL has projected reduction of average annual loss to the extent of 1.99 MW, which is equivalent to gain of Rs.205.86 lakhs in monetary term (considering Rs.2.98/kWh). Considering transmission loss of 3%, OPTCL expects the availability of additional energy to the tune of 120.63 LU/annum, which will bring additional annual revenue of Rs.33.78 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.239.63 lakhs from this investment. This project is financially viable, as 100% grant is available under RRCP scheme.

- f) OPTCL has proposed the construction of 2X63 MVA, 132/33 kV Grid Substation at Satyanagar (Bhubaneswar) along with connectivity through UG cable of about 17 kms at an estimated expenditure of Rs.113.26 crores with funding arrangement under State Capital Region Improvement of Power System (SCRIPS) scheme. OPTCL has submitted that the construction of this substation is very much essential to extend stable & quality power supply to Bhubaneswar, to meet the growing power demand of Bhubaneswar area and also to share the load of Mancheswar to avoid overloading of transformers. The proposed substation at Satyanagar will feed the existing 33/11 kV substations at Satyanagar, Unit-III, Sahid Nagar, Board Colony and proposed 33/11 kV substation at Vani Vihar (covered under ODSSP). The proposed substation has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63 /2020 and 13<sup>th</sup> Intrastate Transmission Plan in Case No.18/2017. OPTCL has projected reduction of average annual loss to the extent of 0.51 MW, which is equivalent to gain of Rs.52.74 lakhs in monetary term (considering Rs.2.98/ kWh). With 70% utilization of the transformation capacity of the proposed grid S/S and with 3% transmission loss, the additional energy available would be 4047.05 LU/annum, which will bring additional annual revenue of Rs.1133.17 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.1185.91 lakhs from this investment. The average

annual rate of return has thus been found to be 33.79%. This project is being funded by Government through grant under SCRIPS scheme. Hence, the project is with positive NPV and financially viable.

- g) OPTCL has proposed the construction of 2X20 MVA, 132/33 kV Grid Substation at Lakhanpur (in the district of Jharsuguda) along with associated transmission line of about 19 kms at an estimated cost of Rs.36.98 crores with funding arrangement from JICA (30% equity and 70% debt). OPTCL has submitted that the construction of this substation is very much required to mitigate low voltage problem and frequent power interruptions in Lakhanpur and its nearby areas. This substation at Lakhanpur will act as an alternate source of supply to the distribution substation making distribution system more stable and reliable. This proposed substation will be helpful for extending power supply to the mega lift projects linked to 33/11 kV substations at Govindpur, Mahurpali, Chantipali and the 33/11 kV substations at Lakhanpur, Govindpur, Dhulunda and implementation of various Government schemes and to provide industrial & agricultural growth in the Jharsuguda district. The proposed substation has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63 /2020 and Business Plan of OPTCL for the period FY 2015-15 to 2018-19 in Case No. 05/2016. OPTCL has projected reduction of average annual loss to the extent of 0.45 MW, which is equivalent to gain of Rs.46.83 lakhs in monetary term (considering Rs.2.98/ kWh). With 70% utilization of the transformation capacity of the proposed grid S/S and with 3% transmission loss, the additional energy available would be 1284.78 LU/annum, which will bring additional annual revenue of Rs.359.74 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.406.57 lakhs from this investment. The average annual rate of return and IRR has thus been found to be 10.99% and 8.47% respectively. OPTCL has submitted that this project with negative NPV is not financially viable. However, OPTCL has prayed for its approval for the interest of the people of that area.
- h) OPTCL has proposed the construction of 2X20 MVA, 132/33 kV Grid Substation at Chandipur (in the district of Balasore) along with associated transmission line of about 26 kms at an estimated cost of Rs.46.84 crores with funding arrangement from JICA. OPTCL has submitted that the construction of this substation is required to eliminate low voltage problem at Chandipur & its

surrounding areas and will also act as an alternative source of supply to the distribution substations making the distribution system more stable and reliable. Further, the consumers covered under rural electrification scheme like Soubhagya are likely to be benefitted by this proposed project. This substation will also share the load of Balasore to avoid transformer overloading. The proposed substation at Chandipur will feed existing 33/11 kV substations at Swadhinpadia, Chandipur and feed IOCL pumping station & DRDO. The proposed substation has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63 /2020 and Business Plan of OPTCL for the period FY 2014-15 to 2018-19 in Case No. 05/2016. OPTCL has projected reduction of average annual loss to the extent of 0.55 MW, which is equivalent to gain of Rs.56.76 lakhs in monetary term (considering Rs.2.98/ kWh). With 70% utilization of the transformation capacity of the proposed grid S/S and with 3% transmission loss, the additional energy available would be 1284.78 LU/annum, which will bring additional annual revenue of Rs.359.74 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.416.50 lakhs from this investment. The average annual rate of return and IRR has thus been found to be 8.89% and 4.90% respectively. OPTCL has submitted that this project with negative NPV is not financially viable. However, this project is required to provide uninterrupted quality power to the consumers of that area & also to meet the future load growth.

- i) OPTCL has proposed the construction of 2X63 MVA, 132/33 kV Grid Substation at Nayapalli (Bhubaneswar) alongwith connectivity through UG cable at an estimated expenditure of Rs.120.49 crores with funding arrangement under State Capital Region Improvement of Power System (SCRIPS) scheme. OPTCL has submitted that the construction of this substation is very much required to share the load of Mancheswar-A and Ransinghpur Grid to avoid transformer overloading. This substation will meet the upcoming loads due to smart city initiatives and will be helpful for availability of a stable and reliable system of Bhubaneswar city and to meet increasing load demand of Nayapalli area. The proposed substation has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63/2020 and 14<sup>th</sup> Intrastate Transmission Plan in Case No.49/2021. OPTCL has projected reduction of average annual loss to the



extent of 0.54 MW, which is equivalent to gain of Rs.55.61 lakhs in monetary term (considering Rs.2.98/ kWh). With 70% utilization of the transformation capacity of the proposed grid S/S and with 3% transmission loss, the additional energy available would be 4047.05 LU/annum, which will bring additional annual revenue of Rs.1133.17 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.1188.78 lakhs from this investment. The average annual rate of return has thus been found to be 9.87%. OPTCL has submitted that this project is being funded by Government through grant under SCRIPS scheme. Hence, the project with positive NPV is financially viable.

- j) OPTCL has proposed the construction of 132 kV D/C line (about 17 km) from 400/220/132/33 kV Grid Sub-station at Lapanga to 132/33 kV GSS at Brajarajnagar along with diversion of 220 kV D/C IB-Budhipadar(1<sup>st</sup> line & 2<sup>nd</sup> line) at an estimated expenditure of Rs.12.15 crores with funding arrangement either from Government /own resources or from other funding agencies depending upon availability of loan. OPTCL has submitted that the addition of the new D/C line to 132/33 kV grid sub-station Brajarajnagar will enhance reliability of power supply and encourage growth of new small and large scale industries in nearby areas. The proposed 132 kV D/C line will support the mega lift projects under Govt. Scheme and hence increase agricultural products in the Lakhanpur Block as well as in near Bhanjanagar NAC. The proposed project will increase the stability and reliability of the 132 kV network in western part of Odisha, improve voltage profile, reduce interruption of power supply and provide uninterrupted power supply. The proposed line will also make a ring system in Brajarajnagar, Budhipadar and Lapanga grid substation. The proposed project has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24.in Case No.63 /2020 and Business Plan of OPTCL for the period from FY 2014-15 to 2018-19 in Case No. 5/2016. OPTCL has projected reduction of average annual loss to the extent of 0.29 MW, which is equivalent to gain of Rs.29.65 lakhs in monetary term (considering Rs.2.98/ kWh). Considering a transmission loss of 3%, OPTCL expects the availability of additional energy to the tune of 1892.50 LU/annum, which will bring additional annual revenue of Rs.529.9 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.559.55 lakhs from this investment. The average annual

rate of return and IRR has thus been found to be 46.04% and 60.50% respectively. This project is with positive NPV and financially viable.

- k) OPTCL has proposed the conversion of existing 132 kV S/C line to D/C line (about 39 kms) from 220/132/33 kV Grid Sub-station at Jayanagar to 132/33 kV GSS at Sunabeda along with one bay extension at each end at an estimated expenditure of Rs.27.83 crores with funding arrangement either from Government /own resources or from other funding agencies depending upon feasibility of loan. OPTCL has submitted that in case of failure of the only S/C line connected between Jayanagar and Sunabeda, important feeders from Sunabeda and OMP, which is supplying power to medical facility for power supply to Koraput town, Nandapur, etc. are being affected. Therefore, to ensure steady power supply, the conversion from S/C to D/C is required. Further, the proposed conversion is necessary to increase stability and reliability of the 132 kV supply in that area. The proposed project has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63 /2020 and revised Business Plan of OPTCL for the period from FY 2014-15 to 2018-19 in Case No. 5/2016. OPTCL has projected reduction of average annual loss to the extent of 0.21 MW, which is equivalent to gain of Rs.21.23 lakhs in monetary term (considering Rs.2.98/ kWh). Considering transmission loss of 3%, OPTCL expects the availability of additional energy to the tune of 1068.10 LU/annum, which will bring additional annual revenue of Rs.299.07 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.320.29 lakhs from this investment. The average annual rate of return and IRR has thus been found to be 11.51% and 6.51% respectively. This project is not financially viable. However, this project is required to increase stability and reliability of power supply in the southern part of the State utilizing the existing transmission corridor.
- l) OPTCL has proposed 132 kV D/C line (about 27 km) from 220/132/33 kV Grid Sub-station at Dhamra (Balimunda) to 132/33 kV GIS substation at Chandabali along with 2 nos of 132 kV line bays at both end (Dhamra & Chandabali substations) at an estimated expenditure of Rs.23.62 crores with funding from Government as grant under Disaster Resilient Power System (DRPS) Scheme. OPTCL has submitted that the construction of 132 kV D/C line with associated 132 kV line bays extensions at Chandabali will establish a ring network by

supplying alternate power to 132 /33 kV GIS Chandabali. This will increase reliability of power system, decrease loading on the existing LILO line, increase system availability, decrease power interruption at Chandabali GSS and associated distribution substation. The proposed project has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63/2020 and Business Plan of OPTCL for the period from FY 2014-15 to 2018-19 in Case No. 5/2016. OPTCL has projected reduction of average annual loss to the extent of 0.01 MW, which is equivalent to gain of Rs.1.32 lakhs in monetary term (considering Rs.2.98/ kWh). Considering transmission loss of 3%, OPTCL expects the availability of additional energy to the tune of 1296.20 LU/annum, which will bring additional annual revenue of Rs.362.94 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.364.25 lakhs from this investment. OPTCL has submitted that this project will be taken up through Government grant under DRPS scheme. Hence, the project is financially viable.

- m) OPTCL has proposed the construction of 132 kV D/C line (about 64 km) from 132/33 kV Paralakhemundi sub-station to 132/33 kV R.Udayagiri substation and 2 nos. of 132 kV line bays each at both ends (Paralakhemundi & R. Udayagiri Substations) at an estimated expenditure of Rs.41.82 crores with grant from State Government under RRCP-1 scheme. The 132/33 kV Grid Substation at Paralakhemundi is supplying 50% area of Gajapati District. OPTCL has submitted that the proposed project will facilitate uninterrupted power supply to the villages covered under the Tehasil of R.Udayagiri, Rayagada, Gumma, Paralakhemundi etc. and will also create a ring network among Paralakhemundi, R.Udayagri, Mohana and Akhusingh 132/33 kV GSS increasing the stability and reliability of the 132 kV network in southern part of Odisha by improving voltage profile & providing uninterrupted power supply. The proposed transmission line has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24.in Case No.63 /2020. OPTCL has projected reduction of average annual loss to the extent of 0.20 MW, which is equivalent to gain of Rs.20.25 lakhs in monetary term (considering Rs.2.98/ kWh). OPTCL considering a transmission loss of 3% expects the availability of additional energy availability to the tune of 1284.78 LU/annum, which will bring additional annual revenue of

Rs.359.74 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.379.99 lakhs from this investment. The project is with positive NPV and is financially viable as it is financed through Govt. grant under RRCP-1 scheme.

- n) OPTCL has proposed the construction of 132 kV D/C line (about 66 kms.) from 132/33 kV Grid Sub-station at Phulbani to 132/33 kV GSS at Boudh along with 2 nos 132 kV line bays extension each at both ends (Phulbani & Boudh substations) including laying of OPGW at an estimated expenditure of Rs.39.36 crores with grant from State Government under RRCP-1 scheme. OPTCL has submitted that the proposed project will facilitate uninterrupted power supply to the consumers of Kandhamal & Boudh Districts and will also create a ring network increasing the stability and reliability of the 132 kV network in south western part of Odisha by providing uninterrupted power supply, better voltage profile to the consumers and also be helpful for smooth evacuation of solar power. The proposed transmission line has been approved by the Commission in the five-year Business Plan of OPTCL for 2<sup>nd</sup> control period i.e. from FY 2019-20 to FY 2023-24 in Case No.63 /2020 and Business Plan of OPTCL for the period from FY 2014-15 to 2018-19 in Case No.05/2016. OPTCL has projected reduction of average annual loss to the extent of 0.43 MW, which is equivalent to gain of Rs.44.13 lakhs in monetary term (considering Rs.2.98/ kWh). Considering a transmission loss of 3%, OPTCL expects the availability of additional energy to the tune of 557.81 LU/annum, which will bring additional annual revenue of Rs.156.19 lakhs at the transmission charge of 28 paise/kWh. Thus, OPTCL expects total annual revenue to the tune of Rs.200.31 lakhs from this investment. The project is with positive NPV and is financially viable as it is financed through Govt. grant under RRCP-1 scheme.

4. The total investment has been estimated to be Rs.891.52 cr. The investment proposal in brief, name of the scheme and source of funding as submitted by OPTCL is mentioned below:

Sl. No.	<u>DESCRIPTION</u>	CAPITAL EXPENDITURE (Rs. Cr.)	NAME OF THE SCHEME & SOURCE OF FUNDING
1	2X160MVA & 2X20MVA, 220/132/33kV Grid Sub-Station at <b>Turumunga</b> along with its associated transmission lines.	119.31	JICA Loan – 70% Equity – 30%

Sl. No.	DESCRIPTION	CAPITAL EXPENDITURE (Rs. Cr.)	NAME OF THE SCHEME & SOURCE OF FUNDING
2	2X63MVA, 132/33kV Gas (SF6) Insulated Sub-Station at <b>Badagada</b> along with associated 132kV Line through UG Cabling.	96.78	SCRIPS (100% grant)
3	2x160MVA, 1X40MVA & 1x20MVA 220/132/33kV Grid S/S at <b>Bamra</b> along with its associated transmission lines.	106.87	Railway deposit -50% Loan – 50%
4	2X20MVA, 220/33kV Grid Sub-Station at Dasapalla along with its associated 220kV LILO arrangements from 220kV Bhanjanagar – Meramundali DC line.	64.08	JICA Loan – 70% Equity – 30%
5	<b>220kV LILO line</b> from existing <b>220kV Theruvalli-Narendrapur DC line</b> to 220/132/33kV Grid Sub Station, <b>Aska</b> and 2 Nos. 220kV Bay extension at Aska Sub-Station.	42.13	RRCP – 1 (100% grant)
6	2X63MVA, 132/33kV GIS Sub-Station at <b>Satyanagar (Bhubaneswar)</b> along with its associated transmission line.	113.26	SCRIPS (100% grant)
7	2X20MVA, 132/33kV Grid Sub-station at <b>Lakhanpur</b> along with associated its transmission line.	36.98	JICA Loan – 70% Equity – 30%
8	2X20MVA, 132/33kV Grid Sub-Station at <b>Chandipur</b> along with its associated transmission line.	46.84	JICA Loan – 70% Equity – 30%
9	2X63MVA, 132/33kV Grid Sub-Station at <b>Nayapalli (Bhubaneswar)</b> along with its associated transmission line.	120.49	SCRIPS (100% grant)
10	<b>132kV D/C line</b> from 400/220/132/33kV Grid Sub-station at <b>Lapanga</b> to 132/33kV GSS, <b>Brajrajnagar</b> along with diversion of 220kV D/C IB-Budhipadar (1st line & 2nd line).	12.15	Loan – 70% Equity – 30%
11	<b>132kV SC line to DC line</b> from 220/132/33kV Grid S/s, <b>Jayanagar</b> to 132/33kV Grid S/s, <b>Sunabeda</b> along with one no. of feeder bay extension at each end.	27.83	Loan – 70% Equity – 30%
12	<b>132kV DC line</b> from proposed 220/132/33 KV Grid Sub-Station, <b>Dhamara (Balimunda)</b> to 132/33kV GIS, <b>Chandbali</b> along bay extension	23.62	DRPS-1 (100% grant)
13	<b>132kV DC line</b> from 132/33kV <b>Paralakhemundi</b> Sub-Station to 132/33kV <b>R.Udayagiri</b> Sub-Station and bay extension at both end.	41.82	RRCP – 1 (100% grant)
14	<b>132kV DC line on DC tower</b> from 132/33kV <b>Phulbani</b> , Grid Sub-Station to 132/33kV <b>Boudh</b> Grid Sub-Station.	39.36	RRCP – 1 (100% grant)
<b>TOTAL</b>		<b>891.52</b>	

5. OPTCL has submitted that the System Studies have been conducted in line with the planning criteria considering different load generation scenario under the normal steady state and contingency conditions. The implementation of the aforesaid additional proposed sub-stations as well as transmission lines would improve the system voltage profile, reduce the loading on certain important sections of the transmission network, strengthen the 220 kV & 132 kV network and also reduce the overall transmission system loss. Further, under single contingency scenario, the study indicates potential problems related to overloading of remaining lines and collapse of system voltages at locations close to the tripped line. Therefore, OPTCL has submitted the above investment proposal for construction of above mentioned substations and transmission

lines for reinforcement of its existing transmission network to meet the system needs in future years. OPTCL envisages the reduction of average annual loss of 8.94 MW after executing of the above projects.

6. OPTCL has submitted that the projects have been proposed after detailed discussion with the concerned DISCOMs. OPTCL has also submitted the Environmental Impact Assessment (EIA) Study for the projects. As per the EIA study, the projects are not having any adverse environmental impact or resettlement issue and the overall impact of the projects are highly positive. OPTCL has also stated that the projects shall be executed on turnkey basis through a Competitive Bidding process.
7. Respondent, Sri R. P. Mahapatra has submitted that OPTCL has started construction of many of the schemes even before approval of investment proposals by the Commission. In past such practices were adopted by the applicant & no action was taken by the Commission. Sri Mahapatra has requested the Commission to issue an appropriate direction to OPTCL not to taken up execution of schemes before sanction and impose heavy penalty on applicant OPTCL in case of violation of the directions. Some of the substations are constructed not due to actual requirement and remains unutilised/under loaded for a long period of time. Further, both OPTCL and DISCOMs should be directed to enter into an agreement specifying the time frame for construction of EHT substations and outgoing HV lines so that the EHV substations are utilised. Unutilised assets created by OPTCL is an unnecessary burden on the consumers of the State.
8. TPCODL as such has no objection to the proposed schemes but requested the Commission to direct OPTCL to take approval of DPR prior to its implementation. TPNODL has supported the proposals and has submitted the projects proposed in their area are very much vital for extension of reliable power in their area of operation. TPWODL while agreeing for approval of the projects has suggested that the proposals should have been shared before-hand i.e. at the planning stage to provide productive suggestions by the stakeholders. The reinforcement of Bamra GSS is required due to the low voltage issue at Bamra, Jarangalai, Saherjbahal at 33 kV level. The GSS at Lakhanpur is required to reduce low voltage issue at Muchbahal, Jharupada, Dhulunda, Govindpur, Lakhanpur at 33 kV level. However, TPWODL emphasised for early execution of the projects to resolve the low voltage issues and to avoid cost and time overrun. TPSODL agreed for approval of the projects but suggested for adherence to the time lines and implementation of the projects through TBCB route.

9. All DISCOMs have agreed with the submission of OPTCL and have requested for early execution of these projects as these projects are required to extend reliable power supply and to meet the expected load growth in those areas. Further, these projects will support implementation of various developmental programmes of the State Government resulting in socio-economic development in remote areas of Northern & Southern part of Odisha. Some of the projects will be helpful for extending quality power to mega lift points and smooth evacuation of solar power.
10. OPTCL has submitted the proposal with Detailed Project Report (DPR) was submitted for approval of the Commission on 12.09.2022. Each of the proposed 14 nos of projects were the part of the Business Plan or Intra state Transmission Plan, approved earlier by the Commission. OPTCL has started the process for execution of some of these projects as the projects are urgently required for implementation of some developmental programmes of the State Government and to ensure reliable & quality power supply to the inhabitants of remote areas, which is essential for socio-economic development. OPTCL, therefore, has prayed for approval of these investment proposals in the overall interest of the people of the State.
11. Heard the parties at length through hybrid mode (physical & virtual) and considered their written submissions & argument during hearing. It is observed that:
  - a) The Commission had accorded in-principle approval earlier for the proposed substations and transmission lines. OPTCL has now approached the Commission with the DPR with justification enclosing the relevant information/document along with the cost benefit analysis for approval of their investment proposals for the proposed projects.
  - b) OPTCL has carried out the system study with the existing network and with the proposed network expansion & strengthening to meet future need.
  - c) The petitioner-OPTCL has justified that the investments would strengthen power transmission system, improving reliability of power supply to SE Railway, reduce loading on certain section of OPTCL's transmission network, reduce the overall transmission losses, improve voltage profile, ensure better quality of power supply, minimize interruption of power supply, enhance security/reliability of power system by formation of ring network at 132 kV level in Northern & Southern of the State for smooth flow of power without any

constraint/congestion in the system and would enable OPTCL to receive economic return.

- d) The Board of Directors (BoD) of OPTCL has accorded administrative approval for the aforesaid projects. Some of the projects covered in the investment proposal are also being funded through Government Grant (under SCRIPS/DRPS/RRCP Scheme) or JICA.
- e) The projects do not have any adverse environmental impact or resettlement issue and the overall impact of the projects are highly positive. OPTCL has also stated that the projects shall be executed on turnkey basis through a Competitive Bidding process. OPTCL has submitted that the execution of some of the projects was started on urgent basis without prior approval of the investment proposal by the Commission in order to support implementation of developmental projects of GoO for the benefit of people of remote area and also to ensure reliable & quality power to the consumers of the State.

12. The Commission studied the technical and commercial viability of the projects as submitted by OPTCL. These are summarized below:

Sl No	Name of the Project	Project Cost (Rs. Cr)	Net Cash flow (Rs. Cr)	Period of Benefits (in Yrs)	Avg. Return estimated by OPTCL (%)	Payback period (in Yrs)	NPV estimated by OPTCL @ 9.86% Dis. Factor (Rs. Cr)	IRR estimated by OPTCL (%)	Viability
1	2X160MVA & 2X20MVA, 220/132/33kV Grid Sub-Station at <b>Turumunga</b> along with its associated transmission lines. (JAICA funded)	119.31	662.62	25	28.90	3.46	145.70	52.76	Viable
2	2X63MVA, 132/33kV Gas (SF6) Insulated Sub-Station at <b>Badagada</b> along with associated 132kV Line though UG Cabling.	96.78	244.23	25	12.29	8.13	Through 100% Government grant (under SCRIPS scheme)		Viable
3	2x160MVA, 1X40MVA & 1x20MVA 220/132/33kV Grid S/S at <b>Bamra</b> along with its associated transmission lines.	106.87	379.25	25	19.45	5.14	200.97	67.99	Viable
4	2X20MVA, 220/33kV Grid Sub-	64.08	(1.41)	25	6.64	15.07	(19.12)	(0.20)	Not viable



Sl No	Name of the Project	Project Cost (Rs. Cr)	Net Cash flow (Rs. Cr)	Period of Benefits (in Yrs)	Avg. Return estimated by OPTCL (%)	Payback period (in Yrs)	NPV estimated by OPTCL @ 9.86% Dis. Factor (Rs. Cr)	IRR estimated by OPTCL (%)	Viability
	Station at <b>Dasapalla</b> along with LILO of existing Bhanjanagar – Meramundali 220 kV D/C line. (JICA funded)								
5	<b>LILO</b> of existing <b>220kV Theruvalli-Narendrapur 220 kV D/C line</b> at 220/132/33kV Aska Grid Sub Station and 2 Nos. 220kV line Bays extension at Aska Sub-Station.	42.13	49.75	35	5.69	17.58	Through 100% Government grant (under RRCP-1 Scheme)		Viable
6	2X63MVA, 132/33kV GIS Sub-Station at <b>Satyanagar (Bhubaneswar)</b> along with its associated transmission line.	113.26	234.19	25	10.47	9.55	Through 100% Government grant (under SCRIPS Scheme)		Viable
7	2X20MVA, 132/33kV Grid Sub-station at <b>Lakhanpur</b> along with associated its transmission line. (JICA funded)	36.98	38.95	25	11.00	9.10	(1.50)	8.45	Not viable
8	2X20MVA, 132/33kV Grid Sub-Station at <b>Chandipur</b> along with its associated transmission line. (JICA funded)	46.84	26.05	25	8.89	11.25	(7.46)	4.90	Not viable
9	2X63MVA, 132/33kV Grid Sub-Station at <b>Nayapalli (Bhubaneswar)</b> along with its associated transmission line.	120.49	230.93	25	9.87	10.14	Through 100% Government grant (under SCRIPS Scheme)		Viable
10	<b>132kV D/C line</b> from 400/220/132/33kV Grid Sub-station at <b>Lapanga</b> to 132/33kV GSS at <b>Brajrajnagar</b> along with diversion of IB-Budhipadar 220 kV D/C line(1st line & 2nd line).	12.15	171.52	35	36.04	2.17	28.05	60.50	Viable
11	<b>132kV S/C line to D/C line</b> from 220/132/33kV Grid	27.83		35	11.51	8.69	(3.89)	6.51	Not viable

Sl No	Name of the Project	Project Cost (Rs. Cr)	Net Cash flow (Rs. Cr)	Period of Benefits (in Yrs)	Avg. Return estimated by OPTCL (%)	Payback period (in Yrs)	NPV estimated by OPTCL @ 9.86% Dis. Factor (Rs. Cr)	IRR estimated by OPTCL (%)	Viability
	S/s at <b>Jayanagar</b> to 132/33kV Grid S/s at <b>Sunabeda</b> along with one line bay extension at each end.								
12	<b>132kV DC line</b> from proposed 220/132/33 KV Grid Sub-Station at <b>Dhamara (Balimunda)</b> to 132/33kV GIS substation at <b>Chandbali</b> along bay extension	23.62	108.39	35	15.42	6.48	Through 100% Government grant (under DRPS scheme)		Viable
13	<b>132kV D/C line</b> from 132/33kV <b>Paralakhemundi</b> Sub-Station to 132/33kV <b>R.Udayagiri</b> Sub-Station and bay extension at both end.	41.82	99.12	35	9.09	11	Through 100% Government grant (under RRCP-1 scheme)		Viable
14	<b>132kV D/C line on D/C tower</b> from 132/33kV <b>Phulbani</b> Grid Sub-Station to 132/33kV <b>Boudh</b> Grid Sub-Station.	39.36		35	5.09	19.65	Through 100% Government grant (under RRCP-1 scheme)		Viable

(a) The above table shows that most of the projects are economically viable except four (4) projects relating to construction of 220/33 kV substation at Dasapalla, 132/33 kV substations at Lakhanpur & Chandipur along with associated transmission line and conversion of 132 kV S/C line to D/C line.

(b) The petitioner OPTCL has submitted that most of the projects are required for larger interest of the society for improvement of socio-economic conditions of the people, meeting increasing power demand and creation of ring network, which will improve reliability & stability of EHV network at 132 kV level.

(c) The stakeholder including all DISCOMs have agreed for implementation of these projects in order to maintain reliable power supply in their area of operation.

13. In view of the above considerations, the Commission is inclined to approve the investment proposal of OPTCL for Rs.891.52 crores for construction of above substations and transmission lines for development of adequate transmission system to facilitate smooth flow of power, which will improve voltage profile, reduce

transmission system loss & strengthen EHV network at 132 kV level, to support industrial & agricultural growth and would ultimately facilitate reliable and uninterrupted (24x7) power supply to Northern & Southern part of the State including remote area in Kandhamal & Boudh district.

14. Since, the projects of OPTCL are linked to stable electricity supply for various purposes like power supply to medical facility, energisation of deep bore well for agriculture, mega lift points, development small & large scale industries, providing reliable & stable power supply to remote areas in Southern & Northern part of the State and evacuation of solar power etc., the Government of Odisha may consider to provide financial support in form of grant to OPTCL for taking up unviable projects in the larger interest of the State. Therefore, OPTCL is directed to approach Government of Odisha for allocation of adequate funds for execution of economically unviable projects in order to reduce financial burden on consumer. Further, OPTCL should take the help of the Government to resolve the issues relating to forest clearance, RoW etc., if any, for timely execution of the projects and to avoid time & cost overrun.
15. OPTCL shall ensure that the projects are completed in time to avoid cost and time overrun and 33 kV outlets are utilised by the respective DISCOMs to avoid creation of stranded assets and optimum utilization of assets created by OPTCL. Accordingly, respective DISCOMs shall be communicated to develop downstream distribution system in matching time frame.
16. The petitioner, OPTCL is directed to avoid execution of transmission project in future without prior approval of investment proposal by the Commission.
17. With the above directions and observations, the case is disposed of.

Sd/-  
**(S. K. Ray Mohapatra)**  
Member

Sd/-  
**(G. Mohapatra)**  
Member

Sd/-  
**(S. C. Mahapatra)**  
Chairperson