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**MINUTES OF THE MEETING OF THE EXPENDITURE FINANCE COMMITTEE  
(E.F.C.) HELD IN THE CONFERENCE ROOM OF THE CHIEF SECRETARY ON  
11<sup>TH</sup> November 2019.**

A meeting of the Expenditure Finance Committee (EFC) was held in the Conference Room of the Chief Secretary on 11/11/2019.

The following members were present for the meeting:

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| 1. Shri. Parimal Rai      | Chairman |
| Chief Secretary           |          |
| 2. Shri. Sunil Masurkar   | Member   |
| Addl. Secretary (Fin-Exp) |          |
| 3. Shri. Reshma Mathew    | Member   |
| Chief Electrical Engineer |          |

The following proposals were deliberated on;

- *Proposal for Conversion of existing LT O/H line of Bansai feeder in CCMC, Curchorem, part of Xelvona feeder, Rivona Feeder in Xeldem VP. areas into underground cabling system emerging from 2 x 10MVA, 33/11KV, Pontemol substation under the jurisdiction of Elect. O&M Sub Division-I, Division-VII, Curchorem, in Curchorem Constituency (Estimated Cost ₹.59.18 Crores).*

It was explained that the existing LT overhead lines and supporting infrastructure are more than 40 years old. There recurs frequent snapping of conductor and sometimes collapsing of a stretch of LT line networks especially during monsoon where falling of trees and branches are a frequent occurrence, as most of the major LT power lines supplying power to the consumers, pass through thick vegetation areas. The condition of conductor and its supporting structures are deteriorated in view of the past mining activities that were prevalent in the area, ensuing overhead conductors to become very vulnerable to snapping especially during falling of branches of trees on lines including failure of insulators. Due to the deterioration of infrastructure, the lines are not suitable to cater the growing load demands in the area. The existing LT O/H line of Bansai feeder, part of Xelvona & Rivona Feeder also passes through dense vegetation/bamboo & coconut plantations which are interrupted mainly due to falling of branches, trees etc. especially during heavy wind and monsoons

The proposed LT Underground (U/G) work at Bansai will cover 74.60 kms of LT Overhead line of 35 Nos of Distribution Transformer centres including associated service connections cables to the various installations in the vicinity. Areas covered include Kakumoddi, Bethmoddi, Shivnagar, Pedamol Shirvoi, Sainagar, Chandegal.

The LT U/G system, is designed with a provision to isolate faulty sections and cater loads of adjacent feeders via ring feed system in the event of any failure on the

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adjacent feeders, thus reducing the outage time and efficiently enabling stability to the LT network in the area concerned. Power supply would also be effectively managed during any maintenance activities being carried out, from time to time with minimum outage period. The quality of power is also an additional feature together with minimum outage followed by higher reliability and stability in the overall system. LT U/G cables support higher capacity as compared to Overhead (O/H) lines and since, are laid underground, they are not directly susceptible to external factors like corrosion, natural calamities like gusty winds, falling of branches and trees, insulator failures and breakages, jumper cuts.. etc.

The average revenue received in this area per year is 8.91Crores. Keeping in view the load growth of average 5-6% in the area, the LT underground system will provide a stable and reliable source of power supply to existing and potential consumers, with efficient service and minimum outage period. The provision is made to also support future load growth for a period of 10-15 years. The overall transmission and distribution losses would be reduced to a large extent.

The proposal covers

1. Dismantling of LT O/H line-----74.60 Kms.
2. Laying of LT Underground & Street light cable-----83.15 Kms.
3. Releasing of 1-Ø/3-Ø underground LT S/C's-----4335 Nos. including installation of required feeder pillars and Service pillars at various locations for a uniform and balanced distribution of load with an emphasis on improvement in voltage level.

The work will be carried out by competitive bidding/ turn key project through e-tendering mode by appointing Project Management Consultant (PMC).

The work will be completed within 12 months inclusive of monsoon from the date of placing of work order after completion of all Department formalities.

- *Estimate for Conversion of existing LT O/H line of 11KV Hodar feeder & part of 11KV Xelvona Feeder into underground cabling system under 2 x 10MVA, 33/11KV, Pontemol substation under the jurisdiction of Elect. O&M Sub Division-I, Division-VII, Curchorem, in Curchorem Constituency. (Estimated Cost ₹39.68 Crores).*

It was explained that this proposed work is planned under similar circumstances as explained in the above work proposed as in this case as well the existing LT overhead lines and supporting infrastructure are more than 40 years old. Recurrences of frequent snapping of conductor, collapsing of stretches of LT line networks especially during monsoon on falling of trees and branches are a frequent occurrence, as most of these LT power lines supplying power to the consumers, pass through thick vegetation areas. The condition of conductor and its supporting structures are deteriorated in view of the past mining activities that were prevalent in the area, ensuing overhead

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conductors to become very vulnerable to snapping especially during falling of branches of trees on lines including failure and breakages of insulators. In view of deterioration of infrastructure, the lines are not suitable to cater the growing load demands in the area. The existing LT O/H line of 11KV Hodar feeder and part of 11KV Xelvona feeder also passes through dense vegetation/bamboo & coconut plantations which are interrupted mainly due to falling of branches, trees etc. especially during heavy wind and monsoons

The proposed LT U/G work at Hodar will cover 54.29Kms of LT O/H line of 22 No's of DTC's including associated service connections cables to the various installations in the vicinity. Areas covered include Talewada, Kurlamorod, Betkator, Baagwada, Bamangal, Damad, Goval, Gawnwada, Xic-Xelvona.

The LT U/G system, is designed with a provision to isolate faulty sections and cater loads of adjacent feeders via ring feed system in the event of any failure on the adjacent feeders, thus reducing the outage time and efficiently enabling stability to the LT network in the area concerned. Power supply would also be effectively managed during any maintenance activities being carried out, from time to time with minimum outage period. The quality of power is also an additional feature together with minimum outage followed by higher reliability and stability in the overall system. LT U/G cables support higher capacity as compared to Overhead (O/H) lines and since, are laid underground, they are not directly susceptible to external factors like corrosion, natural calamities like gusty winds, falling of branches and trees, insulator failures and breakages, jumper cuts.. etc. The LT underground system.

The average revenue received in this area per year is 2.42 Crores. Keeping in view the load growth of average 5-6% in the area, the LT underground system will provide a stable and reliable source of power supply to existing and potential consumers, with efficient service and minimum outage period. The provision is made to also support future load growth for a period of 10-15 years. The overall transmission and distribution losses would be reduced to a large extent.

The proposal covers

1. Dismantling of LT O/H line-----54.29 kms.
2. Laying of LT Underground & Streetlight cable----59.81 kms.
3. Releasing of 1-Ø/3-Ø underground LT S/C's----2541 Nos. including installation of required feeder pillars and Service pillars at various locations for a uniform and balanced distribution of load with an emphasis on improvement in voltage level.

The work will be carried out by competitive bidding/ turn key project through e-tendering mode by appointing Project Management Consultant (PMC).

The work will be completed within 12 months inclusive of monsoon from the date of placing of work order after completion of all Department formalities.

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- Estimate for the conversion of overhead existing ACSR Panther conductor to HTLS conductor from 110/33/11KV Verna Substation to 33/11KV Kadamba Substation at Vasco via 33/11KV Sancoale Substation. (Estimated Cost ₹.50.09 Crores).

The existing 33/11 KV Sancoale substation located at Zuarinagar, Sancoale is feeding the entire Mormugao taluka. There are three main 33 KV incoming circuits to this substation, from 110/33/11 KV Verna substation, out of which the 33 KV Sancoale I & II double circuit tower line is more than 45 years old, with ACSR Panther conductor, which is having a maximum current carrying capacity of 450 Amps. However, due to ageing and corrosion of the conductor at many places, deposition of chemical effluents on conductor, discharged in the form of gases by the factories, the conductor in its present condition, cannot be loaded beyond 300 Amps. In view of this, Peak Load Restrictions are imposed on High tension consumers and some major industries in the area limiting the loading on the feeders up to 300 amps limit during peak hours under the present circumstances, in order to prevent frequent snapping of conductor due to overheating and failures etc.

Replacing the existing ACSR Panther conductor to HTLS conductor will increase current carrying capacity of each circuit from existing 300 amps to about 1000 amps. Thereafter, the enhanced capacity of the line will eliminate the necessity to maintain Peak Load Restrictions in the area and in addition, there will be a provision to cater additional load demand in the Sancoale Industrial Estate and adjacent parts of Mormugao Taluka including port town of Vasco.

The new HTLS conductor has the special feature of low sag and hence, no additional stress on the existing structure of the tower. In an event of a power breakdown on the 33 KV U/G cable connecting Kadamba Substation from Verna Substation, the entire load of Kadamba S/s, including the H.T. consumers situated at Mormugao Harbour can be fed from Sancoale substation via 33 KV MPT 1 & 2 circuits in future.

The GI structural material used for the above tower line is in a very good condition and can be used for many more years, therefore, only the existing 33 KV Disc insulator will be replaced by Composite silicon rubber insulator. This work is proposed on existing tower structures and hence, there will be no acquisition of land or any kind of objection nor any permissions required from other authorities, during the execution of the work.

The rapid development works including construction activities, domestic as well as industrial, has lead to the increase in the load demand on the system and displays an upward trend. In order to cater to this growing demand, it is necessary to timely enhance the transmission and distribution network, which should take care of future loads for a period of 10-15 years with the existing load growth in the area of 8-9%.



Overall reduction in outage time of power supply which in turn will result as indirect benefit in social cost. Quality power, reliability and stability in the power system would be the main benefit to all the consumers in the area. The overall transmission and distribution losses would be reduced to a large extent.

The Scope of work involved is as follows:-

1. Supply of HTLS conductor from Verna to Sancoale----- 52.8 kms.
2. Supply of HTLS conductor from Sancoale to Vasco----- 73.72 kms.
3. SETC of Monopole----- 4 nos.

The work will be carried out by competitive bidding/ turn key project through e-tendering mode by appointing Project Management Consultant (PMC).

The work will be completed within 12 months inclusive of monsoon from the date of placing of work order after completion of all Department formalities.

➤ *Estimate for conversion of HT/LT overhead lines to underground network for Mapusa town in order to provide uninterrupted power supply to consumers of Mapusa Constituency. (Estimated Cost ₹.131.83 Crores).*

The existing overhead 11KV feeders emanating from the Mapusa Substation and feeding major power supply to Mapusa Town and surroundings are in service for more than 40 to 50 years. Some of these line passes through areas covered with dense jungle trees, coconut trees plantations, existing illegal houses in slum area of Khorlim, housing board and Cunchelim. The existing line infrastructure are deteriorated due to aging and salinity, ensuing frequent occurrences of conductor snaps, thereby interrupting power supply, very often. Restranging these snapped conductors for restoration of power supply is a tedious process, where power shutdowns will have to be taken affecting a large number of consumers on every shut down taken, who thereafter, get agitated due to the frequent power outages and reflect such occurrences in a very disreputable manner in the press / media, thereby giving bad reputation to the department. The existing overhead 11KV feeders are fully loaded during peak hours; 11KV Market feeder crosses 180 Amp, 11KV City feeder reaching up to 150 Amps, 11KV Dhuler feeder 200 Amps plus with some portion fed from Thivim Substation. The entire area is presently imposed with peak hour restrictions and load shedding limiting the loading to safe limits on the feeders to prevent overloading and heating of conductors. With the continuous rapid developments especially, commercial and residential projects in the vicinity of Mapusa Town, the existing feeders under such circumstances would not be able to cater to the future load demand. The number of major interruptions during last year were around 280 and most of them were transient faults. Major areas facing power outages include residential areas of Duler & Altinho. The present arrangement is not sufficient to support the growing demand since infrastructure is more than 40 years old and feeder loadings of the Mapusa Substation have reached to tolerance limits.

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The load growth in the area is estimated from last years figures as 8-9% in the Constituency with major land developments for residential and commercial establishments being taken up at rapid pace. The Department knowing the growing demand has made a provision in the budget to cover entire Mapusa Constituency 11KV line network, for Conversion into underground system.

The 11KV XLPE cables are proposed to be laid all along the road side from 33/11 KV Mapusa S/S. The cable network arrangements will not only reduce power interruptions by 90% but also increase revenue to the department. The conversion from overhead to underground system is imperative at this stage due to overcrowding and congestion of various circuits including widening of NH recently being taken up as major development activity under the Mapusa Constituency. The cable network being higher capacity as compared to overhead lines will efficiently, and conveniently be able to cater the growing demand for a period of 10-12 years and in turn give an aesthetic look of the surroundings. The U/G cabling arrangements will provide quality & reliable power supply to the entire Mapusa Town and surroundings with minimum outages; lifting of load restrictions and load shedding, etc will follow. Revenue to the Department will display an upward trend. The transmission and distribution losses will be reduced to a large extent. The underground cabling is designed in such a way that the tail end of each feeder is linked to some other feeder thereby ensuring ring-feed arrangements and continuity in power supply even during cable fault at any locations, isolating only the faulty portion. In other words, there would be flexibility to transfer the load from one feeder to another. Hence, increase in reliability with enhancement of Voltage profile and immense reduction in losses.

A total of 7 feeders namely 11KV city feeder, 11KV market feeder, 11KV Altinho feeder, 11KV Duler feeder, 11KV Khorlim feeder, 11KV Karaswada feeder, 11KV Mapusa Industry feeder all emanating from 33/11KV Mapusa Sub Station shall be converted covering major portion of Mapusa municipal area. Two 11KV feeders emanating from the 220/110/33/11 KV Thivim Sub-Station covering entire portion of Karaswada Industrial Estate shall also be converted to underground system. The overhead LT line network of Mapusa City area is also covered for conversion to underground system.

The Scope of work involved is as follows:-

Supply Erection Testing and commissioning of various sizes of 11KV and LT cables

1. 3Cx300 Sq. mm Al cable - 68.97 Kms
2. 3.5Cx240 Sq. mm Al cable - 11.53 Kms
3. 3.5Cx185 Sq. mm Al cable - 14.09 Kms
4. 3.5Cx120 Sq. mm Al cable - 16.02 Kms
5. 3.5Cx95 Sq. mm Al cable - 22.42 Kms
6. 2C x 10 Sq. mm XLPE Al cable - 332.83 Kms

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Supply Erection Testing and commissioning of switchgear and control equipments as follows :--

1. RMU- 11KV, 630 Amps (2-LBS 1 CB) - 332 Nos.
2. RMU- 11KV, 630 Amps (3-LBS) - 94 Nos.
3. RMU- 11KV, 630 Amps (2-LBS) - 43 Nos.
4. Distribution Feeder Pillar - 360 Nos.
5. Distribution Service Pillar - 1464 Nos.
6. LV main switch board for DT - 118 Nos.

➤ **Estimate for Conversion of 33KV overhead ACSR Racoon Conductor to HTLS Conductor" of 33KV Double Circuit lines from 33/11KV Nachinola Sub-Station to 33/11 KV Saligao Sub-station Via 33/11 KV Porvorim Sub-Station. (Estimated Cost ₹.29.25 Crores).**

The existing overhead line from the Nachinola Substation to Saligao Substation via Porvorim Substation is more than 25 years old and due to continuous overloading and overheating of conductor at peak loads, the conductor is now in a dilapidated state with a reduced load carrying capacity; original capacity is 250 amps however, on deterioration it would be only 200 amps maximum. The lines are presently catering to the three substations for effectively managing the loading via transmission of loading capacity from one substation to another via ring feed arrangement between them from time to time. In the present situation, the existing overhead conductor is overloaded and being aged is not suitable to handle the increased load nor support future load demands. The Electricity Department has taken up policy decision to convert O/H Racoon conductor to HTLS conductor in major towns & coastal belts to increase current carrying capacity of lines and to improve power reliability & quality. In the past several seasons, the power supply was severely interrupted due to continuous overloading of the existing line. The existing feeders being overloaded are presently, under load restriction. The Department is compelled to impose load shedding for HT installations in the area of Industrial estate and costal belt during the peak loading hours. This causes revenue losses to the Department, affecting the power supply to consumers in the area supplied by these substations and in turn inconvenience to the them.

The proposed HTLS Conductor will effectively cater the existing loads of 33/11 KV Saligao, Porvorim and Candolim substation. The existing infrastructure would support the new HTLS conductor and hence, there would be no necessity to erect new lines or change the supporting infrastructure. The current carrying capacity of HTLS conductor is 450 Amps being double the rating of the existing system. The HTLS Conductors will minimize the voltage drop and hence, provide quality supply to tail end consumers. The HTLS conductors will cater additional load at ease since the current carrying capacity is double that of the existing line.

In view of the rapid development in the Costal belt and Porvorim Town, the load demand has tremendously increased in the recent past. Conversion of existing conductor to new HTLS conductors will ease the management of existing load as well

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as be able to support future load demands in the area. Imposition of Load shedding, peak load restrictions would be lifted thereafter as there would be ample loading capacity. HTLS Conductors system will provide quality, reliable and stable power supply with good voltage level maintained at tail ends. With interruptions or load shedding lifted, revenue to the department will display an upward trend. Transmission and distribution losses reduced to large extent due to better and effective management of loads. Overloading and overheating of feeders would be overcome.

The Scope of work involved is as follows:-

1. HTLS conductor from Nachinola to Porvorim--- 7.6 kms.
2. HTLS conductor from Porvorim to Saligao----- 6.6 kms.

The work will be carried out by competitive bidding / turn key project through e-tendering mode by appointing Project Management Consultant (PMC)

The work will be completed within 12 months inclusive of monsoon from the date of placing of work order and completing all Department formalities.

*It was also informed that all the above proposals are inclusive of credit for dismantled materials where ever involved and which will be taken over by the eligible contractor at his own cost. Department will ensure the availability of funds for all these projects.*

The work will be completed within 12 months inclusive of monsoon from the date of placing of work order and completing all Department formalities.

The EFC committee members took the note of above facts and approved the above proposals of the Electricity Department.

  
(Reshma Mathew)  
Chief Electrical Engineer  
Member

  
(Sunil Masurkar)  
Additional Secretary (Fin-Exp)  
Member

  
(Parimal Rai)  
Chief Secretary  
Chairman